HOLY CROSS COLLEGE SHD

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) VOLUME 3 (APPENDICES)

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Environmental Assessment **Built Environment**

Client: CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund

Date: 13 July 2021

CONTENTS

A8.1 Wintering Bird Survey Reports

Wintering Bird Survey Report

For a Proposed Strategic Housing Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for Hines

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Document Control

Project Title	Wintering Bird Survey Report, Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3			
Document Title	Wintering Bird Survey Report		**Project No.**	190250
Revision	**Issue Date**	**Author**	**Reviewed By**	**Approved By**
I1	16/06/2020	CC	MMW	ACr

Table of Contents

1 Introduction

1 This Wintering Bird Survey Report was authored by Colm Clarke of Scott Cawley Ltd.

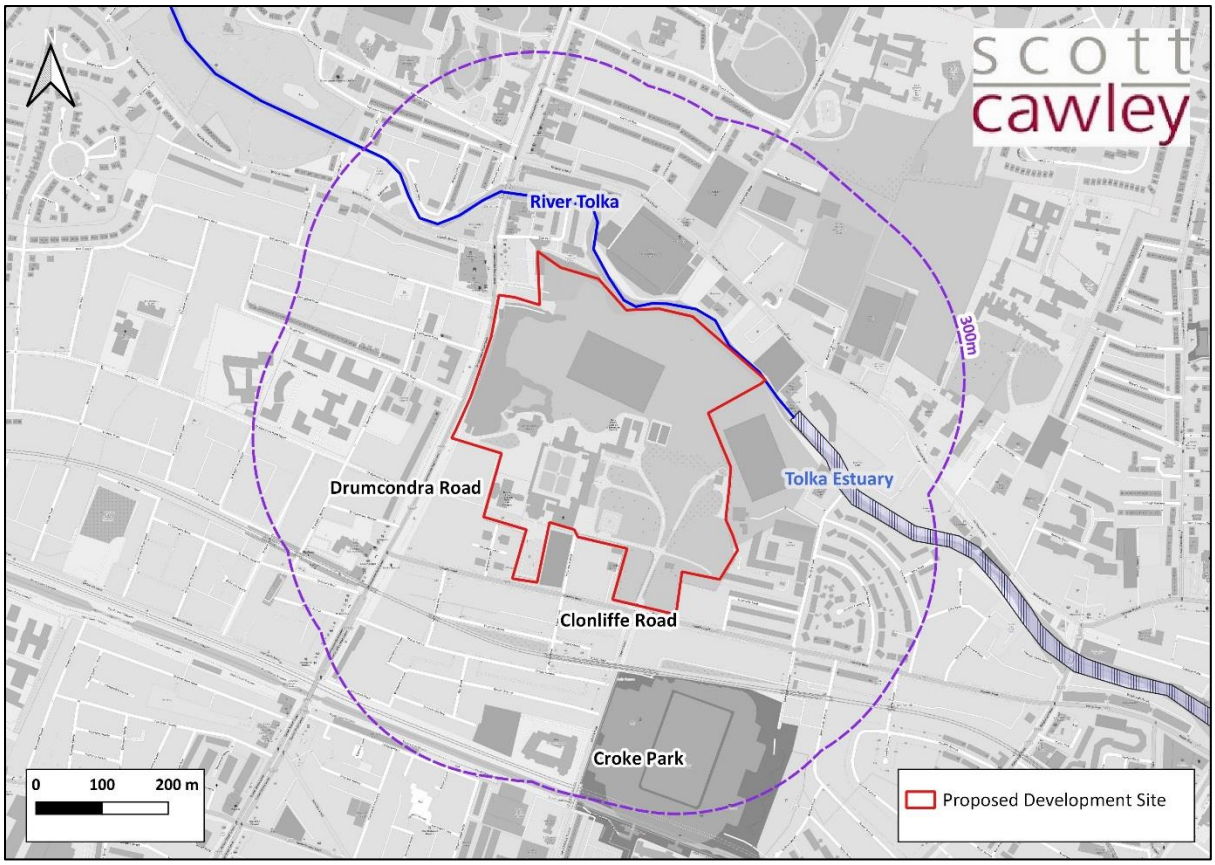
2 It provides an overview of the wintering bird baseline for lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3 (refer to Figure 1 for location) for the season 2019/20. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1, below.

3 The proposed development site consists of the Clonliffe College Campus, containing large amenity grassland areas, areas of parkland, woodland, and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, but particularly along the northern and western parts. The proposed development site is surrounded largely by residential development. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka, to the north and Croke Park Stadium to the south.

4 The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds; and
- To understand the importance of the proposed development site and surrounding area for wintering birds, including those Special Conservation Interest (SCI) species for which European sites have been designated.

Figure 1: The proposed development site in relation to the surrounding environment.



2 Planning, Policy and Legislation

5 The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

6 The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

7 The following national legislation is relevant to the proposed development in the context of wintering wetland bird SCIs of European sites:

- *European Communities (EC) (Birds and Natural Habitats) Regulations 2011 to 2015*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

8 The following plans and policies are relevant to the proposed development:

- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- Dublin City Development Plan 2016-2022 (Dublin City Council, 2016)
- Dublin City Biodiversity Action Plan 2015-2020 (Dublin City Council, 2015)

3 Methodology

3.1 Author Statement

9 This report was authored by Colm Clarke, and reviewed by Maeve Maher-McWilliams and Ashling Cronin of Scott Cawley Ltd. Survey methodologies were designed and supervised by Scott Cawley and surveys were completed by Colm Clarke, Niall McHugh, Shane Brien, and Cathal O'Brien of Scott Cawley and by independent ornithologist Hugh Delaney, under Colm Clarke's supervision.

10 Colm Clarke is a Senior Ecologist with Scott Cawley and has over five years' experience in ecological consultancy. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Colm has been project manager and lead author on a large number of Ecological Assessments for Scott Cawley, and regularly undertakes both field work and report writing as part of his role. Colm was the project manager for Wintering Bird Surveys at Clonliffe College.

11 Maeve Maher-McWilliams is a Principal Ecologist with Scott Cawley. She holds a BSc (Honours) in Biological Sciences from Queen's University Belfast and obtained a distinction in her MSc in Evolutionary and Behavioural Ecology from the University of Exeter. Maeve has worked in environmental consultancy for over eight years across Ireland, Northern Ireland and Scotland specialising in ornithology. Maeve is Scott Cawley's lead ornithologist and has acted as project manager on a variety of developments including large to small scale residential schemes, flood defence schemes, tourism/recreational projects, wind farm developments, solar developments, hydro-schemes, port developments, and linear infrastructure projects. Maeve regularly prepares and reviews Ecological reports (Appropriate Assessment Screening, Natura Impact Statement and Ecological Impact Assessment).

12 Ashling Cronin is Technical Director at Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from The Honourable Society of King's Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the private and public sector. As Technical Director, Ashling provides technical review and quality assurance of surveys and documentation.

13 Shane Brien is a Consultant Ecologist with Scott Cawley. He obtained an honours degree in Environmental Science from the National University of Ireland Galway, and a Masters in Ecological Assessment from University College Cork. Shane is a Qualifying Member of the CIEEM. Shane has over two year's professional experience in ecological consultancy in Ireland and is conversant with a wide range of field survey methodologies. He regularly participates in Irish Wetland Bird Surveys (I-WeBS) for Birdwatch Ireland in a voluntary capacity. Shane completed wintering bird surveys in the proposed development site under the supervision of Colm Clarke.

14 Cathal O'Brien is a Consultant Ecologist with Scott Cawley Ltd and is a Qualifying Member of the CIEEM. Cathal an honours degree in Environmental Biology from University College Dublin, and a Masters in Ecology from the University of Bremen. Cathal has three years' experience in a range of environmental fields, including habitat assessment in terms of mammal, flora, wintering bird surveys and breeding bird surveys. Prior to joining Scott Cawley, Cathal operated as an independent ecologist, specialising in bird surveys. He completed wintering bird surveys for the proposed development under the supervision of Colm Clarke.

15 Niall McHugh is a Field Ecologist with Scott Cawley. He obtained an honours degree in Freshwater and Marine Biology from the Galway-Mayo Institute of Technology. He has been actively involved in numerous ecological surveys with Scott Cawley and completed wintering bird surveys for the proposed development under the supervision of Colm Clarke. He is also a member of BirdWatch Ireland and has regularly undertaken volunteer bird surveys over the past three years including IWeBS, Garden Bird surveys and Hen Harrier surveys.

16 Hugh Delaney is an Independent Ornithologist with over 12 years' experience in bird surveying, he has worked on a broad range of sites across Ireland primarily associated with wind farm projects and has very extensive knowledge of bird distribution, ecology and Identification and has contributed to bird surveys and record gathering for over 20 years. He has worked with Scott-Cawley on a range of projects including the Dun Laoghaire Harbour Deep Port proposal, Brent Geese surveys in North Dublin in 2015/16 and 2016/17, and the Sutton to Sandycove Promenade and Cycleway (S2S) project.

3.2 Desk Study

17 A desk study was undertaken in August 2019, prior to the commencement of field work. It was updated in May and June 2020, following the completion of field work. The purpose of the desk study was to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records
- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland* (Colhoun & Cummins, 2013)
- Publicly available information on inland feeding sites for Light-bellied Brent Geese *Branta bernicla hrota* (herein referred to as Brent Geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2020).

18 It is Scott Cawley's understanding that a three-year project studying the movements and behaviour of wintering bird species in Dublin Bay, and funded in part by the four Dublin local authorities (Dublin City Council, South Dublin County Council, Dún Laoghaire-Rathdown County Council, and Fingal County Council), was underway in in its second year in 2019/20. The data was not publicly available at the time of writing of this report.

3.3 Field Survey

19 Surveys of wintering wetland birds utilising the proposed development site and the adjacent lands at Clonliffe College were undertaken between sunrise and sunset, four times per month, for the months of September 2019 through February 2020, inclusive. A survey could not be completed over the Christmas-New Year period due to the closure of the lands, and therefore three visits were undertaken in December 2019. Two survey dates were completed in March 2020. A third and fourth survey date could not be accomplished in March 2020 in light of restrictions on work imposed by the Irish Government during the 2020 COVID-19 pandemic. The inability to complete the final survey visits has not imposed any limitations on the ability to assess the importance of the site for SCI wetland bird species as it was at the very end of the season when numbers of birds in the Dublin Bay population tapers off. Survey dates are listed in Table 1, overleaf.

20 Each survey visit was conducted by two surveyors, who recorded observations of wintering birds entering and exiting the lands, and the behaviour and movements of birds within the lands. Observations were aided by the use of Binoculars (8x42) and a spotting scope. Where present and readable, ring codes of birds were collected. The surveyors kept to the margins of fields in the site so as to ensure that their presence did not prevent birds landing on site.

21 The survey effort in this instance is intended to provide a representative sample of use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of Brent Geese accumulate on well-used sites (author, personal observation), and on survey dates where birds were not observed landing in the survey area, a search for evidence of wintering birds was undertaken. Data was collected at sampling points (c. 1m2 in total area, i.e. 1m x 1m) located equidistant from each other along a fixed transect line through the proposed development site (see Figure 2, overleaf). Data on the following variables was collected at each sampling point along the transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward
- The proportion cover of bare ground
- The proportion cover of grass species

- The proportion cover of forb[2] species present

22 The results of field surveys have been contextualised against the 1% threshold of the international population of each species, as contained within Nagy & Langendoen (2018), and against the populations of each species at nearby European sites. European sites in the vicinity of the proposed development are illustrated in Figure 3, overleaf.

Table 1 Winter bird survey dates

Survey Date(s)	Surveyor(s)
5th September 2019 12th September 2019 19th September 2019 27th September 2019	Colm Clarke, Niall McHugh, Shane Brien and Cathal O'Brien of Scott Cawley Ltd. and independent ornithologist Hugh Delaney
3rd October 2019 9th October 2019 17th October 2019 24th October 2019	
8th November 2019 13th November 2019 21st November 2019 29th November 2019	
6th December 2019 11th December 2019 20th December 2019	
8th January 2020 15th January 2020 24th January 2020 31st January 2020	
5th February 2020 14th February 2020 22nd February 2020 27th February 2020	
6th March 2020 14th March 2020	

[2] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

Figure 2: Transect lines in relation to the survey area.

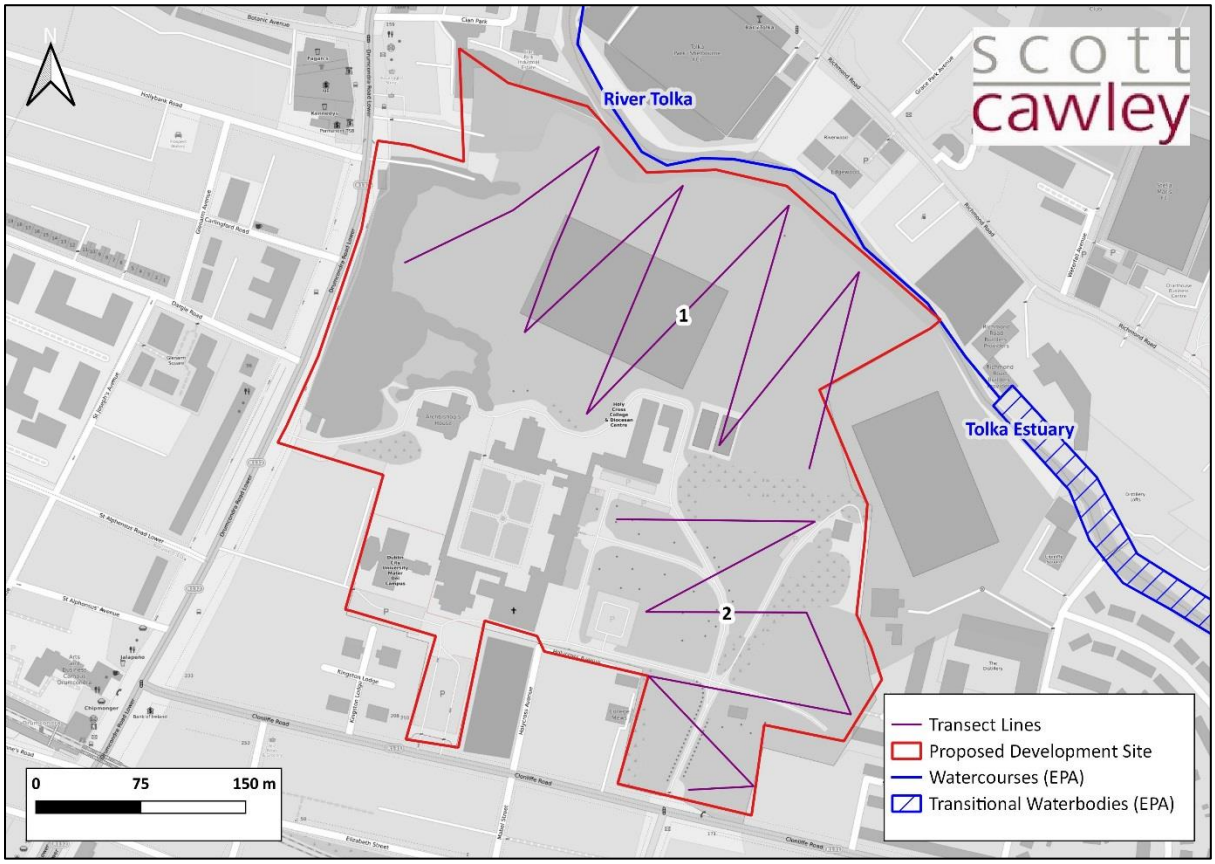
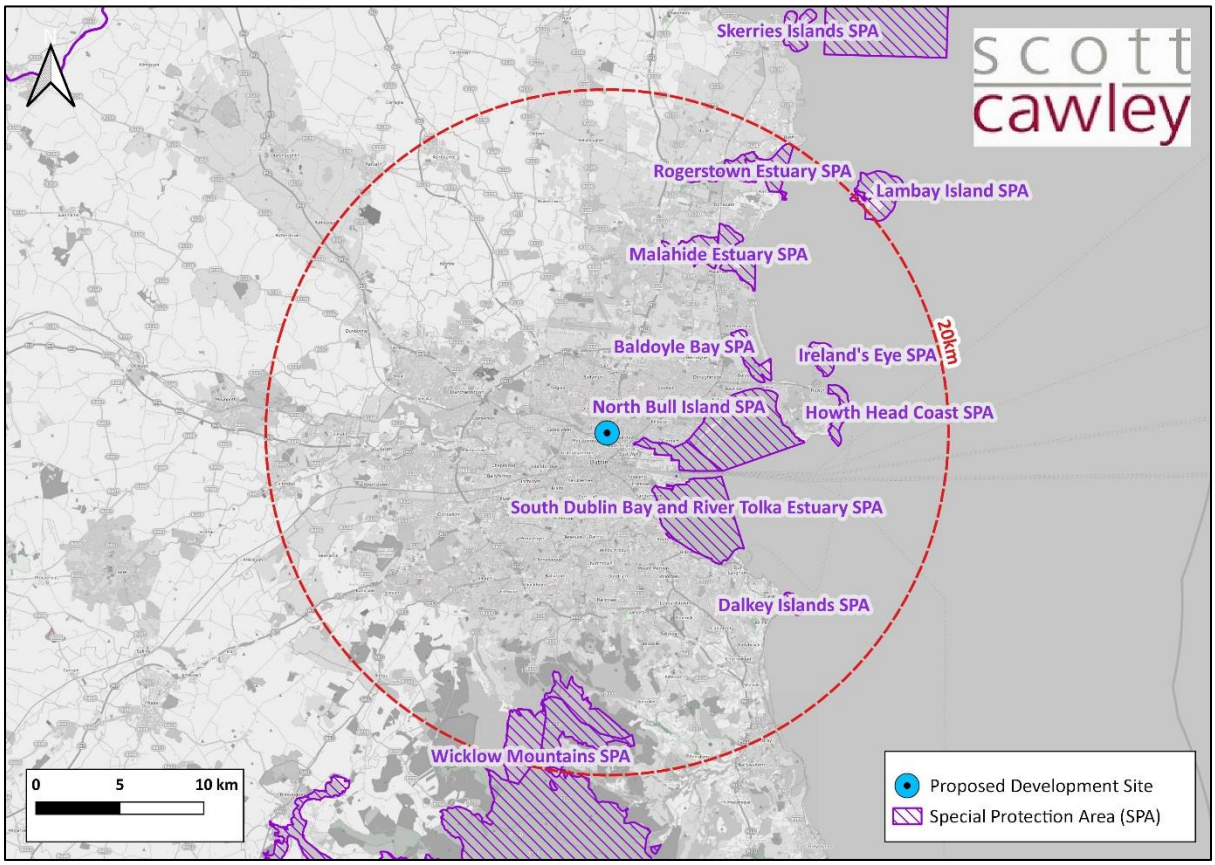


Figure 3: Proposed development site in the context of European sites within 20km.



3.3.1 Survey Limitations

23 It must be acknowledged that the surveys of the lands were undertaken across a single wintering bird survey season. It is possible that the number and frequency of use of inland feeding sites varies from season to season, based on forage resource, disturbance levels, changes to site suitability and other environmental factors. Desktop sources of information have been referenced to overcome this limitation. Most recent data on inland foraging sites for Brent Geese relates to the 2015/16 and 2016/17 wintering bird season, contained within Scott Cawley (2017).

4 Wintering Bird Baseline

24 The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations are included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and account of observations by species is included in the sections below.

25 Records of 49 species of wetland birds, for which European sites have been designated, were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

26 The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2019/2020 wintering bird season:

- Black-headed Gull *Larus ridibundus*
- Herring Gull *Larus argentatus*

- Light-bellied Brent Goose *Branta bernicla hrota*
- Cormorant *Phalacrocorax carbo*
- Curlew *Numenius arquata*
- Grey heron *Ardea cinerea*
- Kingfisher *Alcedo atthis*

27 Herring Gull were the most frequent visitors to the proposed development site, with observations of the species on all 25 survey dates. Black-headed Gull were observed foraging in the lands on 13 of the 25 survey dates, and flying over the site on 10 of the survey dates. Light-bellied Brent Geese (hereafter referred to as Brent Geese) did not land to forage within the proposed development site on any date over the survey period, but were observed flying over the site on 11 dates between December 2019 and March 2020. Like Brent Geese, Curlew were not observed landing or foraging within the proposed development site on any occasion, but were observed flying over the site on 10 dates between October 2019 and March 2020. Cormorant were observed foraging in the River Tolka on five dates between September and December 2019, and were observed flying over or within the proposed development site on 16 dates. Kingfisher were observed foraging in and along the River Tolka on the northern boundary of the site on 18 of the 25 survey dates. Grey Heron were observed flying over the site on nine dates.

28 The proposed development site was heavily utilised by dog walkers over the 2019-2020 season, with dogs generally observed off-lead. This may have discouraged birds such as Brent geese and Curlew from landing in the site.

29 Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites (Scottish Natural Heritage, 2010). For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the survey are discussed in more details in the subsections set out below.

4.1 Black-headed Gull *Larus ridibundus* [A179]

4.1.1 Results of Desk Study for Brent Goose

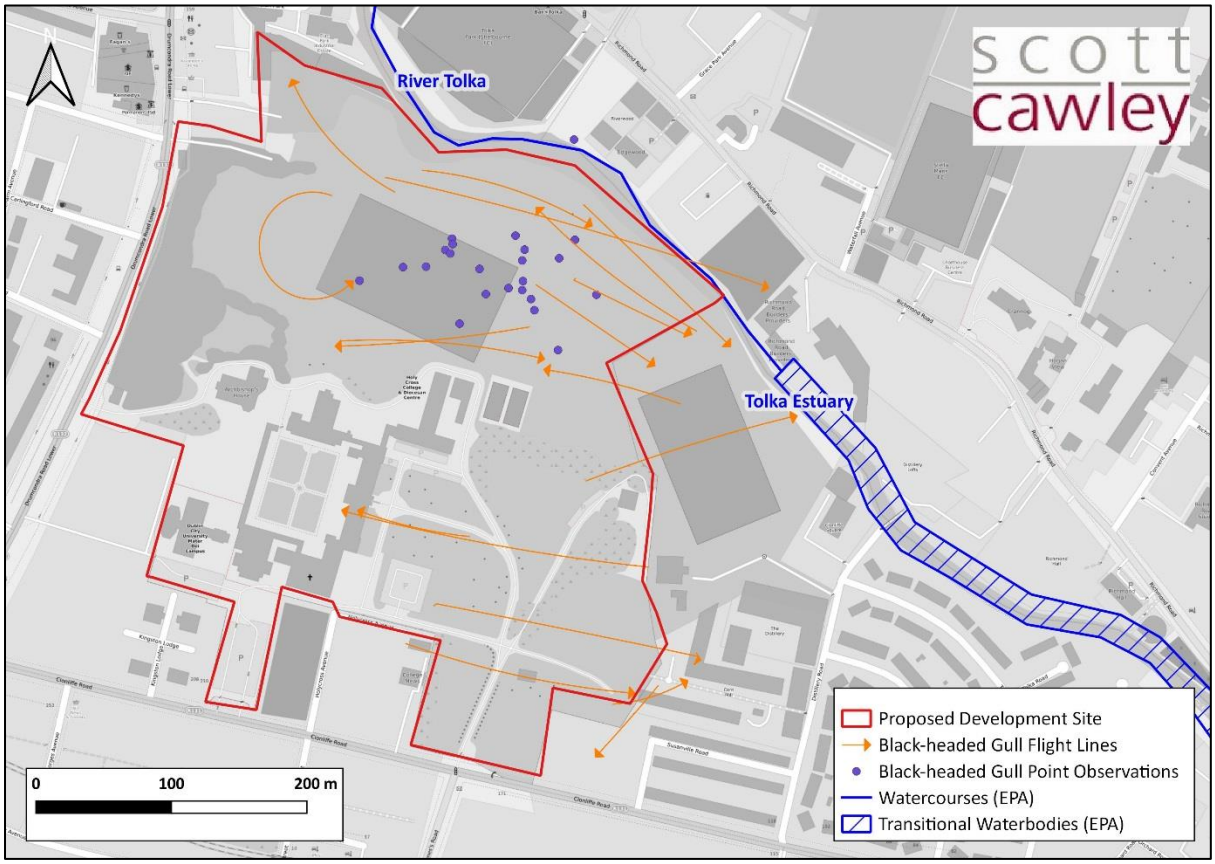
30 Black-headed Gull *Larus ridibundus* [A179] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Black-headed Gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 3,040 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the fourth most important site in the country for this species. The flock in South Dublin Bay and the River Tolka Estuary SPA has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Black-headed Gull in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 2,196 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the eighth most important site in Ireland for wintering Black-headed Gull and is of all-Ireland importance for the species (NPWS, 2014). The flock in North Bull Island has decreased substantially since the population baseline was established in the late 1990s based on review of I-WeBS data for 0U404 Dublin Bay.

31 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting spread out across several subsites in the Bay (NPWS, 2014). The species forages both intertidally and subtidally in Dublin Bay.

4.1.2 Field Survey Results for Black-headed Gulls

Figure 4: Black-headed Gull activity in the survey area between September 2019 and March 2020.



32 Black-headed Gull were observed foraging in the lands on 13 of the 25 survey dates. A peak count of 16 birds was observed foraging on grassy fields in the northern part of the site (see Figure 4) on 12th September 2019. Smaller numbers of birds were observed roosting or foraging in this area on other survey dates. This species was not observed utilising grasslands in the south of the proposed development site.

33 Birds were observed flying over the proposed development site on ten survey days. Flocks of birds flying over the site were substantially larger than the flocks utilising the site for foraging and roosting activity. A peak count of 170 birds was observed flying over the site on 22nd February 2020.

4.1.3 Black-headed Gull at Clonliffe College in the context of European sites within 20km

34 In order to evaluate the importance of the survey area for foraging Black-headed Gull, it is important to relate the number of birds observed foraging in the lands against the baseline populations of European sites in the vicinity, and against the international flocks. The peak count of foraging birds in the survey area (16 birds) potentially represents:

- 0.005% of the baseline population of the South Dublin Bay and River Tolka Estuary SPA (004024) of 3,040 birds, should the flock utilising the survey area belong to this population. It represents 0.0079% of the more recent population estimate of the SPA flock (2006/07-2010/11) of 2,023 birds as documented within NPWS (2014).

- 0.007% of the baseline population of the North Bull Island SPA (004006) of 2,196 birds, should the flock utilising the survey area belong to this population. It represent 0.01% of the more recent population estimate of the SPA flock (2006/07-2010/11) of 1,527 birds as documented within NPWS (2014).

35 According to Nagy & Langendoen (2018), 1% of the international population of Black-headed Gull is 20,000 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of 16 birds observed in the survey area represents 0.0008% of the international population of the species.

4.2 Herring Gull *Larus argentatus* [A184]

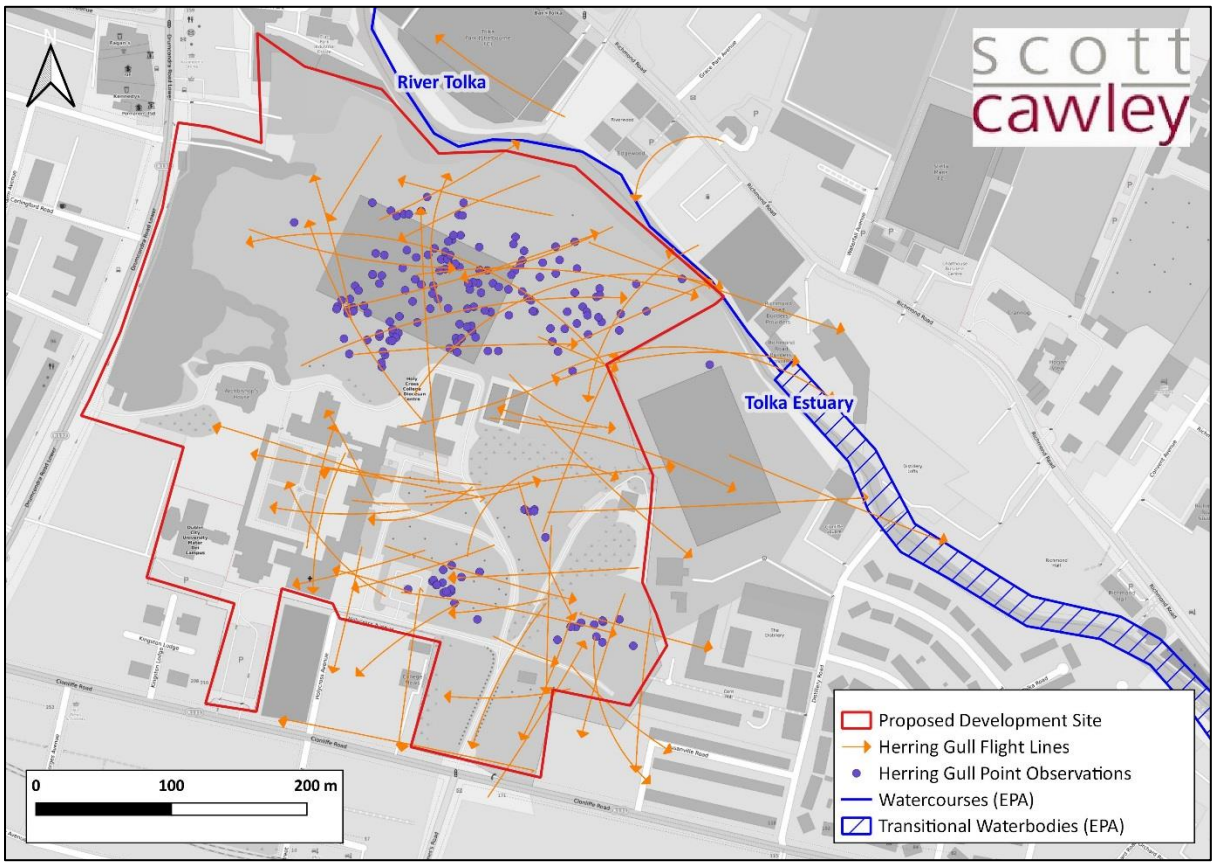
4.2.1 Results of Desk Study for Herring Gull

36 Herring Gull *Larus argentatus* [A148] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for Herring Gull, and has a population of 250 birds (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for Herring Gull, and has a population of 1,806 birds (NPWS, 2018B).

37 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for forage during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban area around Dublin.

Figure 5: Herring Gull activity in the survey area between September 2019 and March 2020



4.2.2 Field Survey Results for Herring Gull

38 Herring Gull were observed in the proposed development site on all 25 survey dates. On the vast majority of survey visits, a small number of birds (<20 birds) were observed foraging for earthworms on grassland areas of the site. Larger flocks of the species (>20 birds) were observed on five dates in September 2019, November 2019, December 2019, and March 2020 (full list of observations included in Appendix II of this report). The peak count for Herring Gull foraging in the proposed development site was 144 birds observed on 6th December 2019.

4.2.3 Herring Gull at Clonliffe College in the context of European sites within 20km

39 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of Herring Gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

40 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 37% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 389 birds for the period 2010/11 – 2014/15 (See Appendix I).
- 48% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 300 birds over the period 2010/11 - 2014/15 (See Appendix I).

41 According to Nagy & Langendoen (2018), 1% of the international population of Herring Gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of 144 birds observed in the survey area represents 0.014% of the international population of the species

4.3 Light-bellied Brent Goose *Branta bernicla hrota* [A046]

4.3.1 Results of Desk Study for Brent Goose

42 Light-bellied Brent Goose *Branta bernicla hrota* [A046] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 525 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the twelfth most important site in the country for this species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 1,548 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the most important site in Ireland for wintering Brent Geese (NPWS, 2014). The site hosts a population of international importance for the species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay
- Baldoyle Bay SPA (004016), *c*. 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North

County Dublin. The baseline population for Brent Geese at this European site is 726 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2011). Baldoyle Estuary SPA is listed as the seventh most important site for Brent Geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site.

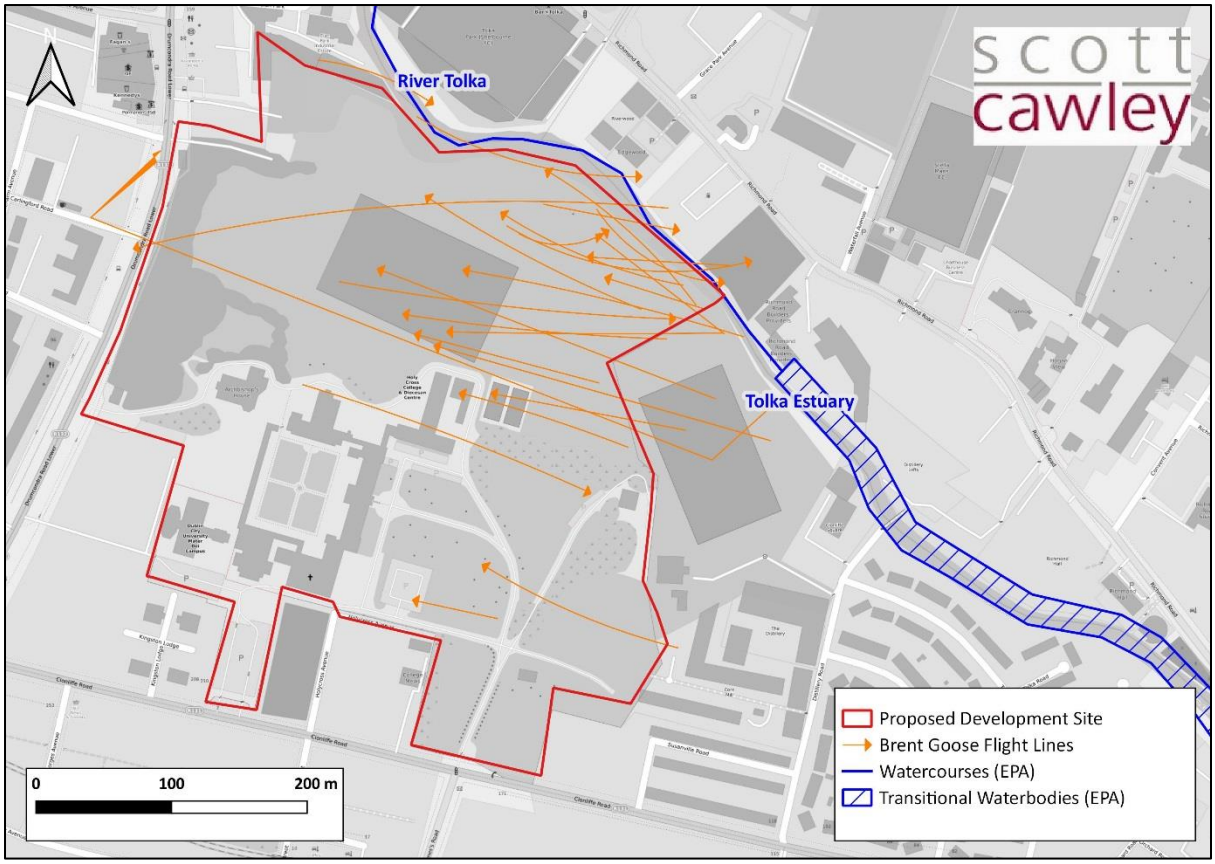
- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for Brent Geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013A). Malahide Estuary SPA is listed as the fourth most important site for Brent Geese in Ireland. Recent I-WeBS data for Rogerstown Estuary does not include regular counts of Brent Geese, however older data from the period 2005/06-2009/10 indicates that the flock has increased in size relative to the baseline (NPWS, 2013B)
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for Brent Geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013B). Rogerstown Estuary SPA is listed as the fifth most important site for Brent Geese in Ireland. The Rogerstown Estuary flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site

43 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting concentrated in the Lagoon east of Bull Island (NPWS, 2014). The Dublin Bay population forages on *Zostera* beds and algal mats in the bay. It also uses a range of terrestrial sites inland of Dublin Bay for foraging (NPWS 2014; Benson, 2009; Scott Cawley, 2017; Enviroguide, 2019). It is thought that the switch to inland terrestrial sites is linked to recent increases in population and/or depletion of coastal foraging resources through the winter season (NPWS, 2014; Benson, 2009).

44 The first published records of Brent Geese using inland feeding sites dates to 1991 (O'Briain & Healy, 1991). A study of the use of inland foraging sites by Brent Geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites compiled by Benson (2009). More recent work on the range of Brent Geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park (Scott Cawley, 2017; Enviroguide, 2019). Scott Cawley undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for Brent Geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016.

4.3.2 Field Survey Results for Brent Geese

Figure 6: Light-bellied Brent goose activity in the survey area between September 2019 and March 2020



45 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period (See Appendix II), and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site. The most likely explanation for this is that the length of the grass in the proposed development site is suboptimal for the Geese, which favour a short, open sward. The grass across the northern part of the site remained relatively tall throughout the survey period. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

46 Birds were observed flying over the proposed development site on 11 dates between December 2019 and March 2020 (see Figure 6). The peak count of birds flying over the lands was 550 birds, recorded on 5th February 2020. Birds tended to fly between 30m and 50m above ground level. Birds tended to fly east-west in the mornings and west-east in the evenings, suggesting the birds were travelling from sites closer to Dublin Bay in the morning and returning to roost in Dublin Bay in the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off of Griffith Avenue.

4.4 Cormorant *Phalacrocorax carbo* [A017]

4.4.1 Results of Desk Study for Cormorant

47 Cormorant *Phalacrocorax carbo* [A017] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

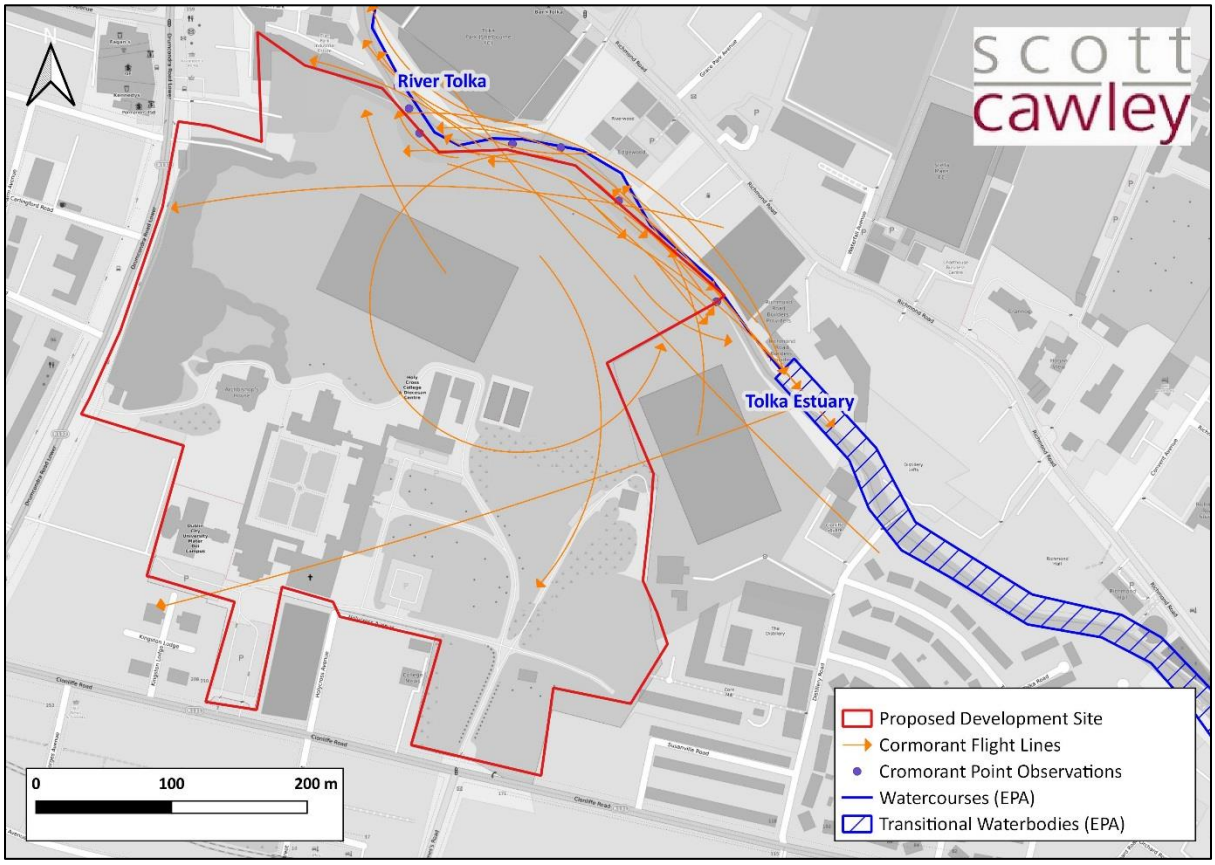
- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs) (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed

on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site (NPWS, 2018B).

48 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.

4.4.2 Field Survey Results for Cormorant

Figure 7: Cormorant activity in the survey area between September 2019 and March 2020



49 Cormorant activity was chiefly concentrated along the River Tolka, which forms the northern boundary of the proposed development site. Members of the species were observed foraging in the River Tolka on five dates between September and December 2019. Observations were generally of a single individual foraging in the river. What is thought to be a single bird was observed foraging on nine occasions in the Tolka on 12th September 2019. Cormorant were observed flying over the proposed development site on 16 dates, again generally individual birds, although two birds were noted flying over the site on 12th September 2019. Birds were generally observed flying upriver along the Tolka, as opposed to across the proposed development site (See Figure 7).

4.4.3 Cormorant at Clonliffe College in the context of European sites within 20km

50 It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of Cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

51 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 0.006% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 175 birds over the period 2010/11 - 2014/15 (See Appendix I).
- 0.005% of the wintering population at Lambay Island, referencing the I-WeBS mean peak count of 200 birds over the period 2010/11 – 2014/15 (See Appendix I).

52 According to Nagy & Langendoen (2018), 1% of the international population of Cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2019/20 survey season. The peak count of one bird observed in the survey area represents 0.0008% of the international population of the species.

4.5 Curlew *Numenius arquata* [A160]

4.5.1 Results of Desk Study for Curlew

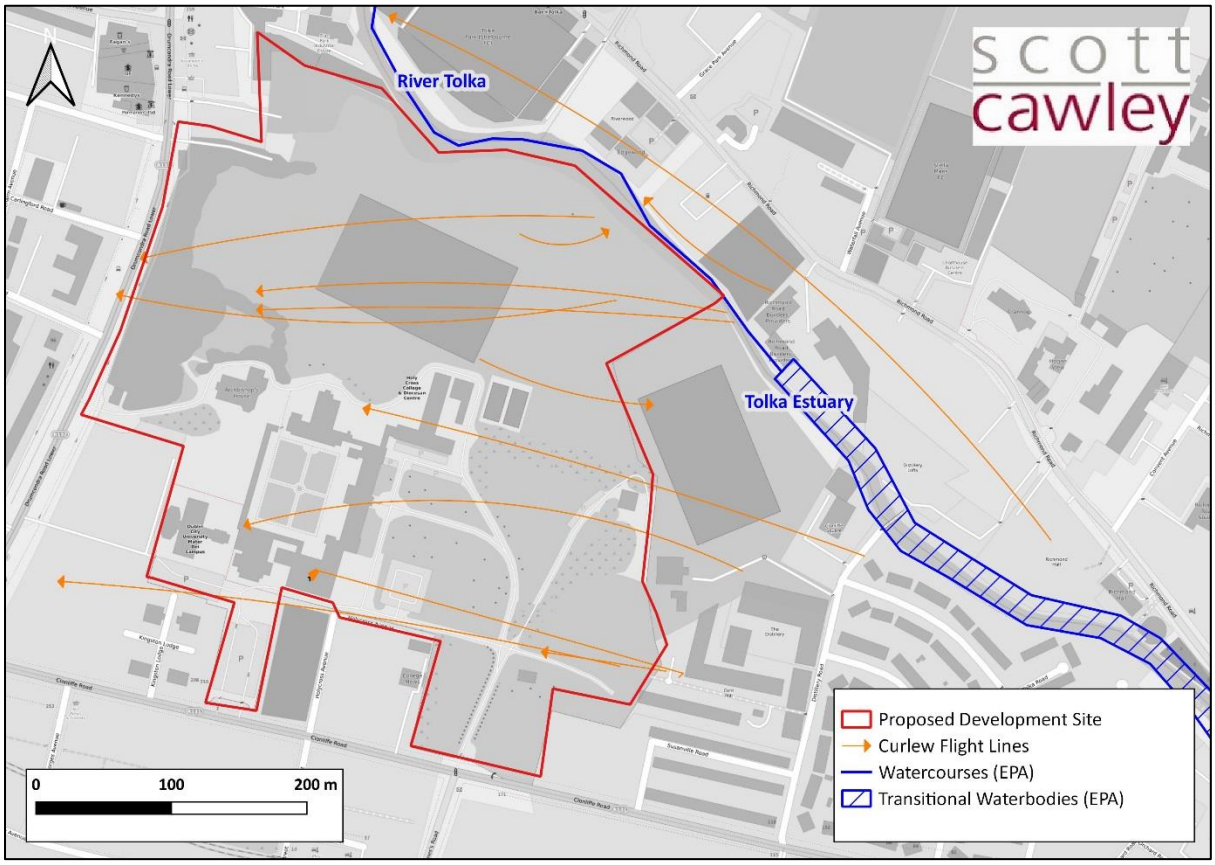
53 Curlew is a SCI species for which the following European site within 20km of the proposed development have been designated:

- North Bull Island SPA (004006), *c.* 4.5km east. The baseline population of Curlew in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 937 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the 11th most important site in Ireland for wintering Curlew (NPWS, 2014). The site hosts a population of all-Ireland importance for the species. Data on the flock size at North Bull Island SPA contained within the *Conservation Objectives Supporting Document* (NPWS, 2014) and for Dublin Bay contained within I-WeBS data (See Appendix I) indicates that the SPA population has increased slightly relative to the baseline population.

54 Curlew are known to forage for earthworms on damp grassland on terrestrial sites (NPWS, 2014). The range of terrestrial sites in the Dublin area does not appear to be as well-documented as Brent Geese. Curlew are known to use inland feeding sites but the network of inland feeding sites is not as well-documented as for Brent Geese. The long-term trend (since the first I-WeBS population estimated, and the most recent population estimate in 2018) in the Irish overwintering population of Curlew has been a precipitous decline in numbers (Burke *et al.*, 2018).

4.5.2 Field Survey Results for Curlew

Figure 8: Curlew activity in the survey area between September 2019 and March 2020.



55 Curlew were observed flying over the site on 10 dates between October 2019 and March 2020. Flock sizes were smaller than Brent Goose flocks observed flying over the site, with a peak count of 32 birds flying across the site on 6th December 2019. Virtually all observations of Curlew flight lines were of movements east-west, e.g. from Dublin Bay inland. West-east movements were observed only on two occasions (see Figure 8). Curlew were not observed foraging within the proposed development site on any occasion.

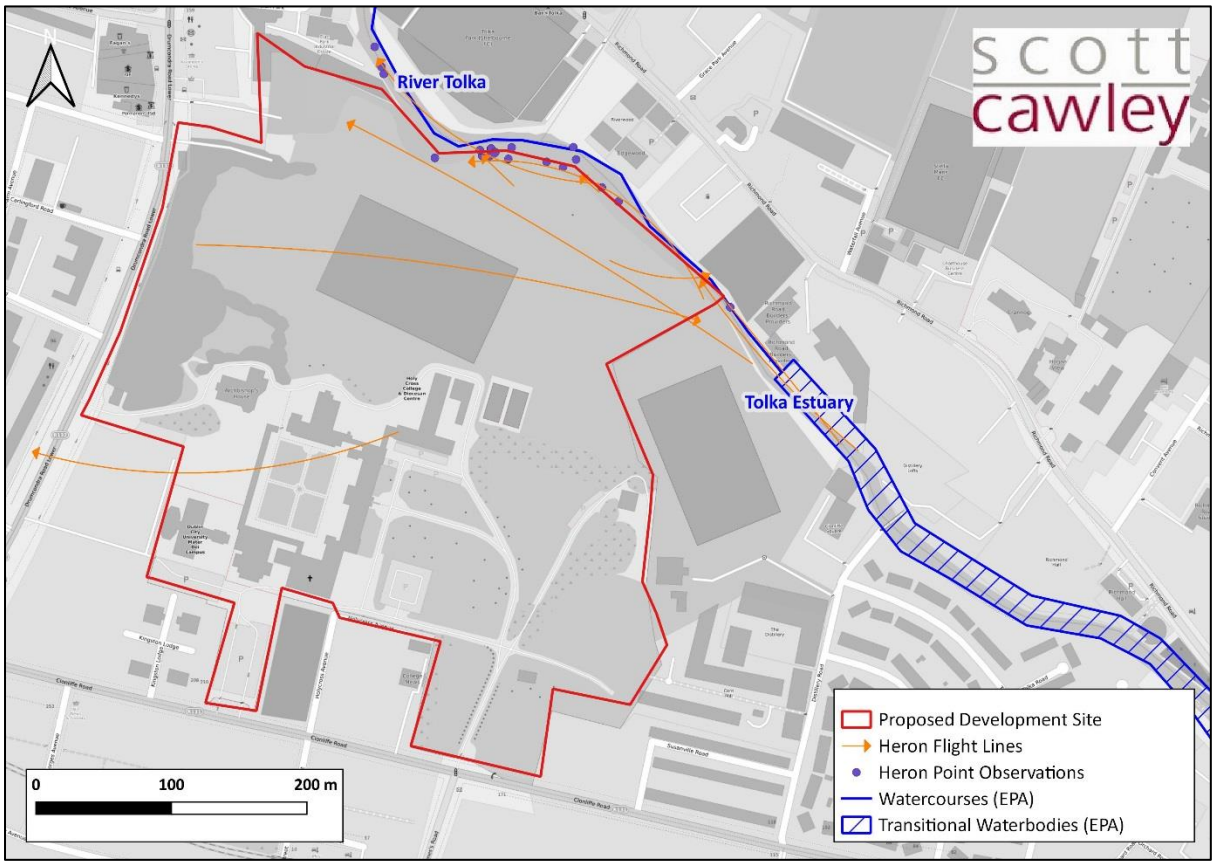
4.6 Grey Heron *Ardea cinerea* [A028]

4.6.1 Results of Desk Study for Grey Heron

56 There are no European sites for which Grey Heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Grey Heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c*. 99km south of the proposed development site. Grey Herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[3], and for this reason, the population of birds in the proposed development site is not part of any European site population.

[3] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 9th June 2020

Figure 9: Grey Heron activity in the survey area between September 2019 and March 2020.



4.6.2 Field Survey Results for Grey Heron

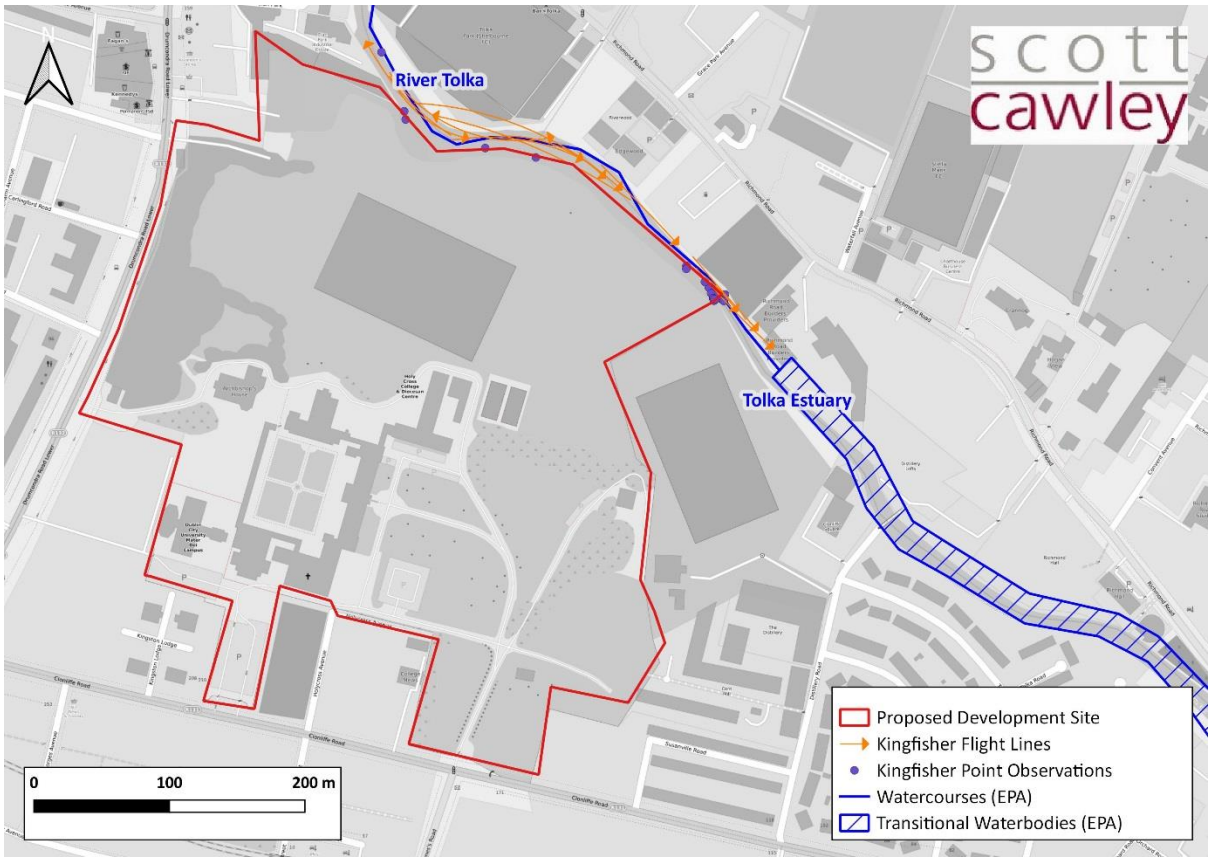
57 Similar to observations of Cormorant, single Grey Herons were observed foraging in and along the River Tolka on nine dates. The birds were also noted flying up and down river. The species was strongly associated with the River Tolka and was not observed foraging or flying across the remainder of the proposed development site.

4.7 Kingfisher *Alcedo atthis* [A229]

4.7.1 Results of Desk Study for Kingfisher

58 There are no European sites for which Kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c*. 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population on the basis of distance of separation between the two.

Figure 10: Kingfisher activity in the survey area between September 2019 and March 2020



4.7.2 Field Survey Results for Kingfisher

59 Kingfisher were observed foraging and/or commuting along the River Tolka on 18 of the 25 completed survey visits. The species was note perching on vegetation overhanging the River Tolka from within the proposed development site. In most instances, a single bird was observed, however two birds were observed on 12th September 2019. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for a pair of Kingfisher.

5 Conclusions

60 Observations of wintering birds in the proposed development site have been contextualised against the populations of these species in nearby European sites. In the case of Black-headed Gull, Herring Gull, Brent Geese, Curlew, Cormorant, Grey Heron and Kingfisher, it has been demonstrated that the peak count of birds in the survey area in 2019/20 is less than 1% of the international population of these species.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 10th June 2020. The records have been reviewed by Colm Clarke of Scott Cawley and only records relating to wetland birds are presented in the table, below. A large proportion of records are of rare / vagrant species.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Barnacle Goose *Branta leucopsis*	1	15/02/2015	Birds of Ireland
Bar-tailed Godwit *Limosa lapponica*	5	31/12/2011	Bird Atlas 2007 - 2011
Black Brant *Branta bernicla subsp. Nigricans*	3	10/03/1995	Rare birds of Ireland
Black Guillemot *Cepphus grille*	23	05/06/2016	Birds of Ireland
Black-headed Gull *Larus ridibundus*	100	08/12/2017	Birds of Ireland
Black-legged Kittiwake *Rissa tridactyla*	4	10/03/2012	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	5	10/03/2012	Birds of Ireland
Branta bernicla subsp. hrota	14	31/12/2011	Bird Atlas 2007 - 2011
Brent Goose *Branta bernicla*	39	17/02/2017	Birds of Ireland
Common Coot *Fulica atra*	31	27/10/2017	Birds of Ireland
Common Greenshank *Tringa nebularia*	2	31/12/2011	Bird Atlas 2007 - 2011
Common Guillemot *Uria aalge*	2	09/03/2009	Birds of Ireland
Common Kingfisher *Alcedo atthis*	28	15/08/2017	Birds of Ireland
Common Pochard *Aythya ferina*	3	31/12/2011	Bird Atlas 2007 - 2011
Common Redshank *Tringa totanus*	13	17/09/2017	Birds of Ireland
Common Sandpiper *Actitis hypoleucos*	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Common Shelduck *Tadorna tadorna*	9	31/12/2011	Bird Atlas 2007 - 2011
Common Snipe *Gallinago gallinago*	6	28/01/2017	Birds of Ireland
Common Tern *Sterna hirundo*	6	18/06/2017	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	16	04/12/2017	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	22	17/09/2017	Birds of Ireland
Eurasian Teal *Anas crecca*	12	26/02/2017	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011

Species name	Record count	Date of last record	Title of dataset
European Shag *Phalacrocorax aristotelis*	1	24/07/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Cormorant *Phalacrocorax carbo*	35	03/12/2017	Birds of Ireland
Great Crested Grebe *Podiceps cristatus*	4	31/12/2011	Bird Atlas 2007 - 2011
Great Egret *Ardea alba*)	1	24/06/2013	Rare birds of Ireland
Great Northern Diver *Gavia immer*	1	31/12/2011	Bird Atlas 2007 - 2011
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	87	15/12/2017	Birds of Ireland
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *Larus argentatus*	113	26/11/2017	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	33	24/07/2017	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	35	27/10/2017	Birds of Ireland
Little Tern *Sternula albifrons*	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Mallard *Anas platyrhynchos*	110	02/12/2017	Birds of Ireland
Manx Shearwater *Puffinus puffinus*	4	18/08/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	3	31/12/2011	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	6	31/12/2011	Bird Atlas 2007 - 2011
Red-breasted Merganser *Mergus serrator*	3	31/12/2011	Bird Atlas 2007 - 2011
Red-throated Diver *Gavia stellata*	2	31/12/2011	Bird Atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	7	31/12/2011	Bird Atlas 2007 - 2011
Ruddy Turnstone *Arenaria interpres*	6	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *Aythya fuligula*	54	06/12/2017	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Arctic Tern			2					3					3
Bar-tailed Godwit	150.00	1200.00	2231	2138	1260	1540	1745	1917	2141	1710	1658	2173	1920
Black-headed Gull		20000.00	3766	4358	3738	2234	2356	2269	1907	2649	1259	2768	2170
Black-necked Grebe								4					4
Black-tailed Godwit	190.00	610.00	664	936	698	1449	1375	927	1362	1768	873	2185	1423
Common Gull		16400.00	549	298	685	579	573	410	309	985	272	890	573
Common Scoter	140.00	5500.00		2	30		80	20	10	42		40	28
Common Tern			173	15	23		14	38	3	39		1	20
Common/ Arctic Tern				400*				163					163
Coot	220.00	17500.00	1										
Cormorant	120.00	1200.00	309	182	82	211	98	151	53	198	41	71	103
Curlew	350.00	8400.00	1374	1017	742	1240	688	1169	874	932	1424	567	993
Curlew Sandpiper		10000.00						1	1				1
Dunlin	570.00	13300.00	7453	6124	6443	4270	6490	3559	4163	5907	3603	3376	4122
Feral/hybrid Mallard type								2	1				2
Gadwall	20.00	600.00			4	19				2	2		2
Glaucous Gull		2200.00			1								
Golden Plover	1200.00	9300.00	1020	162	2500	1360	430	390	404	1080	742	1155	754
Goldeneye	60.00	11500.00	23	23	6	6	5	11	6		2	1*	6

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Great Black-backed Gull		4200.00	637	180	141	84	124	358	116	190	52	263	196
Great Crested Grebe	40.00	3500.00	97	198	105	255	421	930	254	755	143	307	478
Great Northern Diver	20.00	50.00	3	2		8		2		3		5	3
Greenshank	20.00	2300.00	33	47	68	28	43	40	46	34	47	78	49
Green-winged Teal						1							
Grey Heron	25.00	2700.00	44	33	31	54	30	28	15	68	40	44	39
Grey Plover	30.00	2500.00	751	202	265	394	293	200	307	310	452	240	302
Herring Gull		10200.00	497	262	314	422	341	519	135	490	261	538	389
Kingfisher			1			1	1			1		1	1
Knot	280.00	4500.00	4519	5802	5832	4105	2799	3435	3022	4547	4950	2495	3690
Lapwing	1100.00	20000.00	56	26	64	191	44	120	67	52	54	143	87
Lesser Black-backed Gull		5500.00	475	14	4	19	195	28	25	5	20	16	19
Light-bellied Brent Goose	360.00	400.00	2017	3819	4445	5536	3292	4102	6134	3717	4862	4195	4602
Little Egret	20.00	1300.00	29	69	100	87	73	48	19	59	69	59	51
Little Grebe	20.00	4000.00					5	1	9	1	5		4
Little Gull		1100.00					1	1					1
Little Tern			1										
Long-tailed Duck		17250.00		1					2	1			2
Mallard	290.00	20000.00	91	67	58	97	138	151	52	97	106	120	105
Mediterranean Gull		770.00	16	33	70	27	8	113	23	39	27	64	53
Moorhen		20000.00	4	9	4	6	7	7	5	5		5	6
Mute Swan	90.00		5		3	7	6	2	2	5	6	9	5

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Oystercatcher	690.00	8200.00	3327	2933	3946	4324	2804	3408	3025	3074	3315	3588	3282
Pintail	20.00	600.00	150	179	117	162	173	212	160	200	150	124	169
Purple Sandpiper	20.00	710.00		1	2		16	4	3	2	1	2	2
Red-breasted Merganser	20.00	1700.00	43	56	109	58	63	114	50	60	57	69	70
Red-necked Grebe										1			1
Redshank	300.00	3900.00	1758	2856	3621	2639	2790	2509	2077	2460	1889	1648	2117
Red-throated Diver	20.00	3000.00	12	7	9	5	16	8	8	7	2	7	6
Ring-billed Gull		20000.00			1		1	2	1				2
Ringed Plover	100.00	730.00	849	355	146	267	205	314	217	139	121	109	180
Roseate Tern								3					3
Sanderling	60.00	1200.00	692	609	434	674	300	411	405	510	266	841	487
Sandwich Tern			342	122	38	2	43	6	23	52		8	22
Scaup	65.00	3100.00				2							
Shag		2000.00	7	7	35	2	25	19	23	36	3	71	30
Shelduck	120.00	3000.00	761	1036	866	1142	821	603	731	961	2927	744	1193
Shoveler	30.00	400.00	104	111	76	249	73	101	79	126	97	115	104
Slavonian Grebe		55.00					1						
Snipe		20000.00	1		2	16	18	12	62	20		31	31
Spotted Redshank		900.00	1					1		1		3	2
Teal	340.00	5000.00	925	823	785	980	1358	909	981	1378	1233	1291	1158
Tufted Duck	310.00	12000.00			1								
Turnstone	95.00	1400.00	356	292	380	329	392	349	227	466	250	584	375
Unidentified Gull								10	85				48

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Unidentified Tern			244										
Water Rail			1	1				1					1
Whimbrel		6700.00			1		1		1	2	4		2
Wigeon	630.00	15000.00	518	1302	663	1911	806	610	445	691	2201	1106	1011
Yellow-legged Gull									1	1		2	1

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00		1				0	0	0			2	2
Light-bellied Brent Goose	360.00	400.00	678	710	1120	956	0	0	0	580	588	342	503
Egyptian Goose							0	0	0			1	1
Shelduck	120.00	3000.00	175	365	357	238	0	0	0	52	97	88	79
Wigeon	630.00	15000.00	208	57	125	178	0	0	0	54	54	32	47
Teal	340.00	5000.00	320	125	163	218	0	0	0	145	160	108	138
Mallard	290.00	20000.00	178	278	193	249	0	0	0	67	102	106	92
Pintail	20.00	600.00	12	32	23	12	0	0	0	4	4		4
Shoveler	30.00	400.00					0	0	0				
Long-tailed Duck		17250.00				2	0	0	0				
Common Scoter	140.00	5500.00		62	27	130	0	0	0	16	7		12

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Goldeneye	60.00	11500.00				15	0	0	0				
Red-breasted Merganser	20.00	1700.00	17	17	14	23	0	0	0	6	5	2	4
Red-throated Diver	20.00	3000.00	2	5	5	2	0	0	0	14	64		39
Great Northern Diver	20.00	50.00		1	2	5	0	0	0	1	2		2
Little Grebe	20.00	4000.00	1			5	0	0	0	1			1
Great Crested Grebe	40.00	3500.00	16	16	22	63	0	0	0	124	189		156
Cormorant	120.00	1200.00	8	17	14	20	0	0	0	10	4	3	6
Shag		2000.00					0	0	0	7			7
Little Egret	20.00	1300.00	8	27	40	56	0	0	0	18	3	7	9
Grey Heron	25.00	2700.00	8	17	14	32	0	0	0	5	7	7	6
Moorhen		20000.00	2				0	0	0				
Oystercatcher	690.00	8200.00	556	985	1014	880	0	0	0	277	1113	219	536
Ringed Plover	100.00	730.00	45	128	150	168	0	0	0	34	59	123	72
Golden Plover	1200.00	9300.00	1800	1100	750	672	0	0	0	2500	450	2000	1650
Grey Plover	30.00	2500.00	113	45	112	166	0	0	0	55	28	8	30
Lapwing	1100.00	20000.00	460	320	287	550	0	0	0	372	300	137	270
Knot	280.00	4500.00	210	85	47	112	0	0	0	553		19	286
Sanderling	60.00	1200.00	10	35	31	29	0	0	0	6			6
Curlew Sandpiper		10000.00		2	4	12	0	0	0				
Dunlin	570.00	13300.00	205	226	300	110	0	0	0	750	233	300	428
Snipe		20000.00		4	17		0	0	0				
Black-tailed Godwit	190.00	610.00	210	175	175	270	0	0	0	389	139	296	275
Bar-tailed Godwit	150.00	1200.00	150	131	131	105	0	0	0	162	150	48	120

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Whimbrel		6700.00		4	1	7	0	0	0				
Curlew	350.00	8400.00	140	100	138	148	0	0	0	90	61	106	86
Common Sandpiper						2	0	0	0				
Green Sandpiper		15500.00			2	1	0	0	0				
Greenshank	20.00	2300.00	5	27	32	25	0	0	0	6	11	3	7
Redshank	300.00	3900.00	369	375	330	284	0	0	0	144	152	125	140
Turnstone	95.00	1400.00	20	73	126	139	0	0	0	17	12	13	14
Black-headed Gull		20000.00	166				0	0	0	242	281	52	192
Common Gull		16400.00	22				0	0	0	64	11	4	26
Lesser Black-backed Gull		5500.00					0	0	0	4	18	1	8
Herring Gull		10200.00	230				0	0	0	47	91	58	65
Great Black-backed Gull		4200.00	175				0	0	0	7	15	10	11
Sandwich Tern			168	21	37	31	0	0	0				
Roseate Tern						12	0	0	0				
Common Tern			32	8	12	52	0	0	0				
Arctic Tern				2	8	24	0	0	0				
Kingfisher			1		2	3	0	0	0				

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00		97	112	110	114	108	90	47	50	89	58	67
Whooper Swan	150.00	270.00			9			2		1			2
Black Swan											1		1
Greenland White-fronted Goose	110.00	240.00					1						
Bar-headed Goose						1	1						
Barnacle Goose	150.00	710.00					1						
Light-bellied Brent Goose	360.00	400.00	1927	2000	1856	898	1411	943	1980	710	464	824	984
Shelduck	120.00	3000.00	247	273	246	341	479	8	262	120	222	303	183
Wigeon	630.00	15000.00	95	187	150	42	168		157		2	67	75
Gadwall	20.00	600.00					2		120	4			62
Teal	340.00	5000.00	65	176	142	99	670	41	112	119	87	141	100
Mallard	290.00	20000.00	146	340	178	176	379	95	220	112	92	92	122
Pintail	20.00	600.00	74	40	72	66	72		29	6		15	17
Shoveler	30.00	400.00			14	6	50					9	9
Pochard	160.00	3000.00	16	40	18	35	8		2				2
Tufted Duck	310.00	12000.00			2	15	8				1		1
Scaup	65.00	3100.00	2		1		4				3		3
Long-tailed Duck		17250.00					1		3				3

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Common Scoter	140.00	5500.00	240	520	300	278			30				30
Goldeneye	60.00	11500.00	104	184	105	126	93	51	66	36	92	31	55
Red-breasted Merganser	20.00	1700.00	65	51	39	161	78	87	57	80	35	26	57
Ruddy Duck							1						
Red-throated Diver	20.00	3000.00		4	8				4				4
Great Northern Diver	20.00	50.00				3				3		2	2
Little Grebe	20.00	4000.00	4	7	8	13	28	23	21	8	33	26	22
Great Crested Grebe	40.00	3500.00	89	61	96	54	44	34	120	60	72	84	74
Slavonian Grebe		55.00	2										
Cormorant	120.00	1200.00	155	133	58	42	28	6	101	101	42	86	67
Shag		2000.00	2		130	66	30		32	8	9	5	14
Little Egret	20.00	1300.00	26	23	26	17	3	2	17	13	16	35	17
Grey Heron	25.00	2700.00	25	39	28	77	20	12	19	19	27	26	21
Moorhen		20000.00	1	5	3	7	12	4	4	6	9	4	5
Coot	220.00	17500.00	1		2		12						
Oystercatcher	690.00	8200.00	1102	1519	1529	1285	1471	78	1300	1833	1355	1291	1171
Ringed Plover	100.00	730.00	94	15	16	14	25		71			13	42
Golden Plover	1200.00	9300.00	500	2300	1310	72	1000	260	1000	200	5		366
Grey Plover	30.00	2500.00	139	163	155	150	169	3	140	9	6	100	52
Lapwing	1100.00	20000.00	1196	570	434	315	642	1180	900	590	681	63	683
Knot	280.00	4500.00	250	200	331	354	870	4	440	110	49	9	122
Sanderling	60.00	1200.00		8	4		1		2	80	46		43
Curlew Sandpiper		10000.00							2				2

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Dunlin	570.00	13300.00	490	310	1173	416	1365	23	480	94	121	300	204
Ruff		12200.00	8	1	4	1	1	4	1	2	5		3
Jack Snipe		20000.00							1				1
Snipe		20000.00	20	15	44	5	46	20	25	56	25	36	32
Black-tailed Godwit	190.00	610.00	428	397	366	478	258	296	355	206	167	121	229
Bar-tailed Godwit	150.00	1200.00	262	101	200	358	286	62	213	133	14	60	96
Curlew	350.00	8400.00	301	390	240	545	330	1	500	244	83	246	215
Common Sandpiper					6	3	4	1	17		1		6
Green Sandpiper		15500.00								27			27
Spotted Redshank		900.00	1	1	1						1		1
Greenshank	20.00	2300.00	52	78	59	29	26	26	43	64	30	34	39
Redshank	300.00	3900.00	442	927	589	459	364	87	374	171	130	363	225
Turnstone	95.00	1400.00	140	220	139	175	175	23	221	94	85	75	100
Mediterranean Gull		770.00		1									
Little Gull		1100.00			1								
Black-headed Gull		20000.00	510	902	1072	930	565	479	368	659	571	496	515
Common Gull		16400.00	71	180	221	187	228	149	70	71	16	184	98
Lesser Black-backed Gull		5500.00	2	3	28	5	5	4	3	15	8	196	45
Herring Gull		10200.00	20	217	77	66	68	55	139	110	95	118	103
Iceland Gull		1600.00						2					2
Great Black-backed Gull		4200.00	10	10	18	20	20	15	44	93	9	42	41
Sandwich Tern			237	152	26	84	3	2	50	12		2	16

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Common Tern				20		1							

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Mute Swan	90.00				6	3			4	2	2	2	2
Whooper Swan	150.00	270.00					2					12	12
Pink-footed Goose		3500.00	2									8	8
Greenland White-fronted Goose	110.00	240.00						3					3
Greylag Goose	50.00	980.00	90	63	87	134	19	33	89	5	33	95	51
Barnacle Goose	150.00	710.00	1		1								
Brent Goose					1								
Dark-Bellied Brent Goose										1			1
Light-bellied Brent Goose	360.00	400.00	1196	2794	2652	2749	1051	2661	1395	2217	1047	2662	1996
Hybrid Shelduck				1									
Ruddy Shelduck						1							
Shelduck	120.00	3000.00	761	706	809	886	730	752	793	877	652	624	740
Wigeon	630.00	15000.00	1022	724	580	690	490	813	585	686	1342	1532	992
Gadwall	20.00	600.00			1				2		3	2	2

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Teal	340.00	5000.00	1265	1021	1054	1003	1448	1211	1469	685	2008	967	1268
Mallard	290.00	20000.00	138	213	248	319	109	182	198	172	260	220	206
Pintail	20.00	600.00	2		16	6	2		1		4	5	3
Shoveler	30.00	400.00	46	43	79	36	21	26	34	42	15	25	28
Pochard	160.00	3000.00			2								
Scaup	65.00	3100.00				27							
Common Scoter	140.00	5500.00											
Goldeneye	60.00	11500.00	2	1	1	1	1		6				6
Red-breasted Merganser	20.00	1700.00	10	16	26	30	16	30	22	20	39	23	27
Red-throated Diver	20.00	3000.00	1	1	2	1		4	1	2	4	1	2
Great Northern Diver	20.00	50.00	3		1					2			2
Little Grebe	20.00	4000.00	9	19	12	18	10	24	15	15	22	25	20
Great Crested Grebe	40.00	3500.00	2	3	3	46	1	4	14	5	22	3	10
Slavonian Grebe		55.00	1										
Cormorant	120.00	1200.00	21	58	55	77	23	17	33	32	21	27	26
Shag		2000.00	12	302	28	28	44	40	47	36	21	10	31
Little Egret	20.00	1300.00	28	33	41	42	1	43	48	57	46	55	50
Grey Heron	25.00	2700.00	19	36	34	24	6	24	24	17	21	16	20
Great White Egret												1	1
Glossy Ibis													
Spoonbill													
Water Rail					1	1						1	1
Moorhen		20000.00	1	3		3		1	1	8	5	2	3

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Coot	220.00	17500.00							2	3		2	2
Oystercatcher	690.00	8200.00	2666	2779	1199	2024	1781	2116	2491	1531	1519	1697	1871
Ringed Plover	100.00	730.00	196	251	190	153	113	105	284	167	161	125	168
American Golden Plover						1							
Golden Plover	1200.00	9300.00	2150	910	6590	664	40	530	3300	130	2000	2050	1602
Grey Plover	30.00	2500.00	651	231	283	223	210	371	242	151	120	64	190
Lapwing	1100.00	20000.00	3259	3655	5820	1268	710	2855	5805	897	2099	5185	3368
Knot	280.00	4500.00	500	86	500	501	88	190	256	30	130	89	139
Sanderling	60.00	1200.00	53	50	14	30	6	20	300	31	1	130	96
Little Stint		3000.00			1			1		3		1	2
Curlew Sandpiper		10000.00	2	2		6		1	4			1	2
Purple Sandpiper	20.00	710.00	23	10	7	76	5	6	3	72	32	4	23
Dunlin	570.00	13300.00	2065	1680	2546	3151	1061	1904	1860	581	2264	3469	2016
Ruff		12200.00	3	3		1			1			2	2
Jack Snipe		20000.00											
Snipe		20000.00	10	9	35	37	10	4	20	9	5	24	12
Woodcock										1			1
Black-tailed Godwit	190.00	610.00	795	722	1138	568	148	450	883	597	237	191	472
Bar-tailed Godwit	150.00	1200.00	23	63	31	126	1	76	44	120	149	99	98
Whimbrel		6700.00			1	2		2	28	1	1	1	7
Curlew	350.00	8400.00	1376	1246	1055	803	33	922	518	684	600	625	670
Common Sandpiper			1	2	2								
Green Sandpiper		15500.00	5	1								1	1

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Spotted Redshank		900.00		2	1	1			1				1
Greenshank	20.00	2300.00	49	68	40	50	14	83	32	36	35	59	49
Lesser Yellowlegs				1							1		1
Redshank	300.00	3900.00	1241	1025	907	987	378	1104	689	844	945	1007	918
Turnstone	95.00	1400.00	339	227	77	81	95	176	224	207	110	223	188
Mediterranean Gull		770.00				1			1	1			1
Black-headed Gull		20000.00	230	748	764	1314	136	457	310	602	448	458	455
Common Gull		16400.00	17	22	80	419	73	142	175	256	343	159	215
Lesser Black-backed Gull		5500.00		1	3	29	35	76	3	1	38	9	25
Herring Gull		10200.00	23	755	906	596	45	739	189	237	300	332	359
Great Black-backed Gull		4200.00	22	150	170	119	16	107	84	106	37	53	77
Sandwich Tern			2	81	70	100			104	58	245	82	122
Roseate Tern									1				1
Common Tern				20	2					1	4	41	15
Arctic Tern				12									
Kingfisher			1	1	1	1		1	12	2	1		4

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Light-bellied Brent Goose	360.00	400.00	0	80	50	0	0	0	0	100		200	150
Shelduck	120.00	3000.00	0			0	0	0	0			20	20
Mallard	290.00	20000.00	0	6		0	0	0	0	5			5
Red-throated Diver	20.00	3000.00	0			0	0	0	0	2			2
Cormorant	120.00	1200.00	0	100	20	0	0	0	0	200		150	175
Shag		2000.00	0			0	0	0	0	150		60	105
Little Egret	20.00	1300.00	0		2	0	0	0	0			1	1
Grey Heron	25.00	2700.00	0		2	0	0	0	0	1		1	1
Oystercatcher	690.00	8200.00	0	35	100	0	0	0	0	200	150*	100	150
Ringed Plover	100.00	730.00	0			0	0	0	0	10	5*	4	7
Sanderling	60.00	1200.00	0			0	0	0	0	60			60
Purple Sandpiper	20.00	710.00	0	20	5	0	0	0	0	10		15	12
Dunlin	570.00	13300.00	0			0	0	0	0	10			10
Whimbrel		6700.00	0		2	0	0	0	0			1	1
Curlew	350.00	8400.00	0	50	25	0	0	0	0	30	6*	5	18
Greenshank	20.00	2300.00	0		1	0	0	0	0	1		2	2
Redshank	300.00	3900.00	0		10	0	0	0	0	25	10*	25	25
Turnstone	95.00	1400.00	0	60	60	0	0	0	0	80	20*	150	115
Mediterranean Gull		770.00	0			0	0	0	0		1*		

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Black-headed Gull		20000.00	0			0	0	0	0	50		6	28
Common Gull		16400.00	0		10	0	0	0	0	60			60
Herring Gull		10200.00	0		200	0	0	0	0	300	200*	300	300
Great Black-backed Gull		4200.00	0		200	0	0	0	0	250	200*	200	225
Sandwich Tern			0		2	0	0	0	0		15*		

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Greylag Goose	50.00	980.00	0	60				0	0		0		
Light-bellied Brent Goose	360.00	400.00	0	315		400	350	0	0		0	400*	
Shelduck	120.00	3000.00	0	7	6*			0	0		0	4*	
Mallard	290.00	20000.00	0					0	0	10	0		10
Red-throated Diver	20.00	3000.00	0	2				0	0	2	0	2*	2
Great Northern Diver	20.00	50.00	0			2		0	0		0		
Great Crested Grebe	40.00	3500.00	0	2				0	0		0		
Cormorant	120.00	1200.00	0	100		50		0	0	200	0	20*	200
Shag		2000.00	0					0	0	200	0	150*	200
Grey Heron	25.00	2700.00	0	1				0	0	2	0	1*	2
Oystercatcher	690.00	8200.00	0	110	10*	100	100	0	0	100	0	250*	100
Ringed Plover	100.00	730.00	0	2		2		0	0		0	2*	
Golden Plover	1200.00	9300.00	0				100	0	0		0		
Lapwing	1100.00	20000.00	0			100	10	0	0		0		
Purple Sandpiper	20.00	710.00	0	3				0	0	2	0	10*	2
Snipe		20000.00	0	1				0	0		0		
Bar-tailed Godwit	150.00	1200.00	0			2		0	0		0		
Whimbrel		6700.00	0	5		2	1	0	0	10	0	8*	10
Curlew	350.00	8400.00	0	71	6*	200	100	0	0	350	0	200*	350

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	Mean
Redshank	300.00	3900.00	0	15		25	15	0	0	30	0	10*	30
Turnstone	95.00	1400.00	0	25	5*	25	50	0	0	60	0	50*	60
Mediterranean Gull		770.00	0		1*	1		0	0	1	0		1
Sabine's Gull			0	1				0	0		0		
Black-headed Gull		20000.00	0		200*	10		0	0	50	0	5*	50
Common Gull		16400.00	0			20		0	0		0		
Lesser Black-backed Gull		5500.00	0	17				0	0		0		
Herring Gull		10200.00	0	750				0	0	300	0	500*	300
Great Black-backed Gull		4200.00	0	235				0	0	300	0	400*	300
Sandwich Tern			0		4*			0	0		0		
Common Tern			0	1				0	0		0		

Appendix II – Results of Survey Observations

Activity codes: HU – Hunting/Feeding; WA – Walking; FL – Flying; OG – On ground; GL – Gliding; PE – Perching; SO – Soaring; PR – Preening; WP – With prey; SW – Swimming; RO – Roosting

Habitat codes: GA1 – Improved Grassland; WD – Highly modified woodland; GS – Rough Grassland; WS1 – Scrub; GS4 – Wet Grassland; WS5 – Recently felled woodland; GM1 – Marsh; WL1 – Hedgerow; FL – Lake; WL2 – Treeline; FW – Watercourse; PB – Bog; FS1 – Reed/sedge swamp; PF – Fen/flush; FS2 – Tall-herb swamp; HH – Heath; WN – Semi natural woodland; HD – Bracken.

Appendix II - Table 1: Record of survey observations – consisting of both flight lines and point observations. Survey start time and survey end time relate to the start and end of the survey on the date of survey. Observation start relates to the time the species was observed on site.

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	1	06:50	HG	3	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	2	07:15	HG	5	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	3	08:20	HG	1	HU	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	6	09:50	BH	2	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	7	10:40	HG	4	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	9	13:20	HG	4	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	10	15:05	HG	5	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	11	16:15	HG	3	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	13	17:45	HG	2	OG	GA1
HD	05/09/2019	06:35	20:00	F2 west	4/8	15	0	excellent	14	18:10	HG	2	OG	GA1
NMH	12/09/2019	06:54	19:47	1/4	4/8	Dec-18	Early intermittent rain then dry	Good	1		HG	35	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	33	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	25	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	14	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	41	FL	GA2/WD5
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	39	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	42	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	20	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	34	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	13	FL	BL3
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	8	FL	BL3/GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	32	FL	GA2/WD
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	31	FL	GA2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			HG	6	FL	GA2/WL2
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Good			BH	32	FL	GA2/WD5
NMH	12/09/2019	06:54	19:47	1/4	4/8	12-18	Early intermittent rain then dry	Excellent			CA	9	SW	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	1	07:05	HG	17	HU/OG	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	1	07:05	BH	1	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	2	07:10	BH	16	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	2	07:10	HG	13	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	3	07:20	CA	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	4	07:20	H.	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	6	10:10	HG	5	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	7	11:35	HG	2	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	7	11:35	BH	1	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	8	14:00	KF	2	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	9	14:08	KF	1	HU	FW
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	10	15:15	HG	4	HU	GA1
HD	12/09/2019	06:50	19:50	F2 SW	8/8	15	light drizzle to dry after 09:00	excellent	15	18:04	HG	2	HU	GA1
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	12	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	11	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	19	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	65	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	82	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	20	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	38	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	48	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	81	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	38	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	40	FL	BL3
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	80	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	62	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	43	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	75	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			KF	3	FL	FW
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	75	FL	BL3/FW
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	31	FL	BL3
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	61	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	22	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			BH	44	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	54	FL	GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	64	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	69	FL	GA2/WD
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	55	FL	GA2/WD5
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	6	FL	BL3/GA2
NMH	19/09/2019	07:06	19:30	0/4	0	18	0	excellent			HG	70	FL	GA2/WD5
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	1	07:25	HG	4	OG	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	2	07:50	HG	2	OG	GA
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	2	07:50	BH	1	OG	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	08:58	KF	1	FL	FW
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	8	09:15	H.	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	10:51	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	7	10:56	KF	2	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	16	14:40	HG	1	HU	GA1
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	16:14	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	6	17:24	KF	1	HU	WN
HD	19/09/2019	07:10	19:30	F2 east	2/8	17	0	excellent	18	18:04	HG	4	OG	GA1
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	44	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	10	FL	GA2/WD5
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					BH	7	FL	GA2/WD5

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	33	FL	BL3/GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	42	FL	BL3/GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	28	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	55	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	63	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					BH	52	FL	GA2
NMH	27/09/2019	07:20	19:11	2/4	6/8	13					HG	33	FL	BL3/GA2
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	1	07:45	HG	17	HU/OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	2	08:24	HG	24	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	3	08:38	HG	2	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	6	09:02	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	7	09:08	H.	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	8	09:30	HG	1	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	9	09:38	HG	5	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	10	10:20	HG	3	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	11	11:53	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	12	12:45	HG	7	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	11	15:49	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	14	15:55	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	15	16:22	KF	1	HU	FW
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	16	17:35	HG	2	OG	GA1
HD	27/09/2019	07:15	19:10	F3 SW	8/8	16	0	excellent	17	18:40	HG	4	OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			BH	32	FL	BL3
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	10	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	12	FL	BL3/GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	36	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			BH	9	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	57	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	59	FL	GA2
NMH	03/10/2019	07:29	18:58	3/4	6/8	12	Intermittent heavy showers	good			HG	63	FL	BL3/FW
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	2	08:21	CA	1	FL	FW
NMH	03/10/2019	07:29	18:58								BH	14	HU/RO	WD/WN5
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	1	07:55	HG	7	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	4	09:10	HG	8	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	5	11:10	H.	1	HU	FW
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	7	12:50	HG	5	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	8	13:45	HG	4	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	9	15:05	HG	11	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	11	16:30	HG	2	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	13	17:15	HG	2	OG	GA1
HD	03/10/2019	07:30	19:00	F2 south	8/8	13	0	excellent	14	18:12	HG	2	OG	GA1
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	1		KF	1	FL	FW
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	2	08:03	HG	1	FL	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	3	08:12	HG	1	FL	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent	4	09:12	HG	1	FL	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent			CA	1	FL	FW
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	excellent			CA	1	FL	GA2/FW
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			BH	116	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			H.	108	FL	FW
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	115	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	106	FL	GA2
NMH	09/10/2019	07:40	18:43	2/4	1/8	11	Showers	excellent			HG	95	FL	BL3/GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	6	11:12	HG	2	RO	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	7	11:18	HG	1	HU	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent	8	11:38	HG	7	HU	GA2
COB	09/10/2019	07:40	18:43	2/4	1/8	11	Afternoon shower	Excellent			H.	1	RO	FW/WN5
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent	2	09:03	HG	1	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent	3	09:03	HG	1	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			H.	1	FL	FW
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	88	FL	GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	86	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	59	FL	GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			HG	61	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			BH	45	FL	BL3/GA2
NMH	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	excellent			BH	93	FL	GA2
COB	17/10/2019	07:54	18:25	1/4	3/8	10	Dry	Excellent	4	11:25	HG	1	HU	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent	1	08:10	CU	8	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent	4	08:43	CU	5	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			H.	2	FL	GA2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			H.	1	FL	FW
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	excellent			CA	2	FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			BH	73	FL	GA2/FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			CU	12	FL	GA2
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			HG	89	FL	BL3/GA2
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			HG	97	FL	BL3/GA2/WD5
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			KF		FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			KF		FL	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Dry	excellent			BH	94	FL	GA2/WL2
COB	24/10/2019	08:07	18:09	1/4	1/8	7-12	Showers	Excellent			H.	1	HU	FW
NMH	24/10/2019	08:07	18:09	1/4	2/8	7-12	Showers	Excellent			H.		HU	FW
SB	08/11/2019	07:40	16:50	1/4	5/8	5	Dry	excellent	12	09:01	CU		FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent	1	07:55	BH	2	FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent	2	09:05	HG	2	FL	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent			CA	1	FL	GA2/FW
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	excellent			CA	1	FL	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	6	0	excellent	10	13:30	H.	2	FL	WN
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent	4	14:23	HG	2	HU	GA2
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent			CA	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	08/11/2019	07:36	16:41	1/4	1/8	5	Dry	Excellent			H.	1	HU	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	1	07:40	HG	5	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	2	08:10	HG	4	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	3	08:18	CA	1	HU	FW
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	4	08:50	BH	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	4	08:50	HG	3	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	6	10:10	HG	2	HU/OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	8	11:40	HG	5	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	9	12:20	BH	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	9	12:20	HG	2	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	11	14:05	HG	3	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	13	15:10	HG	4	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	14	15:24	HG	7	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	15	15:35	HG	1	OG	GA1
HD	08/11/2019	07:30	16:30	F2 NW	6/8	5	0	excellent	15	15:35	BH	1	OG	GA1
COB	13/11/2019	07:45	16:32	1/4	8/8	6	Heavy rain in afternoon			07:46	CU	10	FL	BL3/GA2
NMH	13/11/2019	07:45	16:35	1/4	8/8	6	Heavy rain in afternoon	excellent			HG		FL	GA2/WD
NMH	13/11/2019	07:45	16:35	1/4	8/8	6	Heavy rain in afternoon	excellent			HG	56	FL	GA2
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	13	15:05	CA	1	FL	FW
COB	13/11/2019	07:45	16:32	1/4	8/8	6	Heavy rain in afternoon.				H.	4	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	1	07:55	HG	12	OG/HU	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	1	07:55	BH	1	OG/HU	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	2	08:15	KF	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	3	08:45	HG	4	OG/HU	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	5	10:05	HG	2	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	6	10:40	CA	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	7	11:22	HG	4	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	8	11:49	HG	14	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	9	13:32	KF	1	HU	FW
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	11	14:10	HG	3	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	11	14:10	BH	1	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	12	14:52	HG	4	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	14	15:20	HG	2	OG	GA1
HD	13/11/2019	07:40	16:30	F2 south	6/8	5	0	excellent	14	15:20	BH	6	OG	GA1
COB	21/11/2019	08:00	16:40	2/4	8/8	8	Rain in morning/dry afternoon		4	11:25	KF	1	FL	FW
COB	21/11/2019	08:00	16:40	2/4	8/8	8	Rain in morning/dry afternoon		5	16:14	BH	150	FL	BL3/GA2
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	14	16:08	BH	140	FL	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	9	13:22	H.	1	FL	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	1	08:20	HG	11	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	2	08:43	HG	47	HU/OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	4	09:06	HG	5	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	5	09:29	HG	10	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	6	09:42	BH	3	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	6	09:42	HG	3	OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	12:50	BH	6	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	12:50	HG	4	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	9	10:43	HG	5	HU/OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	10	14:02	HG	13	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	10	10:59	HG	43	RO	Astroturf
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	11	14:27	BH	2	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	11	11:04	HG	7	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	12	11:10	HG	9	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	13	15:20	HG	3	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	13	11:18	HG	18	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	14	11:35	HG	25	OG	GA1
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	7	11:46	KF	1	HU	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	7	09:53	KF	1	HU	FW
HD	21/11/2019	08:10	16:15	F3 SE	6/8	7	light showers	excellent	8	10:38	HG	3	OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	1	08:24	HG	4	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	2	08:35	HG	6	OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	5	09:40	HG	1	HU	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	6	12:35	HG	23	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	6	12:35	BH	1	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	8	13:54	KF	1	HU	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	9	14:35	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	10	14:45	BH	1	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	11	15:02	HG	3	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	12	15:14	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	13	15:32	HG	2	HU/OG	GA1
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	09:18	KF	1	HU	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	13:51	CA	1	FL	FW
HD	29/11/2019	08:10	16:05	F1 north	8/8	5	Occasional showers	excellent	4	14:03	CA	1	HU	FW
COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent			CA	1	FL	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	11	14:22	BG	17	FL	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	11	14:22	CU	32	FL	GA1
COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light Showers	Excellent			H.	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	1	08:24	HG	45	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	3	08:53	CA	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	09:40	KF	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	09:46	KF	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	5	10:05	HG	2	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	6	10:19	HG	3	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	6	10:19	BH	1	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	7	11:29	HG	17	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	8	11:20	HG	32	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	9	11:35	HG	144	HU/OG	GA1
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	10	12:58	H.	1	HU	FW
HD	06/12/2019	08:20	16:10	F3 west	6/8	9	0	excellent	4	14:55	KF	1	HU	WN

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	excellent	1	08:24	CU	4	FL	BL3/GA2
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	excellent			CA	1	FL	BL3/FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	2	09:15	BG	12	FL	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	7	11:47	BG	48	FL	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	11	12:18	CA	1	FL	WN/FW
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	Excellent	4	12:53	KF	1	PE/RO	FW/WN5
COB	11/12/2019	08:29	16:06	2/4	3/8	5	Dry	Excellent			H.	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	1	08:40	HG	6	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	3	09:42	HG	7	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	3	09:42	BH	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	4	10:50	H.	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	5	11:20	HG	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	6	11:45	HG	2	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	10	12:15	HG	5	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	13	12:49	KF	1	HU	FW
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	14	13:25	HG	4	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	16	14:41	HG	3	HU/OG	GA1
HD	11/12/2019	08:25	16:00	F2 west	3/8	6	0	excellent	18	15:42	HG	4	HU/OG	GA1
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	3	11:24	BG	9	FL	GA2/FW
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	4	11:24	CU	4	FL	GA2
COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent			CA	1	FL	GA2/WD
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	1	08:55	HG		HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	5	09:33	HG	2	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	7	09:44	HG	4	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	10	11:33	KF	1	HU	FW
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	11	11:48	KF	1	FL	FW
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	16	13:40	HG	2	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	17	14:24	HG	5	HU/OG	GA1
HD	20/12/2019	08:30	15:55	F2 SW	4/8	4	0	excellent	19	15:10	HG	1	HU/OG	GA1
COB	08/01/2020	08:38	16:26	2/4	7/8	9	Dry	excellent	1	11:52	KF	1	FL	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	2	09:20	BG	60	FL	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	6	11:15	CA	1	FL	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	13	15:08	BG	380	FL	FW
COB	08/01/2020	08:38	16:26	2/4	7/8	9	Dry	Excellent			H.	1	HU	FW
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	1	08:50	HG	3	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	3	09:25	HG	6	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	5	10:25	HG	2	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	11	14:32	HG	6	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	12	14:55	HG	2	HU/OG	GA1
HD	08/01/2020	08:30	16:15	F2 SW	6/8	8	0	excellent	14	15:48	HG	7	HU/OG	GA1
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent	1	09:06	KF	1	FL	FW
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent			H.	2	FL	GA2
COB	15/01/2020	08:33	16:36	3/4	1/8	7	Dry	excellent			CA	1	FL	BL3/GA2
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:55	BG	60	FL	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:44	BG	4	FL	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:25	BG	7	FL	GA
HD	15/01/2020		F3 SW	2/8	7	0	excellent			08:55	HG	4	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			09:10	HG	7	HU/OG	
HD	15/01/2020		F3 SW	2/8	7	0	excellent			10:17	HG	5	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			11:02	HG	3	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			11:25	HG	5	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			12:40	HG	12	HU/OG	GA1
HD	15/01/2020		F3 SW	2/8	7	0	excellent			14:05	HG	4	HU/OG	GA1
COB	24/01/2020	08:22	16:52	1/4	8/8	8	Drizzle		8	09:07	BG	220	FL	BL3/GA2
COB	24/01/2020	08:22	16:52	1/4	8/8	8	Drizzle				CA	1	FL	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	6	09:17	BG	25	FL	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	5	09:13	BG	170	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	4	09:12	BG	120	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	3	09:05	BG	160	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	3	09:03	BG	280	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	2	09:00	BG	420	FL	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	1	08:50	HG	4	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	7	09:50	H.	1	HU	FW
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	8	10:35	HG	10	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	8	10:35	BH	4	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	11	12:42	HG	3	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	12	13:30	HG	6	HU/OG	GA1
HD	24/01/2020	08:15	16:40	F2 east	8/8	6	0	excellent	16	15:42	HG	1	HU	GA1
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent	3	09:28	CU	1	FL	BL3/GA2
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent	5	15:08	KF	1	FL	FW
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent			CA	1	FL	BL3/FW
COB	31/01/2020	08:12	17:05	2/4	7/8	13	Early morning drizzle, dry	excellent			H.	1	FL	GA2/WD
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	17	16:25	HG	20	FL	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	1	08:15	HG	11	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	2	08:50	KF	1	FL	FW
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	3	09:02	HG	7	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	3	09:02	BH	2	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	7	11:05	HG	2	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	8	11:45	H.	1	HU	FW
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	9	12:15	HG	9	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	12	14:14	HG	4	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	14	15:25	HG	1	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	15	16:00	HG	8	HU/OG	GA1
HD	31/01/2020	08:05	17:00	F2 SW	4/8	10	0	excellent	16	16:10	BH	1	HU/OG	GA1
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	2	12:26	CU	23	FL	BL3/GA2
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	3	16:23	KF	1	FL	FW
COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent			H.	1	FL	GA2/WD
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	11	12:45	BG	380	FL	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	12	13:17	BG	550	FL	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	14	13:42	BG	55	FL	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	21	16:03	CA	1	FL	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	1	08:25	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	2	08:27	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	4	09:54	H.	1	HU	FW
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	6	10:30	HG	8	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	7	11:02	HG	3	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	9	11:50	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	10	12:16	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	13	13:30	HG	6	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	15	14:28	HG	4	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	16	14:50	HG	2	HU/OG	GA1
HD	05/02/2020	08:00	17:10	F1 west	5/8	6	0	excellent	19	15:25	HG	4	HU/OG	GA1
COB	14/02/2020	07:47	17:32	3/4	5/8	8	Showers				KF	1	FL	FW
COB	14/02/2020	07:47	17:32	3/4	5/8	8	Showers				CA	1	FL	FW
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	18	16:34	BG	9	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	9	12:04	CU	4	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	5/8	8	0	excellent	2	08:42	BG	18	FL	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	1	08:05	HG	5	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	3	09:20	H.	1	HU	FW
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	6	10:12	HG	4	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	8	11:22	HG	3	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	10	12:44	HG	5	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	12	14:10	HG	2	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	14	15:30	HG	2	HU	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	16	16:04	HG	3	HU/OG	GA1
HD	14/02/2020	07:50	17:30	F3 south	0	8	0	excellent	17	16:22	HG	5	HU/OG	
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	16	17:05	BH	170	FL	GA1
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	12	15:17	CA	1	FL	FW
HD	22/02/2020	07:40	17:04	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	9	13:39	BG	30	FL	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	1	08:32	HG	6	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	2	09:12	H.	1	HU	FW
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	3	09:40	HG	8	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	4	10:24	KF	1	FL	FW
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	5	11:12	BH	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	5	11:12	HG	12	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	10	14:20	HG	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	11	14:55	HG	5	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	13	15:49	HG	4	HU/OG	GA1
HD	22/02/2020	07:40	17:40	F3 west	5/8	6	dry in morning, showers in afternoon	excellent	15	16:32	HG	2	HU/OG	GA1
COB	27/02/2020	07:20	18:04	2/4	6/8	8	Showers				CA	1	FL	GA2/FW
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	4	08:19	BG	8	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	3	08:10	BG	180	FL	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	6	08:31	BG	40	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	2	08:00	BG	140	FL	GA
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	7	08:48	CA	1	FL	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	1	07:38	HG	2	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	19	16:32	HG	8	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	9	09:28	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	13	13:12	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	16	15:50	HG	4	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	15	15:09	HG	6	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	20	16:50	HG	2	HU/OG	GA1
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	11	11:05	H.	1	HU	FW
HD	27/02/2020	07:20	17:40	F4 west	4/8	8	0	excellent	10	09:52	HG	2	HU/OG	GA1
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent	2	07:35	CU	24	FL	FW/N of site
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent	4	09:08	KF	4	FL	FW
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2/FW
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2
COB	06/03/2020	07:00	18:13	1/4	6/8	0-8	Dry	excellent			CA	1	FL	GA2/FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	2	07:35	CU	25	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	3	07:39	CA	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	4	08:38	CA	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	15	12:09	BG	320	FL	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	1	07:10	HG	15	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	5	09:10	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	7	10:24	KF	1	FL	FW
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	8	11:02	HG	8	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	10	11:32	HG	2	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	12	11:45	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	18	14:42	HG	11	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	19	15:04	HG	3	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	20	15:25	HG	4	HU/OG	GA1
HD	06/03/2020	07:00	18:10	F1 west	4/8	4	0	excellent	21	16:02	HG	2	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	19	17:20	CA	1	FL	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	13	14:07	H.	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	9	11:22	CA	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	1	07:04	HG	22	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	2	07:04	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	4	08:10	KF	1	FL	FW
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	5	08:42	HG	6	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	8	10:52	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	10	11:41	HG	2	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	11	13:00	HG	2	HU/OG	
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	14	14:52	HG	8	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	15	15:04	HG	4	HU/OG	GA1
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	16	15:48	HG	2	HU/OG	GA1

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity	Fossitt Habitat
HD	14/03/2020	06:45	18:20	F2 SW	6/8	8	0	excellent	20	17:31	HG	2	HU/OG	GA1

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
1	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	4.5	5	100	0	Yes
2	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	4	0	95	5	Yes
3	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	95	5	Yes
4	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5.5	0	100	0	Yes
5	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	100	0	Yes
6	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	0	95	5	Yes
7	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	100	0	Yes
8	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	0	90	10	Yes
9	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	6	5	95	5	Yes
10	HD	05/09/2019	10:20	10:55	F2 west	5/8	14	0	excellent		0	5	0	10	0	Yes
1	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	0	90	12	Yes
2	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	13	0.5	80	20	Yes
3	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	9	11	60	30	Yes
4	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	1	88	12	Yes
5	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	13	0	90	10	Yes
6	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	8	0.1	70	30	Yes
7	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	9	0	85	20	Yes
8	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	7	0.5	80	25	Yes
9	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	10	0	50	50	Yes
10	NMH	05/09/2019	09:15	10:05	1/4	2/8	10	0	excellent		0	5.5	0.2	70	30	Yes
1	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	4	0	100	0	Yes
2	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	4	0	95	5	Yes
3	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5	0	95	5	Yes
4	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
5	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
6	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	0	95	5	Yes
7	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	100	0	Yes
8	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	0	90	10	Yes
9	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	6	5	90	10	Yes
10	HD	12/09/2019	11:15	11:40	F2 SE	7/8	14	0	excellent		0	5.5	0	95	5	Yes
1	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	11	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
2	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	12	1	85	15	Yes
3	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	16	3	75	25	Yes
4	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	8.5	0.8	92	8	Yes
5	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	14	0.1	95	5	Yes
6	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	8	0	85	15	Yes
7	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	6	0.5	85	15	Yes
8	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	9	0.5	95	5	Yes
9	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	11	0	85	15	Yes
10	NMH	12/09/2019	12:30	13:10	3/4	4/8	17	0	good	High dog activity and large amount of dog droppings	0	7.5	0	80	20	Yes
1	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	90	10	Yes
2	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	4	0	95	5	Yes
3	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	100	0	Yes
4	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	100	0	Yes
5	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	95	5	Yes
6	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	100	0	Yes
7	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5	0	90	10	Yes
8	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	5.5	0	100	0	Yes
9	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	90	10	Yes
10	HD	19/09/2019	14:30	15:00	F2 west	4/8	18	0	excellent		0	6	0	90	10	Yes
1	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	13	0	95	5	Yes
2	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	10.5	0	97	3	Yes
3	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	17.5	0.2	92	8	Yes
4	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	7.5	1	95	5	Yes
5	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	12	0	80	20	Yes
6	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	12	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
7	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	10	0.5	83	17	Yes
8	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	8.5	1	90	10	Yes
9	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	9.5	0	89	11	Yes
10	NMH	19/09/2019	12:45	13:25	0	0	18	0	excellent	Day started cold and misty, grass dew. Temp rose and grass dried	0	6	0	78	22	Yes
1	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	90	10	Yes
2	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	100	0	Yes
3	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	100	0	Yes
4	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	5	90	10	Yes
5	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5.5	0	90	10	Yes
6	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	100	0	Yes
7	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	5	0	100	0	Yes
8	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	7	0	90	10	Yes
9	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	90	10	Yes
10	HD	27/09/2019	16:05	16:35	F3 SW	6/8	17	0	excellent		0	6	0	90	10	Yes
1	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	16	0	90	10	Yes
2	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	12	0.3	87	13	Yes
3	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	22.5	0	98	2	Yes
4	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	1	0.5	97	3	Yes
5	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	15.5	0	96	4	Yes
6	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	8	0.2	89	11	Yes
7	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	10	0.5	95	5	Yes
8	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	12	3	92	8	Yes
9	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	9.5	0.3	95	10	Yes
10	NMH	27/09/2019	12:45	13:30	3/4	4/8	13	scattered showers	good	Day started wet and overcast until 11. After that weather cleared up, sun out on occasion	0	6.5	0.5	93	10	Yes
1	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	5	0	90	10	Yes
2	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
3	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	5	100	0	Yes
4	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	85	15	Yes
5	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	100	0	Yes
6	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	100	0	Yes
7	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	100	0	Yes
8	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	90	10	Yes
9	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	7	0	100	0	Yes
10	HD	03/10/2019	14:15	14:45	F2 SE	3/8	15	0	excellent		0	6	0	90	0	Yes
1	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	12	0	88	12	Yes
2	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	9.5	1	93	7	Yes
3	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	19	0.3	98	2	Yes
4	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	15	3	95	5	Yes
5	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	16	0	99	0	Yes
6	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	11	0.2	90	10	Yes
7	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	11.5	1	85	15	Yes
8	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	13	0	91	9	Yes
9	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	10	0.5	94	6	Yes
10	NMH	03/10/2019	14:02	14:41	3/4	6/8	12	intermittent light and heavy showers	good	day started off half overcast and gradually becoming stormy	0	7	0	85	15	Yes
1	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	17	0	75	25	Yes
2	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	80	20	Yes
3	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	70	30	Yes
4	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	65	35	Yes
5	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	12	0	60	40	Yes
6	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14	0	75	25	Yes
7	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14	0	60	40	Yes
8	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	14.5	0	85	15	Yes
9	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	55	45	Yes
10	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	12	0	50	50	Yes
11	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10	0	65	35	Yes

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12	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	10.5	0	70	30	Yes
13	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	60	40	Yes
14	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	11.5	0	65	35	Yes
15	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	11	0	55	45	Yes
16	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	9	0	75	25	Yes
17	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	8.5	0	60	40	Yes
18	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	9	0	75	25	Yes
19	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	13	0	80	20	Yes
20	COB	09/10/2019	12:10	13:00	2/4	3/8	13	Dry	excellent	Transect in large field	0	15	0	60	40	Yes
1	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	14	0	98	2	Yes
2	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	11	0.5	96	4	Yes
3	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	16	0	99	1	Yes
4	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	9.5	0.2	92	8	Yes
5	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	15	0.5	96	4	Yes
6	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	0.2	98	2	Yes
7	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	0	99	1	Yes
8	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	10	5	87	13	Yes
9	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	8	1.5	90	10	Yes
10	NMH	09/10/2019	14:30	15:05	3/4	3/8	12	0	good	breezy, blustery - grass not mown in 2 weeks	0	6	0	96	4	Yes
1	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13.5	0	75	25	Yes
2	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13	0	80	20	Yes
3	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	12.5	0	75	25	Yes
4	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10.5	0	70	30	Yes
5	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10	0	75	25	Yes
6	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	12	0	70	30	Yes
7	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8.5	0	55	45	Yes
8	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8	0	65	35	Yes
9	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9.5	0	60	40	Yes
10	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13	0	60	40	Yes
11	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11	0	65	35	Yes
12	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	7.5	0	60	35	Yes
13	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9	0	60	40	Yes
14	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	9.5	0	65	35	Yes
15	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	8	0	80	20	Yes
16	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	60	40	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
17	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	60	40	Yes
18	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	10.5	0	65	35	Yes
19	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	13.5	0	70	30	Yes
20	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11	0	65	35	Yes
21	COB	17/10/2019	15:00	15:45	2/4	3/8	14	None	excellent	Transect in big field	0	11.5	0	70	30	Yes
1	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	16	0.2	95	5	Yes
2	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	13	0.3	96	4	Yes
3	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	20	0.3	99	2	Yes
4	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	10.5	0.5	91	9	Yes
5	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	16	0.5	90	12	Yes
6	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	8	2	92	8	Yes
7	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	9.5	0.2	93	7	Yes
8	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	13.5	0	95	8	Yes
9	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	11.5	0.1	93	10	Yes
10	NMH	17/10/2019	17:36	18:00	0	2/8	8	scattered showers	excellent	Day started bright and warm. Afternoon scattered showers. Lots of HG foraging and resting	0	9	0	90	11	Yes
1	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	18	0	80	20	Yes
2	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	19	0	90	10	Yes
3	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	17	0	95	5	Yes
4	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	65	35	Yes
5	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	70	30	Yes
6	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	18	0	95	5	Yes
7	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	55	45	Yes
8	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	60	40	Yes
9	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	55	45	Yes
10	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	60	40	Yes
11	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	22	0	80	20	Yes
12	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	85	15	Yes
13	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	85	15	Yes
14	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	45	55	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
15	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	50	50	Yes
16	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	12	0	70	30	Yes
17	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	14	0	85	15	Yes
18	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	16	0	75	25	Yes
19	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	13	0	70	30	Yes
20	COB	24/10/2019	13:10	13:50	1/4	7/8	9	Dry	excellent	Transect in big field	0	15	0	80	20	Yes
1	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6	0.2	98	2	Yes
2	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6.5	0.5	97	4	Yes
3	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	7.5	0.4	97	5	Yes
4	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	9	0.2	99	1	Yes
5	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	13.5	0	98	2	Yes
6	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	1.2	98	3	Yes
7	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	6	0.3	97	5	Yes
8	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	0.1	98	3	Yes
9	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5.5	0.1	97	3	Yes
10	NMH	24/10/2019	13:30	14:10	0	2/8	12	scattered heavy showers mid afternoon	excellent	Bright clear start. Overcast and rainy afternoon. Grass freshly cut (3-4 days), various grass mosaic	0	5	0	96	8	Yes
1	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	18	0	75	25	Yes
2	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	95	5	Yes
3	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15	0	85	15	Yes
4	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15.5	0	55	45	Yes
5	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	12.5	0	70	30	Yes
6	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	85	15	Yes
7	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	13.5	0	80	20	Yes
8	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14.5	0	65	35	Yes
9	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	14	0	40	60	Yes
10	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent		0	15.5	0	40	60	Yes
11	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16	0	80	20	Yes
12	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15.5	0	60	40	Yes
13	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16	0	60	40	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
14	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15.5	0	55	45	Yes
15	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	15	0	60	40	Yes
16	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	13.5	0	70	30	Yes
17	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	11.5	0	70	30	Yes
18	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	16.5	0	95	5	Yes
19	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	14	0	75	25	Yes
20	COB	08/11/2019	13:20	13:50	1/4	1/8	7	Dry	excellent	Transect in big field	0	14.5	0	85	15	Yes
1	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	90	10	Yes
2	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	90	10	Yes
3	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7	5	95	5	Yes
4	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	90	10	Yes
5	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	5	0	100	0	Yes
6	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	6	0	100	0	Yes
7	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7.5	5	90	10	Yes
8	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	90	10	Yes
9	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	8	0	100	0	Yes
10	HD	08/11/2019	11:10	11:40	F3 NW	5/8	6	0	excellent	Grass was cut at the front entrance. Moss cover was ranged from 5-30	0	7	0	100	0	Yes
1	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	35	60	5	Yes
2	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	6	0	90	5	Yes
3	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	20	70	5	Yes
4	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	4	10	70	10	Yes
5	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	5	20	70	5	Yes
6	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	7	5	80	5	Yes
7	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	5	60	30	Yes
8	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	6	5	60	30	Yes
9	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	5	70	30	Yes
10	SB	08/11/2019	07:40	08:30	1/4	5/8	5	0	excellent		0	3	2	60	30	Yes
10	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
9	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
8	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	9	0	85	15	Yes
7	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
6	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	5	90	10	Yes
5	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	7	0	100	0	Yes
4	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	6	0	100	0	Yes
3	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
2	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	90	10	Yes
1	HD	13/11/2019	15:05	15:35	F2 south	7/8	6	0	excellent	Cold, dark overcast day. Large area covered by leaf litter. Large patches of bare ground	0	8	0	100	0	Yes
1	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	7	0.5	93	5	Yes
2	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	2	97	3	Yes
3	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	14	0	98	1	Yes
4	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	9	2.5	91	7	Yes
5	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	12	0.2	95	8	Yes
6	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	6	3	90	9	Yes
7	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	1	99	2	Yes
8	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	8	1	87	11	Yes
9	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	6.5	1.5	96	4	Yes
10	NMH	13/11/2019	14:36	15:11	1/4	6/8	8	None/light drizzle. Afternoon heavy rain from 15:00	good	Transect in front of Clonliffe College	0	5	0	90	10	Yes
1	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
2	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	7	0	90	10	Yes
3	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	95	5	Yes
4	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
5	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
6	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	65	35	Yes
7	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	6	0	85	15	Yes
8	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
9	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent	Transect in front of Clonliffe College	0	4	5	95	5	Yes
10	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
11	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
12	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	5	0	95	5	Yes
13	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	95	5	Yes
14	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	7	0	85	15	Yes
15	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	7	0	85	15	Yes
16	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	85	15	Yes
17	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	80	20	Yes
18	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	2	60	100	0	Yes
19	COB	21/11/2019	11:40	12:05	2/4	8/8	8	Intermittent rain	excellent		0	6	0	95	5	Yes
10	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	10	0	100	0	Yes
9	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	95	5	Yes
8	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	90	10	Yes
7	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8.5	0	100	0	Yes
6	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	5	90	10	Yes
5	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	7	0	95	5	Yes
4	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8	0	100	0	Yes
3	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9.5	0	90	10	Yes
2	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	9	0	90	10	Yes
1	HD	29/11/2019	13:40	14:10	F2 north	8/8	5	showers (light)	excellent	No evidence of Geese. Grass has grown in southern transect. Moss/leaf litter cover ranges from 5-60	0	8.5	0	95	5	Yes
1	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	30	40	40	Yes
2	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	40	30	30	Yes
3	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	10	70	10	Yes
4	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	20	80	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
5	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	8	10	60	40	Yes
6	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	50	40	20	Yes
7	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	7	10	80	20	Yes
8	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	6	10	60	40	Yes
9	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	7	5	50	50	Yes
10	SB	29/11/2019	08:20	09:10	1/4	4/8	6	showers most of the day	excellent	Transect in front of Clonliffe College	0	5	0	60	40	Yes
1	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	10	15	100	0	Yes
2	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
3	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
4	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
5	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
6	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	10	10	100	0	Yes
7	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	7	5	90	10	Yes
8	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	7	15	65	35	Yes
9	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent	Transect in front of Clonliffe College	0	9	0	70	30	Yes
10	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	0	45	55	Yes
11	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	7	0	90	10	Yes
12	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	10	0	100	0	Yes
13	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	0	85	15	Yes
14	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	8	0	5	80	Yes
15	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	6	5	85	15	Yes
16	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	11	0	100	0	Yes
17	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	6	5	100	0	Yes
18	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	9	5	85	15	Yes
19	COB	06/12/2019	08:24	16:08	2/4	4/8	9	Light showers	excellent		0	10	5	85	15	Yes
1	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
2	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9.5	0	90	10	Yes
3	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	5	100	0	Yes
4	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
5	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	7	0	90	10	Yes
6	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
7	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
9	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
10	HD	06/12/2019	11:15	11:45	F3 west	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	6	0	90	10	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	6	0	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	65	35	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	8	5	85	15	Yes
	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
1	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
2	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
3	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	6	0	100	0	Yes
4	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	9	0	90	10	Yes
5	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	0	0	100	Yes
6	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	10	5	95	Yes
7	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	6	40	0	100	Yes
8	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	9	0	10	90	Yes
9	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	7	0	20	80	Yes
10	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	7	0	15	85	Yes
11	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	8	0	30	70	Yes
12	COB	11/12/2019	08:29	16:02	2/4	1/8	5	Dry	excellent		0	4	25	25	75	Yes
10	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
9	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
7	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
6	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
5	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	7	0	100	0	Yes
4	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	8	0	95	5	Yes
3	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
2	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
1	HD	11/12/2019	12:00	12:30	F2 west	5/8	6	0	excellent	Transect in front of Clonliffe College	0	9	0	95	5	Yes
1	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
2	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	5	95	5	Yes
3	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	9	5	95	5	Yes
4	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	10	5	100	0	Yes
5	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
6	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	10	90	10	Yes
7	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	7	5	95	5	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
8	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
9	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	11	0	95	5	Yes
10	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	8	5	95	5	Yes
11	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	10	5	100	0	Yes
12	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	9	10	95	5	Yes
13	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	10	0	80	20	Yes
14	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	0	75	25	Yes
15	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	5	85	15	Yes
16	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	8	5	90	10	Yes
17	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	6	10	90	10	Yes
18	COB	20/12/2019	08:37	16:08	1/4	2/8	7	Dry	excellent		0	7	10	95	5	Yes
10	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	90	10	Yes
9	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10.5	0	95	5	Yes
8	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	90	10	Yes
7	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10	0	90	10	Yes
6	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	9	0	95	5	Yes
5	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	8	5	90	10	Yes
4	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	8	0	100	0	Yes
3	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	10.5	0	90	10	Yes
2	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	11	0	95	5	Yes
1	HD	20/12/2019	14:15	14:45	F2 SW	7/8	5	0	good	Transect in front of Clonliffe College	0	9	0	90	10	Yes
1	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	85	15	Yes
2	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	20	95	5	Yes
3	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	90	10	Yes
4	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	100	0	Yes
5	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
6	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
7	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	0	100	0	Yes
8	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Transect in front of Clonliffe College	0	10	10	100	0	Yes
9	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	9	5	90	10	Yes
10	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	10	100	0	Yes
11	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	100	0	Yes
12	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	5	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
13	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	5	90	10	Yes
14	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	95	5	Yes
15	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	100	0	Yes
16	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	95	5	Yes
17	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	8	10	75	25	Yes
18	COB	08/01/2020	08:38	16:26	2/4	7/8	8	Dry	excellent	Landscape gardeners confirmed main area of grass is being cut this winter	0	7	5	75	25	Yes
10	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
9	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
8	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9.5	0	95	5	Yes
7	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
6	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
5	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	8.5	0	90	10	Yes
4	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
3	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
2	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
1	HD	08/01/2020	14:20	14:50	F2 SW	5/8	8	0	excellent	Transect in front of Clonliffe College	0	9	0	85	15	Yes
1	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
2	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	60	100	0	Yes
3	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	95	5	Yes
4	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	70	100	0	Yes
5	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
6	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	10	100	0	Yes
7	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
8	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
9	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
10	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
11	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	100	0	Yes
12	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	95	5	Yes
13	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	100	0	Yes
14	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	100	0	Yes
15	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	5	90	10	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
16	COB	15/01/2020	08:33	16:36	3/4	1/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	85	15	Yes
10	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
9	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
8	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9.5	0	90	5	Yes
7	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
6	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
5	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
4	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
3	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	11	0	95	5	Yes
2	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	10.5	0	90	10	Yes
1	HD	15/01/2020	11:10	11:40	F3 SW	3/8	7	0	excellent		0	10	0	85	15	Yes
1	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	15	80	20	Yes
2	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	8	25	100	0	Yes
3	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	10	85	15	Yes
4	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	7	35	100	0	Yes
5	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	8	5	100	0	Yes
6	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	9	10	100	0	Yes
7	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent		0	9	10	100	0	Yes
8	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	100	0	Yes
9	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	6	15	80	20	Yes
10	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	90	10	Yes
11	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	100	0	Yes
12	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	100	0	Yes
13	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
14	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	15	100	0	Yes
15	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
16	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	9	0	75	25	Yes
17	COB	24/01/2020	08:22	16:52	1/4	8/8	8	Dry	excellent	Transect in front of Clonliffe College	0	8	30	70	30	Yes
10	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
9	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
8	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	9	0	90	10	Yes
7	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
6	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
5	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent	Transect in front of Clonliffe College	0	10	5	95	5	Yes
4	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	10	0	95	5	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
3	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	11	0	95	5	Yes
2	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	11	0	90	0	Yes
1	HD	24/01/2020	15:20	15:45	F2 east	7/8	5	0	excellent		0	10	0	90	10	Yes
1	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	5	95	5	Yes
2	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	8	10	90	10	Yes
3	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	10	100	0	Yes
4	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	6	15	100	0	Yes
5	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	6	10	80	20	Yes
6	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent		0	9	10	100	0	Yes
7	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
8	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	6	10	95	5	Yes
9	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
10	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	5	100	0	Yes
11	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	25	100	0	Yes
12	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	15	85	15	Yes
13	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	10	90	10	Yes
14	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	9	5	90	10	Yes
15	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	8	15	85	15	Yes
16	COB	31/01/2020	08:12	17:05	2/4	6/8	13	Dry	excellent	Transect in front of Clonliffe College	0	7	5	90	10	Yes
1	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
2	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
3	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
4	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	95	5	Yes
5	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	11	5	90	10	Yes
6	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
7	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	9	0	100	0	Yes
8	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
9	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
10	HD	31/01/2020	14:00	14:30	F2 SW	6/8	9	0	excellent		0	11	0	95	5	Yes
1	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes
2	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	15	90	10	Yes
3	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	15	100	0	Yes
4	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	10	100	0	Yes
5	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	8	10	95	5	Yes
6	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	6	10	85	15	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
7	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	6	10	85	15	Yes
8	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	10	90	10	Yes
9	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent		0	7	5	80	20	Yes
10	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	9	15	90	10	Yes
11	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	5	40	90	10	Yes
12	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	6	25	100	0	Yes
13	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	90	10	Yes
14	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	15	100	0	Yes
15	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	100	0	Yes
16	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	8	10	95	5	Yes
17	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	6	10	85	15	Yes
18	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	10	90	10	Yes
19	COB	05/02/2020	08:05	17:13	1/4	3/8	0-8	Dry	excellent	Transect in front of Clonliffe College	0	7	5	80	20	Yes
10	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
9	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	10	0	Yes
8	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
7	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	5	90	10	Yes
6	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10.5	0	95	10	Yes
5	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent	Transect in front of Clonliffe College	0	10	0	100	0	Yes
4	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	90	10	Yes
3	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	95	5	Yes
2	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	11	0	90	10	Yes
1	HD	05/02/2020	10:00	10:30	F2 west	6/8	6	0	excellent		0	10	0	90	10	Yes
1	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	90	10	Yes
2	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	10	75	25	Yes
3	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	5	95	5	Yes
4	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	4	30	100	0	Yes
5	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	0	100	0	Yes
6	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	100	0	Yes
7	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	5	100	0	Yes
8	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	5	20	100	0	Yes
9	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	15	90	10	0	Yes
10	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	10	90	10	Yes
11	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	0	85	15	Yes
12	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	15	85	15	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
13	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	7	5	90	10	Yes
14	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	5	100	0	Yes
15	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	15	90	10	Yes
16	COB	14/02/2020	07:47	17:32	3/4	3/8	11	Dry	excellent		0	6	5	90	10	Yes
1	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
2	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10	0	90	10	Yes
3	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
4	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
5	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
6	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	100	0	Yes
7	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10.5	0	90	10	Yes
8	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	10.5	0	80	20	Yes
9	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
10	HD	14/02/2020	11:00	11:30	F3 south	5/8	7	0	excellent	Transect in front of Clonliffe College	0	12	0	95	5	Yes
1	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
2	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	10	5	85	15	Yes
3	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	12	0	85	15	Yes
4	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	90	10	Yes
5	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	10.5	0	100	0	Yes
6	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	11	0	95	5	Yes
7	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent	Transect in front of Clonliffe College	0	0	90	10	0	Yes
8	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	12	0	85	15	Yes
9	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	11	0	90	10	Yes
10	HD	22/02/2020	14:05	14:35	F4 west	8/8	7	showers	excellent		0	12	0	95	5	Yes
15	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	5	100	0	Yes
16	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	6	15	100	0	Yes
17	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	15	90	10	Yes
1	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	5	25	95	5	Yes
2	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	6	35	100	0	Yes
3	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	15	100	0	Yes
4	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	5	100	0	Yes
5	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	15	100	0	Yes
6	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	9	10	100	0	Yes
7	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	10	5	100	0	Yes
8	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes

id	Surveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
9	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	65	60	40	Yes
10	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	8	5	100	0	Yes
11	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	7	10	100	0	Yes
12	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	excellent		0	10	0	100	0	Yes
13	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	Excellent		0	8	15	80	20	Yes
14	COB	06/03/2020	07:00	18:13	1/4	3/8	0-8	Dry	Excellent		0	8	10	90	10	Yes
10	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	95	5	Yes
9	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	90	10	Yes
8	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	5	90	10	Yes
7	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	85	15	Yes
6	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	10	0	90	10	Yes
5	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	90	10	Yes
4	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11.5	0	95	5	Yes
3	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	90	10	Yes
2	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	11	0	85	15	Yes
1	HD	06/03/2020	14:45	15:15	F1 west	3/8	6	0	excellent		0	12	0	95	5	Yes
10	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	90	10	Yes
9	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	85	15	Yes
8	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11.5	0	90	10	Yes
7	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11.5	0	85	15	Yes
6	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11	0	90	10	Yes
5	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	85	15	Yes
4	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	11	0	95	5	Yes
3	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	90	10	Yes
2	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	12	0	85	15	Yes
1	HD	14/03/2020	11:20	11:55	F2 SW	5/8	7	showers	excellent		0	13	0	90	10	Yes

Wintering Bird Survey Report

For a Proposed Strategic Housing Development

Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3

Prepared for CWTC Multi Family ICAV

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Document Control

Project Title	Wintering Bird Survey Report, Lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3			
Document Title	Wintering Bird Survey Report		**Project No.**	200228
Revision	**Issue Date**	**Author**	**Reviewed By**	**Approved By**
I2	19/04/2021	CMcC	ACr	ACr

Table of Contents

1 Introduction

1 This Wintering Bird Survey Report was authored by Criostoir Mac Cuirc of Scott Cawley Ltd.

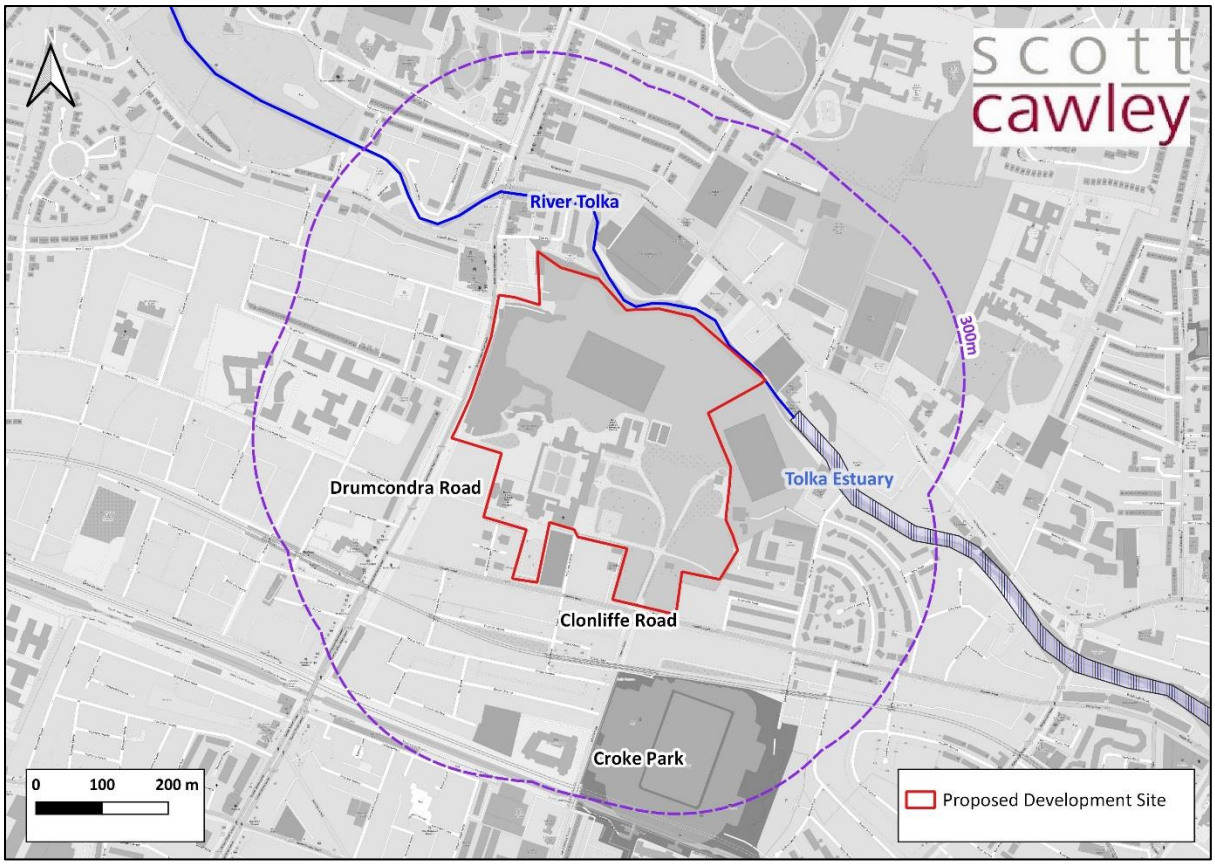
2 It provides an overview of the wintering bird baseline for lands at Clonliffe College, Clonliffe Road, Drumcondra, Dublin 3 (refer to Figure 1 for location) for the season 2020/21. The proposed development consists of a residential scheme to be constructed within the red line boundary illustrated in Figure 1, below.

3 The proposed development site consists of the Clonliffe College Campus, containing large amenity grassland areas, areas of parkland, woodland, and ornamental borders. A large area of open grassland habitat is located in the northern part of the lands, south of the River Tolka. There are scattered trees throughout the proposed development site, but particularly along the northern and western parts. The proposed development site is surrounded largely by residential development. There are also several sports complexes in the vicinity - the Belvedere Rugby grounds to the east, and Shelbourne Football Club across the River Tolka, to the north and Croke Park Stadium to the south.

4 The purpose of the report is to:

- Establish the presence/absence and use of the proposed development site and surrounding area by wintering birds; and
- To understand the importance of the proposed development site and surrounding area for wintering birds, including those Special Conservation Interest (SCI) species for which European sites have been designated.

Figure 1: The proposed development site in relation to the surrounding environment.



2 Planning, Policy and Legislation

5 The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Wintering Bird Survey Report.

6 The following international legislation is relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter, referred to as the 'Habitats Directive'. The Habitats Directive is the legislation under which the Natura 2000 network[1] was established and special areas of conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- Directive 2009/147/EEC; hereafter, referred to as the 'Birds Directive'. The Birds Directive is the legislation under which special protection areas are designated for the protection of endangered species of wild birds listed in Annex I of that directive.

7 The following national legislation is relevant to the proposed development in the context of wintering wetland bird SCIs of European sites:

- *European Communities (EC) (Birds and Natural Habitats) Regulations 2011 to 2015*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the regulations).

8 The following plans and policies are relevant to the proposed development:

- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- Dublin City Development Plan 2016-2022 (Dublin City Council, 2016)
- Dublin City Biodiversity Action Plan 2015-2020 (Dublin City Council, 2015)

3 Methodology

3.1 Author Statement

9 This report was authored by Criostoir Mac Cuirc, and reviewed by Ashling Cronin of Scott Cawley Ltd. Survey methodologies were designed and supervised by Scott Cawley (Colm Clarke) and surveys were completed by Cathal O'Brien, Shane Brien of Scott Cawley, and independent ornithologists, Kate Bismilla and Kathryn Sheridan.

10 Criostoir Mac Cuirc is a Consultant Ecologist at Scott Cawley Ltd. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin in 2019. Criostoir is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He has

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

experience in field data collection of botanical habitat and mammal surveys in Ireland for a range of developments. Since joining Scott Cawley, Criostoir has primarily been involved in habitat classification fieldwork, data collection and analysis, and GIS for a major road infrastructural development. Criostoir also has experience in botanical and bird surveys.

11 Ashling Cronin is Technical Director at Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from The Honourable Society of King's Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the private and public sector. As Technical Director, Ashling provides technical review and quality assurance of surveys and documentation.

12 Colm Clarke is a Senior Ecologist with Scott Cawley and has over five years' experience in ecological consultancy. He obtained an honours degree in Natural Sciences, with a specialisation in Botany, from Trinity College Dublin, and a Masters in Biodiversity and Conservation from the same institution. Colm is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Colm has been project manager and lead author on a large number of Ecological Assessments for Scott Cawley, and regularly undertakes both field work and report writing as part of his role. Colm was the project manager for Wintering Bird Surveys at Clonliffe College.

13 Shane Brien is a Consultant Ecologist with Scott Cawley. He holds an honours degree in Environmental Science from NUI Galway and completed his Masters in Ecological Assessment from University College Cork. Shane has professional experience working in Spain and different parts of Ireland for the last four years. His work has included conducting habitat surveys, floral species lists, bird surveys, mammal surveys (e.g. bats, otters, and badgers), and invertebrate surveys. He has a great interest and enthusiasm in ecology, with a special interest in botany. Since joining Scott Cawley his work has been focused on the collection of ecological data, data analysis, desktop work and preparation of Appropriate Assessment reports. Shane completed wintering bird surveys for the proposed development site under the supervision of Colm Clarke.

14 Cathal O'Brien is a Consultant Ecologist at Scott Cawley Ltd. with over two years' professional ecological consultancy experience. Cathal is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a BSc (Hons) in Environmental Biology from University College Dublin and a MSc (Hons) in Ecology from the University of Bremen. He has a range of fieldwork experience conducting bird, botanical, habitat and mammal surveys in Ireland for a range of large- and small-scale developments. Cathal also has experience in botanical and bird surveys through citizens science programmes and initiatives. Since joining Scott Cawley, he has primarily been involved in fieldwork, recording data and data analysis, and mapping for residential and infrastructural developments as well as a large-scale agri-environmental scheme.

15

3.2 Desk Study

16 A desk study was undertaken in June 2020 prior to the commencement of field work. It was updated in April 2021 following the completion of field work. The purpose of the desk study was to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

- Records of wetland bird species which are Special Conservation Interests (SCIs) for European sites, for the 10km grid square O13, as held by the National Biodiversity Data Centre www.biodiversityireland.ie – refer to Appendix I for all desk study records
- Irish Wetland Bird Survey (I-WeBS) summary data for the following sites: 0U404 Dublin Bay; 0U403 Baldoyle Bay; 0U408 Broadmeadow (Malahide) Estuary; 0U407 Rogerstown Estuary; 0U951 Ireland's Eye; and 0U903 Lambay Island. Summary data was downloaded from the BirdWatch Ireland website at https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/

- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland* (Colhoun & Cummins, 2013)
- Publicly available information on inland feeding sites for Light-bellied Brent Geese *Branta bernicla hrota* (herein referred to as Brent Geese) in the Dublin area contained within (Benson, 2009), Scott Cawley (2017) and Enviroguide (2020).

17 It is Scott Cawley's understanding that a three-year project studying the movements and behaviour of wintering bird species in Dublin Bay, and funded in part by the four Dublin local authorities (Dublin City Council, South Dublin County Council, Dún Laoghaire-Rathdown County Council, and Fingal County Council), is ongoing. The data was not publicly available at the time of writing of this report.

3.3 Field Survey

18 Surveys of wintering wetland birds utilising the proposed development site and the adjacent lands at Clonliffe College were undertaken between sunrise and sunset, four times per month, for the months of October 2020 through February 2021 and five surveys in March 2021, inclusive. All survey dates were completed and are listed in

19

20

21 Table 1, overleaf.

22 Each survey visit was conducted by two surveyors, who recorded observations of wintering birds entering and exiting the lands, and the behaviour and movements of birds within the lands. Observations were aided by the use of Binoculars (8x42) and a spotting scope. Where present and readable, ring codes of birds were collected. The surveyors kept to the margins of fields in the site so as to ensure that their presence did not prevent birds landing on site.

23 The survey effort in this instance is intended to provide a representative sample of use of the lands by wintering birds. The observations of bird movements in the lands were complemented by a search for evidence of wintering birds in the lands. Droppings and feathers of Brent Geese accumulate on well-used sites (Colm Clarke (Scott Cawley), pers. comm), and on survey dates where birds were not observed landing in the survey area, a search for evidence of wintering birds was undertaken. Data was collected at sampling points (c. 1m2 in total area, i.e. 1m x 1m) located equidistant from each other along a fixed transect line through the proposed development site (see Figure 2, overleaf). Data on the following variables was collected at each sampling point along the transect:

- The presence and abundance of signs of wintering birds (e.g. droppings and feathers)
- The height of the grass sward
- The proportion cover of bare ground
- The proportion cover of grass species
- The proportion cover of forb[2] species present

24 The results of field surveys have been contextualised against the 1% threshold of the international population of each species[3], as contained within Nagy & Langendoen (2018), and against the populations

[2] A forb is an herbaceous plant species that is not a grass, sedge or rush, e.g. the plant species daisy *Bellis perennis*.

[3] The 1% criterion is applied to identify sites of international importance for birds

of each species at nearby European sites. European sites in the vicinity of the proposed development are illustrated in Figure 3, overleaf.

Table 1 Winter bird survey dates

Survey Date(s)	Surveyor(s)
8th October 2020 15th October 2020 20th October 2020 30th October 2020	Shane Brien and Cathal O'Brien of Scott Cawley Ltd., and independent ornithologists Kate Bismilla and Kathryn Sheridan.
6th November 2020 11th November 2020 20st November 2020 27th November 2020	
4th December 2020 12th December 2020 16th December 2020 21st December 2020	
8th January 2021 20th January 2021 26th January 2021 29st January 2021	
3th February 2021 8th February 2021 10nd February 2021 22th February 2021	
4th March 2021 8th March 2021 18th March 2021 24th March 2021 31th March 2021	

Figure 2: Transect lines in relation to the survey area.

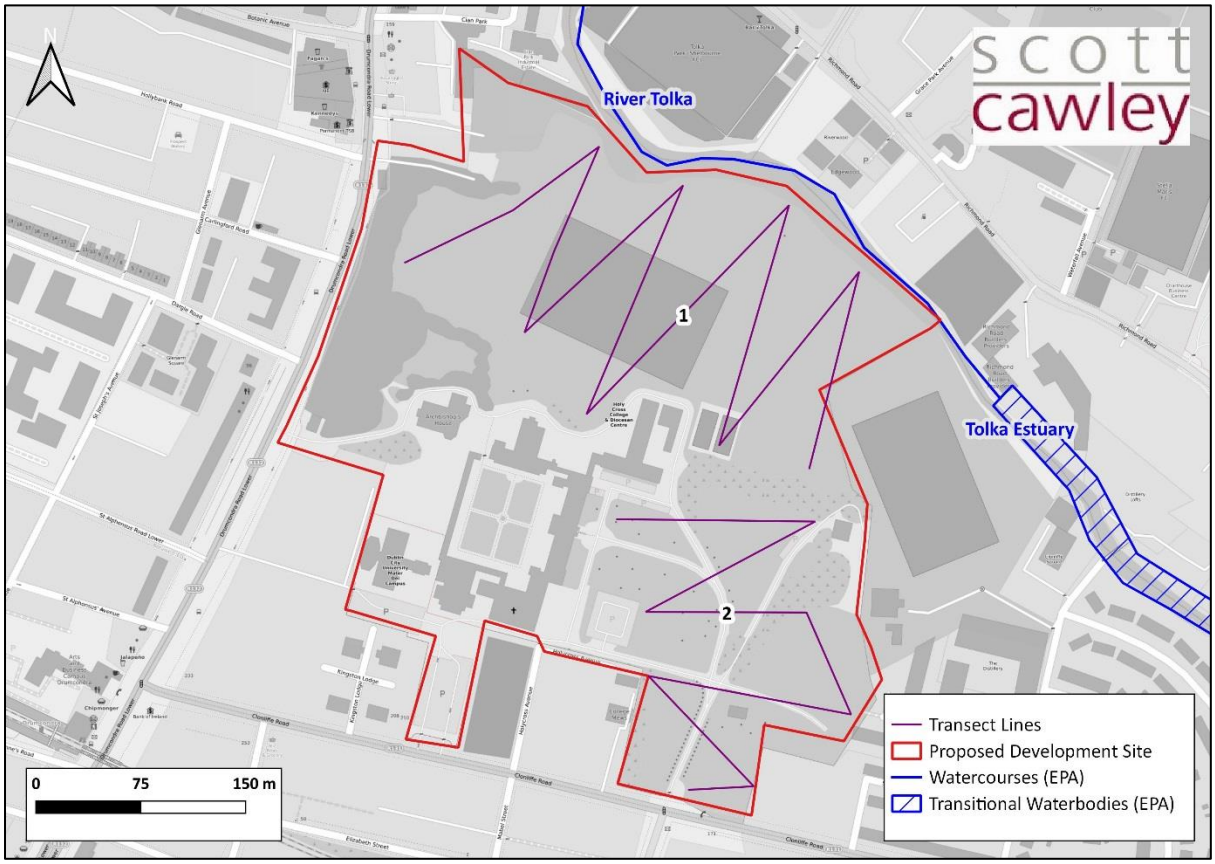
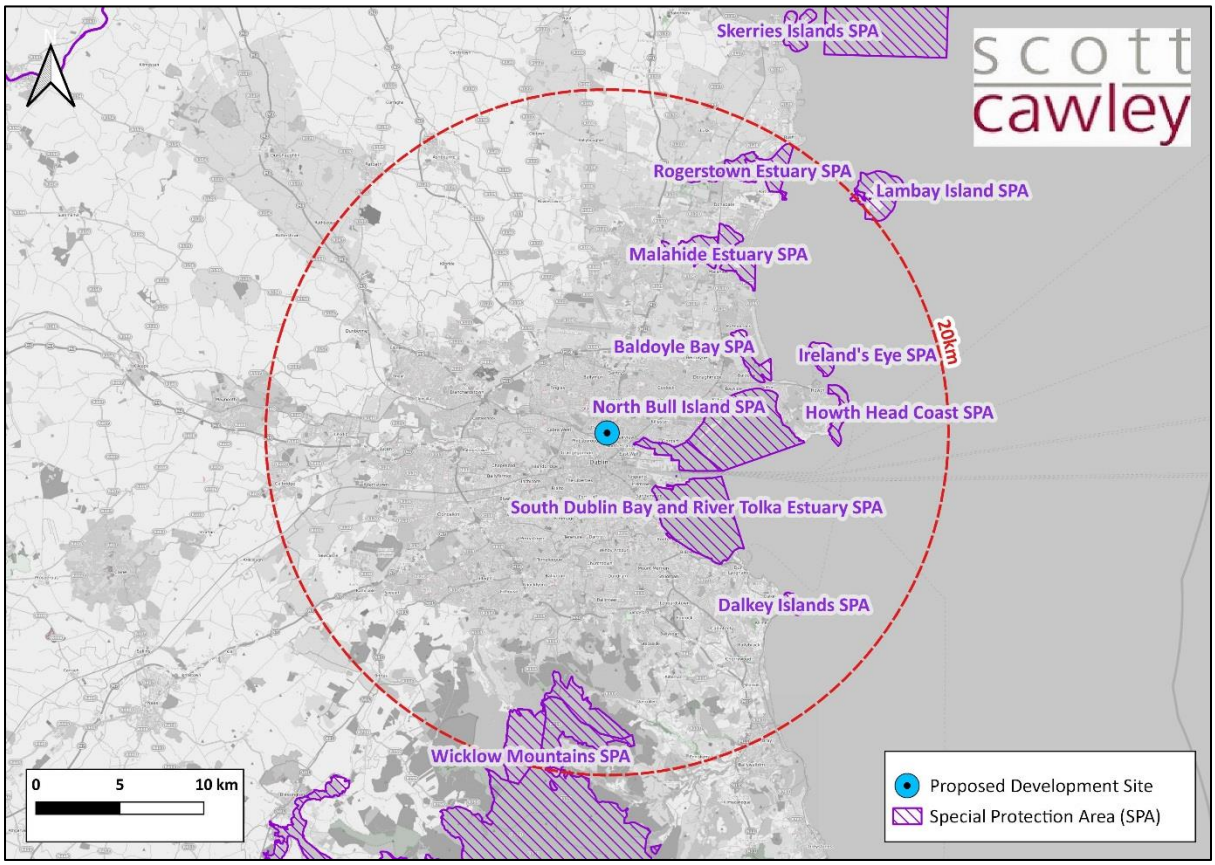


Figure 3: Proposed development site in the context of European sites within 20km.



3.3.1 Survey Limitations

25 It must be acknowledged that the surveys of the lands were undertaken across a single wintering bird survey season. It is possible that the number and frequency of use of inland feeding sites varies from season to season, based on forage resource, disturbance levels, changes to site suitability and other environmental factors. Desktop sources of information have been referenced to overcome this limitation. Most recent data on inland foraging sites for Brent Geese relates to the 2015/16 and 2016/17 wintering bird season, contained within Scott Cawley (2017) and wintering birds surveys of the site 2019/20 Scott Cawley (2020).

4 Wintering Bird Baseline

26 The results of desk study searches are presented in full in Appendix I of this report, while the full set of survey observations are included as Appendix II of this report. The results of desk and field surveys are summarised in this section of the report, and account of observations by species is included in the sections below.

27 Records of 49 species of wetland birds, for which European sites have been designated, were returned from the search of the NBDC database for the 10km grid square O13. The records have been reproduced in Appendix I of this report.

28 The following SCI species of European sites in the vicinity of the proposed development site were observed either flying over or foraging within the proposed development site in the 2020/2021 wintering bird season:

- Herring Gull *Larus argentatus*
- Light-bellied Brent Goose *Branta bernicla hrota*

- Cormorant *Phalacrocorax carbo*
- Curlew *Numenius arquata*
- Grey heron *Ardea cinerea*
- Kingfisher *Alcedo atthis*

29 Herring Gull were the most frequent visitors to the proposed development site, with observations of the species on all 25 survey dates. Light-bellied Brent Geese (hereafter referred to as Brent Geese) did not land to forage within the proposed development site on any date over the survey period, and were observed flying over the site on 16 dates between November 2020 and March 2021. Curlew were recorded foraging and flying over the proposed development site on four dates between October and December 2020. Cormorant were observed foraging in the River Tolka, flying over or within the proposed development site on 17 dates between October 2020 and March 2021. Kingfisher were observed foraging in and along the River Tolka on the northern boundary of the site on four of the 25 survey dates between October 2020 and March 2021. Grey Heron were observed foraging along the river Tolka or flying over or adjacent to the proposed development site 17 of the 25 survey dates.

30 The proposed development site has been closed off to the public since March 2020, and for all of the 2020/21 winter bird survey season, with restricted access to essential staff and visitors only.

31 Wetland bird species are mobile and can regularly travel up to 20km between roosting and feeding sites (Scottish Natural Heritage, 2010). For this reason, it is possible that birds observed at Clonliffe College could belong to populations of SCI species associated with European sites up to 20km from the survey area. Each of the eight SCI species observed foraging within or flying over the survey are discussed in more details in the subsections set out below.

4.1 Herring Gull *Larus argentatus* [A184]

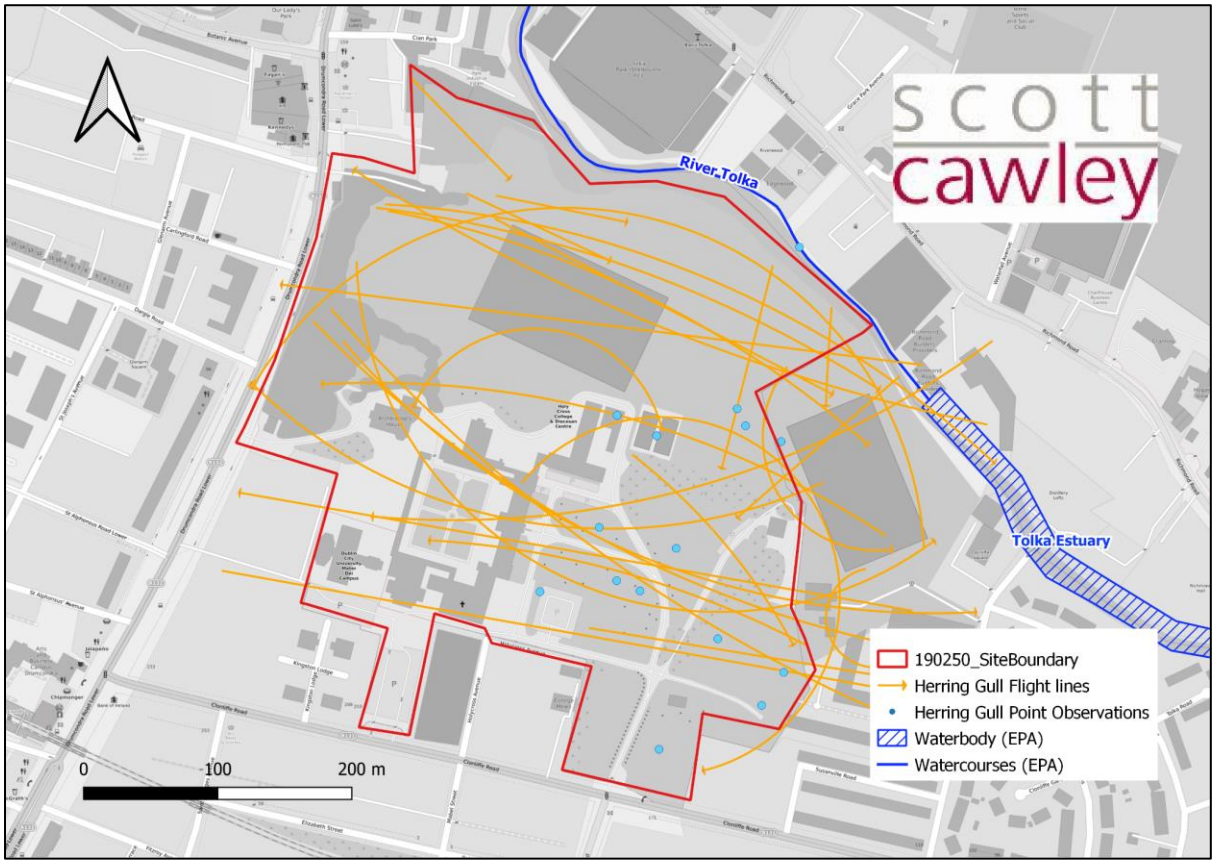
4.1.1 Results of Desk Study for Herring Gull

32 Herring Gull *Larus argentatus* [A148] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Ireland's Eye is an important breeding site for Herring Gull, and has a population of 250 birds (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Lambay Island is an important breeding site for Herring Gull, and has a population of 1,806 birds (NPWS, 2018B).

33 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the proposed development site for forage during the winter months. This species is a commonly encountered urban bird species, with large populations residing in the urban area around Dublin.

Figure 4: Herring Gull activity in the survey area between October 2020 and March 2021



4.1.2 Field Survey Results for Herring Gull

34 Herring Gull were observed in the proposed development site on all 25 survey dates. On the vast majority of survey visits, a small number of birds (<20 birds) were observed foraging for earthworms on grassland areas of the site. Larger flocks of the species (>20 birds) were observed on 12 dates between October 2020 and March 2021 (full list of observations included in Appendix II of this report). The peak count for Herring Gull foraging in the proposed development site was 144 birds observed on 21st December 2020.

4.1.3 Herring Gull at Clonliffe College in the context of European sites within 20km

35 It is worth bearing in mind that nearby European sites have been designated for their breeding populations of Herring Gull as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

36 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 30% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 471 birds for the period 2011/2013– 2017/18 (See Appendix I).
- 72% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 200 birds over the period 2011/2013– 2017/18 (See Appendix I).

37 According to Nagy & Langendoen (2018), 1% of the international population of Herring Gull is 10,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2020/21 survey season. The peak count of 144 birds observed in the survey area represents 1.4% of the 1% international population of the species.

4.2 Light-bellied Brent Goose *Branta bernicla hrota* [A046]

4.2.1 Results of Desk Study for Brent Goose

38 Light-bellied Brent Goose *Branta bernicla hrota* [A046] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

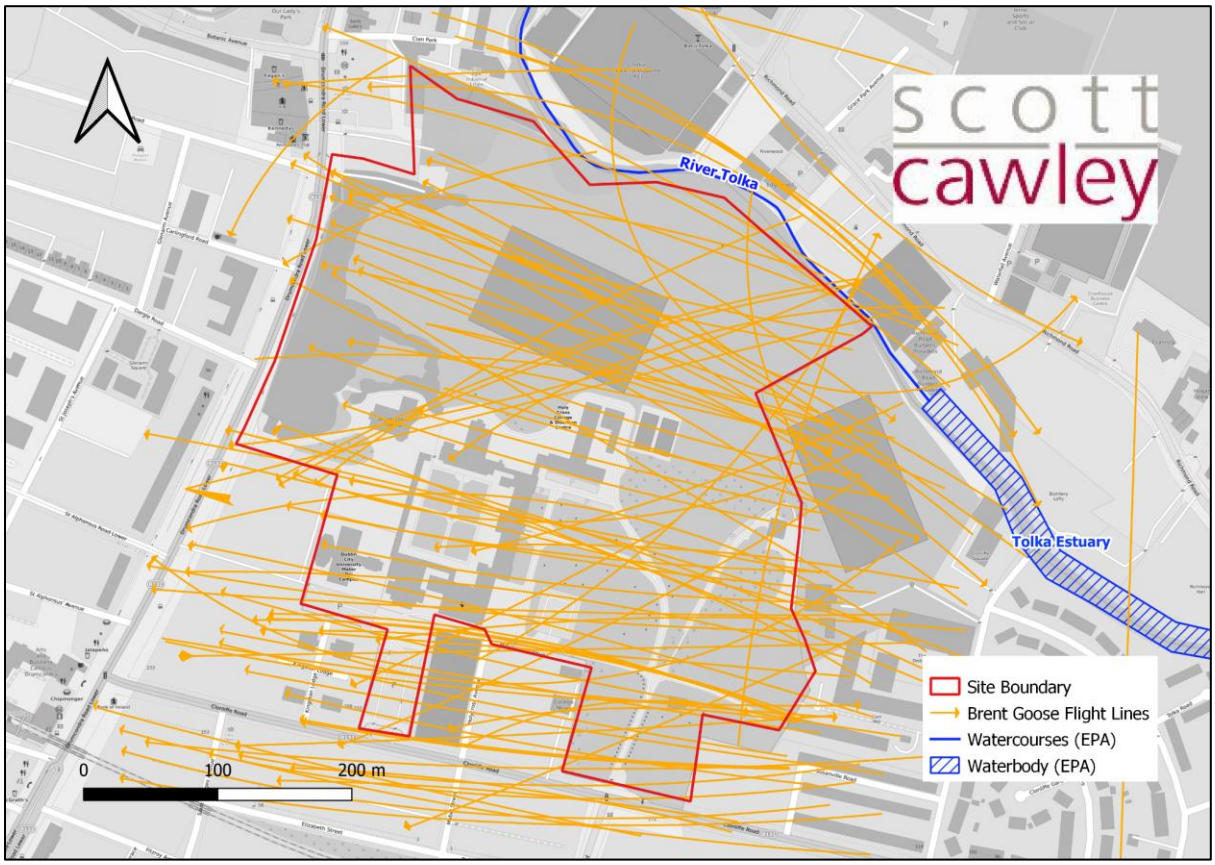
- South Dublin Bay and River Tolka Estuary SPA (004024), *c.* 1.5km southeast. This European site encompasses the coastal and intertidal zones of Dublin Bay extending between the Bull Wall in the north and Dún Laoghaire West Pier in the south. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 525 birds in the Conservation Objectives Supporting Document (NPWS, 2014). South Dublin Bay and River Tolka Estuary SPA (004024) is listed as the twelfth most important site in the country for this species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay.
- North Bull Island SPA (004006), *c.* 4.5km east. This European site encompasses the coastal fringes of Bull Island, and surrounding intertidal and coastal zones extending between the North Bull wall in the south and Howth Head in the north. The baseline population of Brent Geese in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 1,548 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the most important site in Ireland for wintering Brent Geese (NPWS, 2014). The site hosts a population of international importance for the species. It should be noted that the number of Brent Geese in Dublin Bay has increased significantly since the original baseline population was estimated based on review of I-WeBS data for 0U404 Dublin Bay
- Baldoyle Bay SPA (004016), *c*. 8.9km north-east. This European site encompasses the intertidal lagoon and tidal mouth of an estuary between Baldoyle Village and Portmarnock Village in North County Dublin. The baseline population for Brent Geese at this European site is 726 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2011). Baldoyle Estuary SPA is listed as the seventh most important site for Brent Geese in Ireland. The Baldoyle flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site.
- Malahide Estuary SPA (004025), *c.* 10.8km north. This European site encompasses the Malahide Estuary and Broadmeadow Water and surrounding coastal habitats. The baseline population for Brent Geese at this European site is 1,104 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013A). Malahide Estuary SPA is listed as the fourth most important site for Brent Geese in Ireland. Recent I-WeBS data for Rogerstown Estuary does not include regular counts of Brent Geese, however older data from the period 2005/06-2009/10 indicates that the flock has increased in size relative to the baseline (NPWS, 2013B)
- Rogerstown Estuary SPA (004015), *c.* 15.4km north. The baseline population for Brent Geese at this European site is 1,069 birds, based on the five-year mean peak counts for the period 1995/96-1999/2000 (NPWS, 2013B). Rogerstown Estuary SPA is listed as the fifth most important site for Brent Geese in Ireland. The Rogerstown Estuary flock has decreased in size relative to the baseline population for the SPA based on review of recent I-WeBS data for the site

39 It is likely that there is some movement of birds between the aforementioned flocks over the winter period, based on changes in foraging resources and other variables. The flock in Dublin Bay (encompassing both the South Dublin Bay and River Tolka Estuary SPA, and North Bull Island SPA populations) forms a single unit, with roosting concentrated in the Lagoon east of Bull Island (NPWS, 2014). The Dublin Bay population forages on *Zostera* beds and algal mats in the bay. It also uses a range of terrestrial sites inland of Dublin Bay for foraging (NPWS 2014; Benson, 2009; Scott Cawley, 2017; Enviroguide, 2019). It is thought that the switch to inland terrestrial sites is linked to recent increases in population and/or depletion of coastal foraging resources through the winter season (NPWS, 2014; Benson, 2009).

40 The first published records of Brent Geese using inland feeding sites dates to 1991 (O'Briain & Healy, 1991). A study of the use of inland foraging sites by Brent Geese was undertaken and published in Benson (2009). Benson (2009) identified 60 sites across the Dublin area in her study. These sites were spread between Portmarnock in the North, Sandymount in the south and Ashtown and Greenhills in the west. The proposed development site at Clonliffe College does not appear in the list of 60 sites compiled by Benson (2009). More recent work on the range of Brent Geese in Dublin was undertaken to inform Natura Impact Statements for a residential development in St. Anne's Park (Scott Cawley, 2017; Enviroguide, 2019). Scott Cawley undertook surveys of a large number of sites across the Dublin area in the 2015/16 and 2016/17 winter bird seasons, identifying 119 inland foraging sites for Brent Geese across the Dublin Area. The lands at Clonliffe College were identified as a known inland feeding site in Scott Cawley (2017), where they are referred to as "Drumcondra/Holy Cross College". Data on the site relates to the season 2015/2016 when a peak count of 200 birds was recorded at the site on 13th January 2016. Surveys by Scott Cawley of the site in 2019/2020 recorded no Brent Geese within the proposed development as the playing fields reference above have become overgrown and unsuitable as feeding habitat.

4.2.2 Field Survey Results for Brent Geese

Figure 5: Light-bellied Brent goose activity in the survey area between October 2020 and March 2021



41 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period (See Appendix II), and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site. The most likely explanation for this is that the length of the grass in the proposed development site is suboptimal for the Geese, which favour a short, open sward. The grass across the northern part of the site remained relatively tall throughout the survey period. The full dataset for transect surveys, containing data on sward height across the survey season, is provided as Appendix III of this report.

42 Birds were observed flying over the proposed development site on 15 dates between October 2020 and March 2021 (see Figure 5). The peak count of birds flying over the lands was 660 birds, recorded on 10th February 2021. Birds tended to fly between 30m and 50m above ground level. Birds tended to fly east-west

in the mornings and west-east in the evenings, suggesting the birds were travelling from sites closer to Dublin Bay in the morning and returning to roost in Dublin Bay in the evenings. Several known inland feeding sites exist within the immediate vicinity of the lands, including St. Patrick's College in Drumcondra, and several sites off of Griffith Avenue.

4.3 Cormorant *Phalacrocorax carbo* [A017]

4.3.1 Results of Desk Study for Cormorant

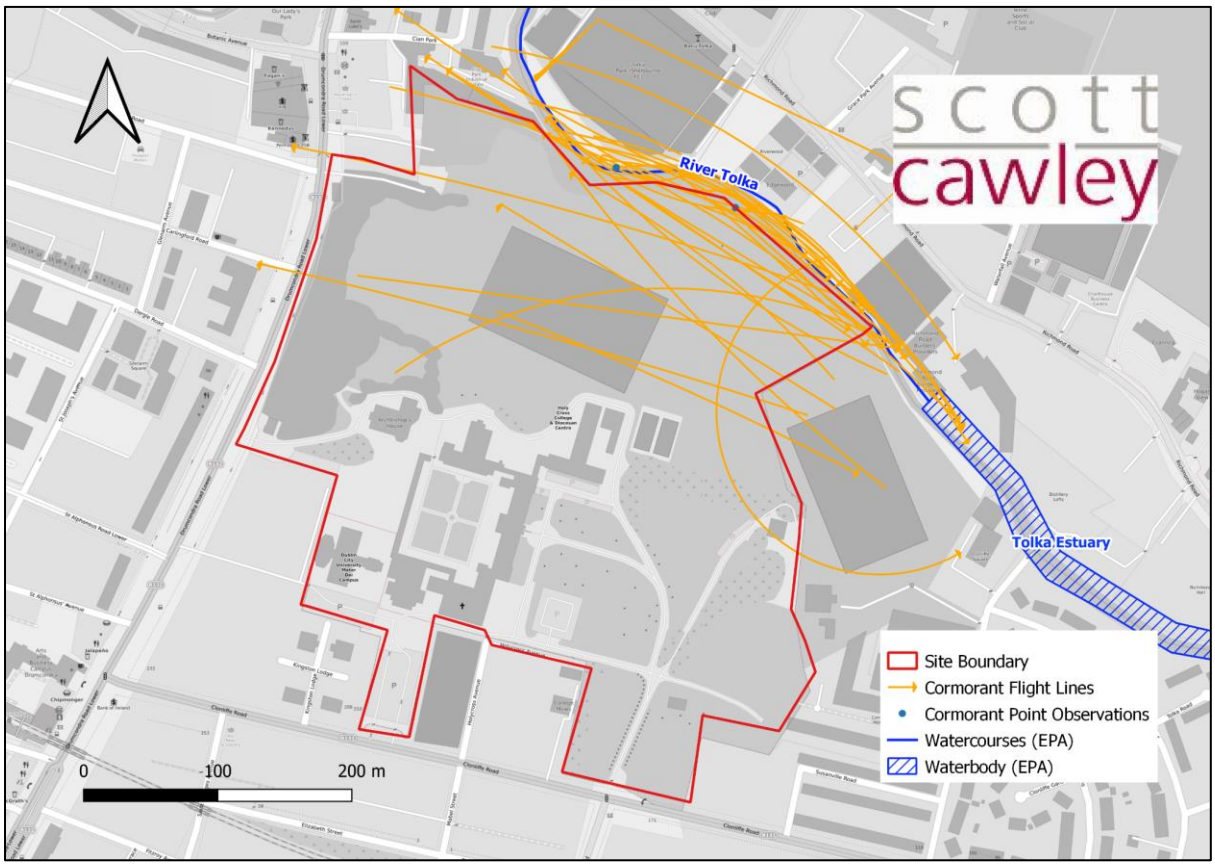
43 Cormorant *Phalacrocorax carbo* [A017] is a SCI species for which the following European sites within 20km of the proposed development have been designated:

- Ireland's Eye SPA (004117), *c.* 12.5km north-east of the proposed development site. The European site encompasses the island of Ireland's Eye and the surrounding coastal waters. Cormorant breed on the island in nationally important numbers (306 pairs) (NPWS, 2018A).
- Lambay Island SPA (004069), *c.* 19.6km north-east of the proposed development site. The European site encompasses Lambay Island and its surrounding coastal waters. Cormorant breed on the island in internationally important numbers (675 pairs), with smaller number of birds (29) overwintering at the site (NPWS, 2018B).

44 There is potential that some members of the Ireland's Eye or Lambay Island breeding population utilise the section of the River Tolka that runs along the northern boundary of the proposed development site.

4.3.2 Field Survey Results for Cormorant

Figure 6: Cormorant activity in the survey area between October 2020 and March 2021



45 Cormorant activity was chiefly concentrated along the River Tolka, which forms the northern boundary of the proposed development site. Members of the species were observed foraging in the River Tolka on two dates between December 2020 and March 2021. Observations were generally of a single individual foraging

in the river. Cormorant were observed flying over the proposed development site on 16 dates and are thought to be reoccurring passes of individual birds. Birds were generally observed flying upriver along the Tolka, as opposed to across the proposed development site (See Figure 6).

4.3.3 Cormorant at Clonliffe College in the context of European sites within 20km

46 It is worth bearing in mind that nearby European sites, Ireland's Eye SPA (004117) and Lambay Island SPA (004069) have been designated for their breeding populations of Cormorant as opposed to their wintering populations. The surveys undertaken to inform this report related to the winter season, when the resident population, and it is not clear how the wintering population relates to the breeding populations at Ireland's Eye and Lambay Island in this instance.

47 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 1.5% of the wintering population at Ireland's Eye, referencing the I-WeBS mean peak count of 136 birds over the period 2013/14 - 2017/18 (See Appendix I).
- 1% of the wintering population at Lambay Island, referencing the I-WeBS mean peak count of 200 birds over the period 2013/14 - 2017/18 (See Appendix I).

48 According to Nagy & Langendoen (2018), 1% of the international population of Cormorant is 1,200 birds. The peak count of birds utilising the survey area did not reach or exceed this number in the 2020/21 survey season. The peak count of one bird observed in the survey area represents 0.16% of the 1% of the international population of the species.

4.4 Curlew *Numenius arquata* [A160]

4.4.1 Results of Desk Study for Curlew

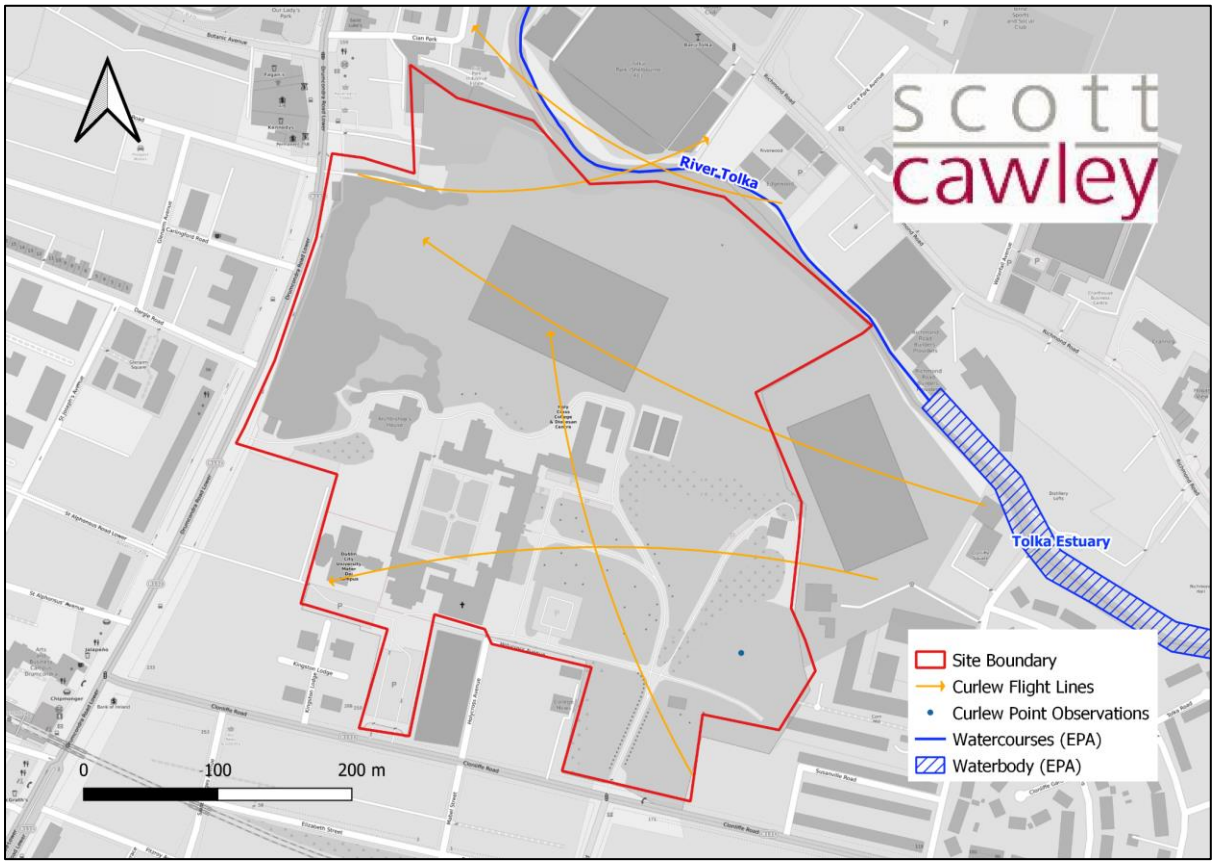
49 Curlew is a SCI species for which the following European site within 20km of the proposed development have been designated:

- North Bull Island SPA (004006), *c.* 4.5km east. The baseline population of Curlew in the European site, based on the five-year mean peak counts for the period 1995/96-1999/2000, is listed as 937 birds in the Conservation Objectives Supporting Document (NPWS, 2014). North Bull Island SPA (004006) is the 11th most important site in Ireland for wintering Curlew (NPWS, 2014). The site hosts a population of all-Ireland importance for the species. Data on the flock size at North Bull Island SPA contained within the *Conservation Objectives Supporting Document* (NPWS, 2014) and for Dublin Bay contained within I-WeBS data (See Appendix I) indicates that the SPA population has increased slightly relative to the baseline population.

50 Curlew are known to forage for earthworms on damp grassland on terrestrial sites (NPWS, 2014). The range of terrestrial sites in the Dublin area does not appear to be as well-documented as Brent Geese. Curlew are known to use inland feeding sites but the network of inland feeding sites is not as well-documented as for Brent Geese. The long-term trend (since the first I-WeBS population estimated, and the most recent population estimate in 2018) in the Irish overwintering population of Curlew has been a precipitous decline in numbers (Burke *et al.*, 2018).

4.4.2 Field Survey Results for Curlew

Figure 7: Curlew activity in the survey area between October 2020 and March 2021.



51 Curlew were recorded once foraging in the proposed development site on the 8th of October 2020 and observed flying over the site on three dates between November and December 2020. Flock sizes were smaller than Brent Goose flocks observed flying over the site, with a peak count of ten birds flying across the site on 20th of November 2020. Virtually all observations of Curlew flight lines were of movements east-west, e.g. from Dublin Bay inland. West-east movements were observed only on one occasions (see Figure 7).

4.4.3 Curlew at Clonliffe College in the context of European sites within 20km

52 The surveys undertaken to inform this report related to the winter season, when the resident population is likely to be boosted by winter migrants. A direct comparison against nearby European site populations, is therefore not possible.

53 In relation to wintering populations of the species in the vicinity, the peak count of birds in the proposed development site potentially represents:

- 0.17% of the wintering population in Dublin Bay, referencing the I-WeBS mean peak count of 850 birds for the period 2012/2013– 2017/18 (See Appendix I).

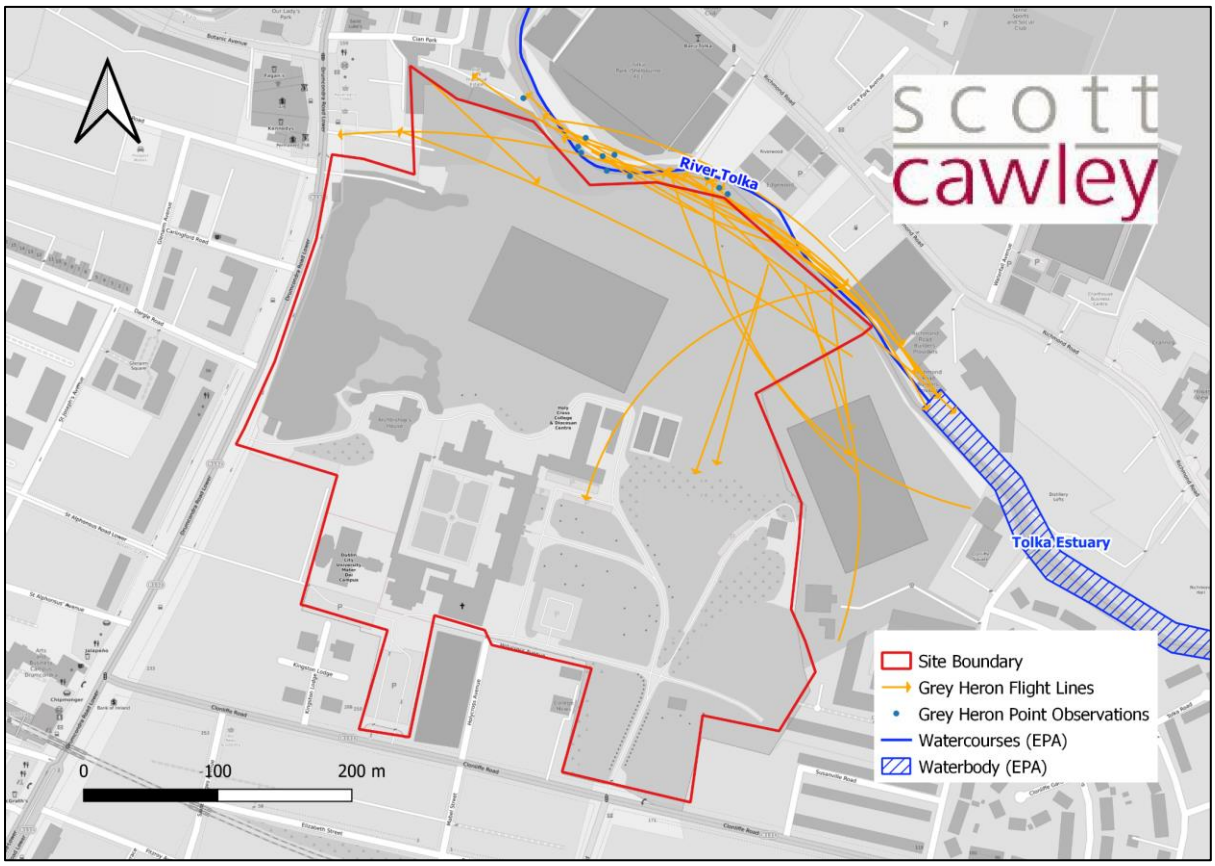
54 Based on Burfield and Bommel (2004), 1% of the international population for Curlew is estimated at 4800. The peak count of one bird observed in the survey area represents 0.02% of the 1% of the international population of the species.

4.5 Grey Heron *Ardea cinerea* [A028]

4.5.1 Results of Desk Study for Grey Heron

55 There are no European sites for which Grey Heron is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Grey Heron as a designating feature is Wexford Harbour and Slobs SPA (004076), *c*. 99km south of the proposed development site. Grey Herons are generally sedentary in Ireland, meaning they do not travel long distances between their breeding and wintering grounds[4], and for this reason, the population of birds in the proposed development site is not part of any European site population.

56 ***Figure 8: Grey Heron activity in the survey area between October 2020 and March 2021.***



4.5.2 Field Survey Results for Grey Heron

57 Similar to observations of Cormorant, single Grey Herons were observed foraging in and along the River Tolka on 15 survey dates. The birds were also noted flying up and down river. The species was strongly associated with the River Tolka, with a small number of individuals recorded flying across the remainder of the proposed development site.

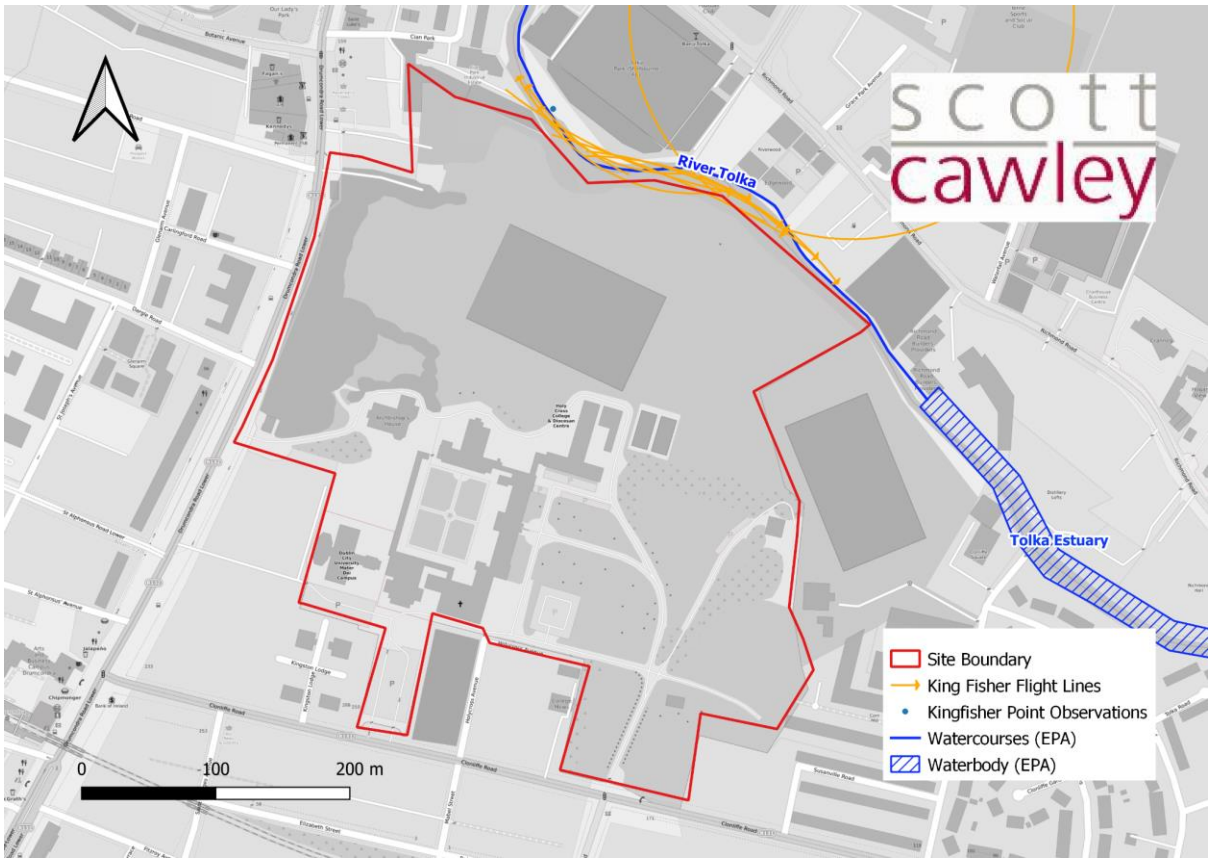
[4] From information on Grey Heron *Ardea cinerea* published on the BirdWatch Ireland website https://birdwatchireland.ie/birds/grey-Heron/. Accessed 13th June 2021

4.6 Kingfisher *Alcedo atthis* [A229]

4.6.1 Results of Desk Study for Kingfisher

58 There are no European sites for which Kingfisher is an SCI species within the vicinity of the proposed development site. The closest European sites which includes Kingfisher as a designating feature is the River Boyne and River Blackwater SPA (004232), *c*. 37km northeast of the proposed development site. The River Boyne and River Blackwater SPA is in a separate water catchment to the River Tolka and is therefore not directly connected to the proposed development site. The population on the River Tolka is not part of the River Boyne and River Blackwater SPA population on the basis of distance of separation between the two.

Figure 9: Kingfisher activity in the survey area between October 2020 and March 2021.



4.6.2 Field Survey Results for Kingfisher

59 Kingfisher were observed foraging and/or commuting along the River Tolka on five of the 25 completed survey visits. The species was noted perching on vegetation overhanging the River Tolka from within the proposed development site. Single birds were observed in all instances. The section of the River Tolka running along the northern boundary of the proposed development site is likely to form part of a breeding territory for a pair of Kingfisher (see Figure 8).

5 Conclusions

60 Observations of wintering birds in the proposed development site have been contextualised against the populations of these species in nearby European sites.

61 The proposed development site has been closed off to the public since March 2020, and for all of the 2020/21 winter bird survey season, with restricted access to essential staff and visitors only. Results of winter bird surveys from the 2019/20 and the 2020/21 season are comparable.

62 Brent Geese were not observed foraging within the lands on any survey dates across the seven-month survey period and no evidence of usage by Brent Geese was collected from completion of survey transects in the proposed development site.

63 In the case of Herring Gull, Brent Geese, Curlew, Cormorant, Grey Heron and Kingfisher, it has been demonstrated that the peak count of birds in the survey area in 2020/21 is less than 1% of the international population of these species.

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Appendix I – Desk Study Results

Wetland Bird Survey Records for O13 10km Grid Square, returned from the National Biodiversity Data Centre Database

A search for all species records contained within the O13 10km grid square was returned on 13th April 2021 The records have been reviewed by Criostoir Mac Cuirc of Scott Cawley and only records relating to wetland birds are presented in the table, below. A large proportion of records are of rare / vagrant species.

Appendix I - Table 1: Wetland bird records from the 10km grid square O13, as returned from the NBDC

Species name	Record count	Date of last record	Title of dataset
Arctic Tern *Sterna paradisaea*	2	31/12/2011	Bird Atlas 2007 - 2011
Barnacle Goose *Branta leucopsis*	1	15/02/2015	Birds of Ireland
Bar-tailed Godwit *Limosa lapponica*	5	31/12/2011	Bird Atlas 2007 - 2011
Black Brant *Branta bernicla subsp. Nigricans*	3	10/03/1995	Rare birds of Ireland
Black Guillemot *Cepphus grille*	23	05/06/2016	Birds of Ireland
Black-headed Gull *Larus ridibundus*	100	08/12/2017	Birds of Ireland
Black-legged Kittiwake *Rissa tridactyla*	4	10/03/2012	Birds of Ireland
Black-tailed Godwit *Limosa limosa*	5	10/03/2012	Birds of Ireland
Branta bernicla subsp. hrota	14	31/12/2011	Bird Atlas 2007 - 2011
Brent Goose *Branta bernicla*	39	17/02/2017	Birds of Ireland
Common Coot *Fulica atra*	31	27/10/2017	Birds of Ireland
Common Greenshank *Tringa nebularia*	2	31/12/2011	Bird Atlas 2007 - 2011
Common Guillemot *Uria aalge*	2	09/03/2009	Birds of Ireland
Common Kingfisher *Alcedo atthis*	28	15/08/2017	Birds of Ireland
Common Pochard *Aythya ferina*	3	31/12/2011	Bird Atlas 2007 - 2011
Common Redshank *Tringa totanus*	13	17/09/2017	Birds of Ireland
Common Sandpiper *Actitis hypoleucos*	1	31/07/1991	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Common Shelduck *Tadorna tadorna*	9	31/12/2011	Bird Atlas 2007 - 2011
Common Snipe *Gallinago gallinago*	6	28/01/2017	Birds of Ireland
Common Tern *Sterna hirundo*	6	18/06/2017	Birds of Ireland
Dunlin *Calidris alpina*	6	31/12/2011	Bird Atlas 2007 - 2011
Eurasian Curlew *Numenius arquata*	16	04/12/2017	Birds of Ireland
Eurasian Oystercatcher *Haematopus ostralegus*)	22	17/09/2017	Birds of Ireland
Eurasian Teal *Anas crecca*	12	26/02/2017	Birds of Ireland
Eurasian Wigeon *Anas penelope*	4	31/12/2011	Bird Atlas 2007 - 2011
European Golden Plover *Pluvialis apricaria*	1	31/12/2011	Bird Atlas 2007 - 2011

Species name	Record count	Date of last record	Title of dataset
European Shag *Phalacrocorax aristotelis*	1	24/07/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Gadwall *Anas strepera*	2	31/12/2011	Bird Atlas 2007 - 2011
Great Cormorant *Phalacrocorax carbo*	35	03/12/2017	Birds of Ireland
Great Crested Grebe *Podiceps cristatus*	4	31/12/2011	Bird Atlas 2007 - 2011
Great Egret *Ardea alba*)	1	24/06/2013	Rare birds of Ireland
Great Northern Diver *Gavia immer*	1	31/12/2011	Bird Atlas 2007 - 2011
Greater Scaup *Aythya marila*	4	27/10/2017	Birds of Ireland
Grey Heron *Ardea cinerea*	87	15/12/2017	Birds of Ireland
Grey Plover *Pluvialis squatarola*	3	31/12/2011	Bird Atlas 2007 - 2011
Herring Gull *Larus argentatus*	113	26/11/2017	Birds of Ireland
Lesser Black-backed Gull *Larus fuscus*	33	24/07/2017	Birds of Ireland
Little Grebe *Tachybaptus ruficollis*	35	27/10/2017	Birds of Ireland
Little Tern *Sternula albifrons*	1	31/07/1972	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Mallard *Anas platyrhynchos*	110	02/12/2017	Birds of Ireland
Manx Shearwater *Puffinus puffinus*	4	18/08/1994	European Seabirds at Sea (ESAS) bird sightings 1980-2003
Northern Lapwing *Vanellus vanellus*	6	31/12/2011	Bird Atlas 2007 - 2011
Northern Shoveler *Anas clypeata*	3	31/12/2011	Bird Atlas 2007 - 2011
Red Knot *Calidris canutus*	6	31/12/2011	Bird Atlas 2007 - 2011
Red-breasted Merganser *Mergus serrator*	3	31/12/2011	Bird Atlas 2007 - 2011
Red-throated Diver *Gavia stellata*	2	31/12/2011	Bird Atlas 2007 - 2011
Ringed Plover *Charadrius hiaticula*	7	31/12/2011	Bird Atlas 2007 - 2011
Ruddy Turnstone *Arenaria interpres*	6	31/12/2011	Bird Atlas 2007 - 2011
Tufted Duck *Aythya fuligula*	54	06/12/2017	Birds of Ireland

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U404 Dublin Bay

The mean is based only on the most recent 5-season period*, i.e*. for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 2: I-WeBS summary data for OU404 Dublin Bay

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Arctic Tern			2					3						0
Bar-tailed Godwit	150.00	1200.00	2231	2138	1260	1540	1745	1917	2141	1710	1658	2173	1934	2026
Black-headed Gull		20000.00	3766	4358	3738	2234	2356	2269	1907	2649	1259	2768	3802	2642
Black-necked Grebe								4						0
Black-tailed Godwit	190.00	610.00	664	936	698	1449	1375	927	1362	1768	873	2185	1479	1516
Common Gull		16400.00	549	298	685	579	573	410	309	985	272	890	321	536
Common Scoter	140.00	5500.00		2	30		80	20	10	42		40	65	33
Common Tern			173	15	23		14	38	3	39		1	2	9
Common/ Arctic Tern				400*				163						21
Coot	220.00	17500.00	1										199	136
Cormorant	120.00	1200.00	309	182	82	211	98	151	53	198	41	71	494	850
Curlew	350.00	8400.00	1374	1017	742	1240	688	1169	874	932	1424	567		0
Curlew Sandpiper		10000.00						1	1				7484	5730
Dunlin	570.00	13300.00	7453	6124	6443	4270	6490	3559	4163	5907	3603	3376		0
Feral/hybrid Mallard type								2	1					1
Gadwall	20.00	600.00			4	19				2	2			0
Glaucous Gull		2200.00			1								2501	1298
Golden Plover	1200.00	9300.00	1020	162	2500	1360	430	390	404	1080	742	1155		1

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Goldeneye	60.00	11500.00	23	23	6	6	5	11	6		2	1*	2	0
Great Black-backed Gull		4200.00	637	180	141	84	124	358	116	190	52	263	115	154
Great Crested Grebe	40.00	3500.00	97	198	105	255	421	930	254	755	143	307	60	292
Great Northern Diver	20.00	50.00	3	2		8		2		3		5	2	2
Greenshank	20.00	2300.00	33	47	68	28	43	40	46	34	47	78	47	48
Green-winged Teal						1								0
Grey Heron	25.00	2700.00	44	33	31	54	30	28	15	68	40	44	29	42
Grey Plover	30.00	2500.00	751	202	265	394	293	200	307	310	452	240	248	299
Herring Gull		10200.00	497	262	314	422	341	519	135	490	261	538	607	471
Kingfisher			1			1	1			1		1		0
Knot	280.00	4500.00	4519	5802	5832	4105	2799	3435	3022	4547	4950	2495		0
Lapwing	1100.00	20000.00	56	26	64	191	44	120	67	52	54	143	6555	4879
Lesser Black-backed Gull		5500.00	475	14	4	19	195	28	25	5	20	16	32	61
Light-bellied Brent Goose	360.00	400.00	2017	3819	4445	5536	3292	4102	6134	3717	4862	4195	14	12
Little Egret	20.00	1300.00	29	69	100	87	73	48	19	59	69	59	3331	4105
Little Grebe	20.00	4000.00					5	1	9	1	5		87	69
Little Gull		1100.00					1	1					4	3
Little Tern			1											0
Long-tailed Duck		17250.00		1					2	1				1
Mallard	290.00	20000.00	91	67	58	97	138	151	52	97	106	120	111	101
Mediterranean Gull		770.00	16	33	70	27	8	113	23	39	27	64	6	41

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Moorhen		20000.00	4	9	4	6	7	7	5	5		5	2	3
Mute Swan	90.00		5		3	7	6	2	2	5	6	9	12	8
Oystercatcher	690.00	8200.00	3327	2933	3946	4324	2804	3408	3025	3074	3315	3588	3521	3508
Pintail	20.00	600.00	150	179	117	162	173	212	160	200	150	124	222	177
Purple Sandpiper	20.00	710.00		1	2		16	4	3	2	1	2		1
Red-breasted Merganser	20.00	1700.00	43	56	109	58	63	114	50	60	57	69	53	64
Red-necked Grebe										1				0
Redshank	300.00	3900.00	1758	2856	3621	2639	2790	2509	2077	2460	1889	1648	2274	1940
Red-throated Diver	20.00	3000.00	12	7	9	5	16	8	8	7	2	7	5	5
Ring-billed Gull		20000.00			1		1	2	1					0
Ringed Plover	100.00	730.00	849	355	146	267	205	314	217	139	121	109	285	172
Roseate Tern								3						0
Sanderling	60.00	1200.00	692	609	434	674	300	411	405	510	266	841	800	558
Sandwich Tern			342	122	38	2	43	6	23	52		8	9	14
Scaup	65.00	3100.00				2								0
Shag		2000.00	7	7	35	2	25	19	23	36	3	71	22	30
Shelduck	120.00	3000.00	761	1036	866	1142	821	603	731	961	2927	744	1611	1611
Shoveler	30.00	400.00	104	111	76	249	73	101	79	126	97	115	144	120
Slavonian Grebe		55.00					1							0
Snipe		20000.00	1		2	16	18	12	62	20		31	57	32
Spotted Redshank		900.00	1					1		1		3		1
Teal	340.00	5000.00	925	823	785	980	1358	909	981	1378	1233	1291	1092	1330
Tufted Duck	310.00	12000.00			1									0

Species	1% national	1% international	2006/07	2007/08	2008 / 09	2009 / 10	2010 / 11	2011 / 12	2012 / 13	2013 / 14	2014 / 15	2015 / 16	2017/ 18	MEAN
Turnstone	95.00	1400.00	356	292	380	329	392	349	227	466	250	584	334	384
Unidentified Gull								10	85					0
Unidentified Tern			244											0
Water Rail			1	1				1						1
Whimbrel		6700.00			1		1		1	2	4		918	1351
Wigeon	630.00	15000.00	518	1302	663	1911	806	610	445	691	2201	1106		1
Yellow-legged Gull									1	1		2		1

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U403 Baldoyle Bay

The mean is based only on the most recent 5-season period*, i.e*. for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 3: I-WeBS summary data for OU403 Baldoyle Bay

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Arctic Tern			8	24									0
Bar-tailed Godwit	170	1500	131	105				162	150	48	59	38	91
Black-headed Gull								242	281	52	120	13	142
Black-tailed Godwit	200	1100	175	270				389	139	296	172	189	237
Common Gull								64	11	4	61	3	29
Common Sandpiper				2									0
Common Scoter	110	7500	27	130				16	7				5
Common Tern			12	52									0
Cormorant	110	1200	14	20				10	4	3	4	1	4
Curlew	350	7600	138	148				90	61	106	49	44	70
Curlew Sandpiper			4	12									0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Dunlin	460	13300	300	110				750	233	300	403	537	445
Egyptian Goose										1			0
Golden Plover	920	9300	750	672				2500	450	2000	1200		1230
Goldeneye	40	11400		15									0
Great Black-backed Gull								7	15	10	9	9	10
Great Crested Grebe	30	6300	22	63				124	189				63
Great Northern Diver	20	50	2	5				1	2				1
Green Sandpiper			2	1									0
Greenshank	20	3300	32	25				6	11	3	6	7	7
Grey Heron	25	5000	14	32				5	7	7	4	6	6
Grey Plover	30	2000	112	166				55	28	8	25	10	25
Herring Gull								47	91	58	112	48	71
Kingfisher			2	3									0
Knot	160	5300	47	112				553		19	600	800	394
Lapwing	850	72300	287	550				372	300	137	392	180	276
Lesser Black-backed Gull								4	18	1	1	1	5
Light-bellied Brent Goose	350	400	1120	956				580	588	342	753	663	585
Little Egret	20	1100	40	56				18	3	7	21	25	15
Little Grebe	20	4700		5				1				3	1
Long-tailed Duck				2									0
Mallard	280	53000	193	249				67	102	106	71	60	81
Mute Swan	90	100								2		2	1
Oystercatcher	610	8200	1014	880				277	1113	219	117	144	374
Pintail	20	600	23	12				4	4				2
Red-breasted Merganser	25	860	14	23				6	5	2	4		3

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Redshank	240	2400	330	284				144	152	125	96	154	134
Red-throated Diver	20	3000	5	2				14	64				16
Ringed Plover	120	540	150	168				34	59	123	4		44
Roseate Tern				12									0
Sanderling	85	2000	31	29				6					1
Sandwich Tern			37	31									0
Shag								7			1		2
Shelduck	100	2500	357	238				52	97	88	127	105	94
Shoveler	20	650									1		0
Snipe			17										0
Teal	360	5000	163	218				145	160	108	131	48	118
Turnstone	95	1400	126	139				17	12	13	10	4	11
Whimbrel			1	7									0
Wigeon	560	14000	125	178				54	54	32	266	332	148

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U408 Broadmeadow (Malahide) Estuary

The mean is based only on the most recent 5-season period*, i.e*. for the period 2013/14 - 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 4: I-WeBS summary data for OU408 Broadmeadow (Malahide) Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	110	114	108	90	47	50	89	58	66	61	65
Whooper Swan	150	340	9			2		1					0
Black Swan									1				0
Greenland White-fronted Goose	100	190			1								0
Bar-headed Goose				1	1								0
Barnacle Goose	160	810			1								0
Light-bellied Brent Goose	350	400	1856	898	1411	943	1980	710	464	824	1565	1000	913
Shelduck	100	2500	246	341	479	8	262	120	222	303	569	321	307
Wigeon	560	14000	150	42	168		157		2	67	94	215	76
Gadwall	20	1200			2		120	4				4	2
Teal	360	5000	142	99	670	41	112	119	87	141	232	196	155
Mallard	280	53000	178	176	379	95	220	112	92	92	134	110	108
Pintail	20	600	72	66	72		29	6		15	23	39	17
Shoveler	20	650	14	6	50					9	24	30	13
Pochard	110	2000	18	35	8		2						0
Tufted Duck	270	8900	2	15	8				1				0
Scaup	25	3100	1		4				3		5	1	2
Long-tailed Duck					1		3				1		0
Common Scoter	110	7500	300	278			30						0
Goldeneye	40	11400	105	126	93	51	66	36	92	31	43	50	50
Red-breasted Merganser	25	860	39	161	78	87	57	80	35	26	237	23	80

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Ruddy Duck					1								0
Red-throated Diver	20	3000	8				4					3	1
Great Northern Diver	20	50		3				3		2			1
Little Grebe	20	4700	8	13	28	23	21	8	33	26	33	84	37
Great Crested Grebe	30	6300	96	54	44	34	120	60	72	84	83	54	71
Slavonian Grebe											1		0
Cormorant	110	1200	58	42	28	6	101	101	42	86	127	99	91
Shag			130	66	30		32	8	9	5	12	2	7
Little Egret	20	1100	26	17	3	2	17	13	16	35	35	22	24
Grey Heron	25	5000	28	77	20	12	19	19	27	26	30	21	25
Moorhen			3	7	12	4	4	6	9	4	3	6	6
Coot	190	15500	2		12								0
Oystercatcher	610	8200	1529	1285	1471	78	1300	1833	1355	1291	1523	1242	1449
Ringed Plover	120	540	16	14	25		71			13	152	240	81
Golden Plover	920	9300	1310	72	1000	260	1000	200	5		337	36	116
Grey Plover	30	2000	155	150	169	3	140	9	6	100	38	82	47
Lapwing	850	72300	434	315	642	1180	900	590	681	63	331	213	376
Knot	160	5300	331	354	870	4	440	110	49	9	202	800	234
Sanderling	85	2000	4		1		2	80	46		13	2	28
Curlew Sandpiper							2						0
Dunlin	460	13300	1173	416	1365	23	480	94	121	300	1489	445	490
Ruff			4	1	1	4	1	2	5			1	2
Jack Snipe							1					1	0
Snipe			44	5	46	20	25	56	25	36	25	3	29
Black-tailed Godwit	200	1100	366	478	258	296	355	206	167	121	293	245	206
Bar-tailed Godwit	170	1500	200	358	286	62	213	133	14	60	93	107	81

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Curlew	350	7600	240	545	330	1	500	244	83	246	363	349	257
Common Sandpiper			6	3	4	1	17		1				0
Green Sandpiper								27					5
Spotted Redshank			1						1				0
Greenshank	20	3300	59	29	26	26	43	64	30	34	46	43	43
Redshank	240	2400	589	459	364	87	374	171	130	363	487	575	345
Turnstone	95	1400	139	175	175	23	221	94	85	75	79	98	86
Little Gull			1										0
Black-headed Gull			1072	930	565	479	368	659	571	496	424	294	489
Common Gull			221	187	228	149	70	71	16	184	75	126	94
Lesser Black-backed Gull			28	5	5	4	3	15	8	196	20	6	49
Herring Gull			77	66	68	55	139	110	95	118	187	389	180
Iceland Gull						2							0
Great Black-backed Gull			18	20	20	15	44	93	9	42	71	69	57
Sandwich Tern			26	84	3	2	50	12		2	42		11
Common Tern				1									0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U407 Rogerstown Estuary

The mean is based only on the most recent 5-season period*, i.e*. for the period 2012/13 – 2017/18. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 5: I-WeBS summary data for OU407 Rogerstown Estuary

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Whooper Swan	150	340			2					12	13	1	5
Pink-footed Goose										8			2
Greenland White-fronted Goose	100	190				3							0
Greylag Goose	35	980	87	134	19	33	89	5	33	95	30	17	36
Barnacle Goose	160	810	1										0
Brent Goose			1										0
Dark-Bellied Brent Goose								1					0
Light-bellied Brent Goose	350	400	2652	2749	1051	2661	1395	2217	1047	2662	2829	2197	2190
Ruddy Shelduck				1									0
Shelduck	100	2500	809	886	730	752	793	877	652	624	687	531	674
Wigeon	560	14000	580	690	490	813	585	686	1342	1532	1094	1695	1270
Gadwall	20	1200	1				2		3	2	4	7	3
Teal	360	5000	1054	1003	1448	1211	1469	685	2008	967	857	1280	1159
Mallard	280	53000	248	319	109	182	198	172	260	220	168	174	199
Pintail	20	600	16	6	2		1		4	5	2		2
Shoveler	20	650	79	36	21	26	34	42	15	25	33	20	27
Pochard	110	2000	2										0
Scaup	25	3100		27									0
Eider	55	9800										1	0
Common Scoter	110	7500									8		2
Goldeneye	40	11400	1	1	1		6						0

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Red-breasted Merganser	25	860	26	30	16	30	22	20	39	23	36	25	29
Red-throated Diver	20	3000	2	1		4	1	2	4	1	1	1	2
Great Northern Diver	20	50	1					2					0
Little Grebe	20	4700	12	18	10	24	15	15	22	25	15	20	19
Great Crested Grebe	30	6300	3	46	1	4	14	5	22	3	2	1	7
Cormorant	110	1200	55	77	23	17	33	32	21	27	29	53	32
Shag			28	28	44	40	47	36	21	11	10	17	19
Little Egret	20	1100	41	42	1	43	48	57	46	55	43	52	51
Grey Heron	25	5000	34	24	6	24	24	17	21	16	20	20	19
Great White Egret										1			0
Glossy Ibis											1		0
Spoonbill											3		1
Water Rail			1	1						1			0
Moorhen				3		1	1	8	5	2	2	3	4
Coot	190	15500					2	3		2	3	4	2
Oystercatcher	610	8200	1199	2024	1781	2116	2491	1531	1519	1697	1057	1161	1393
Ringed Plover	120	540	190	153	113	105	284	167	161	125	144	215	162
American Golden Plover				1									0
Golden Plover	920	9300	6590	664	40	530	3300	130	2000	2050	2152	700	1406
Grey Plover	30	2000	283	223	210	371	242	151	120	64	199	192	145
Lapwing	850	72300	5820	1268	710	2855	5805	897	2099	5185	2845	1290	2463
Knot	160	5300	500	501	88	190	256	30	130	89	12	175	87

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Sanderling	85	2000	14	30	6	20	300	31	1	130	76	35	55
Little Stint			1			1		3		1			1
Curlew Sandpiper				6		1	4			1		1	0
Purple Sandpiper	20	110	7	76	5	6	3	72	32	4	3		22
Dunlin	460	13300	2546	3151	1061	1904	1860	581	2264	3469	2356	1381	2010
Ruff				1			1			2	2	9	3
Jack Snipe											2		0
Snipe			35	37	10	4	20	9	5	24	8	8	11
Woodcock								1					0
Black-tailed Godwit	200	1100	1138	568	148	450	883	597	237	191	1113	1201	668
Bar-tailed Godwit	170	1500	31	126	1	76	44	120	149	99	676	100	229
Whimbrel			1	2		2	28	1	1	1	3	16	4
Curlew	350	7600	1055	803	33	922	518	684	600	625	530	888	665
Common Sandpiper			2										0
Green Sandpiper										1			0
Spotted Redshank			1	1			1						0
Greenshank	20	3300	40	50	14	83	32	36	35	59	64	48	48
Lesser Yellowlegs									1				0
Redshank	240	2400	907	987	378	1104	689	844	945	1007	597	880	855
Turnstone	95	1400	77	81	95	176	224	207	110	223	84	173	159
Mediterranean Gull				1			1	1			1		0
Black-headed Gull			764	1314	136	457	310	602	448	458	428	391	465
Common Gull			80	419	73	142	175	256	343	159	247	152	231

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Lesser Black-backed Gull			3	29	35	76	3	1	38	9	4	11	13
Herring Gull			906	596	45	739	189	237	300	332	488	1405	552
Great Black-backed Gull			170	119	16	107	84	106	37	53	109	27	66
Sandwich Tern			70	100			104	58	245	82	25	14	85
Roseate Tern							1						0
Common Tern			2					1	4	41			9
Kingfisher			1	1		1	12	2	1		5	1	2
SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Mute Swan	90	100	6	3			4	2	2	2	2	2	2

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U951 Ireland's Eye

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 6: I-WeBS summary data for OU951 Ireland's Eye

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Black-headed Gull								50		6			19
Common Gull			10					60					20
Cormorant	110	1200	20					200		150			117
Curlew	350	7600	25					30	6*	5			12
Dunlin	460	13300						10					3
Great Black-backed Gull			200					250	200*	200			150
Greenshank	20	3300	1					1		2			1
Grey Heron	25	5000	2					1		1			1
Herring Gull			200					300	200*	300			200
Light-bellied Brent Goose	350	400	50					100		200			100
Little Egret	20	1100	2							1			0
Mallard	280	53000						5					2
Mediterranean Gull									1*				0
Oystercatcher	610	8200	100					200	150*	100			100
Purple Sandpiper	20	110	5					10		15			8
Redshank	240	2400	10					25	10*	25			17
Red-throated Diver	20	3000						2					1
Ringed Plover	120	540						10	5*	4			5

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Sanderling	85	2000						60					20
Sandwich Tern			2						15*				0
Shag								150		60			70
Shelduck	100	2500								20			7
Turnstone	95	1400	60					80	20*	150			77
Whimbrel			2							1			0

I-WeBS Summary Data Downloaded from BirdWatch Ireland for 0U903 Lambay Island

The mean is based only on the most recent 5-season period*, i.e*. for the period 2010/11 - 2014/15. Columns populated by 0 indicate seasons when no counts were carried out, while blank cells show that a species was absent. Counts that are poor quality are represented by an asterisk.

Appendix I - Table 7: I-WeBS summary data for OU903 Lambay Island

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Bar-tailed Godwit	170	1500		2									0
Black-headed Gull			200*	10				50		5*			25
Common Gull				20									0
Cormorant	110	1200		50				200		20*			100
Curlew	350	7600	6*	200	100			350		200*			175
Golden Plover	920	9300			100								0
Great Black-backed Gull								300		400*			150
Great Northern Diver	20	50		2									0
Grey Heron	25	5000						2		1*			1
Herring Gull								300		500*			150
Lapwing	850	72300		100	10								0
Light-bellied Brent Goose	350	400		400	350					400*			0
Mallard	280	53000						10					5
Mediterranean Gull			1*	1				1					0
Oystercatcher	610	8200	10*	100	100			100		250*			50
Purple Sandpiper	20	110						2		10*			1
Redshank	240	2400		25	15			30		10*			15
Red-throated Diver	20	3000						2		2*			1

SPECIES	1% NATIONAL	1% INTERNATIONAL	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MEAN
Ringed Plover	120	540		2						2*			0
Sandwich Tern			4*										0
Shag								200		150*			100
Shelduck	100	2500	6*							4*			0
Turnstone	95	1400	5*	25	50			60		50*			30
Whimbrel				2	1			10		8*			5

Appendix II – Results of Survey Observations

Activity codes: HU – Hunting/Feeding; WA – Walking; FL – Flying; OG – On ground; GL – Gliding; PE – Perching; SO – Soaring; PR – Preening; WP – With prey; SW – Swimming; RO – Roosting

Habitat codes: GA1 – Improved Grassland; WD – Highly modified woodland; GS – Rough Grassland; WS1 – Scrub; GS4 – Wet Grassland; WS5 – Recently felled woodland; GM1 – Marsh; WL1 – Hedgerow; FL – Lake; WL2 – Treeline; FW – Watercourse; PB – Bog; FS1 – Reed/sedge swamp; PF – Fen/flush; FS2 – Tall-herb swamp; HH – Heath; WN – Semi natural woodland; HD – Bracken.

Appendix II - Table 1: Record of survey observations – consisting of both flight lines and point observations. Survey start time and survey end time relate to the start and end of the survey on the date of survey. Observation start relates to the time the species was observed on site.

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	08/10/2020	07:39	18:50	1/4	8/8	Dry	Excellent			MH	1	HU	FW
COB	08/10/2020	07:39	18:50	1/4	8/8	Dry	Excellent			SG	2	RO	BL3
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	4	14:38	HG	1	HU	GA2
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	1	RO	WL1
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	1	RO	WL1
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MH	1	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MH	2	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			H.	1	HU	FW
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MA	2	SW	FW
KS	30/10/2020	07:20	16:55	3/4	6/8	10% rain, showers from 07:30 to 09:00	Good	8	12:46	KF	1	FL	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent	9	12:46	CA	1	SW/HU	FW
KS	30/10/2020	07:20	16:55	3/4	6/8	10% rain, showers from 07:30 to 09:00	Good	10	13:18	HG	10	HU	GA1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SG	1	RO	BL3
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MA	4	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			GR	1	RO	WL1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MT	2	RO	WL1
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			Mistle Thrush	1	RO	WD5
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MA	2	SW	FW
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			TC	1	HU	WD1
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MH	1	HU	FW
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			MT	2	RO	WL2
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			GR	1	RO	WD5
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			H.	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			H.	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			WW	1	HU	WL2
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MH	1	HU	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			MA	2	RO	FW
COB	04/12/2020	08:32	16:10	2/4	3/8	Dry	Excellent			BC	1	HU	WD1
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	1	08:40	BZ	1	PE	WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	4	08:58	H.	1	PE	FW/WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	6	09:01	MA	2	SW	FW
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	9	08:35	HG	11	OG/HU	GA
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	14	11:47	BZ	1	PE	WL
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	17	14:05	BZ	1	PE	WD
SB	26/01/2021	08:15	16:55	1/4 E	8/8	Drizzle 08:15-10:00	Excellent	18	14:15	MH	1	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	1	08:35	BZ	1	PE	WL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	3	08:50	MH	1	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	4	08:52	MA	2	SW	FW
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	13	14:20	MH	1	SW	FW
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	8	11.13	MH	1	WA	FW
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	9	15.46	H.	1	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MH	2	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MA	1	HU	FW
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wetafternoon	Excellent			MT	1	RO	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MH	2	SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MA	2	RO	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	2	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	8	10:28	HG	2	HU, OG	GA2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			M.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			H.	1	HU	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WL2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	HU	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MA	2	HU,SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			MH	1	HU, SW	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent			R.	1	PE	WD1
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	9	13:15	HG	2	HU	GA2
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MA	2	SW	FW
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MH	1	HU	FW
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			BC	1	PE	WD5
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			MA	2	SW	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WL2

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MH	1	HU	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MA	4	HU.SW	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WL2
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	WD1
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	2	PE	WL2/WS1
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			MA	2	RO	FW
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good			R.	1	PE	FW/WS1
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	2	08:45	MA	Mallard	SW	FW
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	10	09:49	BZ	1	PE	WL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	13	11:19	BZ	1	PE	WD
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	17	16:03	BZ	1	OG	GA
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	18	16:47	GL	1	FL	FW
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	7	10:19	SH	1	PE	WL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	9	13:00	GL	1	PE	WL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	10	13:06	MA	2	SW	FW
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	11	13:06	MH	1	SW	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	13	16:20	HG	2	PE	BL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	2	PE	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	1	PE	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			M.	1	RO	WL2
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			MH	1	HU	FW
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain after 10:30	Excellent			H.	1	PE	BL2/FW
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent	5	12:43	HG	1	HU	HG
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			M.	2	PE	WL2
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			SG	1	PE	WL2
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			SG	2	PE	BL3
COB	03/02/2021	08:05	17:12	2/4	5/8	Dry	Excellent			MA	1	SW	FW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	6	09:21	ET	1	HU	FW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	11	14:53	HG	1	HU	GA2
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			GW	1	HU	BL3
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			MH	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MH	1	HU	FW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MH	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			MA	2	SW	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			H.	1	HU	FW
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			M.	2	PE	WL2
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			M.	1	PE	BL3
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	16	09:58	HG	2	RO	BL3
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	19	12:03	ET	1	HU	FW
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	12	13:05	HG	2	HU	GS
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	13	14:52	ET	1	HU	FW
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	15	12:03	H.	1	HU	FW
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	18	14:12	CA	1	HU	FW
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			GW	2	HU	FW
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			CC	1	PE	WL2
COB	24/03/2021	06:17	18:46	Dry	1/4	2/8	Excellent			GR	1	PE	WL2
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	5	09:47	H.	1	HU	FW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	13	15:53	HG	2	RO	BL3

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	17	19:10	HG	2	HU	GS
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			SG	2	PE	BL3
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			MA	2	SW	FW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			M.	1	PE	WD1
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			MH	1	HU	FW
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	7	08:41	HG	1	HU, OG	GA2
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	46	11:00	HG	2	PE	GA2
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SL	Swallow	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			MT	Mistle Thrush	4	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			BZ	Buzzard	0	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	10	14:47	CA	Cormorant	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	3	08:42	CA	Cormorant	1	FL
COB	08/10/2020	07:39	17:50	1/4	7/8	Dry	Excellent	4	09:02	MA	Mallard	2	

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	2	08:35	CA	Cormorant	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent	3	09:55	MS	Mute Swan	2	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			MT	Mistle Thrush	4	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			H.	Grey Heron	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			GW	Grey Wagtail	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SH	Sparrowhawk	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SM	Sand Martin	2	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SH	Sparrowhawk	1	FL
COB	20/10/2020	07:59	18:19	1/4	5/8	Showers	Excellent			SG	Starling	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	showers	Good	8	11:13	MA	Mallard	2	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	showers	Good	14	16:30	HG	Herring gull	30	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	3	07:50	HG	Herring gull	23	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	4	08:28	MA	Mallard	2	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	5	9:10	BZ	Buzzard	1	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	6	10:44	MH	Moorhen	1	SW
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	7	10:45	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	11	13:19	HG	Herring gull	73	HU
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	12	15:31	MH	Moorhen	3	SW
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	13	16:35	HG	Herring gull	29	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	14	16:47	H.	Grey Heron	1	FL
KS	30/10/2020	07:20	16:55	3/4	6/8	Showers from 07:30 - 9:00, then dry	Good	15	16:47	HG	Herring gull	78	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MT	Mistle Thrush	18	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SG	Starling	4	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MA	Mallard	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			H.	Grey Heron	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			H.	Grey Heron	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			GW	Grey Wagtail	1	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			MH	Moorhen	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent			SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	4	09:15	CU	Curlew	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	5	09:43	CU	Curlew	2	FL
COB	06/11/2020	07:33	16:42	1/4	3/8	Dry	Excellent	7	14:26	ET	Little Egret	1	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	2	09:14	CU	Curlew	10	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	3	09:51	MA	Mallard	2	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	4	10:21	CU	Curlew	5	FL
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	5	15:15	SN	Snipe	1	FL/flushed
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	6	15:18	SN	Snipe	1	FL/flushed
COB	20/11/2020	08:00	16:20	1/4	8/8	Dry/misty	Excellent	7	16:10	PB	Brent geese	130	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	1	08:48	CA	Cormorant	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	2	09:15	PB	Brent geese	32	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	3	09:18	CA	Cormorant	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	4	10:05	PB	Brent geese	8	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent	6	11:32	PB	Brent geese	82	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparowhawk	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	27/11/2020	08:12	16:19	1/4	1/8	Dry	Excellent			SH	Sparrowhawk	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	2	08:52	BG	Brent geese	60	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	3	08:59	BG	Brent geese	30	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	5	09:00	BG	Brent geese	7	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	7	09:14	BG	Brent geese	6	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	8	09:24	BG	Brent geese	150	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	11	10:05	H.	Grey heron	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	12	10:24	CA	Cormorant	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	13	11:31	BG	Brent geese	30	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	15	12:20	BG	Brent geese	180	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	16	13:17	CA	Cormorant	1	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	19	14:39	BG	Brent geese	8	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	20	15:45	BG	Brent geese	160	FL
SB	26/01/2021	08:15	16:55	1/4	8/8	Drizzle 08:15-10:00	Excellent	21	16:35	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	2	08:48	BG	Brent geese	6	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	5	08:59	BG	Brent geese	42	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	6	09:5	BG	Brent geese	45	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	7	09:09	SH	Sparrowhawk	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	8	09:12	BG	Brent geese	32	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	9	09:15	CA	Cormorant	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	11	11:35	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	12	14:04	BZ	Buzzard	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	14	14:30	CA	Cormorant	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	15	14:53	SH	Sparrowhawk	1	FL
SB	29/01/2021	08:13	17:03	2/4 E	8/8	Drizzle 08:13-08:30/10:40-11:40 mist rain	Good	16	15:07	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	3	10.12	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	4	10.27	SH	Sparrowhawk	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	5	10:38	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	6	10.54	ET	Little egret	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	7	11.00	MA	Mallard	2	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	10	15.46	KF	Kingfisher	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	11	15:52	H.	Grey heron	1	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	12	16.19	HG	Herring gull	20	HG
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	13	16:36	RI	Ring-necked parachetes	3	FL
KS	15/10/2020	08:00	18:00	1/4	6/8	30% showers, 8-10am	Good	15	16:38	HG	Herring gull	21	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	1	08:23	PB	Brent geese	95	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	2	08:23	PB	Brent geese	30	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	3	08:27	PB	Brent geese	48	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	4	08:28	PB	Brent geese	18	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	5	08:33	PB	Brent geese	190	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	6	08:34	PB	Brent geese	38	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	7	08:47	PB	Brent geese	10	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	8	09:13	PB	Brent geese	9	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	9	10:55	CA	Cormorant	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent	11	16:07	PB	Brent geese	68	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			SH	Sparrowhawk	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			RN	Raven	2	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			SH	Sparrowhawk	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			BZ	Buzzard	1	FL
COB	04/12/2020	08:22	16:10	2/4	3/8	Dry, wet afternoon	Excellent			GW	Grey wagtail	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	2	08:32	PB	Brent geese	32	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	3	08:36	BG	Brent geese	3	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	4	09:10	BG	Brent geese	5	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	5	09:36	H.	Grey heron	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	6	09:41	ET	Little egret	1	FL/HU
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	7	09:46	PB	Brent geese	142	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	28	09:47	MH	Moorhen	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	36	10:22	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	54	11:34	SG	Starling	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	9	12:10	BG	Brent geese	184	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	66	12:22	RN	Raven	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	70	12:34	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	74	12:34	MS	Mute Swan	2	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	11	12:56	BG	Brent geese	17	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	12	12:57	PE	Peregrine	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	13	14:02	BG	Brent geese	24	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	14	16:05	BG	Brent geese	26	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	1	08:43	PB	Brent geese	55	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	2	08:54	PB	Brent geese	23	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	3	08:55	PB	Brent geese	14	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	4	08:55	PB	Brent geese	78	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	5	09:07	PB	Brent geese	42	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	6	09:08	PB	Brent geese	34	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	7	09:11	PB	Brent geese	7	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	8	10:36	H.	Grey heron	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent	11	16:03	CA	Cormorant	1	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			SH	Sparrowhawk	1	FL
COB	16/12/2020	08:37	16:06	3/4	7/8	Dry am, showers pm	Excellent			BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	2	09:29	CA	Cormorant	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	26	10:20	BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	50	11:58	RN	Raven	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	51	12:40	SH	Sparrowhawk	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	4	14:35	GB	Great black-backed gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	66	15:06	BZ	Buzzard	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	drizzle/light rain	Good	5	15:27	CU	Curlew	7	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	1	08:30	CA	Cormorant	2	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	3	08:54	CA	Comorant	1	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	4	08:56	BG	Brent geese	140	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	5	09:10	BG	Brent geese	40	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	6	09:20	BG	Brent geese	20	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	7	09:30	BG	Brent geese	280	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	8	09:32	CA	Cormorant	1	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	9	09:42	BG	Brent geese	3	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	11	10:14	BG	Brent geese	4	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	12	11:05	BG	Brent geese	48	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	14	12:04	SH	Sparrowhawk	1	FL/HU
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	15	14:34	BG	Brent geese	25	FL
SB	08/02/2021	08:05	17:15	2/4 W	8/8	Periodic sleet	Good	16	15:14	BG	Brent geese	14	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	1	07:16	BG	Brent geese	15	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	2	07:41	MA	Mallard	3	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	3	08:05	MA	Mallard	8	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	4	08:34	H.	Grey Heron	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	5	10:07	BZ	Buzzard	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	6	10:09	H.	Grey Heron	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	8	10:34	SH	Sparrowhawk	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	12	13:45	KF	Kingfisher	1	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	14	16:55	MA	Mallard	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	15	17:56	BG	Brent geese	130	FL
SB	08/03/2021	06:55	18:15	0/4	3/8	nil	Excellent	16	18:05	MA	Mallard	4	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	1	08:37	MA	Mallard	3	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	2	09:12	PB	Brent geese	47	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	3	09:13	PB	Brent geese	160	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	4	09:13	PB	Brent geese	32	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent	7	16:34	CA	Cormorant	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			BZ	Buzzard	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			BZ	Buzzard	1	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			SG	Starling	9	FL
COB	21/01/2021	08:26	16:46	1/4	8/8	Dry morning, rain from 10:20	Excellent			SH	Sparrowhawk	1	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	1	09:45	PB	Brent geese	40	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	2	09:46	PB	Brent geese	33	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	3	09:57	PB	Brent geese	22	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	4	10:00	PB	Brent geese	20	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	7	16:17	CA	Cormorant	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent	8	16:24	ET	Little egret	1	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			GR	Greenfinch	2	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			M.	Mistle thrush	4	FL
COB	03/02/2021	08:06	17:12	2/4	5/8	Dry	Excellent			MA	Mallard	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	1	08:08	CA	Cormorant	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	2	08:10	CA	Cormorant	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	3	08:11	MA	Mallard	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	4	08:18	MA	Mallard	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	5	08:35	MS	Mute swan	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	7	10:03	MS	Mute swan	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	8	10:05	H.	Grey heron	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	9	11:37	CA	Cormorant	1	HU/SW
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	10	11:50	PB	Brent geese	c.600	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent	13	17:04	MA	Mallard	4	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			RN	Raven	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			BZ	Buzzard	1	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			RN	Raven	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			M.	Mistle thrush	2	FL
COB	22/02/2021	07:27	17:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	1	08:25	PB	Brent geese	230	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	2	08:28	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	3	08:32	PB	Brent geese	18	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	4	08:40	PB	Brent geese	25	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	5	08:42	PB	Brent geese	29	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	6	08:55	PB	Brent geese	65	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	7	09:17	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	8	09:47	MA	Mallard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	9	10:02	CA	Cormorant	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	10	10:13	ET	Little egret	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	11	10:29	MA	Mallard	2	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent	13	12:52	PB	Brent geese	c.660	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			BZ	Buzzard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			SH	Sparrowhawk	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			BZ	Buzzard	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			RN	Raven	1	FL
COB	10/02/2021	07:50	17:25	1/4	6/8	light snow showers	Excellent			GW	Grey wagtail	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	1	07:14	MA	Mallard	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	2	07:28	MA	Mallard	2	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	3	07:46	CA	Cormorant	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	4	07:47	MA	Mallard	2	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	5	07:49	PB	Brent geese	28	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	6	07:50	PB	Brent geese	80	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	7	07:52	PB	Brent geese	65	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	8	07:52	PB	Brent geese	27	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	9	07:54	PB	Brent geese	11	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	10	07:56	PB	Brent geese	08:04	08:04
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	12	08:08	MA	Mallard	1	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	13	08:11	PB	Brent geese	3	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	14	08:14	PB	Brent geese	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	15	08:32	H.	Grey heron	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	17	11:55	MA	Mallard	5	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	18	11:56	H.	Grey heron	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	20	12:07	KF	Kingfisher	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	21	12:13	KF	Kingfisher	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	22	12:37	PB	Brent geese	230	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	23	13:01	ET	Little egret	1	FL
COB	04/03/2021	07:04	18:05	1/4	8/8	Dry	Excellent	24	15:19	ET	Little egret	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	1	06:46	MA	Mallard	5	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	2	07:44	MA	Mallard	3	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	3	08:17	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	4	09:10	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	5	09:12	CA	Cormorant	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	6	09:28	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	7	10:55	PB	Brent geese	11	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	8	11:16	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	9	11:31	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	10	12:44	H.	Grey heron	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	11	13:03	MA	Mallard	2	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	14	14:57	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	15	15:02	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	16	15:04	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	17	15:24	KF	Kingfisher	1	FL
COB	18/03/2021	06:30	18:32	1/4	8/8	Dry	Excellent	19	17:29	KF	Kingfisher	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	2	06:28	PB	Brent geese	12	HU
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	3	06:33	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	4	06:34	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	5	06:37	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	6	06:47	PB	Brent geese	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	8	06:54	MA	Mallard	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	9	07:02	PB	Brent geese	5	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	10	07:19	Gj	Greylag geese	30	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	11	07:27	H.	Grey heron	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	12	07:32	CA	Cormorant	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	13	10:11	MA	Mallard	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	14	11:22	ET	Little egret	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	16	13:52	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	19	15:07	H.	Grey heron	1	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	20	17:43	MA	Mallard	2	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	21	18:36	PB	Brent geese	150	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent	22	18:36	PB	Brent geese	70	FL
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent			BZ	Buzzard	3	SO
COB	24/03/2021	06:17	18:46	1/4	2/8	Dry	Excellent			SH	Sparrowhawk	1	FL/SO
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	1	07:09	HG	Herring gull	5	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	2	07:24	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	3	08:21	MA	Mallard	2	SW

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	4	08:55	MA	Mallard	2	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	6	11:22	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	7	12:48	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	8	13:10	MA	Mallard	3	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	9	13:26	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	10	13:46	MA	Mallard	3	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	11	15:06	MA	Mallard	4	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	12	15:11	ET	Little egret	1	FL/SW
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	14	16:19	CA	Cormorant	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	15	16:47	H.	Grey heron	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	16	17:15	MA	Mallard	1	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	18	19:05	HG	Herring gull	45	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent	19	19:05	HG	Herring gull	30	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			BZ	Buzzard	1	SO
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent				RN	Raven	FL
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			SM	Sand martin	2	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
COB	31/03/2021	07:00	19:58	1/4	2/8	Dry	Excellent			M.	Mistle thrush	2	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		08:32	HG	Herring gull	11	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		08:32	BH	Black-headed gull	8	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	15	09:10	BG	Brent geese	5	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:27	HG	Herring gull	3	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	26	09:44	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	30	09:49	BH	Black-headed gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:49	HG	Herring gull	33	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	56	11:37	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	68	12:22	CM	Common gull	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	70	12:34	BZ	Buzzard	1	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		09:49	BH	Black-headed gull	6	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		12:57	HG	Herring gull	4	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		14:00	HG	Herring gull	8	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		14:00	BH	Black-headed gull	17	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	105	15:19	HG	Herring gull	55	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	105	15:19	BH	Black-headed gull	10	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:37	BH	Black-headed gull	13	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:38	HG	Herring gull	56	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	114	15:55	BH	Black-headed gull	50	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent		15:57	HG	Herring gull	36	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	116	16:01	BH	Black-headed gull	40	FL
KB	12/12/2020	08:31	16:05	2/4	1/8	Dry	Excellent	119	16:05	BH	Black-headed gull	48	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	2	08:42	HG	Herring gull	38	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		08:45	HG	Herring gull	23	FL/circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		09:24	HG	Herring gull	10	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		09:24	BH	Black-headed gull	30	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	30	10:33	HG	Herring gull	16	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	44	11:21	HG	Herring gull	44	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	35	11:26	HG	Herring gull	4	FL, circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		11:40	BH	Black-headed gull	17	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		11:40	HG	Herring gull	25	FL

Surveyor	Date	Survey Start	Survey end	Wind	Cloud Cover	Temperature	Rain	Visibility	Reference	Observation Start	Species	No. of Birds	Activity
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	62	14:35	GB	Great black backed gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	63	14:45	CM	Common gull	1	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	68	15:07	HG	Herring gull	9	FL, circling
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good	69	15:23	HG	Herring gull	29	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:27	HG	Herring gull	95	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:27	BH	Black-headed gull	45	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:48	BH	Black-headed gull	84	FL
KB	21/12/2020	08:37	16:08	2/4	8/8	Drizzle/light rain	Good		15:48	HG	Herring gull	156	FL

Appendix III – Results of Survey Transects

Appendix III - Table 1: Results of survey transects sorted by date.

urveyor	Date	Survey Start Time	Survey End Time	Wind	Cloud Cover	Temperature	Rain	Visibility	Surveyor Notes	Goose dropping (No.)	Sward height (cm)	% Bare Ground	% Grass Cover	% Forb Cover	Hedgerow Present
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	45	0	40	60	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	25	0	100	0	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	65	35	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	24	0	85	15	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	21	0	90	10	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	23	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	22	0	90	10	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	24	0	80	20	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Northern large field - grass very rank and overgrown. Not mown since summer 19	0	21	0	95	5	Yes
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	6	0	85	15	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	5	10	75	15	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	8	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	7	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	4	0	100	0	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	7	0	90	10	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	9	5	75	25	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	8	0	80	20	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	6	10	15	75	Yes, treelines
COB	08/10/2020	07:39	18:19	1/4	5/8	11C	light showers	Excellent	Amenity grassland - recently mown, patches of ED3 with longer grass.	0	5	35	10	55	Yes, treelines
COB	20/10/2020	07:39	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	18	15	85	0	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	26	0	100	0	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	24	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	21	0	35	65	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	21	0	100	0	Yes

COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	16	0	90	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	17	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	19	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	15	0	90	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	16	0	95	5	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	13	0	85	15	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	6	0	55	45	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	11	0	70	30	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	10	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	85	15	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	75	25	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	9	0	75	25	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	8	0	80	20	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	9	10	80	10	Yes
COB	20/10/2020	07:59	18:19	1/4	5/8	14C	Dry	Excellent	Northern field -west to east	0	11	0	75	25	Yes
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	30	0	50	50	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	50	0	60	40	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	40	0	40	60	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	60	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	30	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	5	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	15	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers 08:00 to 10:00	Good		0	20	0	90	10	
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	22	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	24	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	12	10	90	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	18	0	100	0	Yes, treelines

SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	20	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	19	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	11	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	17	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	16	0	100	0	Yes, treelines
SB	26/01/2021	14:55	15:15	2/4 E	8/8	6C	nil	Excellent	Amenity Grassland	0	13	0	80	20	Yes, treelines
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	17	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	19	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	13	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	14	0	25	75	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	14	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	12	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	25	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	22	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	33	0	100	0	Yes
SB	26/01/2021	15:20	15:30	2/4 E	8/8	6C	nil	Excellent	Gaelic pitch	0	17	0	100	0	Yes
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	20	0	95	5	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	22	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	14	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	24	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	17	0	95	5	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	14	5	95	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	9	5	95	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	16	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	17	0	100	0	Yes, treelines
SB	29/01/2021	10:50	11:08	2/4 E	8/8	8C	Mist drizzle	Good	Amenity Grassland	0	8	0	80	20	Yes, treelines
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	25	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	20	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	15	0	100	0	Yes

SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	25	0	25	75	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	23	0	90	10	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	16	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	27	0	100	0	Yes
SB	29/01/2021	11:15	11:30	2/4 E	8/8	8C	Mist drizzle	Good	Gaelic pitch	0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	19	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	14	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	8	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	15	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	17	10	90	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	18	15	75	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	9	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	7	5	85	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	12	0	100	10	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Amenity grassland	0	9	5	80	15	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	13	0	60	40	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	18	0	40	60	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	20	0	95	5	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	16	0	45	55	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	15	0	80	20	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	15	0	65	35	Yes
COB	27/11/2020	08:12	16:19	1/4	3/8	0-7C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	30	0	50	50	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	50	0	60	40	

KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	40	0	40	60	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	60	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	30	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	5	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	15	0	90	10	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	80	20	
KS	15/10/2020	08:00	18:00	1/4	6/8	10C	30% showers, 8-10am	Good	Two transects combined	0	20	0	90	10	
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	21	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	13	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	13	0	60	40	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	18	0	40	60	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	20	0	95	5	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	16	0	45	55	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	80	20	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	65	35	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	19	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	9	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	14	5	95	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	8	0	90	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	15	0	85	15	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	7	5	85	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	17	10	90	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	18	15	75	10	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	12	0	100	0	Yes
COB	27/11/2020	08:12	16:19	1/4	1/8	0-6C	Dry	Excellent		0	9	5	80	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	20	0	100	0	Yes

COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	14	0	65	35	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	19	0	60	40	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	21	0	35	65	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	16	0	85	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	18	0	20	80	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	15	0	60	40	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry	Excellent	Rough grassland	0	16	0	55	45	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	16	5	90	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	7	5	85	10	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	15	0	85	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	16	10	85	5	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	8	5	85	10	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	14	0	80	20	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	10	15	70	15	Yes
COB	04/12/2020	08:22	16:10	2/4	3/8	0-5C	Dry, wet afternoon	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	20	5	90	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	15	0	95	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	22	0	80	20	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	21	0	35	65	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	18	0	30	70	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	70	30	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	17	0	80	20	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	21	0	90	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Rough grassland	0	16	0	65	35	Yes

COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	18	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	17	10	90	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	6	5	85	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	17	0	90	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	20	0	100	0	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	14	10	85	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	8	0	90	10	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	8	0	95	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	12	15	80	5	Yes
COB	16/12/2020	08:37	16:06	3/4	7/8	9-11C	Dry am, showers pm	Excellent	Amenity grassland	0	11	0	85	15	Yes
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	23	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	20	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	10	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	15	10	90	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	18	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	11	5	95	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	11	0	100	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	15	5	95	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	16	10	90	0	Yes, treelines
SB	08/02/2021	10:45	10:59	2/4 W	8/8	4C	Periodic sleet	Good	Amenity Grassland	0	6	0	25	75	Yes, treelines
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	23	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	25	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	13	0	90	10	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	15	0	25	75	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	19	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	14	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	13	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	18	0	100	0	Yes
SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	18	0	100	0	Yes

SB	08/02/2021	12:25	12:45	2/4 W	8/8	4C	Periodic sleet	Good	Gaelic pitch	0	9	0	75	25	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	17	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	15	0	40	60	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	12	0	90	10	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	16	0	75	25	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	16	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	13	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	12	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	14	0	100	0	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	14	0	50	50	Yes
SB	08/03/2021	15:30	15:47	0/4	3/8	11C	nil	Excellent		0	10	5	90	5	Yes
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	24	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	17	0	60	40	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	19	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	20	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	10	80	10	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	15	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	22	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	20	0	100	0	Yes, treelines
SB	08/03/2021	15:59	16:10	0	3/8	11C	nil	Excellent	Amenity grassland	0	10	0	100	0	Yes, treelines
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	13	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	12	0	85	15	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	18	0	80	20	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	13	0	40	60	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	24	0	25	75	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	17	0	75	25	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	16	0	100	0	Yes

COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	17	0	90	10	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry morning, rain from 10:30	Excellent	Rough grassland	0	15	0	35	65	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	15	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	14	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	9	0	95	5	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	17	5	70	25	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	14	10	85	5	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	7	10	90	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	6	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	21/01/2021	08:26	16:46	1/4	8/8	5C	Dry	Excellent	Amenity grassland	0	12	5	90	10	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	13	0	30	70	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	10	0	60	40	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	18	0	85	15	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	15	0	20	80	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	19	0	70	30	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	14	0	90	10	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	12	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Rough grassland	0	10	0	95	5	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	12	15	85	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	12	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	16	5	95	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	6	5	95	0	Yes

COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	13	10	90	0	Yes
COB	03/02/2021	08:06	17:12	2/4	5/8	7-8C	Dry morning, showers afternoon	Excellent	Amenity grassland	0	10	5	90	5	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	18	0	90	10	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	13	0	30	70	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	19	0	65	35	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	12	0	25	75	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	10	0	85	15	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	14	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	8	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	1/8	4-11C	Dry	Excellent	Rough grassland	0	9	0	95	5	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	13	15	85	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	10	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	18	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	15	85	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	12	5	95	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	22/02/2021	07:27	17:46	1/4	2/8	4-11C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	14	0	90	10	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	17	0	60	40	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	12	5	35	60	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	12	0	30	70	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	11	0	45	55	Yes

COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	10	0	40	60	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	16	0	95	5	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Rough grassland	0	8	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	16	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	35	65	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	20	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	11	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	15	0	100	0	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	13	0	90	10	Yes
COB	10/02/2021	07:50	17:25	1/4	4/8	2C	light snow showers	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	16	5	95	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	20	0	80	20	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	12	0	35	65	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	9	0	65	35	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	11	0	50	50	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	9	0	30	70	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	14	5	95	5	Yes
COB	04/03/2021	07:05	18:05	1/4	8/8	3-6C	Dry	Excellent	Rough grassland	0	7	0	90	10	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	18	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	6	15	80	5	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	9	0	90	10	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	21	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	19	0	100	0	Yes

COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	14	0	95	5	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	10	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	17	0	100	0	Yes
COB	04/03/2021	07:04	18:05	1/4	8/8	4-6C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	12	0	90	10	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	22	0	95	5	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	10	0	35	65	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	16	0	35	65	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	11	0	30	70	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	13	0	40	60	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	9	0	75	25	Yes
COB	18/03/2021	06:30	18:32	1/4	4/8	6-11C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	3	20	65	15	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	6	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	5	5	95	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	15	80	5	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	7	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	4	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	5	0	100	0	Yes
COB	18/03/2021	06:30	18:32	1/4	3/8	6-11C	Dry	Excellent	Amenity grassland - mown on day of survey	0	6	5	95	0	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	13	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	11	0	70	30	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	75	25	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	40	60	Yes

COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	13	0	55	45	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	19	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	15	0	90	10	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	9	5	85	10	Yes
COB	24/03/2021	06:17	18:46	2/4	6/8	4-12C	Dry	Excellent	Rough grassland	0	12	0	30	70	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	7	50	45	5	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	6	0	85	15	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	11	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	10	20	80	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	7	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	9	0	100	0	Yes
COB	24/03/2021	06:17	18:46	2/4	5/8	6-12C	Dry	Excellent	Amenity grassland	0	8	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	21	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	17	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	15	0	65	35	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	12	0	25	75	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	14	0	60	40	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	11	0	55	45	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	14	0	95	5	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	17	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	13	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	7	20	80	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	8	0	85	15	Yes

COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	13	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	14	5	95	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	12	0	90	10	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	11	0	85	15	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	11	0	95	5	Yes
COB	31/03/2021	07:00	19:58	1/4	2/8	6-14C	Dry	Excellent	Amenity grassland	0	10	0	90	10	Yes
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	60	40	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	20	0	40	60	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	60	0	90	10	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	50	50	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	30	0	60	40	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	10	0	95	5	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	10	5	90	5	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	20	0	80	20	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	5	0	90	10	
KS	30/10/2020	16:00	16:45	3/4	6/8	13	Dry	Good	Transect data covers GS and GA2 areas	0	25	0	100	0	
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	25	0	75	25	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	22	0	25	75	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	15	0	45	55	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	14	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	17	0	80	20	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	25	75	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	20	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	18	0	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Rough grassland	0	19	0	100	0	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	16	0	75	25	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	15	0	80	20	Yes

COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	7	5	90	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	17	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	12	0	60	40	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	11	15	75	10	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	6	0	80	20	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	5	0	85	15	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	12	10	65	35	Yes
COB	06/11/2020	07:33	16:42	2/4	2/8	8-11C	Dry	Excellent	Amenity grassland	0	11	0	70	30	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	13	0	95	5	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	17	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	20	0	75	25	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	14	0	65	35	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	12	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	14	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	18	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	15	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Rough grassland	0	16	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	18	0	90	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	17	0	85	15	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	8	5	85	10	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	15	0	80	20	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	18	0	70	30	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	14	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	5	40	55	5	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	6	0	100	0	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	11	20	55	25	Yes
COB	11/11/2020	07:44	16:33	2/4	8/8	12-14C	Dry	Excellent	Amenity grassland	0	8	0	75	25	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	17	0	100	0	Yes

COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	14	0	100	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	25	0	20	80	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	18	0	70	30	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	23	0	35	65	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	25	0	15	85	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	22	0	75	25	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	21	0	100	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	19	0	80	20	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Rough grassland	0	16	0	70	30	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	16	0	90	10	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0					Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	8	5	95	0	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	0	80	20	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	19	5	95	5	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	11	30	55	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	8	5	80	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	15	0	95	5	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	5	80	15	Yes
COB	20/11/2020	08:00	16:20	2/4	8/8	10-12C	Mostly dry	Excellent	Amenity grassland	0	14	10	70	20	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	21	1	95	4	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	25	4	94	2	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	10	25	70	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	30	2	80	18	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	20	0	95	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	5	7	88	5	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	18	0	77	3	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	18	15	70	15	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	15	0	98	2	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Amenity grassland	0	4	3	77	20	Yes

KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	34	0	60	40	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	22	0	55	45	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	30	0	75	25	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	32	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	35	0	30	70	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	25	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	50	0	75	25	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	15	0	100	0	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	55	0	90	10	Yes
KB	12/12/2020	08:31	16:05	2/4	0/8	5C	Dry	Excellent	Rough grassland	0	28	0	60	40	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	17	1	90	9	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	21	3	90	9	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	7	20	70	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	29	10	80	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	20	10	80	10	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	20	4	93	3	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	8	2	78	20	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	10	2	95	3	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	17	20	55	25	Yes
KB	21/12/2020	08:37	16:05	2/4	8/8	8C	Dry	Good	Amenity grassland	0	7	3	57	40	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	25	0	35	65	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	27	2	90	8	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	30	0	85	15	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	32	0	98	2	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	20	0	45	55	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	21	0	90	10	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	45	0	100	0	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	35	0	100	0	Yes
KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	30	0	100	0	Yes

KB	21/12/2020	08:37	16:05	1/4	8/8	8C	Drizzle	Good	Rough grassland	0	33	0	50	50	Yes

A8.2 Bat and Bird Survey Report

Bat and Bird Evaluation of Holy Cross College and Evaluation of Potential Impacts Brought About by a Proposed Strategic Housing Development

Brian Keeley B.Sc. (Hons) in Zool. Donna Mullen
Survey June to July 2020 and April 2021

Bats and birds are a significant, widespread, and vital element of the natural heritage of Ireland. As part of the European Union, biodiversity conservation in the Republic of Ireland is protected within a single legislative directive (European Communities (Birds and Natural Habitats) Regulations 2011-2015) that is the Birds Directive of 1979 and the Habitats Directive of 1992. Bats and birds are afforded varying degrees of protection under Irish and EU law.

For bats, protection is relatively comprehensive with all Irish species protected under Annex IV of the Directive and with one species, the lesser horseshoe bat, further protected under Annex II. This species is not resident in Dublin and is mainly concentrated in a band of six counties along the west coast of the island.

A second species covered by this higher level of protection (Annex II), the greater horseshoe bat, was recorded in Wicklow in June and July 2020 and would be a significant addition to the Leinster bat fauna if it remained on the island. This species is not part of the regular bat fauna of Ireland.

Bat resting places and breeding places are protected and any actions that lead to their deterioration or destruction are an offence under the Wildlife Act unless a specific derogation from protection has been received in advance through the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage.

Bird protection is more complicated as some species are considered sufficiently abundant to allow killing for sport and recreation or to reduce crop damage, building deterioration or health risk (e.g. large numbers of roosting pigeons may be deemed to create a risk of Histoplasmosis and removed under licence) . Birds and their nests are protected under the Wildlife Act. All bird species and their nests are protected within the officially designated nesting period; March 1st to August 31st including species that are not protected outside of the breeding season (including species considered pest species).

In the urban and suburban environment, the need to protect and enhance biodiversity may be challenging where the need to house and provide recreational facilities may involve the modification of the vegetation and landscape elements and may have an immediate effect upon the biodiversity of the area or of adjoining and surrounding areas. Bird may lose nest sites through hedgerow removal in addition to the feeding opportunities provided by the presence of vegetation and cover. Bats may also lose roost sites and feeding and commuting corridors that allow movement between good roost sites and good feeding areas and the network of roosts that bats avail of throughout the year.

Methodology

Bats

The site was examined on two dates in the summer of 2020. This was undertaken by two specialist bat surveyors, in June 2020: 10th to 11th and 30th June to 1st July 2020. Surveying in June commenced with an examination of the buildings externally within the site and a basic examination of the trees. Trees were further examined on 11th June 2020 with a fibrescope and torch for signs of roosting bats.

Two Songmeter Mini monitors were employed; one was placed at a tree stump on woodland edge to the western perimeter of the site. The second Songmeter Mini was placed at the southwestern corner of the church. Both monitors remained in place up to sunrise. A third monitor, a Songmeter2Bat+ was placed to the north of the main entrance to the College main building and remained here overnight.

The primary focus of the bat survey at sunset were the main seminary building (east side), the northern buildings of the cloister quadrant, the former church (serving as an Ukrainian Orthodox church until summer 2020). These buildings were all observed both at sunset and at sunrise. The house to the east was observed prior to sunrise on 11th June for evidence of any bats returning to the building. All bat activity and directions of flight were noted.

The site was re-examined to cover the inner area of the cloister and areas such as the river and vegetation in this area. This allowed a full evaluation of the bat activity and usage of the site in a highly important period of the year; mid to late June when female bats give birth to their single annual young and gather together into maternity roosts. The second survey was undertaken on 30th June to 1st July 2020 and concentrated on buildings within the cloister as well as re-assessing the surrounding buildings. Emergence observations commenced at the cloister and progressed throughout the site including the western edge and up to the northwestern corner of the College grounds and the Tolka River.

Prior to sunrise, the cloister was again examined for evidence of bats returning to any of the College buildings.

The third visit to Clonliffe involved a visual examination of the attic areas of the College and a thorough examination of the church for any evidence of bat usage on 3rd September 2020.

A fourth visit to Clonliffe College was undertaken on 20th and 21st April 2021 to evaluate the spring activity and roosting patterns within the site. This again involved two surveyors working from prior to sunset (20.35 hours) up to 22.10 hours and again from 05.00 hours to sunrise (06.12 hours). The active survey commenced by examining emergence activity at the College and trees leading to the eastern building as well as the building itself. After this, the bat activity throughout the site was examined by a walked transect to cover all areas. Surveying prior to sunrise involved the examination of the same structures as at sunset in addition.

Survey constraints for bat assessment

Surveying was undertaken at a highly suitable period of the year. There was no rain for any of the survey dates. Sunset was at 21.52 hours on 10th June and at 21.56 hours on 30th June 2020. Sunrise was at 04.57 hours on 11th June and 05.02 hours on 1st July 2020. Temperatures of 1 degrees Celsius and winds of 29 kmph were noted. There were no weather constraints for either date but there was relatively strong wind in places within the site. This may have altered bat activity and brought about more concentrated feeding to avoid wind disruption and to follow insect clustering.

In April 2021, the conditions at sunset were very suitable for bat emergence and bat activity as there was no rain, conditions were calm and temperatures commenced at around 10ºC dropping to 6ºC by sunrise (7ºC at 05.00 hours). This temperature drop brought about a cessation in all bat activity by sunrise. The northern area around the College was windy as in 2020 and it is likely that this exposure reduces bat activity and insect abundance.

Birds

The site was examined by one surveyor with Nikon Aculon 8 x 42 binoculars and access to an Opticron Spotting scope from 05.00 hours on June 11th and again on July 1st 2020 and finally on April 21st 2021 to identify the presence of breeding birds. This involved a walkover of the site following each perimeter feature each line of vegetation, walls and assessing free-standing trees and scrub, to determine whether there were territories of

breeding birds and to observe any other birds within the site that were feeding or commuting through the site. Surveying was based on visual identification and identification of calls and songs. Surveying continued until the entire site had been covered at 07.00 hours on both dates in 2020 and up to 08.30 hours in April 2021. Any bird activity was recorded and the presence of singing birds or nests were noted.

Survey constraints for bird assessment

The survey period was highly suited to an examination of nesting birds. There were no constraints to the assessment on any survey date.

Results

Bats

Species of bat noted to roost within the site

None

Bat activity increased within the site over time within the night and the data suggest that bats are arriving on site from roosts outside of the site. Bat activity dropped significantly approaching sunrise and while there was clearly evidence that two species were roosting in close proximity to the buildings, no bat was seen to enter prior to sunrise. Common pipistrelle activity was noted late into the morning on 11th June 2020 and this would indicate that bats were not commuting long distances to return to the roost. Leisler's bat activity was present at the cloister approaching sunrise on 1st July 2020 and it is probable that this species is roosting in close proximity to the site and potentially in buildings neighbouring the College.

A common pipistrelle was noted at the cloister early on the night of 30th June 2020. This bat fed around the College eaves and displayed a very thorough awareness of the building in its flight paths and proximity to the building. This suggests that there may be occasional usage of the buildings by individual bats. There was no evidence of maternity roosts or large numbers of bats anywhere in the buildings based on the bat activity survey in June and the examination of the buildings in September. Individual bats may roost under slates etc. without any obvious signs of bat presence and their presence at other times (outside of the survey dates) could not be ruled out.

In April 2021, a common pipistrelle was present close to the eastern house relatively early in the night but no bat was seen to emerge from the building. Bat activity around the College was low early in the observations and there were no bats seen to emerge from any building. Leisler's bat activity was extremely low on the night of survey with one monitor noting two periods of bat activity that lasted less than one minute at 20.53 hours.

Bats have not been encountered by the maintenance staff of the College and there is no evidence from all available information of bat occupancy. Given the number of buildings and the volume of roof available to bats, it is very possible that individual bats avail of the buildings. However, no bat was noted to emerge or enter any building. No bat droppings or staining was in evidence and no staff member had encountered bats.

Species feeding within the site

Common pipistrelle	*Pipistrellus pipistrellus*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Leisler's bat	*Nyctalus leisleri*

The period of highest bat activity within the site was after sunset on 20th April 2021. At this time, there was high levels of pipistrelle activity locally including the trees around the eastern house, the trees running from here to the avenue into the site from Clonliffe Road and the major horse chestnut trees adjoining this avenue and along the River Tolka to the north of the site. There were some areas close to the College such as a flat-roofed extension where bat activity was noted, the rear of the College at the northwestern area of the cloisters but overall activity around the College was much lower than around the mature trees and along the river. Activity was highest in the unlit areas rather than the brightly lit areas.

Birds

The breeding species within the site is given in Table 2. All the species noted are very common in Ireland and there were no rare species and no red-listed or amber-listed species that would merit concern for their protection due to modifications to this site (see * below for clarification of these categories). There was a flock of foraging herring gulls on the lawns of the College; at one point, there were 55 gulls present in one cluster and 11 in another on 11th June.

A single blackcap male was noted within the grounds on both survey dates in June; towards Drumcondra Road.

On the evening of 30th June 2020, 6 swifts were seen flying within the grounds and through the site but not to enter any of the buildings.

*Birds of Conservation Concern in Ireland (BoCCI) is an assessment of the conservation status of all regularly occurring birds on the island of Ireland. The criteria on which the assessment is based include international conservation status, historical breeding declines, recent population declines (numbers and range in breeding and nonbreeding seasons), European conservation status, breeding rarity, localised distribution, and the international importance of populations. These criteria assess a number of important characteristics of populations such as changes in range and population size in Ireland, Europe and globally. Meeting one or more of these criteria qualifies a species for the relevant list with each species being listed according to the highest category for which they qualify. Red-listed species are those of highest conservation priority, being globally threatened, declining rapidly in abundance or range, or having undergone historic declines from which they have not recently recovered. Amber-listed species have an unfavourable status in Europe, have moderately declined in abundance or range, a very small population size, a localised distribution, or occur in internationally important numbers.

Those species which are Green-listed do not meet any of these criteria and therefore require little direct conservation action.

Nesting was widespread within and adjacent to the site in the trees and scrub by typical garden species. Birds were present in an abundance and distribution that would be expected for a suburban site that has been repeatedly modified.

A kingfisher was noted flying down the River Tolka on 1st July 2020. The bird did not enter the riverbank of Clonliffe College grounds within the site or adjoining lands.

Proposed development

The development will consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 2 to 18 storeys, to accommodate 1614 no. apartments including a retail unit, a café unit, a crèche, and residential tenant amenity spaces. The development will include a single level basement under Blocks B2, B3 & C1, a single level basement under Block D2 and a podium level and single level basement under Block A1 to accommodate car parking spaces, bicycle parking, storage, services and plant areas. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The proposed development sits as part of a wider Site Masterplan for the entire Holy Cross College lands which includes a permitted hotel development and future proposed GAA pitches and clubhouse.

The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory. The application proposes the renovation and extension of the Seminary Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as residential tenant amenity. The wider Holy Cross College lands also includes Protected Structures including The Red House and the Archbishop's House (no works are proposed to these Structures).

The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Rd. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. Access from the Clonliffe Road entrance

will also facilitate vehicular access to future proposed GAA pitches and clubhouse to the north of the site and to a permitted hotel on Clonliffe Road.

The proposed application includes all site landscaping works, green roofs, boundary treatments, PV panels at roof level, ESB Substations, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

Proposed development of Clonliffe College

Impacts of The Proposed Development

Potential roost loss for bats

Felling of mature trees and alterations to existing buildings creates a risk of roost loss. No roosts were noted within the site. However, there are several trees with roost potential within the site that will be removed. As bats may move tree roost regularly, this means that they will move into roosts between survey dates and may avail of trees that were not occupied during the survey period.

Loss of nesting sites for birds

There will be a reduction in the vegetation cover and removal of the scrub and some of the mature trees that offer nest sites for the bird species noted within the site. Trees that are retained will be under considerable pressure from disturbance for the duration of construction and from human presence into the future. This will arise from the level of noise and lighting associated with construction and following this from lighting associated with residents. This will be a long-term moderate negative impact as there will be a loss in established vegetation.

Disturbance from lighting

Lighting may be increased for two different functions:

R) Access and safety and 2) Security

The former is to allow ease of use for residents at night. The latter is to ensure that residents feel a higher level of security. The lighting for the development is shown in the Appendices. Lighting can affect feeding and commuting behaviour for some species and for many individuals of species that are considered more light-tolerant.

Reduced Feeding

Reduced vegetation will lead to reduced insect abundance. There will be clearance of some of the current vegetation in the clearance of the site for construction. This will be a permanent slight negative impact on bats.

Cumulative Impacts

Changes throughout Dublin reducing the availability of green space will have a cumulative impact on invertebrates, bats and birds. This will be a long-term to permanent slight negative impact upon the fauna of the site.

Mitigation Measures

Avoidance of the bird nesting period for tree removal and hedgerow clearance

All clearance operations shall avoid the bird nesting period; March 1st to August 31st. This will ensure that no birds are directly lost from these procedures. In a situation where trees must be removed prior to the end of the nesting season, an assessment for nesting birds shall be carried out by an ecologist.

Checking of all trees and other structures for bats prior to felling

All mature trees shall be checked for bats by a bat specialist to identify trees with the highest potential prior to felling or major surgery. From this, trees with the highest roost potential as determined by the bat specialist shall be subjected to a higher level of examination that shall include thorough checking of all suitable crevices, cavities, ivy cover or loose bark. This will require access via a hoist to reach all suitable cavities and crevices. Should bats be noted during this evaluation, a derogation shall be required from NPWS. This would also require further mitigation measures including roost replacement such as additional bat boxes or other alternatives.
Where there is a need to undertake building work at roof level for the buildings within the site (the College or house to the east), buildings shall be examined for the presence of bats prior to commencement. Sufficient time must be allowed to seek a derogation if bats are present.

Planting for birds and bats

Planting must provide suitable cover for nesting birds and encourage insect diversity that would sustain birds and bats. This can be achieved both by availing of native species and non-native non-invasive plant species. Nesting birds require dense cover to hide nests and to avoid predation from cats, crow species etc. Planting should be

examined by an ecologist and where supplementary planting is considered necessary; this should be incorporated.

The landscape design for the proposed development prepared by NMP is in line with the policies and objectives of the All-Ireland Pollinator Plan.

Bird boxes and wall access points for birds

Bird boxes shall be provided These shall include boxes suitable for robins, blue tits, and treecreepers. Further to this, four Schwegler 1MF swift and box boxes shall be incorporated into buildings (or equivalent dependent upon availability of stock). These should also include the slopes for easier access.

4 x Schwegler 1MF bat and swift nest box

2 x Eco Bat Boxes

6 x 2F Schwegler with double front panel

Bat boxes

8 Schwegler bat boxes are proposed for incorporation into the site to provide roost sites for bats. The type of bat boxes required are the following: 2 x Eco Bat Boxes, 6 x 2F with double front panel. These shall be provided in unlit areas at a height of no less than 2 metres and in uncluttered areas away from busy roads or other high activity. Mature trees are typically very suitable for boxes. Bat boxes should primarily face southwards but with three of the boxes facing away from direct solar radiation towards midday (e.g. westerly).

Lighting management

Bat Conservation Ireland Lighting recommendations are shown below:

Where there is too much luminance, bats' vision can be reduced resulting in disorientation. While light sensitivity varies between species, bats tend to have a higher tolerance for red visual light than white light. Short wave frequency (UV) light is most disturbing for bats. This is since bats have a higher proportion of rods in their retina compared to cones. The rods allow greater absorption of light in dim conditions. Too much luminance at bat roosts may cause bats to desert a roost.

Light falling on a roost exit point can delay bats from emerging and miss peak levels of insect activity at dusk. Any delays of emergence can reduce feeding periods. Lighting can also disturb bats' feeding behaviour. Many night flying insects are attracted to lights especially those lamps that emit UV light. A sole source of light in a dark area can cause local insect populations to congregate in concentrations around the light source.

While some Irish bat species such as Leisler's bats will opportunistically feed on such insect gatherings, the majority of Irish bat species are too sensitive to such light sources and suffer from insect populations being reduced in traditional feeding areas. In addition, artificial lighting can increase the chances of bats being preyed on. Lighting can be particularly harmful to bat populations along river corridors, woodland edges, along hedgerows and treelines and at lake edges.

Each species of bat has an optimum level of light for emergence. For example, Daubenton's bats prefer a light level of less than 1 lux. To put this in perspective, 0.2 lux level is equivalent to moonlight. While all bat species have a low tolerance for light levels, the following bat species are particularly sensitive to elevated light levels: brown long-eared bat, whiskered bat, Natterer's bat, Daubenton's bat and lesser horseshoe bat.

How can planning influence lighting strategies? Planning conditions in relation to lighting are an important way for planning authorities to influence the design of light installations and potentially mitigate their impacts.

Such conditions could include:

1. Hours of illumination – provide some hours of darkness.
2. Light levels – install lighting that meets the lowest light levels permitted under health and safety. Specification and colour of light treatments Use low pressure

sodium lights instead of high-pressure sodium lights or mercury lamps. If mercury lamps are to be used, fit them with UV filters.

3. Column heights of lamp posts – reduce the amount of light spillage where it is not needed by restricting the height of lamp columns (e.g. lighting)
4. Use of demountable columns
5. Screening to reduce impacts of lighting
6. Assessment of lighting regime after installation
7. Greater use of the solar clock to control timing of lighting

Lighting shall be for safety and mobility and not for ornamental purposes. Light falling upon any areas of benefit to bats such as the wood to the rear of the site must not exceed 3 lux to ensure that light intolerant individuals and species are not prevented from feeding and commuting.

- Lights shall be louvred if necessary, to avoid illumination of the woods and shall be LED
- All luminaires shall lack UV elements when manufactured.
- A warm white spectrum (between 2700 Kelvin and 4000 Kelvin) shall be adopted to reduce blue light component.
- Luminaires shall feature peak wavelengths higher than 550 nm.
- Motion-activated sensor lighting shall be employed where practicable. Such lighting shall have a short “activated time” to ensure that it is responding to human activity rather than bats, birds or passing foxes and to return to darkness quickly. Human presence would continue to re-trigger the lights while occasional bat entry would be less likely to do so.

The lighting design prepared by O’Connor Sutton Cronin and included in the Lighting Report for the Proposed Project meets these objectives.

Impacts Following Mitigation

There will be a reduction in green space that will reduce feeding for bats and birds. The impact of this will be reduced by a planting regime that encourages insect diversity but there will be a long-term slight negative impact.

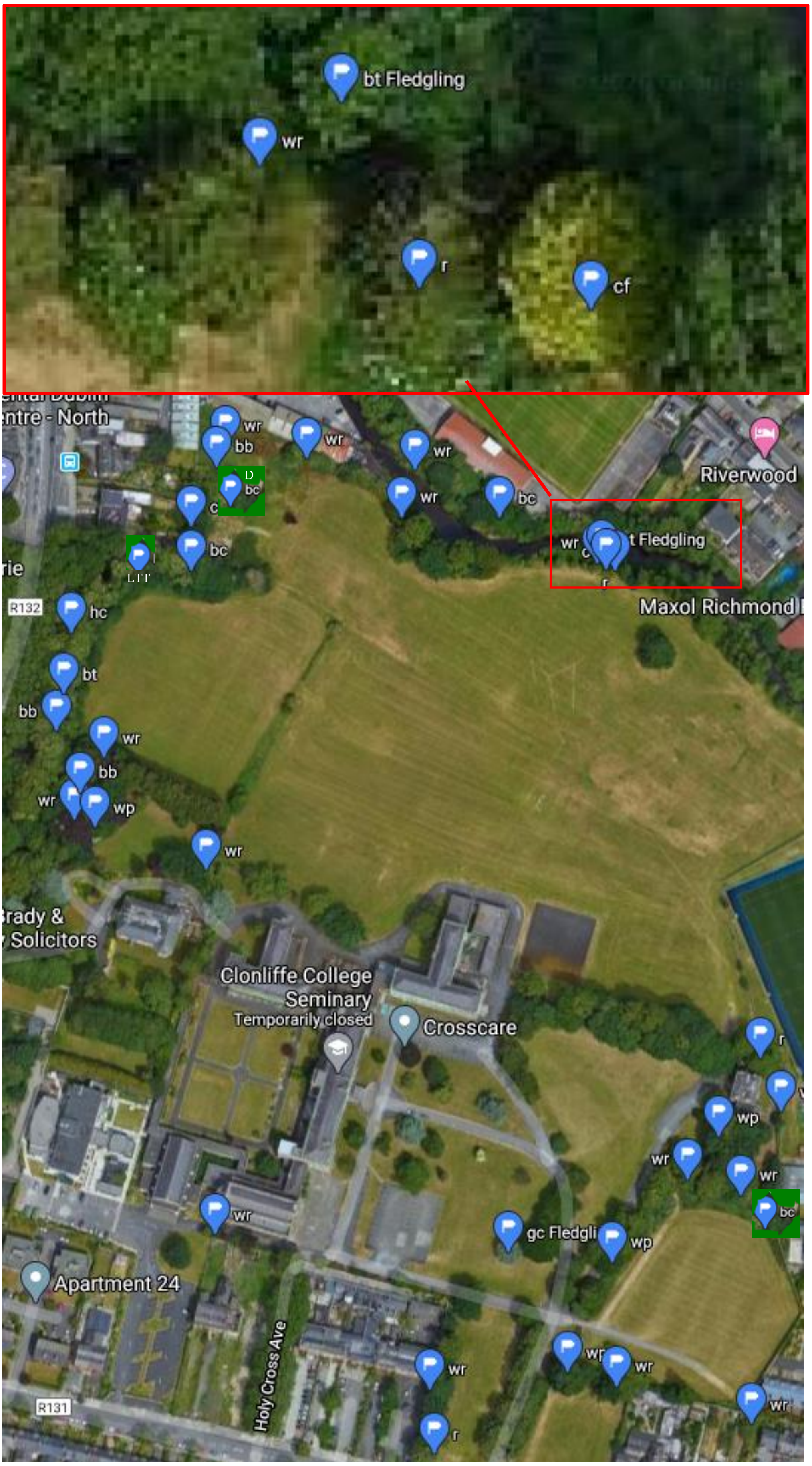
APPENDICES

Table 1: Bat Conservation Ireland data from within a 1-kilometre radius

BCIreland data: search results 20 Apr 2021				
Search parameters: Roosts Transects Ad-hoc observation sites with observations of all bats within 1000m of O1630836310.				
Transects				
Name	Grid reference start	Grid ref start easting	Grid ref start northing	Species
Griffith Park to Drumcondra Park Transect	O1618736725	316187	236725	Pipistrellus spp. (45kHz/55kHz)

Table 2: Bird species noted at Clonliffe College from territorial calls

B.	Blackbird	Turdus merula
BC	Blackcap	Sylvia atricapilla
BT	Blue Tit	Cyanistes caeruleus
LTT	Long-tailed tit	Aegithalos caudatus
BZ	Buzzard	Buteo buteo
CF	Chaffinch	Fringilla coelebs
D.	Dunnock	Prunella modularis
GC	Goldcrest	Regulus regulus
GO	Goldfinch	Carduelis carduelis
GT	Great Tit	Parus major
R.	Robin	Erithacus rubecula
ST	Song Thrush	Turdus philomelos
MT	Mistle Thrush	Turdus viscovorus
SG	Starling	Sturnus vulgaris
BB	Blackbird	Turdus
WP	Wood Pigeon	Columba palumbus
CD	Collared dove	Streptopelia decaocto
P	Feral Pigeon	Columba livia domestica
WR	Wren	Troglodytes troglodytes
HG	Herring gull	Larus argentatus
LBB	Lesser black-backed gull	Larus
JD	Jackdaw	Corvus monedula
MP	Magpie	Pica pica
BC	Blackcap	Sylvia atricapilla
KF (flying on river) (Amber)	Kingfisher	Alcedo atthis
CA (flying over) (Amber)	Cormorant	Phalacrocorax carbo
MA	Mallard	Anas platyrhynchos
MH	Moorhen	Gallinula chloropus
SI (feeding) (Amber)	Swift	Apus apus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Birds nesting at Clonliffe College 2020 to 2021. The abbreviations are explained in Table 2.

Bat activity at Clonliffe College 10th to 11th June 2020

Legend

Small green paddle	Common pipistrelle between sunset at 23.10 hours
Green paddle with diamond	Common pipistrelle prior to sunrise
"2" paddle	Common and Soprano pipistrelles present
White line	Area covered by surveyor
	Songmeter Mini 1
	Songmeter Mini 2
	Songmeter2 Bat+ (SM2)
	Common pipistrelle feeding route

Bat activity at Clonliffe College 30th June to 1st July 2020

Leisler's bats and common pipistrelles were noted in the area of the cloister primarily during the night but Leisler's bats were noted prior to sunrise at the northern buildings but were not seen to enter any building

Clonliffe College EM3 data BK 10th June 2020

TIME	AUTO ID	PULSES	MANUAL ID
21:59:50	PIPI	5	PIPI
22:06:56	PIPI	5	PIPI
22:07:16	PIPI	7	PIPI
22:07:36	PIPI	10	PIPI
22:07:56	PIPI	4	PIPI
22:08:36	PIPI	11	PIPI
22:08:57	PIPI	9	PIPI
22:10:18	PIPI	26	PIPI
22:10:38	PIPI	12	PIPI
22:10:58	PIPI	13	PIPI
22:11:18	PIPI	45	PIPI
22:11:38	PINA	46	PIPI
22:11:58	PIPI	57	PIPI
22:12:18	PINA	21	PIPI
22:13:19	PIPI	6	PIPI
22:13:59	PIPI	8	PIPI
22:14:39	PIPI	43	PIPI
22:14:59	PIPI	130	PIPI
22:15:19	PIPI	112	PIPI
22:15:40	PIPI	41	PIPI
22:16:00	PIPI	271	PIPI
22:16:20	PIPI	318	PIPI
22:16:40	PIPI	233	PIPI
22:17:01	PIPI	141	PIPI
22:17:21	PIPI	218	PIPI
22:17:41	PIPI	243	PIPI
22:18:01	PIPI	303	PIPI
22:18:21	PIPI	39	PIPI
22:18:41	PIPI	91	PIPI PIPY
22:19:01	PIPI	289	PIPI PIPY
22:19:23	PIPI	270	PIPI PIPY
22:19:43	PIPI	191	PIPI PIPY
22:20:03	PIPI	155	PIPI PIPY
22:20:23	PIPI	119	PIPI
22:20:43	PIPI	4	PIPI
22:21:03	PIPI	7	PIPI
22:21:43	PIPI	39	PIPI
22:30:48	NoID	2	PIPI
22:58:02	PIPI	58	PIPI
22:58:22	PIPI	9	PIPI
04:03:36	PIPI	2	PIPI
04:06:58	PIPI	4	PIPI

04:12:01	PIPI	6	PIPI
04:12:21	PIPI	10	PIPI
04:12:41	PIPI	48	PIPI
04:13:01	PIPI	16	PIPI
04:13:22	PIPI	111	PIPI
04:13:42	PIPI	111	PIPI
04:14:02	PIPI	150	PIPI
04:14:22	PIPI	150	PIPI
04:14:42	PIPI	142	PIPI
04:15:02	PIPI	162	PIPI
04:15:22	PIPI	160	PIPI
04:15:42	PIPI	146	PIPI
04:16:03	PIPI	119	PIPI
04:16:23	PIPI	132	PIPI
04:16:44	PIPI	118	PIPI
04:17:05	PIPI	99	PIPI
04:17:25	PIPI	85	PIPI
04:17:45	PIPI	75	PIPI
04:32:52	PIPI	4	PIPI

Bat activity recorded by Songmeter Mini at Clonliffe College BKMINI June 2020

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
10/06/2020	21:26:14	NoID	7	
10/06/2020	21:26:30	NoID	3	
10/06/2020	21:26:46	NoID	13	
10/06/2020	21:27:01	NoID	8	
10/06/2020	21:27:17	NoID	9	
10/06/2020	21:27:32	NoID	10	
10/06/2020	22:06:59	PIPPIP	3	
10/06/2020	22:07:23	PIPPIP	21	
10/06/2020	22:07:30	PIPPIP	29	
10/06/2020	22:07:43	PIPPIP	6	
10/06/2020	22:07:49	PIPPIP	15	
10/06/2020	22:08:37	PIPPIP	27	
10/06/2020	22:08:52	PIPPIP	11	
10/06/2020	22:10:11	PIPPIP	26	
10/06/2020	22:10:41	PIPPIP	9	
10/06/2020	22:11:27	PIPPIP	27	
10/06/2020	22:11:47	PIPPIP	44	
10/06/2020	22:11:57	PIPPIP	50	
10/06/2020	22:12:28	PIPPIP	33	
10/06/2020	22:13:11	PIPPIP	38	
10/06/2020	22:13:21	PIPPIP	46	

10/06/2020	22:14:37	PIPPIP	45	
10/06/2020	22:14:52	PIPPIP	101	
10/06/2020	22:15:07	PIPPIP	11	
10/06/2020	22:15:16	PIPPIP	76	
10/06/2020	22:15:39	PIPPIP	23	
10/06/2020	22:16:00	PIPPIP	21	
10/06/2020	22:16:18	PIPPIP	25	
10/06/2020	22:16:30	PIPPIP	26	
10/06/2020	22:16:46	PIPPIP	39	
10/06/2020	22:16:54	PIPPIP	48	
10/06/2020	22:17:22	PIPPIP	28	
10/06/2020	22:17:33	PIPPIP	45	
10/06/2020	22:17:48	PIPPIP	24	
10/06/2020	22:18:06	PIPPIP	23	
10/06/2020	22:18:19	PIPPIP	34	
10/06/2020	22:18:28	PIPPIP	72	
10/06/2020	22:18:45	PIPPIP	22	
10/06/2020	22:18:55	PIPPIP	48	
10/06/2020	22:20:16	PIPPIP	51	
10/06/2020	22:21:04	PIPPIP	13	
10/06/2020	22:21:24	PIPPIP	9	
10/06/2020	22:23:01	PIPPIP	34	
10/06/2020	22:23:11	PIPPIP	36	
10/06/2020	22:23:21	PIPPIP	23	
10/06/2020	22:23:32	PIPPIP	65	
10/06/2020	22:23:47	PIPPIP	56	
10/06/2020	22:24:07	PIPPIP	42	
10/06/2020	22:24:19	PIPPIP	18	
10/06/2020	22:24:30	PIPPIP	23	
10/06/2020	22:25:26	PIPPIP	54	
10/06/2020	22:26:02	PIPPIP	70	
10/06/2020	22:26:18	PIPPIP	18	
10/06/2020	22:27:30	PIPPIP	87	
10/06/2020	22:27:45	PIPPIP	115	PIPPIP
10/06/2020	22:28:00	PIPPIP	132	PIPPIP
10/06/2020	22:28:16	PIPPIP	23	
10/06/2020	22:28:24	PIPPIP	37	
10/06/2020	22:28:37	PIPPIP	8	
10/06/2020	22:28:42	PIPPIP	38	
10/06/2020	22:29:00	PIPPIP	66	
10/06/2020	22:29:25	PIPPIP	40	
10/06/2020	22:29:52	PIPPIP	67	

10/06/2020	22:30:05	PIPPIP	29	
10/06/2020	22:30:13	PIPPIP	72	
10/06/2020	22:30:28	PIPPIP	19	
10/06/2020	22:32:34	PIPPIP	3	
10/06/2020	22:32:51	PIPPIP	40	
10/06/2020	22:33:16	PIPPIP	5	
10/06/2020	22:33:22	PIPPIP	111	
10/06/2020	22:34:08	PIPPIP	65	
10/06/2020	22:34:22	PIPPIP	27	
10/06/2020	22:34:56	PIPPIP	62	
10/06/2020	22:35:13	PIPPIP	57	
10/06/2020	22:40:24	PIPPIP	87	
10/06/2020	22:42:43	PIPPIP	17	
10/06/2020	22:43:11	PIPPIP	33	
10/06/2020	22:43:35	PIPPIP	64	
10/06/2020	22:45:28	PIPPIP	54	
10/06/2020	22:45:46	PIPPIP	43	
10/06/2020	22:46:00	PIPPIP	81	
10/06/2020	22:46:16	PIPPIP	70	
10/06/2020	22:46:52	PIPPIP	22	
10/06/2020	22:47:28	PIPPIP	2	
10/06/2020	22:48:11	PIPPIP	56	
10/06/2020	22:57:30	PIPPIP	54	
10/06/2020	22:57:46	PIPPIP	7	
10/06/2020	22:57:53	PIPPIP	42	
10/06/2020	22:58:07	PIPPIP	28	
10/06/2020	22:58:17	PIPPIP	48	
10/06/2020	22:59:58	PIPPYG	13	
10/06/2020	23:00:07	PIPPYG	16	
10/06/2020	23:00:21	PIPPYG	24	
10/06/2020	23:00:33	PIPPYG	54	
10/06/2020	23:01:02	PIPPYG	11	
10/06/2020	23:01:20	PIPPYG	26	
10/06/2020	23:01:51	PIPPYG	30	
10/06/2020	23:09:44	PIPNAT	68	PIPPIP
10/06/2020	23:09:59	PIPNAT	7	PIPPIP
10/06/2020	23:12:23	PIPPIP	18	
10/06/2020	23:14:00	PIPPIP	32	
10/06/2020	23:14:19	PIPPIP	85	
10/06/2020	23:14:35	PIPPIP	88	
10/06/2020	23:17:14	PIPPIP	27	
10/06/2020	23:18:40	PIPPYG	15	

10/06/2020	23:18:59	PIPPYG	44	
10/06/2020	23:23:57	PIPPYG	50	
10/06/2020	23:24:25	PIPPIP	55	
10/06/2020	23:43:10	PIPPIP	16	
11/06/2020	01:15:37	PIPPIP	9	
11/06/2020	01:57:44	PIPPIP	45	
11/06/2020	01:57:54	PIPPIP	51	
11/06/2020	01:58:17	PIPPIP	72	
11/06/2020	01:58:33	PIPPIP	82	
11/06/2020	01:58:48	PIPPIP	70	
11/06/2020	01:59:04	PIPPIP	66	
11/06/2020	01:59:56	PIPPIP	96	
11/06/2020	02:00:38	PIPPIP	63	
11/06/2020	02:04:25	PIPPIP	81	
11/06/2020	02:59:56	PIPPIP	8	
11/06/2020	03:00:08	PIPPIP	28	
11/06/2020	03:00:18	PIPPIP	35	
11/06/2020	03:01:01	PIPPIP	21	
11/06/2020	03:01:33	PIPPYG	15	
11/06/2020	03:05:07	PIPNAT	17	PIPPIP
11/06/2020	03:05:21	PIPPIP	6	
11/06/2020	03:05:48	PIPPIP	27	
11/06/2020	03:06:14	PIPPIP	52	
11/06/2020	03:06:35	PIPPIP	45	
11/06/2020	03:06:56	PIPPIP	32	
11/06/2020	03:07:06	PIPPIP	45	
11/06/2020	03:07:43	PIPPIP	12	
11/06/2020	03:08:47	PIPPIP	21	
11/06/2020	03:08:57	PIPPIP	23	
11/06/2020	03:09:58	PIPPIP	27	
11/06/2020	03:10:10	PIPPIP	16	
11/06/2020	03:10:17	PIPPIP	6	
11/06/2020	03:11:05	PIPPIP	8	
11/06/2020	03:11:49	PIPPIP	17	
11/06/2020	03:12:12	PIPPIP	35	
11/06/2020	03:13:59	PIPPIP	15	
11/06/2020	03:14:14	PIPPIP	14	
11/06/2020	03:28:41	PIPPIP	65	
11/06/2020	03:28:57	PIPPIP	34	
11/06/2020	03:29:16	PIPPIP	11	
11/06/2020	03:29:35	PIPPIP	30	
11/06/2020	03:30:02	PIPPYG	36	

11/06/2020	03:45:08	PIPNAT	43	PIPPIP
11/06/2020	03:45:24	PIPPIP	19	
11/06/2020	03:45:34	PIPPIP	37	
11/06/2020	03:45:49	PIPPIP	7	
11/06/2020	03:46:01	PIPPIP	5	
11/06/2020	03:46:14	PIPPIP	31	
11/06/2020	03:46:29	PIPPIP	37	
11/06/2020	03:46:48	PIPPIP	61	
11/06/2020	03:48:27	PIPPIP	33	
11/06/2020	03:57:05	PIPPIP	29	
11/06/2020	03:57:19	PIPPIP	44	
11/06/2020	04:02:15	PIPPIP	24	
11/06/2020	04:04:24	PIPPIP	14	
11/06/2020	04:04:36	PIPPIP	28	
11/06/2020	04:04:59	PIPPIP	19	
11/06/2020	04:05:22	PIPPIP	77	
11/06/2020	04:05:58	PIPPIP	24	
11/06/2020	04:06:22	PIPPIP	31	
11/06/2020	04:06:55	PIPPIP	60	
11/06/2020	04:07:22	PIPPIP	10	
11/06/2020	04:08:23	PIPPIP	18	
11/06/2020	04:08:49	PIPPIP	5	
11/06/2020	04:10:15	PIPPIP	65	
11/06/2020	04:10:30	PIPPIP	85	
11/06/2020	04:10:46	PIPPIP	101	
11/06/2020	04:11:01	PIPPIP	22	
11/06/2020	04:13:14	PIPPIP	34	
11/06/2020	04:19:27	PIPPIP	4	
11/06/2020	04:22:24	PIPPIP	25	

Songmeter SM2 at front of College at 10th June 2020

DATE	AUTO ID*	PULSES	MANUAL ID
10/06/2020	PIPPIP	8	PIPPIP
10/06/2020	PIPPIP	15	PIPPIP
10/06/2020	PIPPIP	12	PIPPIP
10/06/2020	PIPPIP	9	PIPPIP
10/06/2020	PIPPIP	13	PIPPIP
10/06/2020	PIPPIP	19	PIPPIP
10/06/2020	PIPPIP	10	PIPPIP
10/06/2020	PIPPYG	9	PIPPYG
10/06/2020	PIPPIP	28	PIPPIP
10/06/2020	PIPPIP	3	PIPPIP
10/06/2020	PIPPIP	34	PIPPIP
10/06/2020	PIPPIP	71	PIPPIP
10/06/2020	PIPPIP	11	PIPPIP
10/06/2020	PIPPIP	86	PIPPIP
10/06/2020	PIPPIP	24	PIPPIP
10/06/2020	PIPPIP	6	PIPPIP
11/06/2020	PIPPIP	11	PIPPIP
11/06/2020	PIPPIP	11	PIPPIP

Bat activity 30th June 2020 EM3 BK

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
30/06/2020	21:44:14	NYCLEI	13	NYCLEI = Leisler's
30/06/2020	22:07:19	PIPNAT	12	PIPPIP = common pipistrelle
30/06/2020	22:07:59	PIPPIP	16	PIPPIP
30/06/2020	22:12:15	PIPPIP	14	PIPPIP
30/06/2020	22:12:20	PIPPIP	6	PIPPIP
30/06/2020	22:12:35	PIPPIP	6	PIPPIP
30/06/2020	22:12:40	PIPPIP	52	PIPPIP
30/06/2020	22:12:55	PIPPIP	8	PIPPIP
30/06/2020	22:19:42	NoID	2	NYCLEI
30/06/2020	22:23:43	NYCLEI	2	NYCLEI
30/06/2020	22:24:03	PIPPIP	29	PIPPIP
30/06/2020	22:24:18	PIPPIP	15	PIPPIP
30/06/2020	22:24:23	NoID	5	PIPPIP
30/06/2020	22:24:38	PIPPIP	19	PIPPIP
30/06/2020	22:24:43	NoID	22	PIPPIP
30/06/2020	22:25:03	PIPPIP	13	PIPPIP
30/06/2020	22:25:18	NoID	23	PIPPIP
30/06/2020	22:25:43	PIPPIP	12	PIPPIP
30/06/2020	22:25:58	PIPPIP	7	PIPPIP
30/06/2020	22:26:03	PIPPIP	40	PIPPIP
30/06/2020	22:26:18	PIPPIP	42	PIPPIP
30/06/2020	22:26:23	PIPPIP	42	PIPPIP
30/06/2020	22:26:38	PIPNAT	3	PIPPIP
30/06/2020	22:53:35	NoID	4	PIPPIP
30/06/2020	22:53:55	PIPPYG	50	PIPPYG = soprano pipistrelle
30/06/2020	22:54:36	PIPPYG	8	PIPPYG
30/06/2020	23:02:20	PIPPIP	45	PIPPIP
30/06/2020	23:02:35	NoID	34	PIPPIP
30/06/2020	23:02:40	PIPPIP	109	PIPPIP
30/06/2020	23:02:55	PIPPIP	29	PIPPIP
01/07/2020	04:11:25	PIPPIP	3	PIPPIP
01/07/2020	04:11:30	PIPPIP	24	PIPPIP
01/07/2020	04:11:45	PIPPIP	8	PIPPIP
01/07/2020	04:13:06	NYCLEI	2	NYCLEI
01/07/2020	04:13:11	NYCLEI	3	NYCLEI
01/07/2020	04:14:52	NYCLEI	12	NYCLEI
01/07/2020	04:23:11	NYCLEI	8	NYCLEI
01/07/2020	04:23:37	NYCLEI	16	NYCLEI
01/07/2020	04:23:52	NYCLEI	2	NYCLEI

01/07/2020	04:23:57	NYCLEI	22	NYCLEI
01/07/2020	04:24:17	NYCLEI	22	NYCLEI
01/07/2020	04:24:32	NYCLEI	3	NYCLEI
01/07/2020	04:24:37	NYCLEI	11	NYCLEI
01/07/2020	04:24:57	NoID	3	NYCLEI
01/07/2020	04:25:12	PIPNAT	31	PIPPIP NYCLEI
01/07/2020	04:25:17	PIPNAT	6	PIPPIP

Bat activity 30th June Songmeter Mini

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
30/06/2020	21:43:47	NYCLEI	30	NYCLEI
30/06/2020	21:44:03	NYCLEI	11	NYCLEI
30/06/2020	22:01:05	NoID	3	NYCLEI
30/06/2020	22:01:28	NYCLEI	6	NYCLEI
30/06/2020	22:02:53	NYCLEI	2	NYCLEI
30/06/2020	22:03:40	NYCLEI	28	NYCLEI
30/06/2020	22:03:57	NYCLEI	3	NYCLEI
30/06/2020	22:07:05	PIPNAT	38	PIPPIP
30/06/2020	22:12:01	PIPPIP	52	PIPPIP
30/06/2020	22:12:13	PIPPIP	58	PIPPIP
30/06/2020	22:12:31	PIPPIP	24	PIPPIP
30/06/2020	22:19:28	NYCLEI	23	NYCLEI
30/06/2020	22:20:23	PIPPIP	9	PIPPIP
30/06/2020	22:21:34	NYCLEI	75	NYCLEI
30/06/2020	22:21:49	NYCLEI	8	NYCLEI
30/06/2020	22:23:29	NYCLEI	18	NYCLEI
30/06/2020	22:23:50	PIPPIP	97	PIPPIP
30/06/2020	22:24:05	PIPPIP	95	PIPPIP
30/06/2020	22:24:28	PIPPIP	49	PIPPIP
30/06/2020	22:24:42	PIPPIP	73	PIPPIP
30/06/2020	22:24:59	PIPPIP	53	PIPPIP
30/06/2020	22:25:12	PIPPIP	35	PIPPIP
30/06/2020	22:25:22	PIPPIP	57	PIPPIP
30/06/2020	22:25:41	PIPPIP	77	PIPPIP
30/06/2020	22:25:57	PIPPIP	79	PIPPIP
30/06/2020	22:26:15	PIPPIP	54	PIPPIP
30/06/2020	22:26:40	PIPPIP	3	PIPPIP
30/06/2020	22:32:21	PIPPYG	29	PIPPYG
30/06/2020	22:32:45	PIPPYG	21	PIPPYG
30/06/2020	22:48:24	PIPPIP	36	PIPPIP
30/06/2020	23:13:21	PIPPIP	27	PIPPIP

30/06/2020	23:28:58	NYCLEI	8	NYCLEI
30/06/2020	23:30:30	NYCLEI	19	NYCLEI
30/06/2020	23:32:33	NYCLEI	5	NYCLEI
01/07/2020	00:41:27	PIPPIP	26	PIPPIP
01/07/2020	00:41:50	PIPPIP	13	PIPPIP
01/07/2020	00:42:59	PIPNAT	36	PIPPIP
01/07/2020	01:06:22	NYCLEI	11	NYCLEI
01/07/2020	01:18:08	PIPNAT	28	PIPPIP
01/07/2020	01:30:20	NYCLEI	15	NYCLEI
01/07/2020	01:32:01	PIPNAT	9	PIPPIP
01/07/2020	02:10:32	PIPPIP	14	PIPPIP
01/07/2020	02:12:08	PIPPIP	25	PIPPIP
01/07/2020	03:11:36	PIPPIP	17	PIPPIP
01/07/2020	03:36:11	PIPNAT	26	PIPPIP
01/07/2020	03:59:41	PIPPIP	48	PIPPIP
01/07/2020	04:05:56	NoID	20	PIPPIP
01/07/2020	04:07:09	PIPPIP	23	PIPPIP
01/07/2020	04:53:29	NYCLEI	5	NYCLEI
01/07/2020	04:55:01	NYCLEI	5	NYCLEI

Bat activity 30th June, the 2nd Songmeter Mini

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
30/06/2020	21:37:31	NoID	2	Noise
30/06/2020	21:38:59	PIPPIP	5	
30/06/2020	21:40:42	NoID	2	Noise
30/06/2020	22:03:14	PIPPIP	12	
30/06/2020	22:04:20	PIPPIP	6	
30/06/2020	22:05:04	PIPPIP	12	
30/06/2020	22:09:39	PIPPIP	17	
30/06/2020	22:15:57	NoID	3	PIPPIP
30/06/2020	22:16:24	PIPPIP	16	
30/06/2020	22:17:35	PIPPIP	26	
30/06/2020	22:18:06	PIPPIP	26	
30/06/2020	22:19:32	PIPPIP	6	
30/06/2020	22:22:28	PIPPYG	12	PIPPYG
30/06/2020	22:22:36	PIPPIP	19	
30/06/2020	22:23:13	NYCLEI	3	
30/06/2020	22:24:10	NYCLEI	18	NYCLEI
30/06/2020	22:26:46	PIPNAT	26	PIPPIP
30/06/2020	22:27:03	PIPPIP	3	
30/06/2020	22:27:22	PIPPIP	10	

30/06/2020	22:27:28	PIPPIP	10	
30/06/2020	22:27:37	PIPPIP	29	
30/06/2020	22:28:38	PIPPIP	8	
30/06/2020	22:29:07	PIPPIP	3	
30/06/2020	22:29:24	PIPPIP	36	
30/06/2020	22:29:40	PIPPIP	24	
30/06/2020	22:30:24	PIPPIP	3	
30/06/2020	22:30:48	NYCLEI	17	NYCLEI
30/06/2020	22:31:18	PIPPIP	101	PIPPIP
30/06/2020	22:33:24	NoID	2	NYCLEI
30/06/2020	22:36:04	PIPPIP	27	
30/06/2020	22:37:45	NYCLEI	15	NYCLEI
30/06/2020	22:44:06	PIPPIP	32	
30/06/2020	22:59:30	PIPPIP	41	
30/06/2020	23:02:49	PIPPIP	15	
30/06/2020	23:20:30	PIPPIP	27	
30/06/2020	23:24:19	PIPPIP	37	
30/06/2020	23:44:56	PIPPIP	34	
01/07/2020	00:38:42	NoID	11	PIPPYG
01/07/2020	00:43:52	PIPPIP	49	PIPPIP
01/07/2020	01:07:34	PIPPIP	6	
01/07/2020	01:20:39	PIPPIP	11	
01/07/2020	01:48:38	PIPPIP	41	PIPPIP
01/07/2020	01:58:58	PIPPIP	20	
01/07/2020	02:02:15	PIPPIP	10	
01/07/2020	02:06:57	PIPPYG	60	PIPPYG
01/07/2020	02:10:37	PIPPIP	6	
01/07/2020	02:10:44	PIPPYG	61	PIPPYG
01/07/2020	02:11:01	PIPPYG	73	PIPPYG
01/07/2020	02:17:01	PIPPIP	37	
01/07/2020	02:24:00	PIPPIP	15	
01/07/2020	02:27:37	PIPPIP	18	
01/07/2020	02:27:49	PIPPIP	35	
01/07/2020	02:32:21	PIPPIP	10	
01/07/2020	02:32:46	PIPPYG	14	PIPPYG
01/07/2020	02:35:06	PIPPYG	53	PIPPYG
01/07/2020	02:45:35	PIPPYG	58	PIPPYG
01/07/2020	03:00:56	PIPPYG	21	PIPPYG
01/07/2020	03:02:24	PIPPIP	13	
01/07/2020	03:14:32	PIPPIP	40	
01/07/2020	03:14:52	PIPPIP	48	PIPPIP
01/07/2020	03:17:53	PIPPIP	7	

01/07/2020	03:21:49	PIPPIP	32	
01/07/2020	03:27:18	PIPPIP	3	
01/07/2020	03:27:32	PIPPIP	2	
01/07/2020	03:29:17	PIPPIP	15	
01/07/2020	03:29:46	PIPPIP	15	
01/07/2020	03:29:52	PIPPIP	12	
01/07/2020	03:30:00	PIPPIP	35	
01/07/2020	03:31:17	PIPPIP	23	
01/07/2020	03:33:44	PIPPIP	28	
01/07/2020	03:35:24	NoID	3	PIPPIP
01/07/2020	03:36:39	PIPPIP	10	
01/07/2020	03:36:57	PIPPIP	54	PIPPIP
01/07/2020	03:37:34	PIPPIP	24	
01/07/2020	03:43:59	PIPPIP	44	PIPPIP
01/07/2020	03:44:14	PIPPIP	30	
01/07/2020	03:44:33	PIPPIP	26	
01/07/2020	03:44:54	PIPPIP	66	PIPPIP
01/07/2020	03:46:52	PIPPIP	27	
01/07/2020	03:47:34	PIPPIP	12	
01/07/2020	03:51:42	PIPPIP	5	
01/07/2020	03:51:47	PIPPIP	71	PIPPIP
01/07/2020	03:52:15	PIPPIP	30	
01/07/2020	03:52:23	PIPPIP	29	
01/07/2020	03:52:46	PIPPIP	31	
01/07/2020	03:59:58	PIPPIP	12	
01/07/2020	04:00:05	PIPPIP	68	PIPPIP
01/07/2020	04:11:43	PIPPIP	27	
01/07/2020	04:26:13	NoID	9	NYCLEI
01/07/2020	04:26:36	NYCLEI	23	NYCLEI
01/07/2020	04:26:56	NoID	3	NYCLEI
01/07/2020	04:27:05	NYCLEI	5	
01/07/2020	04:27:18	NYCLEI	5	
01/07/2020	04:27:37	NoID	6	NYCLEI
01/07/2020	04:28:00	NYCLEI	6	
01/07/2020	04:28:12	NoID	3	NYCLEI
01/07/2020	04:28:28	PIPPIP	7	
01/07/2020	04:28:39	NYCLEI	7	
01/07/2020	04:28:53	NYCLEI	12	
01/07/2020	04:29:07	NYCLEI	6	
01/07/2020	04:29:18	NoID	3	NYCLEI
01/07/2020	04:29:49	NYCLEI	6	
01/07/2020	04:31:14	NYCLEI	4	NYCLEI

01/07/2020	04:31:29	NoID	6	NYCLEI
01/07/2020	04:31:45	NYCLEI	2	
01/07/2020	04:31:56	NYCLEI	7	
01/07/2020	04:32:05	NYCLEI	9	
01/07/2020	04:32:19	NYCLEI	22	NYCLEI
01/07/2020	04:32:42	NYCLEI	5	
01/07/2020	04:32:54	NoID	2	NYCLEI
01/07/2020	04:33:07	NoID	4	NYCLEI
01/07/2020	04:33:22	NYCLEI	10	
01/07/2020	04:33:42	NYCLEI	3	
01/07/2020	04:33:48	NYCLEI	2	
01/07/2020	04:33:55	NYCLEI	3	
01/07/2020	04:34:06	NoID	6	NYCLEI
01/07/2020	04:34:28	NYCLEI	9	
01/07/2020	04:34:37	NYCLEI	4	
01/07/2020	04:34:56	NYCLEI	4	
01/07/2020	04:35:04	NYCLEI	12	
01/07/2020	04:35:31	NYCLEI	14	NYCLEI
01/07/2020	04:35:55	NoID	6	NYCLEI
01/07/2020	04:36:10	NYCLEI	13	
01/07/2020	04:36:34	NoID	3	NYCLEI
01/07/2020	04:36:58	NYCLEI	11	
01/07/2020	04:37:14	NoID	3	NYCLEI
01/07/2020	04:38:03	NoID	2	NYCLEI
01/07/2020	04:38:09	NoID	8	NYCLEI
01/07/2020	04:38:43	NYCLEI	3	
01/07/2020	04:38:54	NYCLEI	5	
01/07/2020	04:39:10	NoID	10	NYCLEI
01/07/2020	04:39:29	NYCLEI	6	
01/07/2020	04:39:39	NoID	7	NYCLEI
01/07/2020	04:39:55	NYCLEI	4	
01/07/2020	04:40:04	NYCLEI	14	NYCLEI
01/07/2020	04:40:53	NoID	2	NYCLEI
01/07/2020	04:41:10	NoID	2	NYCLEI
01/07/2020	04:41:18	NYCLEI	7	
01/07/2020	04:41:31	NYCLEI	2	
01/07/2020	04:42:19	NYCLEI	4	
01/07/2020	04:42:28	NoID	8	NYCLEI
01/07/2020	04:42:43	NoID	3	NYCLEI
01/07/2020	04:42:51	NoID	3	NYCLEI
01/07/2020	04:43:05	NoID	2	NYCLEI
01/07/2020	04:43:24	NYCLEI	3	

01/07/2020	04:43:32	NYCLEI	2	
01/07/2020	04:43:39	NYCLEI	13	NYCLEI
01/07/2020	04:43:52	NoID	2	NYCLEI
01/07/2020	04:44:08	NoID	2	NYCLEI
01/07/2020	04:44:19	NYCLEI	6	
01/07/2020	04:44:49	NoID	5	NYCLEI
01/07/2020	04:45:08	NYCLEI	6	
01/07/2020	04:45:23	NoID	2	NYCLEI
01/07/2020	04:45:35	NYCLEI	5	
01/07/2020	04:45:45	NoID	2	NYCLEI
01/07/2020	04:45:56	NYCLEI	3	
01/07/2020	04:46:08	NoID	3	NYCLEI
01/07/2020	04:46:33	NoID	4	NYCLEI
01/07/2020	04:46:47	NoID	9	NYCLEI
01/07/2020	04:47:02	NYCLEI	11	
01/07/2020	04:47:24	NYCLEI	3	
01/07/2020	04:47:40	NYCLEI	8	
01/07/2020	04:48:08	NoID	6	NYCLEI
01/07/2020	04:48:24	NYCLEI	2	
01/07/2020	04:48:38	NoID	4	NYCLEI
01/07/2020	04:49:01	NYCLEI	5	
01/07/2020	04:49:09	NoID	4	NYCLEI
01/07/2020	04:49:24	NYCLEI	6	
01/07/2020	04:49:30	NYCLEI	2	
01/07/2020	04:49:37	NYCLEI	9	
01/07/2020	04:49:46	NYCLEI	6	
01/07/2020	04:59:22	NYCLEI	2	

Roost potential in buildings and trees – no bats were noted in any of these

Church at Clonliffe College – no longer in service in late 2020

Attic areas with no bat evidence and a bird nest (final image)

EM3 data 30th June 2020 - Surveyor 1

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
01/07/2020	04:23:57	NYCLEI	22	NYCLEI
01/07/2020	04:24:17	NYCLEI	22	NYCLEI
01/07/2020	04:23:37	NYCLEI	16	NYCLEI
30/06/2020	21:44:14	NYCLEI	13	NYCLEI
01/07/2020	04:14:52	NYCLEI	12	NYCLEI
01/07/2020	04:24:37	NYCLEI	11	NYCLEI
01/07/2020	04:23:11	NYCLEI	8	NYCLEI
01/07/2020	04:13:11	NYCLEI	3	NYCLEI
01/07/2020	04:24:32	NYCLEI	3	NYCLEI
30/06/2020	22:23:43	NYCLEI	2	NYCLEI
01/07/2020	04:13:06	NYCLEI	2	NYCLEI
01/07/2020	04:23:52	NYCLEI	2	NYCLEI
30/06/2020	22:19:42	NoID	2	NYCLEI
30/06/2020	22:24:23	NoID	5	PIPPIP
30/06/2020	22:24:43	NoID	22	PIPPIP
30/06/2020	22:25:18	NoID	23	PIPPIP
30/06/2020	22:53:35	NoID	4	PIPPIP
30/06/2020	23:02:35	NoID	34	PIPPIP
01/07/2020	04:24:57	NoID	3	NYCLEI
01/07/2020	04:25:12	PIPNAT	31	PIPPIP NYCLEI
30/06/2020	22:07:19	PIPNAT	12	PIPPIP
01/07/2020	04:25:17	PIPNAT	6	PIPPIP
30/06/2020	22:26:38	PIPNAT	3	PIPPIP
30/06/2020	23:02:40	PIPPIP	109	PIPPIP
30/06/2020	22:12:40	PIPPIP	52	PIPPIP
30/06/2020	23:02:20	PIPPIP	45	PIPPIP
30/06/2020	22:26:18	PIPPIP	42	PIPPIP
30/06/2020	22:26:23	PIPPIP	42	PIPPIP
30/06/2020	22:26:03	PIPPIP	40	PIPPIP
01/07/2020	04:11:30	PIPPIP	24	PIPPIP
30/06/2020	22:24:03	PIPPIP	29	PIPPIP
30/06/2020	22:12:15	PIPPIP	14	PIPPIP
30/06/2020	22:24:38	PIPPIP	19	PIPPIP
30/06/2020	22:25:03	PIPPIP	13	PIPPIP
30/06/2020	22:24:18	PIPPIP	15	PIPPIP
30/06/2020	22:07:59	PIPPIP	16	PIPPIP
30/06/2020	22:25:43	PIPPIP	12	PIPPIP
30/06/2020	23:02:55	PIPPIP	29	PIPPIP
30/06/2020	22:12:55	PIPPIP	8	PIPPIP
01/07/2020	04:11:45	PIPPIP	8	PIPPIP
30/06/2020	22:12:20	PIPPIP	6	PIPPIP
30/06/2020	22:12:35	PIPPIP	6	PIPPIP
30/06/2020	22:25:58	PIPPIP	7	PIPPIP
01/07/2020	04:11:25	PIPPIP	3	PIPPIP
30/06/2020	22:53:55	PIPPYG	50	PIPPYG
30/06/2020	22:54:36	PIPPYG	8	PIPPYG

Songmeter Mini data 30th June 2020

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
30/06/2020	21:43:47	NYCLEI	30	NYCLEI
30/06/2020	21:44:03	NYCLEI	11	NYCLEI
30/06/2020	22:01:05	NoID	3	NYCLEI
30/06/2020	22:01:28	NYCLEI	6	NYCLEI
30/06/2020	22:02:53	NYCLEI	2	NYCLEI
30/06/2020	22:03:40	NYCLEI	28	NYCLEI
30/06/2020	22:03:57	NYCLEI	3	NYCLEI
30/06/2020	22:07:05	PIPNAT	38	PIPPIP
30/06/2020	22:12:01	PIPPIP	52	PIPPIP
30/06/2020	22:12:13	PIPPIP	58	PIPPIP
30/06/2020	22:12:31	PIPPIP	24	PIPPIP
30/06/2020	22:19:28	NYCLEI	23	NYCLEI
30/06/2020	22:20:23	PIPPIP	9	PIPPIP
30/06/2020	22:21:34	NYCLEI	75	NYCLEI
30/06/2020	22:21:49	NYCLEI	8	NYCLEI
30/06/2020	22:23:29	NYCLEI	18	NYCLEI
30/06/2020	22:23:50	PIPPIP	97	PIPPIP
30/06/2020	22:24:05	PIPPIP	95	PIPPIP
30/06/2020	22:24:28	PIPPIP	49	PIPPIP
30/06/2020	22:24:42	PIPPIP	73	PIPPIP
30/06/2020	22:24:59	PIPPIP	53	PIPPIP
30/06/2020	22:25:12	PIPPIP	35	PIPPIP
30/06/2020	22:25:22	PIPPIP	57	PIPPIP
30/06/2020	22:25:41	PIPPIP	77	PIPPIP
30/06/2020	22:25:57	PIPPIP	79	PIPPIP
30/06/2020	22:26:15	PIPPIP	54	PIPPIP
30/06/2020	22:26:40	PIPPIP	3	PIPPIP
30/06/2020	22:32:21	PIPPYG	29	PIPPYG
30/06/2020	22:32:45	PIPPYG	21	PIPPYG
30/06/2020	22:48:24	PIPPIP	36	PIPPIP
30/06/2020	23:13:21	PIPPIP	27	PIPPIP
30/06/2020	23:28:58	NYCLEI	8	NYCLEI
30/06/2020	23:30:30	NYCLEI	19	NYCLEI
30/06/2020	23:32:33	NYCLEI	5	NYCLEI
01/07/2020	00:41:27	PIPPIP	26	PIPPIP
01/07/2020	00:41:50	PIPPIP	13	PIPPIP
01/07/2020	00:42:59	PIPNAT	36	PIPPIP
01/07/2020	01:06:22	NYCLEI	11	NYCLEI
01/07/2020	01:18:08	PIPNAT	28	PIPPIP
01/07/2020	01:30:20	NYCLEI	15	NYCLEI
01/07/2020	01:32:01	PIPNAT	9	PIPPIP
01/07/2020	02:10:32	PIPPIP	14	PIPPIP
01/07/2020	02:12:08	PIPPIP	25	PIPPIP
01/07/2020	03:11:36	PIPPIP	17	PIPPIP
01/07/2020	03:36:11	PIPNAT	26	PIPPIP
01/07/2020	03:59:41	PIPPIP	48	PIPPIP
01/07/2020	04:05:56	NoID	20	PIPPIP
01/07/2020	04:07:09	PIPPIP	23	PIPPIP
01/07/2020	04:53:29	NYCLEI	5	NYCLEI
01/07/2020	04:55:01	NYCLEI	5	NYCLEI

Static monitor 10th June 2020

Detector	DATE	TIME	AUTO ID*	PULSES	MANUAL ID
BKMINI_20200610_212614_000.wav	10/06/2020	21:26:14	NoID	7	
BKMINI_20200610_212630_000.wav	10/06/2020	21:26:30	NoID	3	
BKMINI_20200610_212646_000.wav	10/06/2020	21:26:46	NoID	13	
BKMINI_20200610_212701_000.wav	10/06/2020	21:27:01	NoID	8	
BKMINI_20200610_212717_000.wav	10/06/2020	21:27:17	NoID	9	
BKMINI_20200610_212732_000.wav	10/06/2020	21:27:32	NoID	10	
BKMINI_20200610_214824_000.wav	10/06/2020	21:48:24	NoID	4	
BKMINI_20200610_215009_000.wav	10/06/2020	21:50:09	NoID	3	
BKMINI_20200610_215511_000.wav	10/06/2020	21:55:11	NoID	2	
BKMINI_20200610_220002_000.wav	10/06/2020	22:00:02	NoID	12	
BKMINI_20200610_220659_000.wav	10/06/2020	22:06:59	PIPPIP	3	
BKMINI_20200610_220723_000.wav	10/06/2020	22:07:23	PIPPIP	21	
BKMINI_20200610_220730_000.wav	10/06/2020	22:07:30	PIPPIP	29	
BKMINI_20200610_220743_000.wav	10/06/2020	22:07:43	PIPPIP	6	
BKMINI_20200610_220749_000.wav	10/06/2020	22:07:49	PIPPIP	15	
BKMINI_20200610_220837_000.wav	10/06/2020	22:08:37	PIPPIP	27	
BKMINI_20200610_220852_000.wav	10/06/2020	22:08:52	PIPPIP	11	
BKMINI_20200610_221011_000.wav	10/06/2020	22:10:11	PIPPIP	26	
BKMINI_20200610_221041_000.wav	10/06/2020	22:10:41	PIPPIP	9	
BKMINI_20200610_221127_000.wav	10/06/2020	22:11:27	PIPPIP	27	
BKMINI_20200610_221147_000.wav	10/06/2020	22:11:47	PIPPIP	44	
BKMINI_20200610_221157_000.wav	10/06/2020	22:11:57	PIPPIP	50	
BKMINI_20200610_221228_000.wav	10/06/2020	22:12:28	PIPPIP	33	
BKMINI_20200610_221311_000.wav	10/06/2020	22:13:11	PIPPIP	38	
BKMINI_20200610_221321_000.wav	10/06/2020	22:13:21	PIPPIP	46	
BKMINI_20200610_221437_000.wav	10/06/2020	22:14:37	PIPPIP	45	
BKMINI_20200610_221452_000.wav	10/06/2020	22:14:52	PIPPIP	101	
BKMINI_20200610_221507_000.wav	10/06/2020	22:15:07	PIPPIP	11	
BKMINI_20200610_221516_000.wav	10/06/2020	22:15:16	PIPPIP	76	
BKMINI_20200610_221539_000.wav	10/06/2020	22:15:39	PIPPIP	23	
BKMINI_20200610_221600_000.wav	10/06/2020	22:16:00	PIPPIP	21	
BKMINI_20200610_221618_000.wav	10/06/2020	22:16:18	PIPPIP	25	
BKMINI_20200610_221630_000.wav	10/06/2020	22:16:30	PIPPIP	26	
BKMINI_20200610_221646_000.wav	10/06/2020	22:16:46	PIPPIP	39	
BKMINI_20200610_221654_000.wav	10/06/2020	22:16:54	PIPPIP	48	
BKMINI_20200610_221722_000.wav	10/06/2020	22:17:22	PIPPIP	28	
BKMINI_20200610_221733_000.wav	10/06/2020	22:17:33	PIPPIP	45	
BKMINI_20200610_221748_000.wav	10/06/2020	22:17:48	PIPPIP	24	
BKMINI_20200610_221806_000.wav	10/06/2020	22:18:06	PIPPIP	23	
BKMINI_20200610_221819_000.wav	10/06/2020	22:18:19	PIPPIP	34	

BKMINI_20200610_221828_000.wav	10/06/2020	22:18:28	PIPPIP	72	
BKMINI_20200610_221845_000.wav	10/06/2020	22:18:45	PIPPIP	22	
BKMINI_20200610_221855_000.wav	10/06/2020	22:18:55	PIPPIP	48	
BKMINI_20200610_222016_000.wav	10/06/2020	22:20:16	PIPPIP	51	
BKMINI_20200610_222104_000.wav	10/06/2020	22:21:04	PIPPIP	13	
BKMINI_20200610_222124_000.wav	10/06/2020	22:21:24	PIPPIP	9	
BKMINI_20200610_222301_000.wav	10/06/2020	22:23:01	PIPPIP	34	
BKMINI_20200610_222311_000.wav	10/06/2020	22:23:11	PIPPIP	36	
BKMINI_20200610_222321_000.wav	10/06/2020	22:23:21	PIPPIP	23	
BKMINI_20200610_222332_000.wav	10/06/2020	22:23:32	PIPPIP	65	
BKMINI_20200610_222347_000.wav	10/06/2020	22:23:47	PIPPIP	56	
BKMINI_20200610_222407_000.wav	10/06/2020	22:24:07	PIPPIP	42	
BKMINI_20200610_222419_000.wav	10/06/2020	22:24:19	PIPPIP	18	
BKMINI_20200610_222430_000.wav	10/06/2020	22:24:30	PIPPIP	23	
BKMINI_20200610_222526_000.wav	10/06/2020	22:25:26	PIPPIP	54	
BKMINI_20200610_222602_000.wav	10/06/2020	22:26:02	PIPPIP	70	
BKMINI_20200610_222618_000.wav	10/06/2020	22:26:18	PIPPIP	18	
BKMINI_20200610_222730_000.wav	10/06/2020	22:27:30	PIPPIP	87	
BKMINI_20200610_222745_000.wav	10/06/2020	22:27:45	PIPPIP	115	PIPPIP
BKMINI_20200610_222800_000.wav	10/06/2020	22:28:00	PIPPIP	132	PIPPIP
BKMINI_20200610_222816_000.wav	10/06/2020	22:28:16	PIPPIP	23	
BKMINI_20200610_222824_000.wav	10/06/2020	22:28:24	PIPPIP	37	
BKMINI_20200610_222837_000.wav	10/06/2020	22:28:37	PIPPIP	8	
BKMINI_20200610_222842_000.wav	10/06/2020	22:28:42	PIPPIP	38	
BKMINI_20200610_222900_000.wav	10/06/2020	22:29:00	PIPPIP	66	
BKMINI_20200610_222925_000.wav	10/06/2020	22:29:25	PIPPIP	40	
BKMINI_20200610_222952_000.wav	10/06/2020	22:29:52	PIPPIP	67	
BKMINI_20200610_223005_000.wav	10/06/2020	22:30:05	PIPPIP	29	
BKMINI_20200610_223013_000.wav	10/06/2020	22:30:13	PIPPIP	72	
BKMINI_20200610_223028_000.wav	10/06/2020	22:30:28	PIPPIP	19	
BKMINI_20200610_223234_000.wav	10/06/2020	22:32:34	PIPPIP	3	
BKMINI_20200610_223251_000.wav	10/06/2020	22:32:51	PIPPIP	40	
BKMINI_20200610_223316_000.wav	10/06/2020	22:33:16	PIPPIP	5	
BKMINI_20200610_223322_000.wav	10/06/2020	22:33:22	PIPPIP	111	
BKMINI_20200610_223408_000.wav	10/06/2020	22:34:08	PIPPIP	65	
BKMINI_20200610_223422_000.wav	10/06/2020	22:34:22	PIPPIP	27	
BKMINI_20200610_223456_000.wav	10/06/2020	22:34:56	PIPPIP	62	
BKMINI_20200610_223513_000.wav	10/06/2020	22:35:13	PIPPIP	57	
BKMINI_20200610_224024_000.wav	10/06/2020	22:40:24	PIPPIP	87	
BKMINI_20200610_224243_000.wav	10/06/2020	22:42:43	PIPPIP	17	
BKMINI_20200610_224311_000.wav	10/06/2020	22:43:11	PIPPIP	33	
BKMINI_20200610_224335_000.wav	10/06/2020	22:43:35	PIPPIP	64	

BKMINI_20200610_224528_000.wav	10/06/2020	22:45:28	PIPPIP	54	
BKMINI_20200610_224546_000.wav	10/06/2020	22:45:46	PIPPIP	43	
BKMINI_20200610_224600_000.wav	10/06/2020	22:46:00	PIPPIP	81	
BKMINI_20200610_224616_000.wav	10/06/2020	22:46:16	PIPPIP	70	
BKMINI_20200610_224652_000.wav	10/06/2020	22:46:52	PIPPIP	22	
BKMINI_20200610_224728_000.wav	10/06/2020	22:47:28	PIPPIP	2	
BKMINI_20200610_224811_000.wav	10/06/2020	22:48:11	PIPPIP	56	
BKMINI_20200610_225730_000.wav	10/06/2020	22:57:30	PIPPIP	54	
BKMINI_20200610_225746_000.wav	10/06/2020	22:57:46	PIPPIP	7	
BKMINI_20200610_225753_000.wav	10/06/2020	22:57:53	PIPPIP	42	
BKMINI_20200610_225807_000.wav	10/06/2020	22:58:07	PIPPIP	28	
BKMINI_20200610_225817_000.wav	10/06/2020	22:58:17	PIPPIP	48	
BKMINI_20200610_225958_000.wav	10/06/2020	22:59:58	PIPPYG	13	
BKMINI_20200610_230007_000.wav	10/06/2020	23:00:07	PIPPYG	16	
BKMINI_20200610_230021_000.wav	10/06/2020	23:00:21	PIPPYG	24	
BKMINI_20200610_230033_000.wav	10/06/2020	23:00:33	PIPPYG	54	
BKMINI_20200610_230102_000.wav	10/06/2020	23:01:02	PIPPYG	11	
BKMINI_20200610_230120_000.wav	10/06/2020	23:01:20	PIPPYG	26	
BKMINI_20200610_230151_000.wav	10/06/2020	23:01:51	PIPPYG	30	
BKMINI_20200610_230944_000.wav	10/06/2020	23:09:44	PIPNAT	68	PIPPIP
BKMINI_20200610_230959_000.wav	10/06/2020	23:09:59	PIPNAT	7	PIPPIP
BKMINI_20200610_231223_000.wav	10/06/2020	23:12:23	PIPPIP	18	
BKMINI_20200610_231400_000.wav	10/06/2020	23:14:00	PIPPIP	32	
BKMINI_20200610_231419_000.wav	10/06/2020	23:14:19	PIPPIP	85	
BKMINI_20200610_231435_000.wav	10/06/2020	23:14:35	PIPPIP	88	
BKMINI_20200610_231714_000.wav	10/06/2020	23:17:14	PIPPIP	27	
BKMINI_20200610_231840_000.wav	10/06/2020	23:18:40	PIPPYG	15	
BKMINI_20200610_231859_000.wav	10/06/2020	23:18:59	PIPPYG	44	
BKMINI_20200610_232357_000.wav	10/06/2020	23:23:57	PIPPYG	50	
BKMINI_20200610_232425_000.wav	10/06/2020	23:24:25	PIPPIP	55	
BKMINI_20200610_234310_000.wav	10/06/2020	23:43:10	PIPPIP	16	
BKMINI_20200611_011537_000.wav	11/06/2020	01:15:37	PIPPIP	9	
BKMINI_20200611_015744_000.wav	11/06/2020	01:57:44	PIPPIP	45	
BKMINI_20200611_015754_000.wav	11/06/2020	01:57:54	PIPPIP	51	
BKMINI_20200611_015817_000.wav	11/06/2020	01:58:17	PIPPIP	72	
BKMINI_20200611_015833_000.wav	11/06/2020	01:58:33	PIPPIP	82	
BKMINI_20200611_015848_000.wav	11/06/2020	01:58:48	PIPPIP	70	
BKMINI_20200611_015904_000.wav	11/06/2020	01:59:04	PIPPIP	66	
BKMINI_20200611_015956_000.wav	11/06/2020	01:59:56	PIPPIP	96	
BKMINI_20200611_020038_000.wav	11/06/2020	02:00:38	PIPPIP	63	
BKMINI_20200611_020425_000.wav	11/06/2020	02:04:25	PIPPIP	81	
BKMINI_20200611_025956_000.wav	11/06/2020	02:59:56	PIPPIP	8	

BKMINI_20200611_030008_000.wav	11/06/2020	03:00:08	PIPPIP	28	
BKMINI_20200611_030018_000.wav	11/06/2020	03:00:18	PIPPIP	35	
BKMINI_20200611_030101_000.wav	11/06/2020	03:01:01	PIPPIP	21	
BKMINI_20200611_030133_000.wav	11/06/2020	03:01:33	PIPPYG	15	
BKMINI_20200611_030507_000.wav	11/06/2020	03:05:07	PIPNAT	17	PIPPIP
BKMINI_20200611_030521_000.wav	11/06/2020	03:05:21	PIPPIP	6	
BKMINI_20200611_030548_000.wav	11/06/2020	03:05:48	PIPPIP	27	
BKMINI_20200611_030614_000.wav	11/06/2020	03:06:14	PIPPIP	52	
BKMINI_20200611_030635_000.wav	11/06/2020	03:06:35	PIPPIP	45	
BKMINI_20200611_030656_000.wav	11/06/2020	03:06:56	PIPPIP	32	
BKMINI_20200611_030706_000.wav	11/06/2020	03:07:06	PIPPIP	45	
BKMINI_20200611_030743_000.wav	11/06/2020	03:07:43	PIPPIP	12	
BKMINI_20200611_030847_000.wav	11/06/2020	03:08:47	PIPPIP	21	
BKMINI_20200611_030857_000.wav	11/06/2020	03:08:57	PIPPIP	23	
BKMINI_20200611_030958_000.wav	11/06/2020	03:09:58	PIPPIP	27	
BKMINI_20200611_031010_000.wav	11/06/2020	03:10:10	PIPPIP	16	
BKMINI_20200611_031017_000.wav	11/06/2020	03:10:17	PIPPIP	6	
BKMINI_20200611_031105_000.wav	11/06/2020	03:11:05	PIPPIP	8	
BKMINI_20200611_031149_000.wav	11/06/2020	03:11:49	PIPPIP	17	
BKMINI_20200611_031212_000.wav	11/06/2020	03:12:12	PIPPIP	35	
BKMINI_20200611_031359_000.wav	11/06/2020	03:13:59	PIPPIP	15	
BKMINI_20200611_031414_000.wav	11/06/2020	03:14:14	PIPPIP	14	
BKMINI_20200611_032841_000.wav	11/06/2020	03:28:41	PIPPIP	65	
BKMINI_20200611_032857_000.wav	11/06/2020	03:28:57	PIPPIP	34	
BKMINI_20200611_032916_000.wav	11/06/2020	03:29:16	PIPPIP	11	
BKMINI_20200611_032935_000.wav	11/06/2020	03:29:35	PIPPIP	30	
BKMINI_20200611_033002_000.wav	11/06/2020	03:30:02	PIPPYG	36	
BKMINI_20200611_034508_000.wav	11/06/2020	03:45:08	PIPNAT	43	PIPPIP
BKMINI_20200611_034524_000.wav	11/06/2020	03:45:24	PIPPIP	19	
BKMINI_20200611_034534_000.wav	11/06/2020	03:45:34	PIPPIP	37	
BKMINI_20200611_034549_000.wav	11/06/2020	03:45:49	PIPPIP	7	
BKMINI_20200611_034601_000.wav	11/06/2020	03:46:01	PIPPIP	5	
BKMINI_20200611_034614_000.wav	11/06/2020	03:46:14	PIPPIP	31	
BKMINI_20200611_034629_000.wav	11/06/2020	03:46:29	PIPPIP	37	
BKMINI_20200611_034648_000.wav	11/06/2020	03:46:48	PIPPIP	61	
BKMINI_20200611_034827_000.wav	11/06/2020	03:48:27	PIPPIP	33	
BKMINI_20200611_035705_000.wav	11/06/2020	03:57:05	PIPPIP	29	
BKMINI_20200611_035719_000.wav	11/06/2020	03:57:19	PIPPIP	44	
BKMINI_20200611_040215_000.wav	11/06/2020	04:02:15	PIPPIP	24	
BKMINI_20200611_040424_000.wav	11/06/2020	04:04:24	PIPPIP	14	
BKMINI_20200611_040436_000.wav	11/06/2020	04:04:36	PIPPIP	28	
BKMINI_20200611_040459_000.wav	11/06/2020	04:04:59	PIPPIP	19	

BKMINI_20200611_040522_000.wav	11/06/2020	04:05:22	PIPPIP	77	
BKMINI_20200611_040558_000.wav	11/06/2020	04:05:58	PIPPIP	24	
BKMINI_20200611_040622_000.wav	11/06/2020	04:06:22	PIPPIP	31	
BKMINI_20200611_040655_000.wav	11/06/2020	04:06:55	PIPPIP	60	
BKMINI_20200611_040722_000.wav	11/06/2020	04:07:22	PIPPIP	10	
BKMINI_20200611_040823_000.wav	11/06/2020	04:08:23	PIPPIP	18	
BKMINI_20200611_040849_000.wav	11/06/2020	04:08:49	PIPPIP	5	
BKMINI_20200611_041015_000.wav	11/06/2020	04:10:15	PIPPIP	65	
BKMINI_20200611_041030_000.wav	11/06/2020	04:10:30	PIPPIP	85	
BKMINI_20200611_041046_000.wav	11/06/2020	04:10:46	PIPPIP	101	
BKMINI_20200611_041101_000.wav	11/06/2020	04:11:01	PIPPIP	22	
BKMINI_20200611_041314_000.wav	11/06/2020	04:13:14	PIPPIP	34	
BKMINI_20200611_041927_000.wav	11/06/2020	04:19:27	PIPPIP	4	
BKMINI_20200611_042224_000.wav	11/06/2020	04:22:24	PIPPIP	25	
BKMINI_20200611_042337_000.wav	11/06/2020	04:23:37	NoID	3	
BKMINI_20200611_045428_000.wav	11/06/2020	04:54:28	NoID	3	

Bat data from the Songmeter 2 on 10th June 2020

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
10/06/2020	01:22.9	PIPPIP	8	PIPPIP
10/06/2020	10:35.5	PIPPIP	15	PIPPIP
10/06/2020	15:00.6	PIPPIP	9	PIPPIP
10/06/2020	15:01.6	PIPPIP	13	PIPPIP
10/06/2020	17:44.4	PIPPYG	9	PIPPYG
10/06/2020	19:36.6	PIPPIP	28	PIPPIP
10/06/2020	19:38.6	PIPPIP	3	PIPPIP
10/06/2020	21:39.2	PIPPIP	34	PIPPIP
10/06/2020	21:42.8	PIPPIP	71	PIPPIP
10/06/2020	21:54.4	PIPPIP	11	PIPPIP
10/06/2020	21:55.2	PIPPIP	86	PIPPIP
10/06/2020	21:59.3	PIPPIP	24	PIPPIP
10/06/2020	11:55.4	PIPPIP	12	PIPPIP
10/06/2020	42:32.8	PIPPIP	6	PIPPIP

Surveyor 2 data 30th June 2020

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
01/07/2020	04:32:19	NYCLEI	22	NYCLEI
01/07/2020	04:26:36	NYCLEI	23	NYCLEI
30/06/2020	22:24:10	NYCLEI	18	NYCLEI
30/06/2020	22:30:48	NYCLEI	17	NYCLEI
01/07/2020	04:40:04	NYCLEI	14	NYCLEI
30/06/2020	22:37:45	NYCLEI	15	NYCLEI
01/07/2020	04:43:39	NYCLEI	13	NYCLEI
01/07/2020	04:35:31	NYCLEI	14	NYCLEI
01/07/2020	04:47:02	NYCLEI	11	
01/07/2020	04:28:53	NYCLEI	12	
01/07/2020	04:36:10	NYCLEI	13	
01/07/2020	04:33:22	NYCLEI	10	
01/07/2020	04:36:58	NYCLEI	11	
01/07/2020	04:35:04	NYCLEI	12	
01/07/2020	04:32:05	NYCLEI	9	
01/07/2020	04:49:37	NYCLEI	9	
01/07/2020	04:31:56	NYCLEI	7	
01/07/2020	04:29:49	NYCLEI	6	
01/07/2020	04:45:08	NYCLEI	6	
01/07/2020	04:49:24	NYCLEI	6	
01/07/2020	04:41:18	NYCLEI	7	
01/07/2020	04:47:40	NYCLEI	8	
01/07/2020	04:34:28	NYCLEI	9	
01/07/2020	04:27:05	NYCLEI	5	
01/07/2020	04:32:42	NYCLEI	5	
01/07/2020	04:45:35	NYCLEI	5	
01/07/2020	04:44:19	NYCLEI	6	
01/07/2020	04:49:46	NYCLEI	6	
01/07/2020	04:28:39	NYCLEI	7	
01/07/2020	04:34:37	NYCLEI	4	
01/07/2020	04:42:19	NYCLEI	4	
01/07/2020	04:27:18	NYCLEI	5	
01/07/2020	04:49:01	NYCLEI	5	
01/07/2020	04:28:00	NYCLEI	6	
01/07/2020	04:29:07	NYCLEI	6	
01/07/2020	04:39:29	NYCLEI	6	
30/06/2020	22:23:13	NYCLEI	3	
01/07/2020	04:33:42	NYCLEI	3	
01/07/2020	04:33:55	NYCLEI	3	
01/07/2020	04:43:24	NYCLEI	3	

01/07/2020	04:47:24	NYCLEI	3	
01/07/2020	04:34:56	NYCLEI	4	
01/07/2020	04:39:55	NYCLEI	4	
01/07/2020	04:38:54	NYCLEI	5	
01/07/2020	04:31:45	NYCLEI	2	
01/07/2020	04:41:31	NYCLEI	2	
01/07/2020	04:43:32	NYCLEI	2	
01/07/2020	04:48:24	NYCLEI	2	
01/07/2020	04:49:30	NYCLEI	2	
01/07/2020	04:59:22	NYCLEI	2	
01/07/2020	04:38:43	NYCLEI	3	
01/07/2020	04:45:56	NYCLEI	3	
01/07/2020	04:33:48	NYCLEI	2	
01/07/2020	04:31:14	NYCLEI	4	NYCLEI
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30/06/2020	22:33:24	NoID	2	NYCLEI
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01/07/2020	03:35:24	NoID	3	PIPPIP
01/07/2020	04:26:56	NoID	3	NYCLEI
01/07/2020	04:26:13	NoID	9	NYCLEI
01/07/2020	04:27:37	NoID	6	NYCLEI
01/07/2020	04:28:12	NoID	3	NYCLEI
01/07/2020	04:29:18	NoID	3	NYCLEI
01/07/2020	04:31:29	NoID	6	NYCLEI
01/07/2020	04:32:54	NoID	2	NYCLEI
01/07/2020	04:33:07	NoID	4	NYCLEI
01/07/2020	04:34:06	NoID	6	NYCLEI
01/07/2020	04:35:55	NoID	6	NYCLEI
01/07/2020	04:36:34	NoID	3	NYCLEI
01/07/2020	04:37:14	NoID	3	NYCLEI
01/07/2020	04:38:03	NoID	2	NYCLEI
01/07/2020	04:38:09	NoID	8	NYCLEI
01/07/2020	04:39:10	NoID	10	NYCLEI
01/07/2020	04:40:53	NoID	2	NYCLEI
01/07/2020	04:39:39	NoID	7	NYCLEI
01/07/2020	04:41:10	NoID	2	NYCLEI
01/07/2020	04:42:43	NoID	3	NYCLEI
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01/07/2020	04:42:51	NoID	3	NYCLEI
01/07/2020	04:43:52	NoID	2	NYCLEI
01/07/2020	04:42:28	NoID	8	NYCLEI
01/07/2020	04:44:08	NoID	2	NYCLEI

01/07/2020	04:45:23	NoID	2	NYCLEI
01/07/2020	04:45:45	NoID	2	NYCLEI
01/07/2020	04:44:49	NoID	5	NYCLEI
01/07/2020	04:46:08	NoID	3	NYCLEI
01/07/2020	04:46:33	NoID	4	NYCLEI
01/07/2020	04:46:47	NoID	9	NYCLEI
01/07/2020	04:48:08	NoID	6	NYCLEI
01/07/2020	04:48:38	NoID	4	NYCLEI
01/07/2020	04:49:09	NoID	4	NYCLEI
30/06/2020	22:26:46	PIPNAT	26	PIPPIP
30/06/2020	22:31:18	PIPPIP	101	PIPPIP
01/07/2020	03:51:47	PIPPIP	71	PIPPIP
01/07/2020	04:00:05	PIPPIP	68	PIPPIP
01/07/2020	03:44:54	PIPPIP	66	PIPPIP
01/07/2020	03:36:57	PIPPIP	54	PIPPIP
01/07/2020	03:14:52	PIPPIP	48	PIPPIP
01/07/2020	03:43:59	PIPPIP	44	PIPPIP
01/07/2020	01:48:38	PIPPIP	41	PIPPIP
01/07/2020	00:43:52	PIPPIP	49	PIPPIP
01/07/2020	03:14:32	PIPPIP	40	
30/06/2020	22:59:30	PIPPIP	41	
30/06/2020	23:24:19	PIPPIP	37	
01/07/2020	02:17:01	PIPPIP	37	
30/06/2020	22:29:24	PIPPIP	36	
01/07/2020	02:27:49	PIPPIP	35	
30/06/2020	23:44:56	PIPPIP	34	
01/07/2020	03:30:00	PIPPIP	35	
01/07/2020	03:52:46	PIPPIP	31	
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01/07/2020	03:52:23	PIPPIP	29	
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01/07/2020	03:33:44	PIPPIP	28	
30/06/2020	23:20:30	PIPPIP	27	
01/07/2020	03:46:52	PIPPIP	27	
01/07/2020	03:44:14	PIPPIP	30	
30/06/2020	22:17:35	PIPPIP	26	
30/06/2020	22:18:06	PIPPIP	26	
01/07/2020	03:44:33	PIPPIP	26	
01/07/2020	03:52:15	PIPPIP	30	
01/07/2020	03:37:34	PIPPIP	24	
01/07/2020	03:31:17	PIPPIP	23	

30/06/2020	22:29:40	PIPPIP	24	
01/07/2020	04:11:43	PIPPIP	27	
30/06/2020	22:36:04	PIPPIP	27	
01/07/2020	01:58:58	PIPPIP	20	
01/07/2020	02:27:37	PIPPIP	18	
30/06/2020	22:09:39	PIPPIP	17	
30/06/2020	22:16:24	PIPPIP	16	
30/06/2020	23:02:49	PIPPIP	15	
01/07/2020	02:24:00	PIPPIP	15	
01/07/2020	03:29:17	PIPPIP	15	
01/07/2020	03:29:46	PIPPIP	15	
30/06/2020	22:03:14	PIPPIP	12	
01/07/2020	03:29:52	PIPPIP	12	
01/07/2020	03:47:34	PIPPIP	12	
01/07/2020	03:59:58	PIPPIP	12	
30/06/2020	22:22:36	PIPPIP	19	
01/07/2020	01:20:39	PIPPIP	11	
01/07/2020	03:02:24	PIPPIP	13	
30/06/2020	22:27:22	PIPPIP	10	
30/06/2020	22:27:28	PIPPIP	10	
01/07/2020	02:02:15	PIPPIP	10	
01/07/2020	02:32:21	PIPPIP	10	
01/07/2020	03:36:39	PIPPIP	10	
30/06/2020	22:28:38	PIPPIP	8	
01/07/2020	03:17:53	PIPPIP	7	
30/06/2020	22:04:20	PIPPIP	6	
30/06/2020	22:19:32	PIPPIP	6	
01/07/2020	01:07:34	PIPPIP	6	
01/07/2020	02:10:37	PIPPIP	6	
30/06/2020	22:05:04	PIPPIP	12	
01/07/2020	03:51:42	PIPPIP	5	
30/06/2020	22:27:03	PIPPIP	3	
30/06/2020	22:29:07	PIPPIP	3	
30/06/2020	22:30:24	PIPPIP	3	
01/07/2020	03:27:18	PIPPIP	3	
30/06/2020	21:38:59	PIPPIP	5	
01/07/2020	04:28:28	PIPPIP	7	
01/07/2020	03:27:32	PIPPIP	2	
01/07/2020	02:11:01	PIPPYG	73	PIPPYG
01/07/2020	02:10:44	PIPPYG	61	PIPPYG
01/07/2020	02:06:57	PIPPYG	60	PIPPYG
01/07/2020	02:45:35	PIPPYG	58	PIPPYG

01/07/2020	02:35:06	PIPPYG	53	PIPPYG
01/07/2020	03:00:56	PIPPYG	21	PIPPYG
01/07/2020	02:32:46	PIPPYG	14	PIPPYG
30/06/2020	22:22:28	PIPPYG	12	PIPPYG

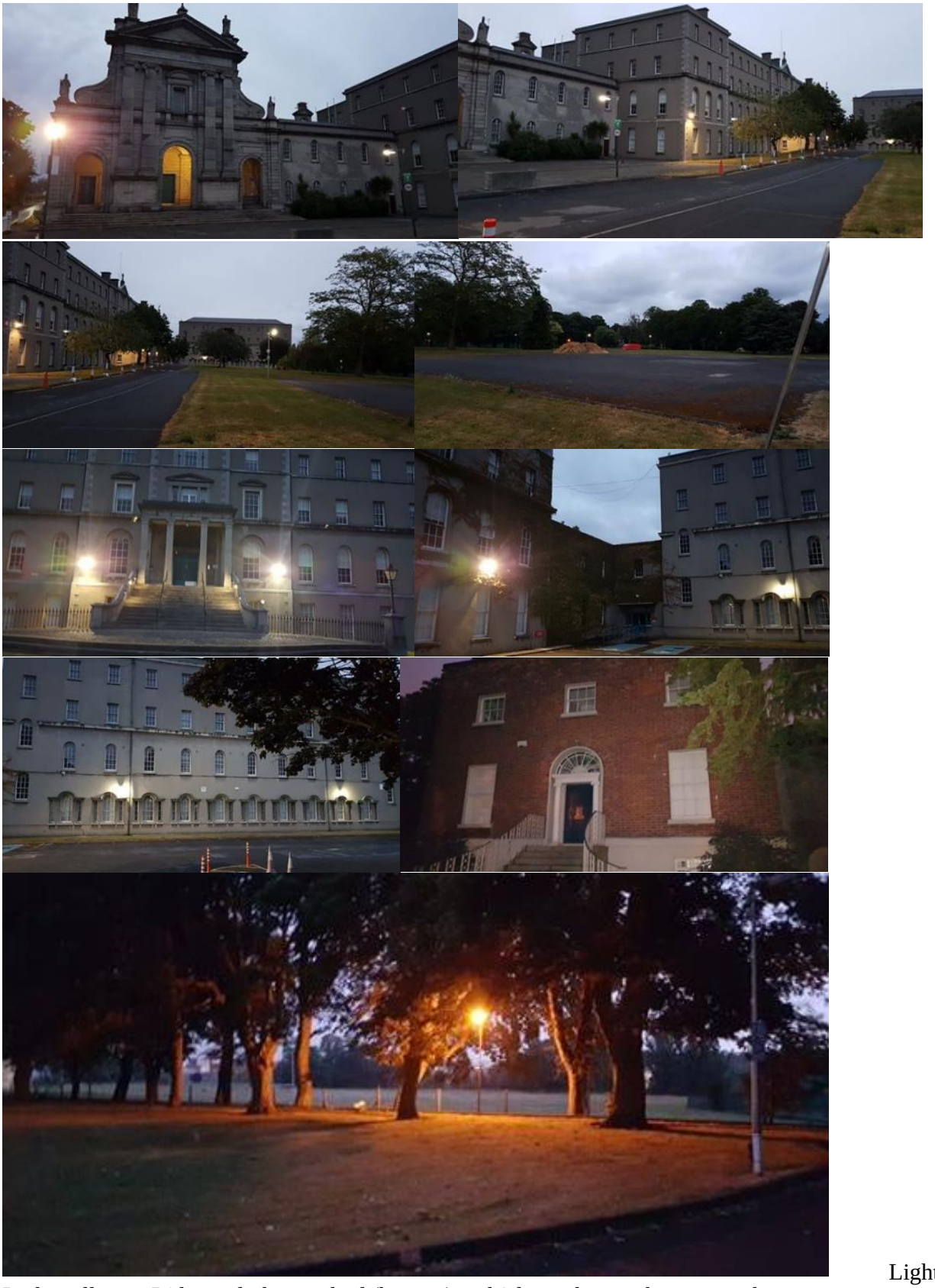
Donna EM3 data 30th June 2020

DATE	TIME	AUTO ID*	PULSES	MANUAL ID
30/06/2020	22:20:57	NYCLEI	36	PIPPYG NYCLEI
30/06/2020	22:18:56	NYCLEI	18	NYCLEI
30/06/2020	22:20:27	NYCLEI	8	NYCLEI
30/06/2020	22:21:12	NYCLEI	5	NYCLEI
30/06/2020	22:28:13	NYCLEI	3	NYCLEI
30/06/2020	22:43:15	NoID	8	PIPPIP
30/06/2020	22:43:30	NoID	37	PIPPIP PIPPYG
30/06/2020	22:44:00	NoID	107	PIPPIP
30/06/2020	22:47:15	NoID	14	PIPPIP PIPPYG
01/07/2020	04:07:30	NoID	5	PIPPIP
30/06/2020	22:10:10	PIPNAT	2	PIPPIP
30/06/2020	22:49:46	PIPPIP	92	PIPPIP
30/06/2020	22:44:30	PIPPIP	161	PIPPIP
30/06/2020	22:45:00	PIPPIP	134	PIPPIP PIPPYG
30/06/2020	22:49:16	PIPPIP	95	PIPPIP
30/06/2020	22:44:15	PIPPIP	110	PIPPIP
01/07/2020	04:06:15	PIPPIP	101	PIPPIP
30/06/2020	22:45:15	PIPPIP	64	PIPPIP
30/06/2020	22:48:45	PIPPIP	57	PIPPIP
30/06/2020	22:50:16	PIPPIP	52	PIPPIP
30/06/2020	22:49:00	PIPPIP	48	PIPPIP
30/06/2020	22:44:45	PIPPIP	109	PIPPIP
30/06/2020	22:43:45	PIPPIP	74	PIPPIP
30/06/2020	22:45:30	PIPPIP	40	PIPPIP
30/06/2020	22:47:00	PIPPIP	81	PIPPIP
30/06/2020	22:49:31	PIPPIP	39	PIPPIP
30/06/2020	22:46:30	PIPPIP	91	PIPPIP
30/06/2020	22:45:45	PIPPIP	32	PIPPIP
30/06/2020	22:48:30	PIPPIP	26	PIPPIP
01/07/2020	04:07:15	PIPPIP	36	PIPPIP
30/06/2020	22:59:17	PIPPIP	24	PIPPIP
01/07/2020	04:07:00	PIPPIP	49	PIPPIP
01/07/2020	04:06:45	PIPPIP	34	PIPPIP NYCLEI
30/06/2020	22:55:01	PIPPIP	16	PIPPIP
30/06/2020	22:48:15	PIPPIP	15	PIPPIP
01/07/2020	04:06:30	PIPPIP	42	PIPPIP

30/06/2020	22:50:01	PIPPIP	17	PIPPIP
30/06/2020	22:56:31	PIPPIP	11	PIPPIP
30/06/2020	22:19:26	PIPPIP	12	PIPPIP
30/06/2020	22:57:17	PIPPIP	7	PIPPIP
30/06/2020	22:58:02	PIPPIP	7	PIPPIP
30/06/2020	22:59:02	PIPPIP	6	PIPPIP
30/06/2020	22:13:11	PIPPIP	4	PIPPIP
30/06/2020	22:09:40	PIPPIP	5	PIPPIP
30/06/2020	22:57:47	PIPPIP	5	PIPPIP
30/06/2020	22:51:31	PIPPIP	3	PIPPIP
30/06/2020	22:58:32	PIPPIP	2	PIPPIP
01/07/2020	04:06:00	PIPPIP	2	PIPPIP
30/06/2020	22:46:00	PIPPYG	49	PIPPYG
30/06/2020	22:46:45	PIPPYG	33	PIPPYG
30/06/2020	22:46:15	PIPPYG	21	PIPPYG
30/06/2020	22:52:46	PIPPYG	3	PIPPYG

Clonliffe College bat assessment

Songmeter Mini location at church



Light pollution 54 lux at light standard (bottom) and 2 lux at house above on right

Light

Field notes 10th June 2020

A common pipistrelle was seen at the edge of the church at 22.00. At 22.10 a common pipistrelle was recorded in the distance from the front of the church. At 22.23 a common pipistrelle was recorded feeding for twenty minutes along the eastern hedgerow. It fed along the trees and elder bushes.
At 22.30 a common pipistrelle was seen feeding around the house. It was windy and the bat used the line of sycamore trees to shelter and feed along.
A common pipistrelle was seen feeding in this area and in the small garden at 4.12. It continued to feed here until 4.33, when it flew north west across the site.
This area around the house is an important feeding area for common pipistrelles.

EM 3 handheld detector data 10th June 2020– Surveyor 2

OUT FILE FS	OUT FILE ZC	AUTO ID	PULSES	MATCI
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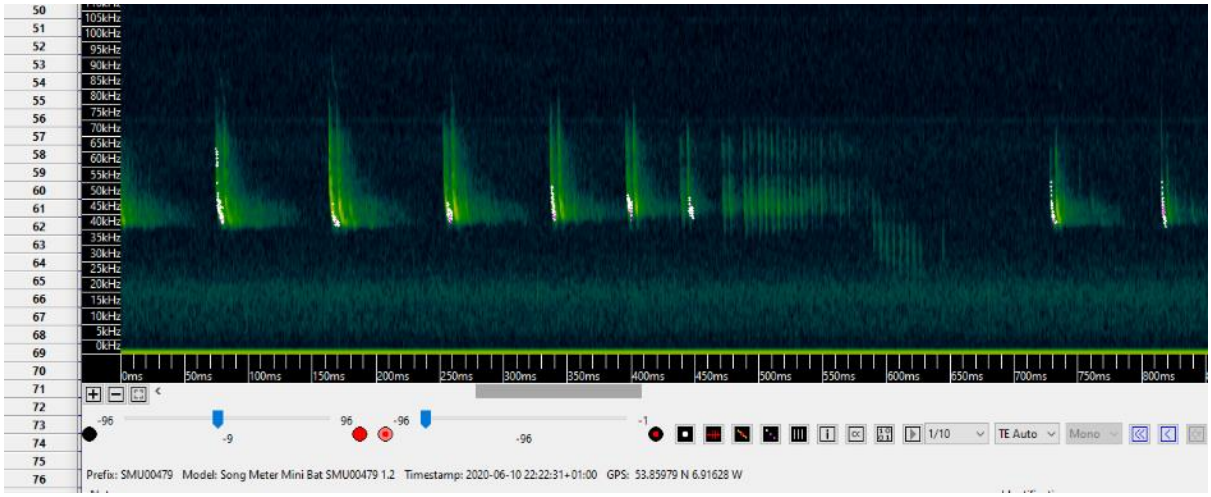

Common pipistrelle feeding near the church at 22.22

Bat activity 20th to 21st April 2021 Surveyor 1

DATE	TIME	AUTO ID	PULSES	MATCHING	MANUAL ID
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20/04/2021	21:03:14	PIPI	7	6	PIPI
20/04/2021	21:06:15	PIPY	13	13	PIPY
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20/04/2021	21:22:29	PIPI	16	16	PIPI
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20/04/2021	21:47:55	PIPI	16	16	PIPI
20/04/2021	21:48:10	PIPI	3	3	PIPI
20/04/2021	21:48:20	PIPI	3	3	PIPI
20/04/2021	21:48:40	PIPI	3	3	PIPI
20/04/2021	21:48:45	PIPI	4	4	PIPI
20/04/2021	21:48:50	PIPI	2	2	PIPI
20/04/2021	21:49:16	PIPI	7	7	PIPI
20/04/2021	21:49:46	PIPI	11	11	PIPI
20/04/2021	21:51:36	PIPI	2	2	PIPI
20/04/2021	21:51:41	PIPI	4	4	PIPI
20/04/2021	21:51:46	PIPI	17	17	PIPI
20/04/2021	21:51:51	PIPI	6	6	PIPI
20/04/2021	21:51:56	PIPI	5	5	PIPI
20/04/2021	21:52:01	PIPI	5	5	PIPI

20/04/2021	21:52:11	PIPI	3	3	PIPI
20/04/2021	21:52:16	PIPI	2	2	PIPI
20/04/2021	21:52:21	PIPI	4	4	PIPI
20/04/2021	21:53:12	PIPI	15	15	PIPI
20/04/2021	21:53:17	PIPI	2	2	PIPI
20/04/2021	21:53:22	PIPI	7	7	PIPI
20/04/2021	21:53:27	PIPI	8	8	PIPI
20/04/2021	21:53:32	PIPI	4	4	PIPI
20/04/2021	21:53:37	PIPI	5	5	PIPI
20/04/2021	21:53:57	PIPI	2	2	PIPI
20/04/2021	21:56:22	PIPI	13	8	PIPI
20/04/2021	21:56:42	PIPY	7	7	PIPY
20/04/2021	21:56:47	PIPI	59	23	PIPI
20/04/2021	21:56:53	PIPY	21	15	PIPY
20/04/2021	21:56:58	PIPY	42	27	PIPY
20/04/2021	21:57:03	PIPY	19	14	PIPY
20/04/2021	21:57:08	PIPI	5	3	PIPI
20/04/2021	21:57:13	PIPI	41	21	PIPI
20/04/2021	21:57:18	PIPY	68	47	PIPY
20/04/2021	21:57:23	PIPY	52	43	PIPY
20/04/2021	21:57:28	PIPY	25	24	PIPY
20/04/2021	21:58:38	PIPI	4	2	PIPI
20/04/2021	21:58:43	PIPI	2	2	PIPI
20/04/2021	21:59:18	PIPY	7	7	PIPY
20/04/2021	21:59:23	PIPY	12	9	PIPY
20/04/2021	21:59:28	PIPY	26	25	PIPY
20/04/2021	21:59:33	PIPY	21	21	PIPY
20/04/2021	21:59:38	PIPY	5	4	PIPY
20/04/2021	21:59:43	PIPY	3	3	PIPY
20/04/2021	21:59:48	PIPY	25	15	PIPY
20/04/2021	21:59:53	PIPY	60	45	PIPY
20/04/2021	21:59:58	PIPI	13	7	PIPI
20/04/2021	22:00:03	PIPY	14	9	PIPY
20/04/2021	22:00:08	PIPY	38	27	PIPY
20/04/2021	22:00:13	PIPY	52	52	PIPY
20/04/2021	22:00:18	PIPI	7	4	PIPI
20/04/2021	22:00:23	PIPY	23	17	PIPY
20/04/2021	22:00:28	PIPY	72	46	PIPY
20/04/2021	22:00:33	PIPI	11	9	PIPI
20/04/2021	22:00:38	PIPI	7	7	PIPI
20/04/2021	22:00:43	PIPY	37	37	PIPY
20/04/2021	22:00:48	PIPY	4	4	PIPY
20/04/2021	22:00:59	PIPY	11	11	PIPY
20/04/2021	22:01:04	PIPY	4	4	PIPY

20/04/2021	22:01:14	PIPY	6	6	PIPY
20/04/2021	22:01:19	PIPY	10	10	PIPY
20/04/2021	22:01:24	PIPY	33	24	PIPY
20/04/2021	22:01:29	PIPY	3	3	PIPY
20/04/2021	22:01:34	PIPY	17	17	PIPY
20/04/2021	22:01:39	PIPY	11	11	PIPY
20/04/2021	22:01:44	PIPY	23	23	PIPY
20/04/2021	22:01:49	PIPY	16	16	PIPY
20/04/2021	22:01:54	PIPY	12	11	PIPY
20/04/2021	22:01:59	PIPY	5	5	PIPY
20/04/2021	22:02:19	PIPI	12	12	PIPI
20/04/2021	22:02:24	PIPI	11	11	PIPI
20/04/2021	22:02:29	PIPY	11	11	PIPY
20/04/2021	22:02:34	PIPY	6	6	PIPY
20/04/2021	22:02:39	PIPY	8	8	PIPY
20/04/2021	22:02:44	PIPY	17	17	PIPY
20/04/2021	22:02:49	PIPY	8	8	PIPY
20/04/2021	22:02:54	PIPY	2	2	PIPY
20/04/2021	22:02:59	PIPY	2	2	PIPY
20/04/2021	22:03:09	PIPI	5	5	PIPI
20/04/2021	22:03:19	PIPI	10	10	PIPI
20/04/2021	22:03:24	PIPI	2	2	PIPI
20/04/2021	22:03:29	PIPI	2	2	PIPI
20/04/2021	22:04:04	PIPY	18	18	PIPY
20/04/2021	22:04:09	PIPY	19	19	PIPY
20/04/2021	22:05:45	PIPI	15	8	PIPI
20/04/2021	22:06:00	PIPI	7	7	PIPI
20/04/2021	22:06:30	PIPY	24	23	PIPY

Bat activity 20th to 21st April 2021 - Surveyor 2

DATE	TIME	AUTO ID	PULSES	MATCHING	MANUAL ID
20/04/2021	21:01:16	PIPI	8	8	PIPI
20/04/2021	21:01:21	PIPI	3	3	PIPI
20/04/2021	21:01:31	PIPI	2	2	PIPI
20/04/2021	21:01:36	PIPI	2	2	PIPI
20/04/2021	21:01:41	PIPI	4	4	PIPI
20/04/2021	21:01:46	PIPI	3	3	PIPI
20/04/2021	21:01:51	PIPI	2	2	PIPI
20/04/2021	21:01:56	PIPI	14	14	PIPI
20/04/2021	21:02:02	PIPI	14	14	PIPI
20/04/2021	21:02:07	PIPI	8	7	PIPI
20/04/2021	21:02:12	PIPI	30	28	PIPI
20/04/2021	21:02:17	PIPI	24	22	PIPI
20/04/2021	21:02:27	PIPI	25	23	PIPI
20/04/2021	21:02:32	PIPI	9	9	PIPI

20/04/2021	21:02:37	PIPI	9	8	PIPI
20/04/2021	21:02:42	PIPI	17	17	PIPI
20/04/2021	21:02:47	PIPI	24	23	PIPI
20/04/2021	21:02:52	PIPI	10	8	PIPI
20/04/2021	21:02:57	PIPI	23	20	PIPI
20/04/2021	21:03:02	PIPI	11	11	PIPI
20/04/2021	21:03:07	PIPI	12	12	PIPI
20/04/2021	21:03:17	PIPI	15	14	PIPI
20/04/2021	21:03:22	PIPI	27	23	PIPI
20/04/2021	21:03:27	PIPI	29	21	PIPI
20/04/2021	21:03:33	PIPI	17	10	PIPI
20/04/2021	21:03:38	PIPI	15	15	PIPI
20/04/2021	21:03:43	PIPI	6	6	PIPI
20/04/2021	21:03:58	PIPI	10	8	PIPI
20/04/2021	21:04:03	PIPY	5	4	PIPY
20/04/2021	21:04:23	PIPI	4	4	PIPI
20/04/2021	21:04:28	PIPI	27	18	PIPI
20/04/2021	21:04:34	PIPY	51	40	PIPY
20/04/2021	21:04:39	PIPY	20	16	PIPY
20/04/2021	21:04:44	PIPI	13	8	PIPI
20/04/2021	21:04:49	PIPI	35	31	PIPI
20/04/2021	21:04:54	PIPI	2	2	PIPI
20/04/2021	21:04:59	PIPI	3	3	PIPI
20/04/2021	21:05:04	PIPI	10	9	PIPI
20/04/2021	21:05:09	PIPI	28	25	PIPI
20/04/2021	21:05:14	PIPI	31	29	PIPI
20/04/2021	21:05:19	PIPI	39	29	PIPI
20/04/2021	21:05:24	PIPI	24	14	PIPI
20/04/2021	21:05:29	PIPY	22	22	PIPY
20/04/2021	21:05:34	PIPY	8	8	PIPY
20/04/2021	21:05:39	PIPY	8	8	PIPY
20/04/2021	21:05:44	PIPI	19	14	PIPI
20/04/2021	21:05:54	PIPI	3	3	PIPI
20/04/2021	21:05:59	PIPI	3	3	PIPI
20/04/2021	21:08:53	PIPY	2	2	PIPY
20/04/2021	21:09:23	PIPI	3	3	PIPI
20/04/2021	21:09:28	PIPI	11	8	PIPI
20/04/2021	21:09:33	PIPI	16	9	PIPI
20/04/2021	21:09:39	PIPY	38	23	PIPY
20/04/2021	21:09:44	PIPI	38	19	PIPI
20/04/2021	21:09:49	PIPI	13	7	PIPI
20/04/2021	21:09:54	PIPI	11	7	PIPI
20/04/2021	21:09:59	PIPI	27	18	PIPI
20/04/2021	21:10:09	PIPY	19	16	PIPY

20/04/2021	21:10:24	PIPY	9	9	PIPY
20/04/2021	21:10:34	PIPI	9	6	PIPI
20/04/2021	21:10:39	PIPI	5	5	PIPI
20/04/2021	21:10:59	PIPI	3	3	PIPI
20/04/2021	21:11:15	PIPI	9	9	PIPI
20/04/2021	21:11:20	PIPY	8	6	PIPY
20/04/2021	21:11:25	PIPI	19	12	PIPI
20/04/2021	21:11:30	PIPI	4	3	PIPI
20/04/2021	21:11:35	PIPY	5	3	PIPY
20/04/2021	21:11:40	PIPI	12	12	PIPI
20/04/2021	21:11:45	PIPI	7	7	PIPI
20/04/2021	21:11:50	PIPI	16	14	PIPI
20/04/2021	21:11:55	PIPI	24	24	PIPI
20/04/2021	21:12:00	PIPI	29	29	PIPI
20/04/2021	21:12:05	PIPI	22	22	PIPI
20/04/2021	21:12:10	PIPI	19	19	PIPI
20/04/2021	21:12:20	PIPI	16	16	PIPI
20/04/2021	21:12:25	PIPI	24	24	PIPI
20/04/2021	21:12:30	PIPI	21	21	PIPI
20/04/2021	21:12:35	PIPI	6	5	PIPI
20/04/2021	21:12:41	PIPI	2	2	PIPI
20/04/2021	21:13:51	PIPI	14	14	PIPI
20/04/2021	21:14:32	PIPI	42	38	PIPI
20/04/2021	21:14:37	PIPI	4	3	PIPI
20/04/2021	21:14:42	PIPY	67	42	PIPY
20/04/2021	21:14:47	PIPY	30	24	PIPY
20/04/2021	21:14:52	PIPI	17	11	PIPI
20/04/2021	21:14:57	PIPI	16	12	PIPI
20/04/2021	21:15:07	PIPY	18	18	PIPY
20/04/2021	21:15:28	PIPY	5	5	PIPY
20/04/2021	21:15:38	PIPY	10	9	PIPY
20/04/2021	21:15:48	PIPY	7	7	PIPY
20/04/2021	21:15:53	PIPY	31	30	PIPY
20/04/2021	21:15:58	PIPY	32	32	PIPY
20/04/2021	21:16:03	PIPY	12	12	PIPY
20/04/2021	21:16:13	PIPY	35	34	PIPY
20/04/2021	21:16:18	PIPY	24	24	PIPY
20/04/2021	21:16:23	PIPY	19	19	PIPY
20/04/2021	21:16:28	PIPY	41	37	PIPY
20/04/2021	21:16:33	PIPY	27	26	PIPY
20/04/2021	21:16:38	PIPY	18	18	PIPY
20/04/2021	21:16:44	PIPY	34	34	PIPY
20/04/2021	21:16:49	PIPY	25	25	PIPY
20/04/2021	21:16:54	PIPY	42	30	PIPY

20/04/2021	21:16:59	PIPY	34	29	PIPY
20/04/2021	21:17:04	PIPI	14	12	PIPI
20/04/2021	21:17:09	PIPY	34	29	PIPY
20/04/2021	21:17:14	PIPI	12	7	PIPI
20/04/2021	21:17:19	PIPY	5	5	PIPY
20/04/2021	21:17:24	PIPY	18	18	PIPY
20/04/2021	21:17:29	PIPY	23	23	PIPY
20/04/2021	21:17:34	PIPY	10	10	PIPY
20/04/2021	21:17:39	PIPY	9	9	PIPY
20/04/2021	21:17:45	PIPY	15	15	PIPY
20/04/2021	21:17:50	PIPY	33	23	PIPY
20/04/2021	21:17:55	PIPY	18	14	PIPY
20/04/2021	21:18:00	PIPI	26	14	PIPI
20/04/2021	21:18:10	PIPI	7	7	PIPI
20/04/2021	21:18:30	PIPY	9	6	PIPY
20/04/2021	21:18:35	PIPY	7	7	PIPY
20/04/2021	21:18:40	PIPY	11	11	PIPY
20/04/2021	21:19:26	PIPI	5	4	PIPI
20/04/2021	21:19:41	PIPI	5	5	PIPI
20/04/2021	21:20:01	PIPI	7	7	PIPI
20/04/2021	21:20:06	PIPY	2	2	PIPY
20/04/2021	21:20:16	PIPI	3	2	PIPI
20/04/2021	21:20:21	PIPI	13	12	PIPI
20/04/2021	21:20:36	PIPI	2	2	PIPI
20/04/2021	21:20:47	PIPI	12	11	PIPI
20/04/2021	21:20:52	PIPI	2	2	PIPI
20/04/2021	21:21:27	PIPI	11	11	PIPI
20/04/2021	21:21:32	PIPI	7	6	PIPI
20/04/2021	21:21:37	PIPI	3	3	PIPI
20/04/2021	21:21:47	PIPI	3	3	PIPI
20/04/2021	21:21:52	PIPI	28	25	PIPI
20/04/2021	21:21:57	PIPI	18	18	PIPI
20/04/2021	21:22:02	PIPI	17	17	PIPI
20/04/2021	21:22:07	PIPI	16	16	PIPI
20/04/2021	21:22:12	PIPI	23	21	PIPI
20/04/2021	21:22:18	PIPI	6	6	PIPI
20/04/2021	21:22:23	PIPI	8	8	PIPI
20/04/2021	21:22:28	PIPI	6	6	PIPI
20/04/2021	21:22:33	PIPI	7	7	PIPI
20/04/2021	21:22:38	PIPI	20	20	PIPI
20/04/2021	21:22:43	PIPI	23	22	PIPI
20/04/2021	21:22:48	PIPI	3	3	PIPI
20/04/2021	21:22:53	PIPI	4	4	PIPI
20/04/2021	21:22:58	PIPI	18	18	PIPI

20/04/2021	21:23:03	PIPI	39	33	PIPI
20/04/2021	21:23:08	PIPI	59	44	PIPI
20/04/2021	21:23:13	PIPI	36	34	PIPI
20/04/2021	21:23:19	PIPI	6	6	PIPI
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20/04/2021	21:23:39	PIPI	41	31	PIPI
20/04/2021	21:23:44	PIPI	30	30	PIPI
20/04/2021	21:23:49	PIPI	24	24	PIPI
20/04/2021	21:24:09	PIPI	3	3	PIPI
20/04/2021	21:24:14	PIPI	2	2	PIPI
20/04/2021	21:24:20	PIPI	4	4	PIPI
20/04/2021	21:24:35	PIPI	2	2	PIPI
20/04/2021	21:24:40	PIPI	9	9	PIPI
20/04/2021	21:24:45	PIPI	11	11	PIPI
20/04/2021	21:24:50	PIPI	9	9	PIPI
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20/04/2021	21:25:15	PIPI	3	3	PIPI
20/04/2021	21:25:20	PIPI	2	2	PIPI
20/04/2021	21:27:11	PIPY	2	2	PIPY
20/04/2021	21:27:16	PIPY	11	11	PIPY
20/04/2021	21:27:22	PIPY	11	11	PIPY
20/04/2021	21:27:27	PIPY	15	15	PIPY
20/04/2021	21:27:32	PIPY	44	44	PIPY
20/04/2021	21:27:37	PIPY	24	24	PIPY
20/04/2021	21:27:42	PIPY	9	9	PIPY
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20/04/2021	21:30:39	PIPI	22	22	PIPI
20/04/2021	21:30:44	PIPI	14	14	PIPI
20/04/2021	21:30:49	PIPI	7	7	PIPI
20/04/2021	21:30:54	PIPI	7	7	PIPI
20/04/2021	21:31:04	PIPI	2	2	PIPI
20/04/2021	21:31:09	PIPI	6	6	PIPI
20/04/2021	21:31:14	PIPI	4	4	PIPI
20/04/2021	21:31:30	PIPI	15	15	PIPI
20/04/2021	21:31:35	PIPI	15	15	PIPI
20/04/2021	21:34:58	PIPY	8	8	PIPY
20/04/2021	21:36:49	PIPI	8	8	PIPI
20/04/2021	21:36:54	PIPI	2	2	PIPI
20/04/2021	21:44:35	PIPI	2	2	PIPI
20/04/2021	21:44:45	PIPI	7	7	PIPI
20/04/2021	21:45:11	PIPI	8	8	PIPI

20/04/2021	21:45:16	PIPI	3	3	PIPI
20/04/2021	21:45:21	PIPI	10	10	PIPI
20/04/2021	21:45:46	PIPI	2	2	PIPI
20/04/2021	21:46:06	PIPI	2	2	PIPI
20/04/2021	21:46:21	PIPI	3	3	PIPI
20/04/2021	21:46:26	PIPI	2	2	PIPI
20/04/2021	21:46:47	PIPI	4	4	PIPI
20/04/2021	21:47:17	PIPI	10	10	PIPI
20/04/2021	21:47:22	PIPI	4	4	PIPI
20/04/2021	21:47:27	PIPI	5	5	PIPI
20/04/2021	21:47:32	PIPI	4	4	PIPI
20/04/2021	21:47:38	PIPI	11	11	PIPI
20/04/2021	21:47:43	PIPI	6	6	PIPI
20/04/2021	21:47:48	PIPI	12	10	PIPI
20/04/2021	21:47:53	PIPI	19	19	PIPI
20/04/2021	21:47:58	PIPI	11	11	PIPI
20/04/2021	21:48:03	PIPI	18	18	PIPI
20/04/2021	21:48:08	PIPI	10	10	PIPI
20/04/2021	21:48:23	PIPI	5	5	PIPI
20/04/2021	21:48:53	PIPI	2	2	PIPI
20/04/2021	21:49:19	PIPI	2	2	PIPI
20/04/2021	21:49:44	PIPI	5	5	PIPI
20/04/2021	21:49:49	PIPI	2	2	PIPI
20/04/2021	21:49:54	PIPI	4	4	PIPI
20/04/2021	21:49:59	PIPI	10	10	PIPI
20/04/2021	21:50:35	PIPI	7	7	PIPI
20/04/2021	21:50:55	PIPI	6	6	PIPI
20/04/2021	21:51:11	PIPI	4	4	PIPI
20/04/2021	21:51:26	PIPI	3	3	PIPI
20/04/2021	21:52:13	PIPI	5	4	PIPI
20/04/2021	21:53:29	PIPI	3	3	PIPI
20/04/2021	21:53:34	PIPI	22	22	PIPI
20/04/2021	21:53:39	PIPI	6	6	PIPI
20/04/2021	21:53:59	PIPI	9	9	PIPI
20/04/2021	21:54:25	PIPI	5	5	PIPI
20/04/2021	21:54:35	PIPI	16	16	PIPI
20/04/2021	21:54:40	PIPI	21	21	PIPI
20/04/2021	21:54:50	PIPI	5	5	PIPI
20/04/2021	21:54:55	PIPI	26	26	PIPI
20/04/2021	21:55:00	PIPI	22	22	PIPI
20/04/2021	21:55:05	PIPI	21	21	PIPI
20/04/2021	21:55:15	PIPI	2	2	PIPI
20/04/2021	21:55:35	PIPI	6	6	PIPI
20/04/2021	21:55:40	PIPI	4	4	PIPI

20/04/2021	21:55:46	PIPI	16	16	PIPI
20/04/2021	21:55:51	PIPI	2	2	PIPI
20/04/2021	21:57:57	PIPY	19	19	PIPY
20/04/2021	21:58:02	PIPY	4	4	PIPY
20/04/2021	21:59:03	PIPI	23	23	PIPI
20/04/2021	21:59:08	PIPI	2	2	PIPI
20/04/2021	21:59:13	PIPI	4	3	PIPI
20/04/2021	21:59:29	PIPI	2	2	PIPI
20/04/2021	21:59:34	PIPY	7	7	PIPY
20/04/2021	21:59:39	PIPY	21	14	PIPI PIPY
20/04/2021	21:59:44	PIPI	34	20	PIPI PIPY
20/04/2021	21:59:49	PIPY	13	10	PIPI PIPY
20/04/2021	21:59:54	PIPI	4	4	PIPI
20/04/2021	21:59:59	PIPI	2	2	PIPI
20/04/2021	22:00:04	PIPI	13	9	PIPI PIPY
20/04/2021	22:00:09	PIPI	33	32	PIPI
20/04/2021	22:00:14	PIPI	17	15	PIPI
20/04/2021	22:00:19	PIPY	19	11	PIPI PIPY
20/04/2021	22:00:24	PIPY	18	12	PIPI PIPY
20/04/2021	22:00:29	PIPI	15	11	PIPI PIPY
20/04/2021	22:00:34	PIPI	3	3	PIPI

Bat activity noted by a static monitor commencing at Clonliffe College prior to moving to the tree-lined avenue. The monitor was moved at 21.37 hours after which more bat activity is evident

DATE	TIME	AUTO ID	PULSES	MATCHING	MANUAL ID
20/04/2021	20:53:52	NYLE	13	13	NYLE
20/04/2021	20:53:57	NYLE	3	3	NYLE
20/04/2021	21:16:15	PIPI	25	25	PIPI
20/04/2021	21:16:20	PIPI	8	8	PIPI
20/04/2021	21:33:44	PIPI	25	25	PIPI
20/04/2021	21:33:49	PIPI	15	15	PIPI
20/04/2021	21:38:19	PIPI	10	10	PIPI
20/04/2021	21:38:24	PIPI	7	7	PIPI
20/04/2021	21:39:03	PIPI	13	13	PIPI
20/04/2021	21:39:08	PIPI	18	18	PIPI
20/04/2021	21:39:13	PIPI	22	19	PIPI
20/04/2021	21:39:18	PIPI	13	13	PIPI
20/04/2021	21:39:23	PIPI	2	2	PIPI
20/04/2021	21:39:28	PIPI	3	3	PIPI
20/04/2021	21:39:34	PIPI	6	6	PIPI
20/04/2021	21:39:53	PIPI	24	24	PIPI
20/04/2021	21:40:09	PIPI	16	16	PIPI
20/04/2021	21:40:14	PIPI	2	2	PIPI
20/04/2021	21:40:20	PIPI	21	21	PIPI

20/04/2021	21:40:25	PIPI	23	23	PIPI
20/04/2021	21:40:30	PIPI	7	3	PIPI PIPY
20/04/2021	21:40:40	PIPI	21	21	PIPI
20/04/2021	21:40:45	PIPI	31	29	PIPI
20/04/2021	21:40:50	PIPI	44	44	PIPI
20/04/2021	21:40:56	PIPI	21	19	PIPI
20/04/2021	21:41:01	PIPI	15	12	PIPI
20/04/2021	21:41:06	PIPI	31	31	PIPI
20/04/2021	21:41:11	PIPI	37	35	PIPI
20/04/2021	21:41:16	PIPI	34	34	PIPI
20/04/2021	21:41:21	PIPI	36	33	PIPI
20/04/2021	21:41:27	PIPI	38	33	PIPI
20/04/2021	21:41:32	PIPI	9	9	PIPI
20/04/2021	21:41:44	PIPI	6	6	PIPI
20/04/2021	21:41:49	PIPI	23	23	PIPI
20/04/2021	21:41:54	PIPI	6	6	PIPI
20/04/2021	21:42:06	PIPI	23	23	PIPI
20/04/2021	21:42:11	PIPI	9	9	PIPI
20/04/2021	21:42:20	PIPI	15	15	PIPI
20/04/2021	21:42:25	PIPI	27	27	PIPI
20/04/2021	21:42:30	PIPI	14	14	PIPI
20/04/2021	21:42:38	PIPI	23	23	PIPI
20/04/2021	21:42:43	PIPI	12	12	PIPI
20/04/2021	21:42:52	PIPI	4	4	PIPI
20/04/2021	21:42:59	PIPI	15	15	PIPI
20/04/2021	21:43:07	PIPI	27	27	PIPI
20/04/2021	21:43:12	PIPI	8	8	PIPI
20/04/2021	21:43:21	PIPI	27	27	PIPI
20/04/2021	21:43:26	PIPI	13	13	PIPI
20/04/2021	21:43:35	PIPI	21	20	PIPI
20/04/2021	21:43:40	PIPI	25	25	PIPI
20/04/2021	21:43:49	PIPI	31	31	PIPI
20/04/2021	21:43:54	PIPI	23	23	PIPI
20/04/2021	21:43:59	PIPI	20	20	PIPI
20/04/2021	21:44:04	PIPI	8	7	PIPI
20/04/2021	21:44:14	PIPI	26	25	PIPI
20/04/2021	21:44:19	PIPI	25	25	PIPI
20/04/2021	21:44:24	PIPI	10	10	PIPI
20/04/2021	21:44:28	PIPI	16	16	PIPI
20/04/2021	21:44:33	PIPI	25	25	PIPI
20/04/2021	21:44:38	PIPI	17	17	PIPI
20/04/2021	21:44:49	PIPI	17	17	PIPI
20/04/2021	21:44:54	PIPI	3	3	PIPI
20/04/2021	21:45:00	PIPI	29	29	PIPI

20/04/2021	21:45:05	PIPI	19	19	PIPI
20/04/2021	21:45:17	PIPI	27	27	PIPI
20/04/2021	21:45:22	PIPI	5	5	PIPI
20/04/2021	21:45:25	PIPI	19	18	PIPI
20/04/2021	21:45:30	PIPI	21	21	PIPI
20/04/2021	21:45:35	PIPI	6	6	PIPI
20/04/2021	21:45:53	PIPY	22	20	PIPY
20/04/2021	21:46:20	PIPI	9	6	PIPI
20/04/2021	21:46:39	PIPI	22	21	PIPI
20/04/2021	21:46:44	PIPI	20	19	PIPI
20/04/2021	21:46:53	PIPI	21	21	PIPI
20/04/2021	21:46:58	PIPI	41	37	PIPI
20/04/2021	21:47:03	PIPI	46	46	PIPI
20/04/2021	21:47:09	PIPI	20	18	PIPI
20/04/2021	21:47:14	PIPI	40	40	PIPI
20/04/2021	21:47:19	PIPI	25	25	PIPI
20/04/2021	21:47:24	PIPI	39	35	PIPI
20/04/2021	21:47:29	PIPI	32	31	PIPI
20/04/2021	21:47:34	PIPI	20	20	PIPI
20/04/2021	21:47:51	PIPI	18	18	PIPI
20/04/2021	21:48:33	PIPI	13	13	PIPI
20/04/2021	21:48:38	PIPI	2	2	PIPI
20/04/2021	21:48:55	PIPI	25	25	PIPI
20/04/2021	21:49:00	PIPI	4	4	PIPI
20/04/2021	21:49:09	PIPI	28	27	PIPI
20/04/2021	21:49:14	PIPI	21	21	PIPI
20/04/2021	21:49:19	PIPI	18	17	PIPI
20/04/2021	21:49:25	PIPI	29	28	PIPI
20/04/2021	21:49:30	PIPI	43	42	PIPI
20/04/2021	21:49:35	PIPI	38	36	PIPI
20/04/2021	21:49:40	PIPI	32	31	PIPI
20/04/2021	21:49:45	PIPI	26	24	PIPI
20/04/2021	21:49:50	PIPI	42	39	PIPI
20/04/2021	21:49:56	PIPI	27	22	PIPI
20/04/2021	21:50:01	PIPI	28	27	PIPI
20/04/2021	21:50:06	PIPI	13	13	PIPI
20/04/2021	21:50:12	PIPI	30	29	PIPI
20/04/2021	21:50:17	PIPI	16	15	PIPI
20/04/2021	21:50:22	PIPI	3	3	PIPI
20/04/2021	21:50:32	PIPI	26	24	PIPI
20/04/2021	21:50:37	PIPI	21	20	PIPI
20/04/2021	21:50:58	PIPI	28	28	PIPI
20/04/2021	21:51:03	PIPI	25	25	PIPI
20/04/2021	21:51:08	PIPI	3	3	PIPI

20/04/2021	21:51:14	PIPI	23	22	PIPI
20/04/2021	21:51:19	PIPI	30	29	PIPI
20/04/2021	21:51:24	PIPI	30	30	PIPI
20/04/2021	21:51:29	PIPI	25	25	PIPI
20/04/2021	21:51:48	PIPY	23	13	PIPY
20/04/2021	21:51:53	PIPY	3	3	PIPY
20/04/2021	21:52:03	PIPI	23	21	PIPI
20/04/2021	21:52:08	PIPI	20	20	PIPI
20/04/2021	21:52:13	PIPI	21	19	PIPI
20/04/2021	21:52:19	PIPI	7	7	PIPI
20/04/2021	21:52:31	PIPI	22	20	PIPI
20/04/2021	21:52:36	PIPI	32	31	PIPI
20/04/2021	21:52:41	PIPI	2	2	PIPI
20/04/2021	21:52:49	PIPI	26	26	PIPI
20/04/2021	21:52:54	PIPI	6	3	PIPI
20/04/2021	21:53:03	PIPI	59	40	PIPI
20/04/2021	21:53:08	PIPY	37	32	PIPY
20/04/2021	21:53:13	PIPI	19	11	PIPI
20/04/2021	21:53:19	PIPI	40	37	PIPI
20/04/2021	21:53:24	PIPI	38	38	PIPI
20/04/2021	21:53:29	PIPI	27	25	PIPI
20/04/2021	21:53:34	PIPI	26	24	PIPI
20/04/2021	21:53:39	PIPI	27	27	PIPI
20/04/2021	21:53:44	PIPI	26	25	PIPI
20/04/2021	21:53:49	PIPI	28	28	PIPI
20/04/2021	21:53:54	PIPI	36	35	PIPI
20/04/2021	21:53:59	PIPI	16	16	PIPI
20/04/2021	21:54:05	PIPI	33	32	PIPI
20/04/2021	21:54:10	PIPI	29	25	PIPI
20/04/2021	21:54:15	PIPI	31	26	PIPI
20/04/2021	21:54:20	PIPI	36	30	PIPI
20/04/2021	21:54:25	PIPI	31	23	PIPI
20/04/2021	21:54:35	PIPI	29	26	PIPI
20/04/2021	21:54:40	PIPI	11	11	PIPI
20/04/2021	21:54:51	PIPI	27	26	PIPI
20/04/2021	21:54:56	PIPI	3	3	PIPI
20/04/2021	21:55:01	PIPI	31	31	PIPI
20/04/2021	21:55:06	PIPI	26	26	PIPI
20/04/2021	21:55:11	PIPI	41	35	PIPI
20/04/2021	21:55:17	PIPI	37	36	PIPI
20/04/2021	21:55:22	PIPI	8	8	PIPI
20/04/2021	21:55:34	PIPI	30	30	PIPI
20/04/2021	21:55:39	PIPI	24	24	PIPI
20/04/2021	21:55:44	PIPI	4	4	PIPI

20/04/2021	21:55:56	PIPI	43	41	PIPI
20/04/2021	21:56:01	PIPI	26	26	PIPI
20/04/2021	21:56:06	PIPI	18	18	PIPI
20/04/2021	21:56:11	PIPI	42	38	PIPI
20/04/2021	21:56:16	PIPI	26	26	PIPI
20/04/2021	21:56:29	PIPI	34	34	PIPI
20/04/2021	21:56:34	PIPI	32	32	PIPI
20/04/2021	21:56:39	PIPI	28	27	PIPI
20/04/2021	21:56:49	PIPI	33	33	PIPI
20/04/2021	21:56:54	PIPI	10	10	PIPI
20/04/2021	21:57:09	PIPI	14	14	PIPI
20/04/2021	21:57:14	PIPI	53	53	PIPI
20/04/2021	21:57:19	PIPI	52	52	PIPI
20/04/2021	21:57:24	PIPI	24	24	PIPI
20/04/2021	21:57:29	PIPI	8	8	PIPI
20/04/2021	21:57:38	PIPI	30	30	PIPI
20/04/2021	21:57:43	PIPI	20	20	PIPI
20/04/2021	21:57:48	PIPI	26	25	PIPI
20/04/2021	21:57:54	PIPI	24	24	PIPI
20/04/2021	21:58:05	PIPI	18	17	PIPI
20/04/2021	21:58:10	PIPI	27	26	PIPI
20/04/2021	21:58:15	PIPI	11	11	PIPI
20/04/2021	21:58:20	PIPI	16	16	PIPI
20/04/2021	21:58:29	PIPI	9	9	PIPI
20/04/2021	21:58:44	PIPI	16	16	PIPI
20/04/2021	21:58:49	PIPI	23	23	PIPI
20/04/2021	21:58:54	PIPI	3	3	PIPI
20/04/2021	21:59:00	PIPI	22	19	PIPI
20/04/2021	21:59:05	PIPI	12	12	PIPI
20/04/2021	21:59:10	PIPI	27	24	PIPI
20/04/2021	21:59:15	PIPI	38	38	PIPI
20/04/2021	21:59:20	PIPI	32	32	PIPI
20/04/2021	21:59:25	PIPI	42	39	PIPI
20/04/2021	21:59:31	PIPI	19	19	PIPI
20/04/2021	21:59:36	PIPI	26	26	PIPI
20/04/2021	21:59:41	PIPI	22	21	PIPI
20/04/2021	21:59:55	PIPI	27	25	PIPI
20/04/2021	22:00:00	PIPI	48	44	PIPI
20/04/2021	22:00:05	PIPI	23	22	PIPI
20/04/2021	22:00:15	PIPI	25	25	PIPI
20/04/2021	22:00:20	PIPI	27	27	PIPI
20/04/2021	22:00:25	PIPI	40	40	PIPI
20/04/2021	22:00:31	PIPI	60	60	PIPI
20/04/2021	22:00:36	PIPI	55	53	PIPI

20/04/2021	22:00:41	PIPI	21	20	PIPI
20/04/2021	22:00:48	PIPI	14	14	PIPI
20/04/2021	22:00:55	PIPI	28	28	PIPI
20/04/2021	22:01:00	PIPI	23	23	PIPI
20/04/2021	22:01:05	PIPI	43	42	PIPI
20/04/2021	22:01:10	PIPI	48	39	PIPI
20/04/2021	22:01:15	PIPI	48	47	PIPI
20/04/2021	22:01:20	PIPI	25	24	PIPI
20/04/2021	22:01:32	PIPI	43	43	PIPI
20/04/2021	22:01:37	PIPI	24	24	PIPI
20/04/2021	22:01:42	PIPI	34	34	PIPI
20/04/2021	22:01:47	PIPI	45	40	PIPI
20/04/2021	22:01:52	PIPI	54	35	PIPI
20/04/2021	22:01:57	PIPY	5	5	PIPY
20/04/2021	22:02:10	PIPI	27	27	PIPI
20/04/2021	22:02:15	PIPI	57	30	PIPI
20/04/2021	22:02:20	PIPI	53	26	PIPI
20/04/2021	22:02:25	PIPI	26	14	PIPI
20/04/2021	22:02:30	PIPY	38	38	PIPY
20/04/2021	22:02:35	PIPY	35	26	PIPY
20/04/2021	22:02:40	PIPY	37	29	PIPY
20/04/2021	22:02:45	PIPI	57	42	PIPI
20/04/2021	22:02:50	PIPY	27	25	PIPY
20/04/2021	22:02:56	PIPY	43	36	PIPY
20/04/2021	22:03:01	PIPI	40	19	PIPI
20/04/2021	22:03:06	PIPI	27	27	PIPI
20/04/2021	22:03:11	PIPI	63	46	PIPI
20/04/2021	22:03:16	PIPI	24	19	PIPI
20/04/2021	22:03:21	PIPY	26	19	PIPY
20/04/2021	22:03:27	PIPI	31	29	PIPI
20/04/2021	22:03:32	PIPI	16	16	PIPI
20/04/2021	22:03:46	PIPI	28	28	PIPI
20/04/2021	22:03:51	PIPI	10	10	PIPI
20/04/2021	22:03:57	PIPI	27	25	PIPI
20/04/2021	22:04:02	PIPI	8	8	PIPI
20/04/2021	22:04:14	PIPI	29	29	PIPI
20/04/2021	22:04:19	PIPI	7	7	PIPI
20/04/2021	22:04:25	PIPI	17	16	PIPI
20/04/2021	22:04:30	PIPI	23	19	PIPI
20/04/2021	22:04:35	PIPI	14	14	PIPI
20/04/2021	22:04:40	PIPI	23	22	PIPI
20/04/2021	22:04:45	PIPI	4	4	PIPI
20/04/2021	22:05:06	PIPI	30	27	PIPI
20/04/2021	22:05:11	PIPI	28	28	PIPI

20/04/2021	22:05:16	PIPI	11	11	PIPI
20/04/2021	22:05:24	PIPI	43	39	PIPI
20/04/2021	22:05:29	PIPI	31	31	PIPI
20/04/2021	22:05:34	PIPI	17	17	PIPI
20/04/2021	22:05:44	PIPI	28	28	PIPI
20/04/2021	22:05:49	PIPI	17	17	PIPI
20/04/2021	22:05:54	PIPI	23	23	PIPI
20/04/2021	22:05:59	PIPI	22	21	PIPI
20/04/2021	22:06:04	PIPI	7	7	PIPI
20/04/2021	22:06:29	PIPI	14	14	PIPI
20/04/2021	22:06:36	PIPI	44	44	PIPI
20/04/2021	22:06:41	PIPI	34	34	PIPI
20/04/2021	22:07:01	PIPI	35	28	PIPI
20/04/2021	22:07:06	PIPI	32	31	PIPI
20/04/2021	22:07:11	PIPI	48	46	PIPI
20/04/2021	22:07:16	PIPI	30	29	PIPI
20/04/2021	22:07:30	PIPI	4	4	PIPI
20/04/2021	22:07:35	PIPI	8	8	PIPI
20/04/2021	22:07:42	PIPI	34	34	PIPI
20/04/2021	22:07:47	PIPI	15	15	PIPI
20/04/2021	22:07:56	PIPI	29	29	PIPI
20/04/2021	22:08:01	PIPI	29	29	PIPI
20/04/2021	22:08:06	PIPI	15	15	PIPI
20/04/2021	22:08:13	PIPI	27	27	PIPI
20/04/2021	22:08:18	PIPI	33	26	PIPI
20/04/2021	22:08:23	PIPI	31	28	PIPI
20/04/2021	22:08:36	PIPI	20	20	PIPI
20/04/2021	22:08:41	PIPI	20	19	PIPI
20/04/2021	22:08:46	PIPI	11	11	PIPI
20/04/2021	22:08:53	PIPI	29	29	PIPI
20/04/2021	22:08:58	PIPI	18	18	PIPI
20/04/2021	22:09:03	PIPI	44	41	PIPI
20/04/2021	22:09:09	PIPI	38	25	PIPI
20/04/2021	22:09:14	PIPY	22	16	PIPY
20/04/2021	22:09:19	PIPI	37	21	PIPI
20/04/2021	22:09:24	PIPY	19	11	PIPY
20/04/2021	22:09:35	PIPI	21	19	PIPI
20/04/2021	22:09:40	PIPI	30	24	PIPI
20/04/2021	22:09:45	PIPI	45	41	PIPI
20/04/2021	22:09:50	PIPI	20	18	PIPI
20/04/2021	22:09:55	PIPI	8	5	PIPI
20/04/2021	22:10:06	PIPI	34	26	PIPI
20/04/2021	22:10:11	PIPI	30	24	PIPI
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20/04/2021	22:12:16	PIPI	42	41	PIPI
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20/04/2021	22:14:42	PIPI	8	8	PIPI
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20/04/2021	22:31:21	PIPI	9	9	PIPI
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20/04/2021	22:33:44	PIPY	24	15	PIPY
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20/04/2021	22:41:04	PIPI	5	5	PIPI
20/04/2021	22:41:18	PIPI	34	33	PIPI

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20/04/2021	22:48:36	PIPI	8	6	PIPI
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20/04/2021	22:48:51	PIPI	38	38	PIPI
20/04/2021	22:48:56	PIPI	29	29	PIPI
20/04/2021	22:49:01	PIPI	53	50	PIPI
20/04/2021	22:49:06	PIPI	44	41	PIPI
20/04/2021	22:49:11	PIPI	14	14	PIPI
20/04/2021	22:49:16	PIPI	2	2	PIPI
20/04/2021	22:49:19	PIPI	41	40	PIPI
20/04/2021	22:49:24	PIPI	39	39	PIPI
20/04/2021	22:49:29	PIPI	31	31	PIPI
20/04/2021	22:49:34	PIPI	25	25	PIPI
20/04/2021	22:49:53	PIPI	5	5	PIPI
20/04/2021	22:50:00	PIPI	18	18	PIPI
20/04/2021	22:50:05	PIPI	24	23	PIPI
20/04/2021	22:50:10	PIPI	15	15	PIPI
20/04/2021	22:50:25	PIPI	23	23	PIPI
20/04/2021	22:50:30	PIPI	7	7	PIPI
20/04/2021	22:50:36	PIPI	20	20	PIPI
20/04/2021	22:50:41	PIPI	4	4	PIPI
20/04/2021	22:50:53	PIPI	17	16	PIPI
20/04/2021	22:50:58	PIPI	10	10	PIPI
20/04/2021	22:51:17	PIPI	26	26	PIPI
20/04/2021	22:51:22	PIPI	8	8	PIPI
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20/04/2021	22:53:03	PIPI	6	6	PIPI
20/04/2021	22:53:18	PIPI	11	10	PIPI
20/04/2021	22:53:23	PIPI	7	7	PIPI
20/04/2021	22:53:36	PIPI	10	10	PIPI
20/04/2021	22:53:44	PIPI	23	22	PIPI
20/04/2021	22:53:54	PIPI	32	30	PIPI
20/04/2021	22:53:59	PIPI	9	8	PIPI
20/04/2021	22:54:09	PIPI	28	26	PIPI

20/04/2021	22:54:14	PIPI	35	35	PIPI
20/04/2021	22:54:19	PIPI	53	51	PIPI
20/04/2021	22:54:24	PIPI	54	51	PIPI
20/04/2021	22:54:45	PIPI	9	9	PIPI
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20/04/2021	22:55:49	PIPI	46	46	PIPI
20/04/2021	22:55:54	PIPI	18	18	PIPI
20/04/2021	22:56:01	PIPY	35	35	PIPY
20/04/2021	22:56:06	PIPY	44	41	PIPY
20/04/2021	22:56:14	PIPI	25	25	PIPI
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20/04/2021	22:58:46	PIPI	17	15	PIPI
20/04/2021	22:58:51	PIPI	7	7	PIPI
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20/04/2021	22:59:28	PIPI	18	18	PIPI
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20/04/2021	23:02:34	PIPI	26	25	PIPI
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20/04/2021	23:02:54	PIPI	21	21	PIPI
20/04/2021	23:02:59	PIPI	6	6	PIPI
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20/04/2021	23:04:27	PIPI	30	30	PIPI
20/04/2021	23:04:32	PIPI	35	35	PIPI
20/04/2021	23:04:37	PIPI	32	32	PIPI

20/04/2021	23:04:42	PIPI	6	6	PIPI
20/04/2021	23:05:02	PIPI	21	21	PIPI
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20/04/2021	23:05:15	PIPI	33	31	PIPI
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20/04/2021	23:05:44	PIPI	4	2	PIPI
20/04/2021	23:06:04	PIPI	27	21	PIPI
20/04/2021	23:06:09	PIPY	39	25	PIPY
20/04/2021	23:06:14	PIPY	17	13	PIPY
20/04/2021	23:06:34	PIPI	15	15	PIPI
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20/04/2021	23:06:44	NoID	1	0	PIPI
20/04/2021	23:06:55	PIPI	43	41	PIPI
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20/04/2021	23:07:15	PIPI	38	36	PIPI
20/04/2021	23:07:20	PIPI	2	2	PIPI
20/04/2021	23:07:38	PIPI	8	6	PIPI
20/04/2021	23:07:43	PIPI	4	4	PIPI
20/04/2021	23:07:48	PIPI	14	14	PIPI
20/04/2021	23:08:07	PIPY	32	21	PIPI PIPY
20/04/2021	23:08:12	PIPY	25	24	PIPI PIPY
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20/04/2021	23:09:23	PIPY	21	12	PIPY
20/04/2021	23:09:28	PIPI	39	22	PIPI
20/04/2021	23:09:33	PIPI	37	23	PIPI
20/04/2021	23:09:38	PIPY	21	20	PIPY
20/04/2021	23:09:45	PIPY	27	19	PIPY
20/04/2021	23:09:50	PIPY	42	32	PIPY
20/04/2021	23:09:55	PIPI	22	22	PIPI
20/04/2021	23:10:00	PIPI	19	19	PIPI
20/04/2021	23:10:05	PIPI	34	32	PIPI
20/04/2021	23:10:10	PIPI	46	35	PIPI
20/04/2021	23:10:16	PIPI	9	9	PIPI
20/04/2021	23:10:27	PIPI	27	27	PIPI

20/04/2021	23:10:36	PIPI	21	11	PIPI
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20/04/2021	23:13:32	PIPI	7	7	PIPI
20/04/2021	23:13:38	PIPI	23	23	PIPI
20/04/2021	23:13:43	PIPI	6	6	PIPI
20/04/2021	23:13:52	PIPI	21	21	PIPI
20/04/2021	23:13:57	PIPI	7	7	PIPI
20/04/2021	23:14:12	PIPI	26	25	PIPI
20/04/2021	23:14:17	PIPI	21	21	PIPI
20/04/2021	23:14:22	PIPI	3	3	PIPI
20/04/2021	23:14:27	PIPI	20	17	PIPI
20/04/2021	23:14:32	PIPI	16	16	PIPI
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20/04/2021	23:15:03	PIPI	36	24	PIPI
20/04/2021	23:15:28	PIPI	32	27	PIPI
20/04/2021	23:15:33	PIPI	34	33	PIPI
20/04/2021	23:15:38	PIPI	41	27	PIPI
20/04/2021	23:15:46	PIPI	29	29	PIPI
20/04/2021	23:15:51	PIPI	48	47	PIPI
20/04/2021	23:15:56	PIPI	30	30	PIPI
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20/04/2021	23:16:34	PIPI	6	6	PIPI
20/04/2021	23:16:38	PIPI	18	18	PIPI
20/04/2021	23:16:55	PIPI	17	17	PIPI
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20/04/2021	23:17:49	PIPI	34	32	PIPI
20/04/2021	23:17:54	PIPI	6	6	PIPI
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20/04/2021	23:19:43	NYLE	3	3	NYLE
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20/04/2021	23:21:31	PIPI	22	22	PIPI
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20/04/2021	23:21:53	PIPI	7	7	PIPI
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20/04/2021	23:22:14	PIPI	34	34	PIPI
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20/04/2021	23:23:01	PIPI	6	6	PIPI
20/04/2021	23:23:11	PIPI	23	22	PIPI
20/04/2021	23:23:16	PIPI	24	24	PIPI

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20/04/2021	23:23:34	PIPI	35	34	PIPI
20/04/2021	23:23:39	PIPI	8	8	PIPI
20/04/2021	23:23:54	PIPI	29	29	PIPI
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20/04/2021	23:25:46	PIPI	9	9	PIPI
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20/04/2021	23:29:37	PIPI	6	6	PIPI
20/04/2021	23:29:44	PIPI	44	39	PIPI
20/04/2021	23:29:49	PIPI	35	32	PIPI

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20/04/2021	23:30:13	PIPI	45	38	PIPI
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20/04/2021	23:31:31	PIPI	3	3	PIPI
20/04/2021	23:31:43	PIPI	18	18	PIPI
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20/04/2021	23:32:24	PIPI	40	33	PIPI
20/04/2021	23:32:29	PIPI	33	33	PIPI
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20/04/2021	23:32:48	PIPI	41	36	PIPI
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20/04/2021	23:36:06	PIPI	25	25	PIPI
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20/04/2021	23:37:11	PIPI	16	16	PIPI
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20/04/2021	23:37:37	PIPI	6	6	PIPI
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20/04/2021	23:37:59	PIPI	11	11	PIPI
20/04/2021	23:38:19	PIPI	11	11	PIPI
20/04/2021	23:38:30	PIPI	17	17	PIPI

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20/04/2021	23:38:46	PIPY	16	11	PIPY
20/04/2021	23:38:51	PIPY	42	23	PIPY
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20/04/2021	23:39:07	PIPI	56	27	PIPI
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20/04/2021	23:39:26	PIPI	28	26	PIPI
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20/04/2021	00:11:05	PIPI	6	6	PIPI
20/04/2021	00:12:00	PIPI	13	10	PIPI
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20/04/2021	00:14:54	PIPI	4	4	PIPI
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20/04/2021	00:17:37	PIPI	28	28	PIPI
20/04/2021	00:17:42	PIPI	7	7	PIPI
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20/04/2021	00:20:43	PIPI	4	4	PIPI
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20/04/2021	00:21:20	PIPI	20	20	PIPI
20/04/2021	00:21:25	PIPI	14	14	PIPI
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20/04/2021	00:22:16	PIPI	30	30	PIPI
20/04/2021	00:22:21	PIPI	8	8	PIPI
20/04/2021	00:22:31	PIPI	31	31	PIPI
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20/04/2021	00:22:41	PIPI	4	4	PIPI
20/04/2021	00:22:45	PIPI	23	22	PIPI
20/04/2021	00:22:50	PIPI	6	6	PIPI
20/04/2021	00:22:54	PIPI	24	24	PIPI
20/04/2021	00:22:59	PIPI	3	3	PIPI
20/04/2021	00:23:09	PIPI	19	19	PIPI
20/04/2021	00:23:24	PIPI	26	26	PIPI
20/04/2021	00:23:29	PIPI	25	25	PIPI
20/04/2021	00:23:43	PIPI	27	27	PIPI
20/04/2021	00:23:55	PIPI	29	29	PIPI
20/04/2021	00:24:00	PIPI	9	6	PIPI
20/04/2021	00:24:14	PIPI	38	35	PIPI
20/04/2021	00:24:19	PIPI	36	36	PIPI
20/04/2021	00:24:24	PIPI	37	35	PIPI
20/04/2021	00:24:29	PIPI	14	14	PIPI
20/04/2021	00:24:43	PIPI	28	28	PIPI
20/04/2021	00:25:00	PIPI	8	8	PIPI
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20/04/2021	00:25:43	PIPI	28	28	PIPI
20/04/2021	00:25:48	PIPI	5	5	PIPI
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20/04/2021	00:26:16	PIPI	25	25	PIPI
20/04/2021	00:26:59	PIPI	6	6	PIPI
20/04/2021	00:27:05	PIPI	31	31	PIPI

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20/04/2021	00:27:15	PIPI	21	21	PIPI
20/04/2021	00:27:22	PIPI	27	27	PIPI
20/04/2021	00:27:27	PIPI	3	3	PIPI
20/04/2021	00:27:34	PIPI	16	16	PIPI
20/04/2021	00:27:39	PIPI	16	16	PIPI
20/04/2021	00:27:51	PIPI	20	20	PIPI
20/04/2021	00:27:59	PIPI	25	25	PIPI
20/04/2021	00:28:11	PIPI	29	29	PIPI
20/04/2021	00:28:16	PIPI	5	5	PIPI
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20/04/2021	00:28:59	PIPI	34	33	PIPI
20/04/2021	00:29:04	PIPI	38	37	PIPI
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20/04/2021	00:29:19	PIPY	16	9	PIPY
20/04/2021	00:29:24	PIPI	25	23	PIPI
20/04/2021	00:29:29	PIPI	23	23	PIPI
20/04/2021	00:29:43	PIPI	24	24	PIPI
20/04/2021	00:29:56	PIPI	22	22	PIPI
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20/04/2021	00:31:29	PIPY	8	6	PIPY
20/04/2021	00:31:38	PIPI	12	12	PIPI
20/04/2021	00:31:48	PIPI	26	26	PIPI
20/04/2021	00:31:53	PIPI	9	9	PIPI
20/04/2021	00:31:58	PIPI	2	2	PIPI
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20/04/2021	00:32:13	PIPI	27	27	PIPI
20/04/2021	00:32:18	PIPI	4	4	PIPI
20/04/2021	00:32:36	PIPI	8	8	PIPI

20/04/2021	00:32:48	PIPI	27	27	PIPI
20/04/2021	00:32:53	PIPI	26	26	PIPI
20/04/2021	00:32:58	PIPI	5	5	PIPI
20/04/2021	00:33:15	PIPI	3	3	PIPI
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20/04/2021	00:33:37	PIPI	2	2	PIPI
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20/04/2021	00:35:38	PIPI	29	29	PIPI
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20/04/2021	00:39:22	PIPY	34	34	PIPY
20/04/2021	00:39:27	PIPY	17	17	PIPY
20/04/2021	00:39:38	PIPY	33	33	PIPY

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20/04/2021	00:41:44	PIPI	29	28	PIPI
20/04/2021	00:41:49	PIPI	33	33	PIPI
20/04/2021	00:41:54	PIPI	26	26	PIPI
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20/04/2021	00:46:36	PIPI	29	29	PIPI
20/04/2021	00:46:41	PIPI	21	21	PIPI
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20/04/2021	00:49:04	PIPI	31	31	PIPI
20/04/2021	00:49:09	PIPI	23	22	PIPI
20/04/2021	00:49:14	PIPI	5	4	PIPI
20/04/2021	00:49:24	PIPI	26	26	PIPI
20/04/2021	00:49:29	PIPI	12	11	PIPI
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20/04/2021	00:50:24	PIPI	30	30	PIPI
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20/04/2021	00:50:45	PIPI	34	34	PIPI
20/04/2021	00:50:50	PIPI	22	19	PIPI
20/04/2021	00:50:55	PIPI	25	25	PIPI

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20/04/2021	00:51:05	PIPI	16	13	PIPI
20/04/2021	00:51:11	PIPI	31	29	PIPI
20/04/2021	00:51:16	PIPI	28	25	PIPI
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20/04/2021	00:55:09	PIPI	16	16	PIPI
20/04/2021	00:55:32	PIPI	31	31	PIPI
20/04/2021	00:55:37	PIPI	11	11	PIPI

20/04/2021	00:56:29	PIPY	7	7	PIPY
20/04/2021	00:56:49	PIPI	29	29	PIPI
20/04/2021	00:56:54	PIPI	31	31	PIPI
20/04/2021	00:56:59	PIPI	31	31	PIPI
20/04/2021	00:57:04	PIPI	20	20	PIPI
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20/04/2021	00:57:18	PIPI	32	32	PIPI
20/04/2021	00:57:23	PIPI	34	34	PIPI
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20/04/2021	00:57:33	PIPI	26	26	PIPI
20/04/2021	00:57:38	PIPI	24	24	PIPI
20/04/2021	00:57:46	PIPI	27	27	PIPI
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20/04/2021	00:58:34	PIPI	30	26	PIPI
20/04/2021	00:58:40	PIPI	17	17	PIPI
20/04/2021	00:58:52	PIPI	26	26	PIPI
20/04/2021	00:58:57	PIPI	23	23	PIPI
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20/04/2021	00:59:55	PIPI	16	16	PIPI
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21/04/2021	01:00:06	PIPI	29	29	PIPI
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21/04/2021	01:00:27	PIPI	3	3	PIPI
21/04/2021	01:00:32	PIPI	31	30	PIPI
21/04/2021	01:00:37	PIPI	20	20	PIPI
21/04/2021	01:00:46	PIPI	32	32	PIPI
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21/04/2021	01:01:11	PIPI	29	29	PIPI
21/04/2021	01:01:16	PIPI	25	25	PIPI
21/04/2021	01:01:21	PIPI	20	20	PIPI

21/04/2021	01:01:27	PIPI	29	29	PIPI
21/04/2021	01:01:32	PIPI	33	33	PIPI
21/04/2021	01:01:37	PIPI	2	2	PIPI
21/04/2021	01:01:46	PIPI	29	29	PIPI
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21/04/2021	01:02:27	PIPI	31	31	PIPI
21/04/2021	01:02:32	PIPI	25	25	PIPI
21/04/2021	01:02:37	PIPI	13	13	PIPI
21/04/2021	01:02:48	PIPI	32	32	PIPI
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21/04/2021	01:02:58	PIPI	13	13	PIPI
21/04/2021	01:03:09	PIPI	28	28	PIPI
21/04/2021	01:03:14	PIPI	8	8	PIPI
21/04/2021	01:03:26	PIPI	25	25	PIPI
21/04/2021	01:03:31	PIPI	9	9	PIPI
21/04/2021	01:03:39	PIPI	26	26	PIPI
21/04/2021	01:03:44	PIPI	32	31	PIPI
21/04/2021	01:03:49	PIPI	4	4	PIPI
21/04/2021	01:04:03	PIPI	30	30	PIPI
21/04/2021	01:04:08	PIPI	11	11	PIPI
21/04/2021	01:04:19	PIPI	25	25	PIPI
21/04/2021	01:04:24	PIPI	17	17	PIPI
21/04/2021	01:04:29	PIPI	14	14	PIPI
21/04/2021	01:04:34	PIPI	31	31	PIPI
21/04/2021	01:04:39	PIPI	18	18	PIPI
21/04/2021	01:06:01	PIPI	7	4	PIPI
21/04/2021	01:06:06	PIPI	31	31	PIPI
21/04/2021	01:06:11	PIPI	18	15	PIPI
21/04/2021	01:06:38	PIPI	25	25	PIPI
21/04/2021	01:06:43	PIPI	15	15	PIPI
21/04/2021	01:07:15	PIPI	6	4	PIPI
21/04/2021	01:07:25	PIPI	17	17	PIPI
21/04/2021	01:07:36	PIPI	9	6	PIPI
21/04/2021	01:09:26	PIPI	4	4	PIPI
21/04/2021	01:09:33	PIPI	19	19	PIPI
21/04/2021	01:09:38	PIPI	33	33	PIPI
21/04/2021	01:09:43	PIPI	32	30	PIPI
21/04/2021	01:09:48	PIPI	25	25	PIPI
21/04/2021	01:09:53	PIPI	28	28	PIPI
21/04/2021	01:09:58	PIPI	38	38	PIPI
21/04/2021	01:10:03	PIPI	32	30	PIPI

21/04/2021	01:10:08	PIPI	3	3	PIPI
21/04/2021	01:10:21	PIPI	13	13	PIPI
21/04/2021	01:10:29	PIPI	21	20	PIPI
21/04/2021	01:10:40	PIPI	36	36	PIPI
21/04/2021	01:10:45	PIPI	5	4	PIPI
21/04/2021	01:11:54	PIPI	30	29	PIPI
21/04/2021	01:11:59	PIPI	7	7	PIPI
21/04/2021	01:12:06	PIPI	15	15	PIPI
21/04/2021	01:12:11	PIPI	26	26	PIPI
21/04/2021	01:12:16	PIPI	18	17	PIPI
21/04/2021	01:12:35	PIPI	18	18	PIPI
21/04/2021	01:12:49	PIPI	29	28	PIPI
21/04/2021	01:12:54	PIPI	11	8	PIPI
21/04/2021	01:13:03	PIPI	30	30	PIPI
21/04/2021	01:13:08	PIPI	12	11	PIPI
21/04/2021	01:13:43	PIPI	25	25	PIPI
21/04/2021	01:13:48	PIPI	42	42	PIPI
21/04/2021	01:13:53	PIPI	32	30	PIPI
21/04/2021	01:14:03	PIPI	18	17	PIPI
21/04/2021	01:14:08	PIPI	12	11	PIPI
21/04/2021	01:14:17	NYLE	4	3	PIPI
21/04/2021	01:14:22	PIPI	17	16	PIPI
21/04/2021	01:14:28	PIPI	10	10	PIPI
21/04/2021	01:14:38	PIPI	31	31	PIPI
21/04/2021	01:14:43	PIPI	18	17	PIPI
21/04/2021	01:14:48	PIPI	18	18	PIPI
21/04/2021	01:14:53	PIPI	31	31	PIPI
21/04/2021	01:14:58	PIPI	13	12	PIPI
21/04/2021	01:15:03	PIPI	12	12	PIPI
21/04/2021	01:15:11	PIPI	29	29	PIPI
21/04/2021	01:15:16	PIPI	13	13	PIPI
21/04/2021	01:15:30	PIPI	26	26	PIPI
21/04/2021	01:15:35	PIPI	11	11	PIPI
21/04/2021	01:15:59	PIPI	29	29	PIPI
21/04/2021	01:16:04	PIPI	22	21	PIPI
21/04/2021	01:16:09	PIPI	25	25	PIPI
21/04/2021	01:16:15	PIPI	23	20	PIPI
21/04/2021	01:16:25	PIPI	33	32	PIPI
21/04/2021	01:16:30	PIPI	13	12	PIPI
21/04/2021	01:16:39	PIPI	6	6	PIPI
21/04/2021	01:16:46	PIPI	31	31	PIPI
21/04/2021	01:16:51	PIPI	24	23	PIPI
21/04/2021	01:16:56	PIPI	11	10	PIPI
21/04/2021	01:17:02	PIPI	20	20	PIPI

21/04/2021	01:17:07	PIPI	23	23	PIPI
21/04/2021	01:17:12	PIPI	24	20	PIPI
21/04/2021	01:17:18	PIPI	22	22	PIPI
21/04/2021	01:17:23	PIPI	31	30	PIPI
21/04/2021	01:17:28	PIPI	9	6	PIPI
21/04/2021	01:17:39	PIPI	31	31	PIPI
21/04/2021	01:17:44	PIPI	18	16	PIPI
21/04/2021	01:17:54	PIPI	33	33	PIPI
21/04/2021	01:17:59	PIPI	21	19	PIPI
21/04/2021	01:18:13	PIPI	28	28	PIPI
21/04/2021	01:18:18	PIPI	11	8	PIPI
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21/04/2021	01:22:22	PIPI	24	24	PIPI
21/04/2021	01:22:27	PIPI	5	5	PIPI
21/04/2021	01:22:46	PIPI	22	22	PIPI
21/04/2021	01:22:51	PIPI	29	29	PIPI
21/04/2021	01:22:56	PIPI	13	12	PIPI
21/04/2021	01:23:08	PIPI	29	29	PIPI
21/04/2021	01:23:13	PIPI	22	22	PIPI
21/04/2021	01:23:18	PIPI	6	5	PIPI
21/04/2021	01:23:25	PIPI	26	26	PIPI
21/04/2021	01:23:30	PIPI	22	22	PIPI
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21/04/2021	01:23:50	PIPI	30	28	PIPI
21/04/2021	01:23:55	PIPI	28	26	PIPI
21/04/2021	01:24:00	PIPI	30	29	PIPI
21/04/2021	01:24:05	PIPI	19	19	PIPI
21/04/2021	01:24:18	PIPI	20	19	PIPI
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21/04/2021	01:24:28	PIPI	16	15	PIPI
21/04/2021	01:24:34	PIPI	32	32	PIPI
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21/04/2021	01:24:50	PIPI	29	29	PIPI
21/04/2021	01:24:55	PIPI	23	22	PIPI
21/04/2021	01:25:00	PIPI	25	25	PIPI
21/04/2021	01:25:05	PIPI	26	25	PIPI
21/04/2021	01:25:24	PIPI	23	22	PIPI
21/04/2021	01:25:29	PIPI	9	8	PIPI
21/04/2021	01:25:38	PIPI	20	20	PIPI
21/04/2021	01:25:43	PIPI	3	3	PIPI
21/04/2021	01:25:58	PIPI	28	28	PIPI

21/04/2021	01:26:03	PIPI	16	15	PIPI
21/04/2021	01:26:08	PIPI	21	21	PIPI
21/04/2021	01:26:18	PIPI	31	31	PIPI
21/04/2021	01:26:23	PIPI	26	23	PIPI
21/04/2021	01:26:28	PIPI	19	18	PIPI
21/04/2021	01:26:33	PIPI	24	23	PIPI
21/04/2021	01:26:38	PIPI	9	8	PIPI
21/04/2021	01:26:48	PIPI	32	32	PIPI
21/04/2021	01:26:53	PIPI	19	19	PIPI
21/04/2021	01:26:58	PIPI	11	11	PIPI
21/04/2021	01:27:04	PIPI	30	30	PIPI
21/04/2021	01:27:09	PIPI	29	29	PIPI
21/04/2021	01:27:14	PIPI	24	22	PIPI
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21/04/2021	01:27:25	PIPI	34	31	PIPI
21/04/2021	01:27:30	PIPI	24	23	PIPI
21/04/2021	01:27:35	PIPI	24	22	PIPI
21/04/2021	01:27:40	PIPI	2	2	PIPI
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21/04/2021	01:27:52	PIPI	20	19	PIPI
21/04/2021	01:27:57	PIPI	28	28	PIPI
21/04/2021	01:28:03	PIPI	17	17	PIPI
21/04/2021	01:28:09	PIPI	30	30	PIPI
21/04/2021	01:28:14	PIPI	7	7	PIPI
21/04/2021	01:28:19	PIPI	22	22	PIPI
21/04/2021	01:28:24	PIPI	19	18	PIPI
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21/04/2021	01:30:25	PIPI	8	8	PIPI
21/04/2021	01:30:52	PIPI	26	25	PIPI
21/04/2021	01:30:57	PIPI	24	23	PIPI
21/04/2021	01:31:02	PIPI	28	28	PIPI
21/04/2021	01:31:13	PIPI	26	26	PIPI
21/04/2021	01:31:18	PIPI	14	14	PIPI
21/04/2021	01:31:49	PIPI	14	14	PIPI

21/04/2021	01:32:05	PIPI	34	34	PIPI
21/04/2021	01:32:10	PIPI	28	28	PIPI
21/04/2021	01:32:15	PIPI	8	7	PIPI
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21/04/2021	01:32:31	PIPI	22	18	PIPI
21/04/2021	01:33:04	PIPI	24	24	PIPI
21/04/2021	01:33:09	PIPI	21	18	PIPI
21/04/2021	01:33:14	PIPI	31	31	PIPI
21/04/2021	01:33:19	PIPI	21	21	PIPI
21/04/2021	01:33:28	PIPI	34	34	PIPI
21/04/2021	01:33:33	PIPI	36	36	PIPI
21/04/2021	01:33:38	PIPI	19	14	PIPI
21/04/2021	01:34:02	PIPI	18	18	PIPI
21/04/2021	01:34:07	PIPI	31	31	PIPI
21/04/2021	01:34:12	PIPI	24	23	PIPI
21/04/2021	01:34:17	PIPI	26	26	PIPI
21/04/2021	01:34:22	PIPI	8	7	PIPI
21/04/2021	01:34:34	PIPI	23	23	PIPI
21/04/2021	01:34:39	PIPI	23	23	PIPI
21/04/2021	01:34:44	PIPI	3	3	PIPI
21/04/2021	01:34:53	PIPI	12	12	PIPI
21/04/2021	01:35:01	PIPI	30	30	PIPI
21/04/2021	01:35:06	PIPI	22	20	PIPI
21/04/2021	01:35:17	PIPI	31	30	PIPI
21/04/2021	01:35:22	PIPI	15	15	PIPI
21/04/2021	01:36:16	PIPI	34	34	PIPI
21/04/2021	01:36:21	PIPI	14	11	PIPI
21/04/2021	01:36:30	PIPI	14	14	PIPI
21/04/2021	01:36:37	PIPI	26	24	PIPI
21/04/2021	01:36:42	PIPI	7	6	PIPI
21/04/2021	01:36:57	PIPI	28	28	PIPI
21/04/2021	01:37:02	PIPI	19	15	PIPI
21/04/2021	01:37:10	PIPI	28	28	PIPI
21/04/2021	01:37:15	PIPI	16	14	PIPI
21/04/2021	01:39:48	PIPI	19	17	PIPI
21/04/2021	01:40:11	PIPI	34	34	PIPI
21/04/2021	01:40:16	PIPI	13	12	PIPI
21/04/2021	01:40:30	PIPI	31	31	PIPI
21/04/2021	01:40:35	PIPI	17	16	PIPI
21/04/2021	01:41:06	PIPI	33	33	PIPI
21/04/2021	01:41:11	PIPI	29	25	PIPI
21/04/2021	01:41:16	PIPI	4	4	PIPI
21/04/2021	01:42:07	PIPI	24	24	PIPI
21/04/2021	01:42:12	PIPI	32	30	PIPI

21/04/2021	01:42:17	PIPI	10	9	PIPI
21/04/2021	01:42:31	PIPI	27	27	PIPI
21/04/2021	01:42:36	PIPI	16	14	PIPI
21/04/2021	01:42:47	PIPI	29	29	PIPI
21/04/2021	01:42:52	PIPI	12	10	PIPI
21/04/2021	01:42:58	PIPI	30	30	PIPI
21/04/2021	01:43:03	PIPI	21	19	PIPI
21/04/2021	01:43:08	PIPI	24	24	PIPI
21/04/2021	01:43:14	PIPI	28	28	PIPI
21/04/2021	01:43:19	PIPI	14	12	PIPI
21/04/2021	01:43:33	PIPI	31	31	PIPI
21/04/2021	01:43:38	PIPI	20	18	PIPI
21/04/2021	01:43:50	PIPI	31	31	PIPI
21/04/2021	01:43:55	PIPI	17	14	PIPI
21/04/2021	01:44:07	PIPI	30	30	PIPI
21/04/2021	01:44:12	PIPI	22	19	PIPI
21/04/2021	01:44:17	PIPI	27	27	PIPI
21/04/2021	01:44:23	PIPI	23	22	PIPI
21/04/2021	01:44:28	PIPI	31	31	PIPI
21/04/2021	01:44:33	PIPI	15	11	PIPI
21/04/2021	01:44:42	PIPI	13	13	PIPI
21/04/2021	01:44:53	PIPI	13	12	PIPI
21/04/2021	01:44:58	PIPI	25	24	PIPI
21/04/2021	01:45:03	PIPI	4	4	PIPI
21/04/2021	01:50:49	PIPI	25	23	PIPI
21/04/2021	01:50:54	PIPI	4	4	PIPI
21/04/2021	01:52:44	PIPI	31	30	PIPI
21/04/2021	01:52:49	PINA	10	5	PIPI
21/04/2021	01:53:36	PIPI	26	26	PIPI
21/04/2021	01:53:41	PIPI	21	21	PIPI
21/04/2021	01:54:01	PIPI	29	29	PIPI
21/04/2021	01:54:06	PIPI	12	11	PIPI
21/04/2021	01:54:21	PIPI	28	28	PIPI
21/04/2021	01:54:26	PIPI	9	8	PIPI
21/04/2021	01:54:35	PIPI	29	29	PIPI
21/04/2021	01:54:40	PIPI	12	8	PIPI
21/04/2021	02:45:37	PIPI	18	18	PIPI
21/04/2021	05:09:36	PIPI	10	10	PIPI
21/04/2021	05:09:41	PIPI	16	16	PIPI
21/04/2021	05:09:46	PIPI	2	2	PIPI
21/04/2021	05:09:51	PIPI	30	30	PIPI
21/04/2021	05:09:56	PIPI	9	9	PIPI

A9.1 Impact Assessment Criteria

Table 9.1 Criteria for rating site importance of Geological Features (NRA)

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or high fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

Table 9.2 Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on soil / geology attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of	Loss of small proportion of future quarry or pit reserves
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

The NRA criteria for estimation of the importance of hydrogeological attributes at the site during the EIA stage are summarised in Table 4 below.

Table 9.3 Criteria for rating Site Attributes - Estimation of Importance of Hydrogeology Attributes (NRA)

Magnitude of Impact	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple well fields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Table 9.4 Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.

Table 9.5: Rating of Significant Environmental Impacts at EIS Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Neglible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

A9.2 Ground Investigation Results

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary			**Trial Pit Number** TR1
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m X 0.40m X 2.40m	**Ground Level (mOD)** 7.89	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716216.7 E 736595.2 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.30)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				7.59	0.30			
					(0.60)	Soft brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and boulders		
				6.99	0.90			
1.00 1.00-2.40	B ES				(0.60)	Brown/grey clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders		
				6.39	1.50			
2.00	B				(0.90)	Grey slightly clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders		
				5.49	2.40			
						Complete at 2.40m		

Plan

Remarks

No groundwater encountered
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR1

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Site Project Calvary			**Trial Pit Number** TR2
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m X 0.40m X 2.40m	**Ground Level (mOD)** 7.15	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716193.2 E 736525.1 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				6.95	0.20			
						Soft brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(1.00)			
1.00 1.00-2.40	B ES							
				5.95	1.20			
						Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
					(0.40)			
			seepage(1) at 1.60m.	5.55	1.60			▽1
						Brown clayey sandy subangular to subrounded fine to coarse GRAVEL with some subangular to subrounded cobbles and occasional boulders (view obstructed by groundwater)		
2.00	B		fast ingress(2) at 2.00m.		(0.80)			▽2
				4.75	2.40			
						Complete at 2.40m		

Plan

Remarks

Groundwater seepage at 1.60m BGL
Second groundwater strike at 2.00m BGL; fast ingress
Trial pit unstable; side walls spalling
Terminated at 2.40m BGL due to groundwater ingress
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR2

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Site Project Calvary			**Trial Pit Number** TR3
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m X 0.40m X 3.00m	**Ground Level (mOD)** 9.71	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716184.1 E 736478.5 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.25)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				9.46	0.25			
					(0.55)	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				8.91	0.80			
1.00 1.00-3.00	B ES		seepage(1) at 1.20m.		(1.00)	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽1
				7.91	1.80			
2.00	B				(0.70)	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
				7.21	2.50			
					(0.50)	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
3.00	B			6.71	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.20m BGL
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR3

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Site Project Calvary			**Trial Pit Number** TR4
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.00m	**Ground Level (mOD)** 9.34	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716282.3 E 736421.6 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-2.00	ES			9.24	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
						MADE GROUND: Brown/dark grey slightly sandy slightly gravelly Clay with occasional cobbles and boulders, and fragments of bricks, mortar, ceramic pipe and shells		
1.00	B				(1.90)			
2.00	B			7.34	2.00	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
2.00-3.00	ES				(1.00)			
3.00	B			6.34	3.00	Complete at 3.00m		

Plan

Remarks

No groundwater encountered
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR4

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Site Project Calvary			**Trial Pit Number** TR5
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.00m	**Ground Level (mOD)** 8.68	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716399.6 E 736348.2 N	**Dates** 12/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.10	ES			8.58	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(1.00)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with some bricks, mortar, timber and animal bone		
1.10 1.10-3.00	B ES			7.58	1.10	Firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.40)			
			seepage(1) at 1.50m.	7.18	1.50	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
2.00	B				(1.10)			
				6.08	2.60	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		
					(0.40)			
3.00	B			5.68	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.50m BGL
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR5

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Site Project Calvary			**Trial Pit Number** TR6
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 8.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716377.3 E 736275.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.10	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				8.45	0.20			
						MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with some bricks, mortar, scrap metal and timber		
					(0.90)			
			seepage(1) at 0.80m.					▽1
				7.55	1.10			
1.10-3.00	ES					Firm light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.70)			
1.50	B							
				6.85	1.80			
						Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		
			fast ingress(2) at 2.30m.					▽2
					(1.20)			
2.50	B							
				5.65	3.00			
						Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 0.80m BGL
Second groundwater strike at 2.30m BGL; fast ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR6

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Site Project Calvary			**Trial Pit Number** TR7
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.20m	**Ground Level (mOD)** 10.14	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716315.8 E 736268.6 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES				(0.30)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				9.84	0.30			
					(0.70)	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.00	B			9.14	1.00			
1.00-2.00	ES					Soft to firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and occasional granular lenses		
			seepage(1) at 1.40m.		(0.90)			▽1
				8.24	1.90			
2.00	B				(0.30)	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				7.94	2.20			
			seepage(2) at 2.50m.		(0.70)	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		▽2
				7.24	2.90			
3.00	B				(0.30)	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
				6.94	3.20			
						Complete at 3.20m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.50m BGL; seepage
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR7

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Site Project Calvary			**Trial Pit Number** TR8
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 6.81	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716438.3 E 736277.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	ES				(0.70)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks, shells, pottery and ceramic		
0.70-3.00	ES			6.11	0.70	Soft light brown mottled grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
1.00	B				(0.50)			
			seepage(1) at 1.20m.	5.61	1.20	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
					(0.80)			
2.00	B		fast ingress(2) at 2.00m.	4.81	2.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽2
					(1.00)			
3.00	B			3.81	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 1.20m BGL
Second groundwater strike at 2.00m BGL; fast ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR8

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Site Project Calvary			**Trial Pit Number** TR9
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.00m	**Ground Level (mOD)** 7.51	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716426.1 E 736236.5 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.55	ES			7.41	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(0.45)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with fragments of brick, ceramic, plastic, glass and mortar		
0.55-3.00	ES			6.96	0.55	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.35)			
			seepage(1) at 0.90m.	6.61	0.90	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and granular lenses		▽1
1.00	B							
					(1.40)			
2.00	B							
				5.21	2.30	Soft brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and lenses of dark grey fine to coarse Sand		
					(0.70)			
3.00	B			4.51	3.00	Complete at 3.00m		

Plan

Remarks

Groundwater seepage at 0.90m BGL
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR9

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Site Project Calvary			**Trial Pit Number** TR10
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 3.10m	**Ground Level (mOD)** 7.87	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716414.4 E 736204.3 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			7.72	(0.15) 0.15	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(0.45)	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with fragments of brick, ceramic, plastic, glass and mortar		
0.60-2.00	ES			7.27	0.60	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
1.00	B				(0.40)			
			seepage(1) at 1.40m.	6.87	1.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽1
					(0.80)			
2.00	B			6.07	1.80	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
2.00-3.00	ES				(0.80)			
			fast ingress(2) at 2.60m.	5.27	2.60	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles (groundwater obstructing view and washing away clay content)		▽2
					(0.50)			
3.00	B			4.77	3.10	Complete at 3.10m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.60m BGL; fast ingress
Trial pit unstable; side walls collapsed
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR10

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Site Project Calvary			**Trial Pit Number** TR11
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.50m X 0.40m X 3.10m	**Ground Level (mOD)** 8.06	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716321.1 E 736204.7 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	ES			7.91	(0.15) 0.15	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
					(1.05)	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles and boulders		
1.00 1.00-2.00	B ES		seepage(1) at 1.40m.	6.86	1.20	Soft to firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional granular lenses		▽1
					(0.80)			
2.00 2.00-3.00	B ES		medium ingress(2) at 2.20m.	6.06	2.00	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽2
					(0.30)			
				5.76	2.30	Firm to stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional lenses of dark grey fine to coarse Sand		
					(0.50)			
				5.26	2.80	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles, occasional boulders and lenses of dark grey fine to coarse Sand		
					(0.30)			
3.00	B			4.96	3.10	Complete at 3.10m		

Plan

Remarks

Groundwater seepage at 1.40m BGL
Second groundwater strike at 2.20m BGL; medium ingress
Trial pit unstable; side walls spalling
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.TR11

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Site Project Calvary Additional Work			**Trial Pit Number** TR12
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.20m X 0.40m X 2.10m	**Ground Level (mOD)** 12.29	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716235.8 E 736356.6 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			12.19	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.50)	MADE GROUND Dark brown slightly sandy slightly gravelly Clay with many bricks, stone blocks, and occasional pieces of glass, mortar, concrete and ceramic		
0.50	B			11.69	0.60			
0.60-1.60	ES				(1.00)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and occasional bricks, plant remains, clay pipe and ceramic.		
1.50	B			10.69	1.60			
1.60-2.10	ES				(0.50)	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles Obstruction: excavator not advancing		
2.00	B			10.19	2.10	Complete at 2.10m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR12

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Site Project Calvary Additional Work			**Trial Pit Number** TR13
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.80m X 0.40m X 2.40m	**Ground Level (mOD)** 12.06	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716228.9 E 736327.6 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	ES			11.96	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.40)	MADE GROUND Dark brown slightly gravelly sandy Clay with occasional subangular to subrounded cobbles and pieces of brick, glass, metal, mortar and ceramic		
0.40	B			11.56	0.50			
0.50-2.10	ES				(0.40)	Possible MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				11.16	0.90			
					(0.70)	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
1.50	B			10.46	1.60			
					(0.50)	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				9.96	2.10			
					(0.30)	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional cobbles Obstruction: excavator not advancing		
2.40	B			9.66	2.40	Complete at 2.40m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR13

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Site Project Calvary Additional Work			**Trial Pit Number** TR14
Machine : 3.5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.20m X 0.40m X 2.70m	**Ground Level (mOD)** 11.89	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716226 E 736316.1 N	**Dates** 24/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	ES			11.79	(0.10) 0.10	MADE GROUND: Dark brown slightly sandy slightly gravelly organic Clay with rootlets		
					(0.50)	MADE GROUND Dark brown slightly gravelly sandy Clay with occasional subangular to subrounded cobbles and pieces of brick, glass, metal, mortar and ceramic		
0.50	B			11.29	0.60			
0.60-2.30	ES				(0.30)	Possible MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				10.99	0.90			
					(0.80)	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
1.50	B			10.19	1.70			
					(0.30)	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				9.89	2.00			
					(0.30)	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
				9.59	2.30			
2.50	B				(0.40)	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional cobbles Obstruction: excavator not advancing		
				9.19	2.70	Complete at 2.70m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Trial pit backfilled on completion

Scale (approx)	Logged By	Figure No.
1:25	JC	9645-05-20.TR14

Project Calvary – Trial Pit Photographs

TR1

TR1

Project Calvary – Trial Pit Photographs

TR1

TR1

Project Calvary – Trial Pit Photographs

TR2

TR2

Project Calvary – Trial Pit Photographs

TR2

TR2

Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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Project Calvary – Trial Pit Photographs

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TR14

APPENDIX 3 – Soakaway Testing Records

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Site Project Calvary			**Trial Pit Number** IF1
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.40m X 0.35m X 1.50m	**Ground Level (mOD)** 10.78	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716292.4 E 736341 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				10.58	0.20			
					(0.70)	Soft brown slightly sandy slightly gravelly CLAY		
				9.88	0.90			
			seepage(1) at 1.30m.		(0.60)	Soft to firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		▽1
				9.28	1.50	Complete at 1.50m		

Plan

Remarks

Groundwater seepage at 1.30m BGL
Trial pit stable
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF1

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary			**Trial Pit Number** IF2
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.60m X 0.35m X 1.50m	**Ground Level (mOD)** 8.67	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716370.1 E 736318.4 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.50	ES				(0.20)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				8.47	0.20			
					(1.10)	MADE GROUND: Brown/grey slightly sandy gravelly CLAY with many bricks, concrete blocks, scrap metal, timber and waste ash (General Builders Rubble)		
				7.37	1.30			
					(0.20)	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles		
			seepage(1) at 1.50m.	7.17	1.50	Complete at 1.50m		▽1

Plan

Remarks

Groundwater seepage at 1.50m BGL
Trial pit unstable; side walls spalling
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF2

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary			**Trial Pit Number** IF3
Machine : 5 Tonne Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.70m X 0.35m X 1.50m	**Ground Level (mOD)** 7.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716412 E 736297.4 N	**Dates** 11/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.50	ES				(0.40)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with occasional fragments of bricks and ceramic		
				7.22	0.40	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly CLAY with occasional cobbles and fagments of bricks, timber, mortar and ceramic		
					(0.90)			
				6.32	1.30	Possible MADE GROUND: Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.20)			
				6.12	1.50	Complete at 1.50m		

Plan

Remarks

No groundwater encountered
Trial pit stable
Soakaway test carried out in trial pit
Trial pit backfilled on completion of test

Scale (approx)	Logged By	Figure No.
1:25	JC	9363-01-20.IF3

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

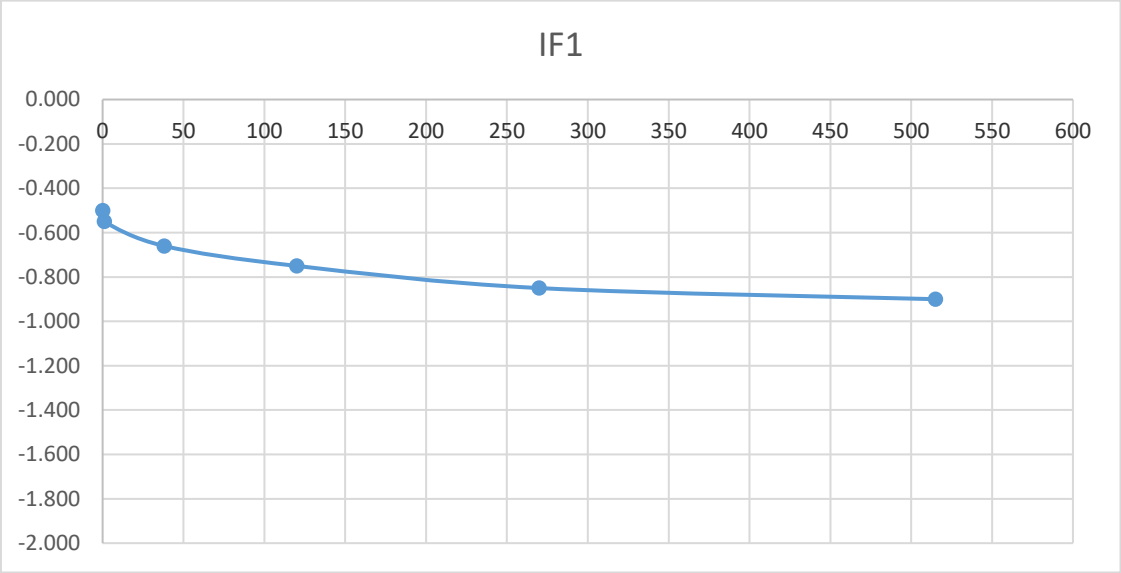
IF1

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.40m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.550
11/02/2020	38	-0.660
11/02/2020	120	-0.750
11/02/2020	270	-0.850
11/02/2020	515	-0.900

***Soakaway failed - Pit backfilled**

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	1.500	1.000	0.75	1.25



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Geotechnical & Environmental

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Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

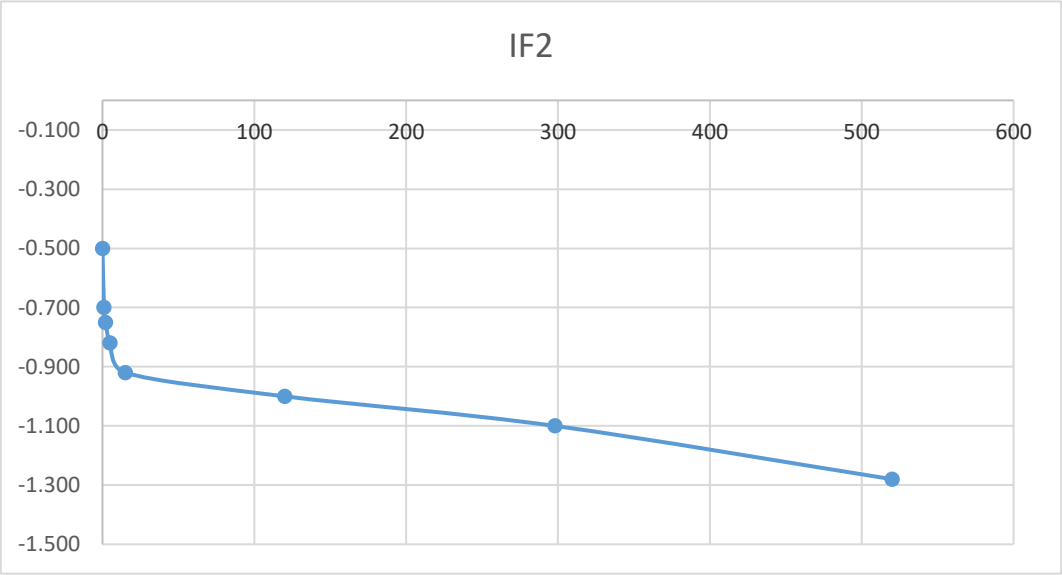
IF2

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.60m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.700
11/02/2020	2	-0.750
11/02/2020	5	-0.820
11/02/2020	15	-0.920
11/02/2020	120	-1.000
11/02/2020	298	-1.100
11/02/2020	520	-1.280

Start depth	Depth of Pit		Diff	75% full	25%full
0.50	**1.500**		**1.000**	**0.75**	**1.25**

Length of pit (m)	Width of pit (m)		75-25Ht (m)	Vp75-25 (m3)
1.600	0.350		0.500	0.28
Tp75-25 (from graph) (s)		**25080**	50% Eff Depth	ap50 (m2)
			0.500	2.51
f =	**4.448E-06**	**m/s**		



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Hazelhatch Road,
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Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

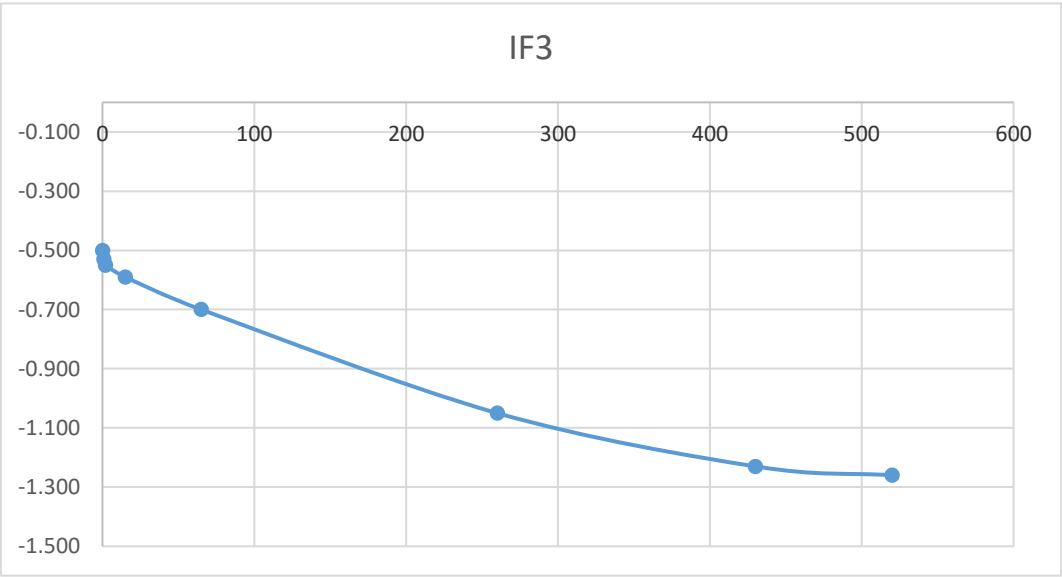
IF3

Soakaway Test to BRE Digest 365
Trial Pit Dimensions: 1.70m x 0.35m 1.50m (L x W x D)

Date	Time	Water level (m bgl)
11/02/2020	0	-0.500
11/02/2020	1	-0.530
11/02/2020	2	-0.550
11/02/2020	15	-0.590
11/02/2020	65	-0.700
11/02/2020	260	-1.050
11/02/2020	430	-1.230
11/02/2020	520	-1.260

Start depth	Depth of Pit		Diff	75% full	25%full
0.50	**1.500**		**1.000**	**0.75**	**1.25**

Length of pit (m)	Width of pit (m)		75-25Ht (m)	Vp75-25 (m3)
1.700	0.350		0.500	0.30
Tp75-25 (from graph) (s)		**22800**	50% Eff Depth	ap50 (m2)
			0.500	2.645
f =	**4.933E-06**	**m/s**		



Project Calvary – Soakaway Testing Photographs

IF1

IF1

Project Calvary – Soakaway Testing Photographs

IF1

IF1

Project Calvary – Soakaway Testing Photographs

IF1

Project Calvary – Soakaway Testing Photographs

IF2

IF2

Project Calvary – Soakaway Testing Photographs

IF2

IF2

Project Calvary – Soakaway Testing Photographs

IF2

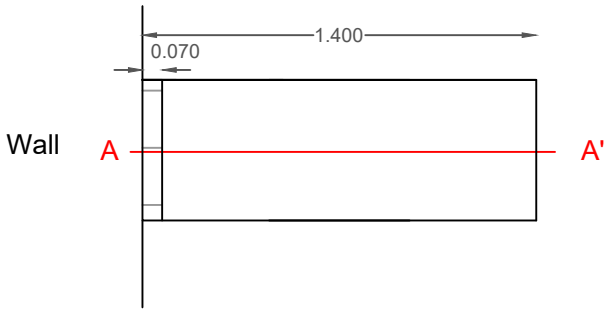
Project Calvary – Soakaway Testing Photographs

IF3

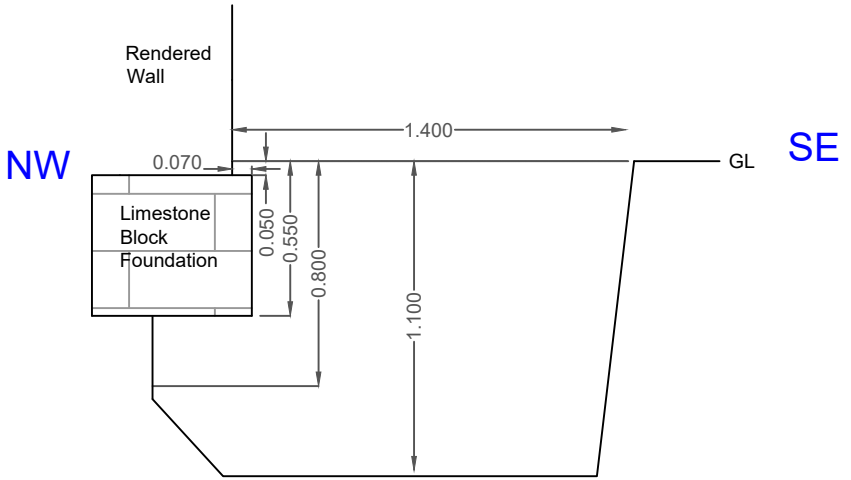
APPENDIX 4 – Foundation Pit Records

SL1

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.70	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.70	1.10	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles

DATE OF EXCAVATION : 13/02/20

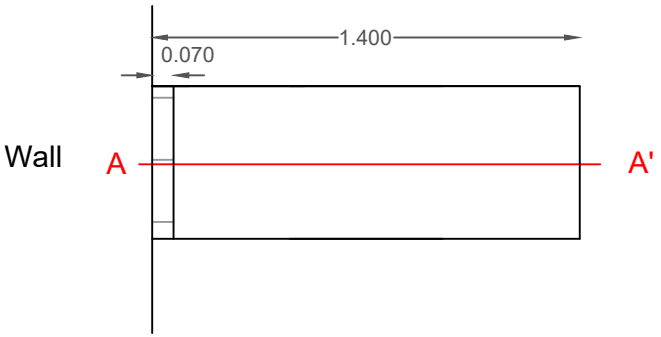
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL1
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

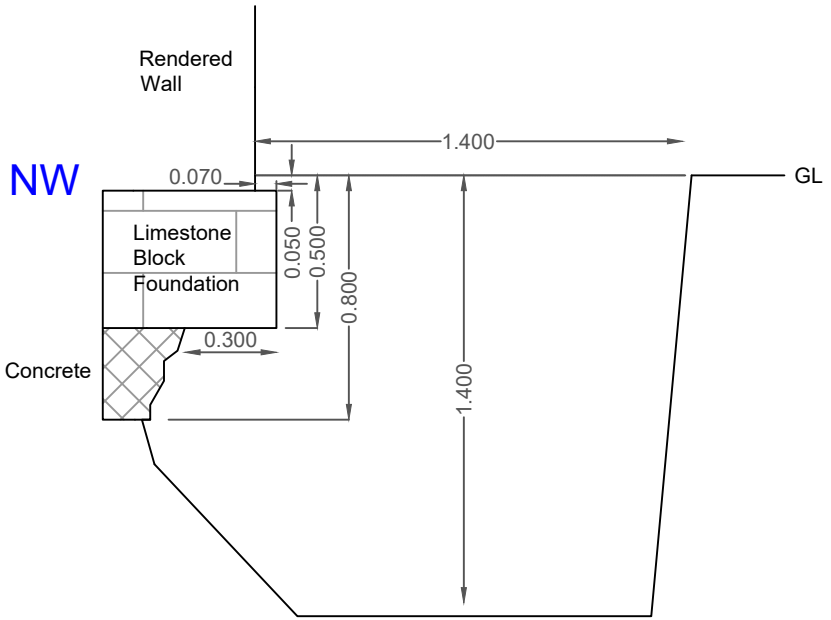
SL2

Plan View



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.80	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.80	1.40	Stiff brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles

X-Section A-A'



DATE OF EXCAVATION : 13/02/20

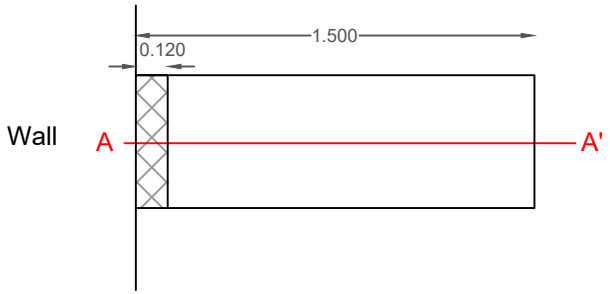
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL2
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

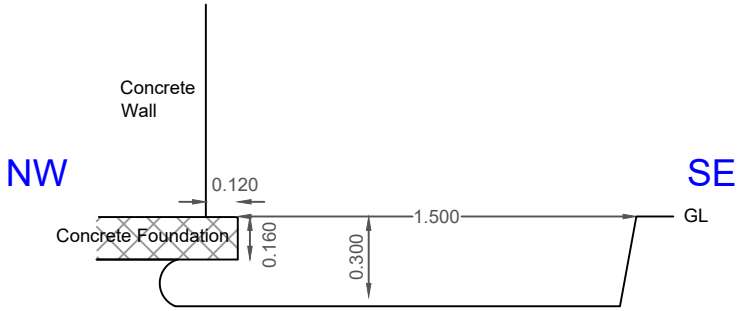
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL3

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.07	Tarmacadam
0.07	0.30	MADE GROUND: Grey slightly clayey sandy angular to subangular fine to coarse Gravel with pieces of concrete, brick, ceramic pipe and mortar

DATE OF EXCAVATION : 12/02/20

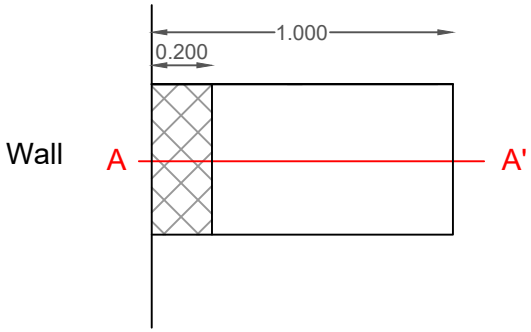
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL3
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

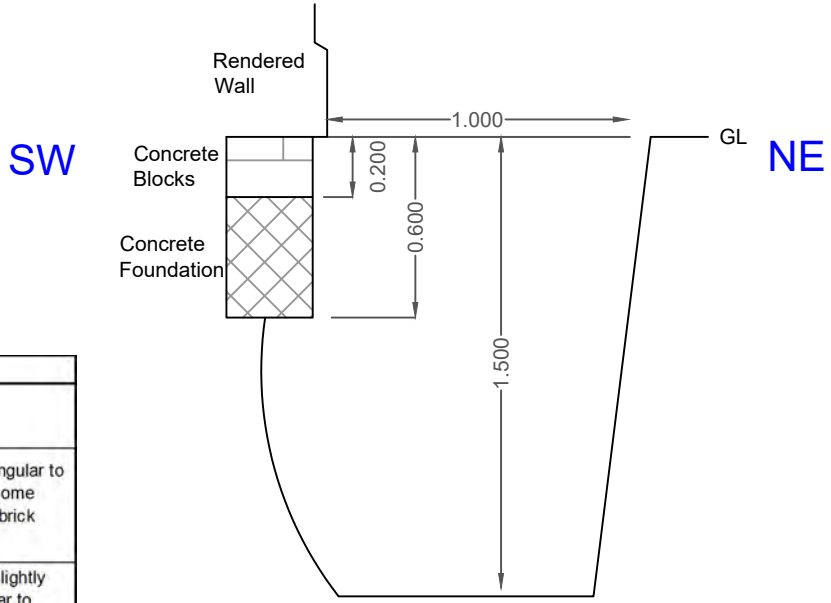
SL4

Plan View



From (m)	To (m)	Description
0.00	0.13	Tarmacadam
0.13	0.30	MADE GROUND: Grey clayey sandy subangular to subrounded fine to coarse Gravel with some subangular to subrounded cobbles and brick fragments
0.30	0.60	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick, concrete and roots
0.60	1.50	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

X-Section A-A'



Groundwater	Y/N	Depth
	Y	1.50

DATE OF EXCAVATION : 14/02/20

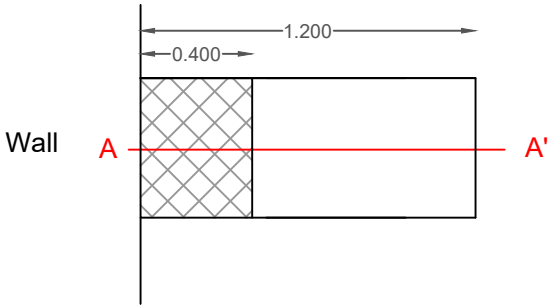
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL4
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

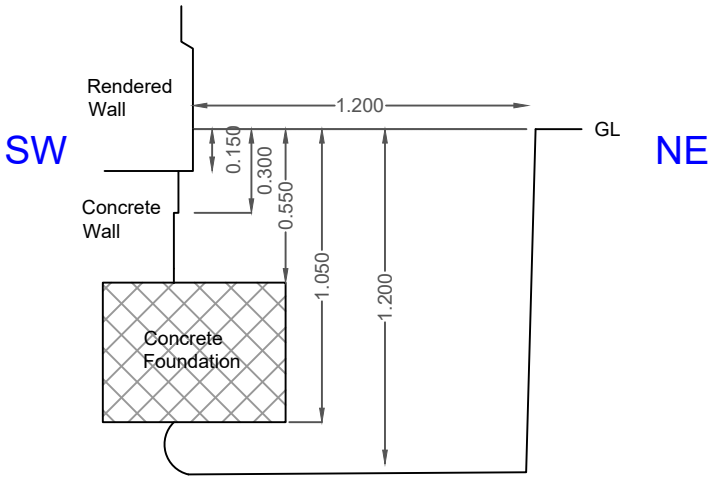
SL5

Plan View



From (m)	To (m)	Description
0.00	0.12	Concrete
0.15	1.05	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, concrete and shells
1.05	1.20	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

X-Section A-A'



DATE OF EXCAVATION : 13/02/20

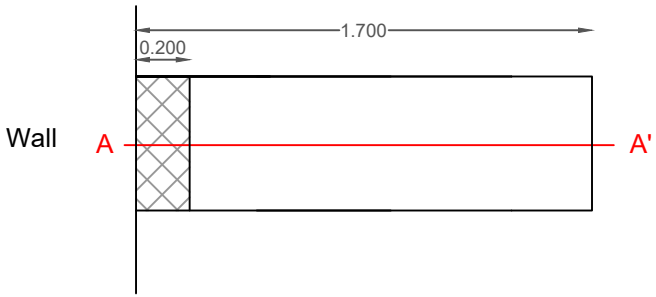
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL5
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

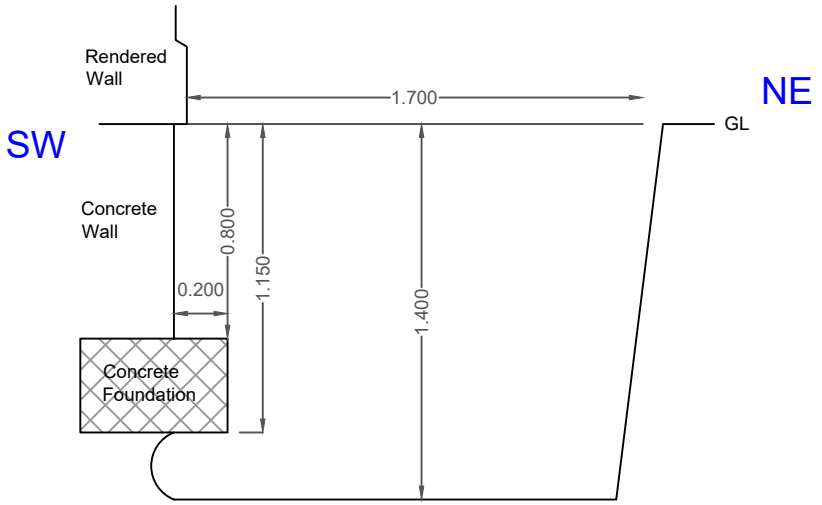
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL6

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	1.15	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick, ceramic and roots
1.15	1.40	Stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles

Groundwater	Y/N	Depth
	Y	1.40

DATE OF EXCAVATION : 13/02/20

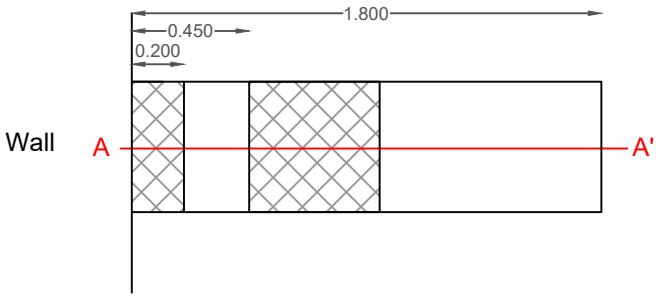
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL6
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

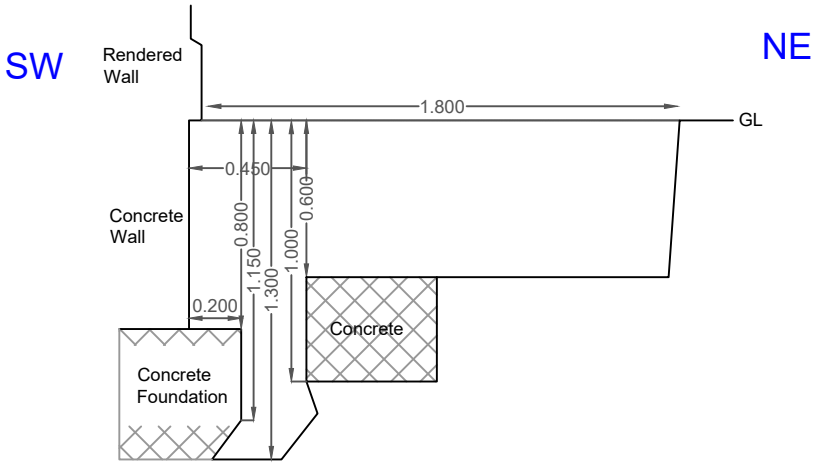
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL7

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.20	Concrete
0.20	0.80	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with some subangular to subrounded cobbles and pieces of brick, mortar, ceramic and concrete
0.80	1.30	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles

Groundwater	Y/N	Depth
	Y	1.15

DATE OF EXCAVATION : 12/02/20

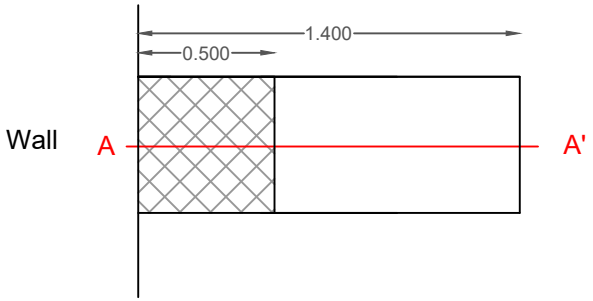
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL7
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

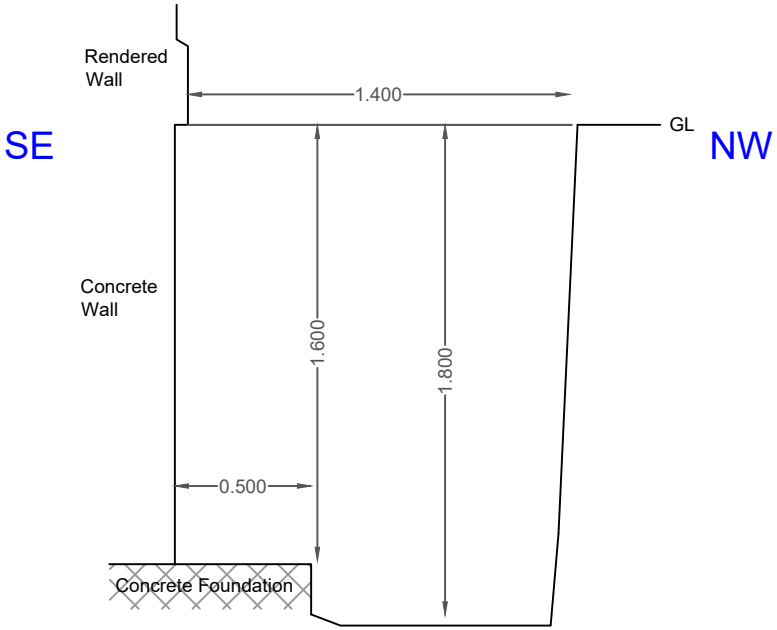
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL8

Plan View



X-Section A-A'



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	1.60	MADE GROUND: Brown/dark brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and pieces of brick and roots
1.60	1.80	Stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles

	Y/N	Depth
Groundwater	Y	1.60

DATE OF EXCAVATION : 13/02/20

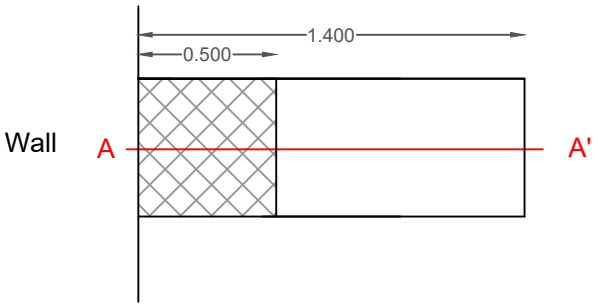
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL8
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

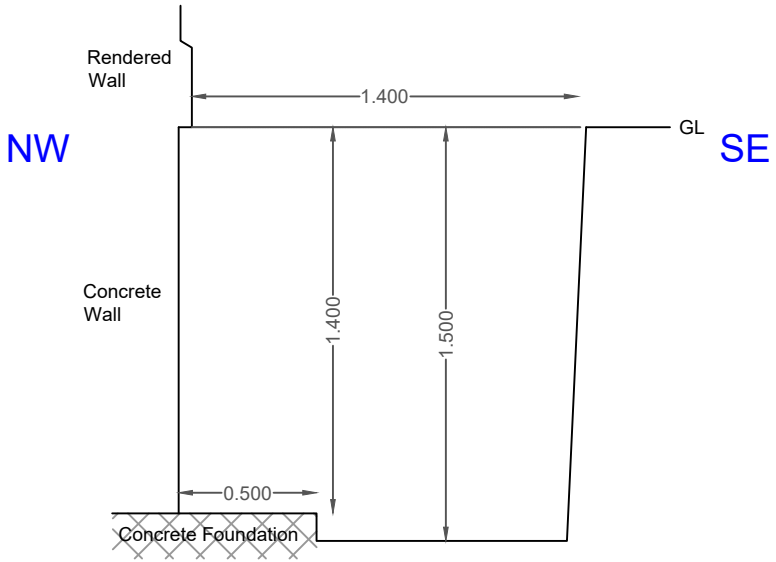
SL9

Plan View



From (m)	To (m)	Description
0.00	0.15	Concrete
0.15	0.60	MADE GROUND: Brown/grey slightly sandy gravelly Clay with many concrete blocks, bricks, mortar, glass and scrap metal
0.60	1.50	MADE GROUND: Brown slightly sandy gravelly Clay with occasional cobbles, bricks and mortar

X-Section A-A'



DATE OF EXCAVATION : 13/02/20

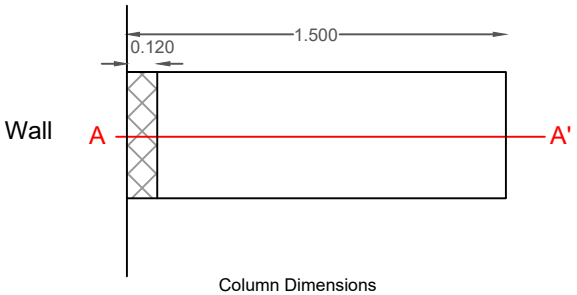
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL9
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

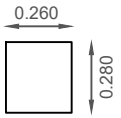
Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

SL10

Plan View

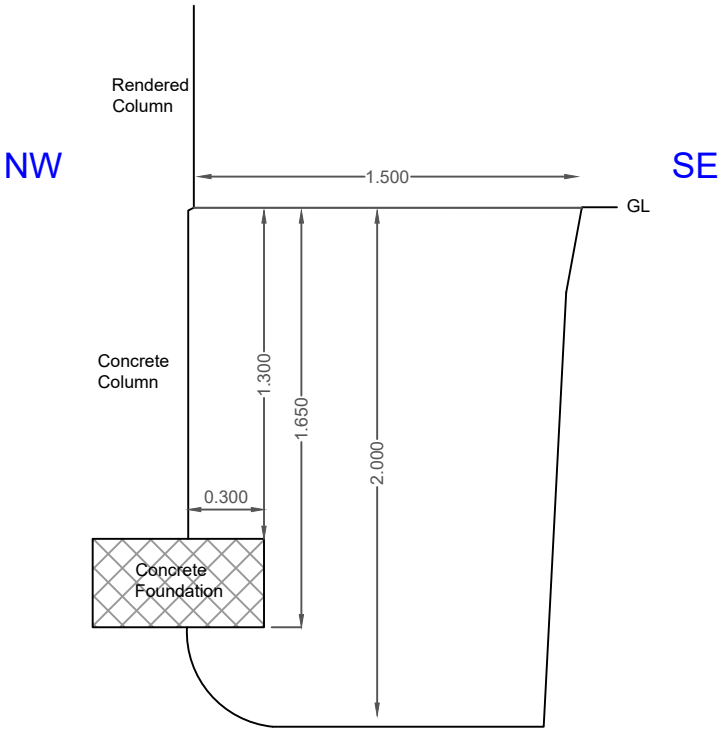


Column Dimensions
Inclusive of Rendering



From (m)	To (m)	Description
0.00	0.06	Concrete Tile
0.06	0.20	MADE GROUND: Grey/brown slightly gravelly fine to coarse Sand
0.20	1.30	MADE GROUND: Brown slightly sandy gravelly Clay with many pieces of brick, concrete, mortar, glass and scrap metal
1.30	2.00	Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles

X-Section A-A'



DATE OF EXCAVATION : 14/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Project Calvary
DRAWING No.:	9363-01-20 SL10
DATE:	February 2020
CLIENT:	Virtus Project Management
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	18/02/20	JC	SK

Project Calvary – Foundation Pit Photographs

SL1

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Project Calvary – Foundation Pit Photographs

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Project Calvary – Foundation Pit Photographs

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Project Calvary – Foundation Pit Photographs

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APPENDIX 5 – Borehole Records

Ground Investigations Ireland Ltd
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Site Project Calvary			**Borehole Number** BH01
Machine : Dando 2000 & Beretta T47S **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 6.60m 100mm cased to 17.00m	**Ground Level (mOD)** 6.91	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716308.4 E 736162 N	**Dates** 26/02/2020-24/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					6.61	(0.30) 0.30	MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL			
							MADE GROUND: Brown mottled grey slightly sandy slightly gravelly Clay with rare brick and timber fragments			
1.00	B					(1.70)				
1.20-1.65	SPT(C) N=5			1,1/1,1,1,2						
2.00	B				4.91	2.00				
2.00-2.45	SPT(C) N=32			4,5/7,8,8,9	4.71	(0.20) 2.20	Stiff brown slightly sandy gravelly CLAY			
							Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
3.00	B									
3.00-3.45	SPT(C) N=49			8/8,13,13,15						
4.00	B									
4.00-4.16	SPT(C) 25*/80 50/80			23,2/50		(4.40)				
5.00	B									
5.00-5.06	SPT(C) 25*/30 50/30			25/50						
6.00	B									
6.00-6.06	SPT(C) 25*/30 50/30			25/50						
	TCR	**SCR**	**RQD**	**FI**						
6.60					0.31	6.60	Poor recovery - recovery consists of dark grey slightly sandy gravelly Clay with cobble fragments. Drillers notes: black gravelly Clay (Very stiff)			
	31					(1.10)				
8.00-8.18				8,17/50 SPT(C) 25*/120 50/60	-0.79	7.70	Poor recovery - recovery consists of grey subangular to angular Gravel with cobble fragments. Drillers notes: Black gravelly boulder Clay (Very stiff)			
8.00					-1.29	(0.50) 8.20				
	63						Very stiff light grey slightly sandy gravelly CLAY with cobble fragments			
9.50-9.66				16,21/50 SPT(C) 37*/120 50/40						
9.50										

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 17.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a flush cover.
Chiselling from 6.60m to 6.60m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH01

Ground Investigations Ireland Ltd
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Site Project Calvary			**Borehole Number** BH01
Machine : Dando 2000 & Beretta T47S **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 6.60m 100mm cased to 17.00m **Location** (dGPS) 716308.4 E 736162 N	**Ground Level (mOD)** 6.91 **Dates** 26/02/2020-24/03/2020	**Client** Virtus Project Management **Engineer** Barrett Mahony Consulting Engineers	**Job Number** 9363-01-20 **Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	83				19,6/50 SPT(C) 25*/100 50/100		(4.30)				
11.00-11.20 11.00	80				25/50 SPT(C) 25*/50 50/0						
12.50-12.55 12.50	100					-5.59	12.50	Very stiff dark grey slightly sandy gravelly CLAY with cobble fragments			
13.90 14.00	100	76	69	9			(1.50)				
14.90				7		-7.09	14.00	Medium strong fine to medium grained thinly laminated grey LIMESTONE partially weathered with Clay smearing Sequence contains two sets of fractures, F1 are very closely to closely spaced, dipping 0 - 20 degrees, planar to undulose rough, F2 are closely to medium spaced, dipping 30 - 50 degrees, rough planar			
15.50							(0.80)				
16.00	100	75	62	15		-7.89	14.80	Strong fine to medium grained thinly laminated grey LIMESTONE unweathered to partially weathered interbedded with weak fine grained thinly laminated dark grey MUDSTONE partially weathered Sequence contains two sets of fractures, F1 are very closely to closely spaced, dipping 0 - 20 degrees, planar to undulose rough, F2 are closely to medium spaced, dipping 30 - 50 degrees, rough planar			
17.00							(2.20)				
						-10.09	17.00	Complete at 17.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH01

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Site Project Calvary			**Borehole Number** BH02
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 5.70m	**Ground Level (mOD)** 8.81	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716330.7 E 736225.9 N	**Dates** 27/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					8.61	(0.20) 0.20	Possible MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL		
						(0.80)	Possible MADE GROUND: Brown slightly sandy slightly gravelly CLAY		
1.00	B				7.81	1.00	Soft to firm brown slightly sandy slightly gravelly CLAY		
1.20-1.65	SPT(C) N=8			3,3/4,1,2,1		(0.80)			
2.00-2.45	SPT(C) N=26			4,6/6,6,7,7	7.01	1.80	Stiff brown slightly sandy gravelly CLAY		
2.00	B					(1.30)			
3.00	B			Water strike(1) at 3.00m, rose to 1.70m in 20 mins.	5.71	3.10	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
3.00-3.41	SPT(C) 50/260			3,5/11,13,13,13					
4.00-4.06	SPT(C) 25*/30 50/30			25/50					
4.00	B					(2.60)			
5.00-5.06	SPT(C) 25*/30 50/30			25/50					
5.00	B				3.11	5.70	Complete at 5.70m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 3.00m BGL; rose to 1.70m BGL after 20 mins
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH02

Ground Investigations Ireland Ltd
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Site Project Calvary			**Borehole Number** BH03
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.30m	**Ground Level (mOD)** 8.01	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716382.5 E 736228.2 N	**Dates** 25/02/2020-26/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	MADE GROUND: Grey sandy angular fine to coarse Gravel (Crushed Rock Fill)		
					7.41	0.60	MADE GROUND: Brown slightly sandy slightly gravelly Clay with fragments of brick		
1.00	B					(1.00)			
1.20-1.65	SPT(C) N=4			0,2/1,1,1,1					
					6.41	1.60	Soft brown slightly sandy gravelly CLAY		
						(0.40)			
2.00-2.45	SPT(C) N=20			2,4/5,5,5,5	6.01	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B					(0.80)			
					5.21	2.80	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
3.00-3.45	SPT(C) N=36			5,9/9,9,8,10					
3.00	B								
4.00-4.14	SPT(C) 25*/90 50/50			21,4/50					
4.00	B					(3.50)			
5.00-5.16	SPT(C) 25*/80 50/80			22,3/50					
5.00	B								
6.00-6.07	SPT(C) 25*/30 50/40			25/50					
6.00	B				1.71	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.30m to 6.30m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH03

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Site Project Calvary			**Borehole Number** BH04
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.80m	**Ground Level (mOD)** 7.74	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716435.4 E 736195.1 N	**Dates** 24/02/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly TOPSOIL		
					7.34	0.40	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with fragments of brick, glass and mortar		
						(0.60)			
1.00	B				6.74	1.00	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with fragments of brick		
1.20-1.65	SPT(C) N=6			2,3/1,2,1,2		(0.70)			
					6.04	1.70	Soft brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
						(0.30)			
2.00-2.45	SPT(C) N=10			1,1/3,2,2,3	5.74	2.00	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B								
						(1.00)			
3.00-3.45	SPT(C) N=30			5,6/8,7,8,7	4.74	3.00	Very stiff brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
3.00	B					(0.50)			
					4.24	3.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00-4.45	SPT(C) N=48			9,9/11,14,11,12					1
4.00	B								
5.00-5.34	SPT(C) 50/190			14,16/18,19,13		(3.30)			
5.00	B								1
				Water strike(1) at 5.50m, rose to 4.30m in 20 mins.					
6.00-6.20	SPT(C) 25*/120 50/80			16,9/50					
6.00	B								
6.80-6.80	SPT(C) 25*/0 50/0			25/50	0.94	6.80	Complete at 6.80m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 5.50m BGL; rose to 4.30m BGL after 20 mins
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH04

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m	**Ground Level (mOD)** 6.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716450.7 E 736271.4 N	**Dates** 25/02/2020-25/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.40)	Brown slightly sandy slightly gravelly TOPSOIL			
					6.25	0.40	MADE GROUND: Brown/grey slightly sandy slightly gravelly Clay with timber, red brick and shell fragments			
						(1.00)				
1.00	B									
1.20-1.65	SPT(C) N=5			1,1/2,1,1,1	5.25	1.40	Soft brown slightly sandy gravelly CLAY			
2.00	B					(1.10)				
2.00-2.45	SPT(C) N=4			2,2/1,1,1,1						
					4.15	2.50	Soft greyish brown slightly sandy gravelly CLAY			
						(0.50)				
3.00	B				3.65	3.00				
3.00-3.45	SPT(C) N=33			2,7/7,13,7,6	3.45	(0.20) 3.20	Stiff greyish brown slightly sandy gravelly CLAY			
							Very stiff dark grey slightly sandy gravelly CLAY with occasional cobbles			
4.00	B									
4.00-4.45	SPT(C) N=47			3,7/9,13,13,12						
5.00	B									
5.00-5.39	SPT(C) 50/235			6,9/11,17,16,6		(4.00)				
6.00	B									
6.00-6.31	SPT(C) 50/160			12,19/20,25,5						
7.00	B 50/0									
7.00-7.06	SPT(C) 25*/60			25/50						
	TCR / **SCR**	**RQD**	**FI**		-0.55	7.20	Poor recovery - recovery consists of grey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Black gravelly sandy Clay (Very stiff)			
7.20	25					(0.80)				
8.00-8.42				12,13/12,13,15,10 SPT(C) 50/270						
8.00					-1.35	8.00	Dense grey gravelly fine to coarse Sand. Drillers notes: Grey gravelly Sand with cobbles			
	66					(1.50)				
9.50-9.91				10,10/14,13,14,9 SPT(C) 50/260						
9.50					-2.85	9.50	Poor recovery - recovery consists of grey clayey sandy subangular fine to coarse Gravel. Drillers notes: Grey silty Sand with cobbles (Dense)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater enountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 21.00m to 1.00m BGL. 50mm plain standpipe with a bentonite seal installed from 1.00m BGL to GL, with a raised cover.
Chiselling from 7.20m to 7.20m for 1 hour.

Scale (approx)	**Logged By**
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Flush :** Water **Core Dia:** 63 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m **Location** (dGPS) 716450.7 E 736271.4 N	**Ground Level (mOD)** 6.65 **Dates** 25/02/2020-25/03/2020	**Client** Virtus Project Management **Engineer** Barrett Mahony Consulting Engineers	**Job Number** 9363-01-20 **Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	40						(1.15)				
						-4.00	10.65 (0.20)	Very stiff grey slightly sandy gravelly CLAY			
11.00-11.38 11.00					14,11/17,15,15,3 SPT(C) 25*/120 50/260	-4.20	10.85	Poor recovery - recovery consists of grey slightly clayey slightly sandy subangular fine to coarse Gravel. Drillers notes: Grey gravelly Sand with cobbles (Dense)			
	47										
12.50-12.73 12.50					15,10/22,19,9 SPT(C) 25*/100 50/130		(3.15)				
	73										
14.00-14.20 14.00					16,9/50 SPT(C) 25*/100 50/100	-7.35	14.00	Very stiff light grey slightly sandy gravelly CLAY with occasional cobble fragments			
	70										
15.50-15.68 15.50					21,4/50 SPT(C) 25*/90 50/90		(3.00)				
	99										
17.00-17.05 17.00					25/50 SPT(C) 25*/20 50/30	-10.35	17.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional cobble fragments			
	100						(2.50)				
18.50											
	100	22	13			-12.85	19.50	Weak fine grained thinly laminated dark grey MUDSTONE partially weathered interbedded with weak to medium strong grey fine to medium grained thinly laminated LIMESTONE partially			
19.50 20.00											

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH05
Machine : Dando 2000 & Beretta T44 **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.20m 100mm cased to 21.00m	**Ground Level (mOD)** 6.65	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location (dGPS) 716450.7 E 736271.4 N	**Dates** 25/02/2020-25/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	100	93	79	12			(1.50)	weathered with Clay smearing Sequence contains three sets of fractures, F1 are very closely to closely spaced, dipping 0 - 25 degrees, rough to smooth planar, F2 are closely to medium spaced, dipping 35 - 50 degrees, smooth planar, F3 are closely spaced, dipping 80 - 90 degrees, rough planar			
21.00						-14.35	21.00	Complete at 21.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH05

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Site Project Calvary			**Borehole Number** BH06
Machine : Dando 2000 & Beretta T47S **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm to 6.00m 100mm to 15.00m	**Ground Level (mOD)** 8.45	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716412.6 E 736350.4 N	**Dates** 02/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	Casing Depth (m)	Water Depth (m)	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
									8.15	(0.30) 0.30	Brown slightly sandy slightly gravelly TOPSOIL MADE GROUND: Brown mottled grey slightly sandy slightly gravelly Clay with rare brick and timber fragments			
1.00 1.20-1.65	B SPT(C) N=6							2,2/1,2,1,2	6.95	(1.20) 1.50	Soft to firm brown slightly sandy gravelly CLAY		▼1	
2.00 2.00-2.45	B SPT(C) N=10							1,2/2,4,2,2	6.45	(0.50) 2.00	Firm brown slightly sandy gravelly CLAY		▽1	
3.00 3.00-3.45	B SPT(C) N=25							Water strike(1) at 2.50m, rose to 1.20m in 20 mins, sealed at 3.00m. 5,6/5,6,7,7	5.45	(1.00) 3.00	Stiff brown slightly sandy gravelly CLAY			
4.00 4.00-4.34	B SPT(C) 50/190							9,9/10,17,23	4.95 4.45	(0.50) 3.50 (0.50) 4.00	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
5.00 5.00-5.07	B SPT(C) 25*/70 50/0							25/50		(2.00)				
6.00 6.00-6.06	B SPT(C) 25*/60 50/0							25/50	2.45	6.00	Driller notes dark grey slightly sandy gravelly CLAY with cobbles (Very Stiff)			
6.00		75							1.95	(0.50) 6.50	Driller notes dark grey cobbles with Sands over gravelly silty Clay			
6.50		50								(1.50)				
8.00-8.20 8.00	SPT(C) 25*/100 50/100							21,4/50	0.45	8.00	Driller notes grey silty GRAVEL with cobbles (Dense)			
		55								(1.50)				
9.50-9.76 9.50	SPT(C) 50/110							12,12/15,35	-1.05	9.50	Driller notes dark grey silty sandy gravelly CLAY with cobbles (Very Stiff)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 2.50m BGL
50mm slotted standpipe with a pea gravel surround installed from 15.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a flush cover.
Original core lost on site due to vandalism, only drillers notes to reference
Chiselling from 6.00m to 6.00m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH06

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Site Project Calvary			**Borehole Number** BH06
Machine : Dando 2000 & Beretta T47S **Flush :** Water **Core Dia :** 63 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm to 6.00m 100mm to 15.00m	**Ground Level (mOD)** 8.45	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716412.6 E 736350.4 N	**Dates** 02/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	25				25/50 SPT(C)		(1.50)				
11.00-11.12 11.00						-2.55	11.00	Driller notes dark grey sandy gravelly CLAY with cobbles (Very Stiff)			
	85				19,6/50 SPT(C) 25*/100 50/50		(1.50)				
12.50-12.65 12.50						-4.05	12.50	Driller notes large Gravel with cobbles (Dense)			
	40				21,4/50 SPT(C) 25*/100 50/60		(1.50)				
14.00-14.16 14.00						-5.55	14.00	Driller notes Gravel (Dense)			
	20						(1.00)				
15.00						-6.55	15.00	Complete at 15.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH06

Ground Investigations Ireland Ltd
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Site Project Calvary			**Borehole Number** BH07
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.10m	**Ground Level (mOD)** 10.63	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716293.6 E 736254.3 N	**Dates** 05/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Grey fine to coarse angular to subangular crushed rock FILL		
					10.23	0.40	MADE GROUND: Brown slightly sandy slightly gravelly silty Clay with rare brick and plastic fragments		
1.00	B					(1.40)			
1.20-1.65	SPT(C) N=3			0,0/1,0,1,1					
					8.83	1.80	Possible MADE GROUND: Very soft brown slightly sandy gravelly CLAY		
2.00-2.45 2.00	SPT(C) N=2 B			1,1/0,0,1,1		(1.20)			
3.00-3.45 3.00	SPT(C) N=10 B			3,3/3,3,2,2	7.63	3.00	Firm brown slightly sandy gravelly CLAY		
						(0.40)			
					7.23	3.40	Firm dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.60)			
4.00-4.45 4.00	SPT(C) N=46 B			8,11/11,11,12,12	6.63	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06 5.00	SPT(C) 25*/60 50/0 B			25/50		(2.10)			
6.00-6.06 6.00	SPT(C) 25*/60 50/0 B			25/50	4.53	6.10	Complete at 6.10m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.10m to 6.10m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH06

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Site Project Calvary			**Borehole Number** BH08
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.40m	**Ground Level (mOD)** 10.93	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716296.8 E 736290.5 N	**Dates** 04/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Brown slightly gravelly TOPSOIL		
					10.53	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and plastic fragments		
1.00	B					(1.50)			
1.20-1.65	SPT(C) N=8			2,3/2,2,3,1					
					9.03	1.90	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45 2.00	SPT(C) N=24 B			4,5/6,6,6,6					
						(1.40)			
3.00-3.45 3.00	SPT(C) N=29 B			5,5/6,7,8,8					
					7.63	3.30	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.70)			
4.00-4.05 4.00	SPT(C) 25*/50 50/0 B			25/50	6.93	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06 5.00	SPT(C) 25*/60 50/0 B			25/50		(2.40)			
6.00-6.06 6.00	SPT(C) 25*/60 50/0 B			25/50					
					4.53	6.40	Complete at 6.40m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.40m to 6.40m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH08

Ground Investigations Ireland Ltd
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Site Project Calvary			**Borehole Number** BH09
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.30m	**Ground Level (mOD)** 9.93	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716337 E 736281.9 N	**Dates** 04/03/2020-05/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.40)	Brown slightly gravelly TOPSOIL		
					9.53	0.40	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and plastic fragments		
1.00	B								
1.20-1.65	SPT(C) N=6			1,1/1,2,1,2		(1.60)			
2.00-2.45	SPT(C) N=23			4,4/6,5,6,6	7.93	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B								
						(1.60)			
3.00-3.45	SPT(C) N=24			3,3/4,6,6,8					
3.00	B								
					6.33	3.60	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.40)			
4.00-4.27	SPT(C) 50/115			16,17/24,26	5.93	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00	B								
5.00-5.07	SPT(C) 25*/70 50/0			25/50		(2.30)			
5.00	B								
6.00-6.07	SPT(C) 25*/70 50/0			25/50					
6.00	B				3.63	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.30m to 6.30m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH09

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Site Project Calvary			**Borehole Number** BH10
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.30m	**Ground Level (mOD)** 8.43	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716384 E 736304.6 N	**Dates** 02/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					8.23	(0.20) 0.20	Brown slightly gravelly TOPSOIL		
							MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick and timber fragments		
1.00	B					(1.10)			
1.20-1.65	SPT(C) N=4			1,0/1,1,1,1	7.13	1.30			
					6.93	(0.20) 1.50	MADE GROUND: Old Topsoil: Brown slightly gravelly Clay		▼*
						(0.50)	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
2.00	B			Water strike(1) at 2.00m, rose to 1.50m in 20 mins, sealed at 3.00m.	6.43	2.00	Soft to firm brown slightly sandy gravelly CLAY		▽1
2.00-2.45	SPT(C) N=7			1,1/1,4,1,1		(1.00)			
3.00-3.45	SPT(C) N=11			1,2/3,3,2,3	5.43	3.00	Firm brown slightly sandy gravelly CLAY		
3.00	B					(1.00)			▽2
4.00	B			Water strike(2) at 3.70m, rose to 1.50m in 20 mins, sealed at 4.50m.	4.43	4.00	Very stiff brown slightly sandy gravelly CLAY		
4.00-4.45	SPT(C) N=48			7,11/11,12,12,13		(0.50)			
					3.93	4.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.07	SPT(C) 25*/70 50/0			25/50					
5.00	B					(1.80)			
6.00-6.07	SPT(C) 25*/70 50/0			25/50					
6.00	B				2.13	6.30	Complete at 6.30m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 2.00m BGL and 3.70m BGL
Chiselling from 6.30m to 6.30m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH10

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Site Project Calvary			**Borehole Number** BH11
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.60m	**Ground Level (mOD)** 9.15	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716362.9 E 736359.3 N	**Dates** 03/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.90)	Brown slightly gravelly TOPSOIL		
					8.25	0.90			
1.00	B					(0.30)	MADE GROUND: Brown slightly sandy slightly gravelly organic Clay with rare brick fragments		
1.20-1.65	SPT(C) N=12			1,1/3,3,3,3	7.95	1.20	Possible MADE GROUND: Brown slightly sandy slightly gravelly Clay		
						(0.80)			
2.00-2.45	SPT(C) N=7			2,1/3,1,1,2	7.15	2.00	Soft to firm brown slightly sandy gravelly CLAY		
2.00	B					(1.30)			
3.00-3.45	SPT(C) N=23			1,2/3,5,7,8					
3.00	B				5.85	3.30	Stiff brown slightly sandy gravelly CLAY		
						(0.40)			
					5.45	3.70	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00-4.14	SPT(C) 25*/135 50/0			25/50					
4.00	B								
5.00-5.07	SPT(C) 25*/70 50/0			25/50		(2.90)			
5.00	B								
6.00-6.05	SPT(C) 25*/50 50/0			25/50					
6.00	B								
					2.55	6.60	Complete at 6.60m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.60m to 6.60m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH11

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Site Project Calvary			**Borehole Number** BH12
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 5.80m	**Ground Level (mOD)** 9.70	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716331.9 E 736385.6 N	**Dates** 12/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.20)	MADE GROUND: Grey/brown fine to coarse angular to subangular crushed rock FILL with red brick fragments		
1.00	B				8.50	1.20			
1.20-1.65	SPT(C) N=17			3,7/7,5,3,2		(0.40)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with some red brick fragments		
					8.10	1.60	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=22			5,5/5,4,7,6		(1.20)			
2.00	B				6.90	2.80	Very stiff greyish brown slightly sandy gravelly CLAY		
3.00-3.45	SPT(C) N=48			6,11/11,10,16,11		(1.50)			
3.00	B								
4.00-4.14	SPT(C) 23*/135 50/0			23/50					
4.00	B				5.40	4.30	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06	SPT(C) 25*/60 50/0			25/50		(1.50)			
5.00	B								
					3.90	5.80	Complete at 5.80m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 5.80m to 5.80m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH12

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Site	Borehole Number
Project Calvary	BH13

Machine : Dando 2000 Method :	Casing Diameter 200mm to 6.90m	Ground Level (mOD) 9.27	Client Virtus Project Management	Job Number 9363-01-20
	Location 716245.7 E 736438.4 N	Dates 10/03/2020-11/03/2020	Engineer Barrett Mahony Consulting Engineers	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	Brown slightly gravelly TOPSOIL		
					8.67	0.60	MADE GROUND: Orangish brown slightly sandy slightly gravelly organic Clay with rare brick fragments		
1.00	B								
1.20-1.65	SPT(C) N=10			1,2/3,2,3,2		(1.40)			
2.00-2.45	SPT(C) N=23			3,3/5,5,6,7	7.27	2.00	Stiff brown slightly sandy gravelly CLAY		
2.00	B								
3.00-3.45	SPT(C) N=24			5,5/5,5,6,8		(2.00)			
3.00	B								
4.00-4.45	SPT(C) N=39			6,6/8,10,8,13	5.27	4.00	Very stiff brown slightly sandy gravelly CLAY		
4.00	B					(0.50)			
					4.77	4.50	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
5.00-5.06	SPT(C) 25*/60 50/0			25/50					
5.00	B					(2.20)			
6.00-6.06	SPT(C) 25*/60 50/0			25/50					
6.00	B								
					2.57	6.70 (0.20)	OBSTRUCTION: Large boulder or bedrock		
					2.37	6.90	Complete at 6.90m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.70m to 6.90m for 1.5 hours.

Scale (approx)	Logged By
1:50	

Figure No.
9363-01-20.BH13

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Site Project Calvary			**Borehole Number** BH14
Machine : Dando 2000 & Beretta T44 **Method :** Cable percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 5.70m 100mm cased to 15.00m	**Ground Level (mOD)** 13.98	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716194.1 E 736409.9 N	**Dates** 11/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							13.88	0.10	Tarmacadam			
							13.78	0.20	FILL: Grey fine to coarse angular to subangular crushed rock Fill			
								(1.00)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick fragments			
1.00	B						12.78	1.20	Firm brown slightly sandy gravelly CLAY			
1.20-1.65	SPT(C) N=9					2,2/1,2,4,2						
2.00	B											
2.00-2.45	SPT(C) N=10					2,3/2,2,3,3		(1.80)				
3.00	B						10.98	3.00				
3.00-3.45	SPT(C) N=34					5,3/3,9,11,11		(0.30)	Very stiff brown slightly sandy gravelly CLAY			
							10.68	3.30	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
4.00	B											
4.00-4.29	SPT(C) 50/135					14,15/12,38						
								(2.40)				
5.00	B											
5.00-5.07	SPT(C) 25*/70 50/0					25/50						
		TCR	SCR	RQD	FI		8.28	5.70				
5.70									Poor recovery - recovery consists of light grey slightly sandy gravelly Clay. Drillers notes: Gray Sand (Medium dense)			
		43						(0.60)				
6.50-6.95						6,8/7,7,8,8 SPT(C) N=30	7.68	6.30				
6.50									Poor recovery - recovery consists of grey slightly clayey subrounded to subangular fine to coarse Gravel with cobble fragments. Drillers notes: Black boulder Clay (Very stiff)			
		10										
								(2.70)				
8.00-8.29						9,16/25,25 SPT(C) 50/140						
8.00												
		50					4.98	9.00	Very stiff light grey slightly sandy gravelly CLAY			
								(0.50)				
9.50-9.65						10,15/50 SPT(C) 25*/120 50/30	4.48	9.50				
9.50									Poor recovery - recovery consists of grey slightly clayey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Brown gravelly Clay (Very stiff)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered during cable percussion drilling
50mm slotted standpipe with a pea gravel surround installed from 15.00m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a raised cover.
Chiselling from 5.70m to 5.70m for 1 hour.

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH14

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Site Project Calvary			**Borehole Number** BH14
Machine : Dando 2000 & Beretta T44 **Flush :** Water **Core Dia :** 63 mm **Method :** Cable percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 5.70m 100mm cased to 15.00m	**Ground Level (mOD)** 13.98	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716194.1 E 736409.9 N	**Dates** 11/03/2020-27/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	39				19,6/50 SPT(C) 25*/100 50/40		(1.50)				
11.00-11.14 11.00						2.98	11.00	Very stiff grey slightly sandy gravelly CLAY			
	100						(1.50)				
12.50-12.64 12.50					/ SPT(C) 0*/100 0/40	1.48	12.50	Very stiff dark grey slightly sandy gravelly CLAY			
							(0.35)				
	66					1.13	12.85	Grey subrounded to angular fine to coarse Gravel. Drillers notes: Black boulder Clay (Very stiff)			
							(0.75)				
14.00-14.23 14.00					19,6/50 SPT(C) 50/75	0.38	13.60	Very stiff dark grey slightly sandy gravelly CLAY with cobble fragments			
	70						(1.05)				
						-0.67	14.65	Grey subrounded to angular fine to coarse Gravel. Drillers notes: Black gravelly boulder Clay (Very stiff)			
							(0.35)				
15.00						-1.02	15.00	Complete at 15.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 9363-01-20.BH14

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Site Project Calvary			**Borehole Number** BH15
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.10m	**Ground Level (mOD)** 7.67	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716214.8 E 736484.6 N	**Dates** 07/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly gravelly TOPSOIL		
					7.37	0.30	MADE GROUND: Brown slightly sandy slightly gravelly organic Clay with some red brick and ceramic fragments		
						(1.20)			
1.00	B								
1.20-1.65	SPT(C) N=8			0,1/2,2,2,2					
					6.17	1.50	Firm brown slightly sandy gravelly CLAY		
						(0.50)			
2.00-2.45	SPT(C) N=14			2,2/3,4,4,3	5.67	2.00	Firm to stiff brown slightly sandy gravelly CLAY		
2.00	B								
						(1.20)			
3.00-3.45	SPT(C) N=26			3,4/6,6,7,7					
3.00	B				4.47	3.20	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
						(0.80)			
4.00-4.06	SPT(C) 25*/60 50/0			25/50	3.67	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		
4.00	B								
5.00-5.06	SPT(C) 25*/60 50/0			25/50		(2.10)			
5.00	B								
6.00-6.07	SPT(C) 25*/70 50/0			25/50	1.57	6.10	Complete at 6.10m		
6.00	B								

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
Chiselling from 6.10m to 6.10m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH15

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Site Project Calvary			**Borehole Number** BH16
Machine : Dando 2000 **Method :**	**Casing Diameter** 200mm to 6.50m	**Ground Level (mOD)** 9.11	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716155.8 E 736517.4 N	**Dates** 09/03/2020-10/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.30)	Brown slightly gravelly TOPSOIL		
					8.81	0.30	MADE GROUND: Brown slightly sandy slightly gravelly Clay with rare brick fragments and some cobbles		
1.00	B					(1.60)			
1.20-1.65	SPT(C) N=4			4,1/1,1,1,1					
					7.21	1.90	Stiff brown slightly sandy gravelly CLAY		
2.00-2.45	SPT(C) N=24			3,4/5,5,6,8					
2.00	B					(1.20)			
3.00-3.45	SPT(C) N=28			3,2/2,8,9,9	6.01	3.10	Stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▼1
3.00	B					(0.90)			
4.00	B			Water strike(1) at 4.00m, rose to 3.20m in 20 mins, sealed at 4.50m.	5.11	4.00	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles		▽1
4.00-4.40	SPT(C) 50/245			6,9/12,15,15,8					
5.00-5.28	SPT(C) 50/125			17,20/26,24					
5.00	B					(2.50)			
6.00-6.07	SPT(C) 25*/70 50/0			25/50					
6.00	B				2.61	6.50	Complete at 6.50m		

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
Groundwater encountered at 4.00m BGL
Chiselling from 6.50m to 6.50m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-20.BH16

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Site Project Calvary			**Borehole Number** BH17
Machine : Dando 2000 & Beretta T44 **Method :** Cable Percussion and Rotary Coring	**Casing Diameter** 200mm to 5.80m 100mm to 15.50m	**Ground Level (mOD)** 6.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716254.2 E 736573.8 N	**Dates** 07/03/2020-09/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	TCR	SCR	RQD	FI	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
									6.32	(0.30) 0.30	Brown slightly gravelly TOPSOIL			
											MADE GROUND: Brown slightly sandy gravelly Clay with rare red brick and plastic fragments			
1.00	B									(1.60)				
1.20-1.65	SPT(C) N=5							2,1/2,1,1,1						
2.00	B								4.72	1.90				
2.00-2.31	SPT(C) 50/160							11,14/21,17,12		(0.40)	Very stiff greyish brown slightly sandy gravelly CLAY			
									4.32	2.30	Very stiff brown slightly sandy gravelly CLAY			
										(0.90)				
3.00	B													
3.00-3.27	SPT(C) 50/115							14,14/20,30						
									3.42	3.20	Very stiff dark grey slightly sandy gravelly CLAY with some subangular to subrounded cobbles			
4.00	B													
4.00-4.07	SPT(C) 25*/70 50/0							25/50						
										(2.60)				
5.00	B													
5.00-5.07	SPT(C) 25*/70 50/0							25/50						
5.80		TCR	SCR	RQD	FI				0.82	5.80				
										(0.35)	Poor recovery - recovery consists of grey subrounded to angular fine to coarse Gravel with cobble fragments. Drillers notes: Grey sandy gravelly Clay (Very stiff)			
		29							0.47	6.15				
6.50-6.58								12,13/50 SPT(C) 25*/75 50/0		(0.35)				
6.50									0.12	6.50	Very stiff dark grey slightly sandy gravelly CLAY			
											Poor recovery - recovery consists of grey slightly sandy gravelly Clay with cobble fragments. Drillers notes: Black boulder Clay (Very stiff)			
		43												
8.00-8.45								8,8/9,9,10,12 SPT(C) N=40						
8.00										(3.00)				
		68												
9.50									-2.88	9.50	Poor recovery - recovery consists of grey clayey angular fine to coarse Gravel. Drillers notes: Black boulder Clay (Very stiff)			

Remarks
Hand dug inspection pit from 0.00m to 1.20m BGL
No groundwater encountered
50mm slotted standpipe with a pea gravel surround installed from 15.50m to 2.00m BGL. 50mm plain standpipe with a bentonite seal installed from 2.00m BGL to GL, with a raised cover.
Chiselling from 5.80m to 5.80m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-7

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Site Project Calvary			**Borehole Number** BH17
Machine : Dando 2000 & Beretta T44 **Flush :** **Core Dia :** mm **Method :** Cable Percussion and Rotary Coring	**Casing Diameter** 200mm to 5.80m 100mm to 15.50m	**Ground Level (mOD)** 6.62	**Client** Virtus Project Management	**Job Number** 9363-01-20
	Location 716254.2 E 736573.8 N	**Dates** 07/03/2020-09/03/2020	**Engineer** Barrett Mahony Consulting Engineers	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	71				19,6/50 SPT(C) 50/0		(1.20)				
						-4.08	10.70	Very stiff grey slightly sandy gravelly CLAY			
11.00-11.15 11.00							(0.50)				
	76					-4.58	11.20	Poor recovery - recovery consists of grey slightly clayey angular to subangular fine to coarse Gravel with boulder fragments. Drillers notes: Grey gravelly boulder Clay (Very stiff)			
							(1.40)				
12.50 12.60						-5.98	12.60	Strong grey fine to medium grained thinly laminated LIMESTONE unweathered to partially weathered			
	100	58	54	7							
14.00							(2.90)				
14.30				NI				14.00m to 14.30m BGL: Black clayey sandy angular fine to coarse Gravel lens			
	100	60	46	10				Sequence contains two sets of fractures, F1 are closely spaced, dipping 0 - 15 degrees, rough to smooth planar, F2 are medium spaced, dipping 35 - 50 degrees, rough to smooth planar			
15.50						-8.88	15.50	Complete at 15.50m			

Remarks

Scale (approx)	Logged By
1:50	

Figure No. 9363-01-7

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Site Project Calvary Additional Work			**Borehole Number** BH18
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 7.20m	**Ground Level (mOD)** 15.35	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716190.1 E 736389.1 N	**Dates** 26/06/2020-29/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					15.25	0.10	TARMACADAM		
					15.15	0.20	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
0.20	B					(1.00)	Brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
1.00	B								
1.20-1.65	SPT(C) N=16			2,4/4,4,4,4	14.15	1.20	Stiff brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
						(0.80)			
2.00-2.45	SPT(C) N=48			6,7/10,12,13,13	13.35	2.00	Very stiff brown slightly sandy gravelly CLAY. Gravel is fine to coarse, angular to subangular		
2.00	B					(0.60)			
					12.75	2.60	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
3.00-3.45	SPT(C) N=28			4,4/6,7,7,8					
3.00	B								
4.00-4.45	SPT(C) N=30			4,5/6,7,8,9					
4.00	B								
						(4.60)			
5.00-5.10	SPT(C) 50*/95 50/0			30,20/50					
5.00	B								
6.00-6.40	SPT(C) 50/245			10,12/13,13,16,8					
6.00	B								
7.00-7.19	SPT(C) 50/40			15,19/50					
7.00	B				8.15	7.20	OBSTRUCTION due to possible boulder or bedrock		
7.20	B						Complete at 7.20m		

Remarks
No Groundwater encountered
Hand dug pit to 1.20m BGL
Refusal at 7.20m BGL
Borehole backfilled upon completion
Chiselling from 5.00m to 5.30m for 1 hour. Chiselling from 7.20m to 7.20m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH18

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Site Project Calvary Additional Work			**Borehole Number** BH19
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.30m	**Ground Level (mOD)** 12.84	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716231.4 E 736359.3 N	**Dates** 29/06/2020-30/06/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					12.74	0.10 (0.20)	TARMACADAM		
0.20	B				12.54	0.30	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
						(0.90)	Brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
1.00	B								
1.20-1.65	SPT(C) N=15			2,2/3,4,4,4	11.64	1.20	Stiff brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
						(0.90)			
2.00-2.45	SPT(C) N=24			5,6/5,6,6,7	10.74	2.10	Stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
2.00	B					(0.90)			
3.00-3.45	SPT(C) N=28			4,5/6,6,7,9	9.84	3.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse, angular to subangular		
3.00	B								
4.00-4.45	SPT(C) N=30			4,6/6,8,8,8					
4.00	B					(3.30)			1
5.00	B			Water strike(1) at 5.00m, rose to 4.60m in 20 mins.					1
5.00-5.45	SPT(C) N=44			7,8/10,10,11,13					
6.00-6.24	SPT(C) 50/85			7,11/15,35					
6.00	B								
6.30	B				6.54	6.30	OBSTRUCTION due to possible boulder or bedrock		
							Complete at 6.30m		

Remarks
Groundwater encountered at 5.00m BGL
Hand dug pit to 1.20m BGL
Refusal at 6.30m BGL
Borehole backfilled upon completion
Chiselling from 6.30m to 6.30m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH19

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Site Project Calvary Additional Work			**Borehole Number** BH20
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.70m	**Ground Level (mOD)** 12.49	**Client** Virtus Project Management	**Job Number** 9645-05-20
	Location (dGPS) 716218.4 E 736310.1 N	**Dates** 30/06/2020-01/07/2020	**Engineer** Barret Mahony Consulting Engineers	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					12.39	0.10	TARMACADAM		
						(0.30)			
0.20	B				12.09	0.40	FILL: Grey coarse angular Gravel with many angular cobbles (Crushed Rock Fill)		
						(0.60)	MADE GROUND: Reddish brown mottled black slightly sandy gravelly Clay with occasional fragments of concrete and shells		
1.00	B				11.49	1.00			
						(0.20)			
1.20-1.65	SPT(C) N=12			1,2/3,3,3,3	11.29	1.20	Brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
							Firm to stiff brown slightly sandy gravelly CLAY with occasional subrounded cobbles. Gravel is fine to coarse, angular to subangular		
2.00-2.45	SPT(C) N=13			2,2/3,3,3,4		(1.80)			
2.00	B								
3.00-3.45	SPT(C) N=40			5,5/7,9,11,13	9.49	3.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangu;lar cobbles. Gravel is fine to coarse, subangular to subrounded		
3.00	B								
4.00-4.45	SPT(C) N=31			4,7/7,7,7,10					
4.00	B								
						(3.70)			
5.00-5.45	SPT(C) N=46			5,7/10,11,12,13					
5.00	B								
6.00-6.40	SPT(C) 50/245			6,7/11,14,14,11					
6.00	B								
6.70	B				5.79	6.70	OBSTRUCTION due to possible boulder or bedrock		
							Complete at 6.70m		

Remarks
No groundwater encountered
Hand dug pit to 1.20m BGL
Refusal at 6.70m BGL
Borehole backfilled upon completion
Chiselling from 6.70m to 6.70m for 1 hour. Excavating from 0.00m to 1.20m for 1.5 hours.

Scale (approx)	Logged By
1:50	AB

Figure No. 9645-05-20.BH20

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Site Project Calvary Clonliffe Road			**Borehole Number** RC02A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 7.14	**Client** Virtus	**Job Number** 9791-07-20
	Location 716182 E 736542 N	**Dates** 05/10/2020-06/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						6.89	(0.25) 0.25	TOPSOIL: Soft to firm dark brown slightly sandy slightly gravelly Clay with grass and rootlets. Gravel is fine to medium subangular to rounded.		
						6.49	(0.40) 0.65	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded.		
						6.14	(0.35) 1.00	Soft to firm light brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is fine to coarse subangular to subrounded.		
	34					5.94	(0.20) 1.20	Brown slightly sandy clayey fine to coarse subangular to rounded GRAVEL with occasional subangular to subrounded cobbles.		
							(1.10)	Poor recovery. Recovery consists of brown to grey clayey sandy fine to coarse subangular to rounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravelly clay with boulders.		
2.30 2.30-2.75					8,9/13,37 SPT(C) N=50	4.84	2.30	Poor recovery. Recovery consists of fine to coarse subangular to subrounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravelly clay (very stiff).		
	21						(1.50)			
3.80 3.80-4.25					3,5/5,3,4,4 SPT(C) N=16	3.34	3.80	Poor recovery. Recovery consists of dark grey/brown sandy very gravelly CLAY with frequent cobbles and occasional boulders of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (stiff).		
	23									
5.30-5.75					5,6/6,5,7,5 SPT(C) N=23					
5.80										
	22									
6.80 6.80-7.25					7,8/6,6,5,7 SPT(C) N=24		(6.00)			
	26									
8.30 8.30-8.75					8,6/7,8,7,7 SPT(C) N=29					
	47									
9.80 9.80-10.25					9,11/12,12,13,13 SPT(C) N=50	-2.66	9.80	Poor recovery. Recovery consists of dark grey/brown sandy		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC02A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC02A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 7.14	**Client** Virtus	**Job Number** 9791-07-20
	Location 716182 E 736542 N	**Dates** 05/10/2020-06/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	63						(2.35)	very gravelly CLAY with frequent cobbles and occasional boulders of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
11.30 11.30-11.75	75	45	28		11,14/15,14,16,5 SPT(C) N=50					
12.15						-5.01	12.15	Strong narrowly banded dark grey fine grained LIMESTONE with rare pyrite veins and dark brown slightly sandy slightly gravelly Clay lenses. Predominantly unweathered. 12.15m - 14.50m BGL: 2 Fracture sets. F1: 5 - 20 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 45 - 60 degrees, closely to widely spaced, undulating to planar, rough, clay smearing.		
12.80 12.80-13.25	100	70	23	8	25,25/50 SPT(C) N=50		(1.25)			
13.40	41	25	21			-6.26	13.40	Medium strong to strong narrowly banded dark grey fine grained LIMESTONE with rare pyrite veins. Predominantly unweathered.		
14.50 14.80	100	85	35	11			(2.40)	Non intact zones between 14.50m - 14.60m BGL and 15.55m - 15.63m BGL. 14.60m - 15.80m BGL: 2 Fracture sets: F1: 5 - 20 degrees, very close to closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 70 - 80 degrees, closely spaced, undulating to planar, rough to smooth, some clay infilling and slight brown oxidation staining.		
15.80						-8.66	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC02A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC03A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.5m	**Ground Level (mOD)** 9.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716174 E 736486 N	**Dates** 07/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						8.70	(0.30) 0.30	TOPSOIL: Firm brown slightly sandy gravelly Clay with grass, rootlets, and occasional fragments of red brick, plastic and charcoal. Gravel is fine to coarse subangular to subrounded.		
							(0.90)	Firm light brown slightly sandy gravelly CLAY with frequent subangular to subrounded cobbles. Gravel is fine to coarse subangular to rounded.		
	17					7.80	1.20	Poor recovery. Recovery consists of grey to brown slightly clayey slightly sandy fine to coarse angular to subrounded Gravel with cobbles of Limestone. Driller notes gravelly clay and cobbles.		
2.30										
	26						(3.80)			
3.80										
	20									
5.00 5.00-5.45					2,3/3,4,4,5 SPT N=16	4.00	5.00	Poor recovery. Recovery consists of dark grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles of Limestone. Driller notes gravelly clay and cobbles (stiff).		
	17						(1.50)			
6.50 6.50-6.95					3,6/7,6,5,8 SPT N=26	2.50	6.50	Poor recovery. Recovery consists of dark brown slightly clayey slightly gravelly fine to medium Sand. Gravel is fine to medium subangular to subrounded. Driller notes brown sandy gravel (medium dense).		
	35						(1.10)			
						1.40	7.60	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to rounded Gravel with frequent cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		
8.00 8.00-8.45					7,7/6,8,8,9 SPT N=31					
	15						(1.90)			
9.50 9.50-9.95					8,8/5,8,9,9 SPT N=31	-0.50	9.50	Poor recovery. Recovery consists of grey fine to coarse subangular to subrounded Gravel with frequent cobbles of Limestone. Driller notes brown sandy gravel (dense).		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 15.50m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC03A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC03A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.5m	**Ground Level (mOD)** 9.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716174 E 736486 N	**Dates** 07/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	12									
11.00 11.00-11.45	18				6,6/7,8,7,8 SPT N=30		(5.30)			
12.50 12.50-12.95	15				8,9/11,8,9,9 SPT N=37					
14.00 14.00-14.45	46				6,9/9,9,10,10 SPT N=38	-5.80	14.80	Poor recovery. Recovery consists of dark grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles and boulders of Limestone. Driller notes black sandy gravelly clay (very stiff).		
							(0.70)			
15.50						-6.50	15.50	Complete at 15.50m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC03A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC04A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 17.0m	**Ground Level (mOD)** 7.23	**Client** Virtus	**Job Number** 9791-07-20
	Location 716216 E 736492 N	**Dates** 07/10/2020-08/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						6.93	(0.30) 0.30	TOPSOIL: Brown slightly sandy slightly gravelly Clay with rare ceramic fragments. Gravel is fine to medium subangular to subrounded.		
						6.73	(0.20) 0.50	Soft light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
	19						(0.70)	Soft to firm light brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
						6.03	1.20	Poor recovery. Recovery consists of firm brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes light brown sandy clay.		
2.00 2.00-2.45	41				2,2/1,2,4,3 SPT N=10		(1.80)			
						4.23	3.00	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes large gravels and brown sand (medium dense).		
							(0.50)			
3.50 3.50-3.95	19				3,4/25,25 SPT N=50	3.73	3.50	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes large gravels and brown sand (very dense).		
							(1.50)			
5.00 5.00-5.45	22				6,5/6,7,7,8 SPT N=28	2.23	5.00	Poor recovery. Recovery consists of dark grey clayey slightly sandy Gravel with occasional cobbles of Limestone. Driller notes black sandy gravelly clay (stiff).		
							(1.50)			
6.50 6.50-6.95	25				9,20/50 SPT N=50	0.73	6.50	Poor recovery. Recovery consists of grey slightly clayey slightly sandy GRAVEL with occasinoal cobbles of Limestone. Driller notes large gravels and small boulder (very dense).		
8.00 8.00-8.45	22				12,12/14,11,25 SPT N=50		(4.13)			
9.50 9.50-9.95					11,13/13,17,20 SPT N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 17.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC04A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC04A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 17.0m	**Ground Level (mOD)** 7.23	**Client** Virtus	**Job Number** 9791-07-20
	Location 716216 E 736492 N	**Dates** 07/10/2020-08/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	30					-3.40	10.63 (0.17)	Poor recovery. Recovery consists of dense dark brown slightly clayey slightly silty fine to medium SAND.		
						-3.57	10.80			
11.00 11.00-11.45	60				25,25/50 SPT N=50			Very stiff dark brown to black slightly sandy gravelly CLAY with cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
							(2.90)			
12.40 12.50-12.95	88	24			15,19/50 SPT N=50					
13.70						-6.47	13.70			
14.00	100	69	40	NI				Strong narrowly banded dark grey fine grained LIMESTONE. Predominantly unweathered. 13.70m - 14.20m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 5 - 30 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, very closely to medium sapced, extremely closely to medium spaced, planar, rough to smooth, occasional clay smearing.		
14.70										
15.50	100	98	93	5			(3.30)	14.20m - 17.00m BGL: 2 fracture sets. F1: 5 - 30 degrees, extremely close to medium spaced, planar, rough to smooth, occasional clay smearing. F2: one fracture occurring between 14.50m BGL - 14.70m BGL, dipping 70 degrees, undulating, rough.		
17.00						-9.77	17.00	Complete at 17.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC04A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						10.44	(0.20) 0.20	TOPSOIL: Brown slightly sandy slightly gravelly Clay. Gravel is fine to medium subrounded to rounded.		
	11						(1.00)	MADE GROUND: Brown sandy gravelly Clay with subangular to subrounded cobbles and boulders and occasional fragments of red brick, plastic, charcoal and metal. Gravel is fine to coarse subangular to subrounded.		
2.00 2.00-2.45	16				3,5/5,6,4,5 SPT N=20	9.44	1.20	Poor recovery. Recovery consists of brownish grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasional cobbles of Limestone. Driller notes brown clayey gravels and cobbles (medium dense).		
3.50 3.50-3.95	22				6,4/4,5,5,4 SPT N=18		(5.30)			
5.00 5.00-5.45	18				4,5/5,6,7,6 SPT N=24					
6.50 6.50-6.95	0				5,5/7,8,6,6 SPT N=27	4.14	6.50	No recovery. Driller notes brown SAND (medium dense).		
							(1.50)			
8.00 8.00-8.45	18				25,25/50 SPT N=50	2.64	8.00	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL with occasinoal cobbles of Limestone. Driller notes gravels and cobbles (dense).		
9.50 9.50-9.95					9,13/9,8,10,11 SPT N=38					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Borehole complete at 21.50m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC05A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	20						(4.50)			
11.00 11.00-11.45	21				8,8/9,9,11,13 SPT N=42					
12.50 12.50-12.95	18				8,12/12,12,14,12 SPT N=50	-1.86	12.50	Poor recovery. Recovery consists of dark brown slightly gravelly very sandy Clay. Gravel is fine to medium subangular to subrounded. Driller notes fine grey sand with gravel (very stiff).		
14.00 14.00-14.45	22				12,10/11,14,16,9 SPT N=50		(2.85)			
15.50 15.50-15.95	26				10,17/17,18,15 SPT N=50	-4.71	15.35	Poor recovery. Recovery consists of fine to coarse subangular to rounded GRAVEL with occasional cobbles of Limestone. Driller notes fine sand and gravel (very dense).		
17.00						-6.36	(1.65) 17.00	Poor recovery. Recovery consists of grey to dark brown slightly clayey slightly sandy GRAVEL with cobbles and boulders of Limestone.		
17.93	65	37	15			-7.29	(0.93) 17.93	Strong narrowly banded light grey fine grained LIMESTONE with rare pyrite. Partially weathered. 17.93m - 19.10m BGL: 2 Fracture sets. F1: 5 - 30 degrees, closely to medium spaced, planar to undulating, rough, clay smearing, orange to brown oxidation staining. F2: 70 - 90 degrees, medium sapced, undulating, rough, clay smearing, occasional slight orange ocidation staining.		
18.50				9			(1.27)			
19.10 19.20	100	63	47	NI 8		-8.56	19.20	Strong narrowly banded dark to light grey fine grained LIMESTONE with rare pyrite. Partially weathered. 19.20m - 19.80m BGL: 2 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, smooth to rough, clay smearing. F2: 70 - 90 degrees, medium to widely spaced, undulating, rough to smooth,		
19.80 20.00				NI						

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC05A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC05A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 21.5m	**Ground Level (mOD)** 10.64	**Client** Virtus	**Job Number** 9791-07-20
	Location 716278 E 736401 N	**Dates** 08/10/2020-09/10/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100	37	15	15			(2.30)	clay smearing. 20.00m - 20.44m BGL: 2 Fracture sets. F1: 5 - 30 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing. F2: 70 - 90 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing, orange to brown oxidation staining. 20.57m - 21.50m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 5 - 30 degrees, very closely to closely spaced, undulating to planar, rough to smooth. F2: 70 - 90 degrees, closely spaced, undulating to planar, rough to smooth, slight clay smearing, orange to brown oxidation staining.		
21.50						-10.86	21.50	Complete at 21.50m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC05A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC06A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15m	**Ground Level (mOD)** 10.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716234 E 736344 N	**Dates** 12/10/2020-13/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(1.00)	MADE GROUND: Dark brown slightly sandy gravelly Clay with grass, rootlets and occasional fragments of red brick and ceramic. Gravel is fine to coarse subangular to subrounded.		
						9.70	1.00			
							(0.20)	Soft to firm brown mottled grey silty slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is fine to coarse subangular to rounded.		
						9.50	1.20	No recovery (open hole to 7.00m BGL). Driller notes black sandy gravelly clay.		
							(5.80)			
7.00	30					3.70	7.00	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded. Driller notes black sandy gravelly clay.		
							(1.00)			
8.00 8.00-8.45	32				5,5/6,8,9,11 SPT N=34	2.70	8.00	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
							(1.20)			
9.50 9.50-9.95					15,25/50 SPT N=50	1.50	9.20	Poor recovery. Recovery consists of dark grey fine to coarse subangular to subrounded Gravel with cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 7.00m BGL.
Borehole complete at 15.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC06A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC06A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15m	**Ground Level (mOD)** 10.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716234 E 736344 N	**Dates** 12/10/2020-13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	26						(1.80)			
11.00 11.00-11.45	17				6,9/8,9,12,15 SPT N=44	-0.30	11.00	Poor recovery. Recovery consists of dark grey/brown slightly sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
12.50 12.50-12.95	20				8,11/11,13,17,9 SPT N=50		(2.86)			
14.00 14.00-14.45	40				25,25/50 SPT N=50	-3.16	13.86	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles and boulders of Limestone. Driller notes black sandy gravelly clay (very stiff).		
15.00							(1.14)			
						-4.30	15.00	Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC06A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC07A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.0m	**Ground Level (mOD)** 12.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716231 E 736331 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.60)	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional fragments of ceramic and red brick.		
						11.40	0.60			
							(0.60)	Soft to firm brown silty slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is fine to coarse subangular to subrounded.		
						10.80	1.20			
							(5.80)	No recovery (open hole to 7.00m BGL). Driller notes grey sandy gravelly clay.		
7.00	49					5.00	7.00	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes grey sandy gravelly clay.		
							(1.00)			
8.00 8.00-8.45	31				4,6/6,8,10,11 SPT N=35	4.00	8.00	Poor recovery. Recovery consists of dark grey/brown slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes grey sandy gravelly clay (very stiff).		
9.50 9.50-9.95					19,25/50 SPT N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 7.00m BGL.
Borehole complete at 15.0m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC07A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC07A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.0m	**Ground Level (mOD)** 12.00	**Client** Virtus	**Job Number** 9791-07-20
	Location 716231 E 736331 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	17						(5.65)			
11.00 11.00-11.45	18				12,17/50 SPT N=50					
12.50 12.50-12.95	44				11,13/16,34 SPT N=50					
						-1.65	13.65	Poor recovery. Recovery consists of very stiff dark grey/brown sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse angular to subrounded.		
14.00 14.00-14.45	45				25,25/50 SPT N=50		(1.35)			
15.00						-3.00	15.00	Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC07A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC08A
Machine : Beretta T44 **Flush :** **Core Dia :** mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 9.21	**Client** Virtus	**Job Number** 9791-07-20
	Location 716360 E 736355 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						9.01	(0.20) 0.20	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						8.71	(0.30) 0.50	Firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.51	(0.20) 0.70	Firm brown/grey sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.41	0.80	Firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						8.01	(0.40) 1.20	Firm brown mottled light grey slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is subangular to subrounded fine to coarse.		
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80	25					2.41	6.80 (1.50)	Poor recovery. Recovery consists of dark grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes black sandy gravelly clay.		
8.30 8.30-8.75	20				9,8/10,7,8,8 SPT N=33	0.91	8.30 (1.50)	Poor recovery. Recovery consists of dark grey slightly clayey fine to coarse Sand. Driller notes black sandy gravelly clay onto gravel (dense).		
9.80 9.80-10.25					6,8/8,9,7,10 SPT N=34	-0.59	9.80	Poor recovery. Recovery consists of dark grey/brown		

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC08A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC08A
Machine : Beretta T44 **Flush :** **Core Dia :** mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 9.21	**Client** Virtus	**Job Number** 9791-07-20
	Location 716360 E 736355 N	**Dates** 13/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	30						(1.35)	slightly sandy clayey fine to coarse subangular to subrounded GRAVEL. Driller notes gravel (dense).		
						-1.94	11.15 (0.15)			
11.30 11.30-11.75	25				9,8/9,11,8,7 SPT N=35	-2.09	11.30	Poor recovery. Recovery consists of dark grey/brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (stiff).		
							(1.50)	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel. Driller notes black sandy gravelly clay (very stiff).		
12.80 12.80-13.25	32				9,9/12,10,11,11 SPT N=44	-3.59	12.80	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel with cobbles and boulders of Limestone. Driller ntoes black sandy gravelly clay (very stiff).		
14.30 14.30-14.75	23				10,10/12,14,11,13 SPT N=50		(3.00)			
15.80 15.80-16.25					13,12/13,14,23 SPT N=50	-6.59	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC08A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						8.10	(0.30) 0.30	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						7.30	(0.80) 1.10	MADE GROUND: Brown sandy gravelly Clay with some angular to subrounded cobbles and concrete and red brick fragments. Gravel is subangular to subrounded fine to coarse.		
						7.20	1.20	Soft to firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes brown clay.		
6.80	22					1.60	6.80 (1.50)	Poor recovery. Recovery consists of grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes brown to black sandy gravelly clay.		
8.30 8.30-8.75	25				7,6/6,7,8,7 SPT(C) N=28	0.10	8.30	Poor recovery. Recovery consists of grey clayey slightly sandy fine to coarse subangular to subrounded Gravel with occasional cobbles of Limestone. Driller notes brown to black sandy gravelly clay (stiff).		
9.80										

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 22.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	20						(4.50)			
11.30	15									
12.80 12.80-13.25	22				18,23/50 SPT(C) N=50	-4.40	12.80	Poor recovery. Recovery consists of dark grey/brown slightly sandy very gravelly CLAY with occasional cobbles of Limestone. Driller notes black sandy gravelly clay (very stiff).		
14.30 14.30-14.75	17				17,20/26,24 SPT(C) N=50		(3.00)			
15.80 15.80-16.25	78				15,16/16,14,15,5 SPT(C) N=50	-7.40	15.80	Very stiff dark grey/brown sandy very gravelly CLAY. Gravel is fine to coarse subangular to subrounded.		
17.30 17.30-17.75	85				17,27/50 SPT(C) N=50		(3.40)			
18.80 18.80-19.25					25,25/50 SPT(C) N=50					
19.20	100	53	29	NI		-10.80	19.20	Medium strong to strong narrowly banded grey fine grained LIMESTONE. Predominantly unweathered. 19.20m - 19.87m BGL: Predominantly non intact but recovery indicates 2 fracture sets. F1: 10 - 30 degrees, closely spaced, planar, rough to smooth, clay smearing. F2: 60 - 80 degrees, closely spaced,		
19.94										

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC09A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 22.8m	**Ground Level (mOD)** 8.40	**Client** Virtus	**Job Number** 9791-07-20
	Location 716397 E 736320 N	**Dates** 28/09/2020-01/10/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				11				undulating to planar, rough to smooth, clay smearing, slight orange oxidation staining.		
20.30				NI				19.94m - 21.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium spaced, undulating, rough. F2: 20 - 40 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, closely to medium spaced, undulating to planar, rough to smooth, slight clay smearing.		
20.77	100	41	16	12			(3.60)			
21.30				21				21.30m - 22.80m BGL: 2 Fracture sets. F1: 20 - 40 degrees, very closely to medium spaced, planar, rough to smooth, slight clay smearing. F2: 60 - 80 degrees, closely to medium spaced, undulating to planar, rough to smooth, slight clay smearing.		
21.80	100	27	11							
22.80						-14.40	22.80	Complete at 22.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC09A

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Site Project Calvary Clonliffe Road			**Borehole Number** RC10A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 8.69	**Client** Virtus	**Job Number** 9791-07-20
	Location 716380 E 736294 N	**Dates** 23/09/2020-28/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00						8.59	0.10	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
							(0.90)	MADE GROUND: Brown/grey sandy gravelly Clay with occasional fragments of concrete, old pipe and red brick. Gravel is angular to subrounded fine to coarse.		
	6					7.69	1.00 (0.20)	Soft brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
						7.49	1.20	Poor recovery. Recovery consists of brown very clayey sandy fine to coarse subangular to subrounded GRAVEL. Driller notes brown clay.		
							(1.10)			
2.30 2.30-2.75					3,4/4,5,4,3 SPT(C) N=16	6.39	2.30	Poor recovery. Recovery consists of brown very clayey sandy fine to coarse subangular to subrounded Gravel. Driller notes brown sandy gravelly clay (stiff).		
	33									
							(2.60)			
3.80 3.80-4.25					5,6/5,3,4,4 SPT(C) N=16					
	51									
						3.79	4.90	Stiff dark grey slightly sandy gravelly CLAY with occasional cobbles. Gravel is fine to coarse subangular to subrounded.		
5.30 5.30-5.75					8,8/7,10,9,10 SPT(C) N=36					
	67						(1.90)			
6.80 6.80-7.25					11,11/14,13,12,11 SPT(C) N=50	1.89	6.80	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded Gravel. Driller notes black boulder clay (very stiff).		
	8									
8.30 8.30-8.75					7,9/9,8,7,6 SPT(C) N=30					
	35						(4.50)			
9.80 9.80-10.25					9,6/9,7,8,8 SPT(C) N=32					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC10A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC10A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.8m	**Ground Level (mOD)** 8.69	**Client** Virtus	**Job Number** 9791-07-20
	Location 716380 E 736294 N	**Dates** 23/09/2020-28/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	27									
11.30 11.30-11.75	17				8,8/7,6,7,8 SPT(C) N=28	-2.61	11.30 (1.50)	Poor recovery. Recovery consists of dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders of Limestone (stiff).		
12.80 12.80-13.25	31				12,14/14,16,13,7 SPT(C) N=50	-4.11	12.80 (3.00)	Poor recovery. Recovery consists of dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders of Limestone (very stiff).		
14.30 14.30-14.75	37				13,12/10,10,8,11 SPT(C) N=39					
15.80 15.80-16.25					14,15/17,15,16,2 SPT(C) N=50	-7.11	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC10A

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary Clonliffe Road			**Borehole Number** RC11A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.3m	**Ground Level (mOD)** 10.50	**Client** Virtus	**Job Number** 9791-07-20
	Location 716300 E 736278 N	**Dates** 21/09/2020-22/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						10.30	(0.20) 0.20	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						10.00	(0.30) 0.50	Soft dark brown sandy slightly gravelly CLAY with some subrounded to rounded cobbles. Gravel is subangular to subrounded fine to coarse.		
						9.30	(0.70) 1.20	Soft brown mottled light grey sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80						3.70	6.80			
	33						(1.50)	Poor recovery. Recovery consists of dark brown to black sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay.		
8.30 8.30-8.75	32				8,8/10,9,7,8 SPT(C) N=34	2.20	8.30	Very stiff dark brown to black sandy gravelly CLAY with occasional cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
9.80 9.80-10.25					9,9/11,10,8,13 SPT(C) N=42					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.2m BGL.
Open hole to 6.80m BGL.
Borehole complete at 18.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC11A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC11A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.3m	**Ground Level (mOD)** 10.50	**Client** Virtus	**Job Number** 9791-07-20
	Location 716300 E 736278 N	**Dates** 21/09/2020-22/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	66						(5.70)			
11.30 11.30-11.75	100				18,21/24,26 SPT(C) N=50					
12.30	20									
12.80 12.80-13.25	79	17	9		20,23/28,22 SPT(C) N=50					
14.00						-3.50	14.00	Medium strong dark grey fine grained LIMESTONE. Mostly unweathered. 14.00m - 14.88m BGL: 2 Fracture sets. F1: 5 - 20 degrees, closely spaced, undulating to planar, rough, slight clay smearing. F2: 60 - 75 degrees, medium to widely spaced, planar, rough to smooth, slight clay smearing and brown oxidation staining.		
14.30	93	27	14	9				14.50m - 14.60m BGL: Non intact zone.		
14.88				15				14.88m - 15.80m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, undulating to planar, rough, clay smearing. F2: 50 - 60 degrees, medium to widely spaced, undulating to planar, rough to smooth, clay smearing. F3: 70 - 85 degrees, closely to medium spaced, undulating, rough, slight clay smearing.		
15.80							(4.30)			
16.20	100	80	50	12				15.80m - 17.00m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, rough to smooth, occasional clay smearing. F2: 40 - 60 degrees, closely to widely spaced, undulating, rough, slight clay smearing. F3: 70 - 85 degrees, widely spaced, undulating to planar, rough, slight clay smearing.		
17.00										
17.30	100	81	81	9				17.00m - 18.30m BGL: 2 Fracture sets. F1: 10 - 30 degrees, closely to medium spaced, undulating to planar, rough, clay smearing. F2: 70 - 85 degrees, widely spaced, undulating, rough, slight clay smearing and brown oxidation staining.		
18.30						-7.80	18.30	Complete at 18.30m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC11A

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary Clonliffe Road			**Borehole Number** RC12A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 8.78	**Client** Virtus	**Job Number** 9791-07-20
	Location 716341 E 736255 N	**Dates** 18/09/2020-21/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.40)	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						8.38	0.40			
							(0.30)	Soft to firm brown sandy gravelly CLAY with gravel lenses. Gravel is angular to subrounded fine to coarse.		
						8.08	0.70			
							(0.20)	Soft to firm brown sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subrounded fine to coarse.		
						7.88	0.90			
							(0.30)	Firm brown sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
						7.58	1.20			
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes black sandy gravelly clay.		
6.80						1.98	6.80			
	19						(1.50)	Poor recovery. Recovery consists of dark grey sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay.		
8.30 8.30-8.75					7,6/7,8,9,9 SPT(C) N=33	0.48	8.30			
	43						(3.00)	Poor recovery. Recovery consists of dark grey sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded. Driller notes black sandy gravelly clay (very stiff).		
9.80 9.80-10.25					10,13/14,16,15,5 SPT(C) N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m BGL.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC12A

Ground Investigations Ireland Ltd
www.gii.ie

Site Project Calvary Clonliffe Road			**Borehole Number** RC12A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 8.78	**Client** Virtus	**Job Number** 9791-07-20
	Location 716341 E 736255 N	**Dates** 18/09/2020-21/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	85									
11.30 11.30-11.75	36				13,14/16,18,16 SPT(C) N=50	-2.52	11.30 (1.50)	Poor recovery. Recovery consists of grey slightly clayey slightly sandy Gravel with cobbles. Driller notes black sandy gravelly clay (very stiff).		
12.80 12.80-13.25	77				15,18/16,16,17,1 SPT(C) N=50	-4.02	12.80 (3.00)	Very stiff dark grey sandy gravelly CLAY with cobbles and boulders of Limestone. Gravel is fine to coarse subangular to subrounded.		
14.30 14.30-14.75	27				18,18/16,21,13 SPT(C) N=50					
15.80 15.80-16.25					19,23/27,23 SPT(C) N=50	-7.02	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC12A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC13A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.8m	**Ground Level (mOD)** 8.20	**Client** Virtus	**Job Number** 9791-07-20
	Location 716328 E 736222 N	**Dates** 14/09/2020-16/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(6.80)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80						1.40	6.80			
	37						(1.50)	Poor recovery. Recovery consists of dark grey fine to coarse subangular to subrounded Gravel. Driller notes black sandy gravelly clay.		
8.30 8.30-8.75	13				7,8/7,9,10,10 SPT(C) N=36	-0.10	8.30 (1.50)	Poor recovery. Recovery consists of black slightly gravelly fine to medium SAND. Gravel is fine to medium subangular to subrounded. Driller notes sand (dense).		
9.80 9.80-10.25					10,8/8,9,7,10 SPT(C) N=34	-1.60	9.80	Very stiff dark grey/brown slightly sandy gravelly CLAY with		

Remarks
Open hole to 6.80m BGL.
No groundwater encountered.
Borehole complete at 18.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC13A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC13A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 18.8m	**Ground Level (mOD)** 8.20	**Client** Virtus	**Job Number** 9791-07-20
	Location 716328 E 736222 N	**Dates** 14/09/2020-16/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	15							occasional cobbles and possible boulder fragments of Limestone. Gravel is fine to coarse subangular to subrounded.		
11.30 11.30-11.75	73				22,23/50 SPT(C) N=50		(2.90)			
12.80 12.80-13.25	55	17	7		10,10/14,16,20 SPT(C) N=50	-4.50	12.70 (1.60)	WEATHERED ROCK: Recovered as black slightly sandy clayey fine to coarse angular to subrounded Gravel with cobbles and boulders of Limestone with occasional pyrite. Driller notes rock with clay bands.		
14.30 14.30-14.75	69	32	20	10	17,28/50 SPT(C) N=50	-6.10	14.30	Medium strong to strong dark grey fine grained LIMESTONE with occasional pyrite. Unweathered to partially weathered. 14.30m - 15.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, rough, slight clay smearing. F2: 45 - 60 degrees, medium spaced, undulating, rough, slight clay smearing. F3: 70 - 85 degrees, medium spaced, undulating, rough, slight clay smearing.		
15.30 15.60 15.80	75	59	45	NI 7			(4.50)	15.60m - 17.50m BGL: 3 Fracture sets. F1: 5 - 20 degrees, very closely to medium spaced, planar, smooth to rough, slight clay smearing. F2: 50 - 65 degrees, medium spaced, undulating to planar, rough, clay smearing, brown oxidation staining. F3: 70 - 85 degrees, medium to widely spaced, undulating to planar, rough, clay smearing, brown oxidation staining.		
17.30 17.50	81	45	16	14				17.50m - 18.80m BGL: 3 Fracture sets. F1: 5 - 20 degrees, extremely close to closely spaced, planar, smooth to rough, clay smearing, occasional brown oxidation staining. F2: 50 - 65 degrees, medium spaced, undulating, rough, clay smearing, brown oxidation staining. F3: 70 - 85 degrees, medium spaced, undulating, rough, slight clay smearing, orange to brown oxidation staining.		
18.80						-10.60	18.80	Complete at 18.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC13A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC14A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 7.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716396 E 736230 N	**Dates** 17/09/2020-18/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						7.40	(0.30) 0.30	TOPSOIL: Dark brown sandy slightly gravelly Clay with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						7.10	(0.30) 0.60	MADE GROUND: Brown sandy gravelly Clay with tile and plastic fragments. Gravel is subangular to subrounded fine to coarse.		
						6.70	(0.40) 1.00	Soft to firm brown sandy gravelly CLAY with some cobbles. Gravel is subangular to subrounded fine to coarse.		
						6.50	(0.20) 1.20	Firm brown mottled grey sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse.		
							(5.60)	No recovery (open hole to 6.80m BGL). Driller notes brown to black sandy gravelly clay.		
6.80	49					0.90	6.80 (1.50)	Dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
8.30 8.30-8.75	62				7,7/9,6,8,9 SPT(C) N=32	-0.60	8.30 (3.00)	Very stiff dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
9.80 9.80-10.25					11,13/16,34 SPT(C) N=50					

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Open hole to 6.80m BGL.
Borehole complete at 15.80m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC14A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC14A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 15.80m	**Ground Level (mOD)** 7.70	**Client** Virtus	**Job Number** 9791-07-20
	Location 716396 E 736230 N	**Dates** 17/09/2020-18/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/2

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	82									
11.30 11.30-11.75	75				18,21/26,24 SPT(C) N=50	-3.60	11.30	Very stiff black sandy gravelly CLAY with cobbles of Limestone. Gravel is fine to coarse subangular to subrounded.		
12.80 12.80-13.25	48				16,23/27,23 SPT(C) N=50		(4.50)			
14.30 14.30-14.75	51				13,15/19,23,8 SPT(C) N=50					
15.80 15.80-16.25					21,25/50 SPT(C) N=50	-8.10	15.80	Complete at 15.80m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC14A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 1/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
						6.59	(0.40) 0.40	TOPSOIL: Dark brown sandy slightly gravelly CLAY with grass and rootlets. Gravel is subangular to subrounded fine to coarse.		
						6.19	(0.40) 0.80	MADE GROUND: Brown sandy gravelly CLAY with animal bone fragments. Gravel is subangular to subrounded fine to coarse.		
	25					5.79	(0.40) 1.20	Soft to firm brown sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
							(1.10)	Poor recovery. Recovery consists of brown sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded. Driller notes brown clay with stones.		
2.30 2.30-2.75	11				3,3/4,3,4,5 SPT(C) N=16	4.69	2.30	Poor recovery. Recovery consists of grey slightly clayey slightly sandy fine to coarse subangular to subrounded GRAVEL. Driller notes gravelly clay.		
3.80 3.80-4.25	22				2,3/2,4,4,3 SPT(C) N=13		(3.00)			
5.30 5.30-5.75	14				5,5/7,6,7,7 SPT(C) N=27	1.69	5.30	Poor recovery. Recovery consists of dark grey to black sandy gravelly CLAY with occasional cobbles of Limestone. Gravel is fine to coarse subangular to rounded (very stiff).		
6.80 6.80-7.25	13				7,7/8,6,8,9 SPT(C) N=31					
8.30 8.30-8.75	24				7,8/7,9,9,10 SPT(C) N=35					
9.30-9.75					12,11/11,12,14,13 SPT(C) N=50					
9.80							(9.00)			

Remarks
Inspection pit carried out to 1.20m BGL.
Inspection pit sidewalls stable.
No groundwater encountered.
Rotary core follow on from 1.20m.
Borehole complete at 23.30m BGL.
Borehole backfilled on completion.

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC15A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 2/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	26									
11.30 11.30-11.75	25				14,12/11,14,15,10 SPT(C) N=50					
12.80 12.80-13.25	12				8,10/7,9,10,9 SPT(C) N=35					
14.30	13	5				-7.31	14.30	Poor recovery. Recovery consists of black sandy gravelly CLAY with cobbles and boulders of Limestone with pyrite. Gravel is fine to coarse subangular to rounded. Driller notes black sandy gravelly clay with large cobbles (stiff).		
15.80	19	14					(5.00)			
17.30 17.30-17.75	15	5			6,7/7,8,7,6 SPT(C) N=28					
18.80 18.80-19.25	67	47	37		7,8/7,6,8,8 SPT(C) N=29					
19.30						-12.31	19.30	Medium strong dark grey fine grained LIMESTONE. Unweathered to partially weathered. 19.30m - 21.20m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium sapced, planar, rough to smooth, slight clay smearing, slight brown oxidation		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC15A

Ground Investigations Ireland Ltd
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Site Project Calvary Clonliffe Road			**Borehole Number** RC15A
Machine : Beretta T44 **Flush :** Water **Core Dia :** 64 mm **Method :** Rotary Cored	**Casing Diameter** 64mm to 23.3m	**Ground Level (mOD)** 6.99	**Client** Virtus	**Job Number** 9791-07-20
	Location 716462 E 736223 N	**Dates** 16/09/2020-17/09/2020	**Engineer** Barrett Mahony	**Sheet** 3/3

Depth (m)	TCR (%)	SCR (%)	RQD (%)	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				9				staining. F2: 45 - 60 degrees, closely to widely spaced, undulating, rough, occasional brown oxidation staining. F3: 70 - 85 degrees, medium spaced, undulating to planar, rough to smooth, clay smearing, occasional brown oxidation staining.		
20.30	100	53	43							
21.20	45	22	22	NI			(4.00)			
21.65								21.65m - 23.30m BGL: 3 Fracture sets. F1: 5 - 20 degrees, closely to medium spaced, undulating to planar, rough, clay smearing. F2: 30 - 50 degrees, closely to medium spaced, planar, rough to smooth, slight clay smearing. F3: 70 - 85 degrees, closely to medium spaced, undulating to planar, rough to smooth, clay smearing.		
21.80	77	24	9	12						
23.30						-16.31	23.30	Complete at 23.30m		

Remarks

Scale (approx)	Logged By
1:50	JMD

Figure No. 9791-07-20.RC15A

A9.3 Soil Testing Results

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Stephen Kealy
Date :	6th April, 2020
Your reference :	Project Cavalry
Our reference :	Test Report 20/2403 Batch 1
Location :	Project Calvary
Date samples received :	17th February, 2020
Status :	Final report
Issue :	2

Twenty four samples were received for analysis on 17th February, 2020 of which twenty three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Antimony	1	1	3	1	3	1	3	2	3	2	<1	mg/kg	TM30/PM15
Arsenic #	6.5	6.9	15.1	9.8	12.5	7.7	16.2	10.5	13.1	8.9	<0.5	mg/kg	TM30/PM15
Barium #	36	96	136	59	71	53	95	149	83	73	<1	mg/kg	TM30/PM15
Cadmium #	0.8	1.7	2.0	1.4	2.1	1.8	1.7	3.1	2.2	2.0	<0.1	mg/kg	TM30/PM15
Chromium #	21.5	19.7	39.8	23.0	23.2	19.0	28.7	30.8	26.3	16.4	<0.5	mg/kg	TM30/PM15
Copper #	15	20	46	24	44	24	65	24	38	30	<1	mg/kg	TM30/PM15
Lead #	14	28	103	19	42	28	113	21	37	16	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.0	1.8	5.3	2.5	5.2	2.2	4.0	2.9	3.2	3.0	<0.1	mg/kg	TM30/PM15
Nickel #	30.4	35.7	53.9	38.6	47.3	37.4	40.8	29.9	45.1	36.9	<0.7	mg/kg	TM30/PM15
Selenium #	<1	2	2	1	2	1	2	1	<1	2	<1	mg/kg	TM30/PM15
Zinc #	44	128	154	81	113	79	115	88	98	75	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	0.10	<0.03	0.06	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	0.08	<0.03	<0.03	<0.03	0.17	<0.03	0.11	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	0.14	<0.03	0.09	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.13	<0.06	0.09	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	0.12	<0.02	0.08	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.18	<0.07	0.13	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.10	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	0.05	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.59	<0.22	0.41	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.08	<0.64	0.73	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97	95	94	97	95	95	93	90	94	94	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.4 SV	<0.1	0.2	0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	10	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	14	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	24	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5 SV	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5 SV	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35 SV	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Natural Moisture Content	10.1	7.4	26.0	16.0	15.0	13.6	19.6	22.1	17.4	13.4	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	9.1	6.9	20.7	13.8	13.0	12.0	16.4	18.1	14.8	11.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0077	-	0.0024	-	0.0185	-	0.0163	-	0.0126	-	<0.0015	g/l	TM38/PM20
Chromium III	21.5	19.7	39.8	23.0	23.2	19.0	28.7	30.8	26.3	16.4	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.36	0.52	1.66	0.43	1.03	0.32	2.42	0.48	1.19	0.40	<0.02	%	TM21/PM24
pH #	8.90	8.62	8.24	8.55	8.55	8.48	8.14	8.21	8.44	8.66	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1015	0.1021	0.1103	0.129	0.111	0.1018	0.1183	0.1134	0.1105	0.1026		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Antimony	3	2	3	2	3	2	3	3	4	3	<1	mg/kg	TM30/PM15
Arsenic #	15.1	9.8	11.9	11.1	22.7	9.3	25.4	13.7	28.5	13.4	<0.5	mg/kg	TM30/PM15
Barium #	210	60	67	60	109	56	122	81	131	80	<1	mg/kg	TM30/PM15
Cadmium #	1.3	2.3	2.4	2.4	1.6	1.9	1.7	2.6	1.7	2.9	<0.1	mg/kg	TM30/PM15
Chromium #	26.6	21.4	21.6	18.3	25.0	28.4	25.9	18.4	26.6	20.5	<0.5	mg/kg	TM30/PM15
Copper #	51	28	39	35	59	26	75	38	80	44	<1	mg/kg	TM30/PM15
Lead #	276	18	24	19	231	21	198	20	178	21	<5	mg/kg	TM30/PM15
Mercury #	0.2	<0.1	<0.1	<0.1	0.4	<0.1	0.6	<0.1	0.6	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	2.1	3.1	4.6	2.8	3.0	3.1	3.2	6.4	4.7	5.2	<0.1	mg/kg	TM30/PM15
Nickel #	38.3	34.4	45.7	44.5	47.4	34.4	51.7	42.7	55.5	50.0	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	1	<1	1	<1	2	2	1	<1	<1	mg/kg	TM30/PM15
Zinc #	204	84	92	91	125	73	156	98	146	115	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.27	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	<0.03	0.21	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	0.08	<0.04	<0.04	<0.04	0.10	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.38	<0.03	<0.03	<0.03	<0.03	<0.03	0.36	<0.03	0.37	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.35	<0.03	<0.03	<0.03	<0.03	<0.03	0.31	<0.03	0.31	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.23	<0.06	<0.06	<0.06	<0.06	<0.06	0.28	<0.06	0.24	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.24	<0.02	<0.02	<0.02	<0.02	<0.02	0.25	<0.02	0.25	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.40	<0.07	<0.07	<0.07	<0.07	<0.07	0.42	<0.07	0.37	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	0.21	<0.04	0.19	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0.15	<0.04	<0.04	<0.04	<0.04	<0.04	0.16	<0.04	0.12	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.15	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	0.12	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	1.29	<0.22	<0.22	<0.22	<0.22	<0.22	1.30	<0.22	1.17	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	2.46	<0.64	<0.64	<0.64	<0.64	<0.64	2.32	<0.64	2.18	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.29	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	<0.05	0.27	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.11	<0.02	<0.02	<0.02	<0.02	<0.02	0.12	<0.02	0.10	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	94	100	91	93	94	94	94	93	94	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 SV	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	9	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	60	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	69	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	69	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	26	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	47	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene #	<5 SV	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	LOD/LOR	Units	Method No.
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Natural Moisture Content	26.2	12.0	14.6	16.6	25.3	12.4	22.8	15.5	24.6	16.1	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	20.8	10.7	12.8	14.2	20.2	11.1	18.6	13.4	19.7	13.8	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.1559	-	0.0080	-	0.0099	-	0.0185	-	0.0073	-	<0.0015	g/l	TM38/PM20
Chromium III	26.6	21.4	21.6	18.3	25.0	28.4	25.9	18.4	26.6	20.5	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	3.60	0.30	0.72	0.35	3.34	0.45	6.98	0.56	5.58	0.42	<0.02	%	TM21/PM24
pH #	8.05	8.23	8.41	8.53	8.18	8.63	7.96	8.38	8.16	8.51	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1124	0.1035	0.1061	0.1	0.1154	0.1056	0.1132	0.1093	0.1137	0.1046		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	61-63	64-66	67-69									
Sample ID	TR10	TR11	TR11									
Depth	2.00-3.00	0.00-1.00	1.00-2.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	13/02/2020	13/02/2020	13/02/2020									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	17/02/2020	17/02/2020	17/02/2020									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Antimony	-	3	2								<1	mg/kg	TM30/PM15
Arsenic #	-	11.3	10.3								<0.5	mg/kg	TM30/PM15
Barium #	-	147	53								<1	mg/kg	TM30/PM15
Cadmium #	-	3.5	2.0								<0.1	mg/kg	TM30/PM15
Chromium #	-	20.8	18.2								<0.5	mg/kg	TM30/PM15
Copper #	-	33	28								<1	mg/kg	TM30/PM15
Lead #	-	23	18								<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Molybdenum #	-	4.2	2.7								<0.1	mg/kg	TM30/PM15
Nickel #	-	45.0	38.4								<0.7	mg/kg	TM30/PM15
Selenium #	-	2	<1								<1	mg/kg	TM30/PM15
Zinc #	-	99	79								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	-	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 6 Total #	-	<0.22	<0.22								<0.22	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	-	<1	<1								<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	99	97								<0	%	TM4/PM8
Mineral Oil (C10-C40)	-	<30	<30								<30	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	61-63	64-66	67-69									
Sample ID	TR10	TR11	TR11									
Depth	2.00-3.00	0.00-1.00	1.00-2.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	13/02/2020	13/02/2020	13/02/2020									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	17/02/2020	17/02/2020	17/02/2020									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	-	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C35-C40	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	-	<26	<26								<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C25	-	<10	<10								<10	mg/kg	TM5/PM8/PM16
>C25-C35	-	<10	<10								<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	-	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	-	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	-	<26	<26								<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	-	<52	<52								<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	-	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC25	-	<10	<10								<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	-	<10	<10								<10	mg/kg	TM5/PM8/PM16
MTBE #	-	<5	<5								<5	ug/kg	TM36/PM12
Benzene #	-	<5	<5								<5	ug/kg	TM36/PM12
Toluene #	-	<5	<5								<5	ug/kg	TM36/PM12
Ethylbenzene #	-	<5	<5								<5	ug/kg	TM36/PM12
m/p-Xylene #	-	<5	<5								<5	ug/kg	TM36/PM12
o-Xylene #	-	<5	<5								<5	ug/kg	TM36/PM12
PCB 28 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 52 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 101 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 118 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 138 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 153 #	-	<5	<5								<5	ug/kg	TM17/PM8
PCB 180 #	-	<5	<5								<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	<35	<35								<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	61-63	64-66	67-69									
Sample ID	TR10	TR11	TR11									
Depth	2.00-3.00	0.00-1.00	1.00-2.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	13/02/2020	13/02/2020	13/02/2020									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	17/02/2020	17/02/2020	17/02/2020									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Natural Moisture Content	-	15.3	13.8								<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	-	13.2	12.1								<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0127	-	0.0107								<0.0015	g/l	TM38/PM20
Chromium III	-	20.8	18.2								<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	-	0.60	0.36								<0.02	%	TM21/PM24
pH #	-	8.38	8.42								<0.01	pH units	TM73/PM11
Mass of raw test portion	-	0.1109	0.1018									kg	NONE/PM17
Mass of dried test portion	-	0.09	0.09									kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5			
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0066	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.066	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.010	0.007	0.017	0.004	0.008	0.006	0.003	0.002	0.009	0.008	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.10	0.07	0.17	0.04	0.08	0.06	0.03	0.02	0.09	0.08	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.003	<0.003	0.004	<0.003	<0.003	<0.003	0.003	0.004	<0.003	0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.3	<0.3	0.5	0.4	0.5	<0.3	0.6	<0.3	0.4	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	5	4	5	<3	6	<3	4	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	<0.5	<0.5	2.4	<0.5	2.5	<0.5	0.7	<0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	<5	<5	24	<5	25	<5	7	<5	<5	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	1.4	<0.3	0.8	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	14	<3	8	<3	<3	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	2	<2	<2	<2	2	<2	2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	mg/kg	TM60/PM0
pH	8.51	8.50	8.23	8.29	8.34	8.31	8.31	8.30	8.32	8.00	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	45	<35	74	69	52	45	75	53	88	38	<35	mg/l	TM20/PM0
Total Dissolved Solids #	450	<350	740	690	520	450	750	530	880	380	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10			
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	LOD/LOR	Units	Method No.
Dissolved Antimony #	0.005	<0.002	<0.002	<0.002	<0.002	0.005	0.005	0.002	0.004	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.05	<0.02	<0.02	<0.02	<0.02	0.05	0.05	<0.02	0.04	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	0.0029	0.0184	<0.0025	0.0120	<0.0025	0.0090	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	0.029	0.184	<0.025	0.120	<0.025	0.090	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.055	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.55	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.023	0.007	0.002	0.007	0.004	0.006	0.010	0.010	0.005	0.006	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.23	0.07	<0.02	0.07	0.04	0.06	0.10	0.10	0.05	0.06	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.005	<0.003	<0.003	<0.003	0.005	<0.003	0.004	<0.003	0.007	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.05	<0.03	<0.03	<0.03	0.05	<0.03	0.04	<0.03	0.07	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.3	0.3	0.5	<0.3	0.4	<0.3	0.4	0.3	<0.3	0.4	<0.3	mg/l	TM173/PM0
Fluoride	<3	3	5	<3	4	<3	4	<3	<3	4	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	74.9	2.0	<0.5	0.6	0.7	<0.5	0.9	<0.5	0.5	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	749	20	<5	6	7	<5	9	<5	5	<5	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	2	2	7	2	13	4	6	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	<20	130	40	60	20	<20	mg/kg	TM60/PM0
pH	8.13	6.78	7.64	3.37	4.56	7.72	6.14	8.05	6.96	7.98	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	237	90	104	77	79	53	138	88	112	91	<35	mg/l	TM20/PM0
Total Dissolved Solids #	2370	901	1040	770	790	530	1379	880	1120	910	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	64-66	67-69									LOD/LOR	Units	Method No.
Sample ID	TR11	TR11											
Depth	0.00-1.00	1.00-2.00											
COC No / misc													
Containers	V J T	V J T											
Sample Date	13/02/2020	13/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	17/02/2020	17/02/2020											
Dissolved Antimony #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025									<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025									<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005									<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005									<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015									<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015									<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007									<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07									<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005									<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05									<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003	0.005									<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03	0.05									<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001									<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001									<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01									<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1									<0.1	mg/kg	TM26/PM0
Fluoride	0.4	<0.3									<0.3	mg/l	TM173/PM0
Fluoride	4	<3									<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	<0.5									<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	<5									<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3									<0.3	mg/l	TM38/PM0
Chloride #	<3	<3									<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2									<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20									<20	mg/kg	TM60/PM0
pH	8.00	8.14									<0.01	pH units	TM73/PM0
Total Dissolved Solids #	96	89									<35	mg/l	TM20/PM0
Total Dissolved Solids #	960	890									<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30						
Sample ID	TR1	TR1	TR2	TR2	TR3	TR3	TR4	TR4	TR5	TR5						
Depth	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-1.00	1.00-2.40	0.00-2.00	2.00-3.00	0.00-1.10	1.10-3.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020	12/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020						
Solid Waste Analysis																
Total Organic Carbon #	0.36	0.52	1.66	0.43	1.03	0.32	2.42	0.48	1.19	0.40	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025 [SV]	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035 [SV]	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.59	<0.22	0.41	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.08	<0.64	0.73	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.066	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.10	0.07	0.17	0.04	0.08	0.06	0.03	0.02	0.09	0.08	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	450	<350	740	690	520	450	750	530	880	380	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1015	0.1021	0.1103	0.129	0.111	0.1018	0.1183	0.1134	0.1105	0.1026	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	88.6	88.1	81.5	69.8	80.7	88.2	75.9	79.5	81.5	87.8	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.888	0.888	0.879	0.861	0.878	0.888	0.871	0.877	0.879	0.887	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.6	0.8	0.831	0.8	0.8	0.8	0.779	0.669	0.8	-	-	-		l	NONE/PM17
pH #	8.90	8.62	8.24	8.55	8.55	8.48	8.14	8.21	8.44	8.66	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	5	4	5	<3	6	<3	4	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	<5	<5	24	<5	25	<5	7	<5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	14	<3	8	<3	<3	<3	<3	800	15000	25000	<3	mg/kg	TM38/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60						
Sample ID	TR6	TR6	TR7	TR7	TR8	TR8	TR9	TR9	TR10	TR10						
Depth	0.00-1.10	1.10-3.00	0.00-1.00	1.10-3.00	0.00-0.70	0.70-3.00	0.00-0.55	0.55-3.00	0.00-0.60	0.60-2.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020	13/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	17/02/2020	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	3.60	0.30	0.72	0.35	3.34	0.45	6.98	0.56	5.58	0.42	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 SV	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	1.29	<0.22	<0.22	<0.22	<0.22	<0.22	1.30	<0.22	1.17	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	2.46	<0.64	<0.64	<0.64	<0.64	<0.64	2.32	<0.64	2.18	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	0.029	0.184	<0.025	0.120	<0.025	0.090	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.55	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.23	0.07	<0.02	0.07	0.04	0.06	0.10	0.10	0.05	0.06	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.05	<0.02	<0.02	<0.02	<0.02	0.05	0.05	<0.02	0.04	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.05	<0.03	<0.03	<0.03	0.05	<0.03	0.04	<0.03	0.07	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	2370	901	1040	770	790	530	1379	880	1120	910	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	<20	130	40	60	20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1124	0.1035	0.1061	0.1	0.1154	0.1056	0.1132	0.1093	0.1137	0.1046	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	80.4	86.9	85.2	90.0	77.8	85.1	79.3	82.1	79.4	86.4	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.878	0.887	0.884	0.89	0.874	0.884	0.876	0.88	0.877	0.886	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.74	0.8	0.8	0.8	0.8	0.84	0.75	0.8	0.6	-	-	-		l	NONE/PM17
pH #	8.05	8.23	8.41	8.53	8.18	8.63	7.96	8.38	8.16	8.51	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	3	5	<3	4	<3	4	<3	<3	4	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	749	20	<5	6	7	<5	9	<5	5	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	800	15000	25000	<3	mg/kg	TM38/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2403

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	64-66	67-69									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TR11	TR11														
Depth	0.00-1.00	1.00-2.00														
COC No / misc																
Containers	V J T	V J T														
Sample Date	13/02/2020	13/02/2020														
Sample Type	Soil	Soil														
Batch Number	1	1														
Date of Receipt	17/02/2020	17/02/2020														
Solid Waste Analysis																
Total Organic Carbon #	0.60	0.36									3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025									6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035									1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30									500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22									-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64									100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025									0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03									20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005									0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015									0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07									2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001									0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03	0.05									0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02									0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05									0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02									0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03									0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03									4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	960	890									4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20									500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1109	0.1018									-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	80.8	88.2									-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.879	0.888									-	-	-		l	NONE/PM17
Eluate Volume	0.75	0.79									-	-	-		l	NONE/PM17
pH #	8.38	8.42									-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1									1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	4	<3									-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	<5									1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3									800	15000	25000	<3	mg/kg	TM38/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland

Reference: Project Cavalry

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
20/2403	1	TR1	0.00-1.00	1-3	No interpretation possible
20/2403	1	TR1	1.00-2.40	4-6	No interpretation possible
20/2403	1	TR2	0.00-1.00	7-9	No interpretation possible
20/2403	1	TR2	1.00-2.40	10-12	No interpretation possible
20/2403	1	TR3	0.00-1.00	13-15	No interpretation possible
20/2403	1	TR3	1.00-2.40	16-18	No interpretation possible
20/2403	1	TR4	0.00-2.00	19-21	Possible PAH's
20/2403	1	TR4	2.00-3.00	22-24	No interpretation possible
20/2403	1	TR5	0.00-1.10	25-27	No interpretation possible
20/2403	1	TR5	1.10-3.00	28-30	No interpretation possible
20/2403	1	TR6	0.00-1.10	31-33	No interpretation possible
20/2403	1	TR6	1.10-3.00	34-36	No interpretation possible
20/2403	1	TR7	0.00-1.00	37-39	No interpretation possible
20/2403	1	TR7	1.10-3.00	40-42	No interpretation possible
20/2403	1	TR8	0.00-0.70	43-45	No interpretation possible
20/2403	1	TR8	0.70-3.00	46-48	No interpretation possible
20/2403	1	TR9	0.00-0.55	49-51	PAH's
20/2403	1	TR9	0.55-3.00	52-54	No interpretation possible
20/2403	1	TR10	0.00-0.60	55-57	No interpretation possible
20/2403	1	TR10	0.60-2.00	58-60	No interpretation possible
20/2403	1	TR11	0.00-1.00	64-66	No interpretation possible
20/2403	1	TR11	1.00-2.00	67-69	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR1	0.00-1.00	2	18/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR1	1.00-2.40	5	18/02/2020	**General Description (Bulk Analysis)**	Soil
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR2	0.00-1.00	8	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR2	1.00-2.40	11	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR3	0.00-1.00	14	18/02/2020	**General Description (Bulk Analysis)**	soil.stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR3	1.00-2.40	17	18/02/2020	**General Description (Bulk Analysis)**	Soil
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD
					18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR4	0.00-2.00	20	18/02/2020	**General Description (Bulk Analysis)**	soil-stones
					18/02/2020	**Asbestos Fibres**	NAD
					18/02/2020	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR4	0.00-2.00	20	18/02/2020	**Asbestos Type**	NAD
					18/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR4	2.00-3.00	23	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR5	0.00-1.10	26	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR5	1.10-3.00	29	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR6	0.00-1.10	32	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR6	1.10-3.00	35	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR7	0.00-1.00	38	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR7	1.10-3.00	41	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR8	0.00-0.70	44	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR8	0.70-3.00	47	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD

Client Name: Ground Investigations Ireland
Reference: Project Cavalry
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2403	1	TR8	0.70-3.00	47	19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR9	0.00-0.55	50	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR9	0.55-3.00	53	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR10	0.00-0.60	56	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR10	0.60-2.00	59	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR11	0.00-1.00	65	19/02/2020	**General Description (Bulk Analysis)**	Soil/Stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD
20/2403	1	TR11	1.00-2.00	68	19/02/2020	**General Description (Bulk Analysis)**	soil-stones
					19/02/2020	**Asbestos Fibres**	NAD
					19/02/2020	**Asbestos ACM**	NAD
					19/02/2020	**Asbestos Type**	NAD
					19/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland

Reference: Project Cavalry

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
20/2403	1	TR1	0.00-1.00	1-3	Sulphate	Sample holding time exceeded
20/2403	1	TR2	0.00-1.00	7-9	Sulphate	Sample holding time exceeded
20/2403	1	TR3	0.00-1.00	13-15	Sulphate	Sample holding time exceeded
20/2403	1	TR4	0.00-2.00	19-21	Sulphate	Sample holding time exceeded
20/2403	1	TR5	0.00-1.10	25-27	Sulphate	Sample holding time exceeded
20/2403	1	TR6	0.00-1.10	31-33	Sulphate	Sample holding time exceeded
20/2403	1	TR7	0.00-1.00	37-39	Sulphate	Sample holding time exceeded
20/2403	1	TR8	0.00-0.70	43-45	Sulphate	Sample holding time exceeded
20/2403	1	TR9	0.00-0.55	49-51	Sulphate	Sample holding time exceeded
20/2403	1	TR10	0.00-0.60	55-57	Sulphate	Sample holding time exceeded
20/2403	1	TR10	2.00-3.00	61-63	Sulphate	Sample holding time exceeded
20/2403	1	TR11	1.00-2.00	67-69	Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/2403

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes

EMT Job No: 20/2403

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

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Ground Investigations Ireland
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Hazelhatch Road
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Ireland

Attention :	Stephen Kealy
Date :	19th March, 2020
Your reference :	9363-01-20
Our reference :	Test Report 20/2573 Batch 1
Location :	Project Calvary
Date samples received :	19th February, 2020
Status :	Final report
Issue :	3

Twelve samples were received for analysis on 19th February, 2020 of which twelve were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
Antimony	3	3	-	5	4	5	3	3	3	2	<1	mg/kg	TM30/PM15
Arsenic #	14.0	12.2	-	7.6	15.8	16.5	12.1	22.1	14.4	9.1	<0.5	mg/kg	TM30/PM15
Barium #	110	92	-	113	114	113	75	131	90	161	<1	mg/kg	TM30/PM15
Cadmium #	2.3	2.7	-	3.4	5.2	3.6	2.4	1.9	2.7	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	40.5	36.1	-	53.0	74.9	52.1	39.3	51.6	55.7	52.8	<0.5	mg/kg	TM30/PM15
Copper #	124	44	-	39	60	55	44	74	69	25	<1	mg/kg	TM30/PM15
Lead #	193	20	-	27	40	64	40	161	35	40	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	4.5	5.4	-	7.0	7.9	9.0	4.5	6.0	5.3	3.8	<0.1	mg/kg	TM30/PM15
Nickel #	46.2	47.9	-	56.5	92.0	63.1	46.3	59.1	81.2	40.4	<0.7	mg/kg	TM30/PM15
Selenium #	2	2	-	3	3	2	2	2	2	<1	<1	mg/kg	TM30/PM15
Zinc #	128	105	-	130	282	141	114	183	132	70	<5	mg/kg	TM30/PM15
Antimony	-	-	<1	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	4.1	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	61	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	0.4	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	32.5	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	44	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	41	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	<0.1	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	0.4	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	28.3	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	<1	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	112	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.06	<0.03	0.09	0.11	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.05	<0.03	0.16	0.11	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	0.06	0.10	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.05	<0.02	0.17	0.10	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	0.14	0.26	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	0.09	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	0.04	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	0.13	0.10	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	0.49	0.72	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	0.88	1.03	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.10	0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.04	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	87	84	86	90	90	89	84	90	92	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	343	303 AA	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.6 AA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<12 AA	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<21 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	326	222 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	17	81 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	343	303 AA	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	50	<30 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	276	211 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.6 AA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<12 AA	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<21 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	70	388 AA	63	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	8	197 AA	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	78	585 AA	63	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	421	888 AA	63	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	11	<30 AA	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	59	380 AA	56	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	18.0	11.7	6.7	21.7	16.7	19.7	20.7	25.2	27.8	19.3	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	15.3	10.5	6.2	17.9	14.3	16.4	17.1	20.1	21.7	16.1	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	40.5	36.1	-	53.0	74.9	52.1	39.3	51.6	55.7	52.8	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	32.5	-	-	-	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.89	0.43	NDP	0.60	0.71	1.14	0.84	4.68	0.64	0.37	<0.02	%	TM21/PM24
pH #	9.66	8.72	8.88	8.40	8.07	8.35	9.76	8.38	8.65	8.33	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1043	0.1052	0.0997	0.1129	0.1137	0.1122	0.1082	0.115	0.1158	0.1143		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30	Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	LOD/LOR	Units	Method No.
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Antimony	4	3									<1	mg/kg	TM30/PM15
Arsenic #	15.9	12.3									<0.5	mg/kg	TM30/PM15
Barium #	193	104									<1	mg/kg	TM30/PM15
Cadmium #	0.5	2.2									<0.1	mg/kg	TM30/PM15
Chromium #	57.8	38.5									<0.5	mg/kg	TM30/PM15
Copper #	42	301$_{AB}$									<1	mg/kg	TM30/PM15
Lead #	460	133									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Molybdenum #	3.3	4.3									<0.1	mg/kg	TM30/PM15
Nickel #	33.2	43.6									<0.7	mg/kg	TM30/PM15
Selenium #	<1	1									<1	mg/kg	TM30/PM15
Zinc #	142	149									<5	mg/kg	TM30/PM15
Antimony	-	-									<1	mg/kg	TM30/PM62
Arsenic	-	-									<0.5	mg/kg	TM30/PM62
Barium	-	-									<1	mg/kg	TM30/PM62
Cadmium	-	-									<0.1	mg/kg	TM30/PM62
Chromium	-	-									<0.5	mg/kg	TM30/PM62
Copper	-	-									<1	mg/kg	TM30/PM62
Lead	-	-									<5	mg/kg	TM30/PM62
Mercury	-	-									<0.1	mg/kg	TM30/PM62
Molybdenum	-	-									<0.1	mg/kg	TM30/PM62
Nickel	-	-									<0.7	mg/kg	TM30/PM62
Selenium	-	-									<1	mg/kg	TM30/PM62
Zinc	-	-									<5	mg/kg	TM30/PM62

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.07	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.11	0.07									<0.03	mg/kg	TM4/PM8
Pyrene #	0.10	0.06									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.07	0.06									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.10	0.10									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.05	0.05									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
PAH 6 Total #	0.26	0.22									<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.07	0.07									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.03									<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1									<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	90									<0	%	TM4/PM8
Mineral Oil (C10-C40)	37	<30									<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	37	<7									<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	37	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10									<10	mg/kg	TM5/PM8/PM16
>C25-C35	33	<10									<10	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26									<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52									<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10									<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10									<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5									<5	ug/kg	TM31/PM12
Benzene #	<5	<5									<5	ug/kg	TM31/PM12
Toluene #	<5	<5									<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5									<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5									<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5									<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5									<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5									<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35									<35	ug/kg	TM17/PM8
Natural Moisture Content	22.5	20.0									<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	18.4	16.6									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Chromium III	57.8	38.5									<0.5	mg/kg	NONE/NONE
Chromium III	-	-									<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	1.03	0.85									<0.02	%	TM21/PM24
pH #	8.78	10.76									<0.01	pH units	TM73/PM11
Mass of raw test portion	0.109	0.1058										kg	NONE/PM17

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Mass of dried test portion	0.09	0.09										kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	LOD/LOR	Units	Method No.
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10			
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020			
Dissolved Antimony #	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	0.004	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.03	0.04	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0042	0.0084	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.042	0.084	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0026	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.0030	<0.0015	<0.0015	0.0016	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.026	<0.015	<0.015	<0.015	<0.015	<0.015	0.030	<0.015	<0.015	0.016	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.005	0.013	<0.002	0.018	0.005	0.011	0.014	0.007	0.008	0.010	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.05	0.13	<0.02	0.18	0.05	0.11	0.14	0.07	0.08	0.10	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	0.5	<0.3	0.3	<0.3	0.4	<0.3	0.4	0.3	0.7	<0.3	mg/l	TM173/PM0
Fluoride	<3	5	<3	3	<3	4	<3	4	<3	7	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	1.5	1.5	7.5	1.2	0.7	0.6	4.6	2.0	2.8	3.8	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	15	15	75	12	7	6	46	20	28	38	<5	mg/kg	TM38/PM0
Chloride #	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	0.4	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	4	<3	<3	<3	<3	<3	4	<3	4	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3	4	4	2	2	4	3	5	3	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	40	40	20	20	40	30	50	30	20	<20	mg/kg	TM60/PM0
pH	8.55	8.11	9.37	8.17	8.12	8.02	9.03	7.97	8.11	8.28	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	<35	51	78	90	57	64	84	58	60	91	<35	mg/l	TM20/PM0
Total Dissolved Solids #	<350	510	780	901	570	640	840	580	600	910	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									LOD/LOR	Units	Method No.
Sample ID	IF2	IF3											
Depth	0.00-1.50	0.00-1.50											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/02/2020	11/02/2020											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	19/02/2020	19/02/2020											
Dissolved Antimony #	0.007	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.07	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0040	0.0159									<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.040	0.159									<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.015	0.005									<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.15	0.05									<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005									<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005									<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0096	0.0092									<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.096	0.092									<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	0.064									<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	0.64									<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005									<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05									<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.011									<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.11									<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002									<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02									<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003									<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03									<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	0.00003									<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	0.0003									<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01									<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1									<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3									<0.3	mg/l	TM173/PM0
Fluoride	<3	<3									<3	mg/kg	TM173/PM0
Sulphate as SO4 #	4.6	6.1									<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	46	61									<5	mg/kg	TM38/PM0
Chloride #	<0.3	0.4									<0.3	mg/l	TM38/PM0
Chloride #	<3	4									<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	4									<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	40									<20	mg/kg	TM60/PM0
pH	8.45	2.91									<0.01	pH units	TM73/PM0
Total Dissolved Solids #	45	131									<35	mg/l	TM20/PM0
Total Dissolved Solids #	450	1310									<350	mg/kg	TM20/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30						
Sample ID	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10						
Depth	0.20-1.10	0.15-1.40	0.07-0.30	0.13-1.50	0.12-1.20	0.15-1.40	0.20-1.30	0.15-1.60	0.15-1.50	0.20-1.30						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	13/02/2020	13/02/2020	12/02/2020	14/02/2020	13/02/2020	13/02/2020	12/02/2020	13/02/2020	13/02/2020	14/02/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	19/02/2020	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	0.89	0.43	NDP	0.60	0.71	1.14	0.84	4.68	0.64	0.37	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	343	303 BA	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	0.49	0.72	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	0.88	1.03	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.042	0.084	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.026	<0.015	<0.015	<0.015	<0.015	<0.015	0.030	<0.015	<0.015	0.016	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.05	0.13	<0.02	0.18	0.05	0.11	0.14	0.07	0.08	0.10	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.03	0.04	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	<350	510	780	901	570	640	840	580	600	910	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30	40	40	20	20	40	30	50	30	20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1043	0.1052	0.0997	0.1129	0.1137	0.1122	0.1082	0.115	0.1158	0.1143	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	86.6	85.7	90.4	80.0	79.4	80.3	83.6	78.5	77.8	78.7	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.886	0.885	0.89	0.878	0.877	0.878	0.882	0.875	0.874	0.876	-	-	-		l	NONE/PM17
Eluate Volume	0.87	0.87	0.87	0.67	0.82	0.85	0.87	0.87	0.88	0.78	-	-	-		l	NONE/PM17
pH #	9.66	8.72	8.88	8.40	8.07	8.35	9.76	8.38	8.65	8.33	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	5	<3	3	<3	4	<3	4	<3	7	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	15	15	75	12	7	6	46	20	28	38	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	4	<3	<3	<3	<3	<3	4	<3	4	<3	800	15000	25000	<3	mg/kg	TM38/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy
EMT Job No: 20/2573

Report : EN12457_2

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	31-33	34-36									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	IF2	IF3														
Depth	0.00-1.50	0.00-1.50														
COC No / misc																
Containers	V J T	V J T														
Sample Date	12/02/2020	11/02/2020														
Sample Type	Soil	Soil														
Batch Number	1	1														
Date of Receipt	19/02/2020	19/02/2020														
Solid Waste Analysis																
Total Organic Carbon #	1.03	0.85									3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025									6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035									1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	37	<30									500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	0.26	0.22									-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64									100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	0.040	0.159									0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.15	0.05									20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005									0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.096	0.092									0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	0.64									2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	0.0003									0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	0.11									0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02									0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05									0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.07	<0.02									0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03									0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03									4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	450	1310									4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	40									500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.109	0.1058									-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	82.8	85.5									-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.881	0.885									-	-	-		l	NONE/PM17
Eluate Volume	0.87	0.7									-	-	-		l	NONE/PM17
pH #	8.78	10.76									-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1									1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3									-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	46	61									1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	4									800	15000	25000	<3	mg/kg	TM38/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland

Reference: 9363-01-20

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
20/2573	1	SL1	0.20-1.10	1-3	No interpretation possible
20/2573	1	SL2	0.15-1.40	4-6	Lubricating oil
20/2573	1	SL3	0.07-0.30	7-9	Lubricating oil & Possible taramc/bitumen
20/2573	1	SL4	0.13-1.50	10-12	No interpretation possible
20/2573	1	SL5	0.12-1.20	13-15	No interpretation possible
20/2573	1	SL6	0.15-1.40	16-18	No interpretation possible
20/2573	1	SL7	0.20-1.30	19-21	No interpretation possible
20/2573	1	SL8	0.15-1.60	22-24	No interpretation possible
20/2573	1	SL9	0.15-1.50	25-27	No interpretation possible
20/2573	1	SL10	0.20-1.30	28-30	No interpretation possible
20/2573	1	IF2	0.00-1.50	31-33	Possible Lubricating oil
20/2573	1	IF3	0.00-1.50	34-36	No interpretation possible

Client Name: Ground Investigations Ireland
Reference: 20/01/9363
Location: Project Calvary
Contact: Stephen Kealy

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2573	1	SL1	0.20-1.10	2	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL2	0.15-1.40	5	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL3	0.07-0.30	8	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	Fibre Bundles
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	Chrysotile
					21/02/2020	**Asbestos Level Screen**	less than 0.1%
					03/03/2020	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					03/03/2020	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					03/03/2020	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
20/2573	1	SL4	0.13-1.50	11	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL5	0.12-1.20	14	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL6	0.15-1.40	17	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 20/01/9363
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/2573	1	SL7	0.20-1.30	20	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL8	0.15-1.60	23	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL9	0.15-1.50	26	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	SL10	0.20-1.30	29	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	IF2	0.00-1.50	32	21/02/2020	**General Description (Bulk Analysis)**	Soil
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD
20/2573	1	IF3	0.00-1.50	35	21/02/2020	**General Description (Bulk Analysis)**	soil-stones
					21/02/2020	**Asbestos Fibres**	NAD
					21/02/2020	**Asbestos ACM**	NAD
					21/02/2020	**Asbestos Type**	NAD
					21/02/2020	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland

Reference: 9363-01-20

Location: Project Calvary

Contact: Stephen Kealy

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
20/2573	1	SL3	0.07-0.30	7-9	TM21/PM24	Asbestos detected in sample

Client Name: Ground Investigations Ireland
Reference: 9363-01-20
Location: Project Calvary
Contact: Stephen Kealy

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/2573						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/2573

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x3 Dilution

AB	x5 Dilution
BA	x3 Dilution

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes

EMT Job No: 20/2573

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

A10.1 Impact Assessment Criteria

Table 10.1: Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on hydrology attributes (NRA, 2009)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and/ or quality and integrity of attribute	Loss or extensive change to a water body or water dependent habitat
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Calculated risk of serious pollution incident >1% annually2
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm1
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level1
Minor Beneficial	Results in minor improvement of attribute quality	Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually2
Moderate Beneficial	Results in moderate improvement of attribute quality	Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually2
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm1

Additional examples are provided in the NRA Guidance Document

1 Refer to Annex 1, Methods E and F, Annex 1 of HA216/06

1 Refer to Appendix B3 / Annex 1, Method D, Annex 1 of HA216/06

Source: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

Table 10.2 Criteria for Rating Impact Significance of Hydrological Attributes (NRA, 2009)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2- 3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

Source: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

A11.1 Ambient Air Quality Standards

APPENDIX 11.1: AMBIENT AIR QUALITY STANDARDS

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (and previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this, sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years, the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds. Finally, it aims to maintain air quality where it is good, and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these Directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values, which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2, and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages, to reach 0% by the attainment date. A second daughter Directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08, which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2010) and a limit value of 25 $\mu g/m^3$, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 $\mu g/m^3$ to 20% of the average exposure indicator (AEI) for concentrations of between 18 – 22 $\mu g/m^3$). Where the AEI is currently greater than 22 $\mu g/m^3$, all

appropriate measures should be employed to reduce this level to 18 µg/m^3 by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 – 2010, and again from 2018 – 2020. Additionally, an exposure concentration obligation of 20 µg/m^3 was set to be complied with by 2015, again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used, which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as *"a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC"*. These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway;
- 5 km from the nearest major industrial installation; and
- 20 km from a major urban conurbation.

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within Member States have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs. Zone B is defined as Cork City. Zone C is defined as 23 urban areas with a population greater than 15,000. Zone D is defined as the remainder of the country. The Zones were defined based on, among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish legislation (S.I. No. 33 of 1999). The act has designated the EPA as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality guidelines include those of the World Health Organisation (WHO). The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

A11.2 Dust Minimisation Plan

APPENDIX 11.2: DUST MINIMISATION PLAN

The objective of dust control at the Site is to ensure that no significant nuisance occurs at nearby sensitive receptors during the construction phase. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997).

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-Site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2 mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7 m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales), as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the Site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised.
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the Site boundary. This notice board should also include head / regional office contact details.
- It is recommended that community engagement be undertaken before works commence on Site explaining the nature and duration of the works to local residents and businesses.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out. The Community Liaison Officer (CLO) will be the responsible person.
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein.

- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the Site boundary, Site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Preparing and Maintaining the Site

- Plan Site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production and the Site is active for an extensive period.
- Avoid Site run-off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from Site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 20 kph haul roads and work areas. If long haul routes are required, these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where appropriate.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel among Site personnel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment, wherever appropriate.
- Ensure equipment is readily available on Site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- No bonfires or burning of waste materials.
- Waste management to be in accordance with all mitigation measures set out in Chapter 19 of the EIAR (Material Assets – Waste).

Measures Specific to Demolition

- Prior to demolition, blocks shall be soft stripped inside buildings (while retaining walls and windows in the rest of the building, where possible, to provide a screen against dust).
- During the demolition process, water suppression shall be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays / local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised. If necessary, fine water sprays will be employed in conjunction.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives instead.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials, ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard-surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site, where reasonably practicable).
- Ensure there is an adequate area of hard-surfaced road between the wheel wash facility and the site exit, wherever Site size and layout permits.

Summary of Dust Mitigation Measures

The proactive control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. In summary, the key features with respect to control of dust will be:

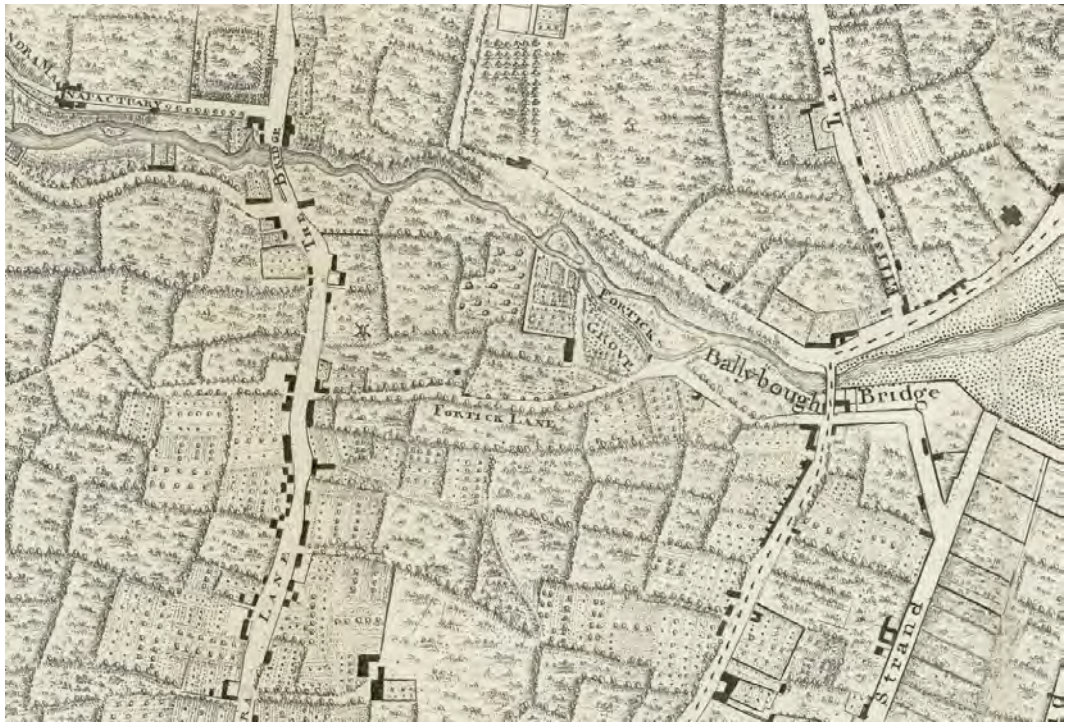
- The specification of a Site policy on dust and the identification of the Site management responsibilities for dust issues.
- The development of a documented system for managing Site practices with regard to dust control.
- The development of a means by which the performance of the Dust Minimisation Plan can be regularly monitored and assessed.
- The specification of effective measures to deal with any complaints received.

A14.1 Historic Maps

Holy Cross College, Clonliffe Road, Dublin 3.

Historic Maps

1. Extract from John Rocque's Survey of Dublin, 1757



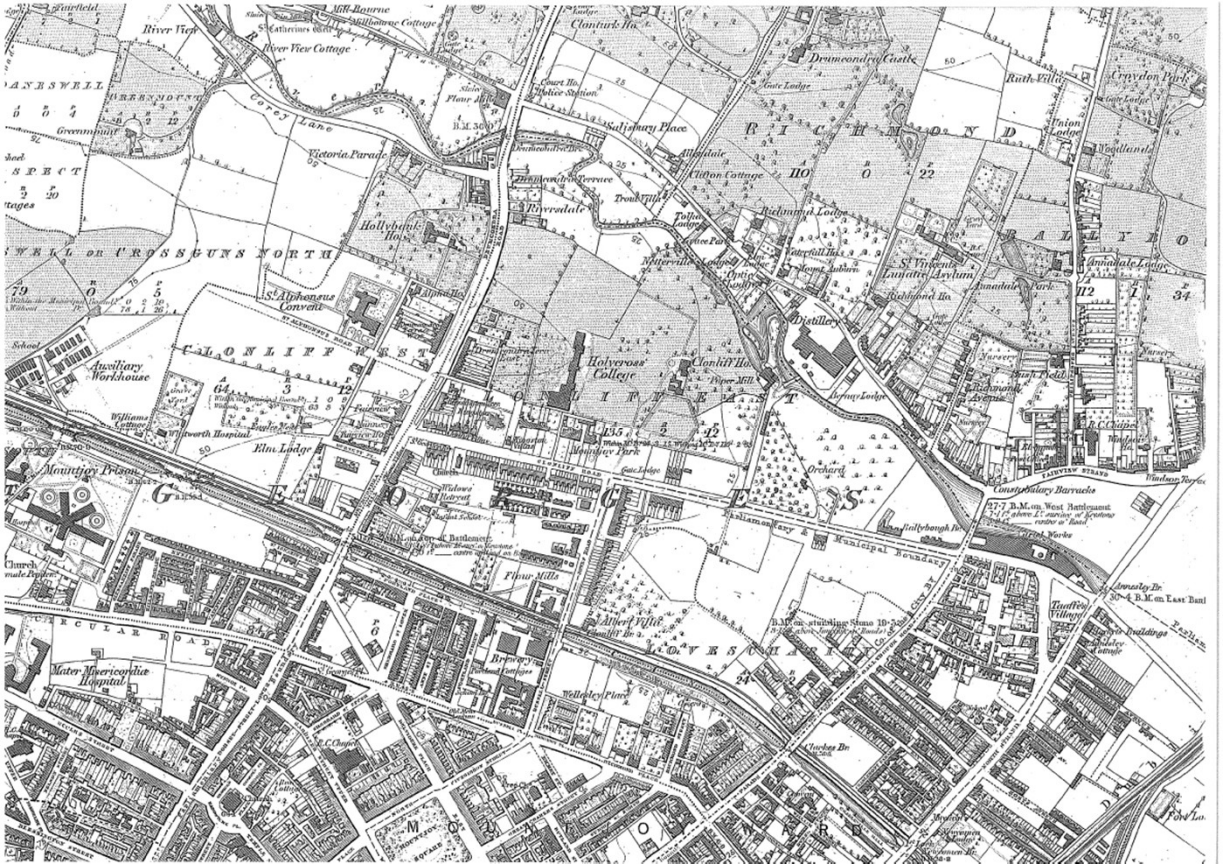
2. Extract from Bernard Scalé's Survey of Dublin, 1773

3. Extract from John Taylor's Map of Dublin, 1816

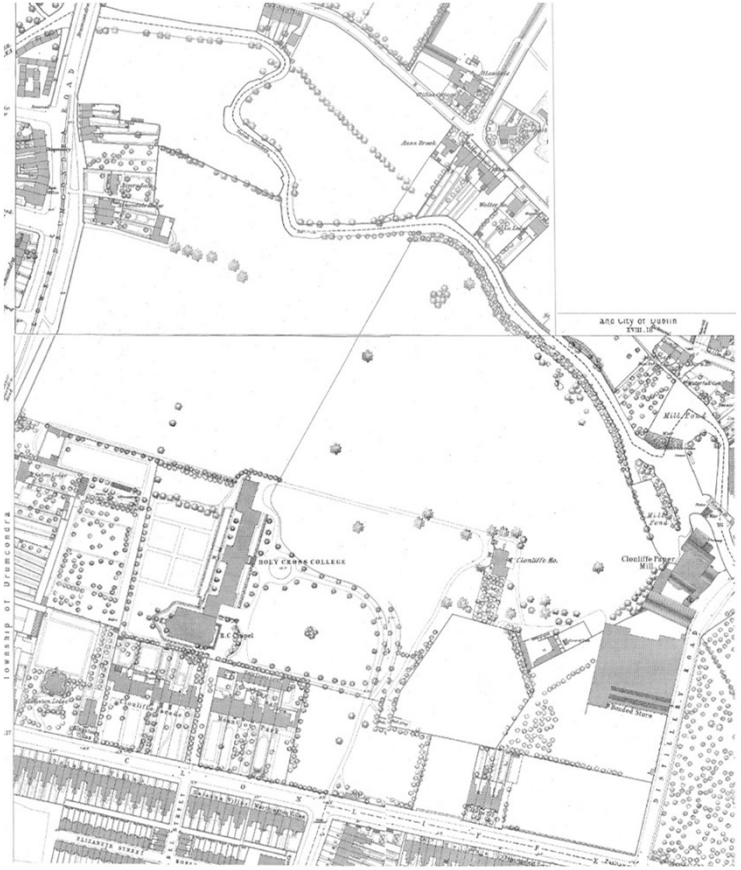
4. Extract from William Duncan's Map of Dublin, 1821

5. Extract from Ordnance Survey Map of Dublin, 1837-44

6. Extract from Ordnance Survey Map of Dublin, 1864-71



7. Extract from Ordnance Survey Map of Dublin, 1875-76



8. Extract from Ordnance Survey Map of Dublin, 1875-89

9. Extract from Ordnance Survey Map of Dublin, 1907-8

10. Extract from Ordnance Survey Map of Dublin, 1907-11

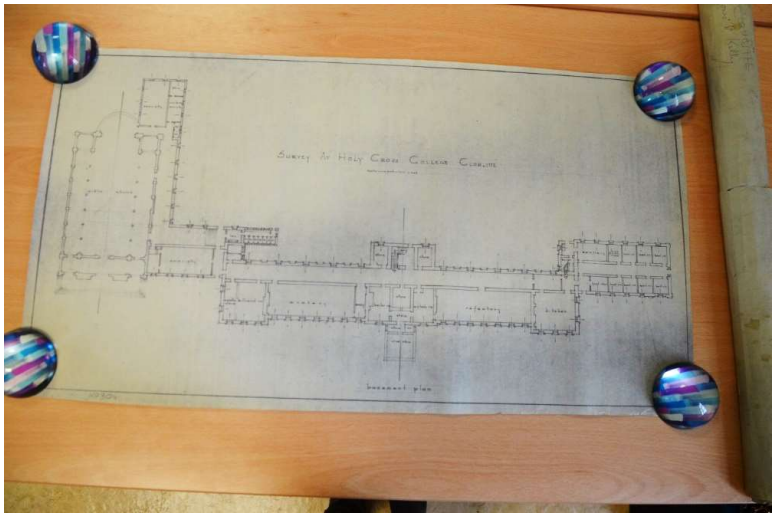
11. Extract from Ordnance Survey Map of Dublin, 1935-38

12. Extract from Dublin Corporation Planning Department Map, 1985

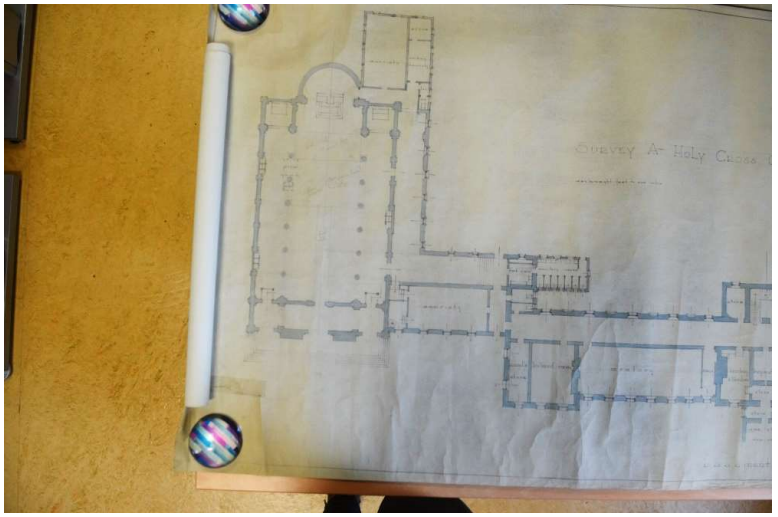
A14.2 Historic Drawings

Holy Cross College, Clonliffe Road, Dublin 3.

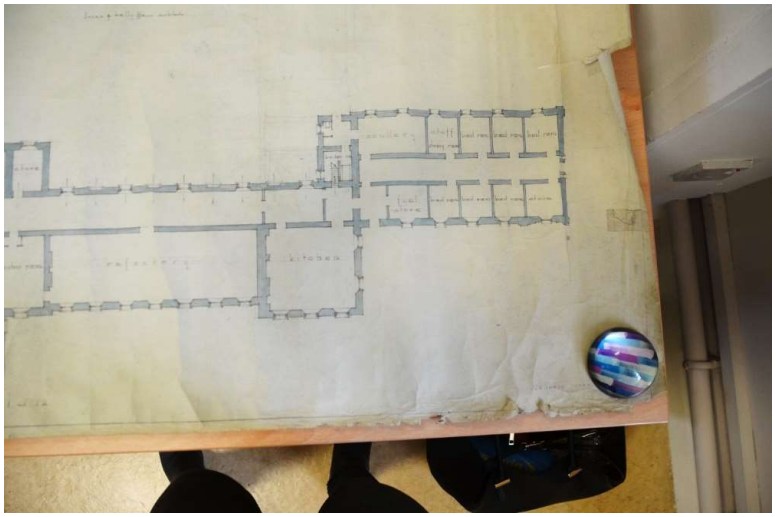
Historic Drawings – Dublin Diocesan Archives



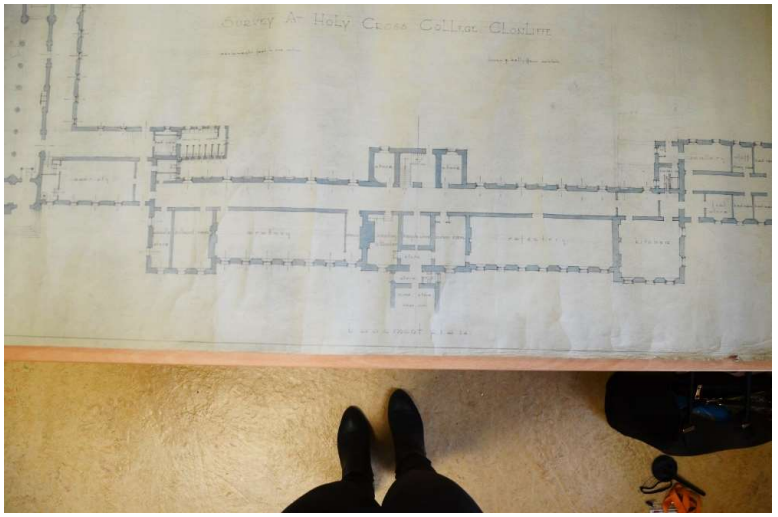
1. Undated Survey Drawing of Clonliffe College – Basement Level



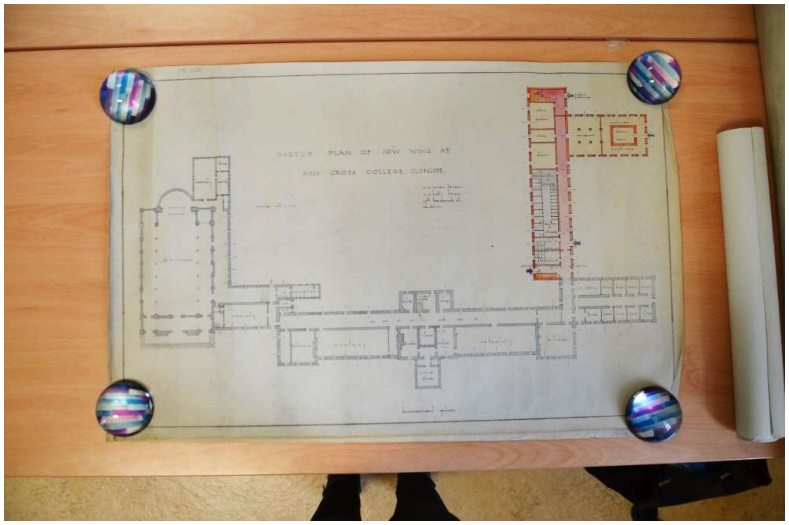
2. Detail: Undated Survey Drawing of Clonliffe College – Basement Level



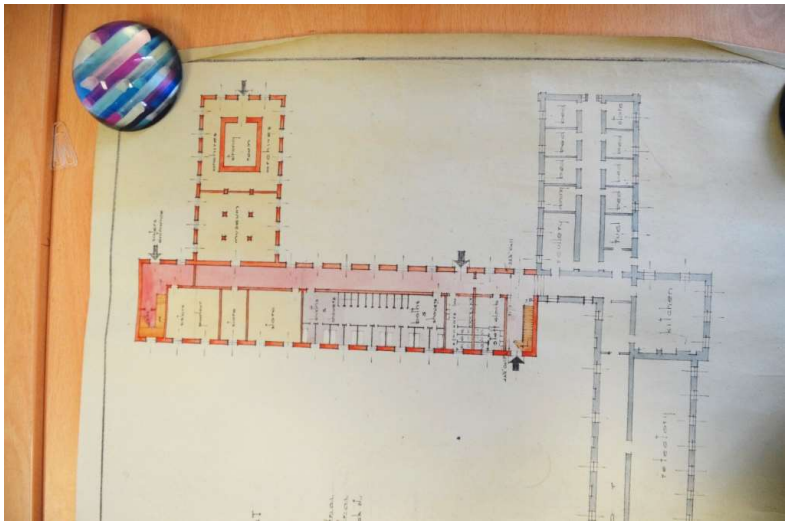
3. Detail: Undated Survey Drawing of Clonliffe College – Basement Level



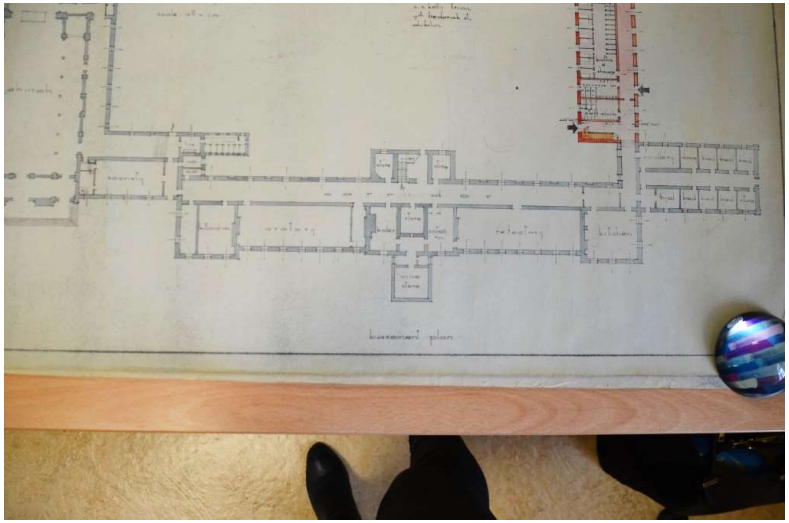
4. Detail: Undated Survey Drawing of Clonliffe College – Basement Level



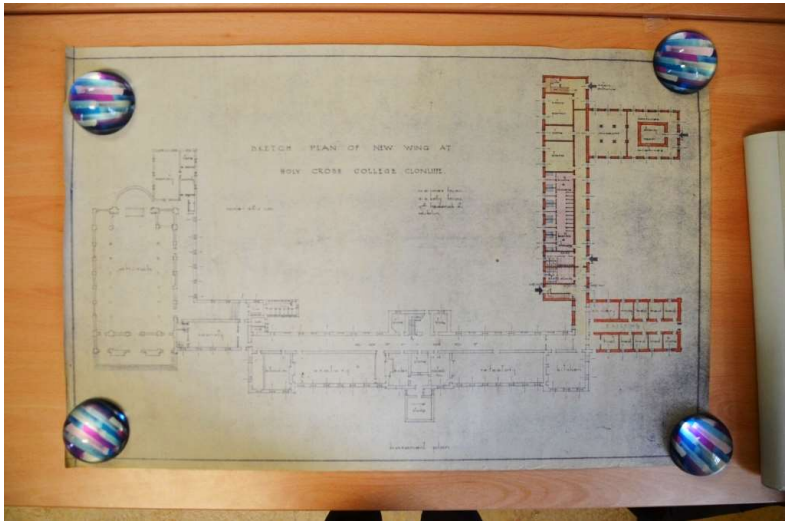
5. Undated Sketch Plan of New Wing – Basement Level



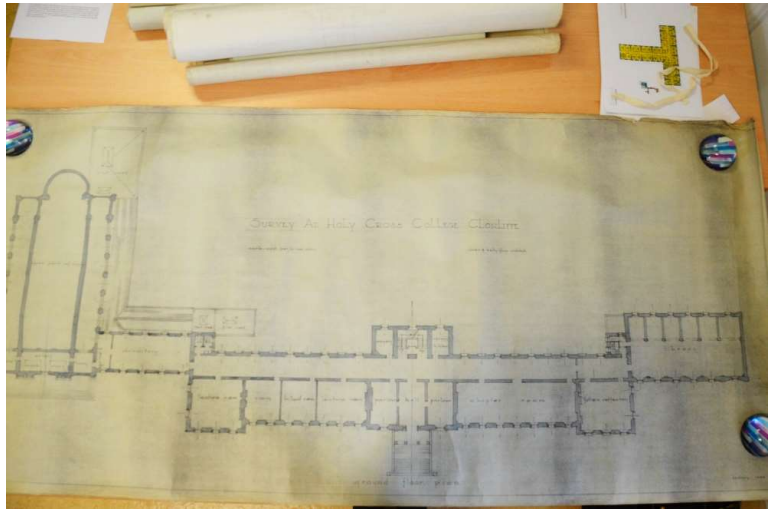
6. Detail: Undated Sketch Plan of New Wing – Basement Level



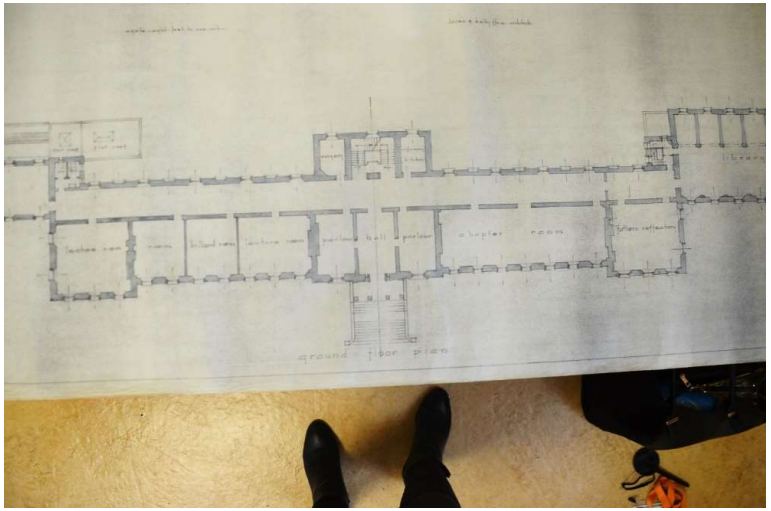
7. Detail: Undated Sketch Plan of New Wing – Basement Level



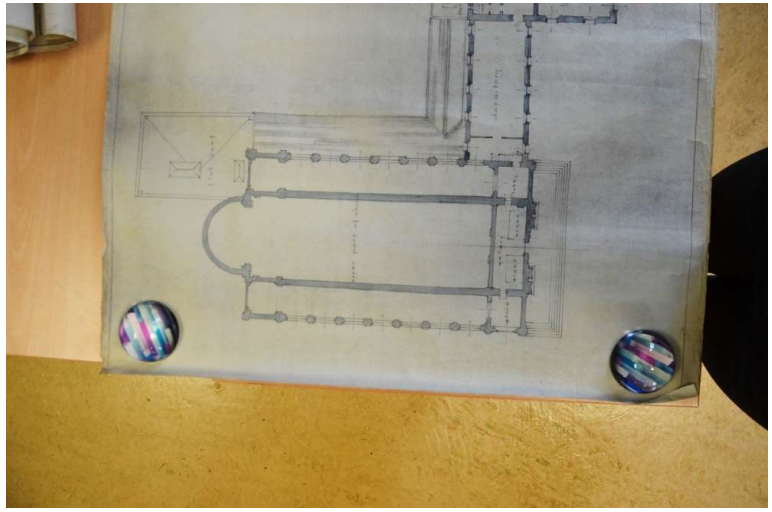
8. Undated Sketch Plan of New Wing – Basement Level



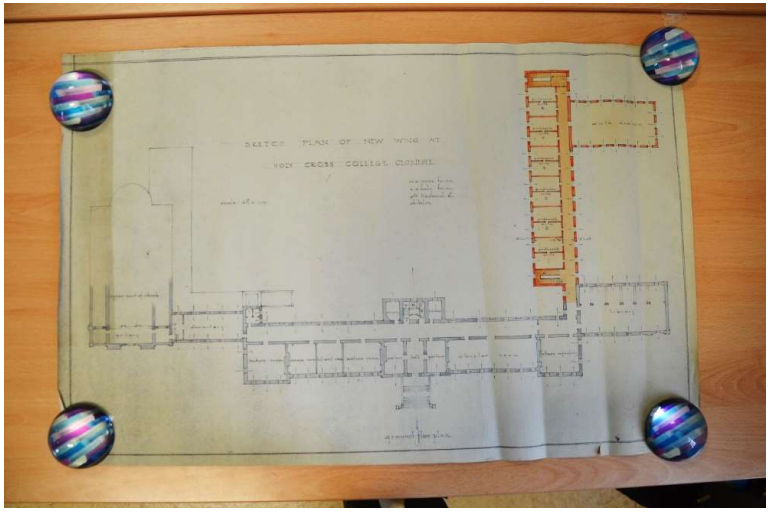
9. 1943 Survey Drawing of Clonliffe College – Ground Floor



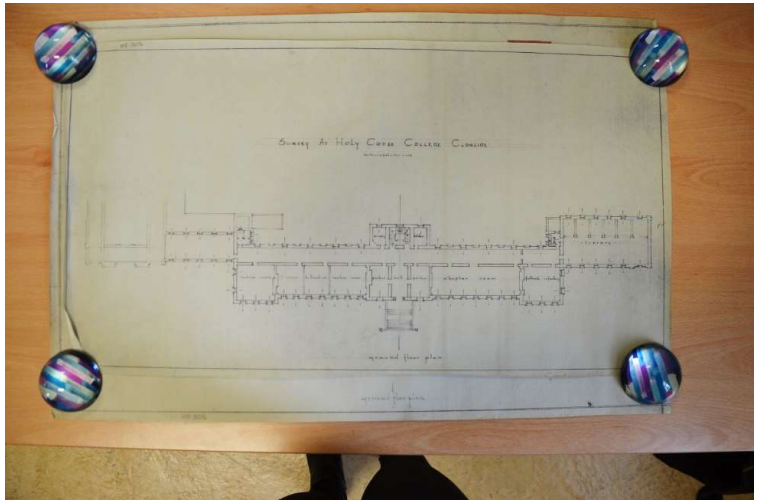
10. Detail: 1943 Survey Drawing of Clonliffe College – Ground Floor



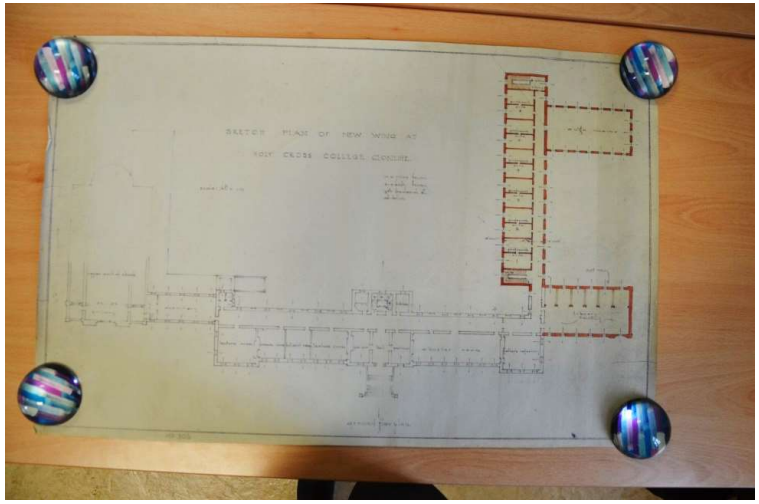
11. Detail: 1943 Survey Drawing of Clonliffe College – Ground Floor



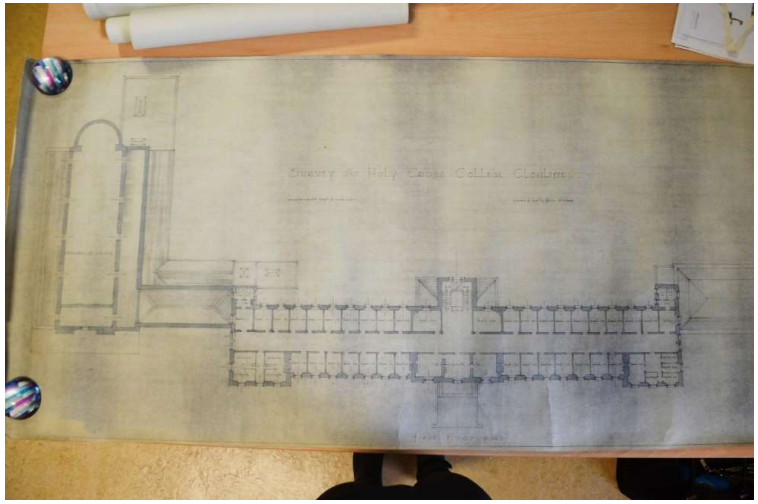
12. Undated Sketch Plan of New Wing – Ground Floor



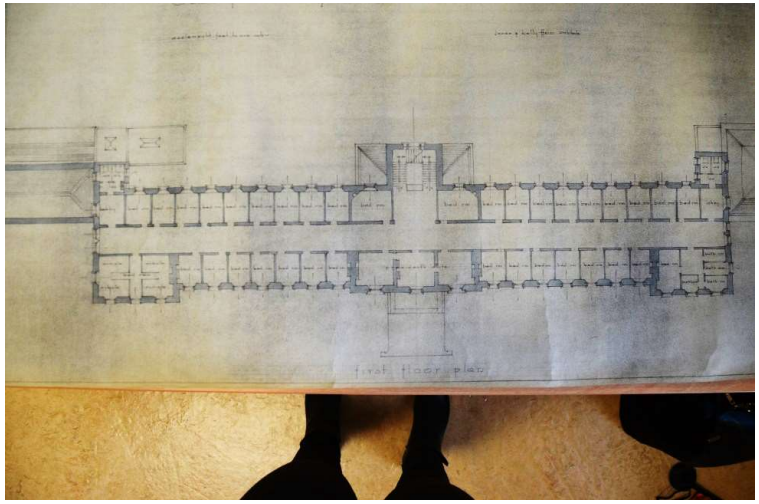
13. Undated Survey Drawing of Clonliffe College – Ground Floor



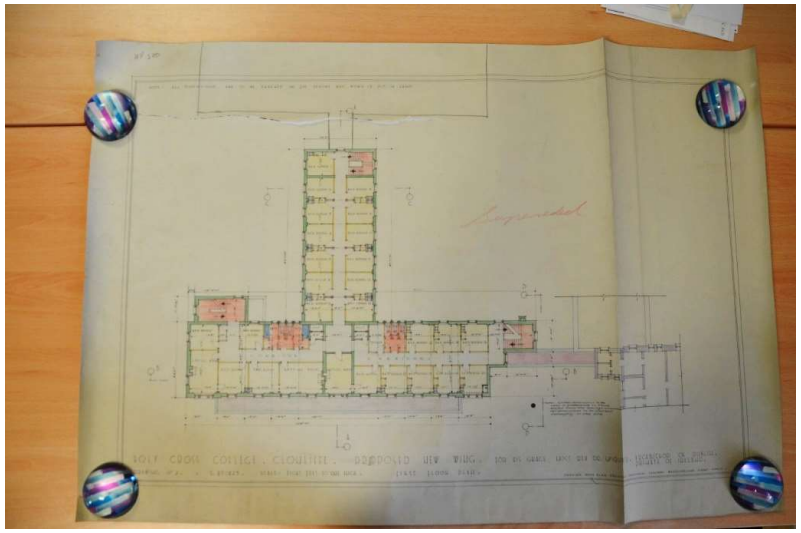
14. Undated Sketch Plan of New Wing – Ground Floor



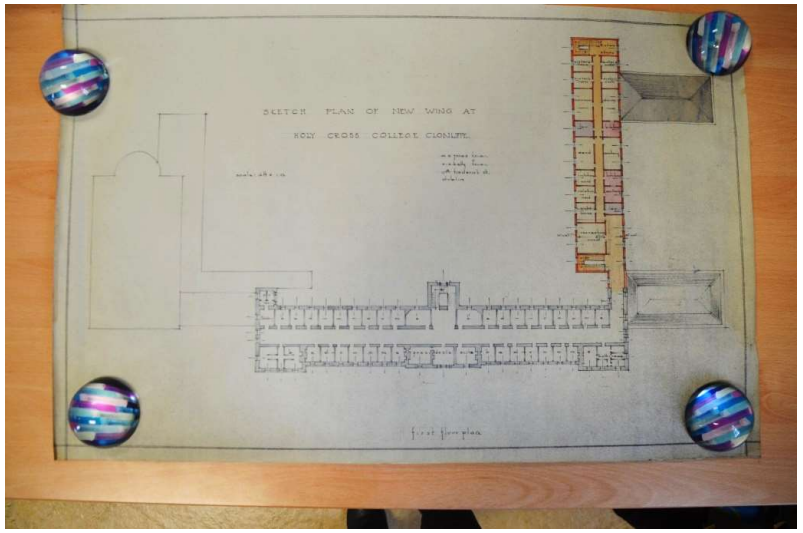
15. Undated Survey Drawing of Clonliffe College – First Floor



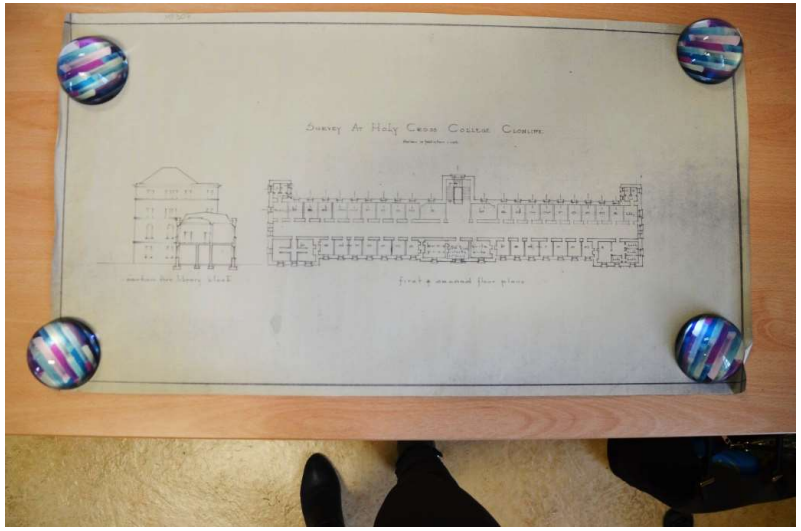
16. Detail: Undated Survey Drawing of Clonliffe College – First Floor



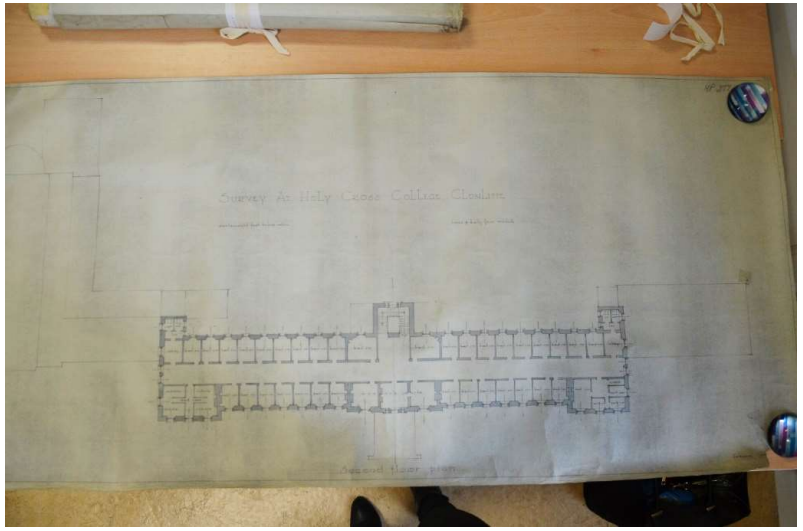
17. Undated Sketch Plan of New Wing – First Floor



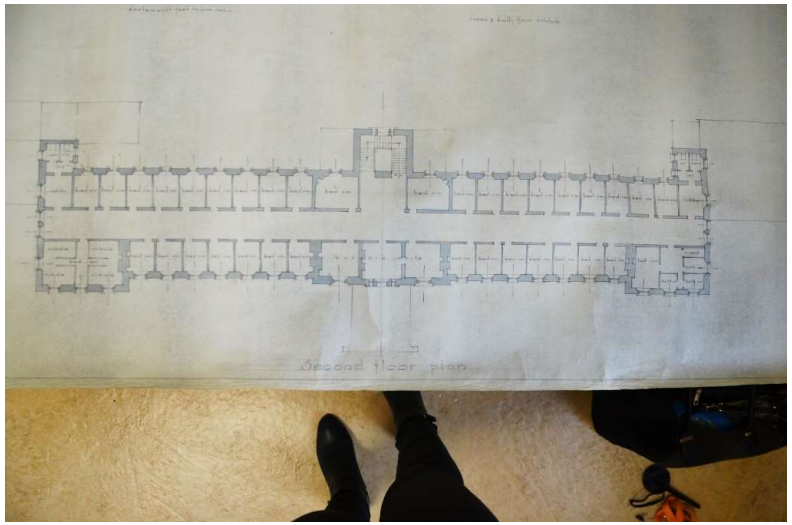
18. Undated Sketch Plan of New Wing – First Floor



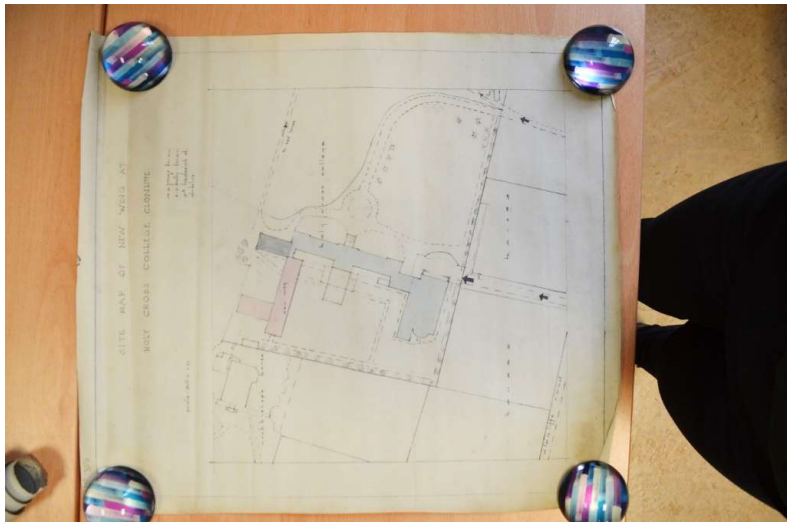
19. Undated Survey Section and Plans at First and Second Floor



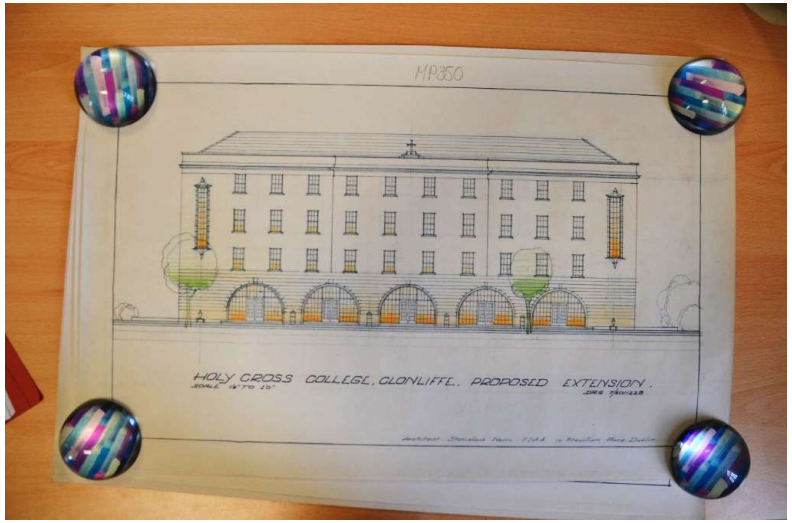
20. 1940s Survey Drawing of Clonliffe College – Second Floor Level



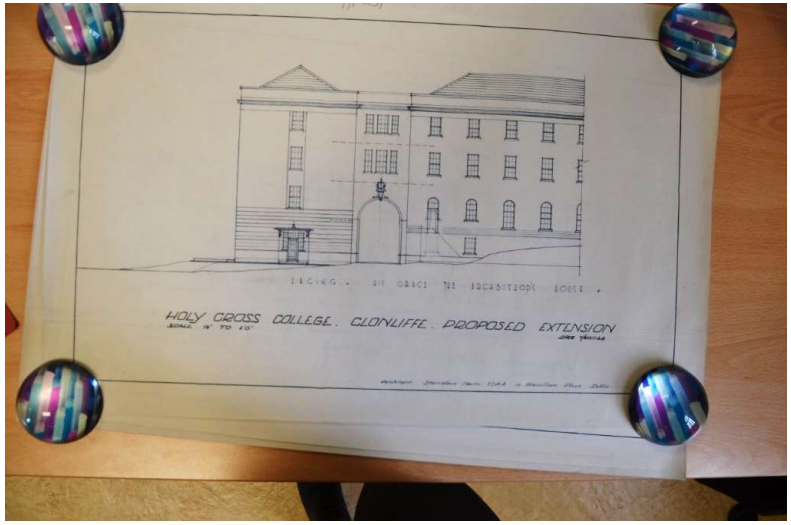
21. Detail: 1940s Survey Drawing of Clonliffe College – Second Floor Level



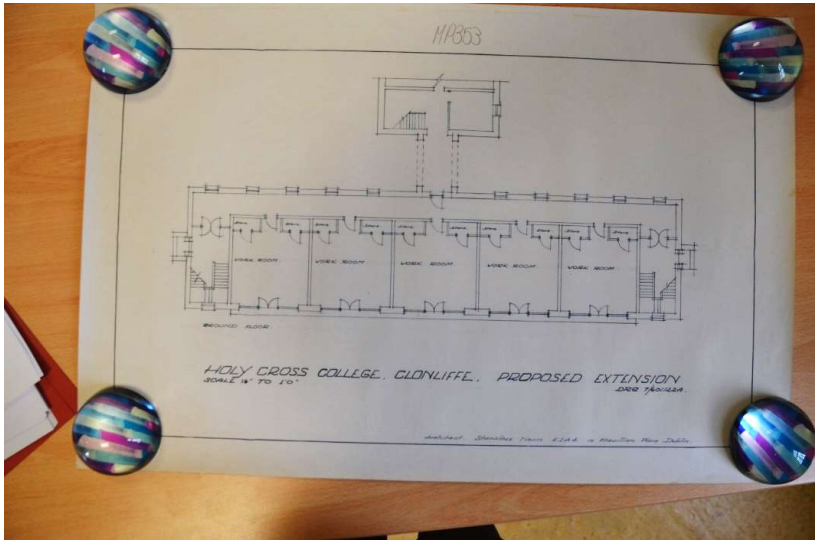
22. Undated Site Map of New Wing



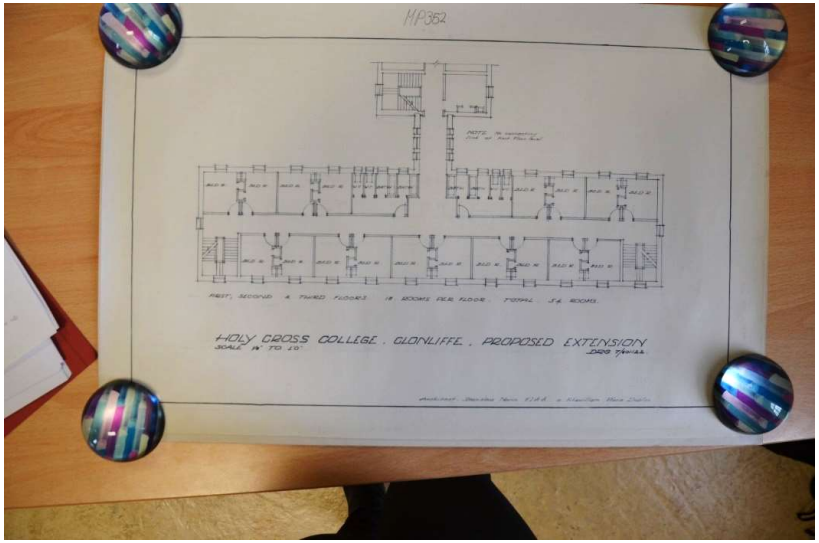
23. Undated Elevation of Proposed Extension



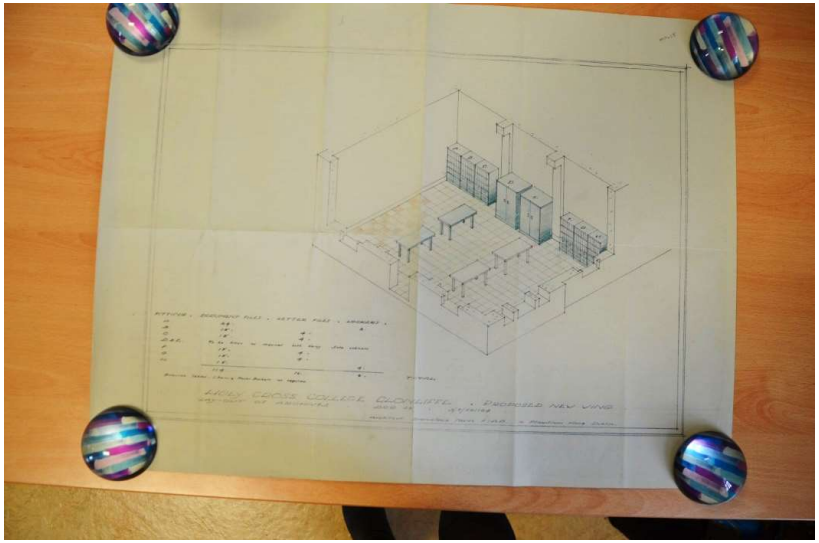
24. Undated Elevation of Proposed Extension



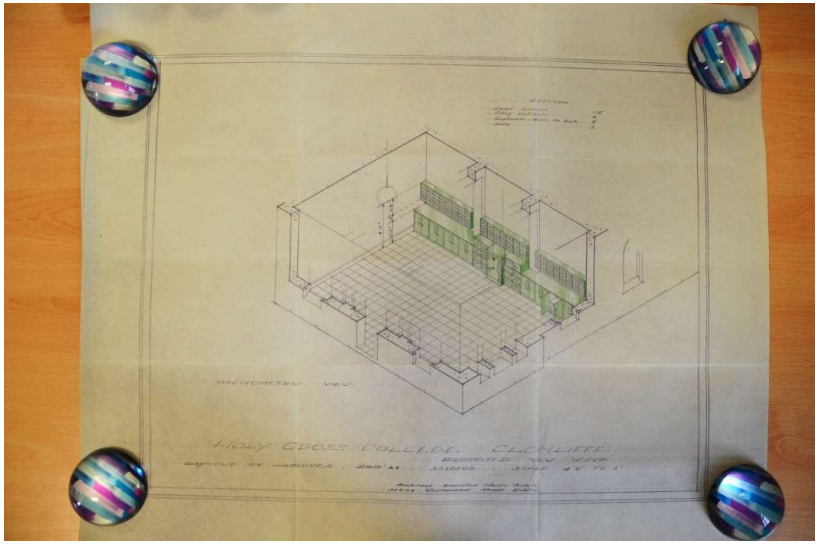
25. Undated Layout of Proposed Extension – Ground Floor



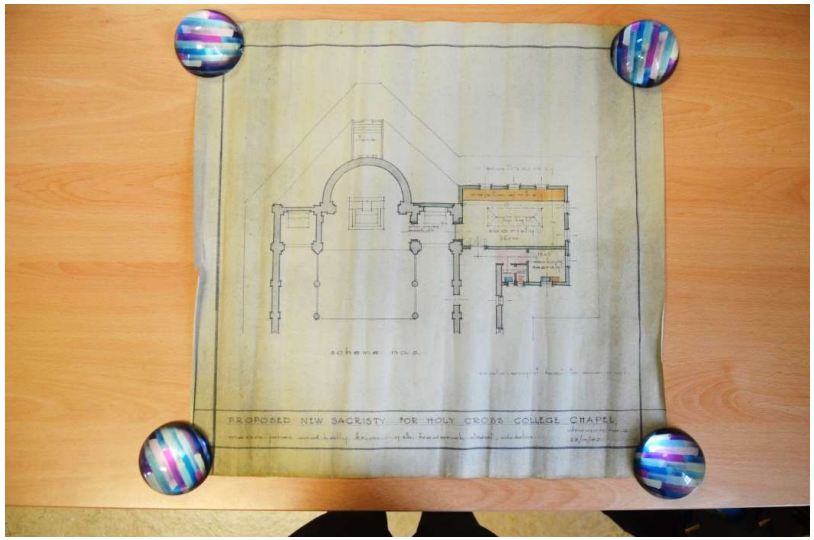
26. Undated Layout of Proposed Extension – 1st/2nd/3rd Floors



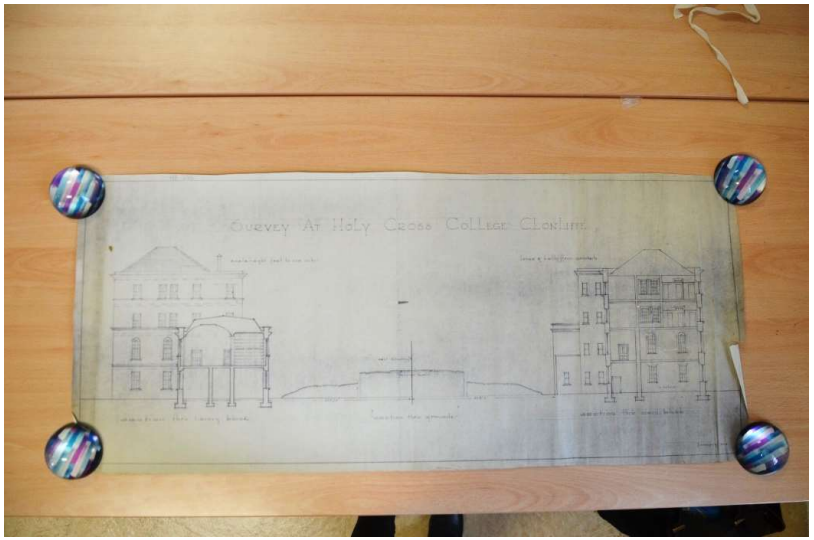
27. Undated Axonometric Drawings of Archives



28. Undated Axonometric Drawings of Archives

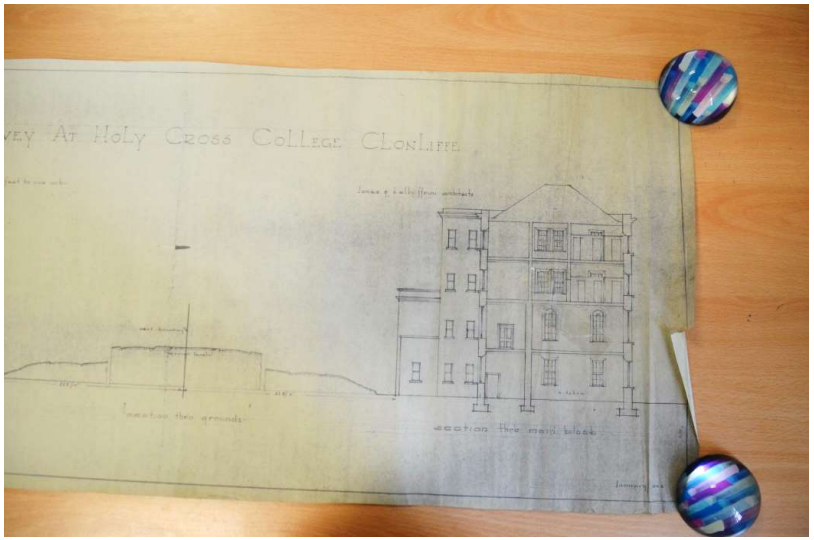


29. 1942 Drawing of Proposed New Sacristy

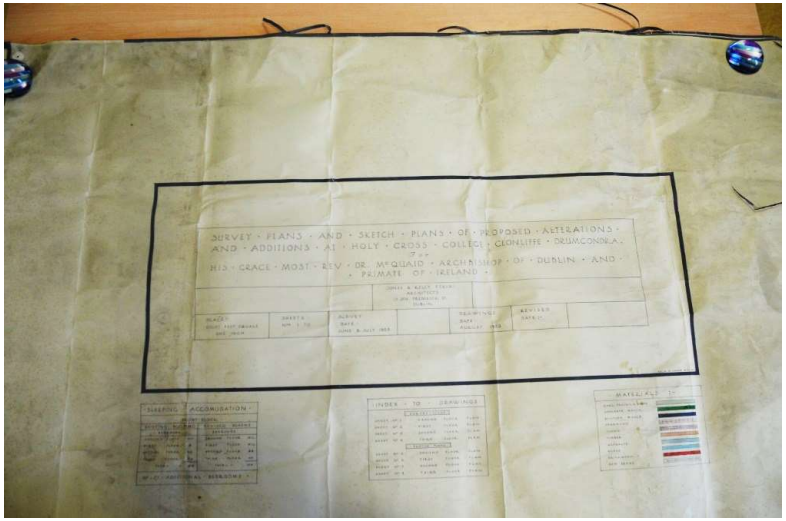


30. 1943 Survey Sections

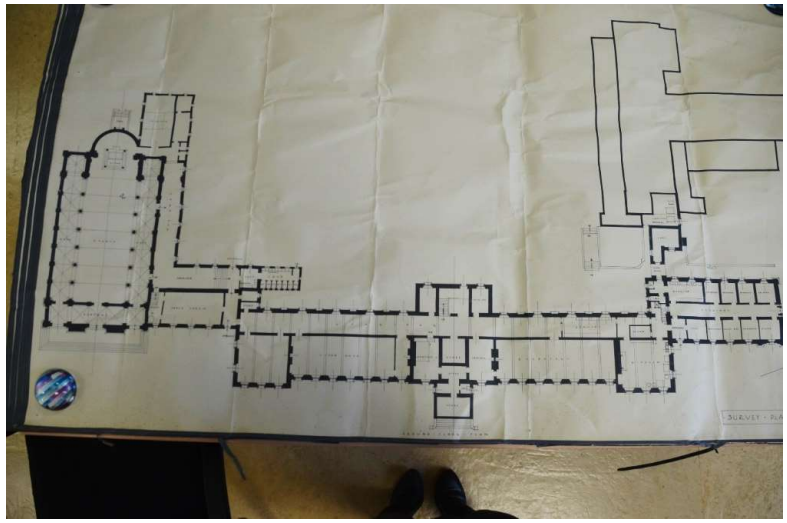
31. Detail: 1943 Survey Sections



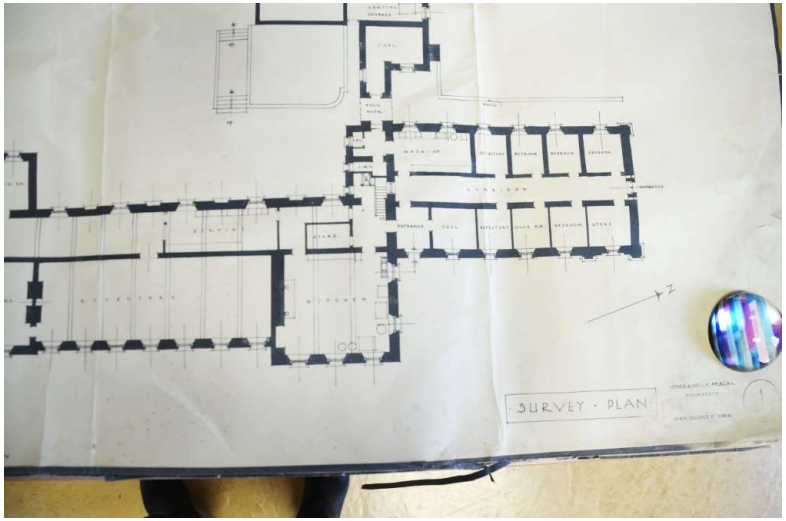
32. Detail: 1943 Survey Sections



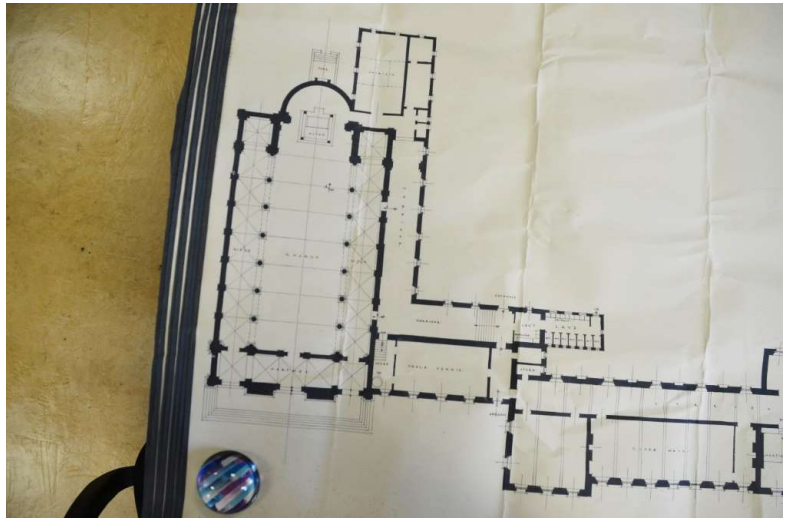
33. 1955 Proposed Alterations – Title Page



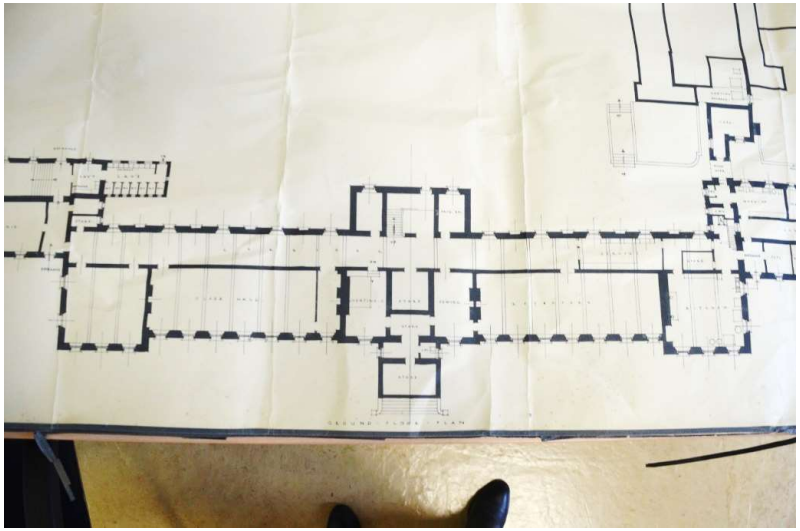
34. 1955 Proposed Alterations – Survey – Ground Floor



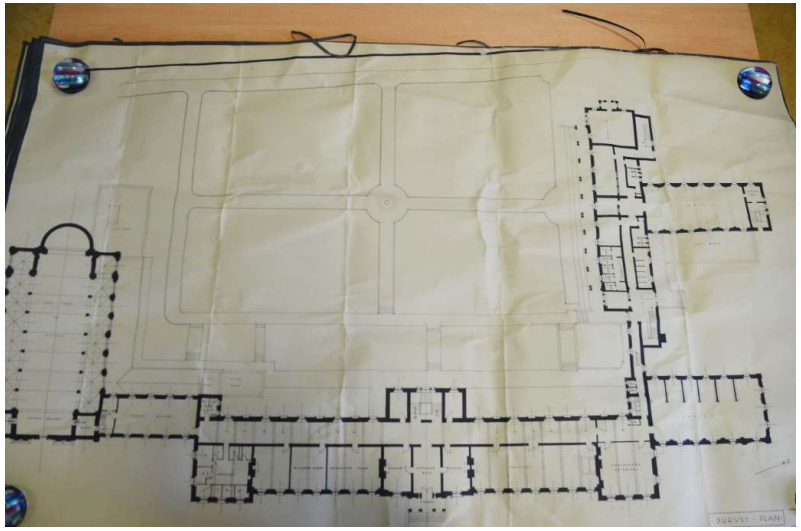
35. Detail: 1955 Proposed Alterations – Survey – Ground Floor



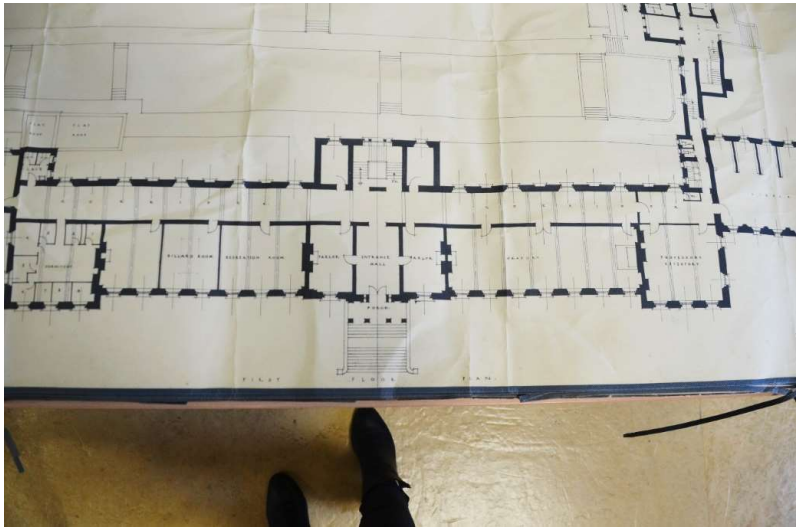
36.Detail: 1955 Proposed Alterations – Survey – Ground Floor



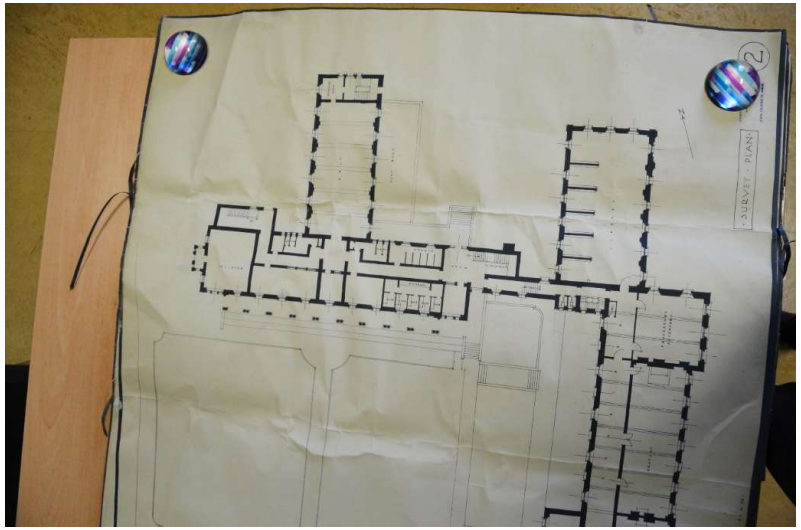
37. Detail: 1955 Proposed Alterations – Survey – Ground Floor



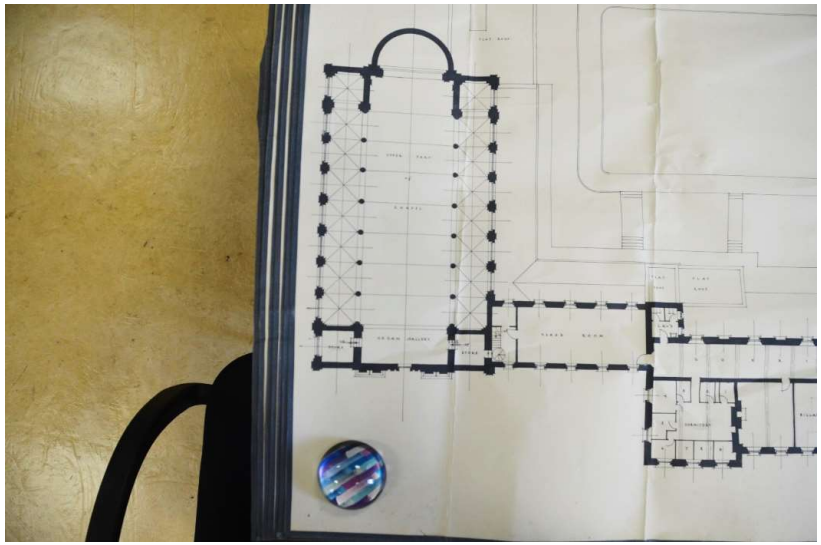
38. 1955 Proposed Alterations – Survey – First Floor



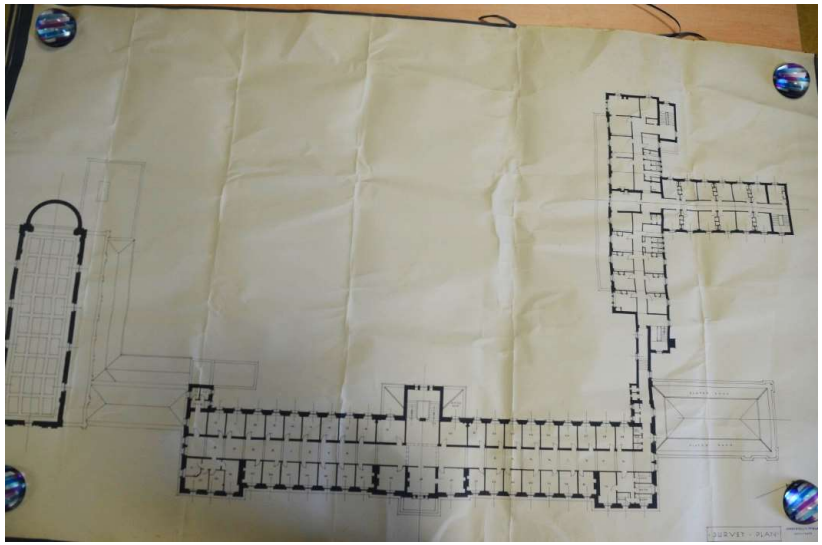
39. Detail: 1955 Proposed Alterations – Survey – First Floor



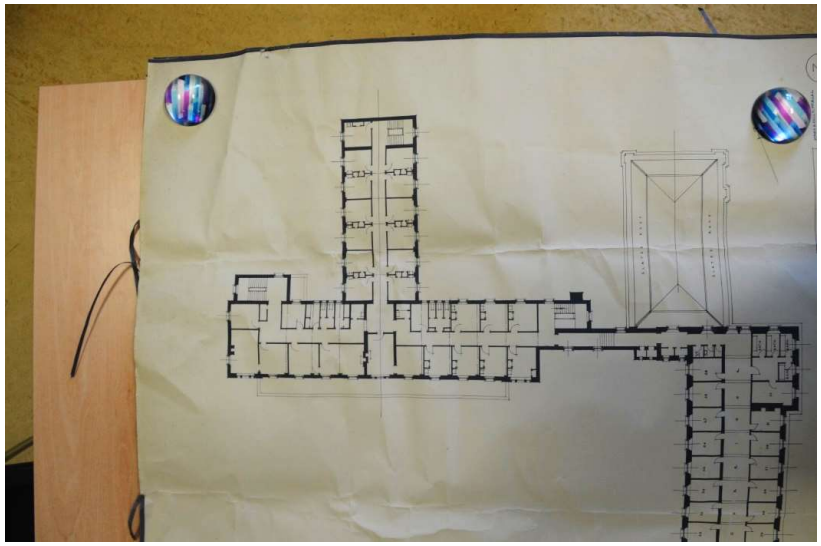
40. Detail: 1955 Proposed Alterations – Survey – First Floor



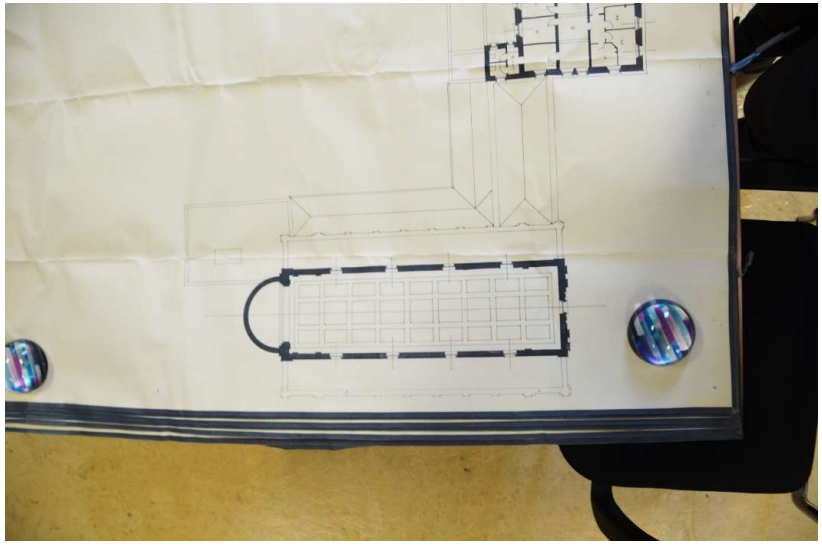
41. Detail: 1955 Proposed Alterations – Survey – First Floor



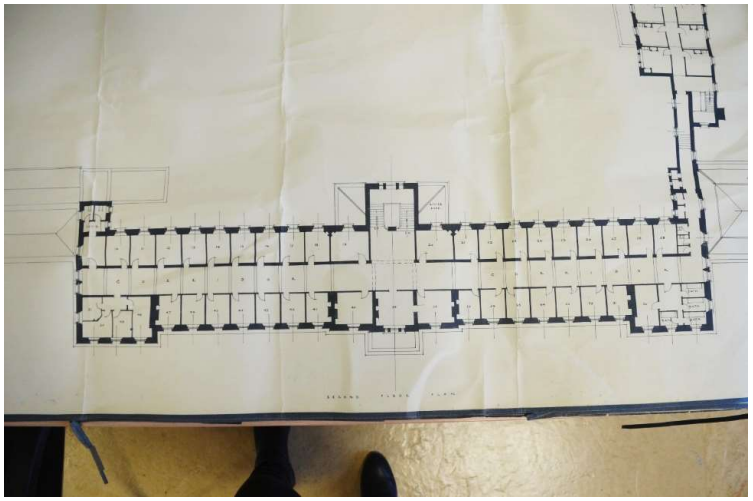
42. 1955 Proposed Alterations – Survey – Second Floor



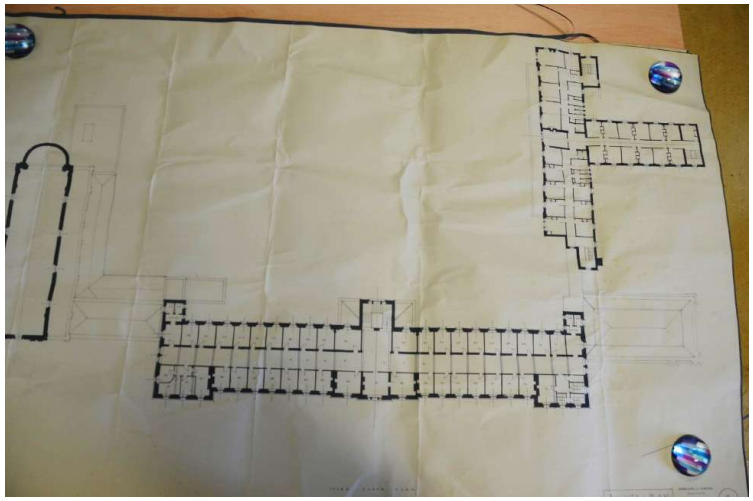
43 Detail: 1955 Proposed Alterations – Survey – Second Floor



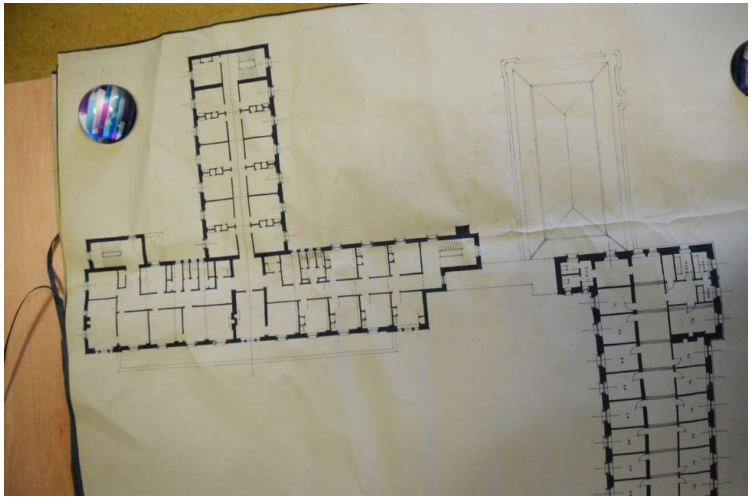
44. Detail: 1955 Proposed Alterations – Survey – Second Floor



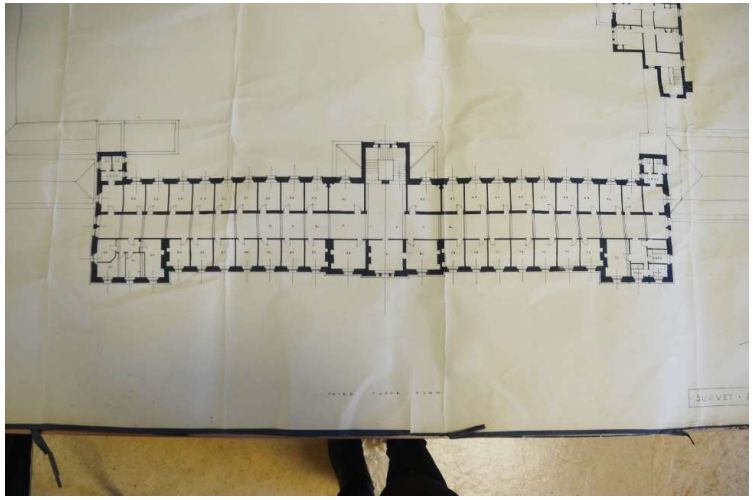
45. Detail: 1955 Proposed Alterations – Survey – Second Floor



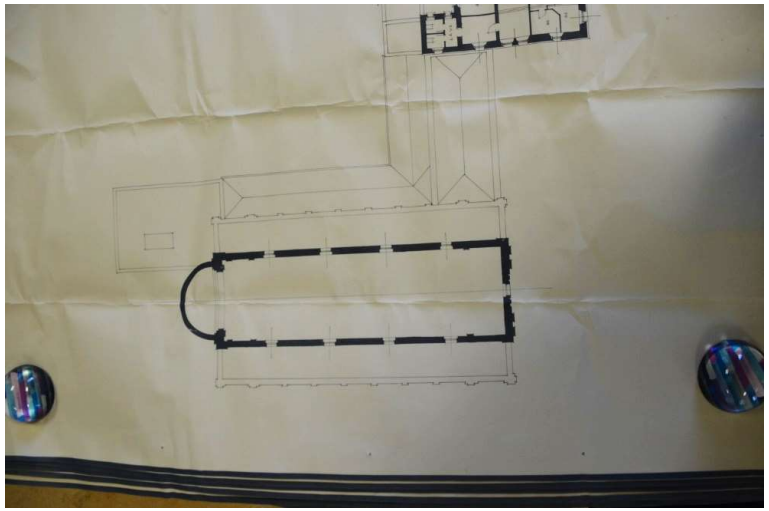
46. 1955 Proposed Alterations – Survey – Third Floor



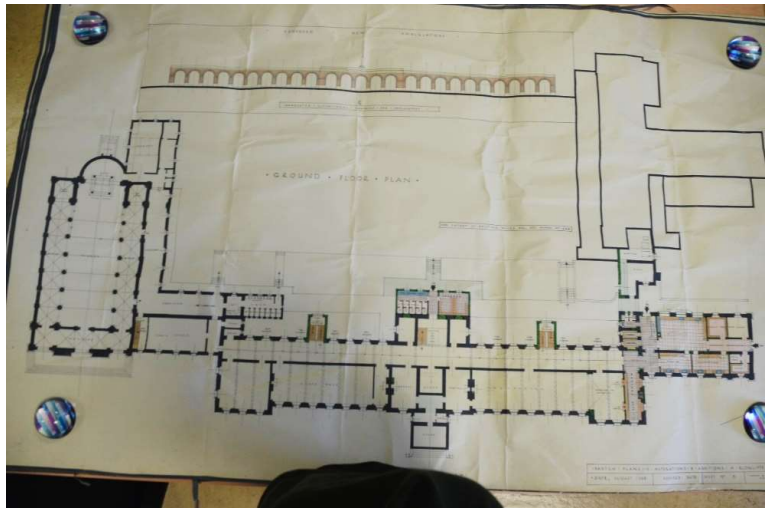
47. Detail: 1955 Proposed Alterations – Survey – Third Floor



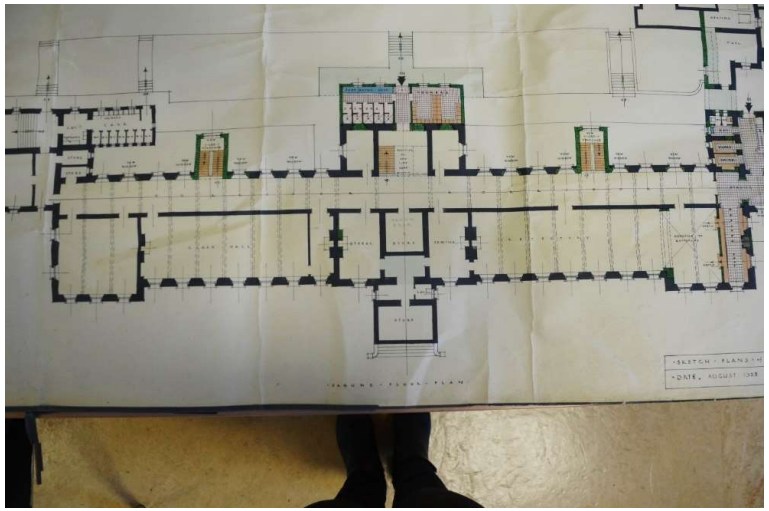
48. Detail: 1955 Proposed Alterations – Survey – Third Floor



49. Detail: 1955 Proposed Alterations – Survey – Third Floor

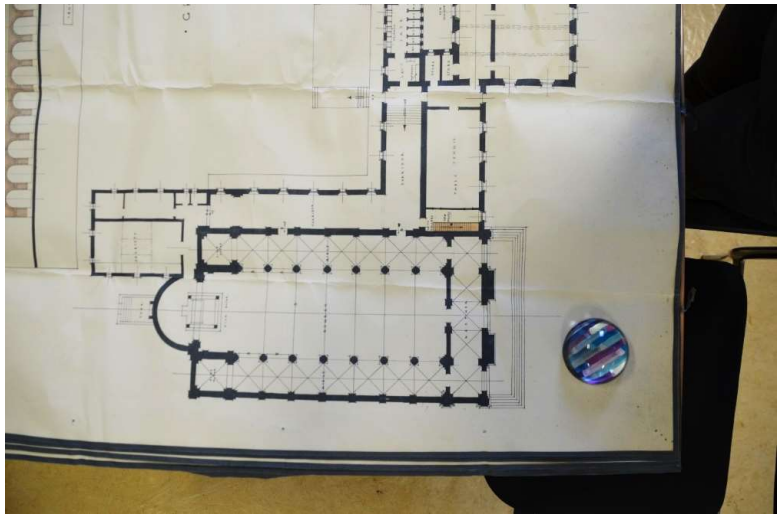


50. 1955 Proposed Alterations – Ground Floor



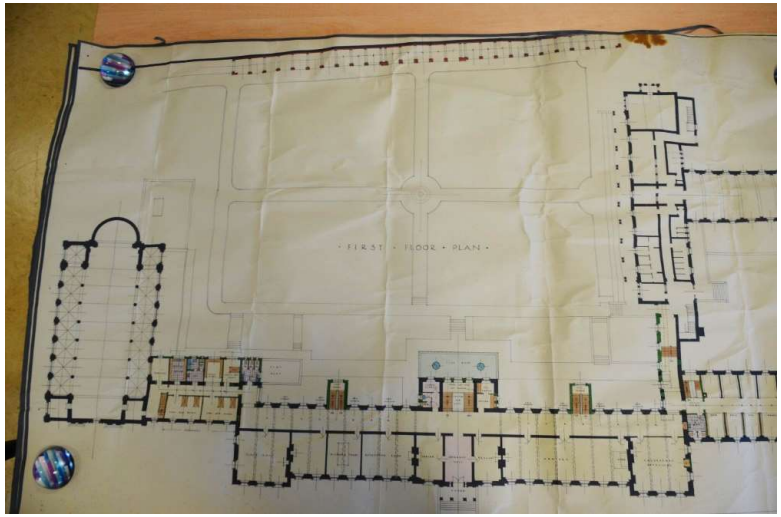
51. Detail: 1955 Proposed Alterations – Ground Floor

52. Detail: 1955 Proposed Alterations – Ground Floor

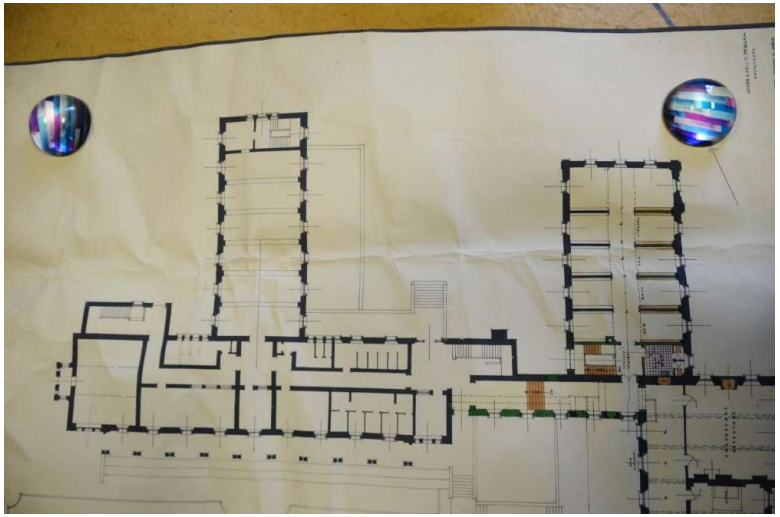


53. Detail: 1955 Proposed Alterations – Ground Floor

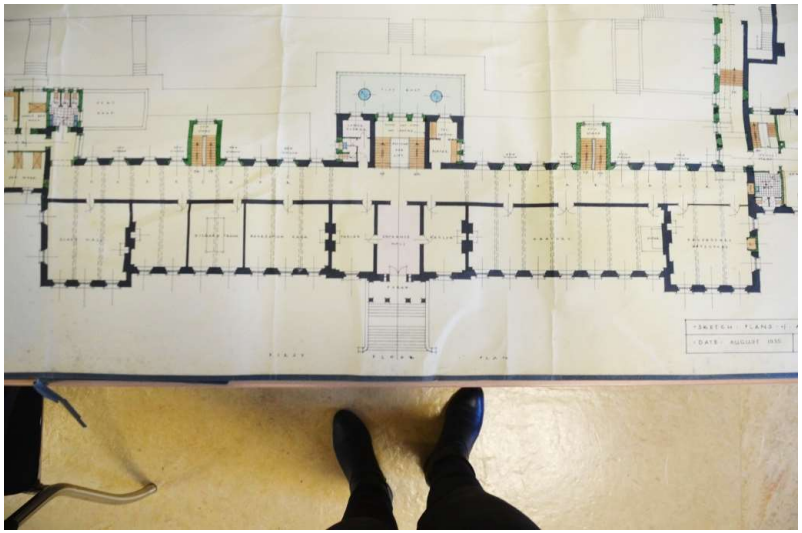
54. Detail: 1955 Proposed Alterations – Ground Floor



55. 1955 Proposed Alterations – First Floor

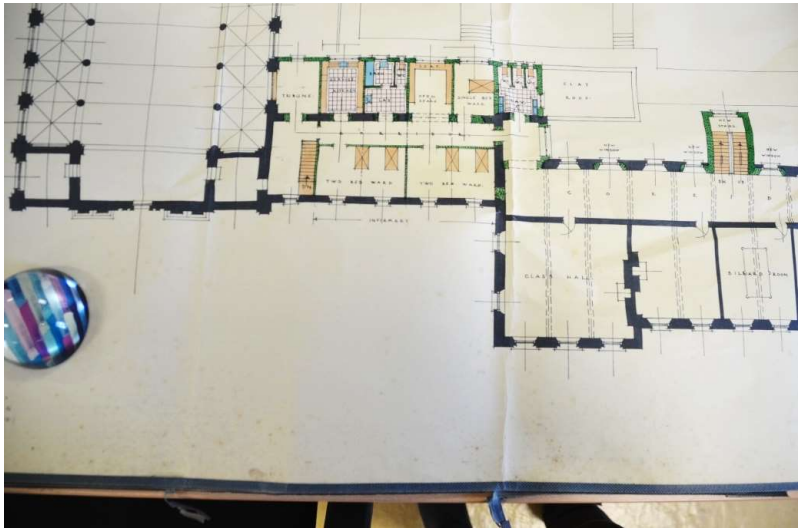


56. Detail: 1955 Proposed Alterations – First Floor

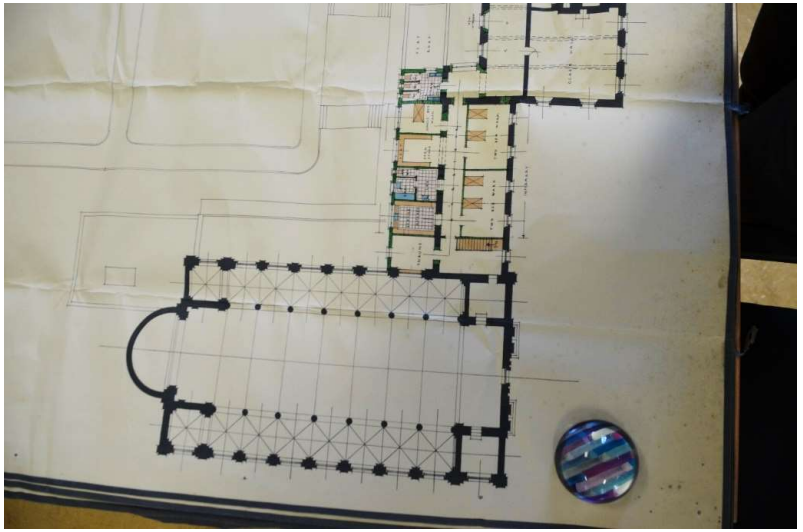


57. Detail: 1955 Proposed Alterations – First Floor

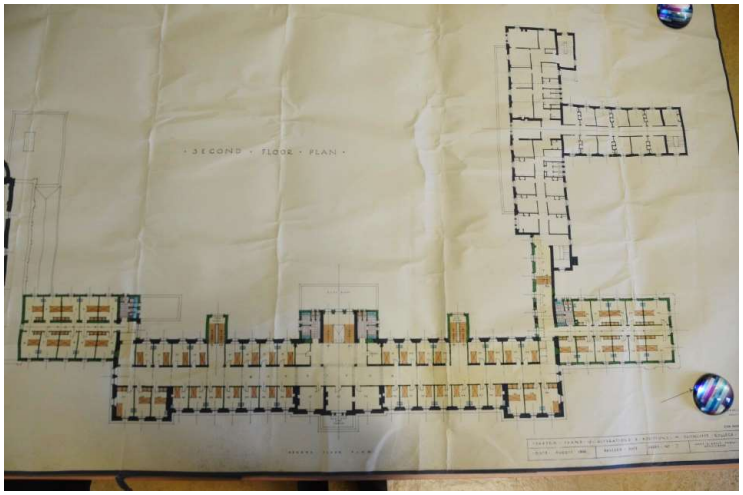
58. Detail: 1955 Proposed Alterations – First Floor



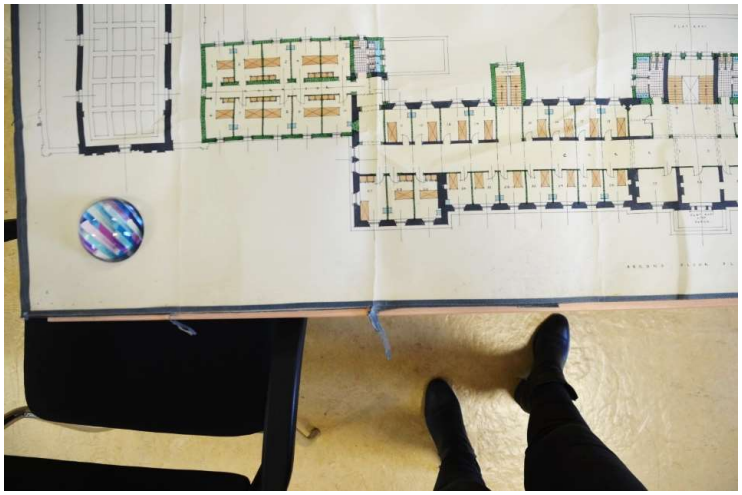
59. Detail: 1955 Proposed Alterations – First Floor



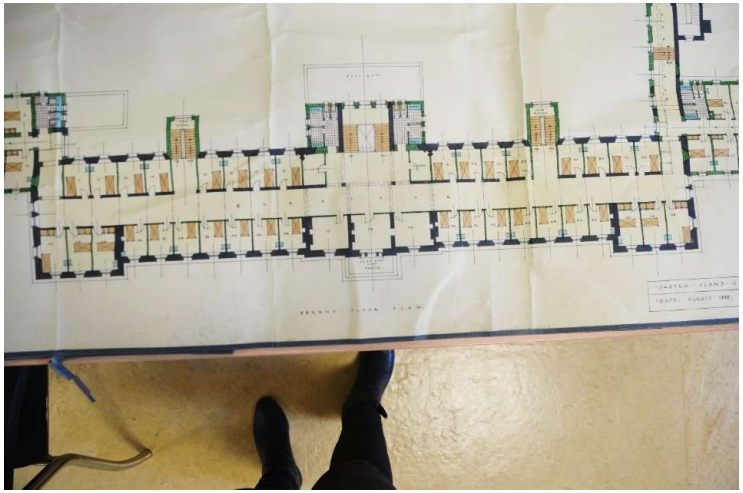
60. Detail: 1955 Proposed Alterations – First Floor



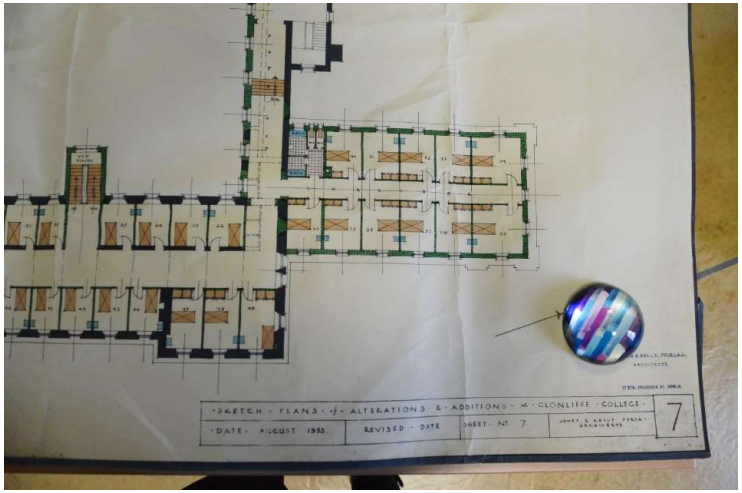
61. 1955 Proposed Alterations – Second Floor



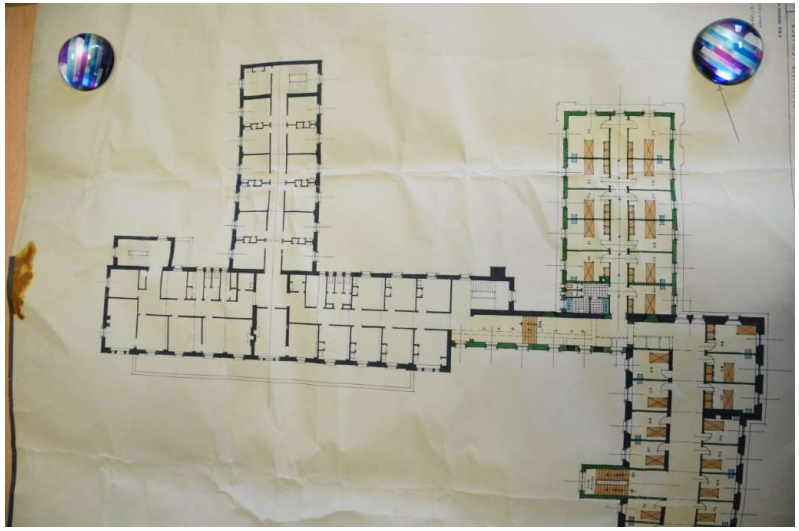
62. Detail: 1955 Proposed Alterations – Second Floor



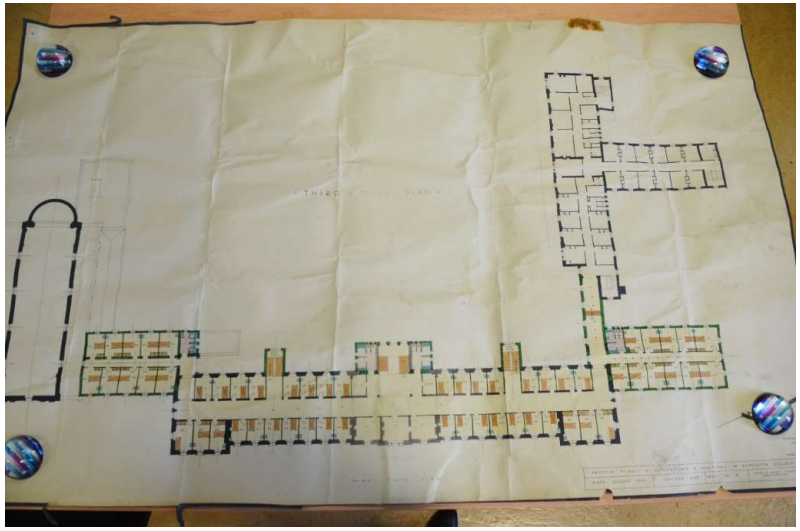
63. Detail: 1955 Proposed Alterations – Second Floor



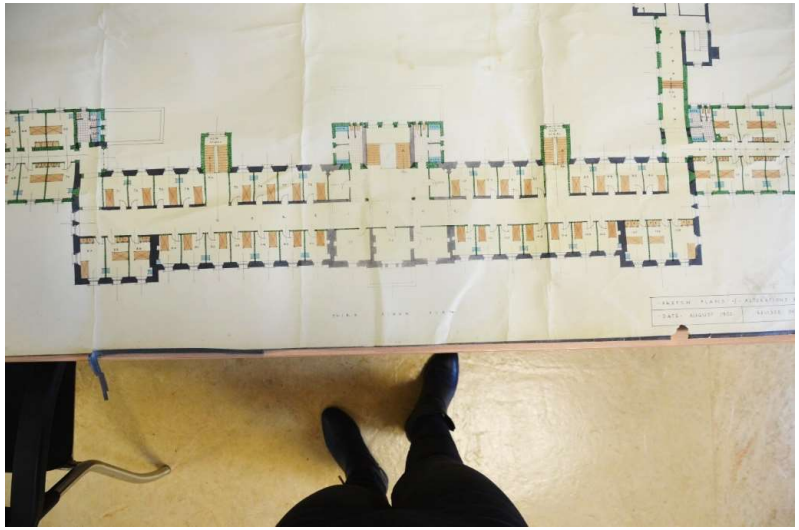
64. Detail: 1955 Proposed Alterations – Second Floor



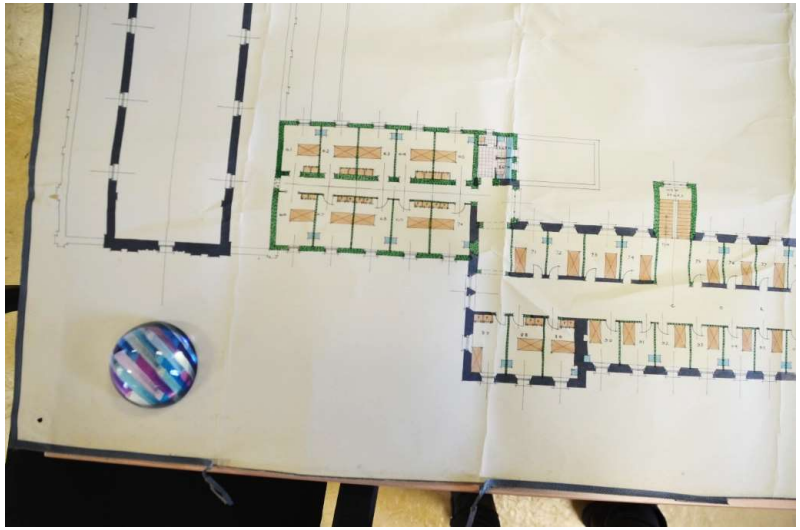
65. Detail: 1955 Proposed Alterations – Second Floor



66. 1955 Proposed Alterations – Third Floor

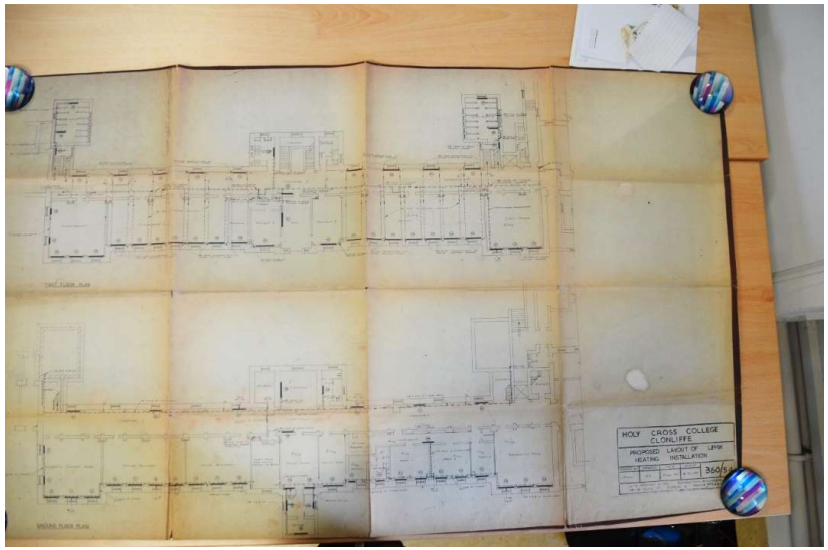


67. Detail: 1955 Proposed Alterations – Third Floor

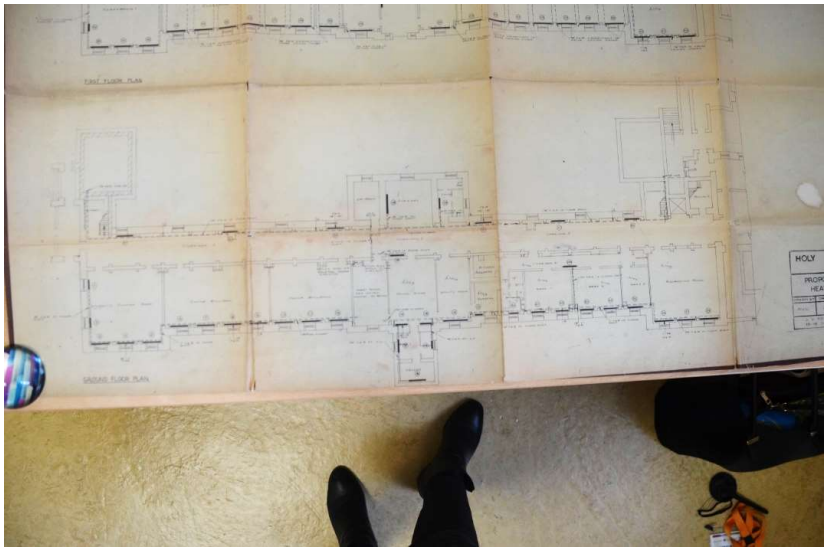


68. Detail: 1955 Proposed Alterations – Third Floor

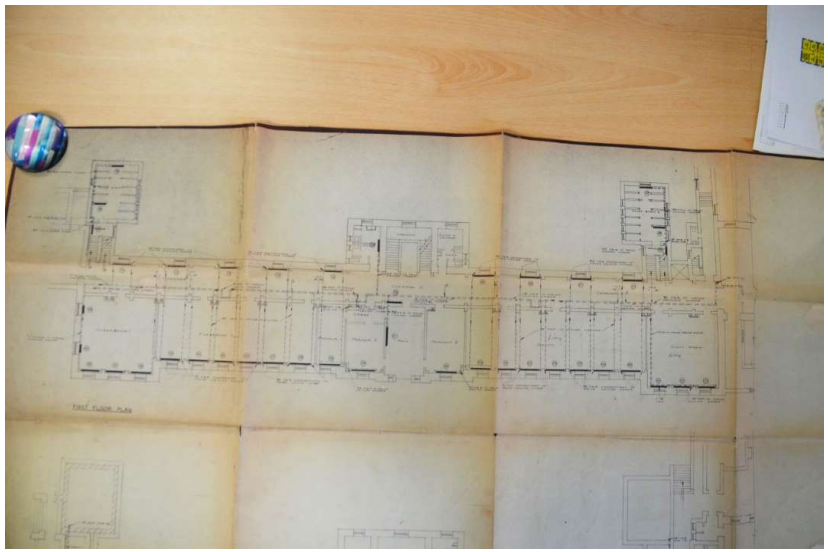
69. Detail: 1955 Proposed Alterations – Third Floor



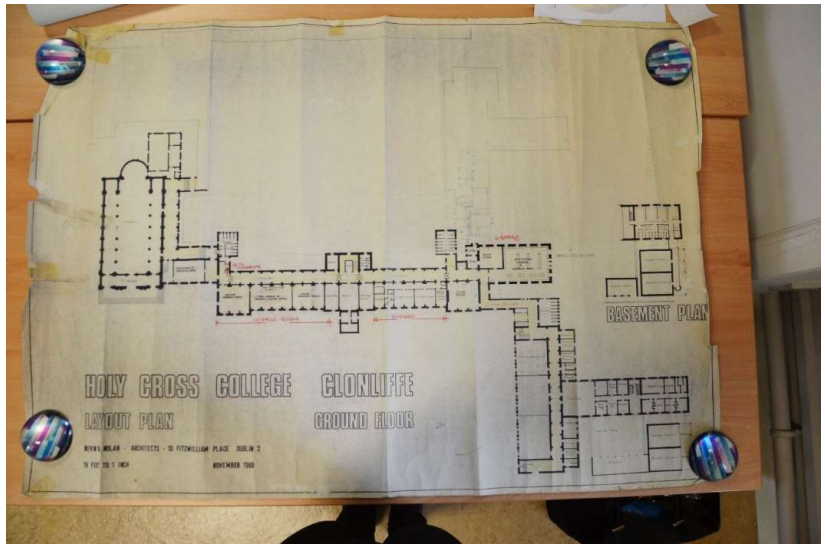
70. 1967 Heating Layout – Ground and First Floor



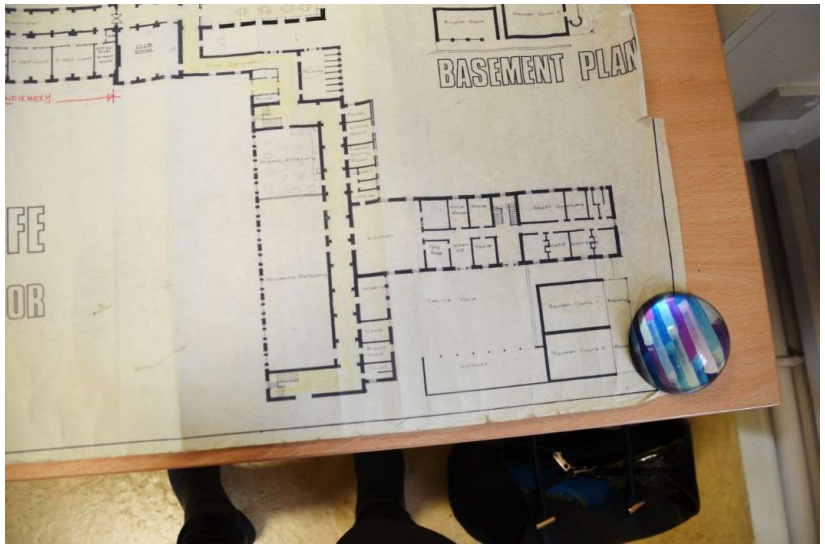
71. Detail: 1967 Heating Layout – Ground Floor



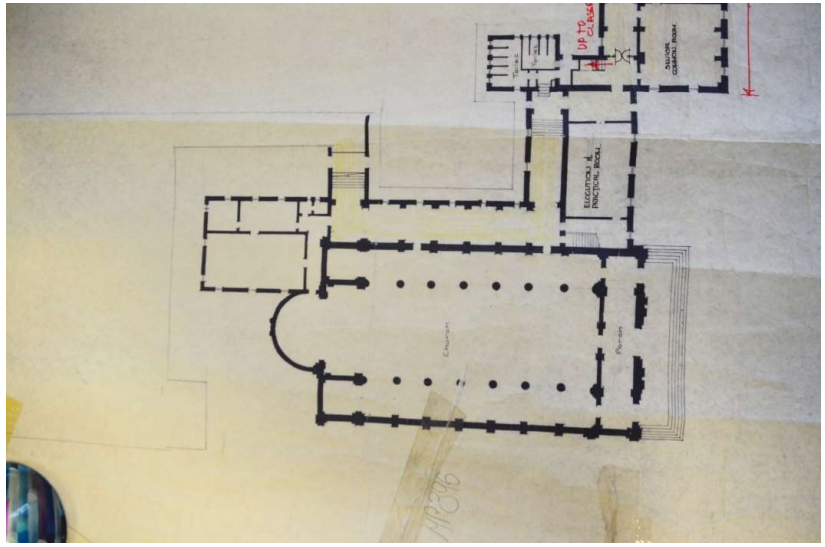
72. Detail: 1967 Heating Layout – First Floor



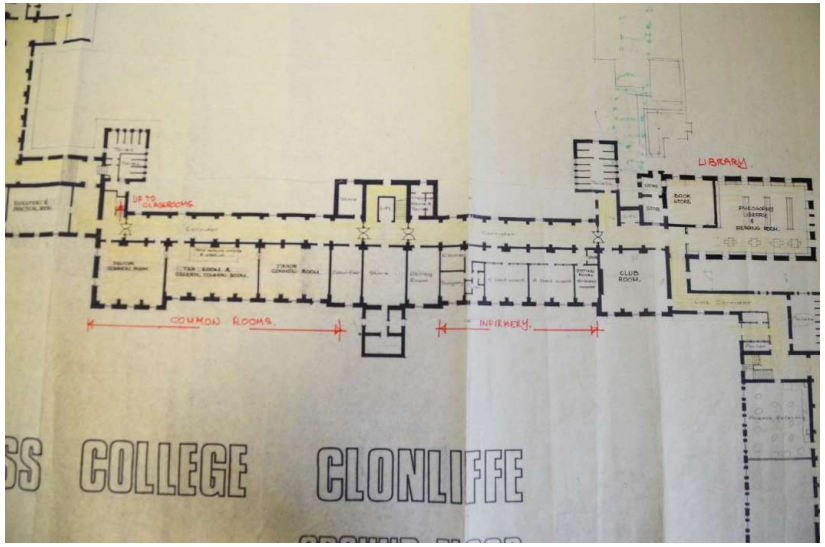
73. 1969 Ground Floor Layout



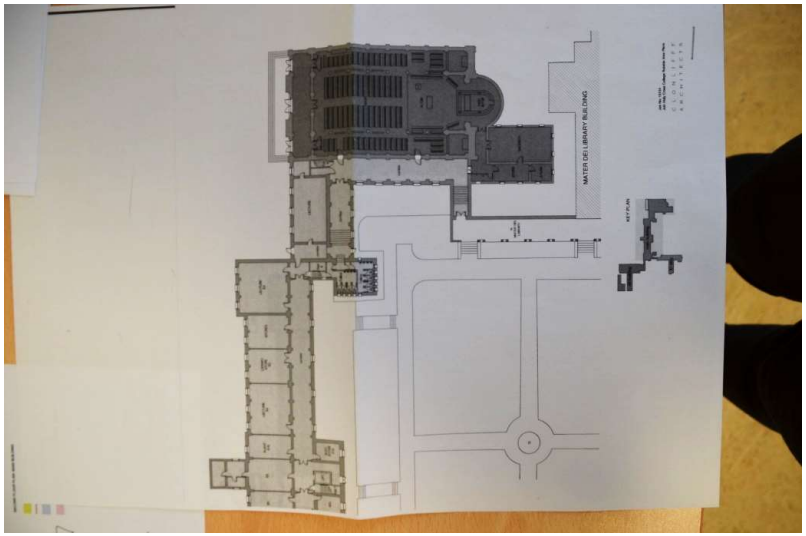
74. Detail: 1969 Ground Floor Layout



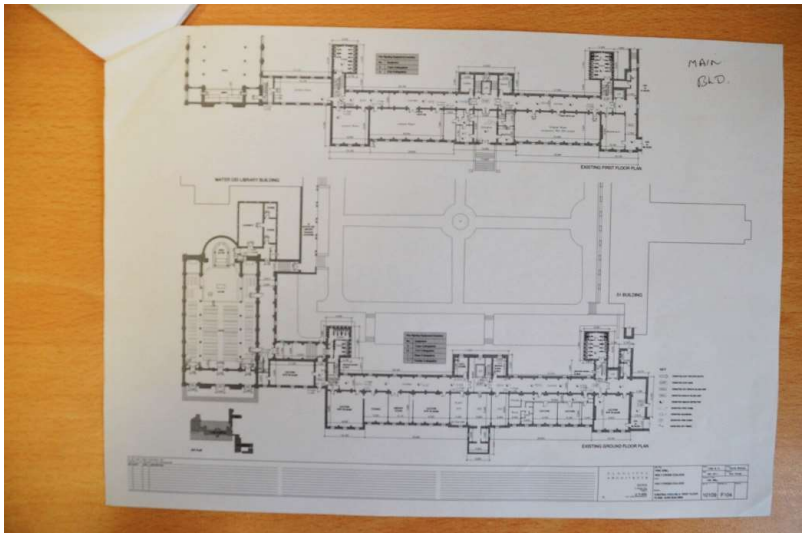
75. Detail: 1969 Ground Floor Layout



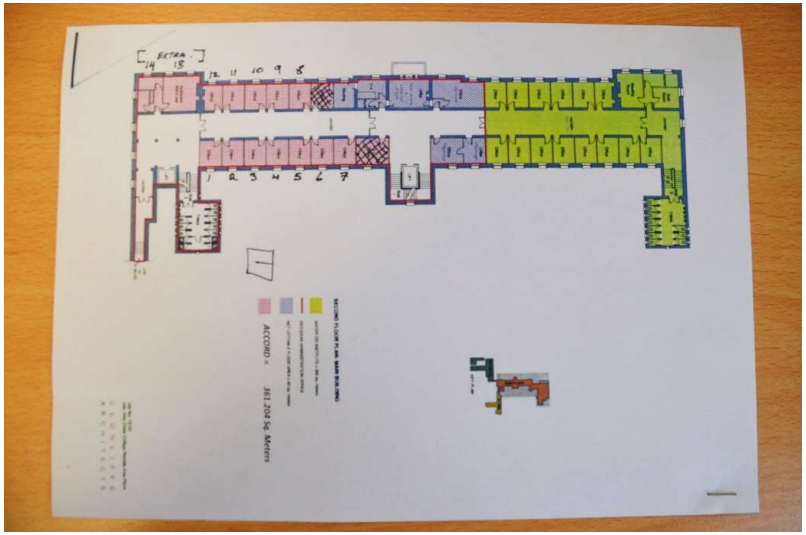
76. Detail: 1969 Ground Floor Layout



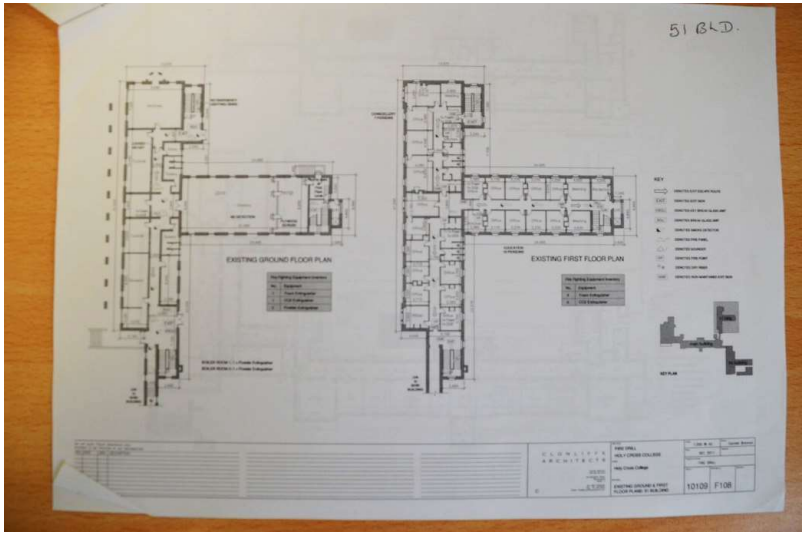
77. Modern Drawings – Chapel



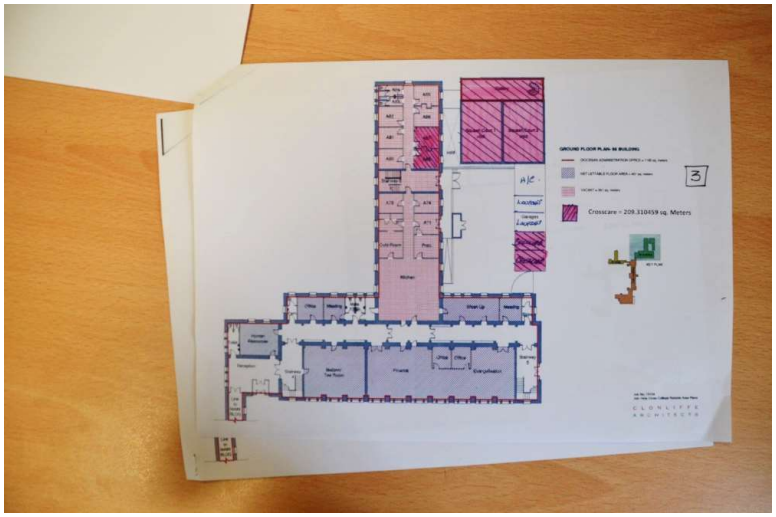
78. Modern Drawings – Main 1863 Block – Ground and First Floor Levels



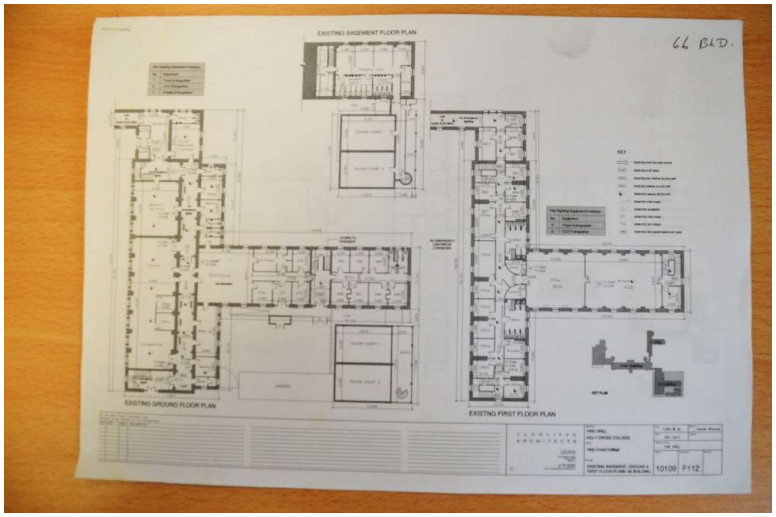
79. Modern Drawings – Main 1860s Block – Second Floor Level



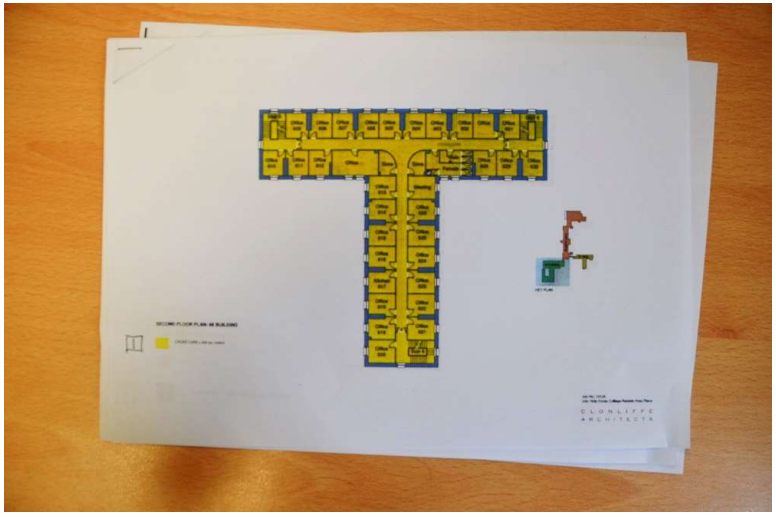
80. Modern Drawings – 1950s Block – Ground and First Floor Levels



81. Modern Drawings – 1960s Block – Ground Floor Level



82. Modern Drawings – 1960s Block – Ground and First Floor Levels



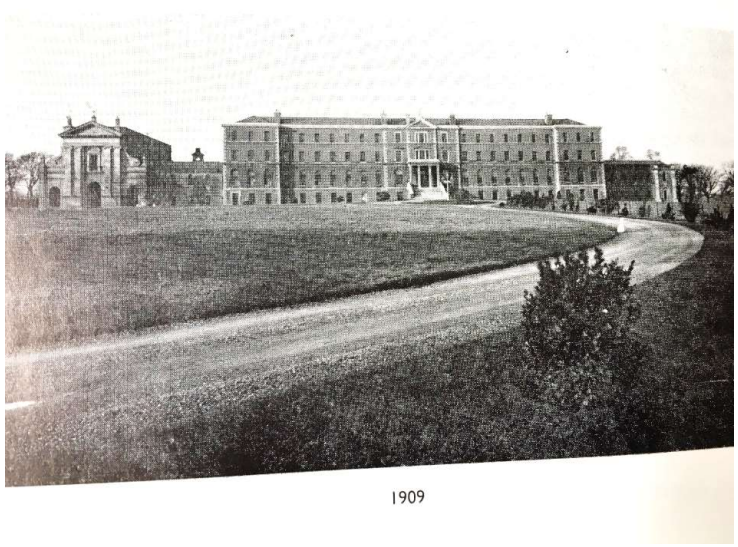
83. Modern Drawings – 1960s Block – Second Floor Level

84. Modern Drawings – 1960s Block – Third Floor Level

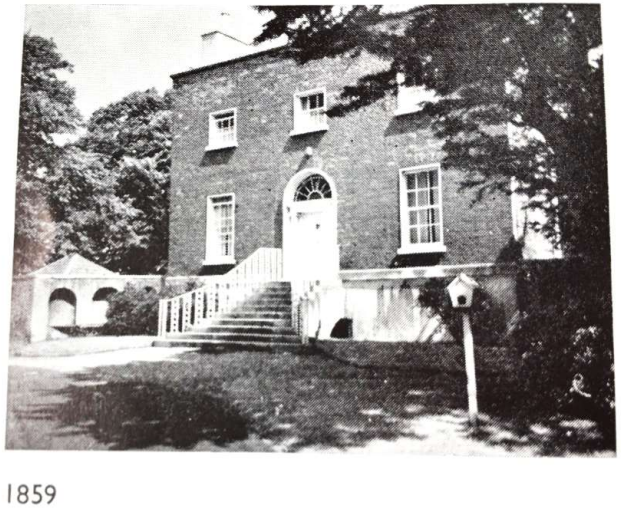
A14.3 Historic Photos

Holy Cross College, Clonliffe Road, Dublin 3.

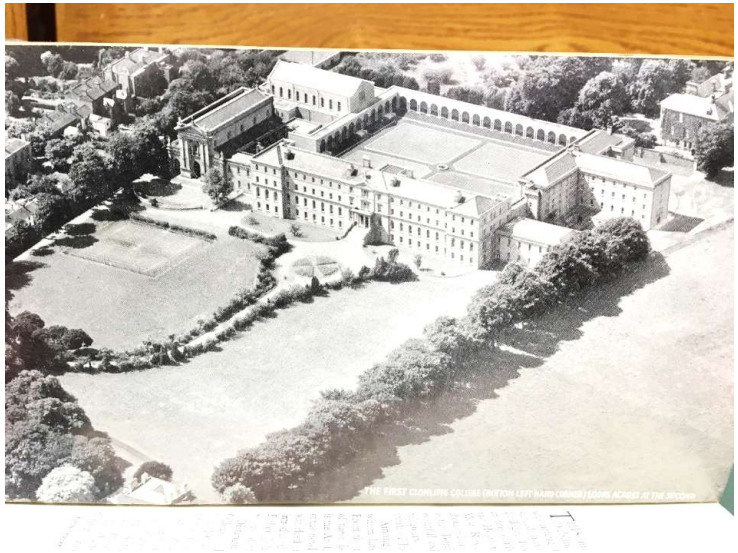
Historic Photos



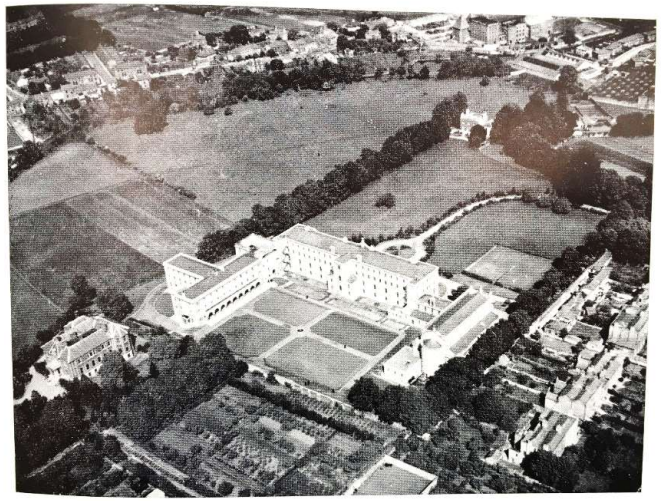
1. Early 20th century View of Front Façade of College



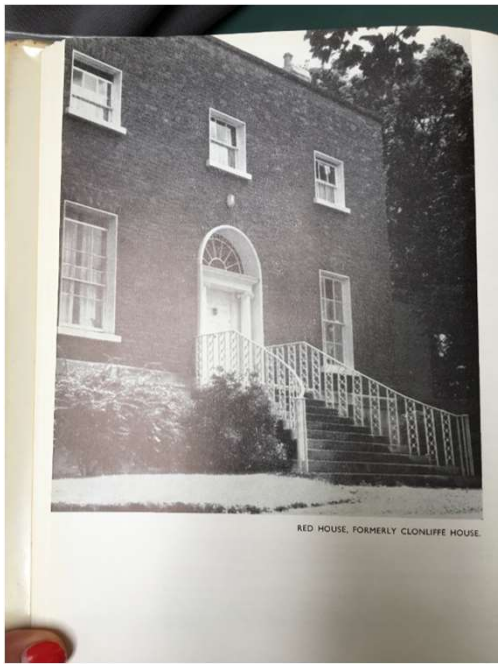
2. 1859 View of Front Façade of Red House



3. 1950s Aerial View of College



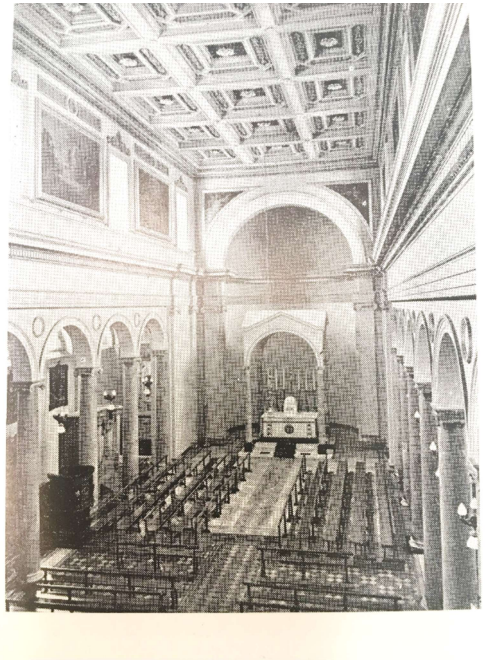
4. 1951 Aerial View of College


RED HOUSE, FORMERLY CLONLIFFE HOUSE.

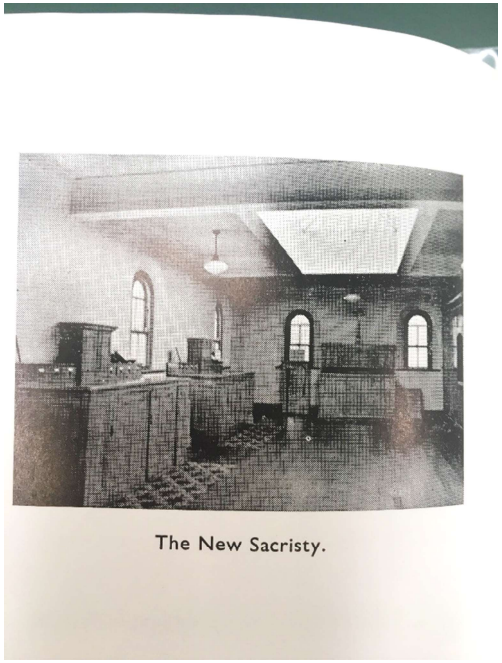
5. Front Façade of Red House (Undated)


The tomb of Cardinal Cullen.

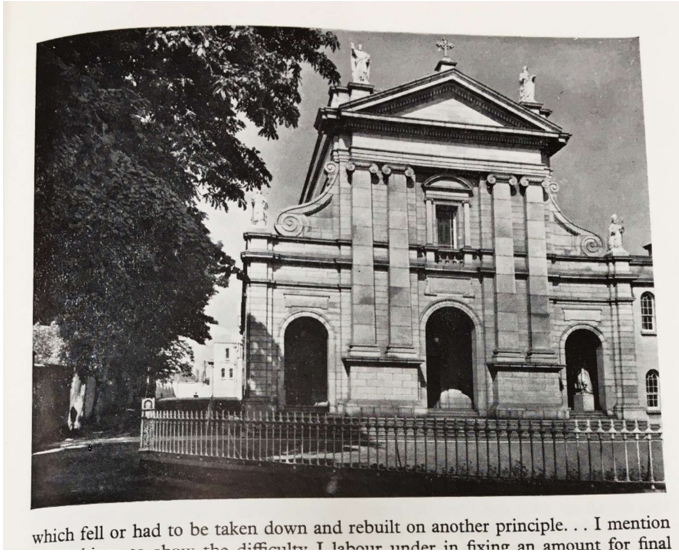
6. Tomb of Cardinal Cullen at western end of Chapel



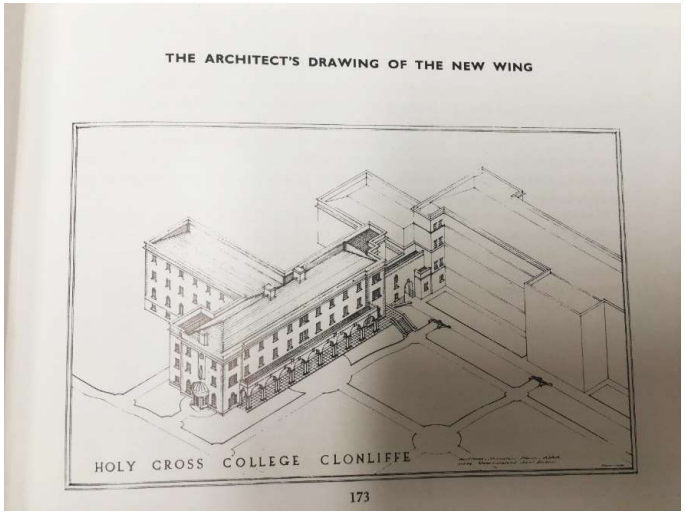
7. Interior View of Chapel (Undated)


The New Sacristy.

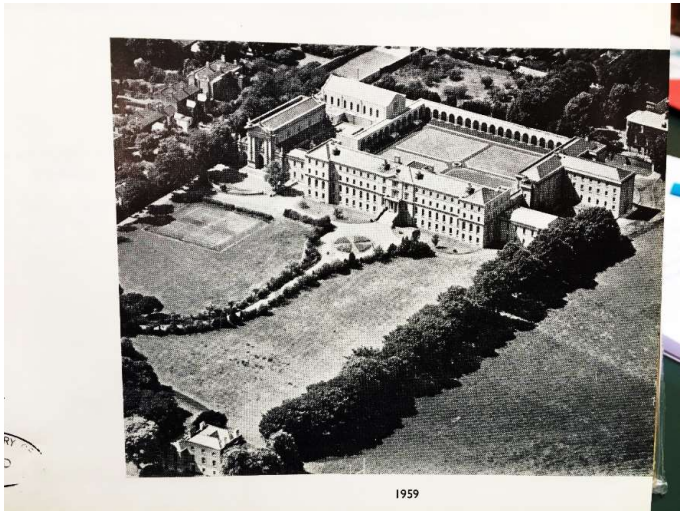
8. New Sacristy


which fell or had to be taken down and rebuilt on another principle. . . I mention

9. Undated photo of façade of Chapel

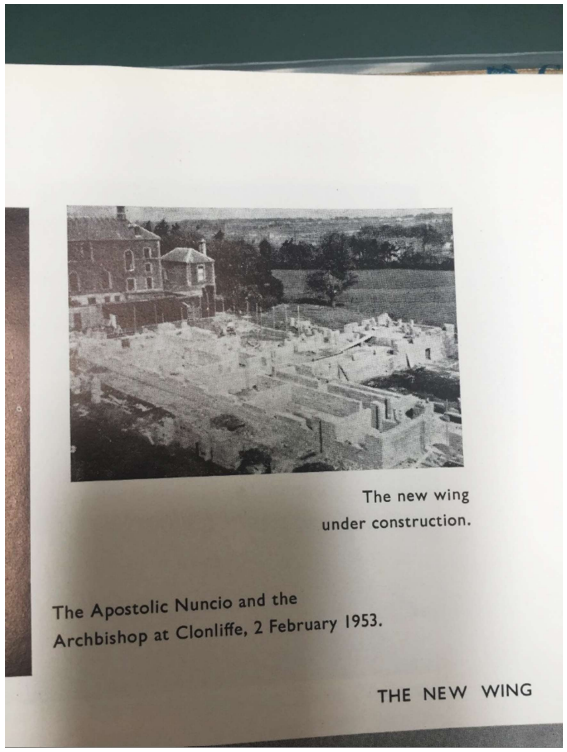


10. 1950s Architects Drawing of New Wing



11. Early 1960s Aerial View of College

12. New Ambulatory and 1950s Wing

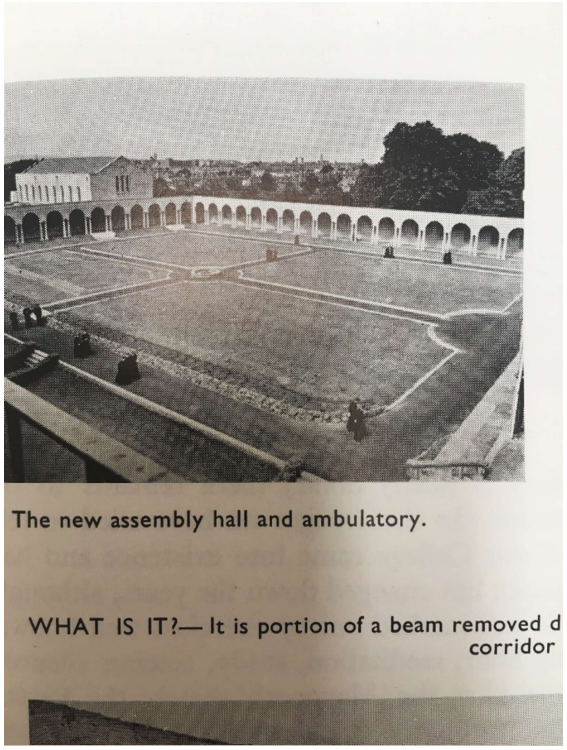


The new wing
under construction.

The Apostolic Nuncio and the
Archbishop at Clonliffe, 2 February 1953.

THE NEW WING

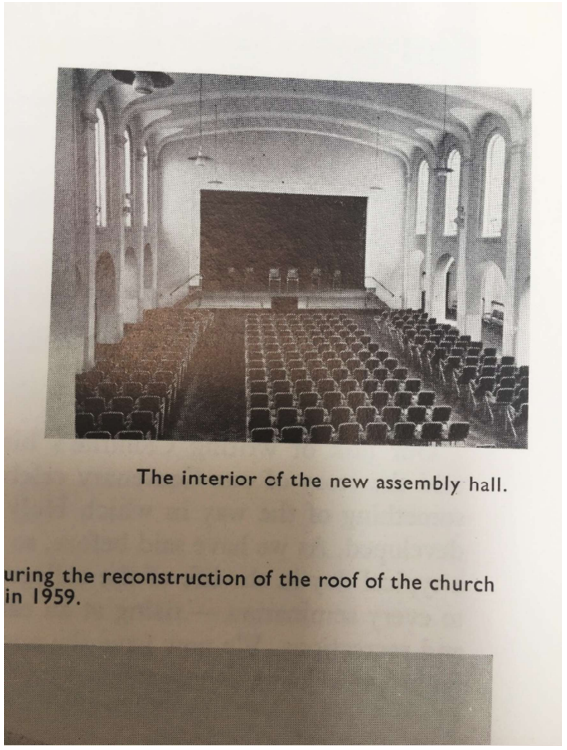
13. New Wing Under Construction



The new assembly hall and ambulatory.

WHAT IS IT?— It is portion of a beam removed d
corridor

14. New Assembly Hall and Ambulatory -



The interior of the new assembly hall.

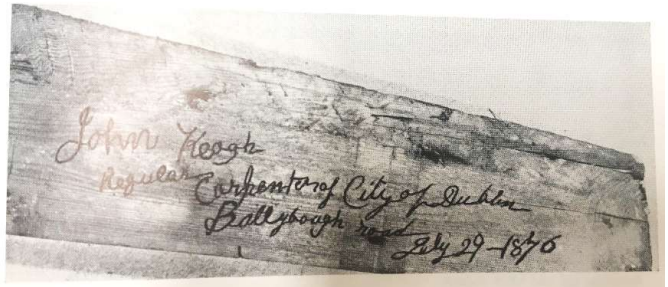
uring the reconstruction of the roof of the church
in 1959.

15. New Assembly Hall

The new assembly hall and ambulatory.

The interior of the new assembly hall.

WHAT IS IT?— It is portion of a beam removed during the reconstruction of the roof of the church corridor in 1959.



16. 1876 Beam found in Church Corridor

THE NEW ORATORY

17. New Oratory

The wall and trees between the Archbishop's garden and our grounds were removed in the autumn of 1958 to make way for the new ambulatory.

Work in progress on the new hall.

18. Work in progress at new Assembly Hall

19. Old Oratory

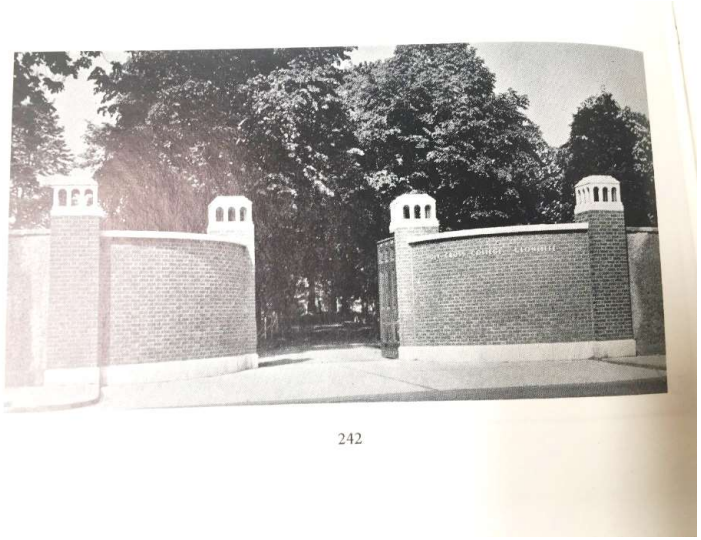
THE BISHOPS OF IRELAND AND THE METROPOLITAN CHAPTER WERE IN THE SANCTUARY

20. 1959 - Interior View of Chapel

21. 1959 - Interior View of Chapel

THE CENTENARY SERMON

22. 1959 - Interior View of Chapel



242

23. Entrance from Clonliffe Road (Undated)

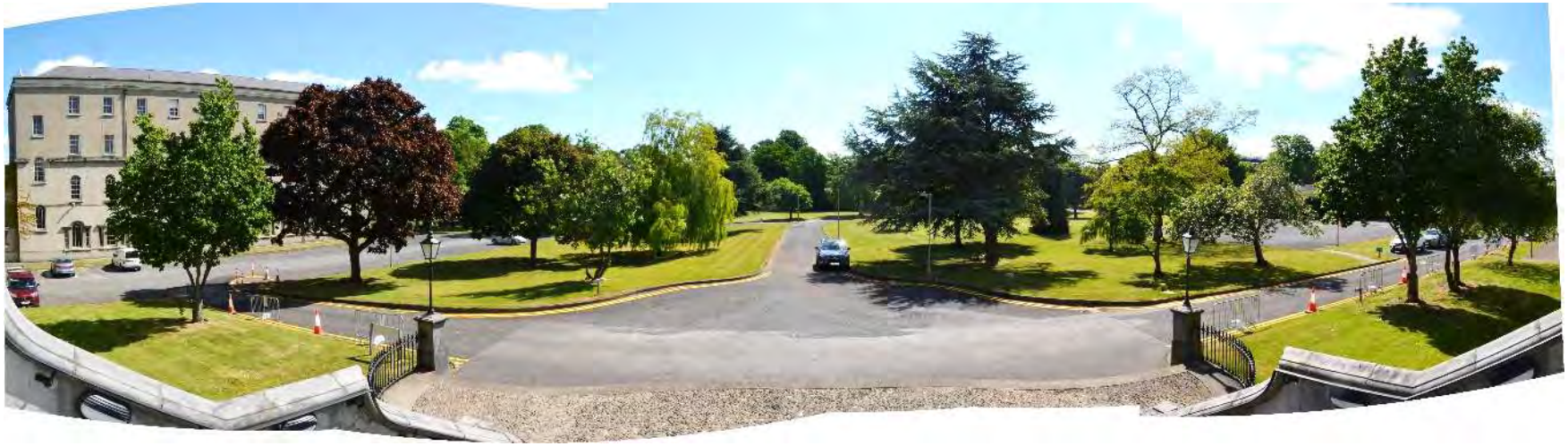
A14.4 Photographic Record – External

Holy Cross College, Clonliffe Road, Dublin 3.

External Photographs

1. Panoramic view of the front façade of the Main Seminary Block

2. Oblique view of the front façade of the Main Seminary Block, with the Library Block visible in the background



3. Panoramic view of the front setting from the entrance steps of the Main Seminary Block

4. Panoramic view of the front setting, showing the entrance avenue and the Library Block to the LHS

5. Oblique view of the front facade of the Main Seminary Block, from the front setting of the Library Block

6. Panoramic view of the front setting of the Library Block, showing an oblique view of the Main Seminary Block to the RHS

7. Panoramic view of the front façade of the Library Block

8. Panoramic view of the side elevation and front setting of the Library Block

9. Oblique view of the front façade of the College Chapel, with the Main Seminary Block and Library Block in the background

10. Oblique view of the front façade of the College Chapel, with the Main Seminary Block and Library Block in the background

11. View of existing secondary entrance to the site, from Holy Cross Avenue

12. View of entrance to site from adjoining Mater Dei site, showing the side elevation of the Assembly Hall

13. Side elevation of the Assembly Hall

14. View of the entrance area to Cardinal Cullen's tomb

15. Entrance to Cardinal Cullen's Tomb

16. View of the tiled entrance to Cardinal Cullen's Tomb

17. Panoramic view of the South Link building

18. Panoramic view of the front setting of the College Chapel, with the Main Seminary Block and front setting visible in the background

19. Panoramic view of the front setting to the college, showing the view from the entrance avenue towards the College Chapel, Main Seminary Block and Library Block

20. Panoramic view of the side (eastern) elevation of the Library Block, showing the later additions

21. Panoramic view of the northern elevation of the Library Block, showing the later additions

22. Panoramic view of the northern/western elevation of the Library Block and the rear elevation of the New Wing

23. Panoramic view of the western elevation of the Library Block and the rear elevation of the New Wing

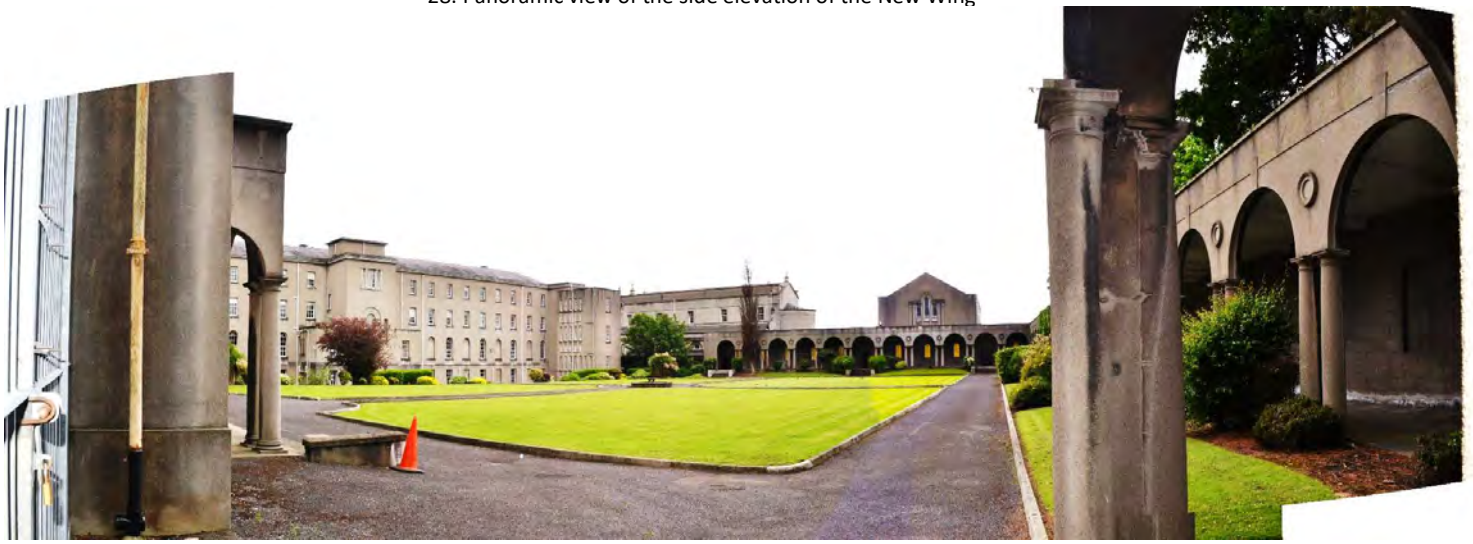
24. Panoramic view of the western elevation of the Library Block and the rear elevation of the New Wing

25. Panoramic view of the rear elevation of the New Wing

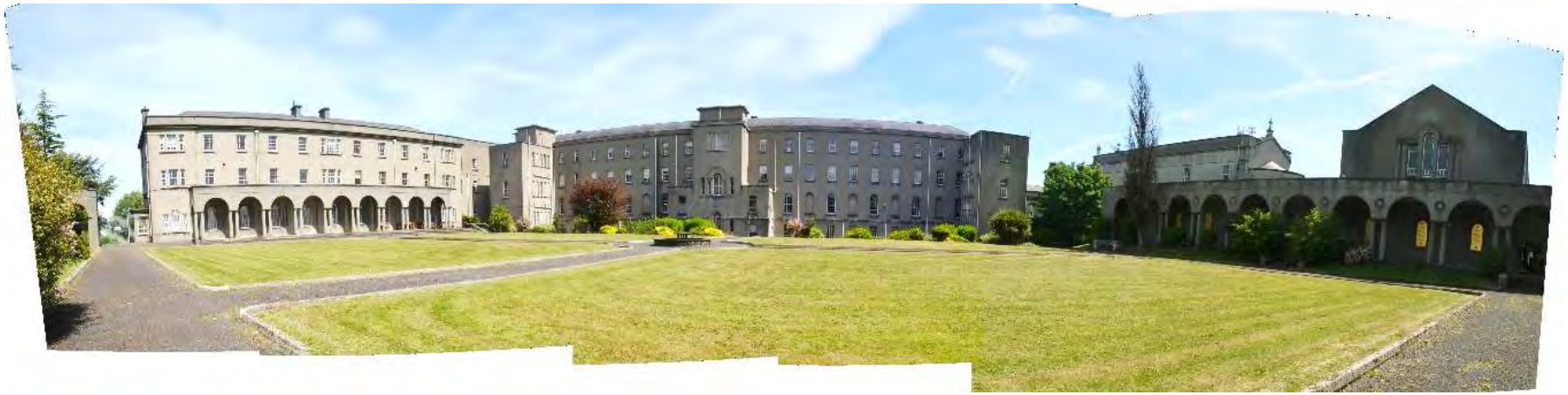
26. Panoramic view of the rear elevation of the New Wing

27. Panoramic view of the side elevation of the New Wing

28. Panoramic view of the side elevation of the New Wing



29. Panoramic view of the rear quadrangle, showing the Ambulatory, the Assembly Hall and the rear elevation of the Main Seminary Block



30. Panoramic view of the College Quadrangle, showing the New Wing, the rear of the Main Seminary Block, the Ambulatory and the Assembly Hall

31. Panoramic view of the College Quadrangle, showing the New Wing, the rear of the Main Seminary Block, the Ambulatory and the Assembly Hall

32. Panoramic view of the College Quadrangle, showing the New Wing and the rear of the Main Seminary Block

33. Detail of the tripartite window on the end bay of the New Wing

34. Detail of the central window on the Assembly Hall

35. View of the modern toilet block at the northern end of the Main Seminary Block

36. View of the rear return at the centre of the Main Seminary Block

37. View of the modern toilet block at the northern end of the Main Seminary Block

38. Detail view of the tripartite window to the rear return of the Main Seminary Block

39. Panoramic view of the rear quadrangle, from the upper floor of the Main Seminary Block, showing the Ambulatory and the New Wing

40. View of the western range of the Ambulatory

41. View of the south-western corner of the Ambulatory

42. View of the commemorative mosaics in the Ambulatory

43. View of the commemorative mosaics in the Ambulatory

44. View of metal door on the western wall of the Ambulatory

45. Panoramic view of the southern range of the Ambulatory, showing the entrance to the Assembly Hall

46. Panoramic view of the front setting of the College, showing the view to the front entrance of the Main Seminary Block from the entrance avenue

47. Panoramic view of the front setting of the College, showing the Library Block and the Main Seminary Block from the entrance avenue

48. Panoramic view of the front setting of the College, showing the Library Block and the Main Seminary Block from the entrance avenue

49. Panoramic view of the front setting of the College, showing the Chapel, the Library Block and the Main Seminary Block from the entrance avenue

50. Panoramic view of front entrance and oblique view of entrance avenue, with Croke Park visible in the background

51. Panoramic view from entrance avenue to Red House, showing the mature trees in the front setting of the College. Glimpses of the College Chapel, Main Seminary Block and Library Block are visible.

52. Panoramic view of the eastern area of the College lands

53. Panoramic view of the eastern area of the College lands

54. Panoramic view of the setting of the College, from the front steps of the Red House

55. Panoramic view of the front setting of the Red House, showing the tree-lined avenue between the Library Block and the Red House

56. Panoramic view of the front façade and front setting of the Red House

57. Panoramic view of the side elevation of the Red House

58. Panoramic view of the rear (eastern) elevation of the Red House

59. View of the side (southern) elevation of the Red House

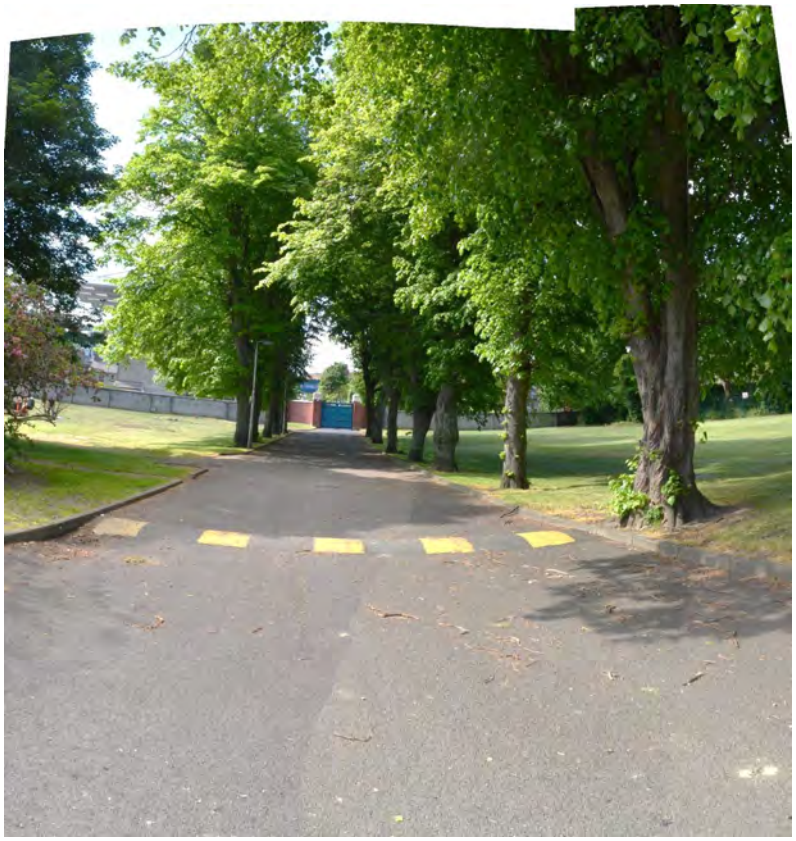
60. Side (North) elevation of the Red House

61. Panoramic view of the front setting of the Red House

62. Panoramic view of the front setting of the Red House, showing the tree-lined avenue between the Red House and the Library Block

63. Panoramic view of the front setting of the College, from the main entrance avenue, showing the College Chapel and the Main Seminary Block

64. Panoramic view of the front setting of the College, from the avenue to the Red House



65. Panoramic view of the entrance avenue to the College, showing the entrance from Clonliffe Road

66. Panoramic view from the front setting of the College, showing the view towards Clonliffe Road and Croke Park stadium

67. Panoramic view of the front gates to the College from Clonliffe Road

68. Panoramic view of the streetscape of Clonliffe Road, showing the entrance gates to the college

69. Panoramic view of the streetscape of Clonliffe Road, showing the entrance gates to the college

70. Panoramic view of the streetscape of Clonliffe Road, showing the boundary walls to the college

71. Panoramic view of the streetscape of Clonliffe Road

72. Panoramic view of the streetscape of Clonliffe Road, showing the boundary walls and the entrance gates to the college

73. Panoramic view of the streetscape of Clonliffe Road, showing the junction with Holy Cross Avenue

74. Panoramic view along Holy Cross Avenue, looking towards the secondary entrance gate to the College

75. Panoramic view of the streetscape of Clonliffe Road, showing the boundary walls and entrance gates to Mater Dei

76. Panoramic view of the streetscape of Clonliffe Road, showing the boundary walls and entrance gates to Mater Dei

77. Front setting of the Mater Dei campus, showing the front façade of the Assembly Hall

78. Panoramic view of the front setting of the Mater Dei campus, showing the front and side elevations of the Assembly Hall

79. Panoramic view of the streetscape of Clonliffe Road, showing the boundary walls and entrance gates to Mater Dei

80. Panoramic view of the streetscape of the Drumcondra Road, showing the boundary walls and entrance gates to the Archbishop's House

81. Panoramic view of the streetscape of the Drumcondra Road, showing the boundary walls and secondary entrance gate to the College

82. Panoramic view of the streetscape of the Drumcondra Road, showing the boundary walls of the College

83. Panoramic view of the streetscape of the Drumcondra Road, showing the boundary walls and secondary entrance gate to the College

84. Panoramic view of the streetscape of the Drumcondra Road, showing the secondary entrance gate to the College, accessed via a narrow laneway between the existing houses

85. Panoramic view of the secondary entrance to the College along Drumcondra Road, accessed via a narrow lane between the existing houses

86. Panoramic view of the modern entrance gates to the Archbishop's House from the setting of the College

87. Panoramic view of the front setting of the Archbishop's House

88. Panoramic view of the front and side elevations of the Archbishop’s House

89. Panoramic view of the front elevation of the Archbishop’s House

90. Panoramic view of the rear elevation of the Archbishop's House

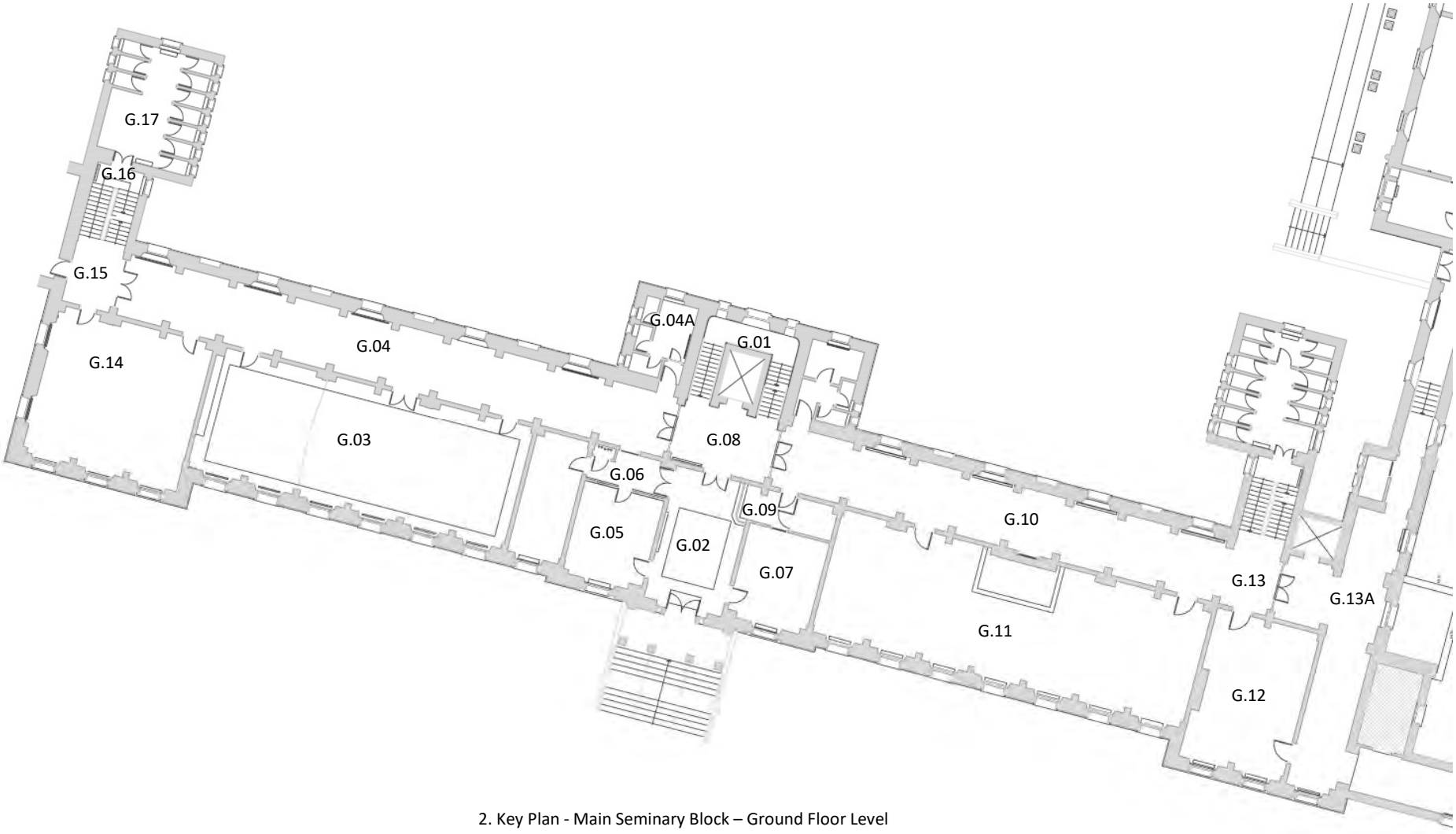
91. Panoramic view of the side elevation of the Archbishop's House

A14.5 Photographic Record – Main Seminary Building

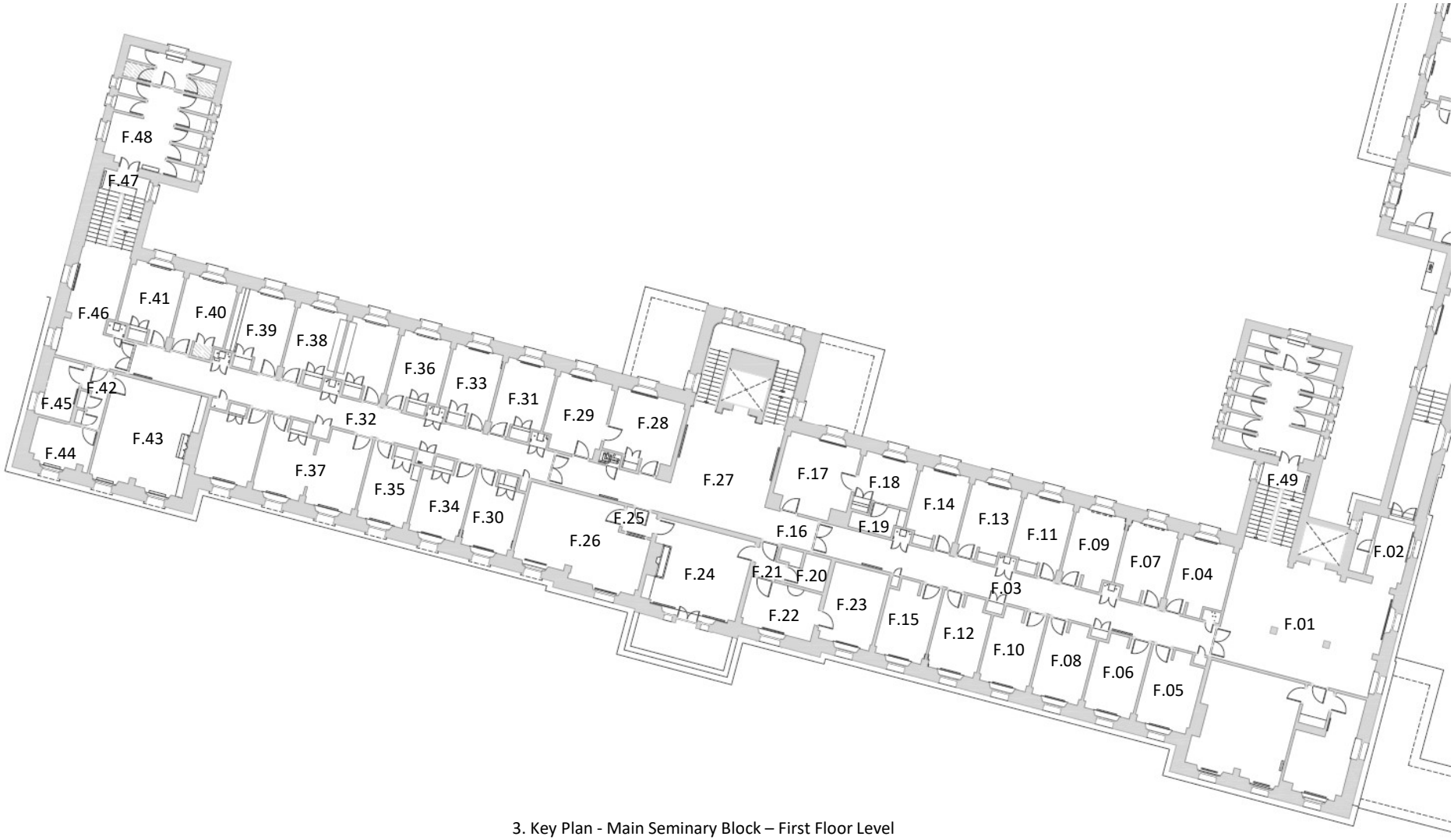
Holy Cross College, Clonliffe Road, Dublin 3.

Key Plans – Main Seminary Block

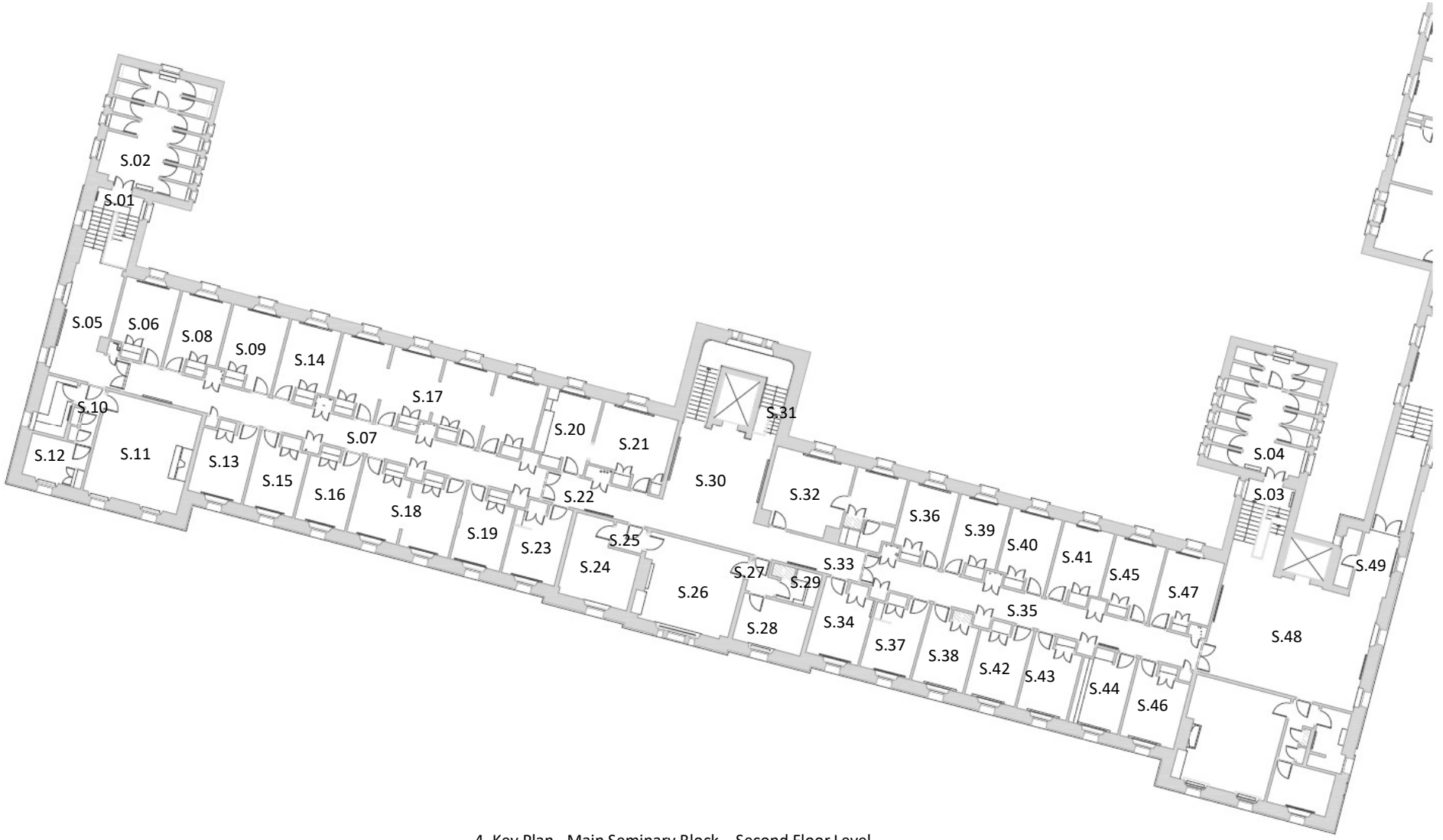
1. Key Plan - Main Seminary Block – Basement Level



2. Key Plan - Main Seminary Block – Ground Floor Level



3. Key Plan - Main Seminary Block – First Floor Level



4. Key Plan - Main Seminary Block – Second Floor Level

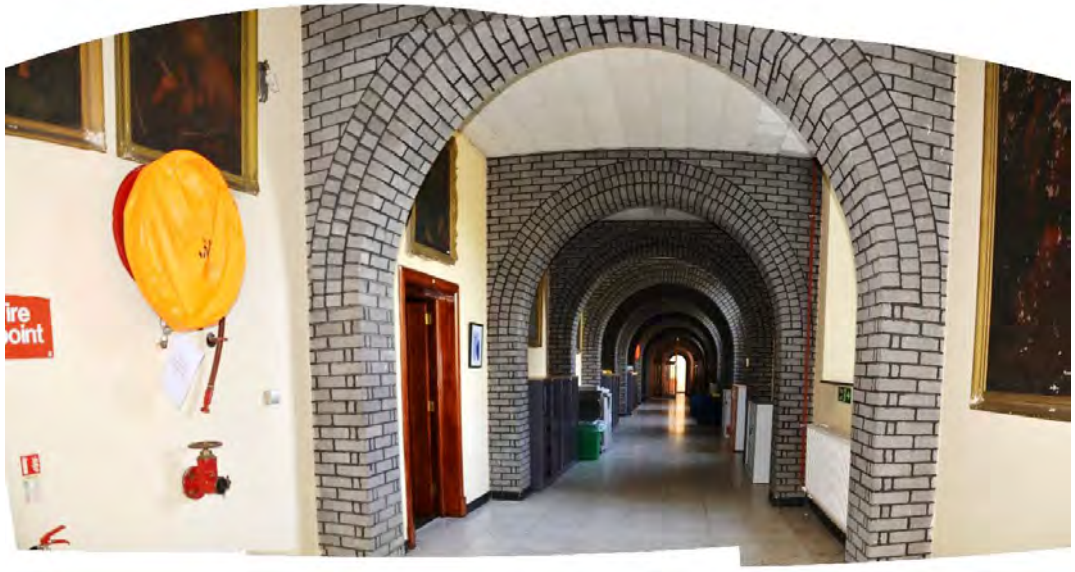
Main Seminary Block, Holy Cross College, Clonliffe.

Internal Photos – Basement Floor

1. Room B.01

2. Room B.02

3. Room B.02



4. Room B.02

5. Room B.03

6. Room B.03

7. Room B.04

8. Room B.04

9. Room B.05

10. Room B.06

11. Room B.07

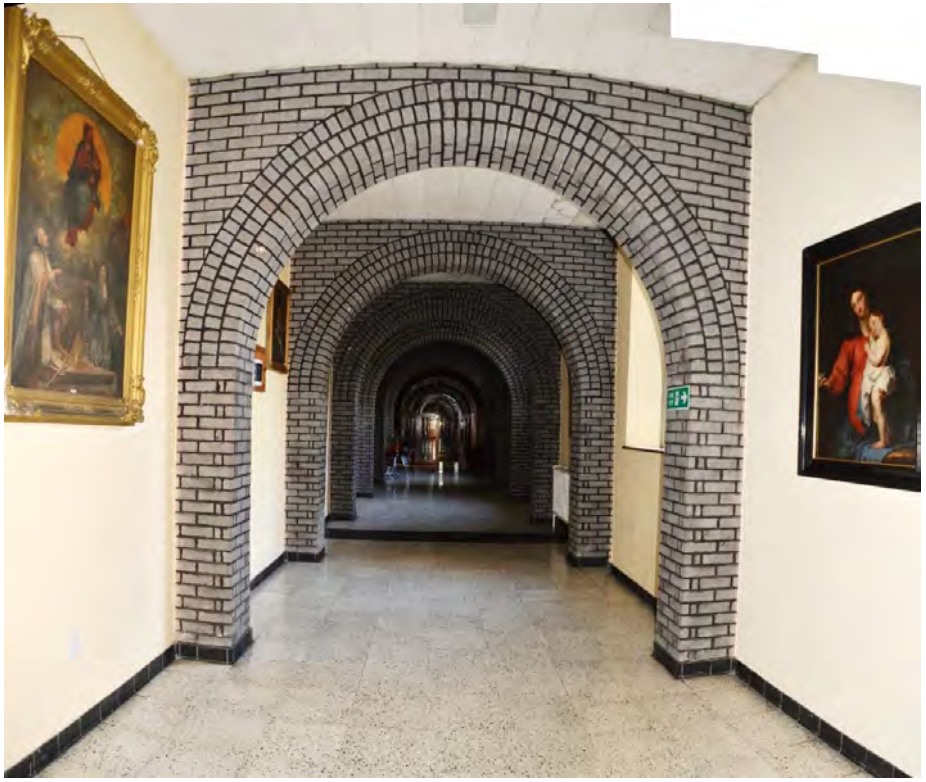
12. Room B.08

13.Room B.08

14. Room B.09

15. Room B.09

16. Room B.10



17. Room B.10

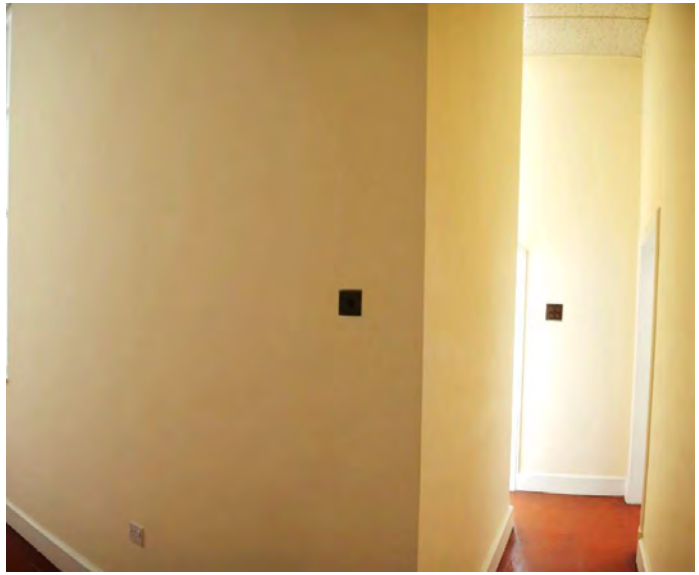
18. Room B.11

19. Room B.12

20. Room B.13

21. Room B.13

22. Room B.13



23. Room B.14

24. Room B.15

25. Room B.16

26. Room B.16

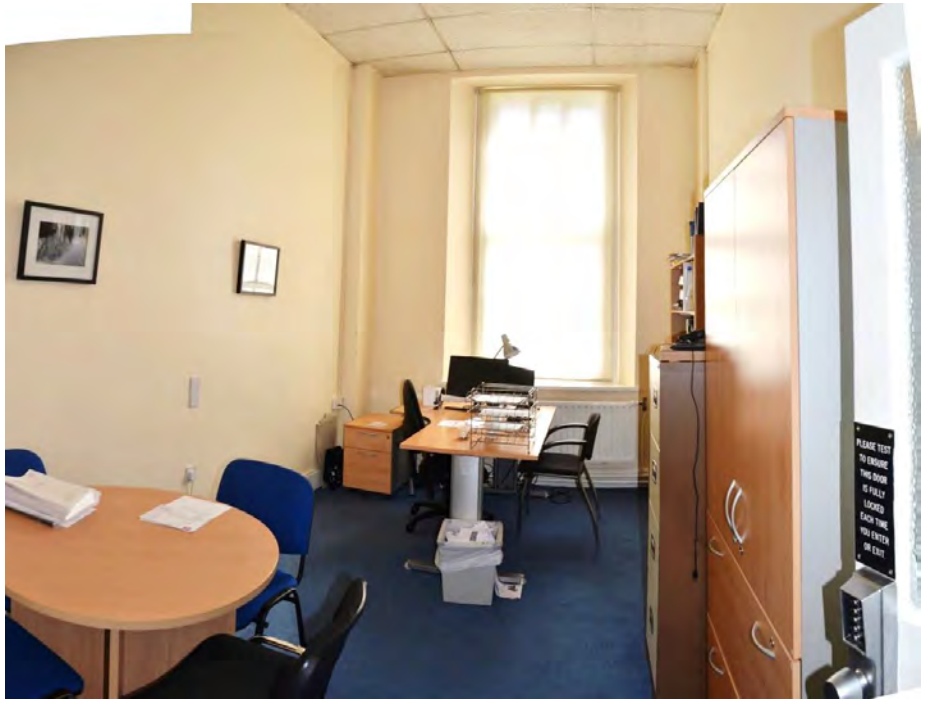
27. Room B.17

28. Room B.17

29. Room B.18

30. Room B.18

31. Room B.18



32. Room B.19

33. Room B.19

Main Seminary Block, Holy Cross College, Clonliffe.

Internal Photos – Ground Floor

1. Room G.01

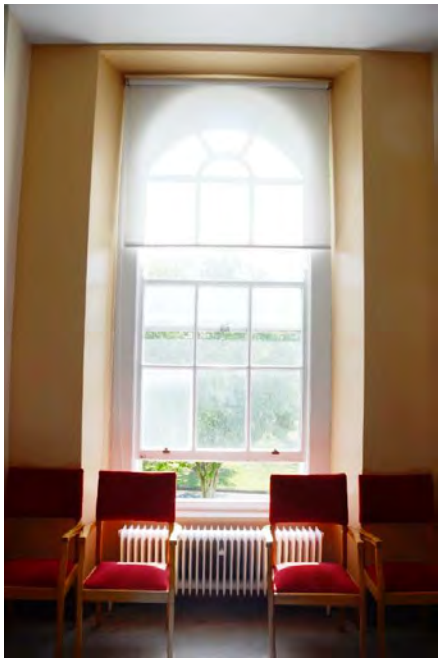
2. Room G.01

3. Room G.02

4. Room G.02

5. Room G.03

6. Room G.03



7. Room G.03

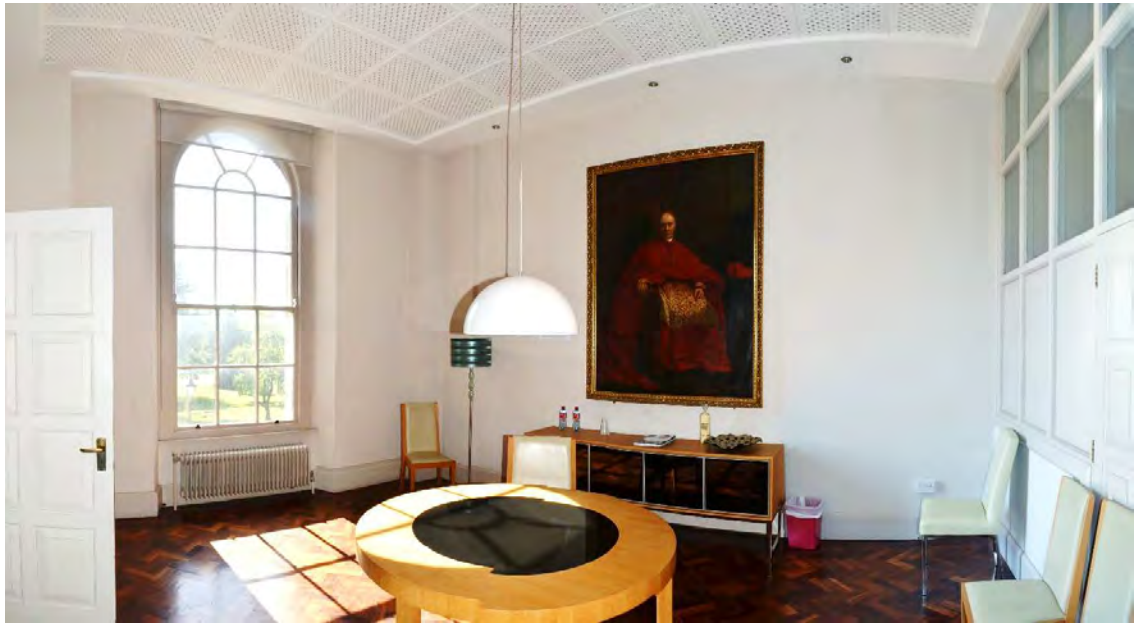
8. Room G.03

9. Room G.03

10. Room G.04

11. Room G.04

12. Room G.04A



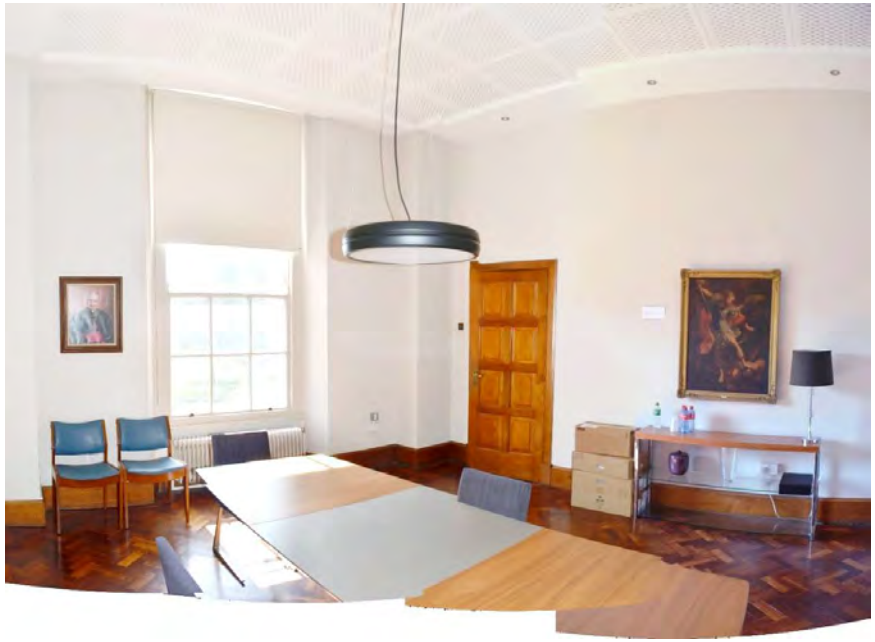
13. Room G.05

14. Room G.05

15. Room G.06

16. Room G.06

17. Room G.07



18. Room G.07

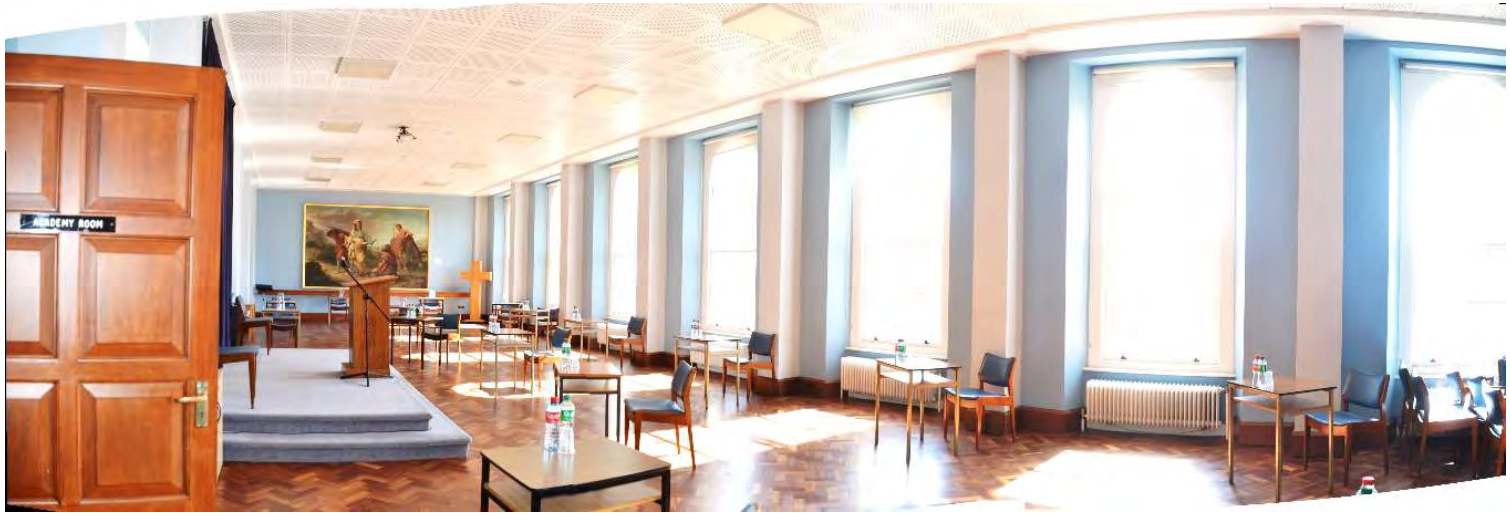
19. Room G.08

20. Room G.08

21. Room G.09

22. Room G.10

23. Room G.10



24. Room G.11

25. Room G.11

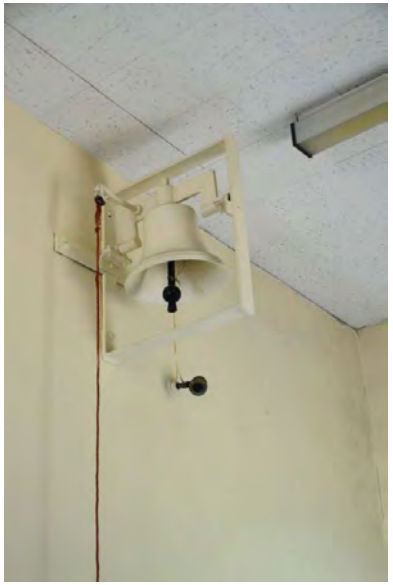
26. Room G.12

27. Room G.12

28. Room G.13

29. Room G.13A

30. Room G.13A



31. Room G.13A

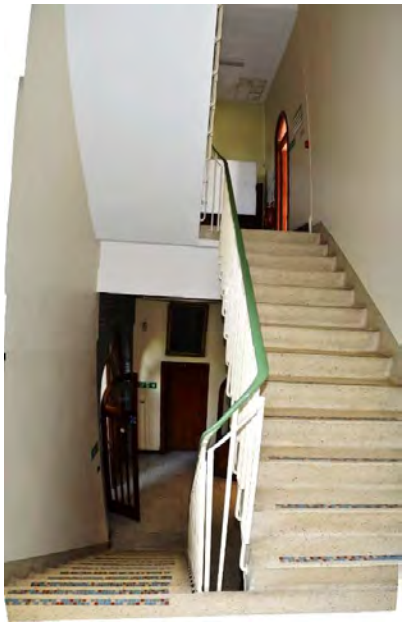
32. Room G.14

33. Room G.14

34. Room G.15

35. Room G.15

36. Room G.15



37. Room G.16

38. Room G.17

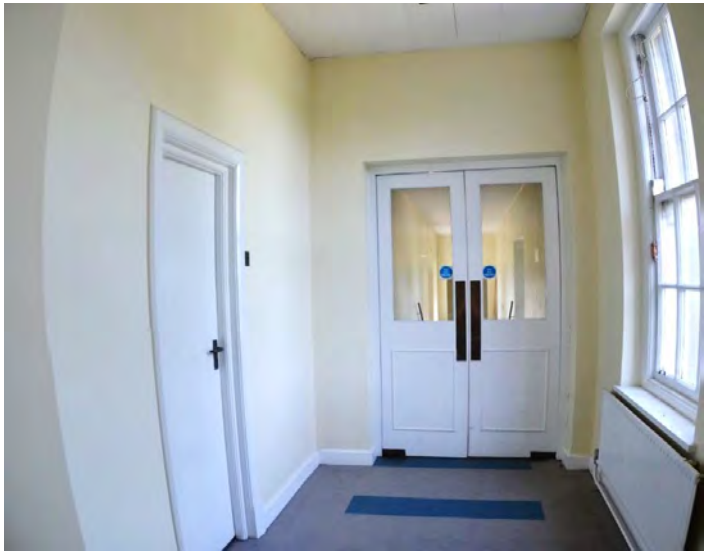
Main Seminary Block, Holy Cross College, Clonliffe.

Internal Photos - First Floor

1. Room F.01

2. Room F.01

3. Room F.01



4. Room F.02

5. Room F.01

6. Room F.03

7. Room F.03

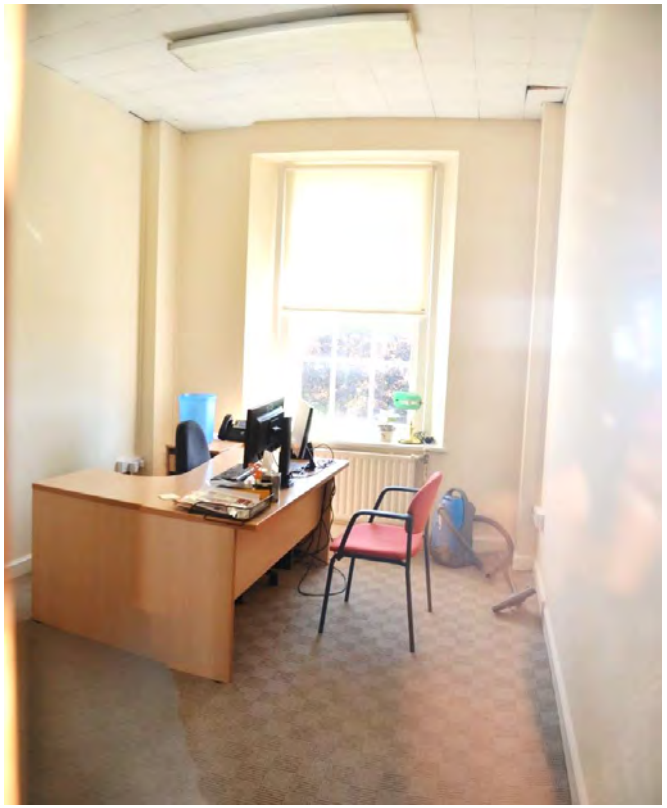
8. Room F.03

9. Room F.04

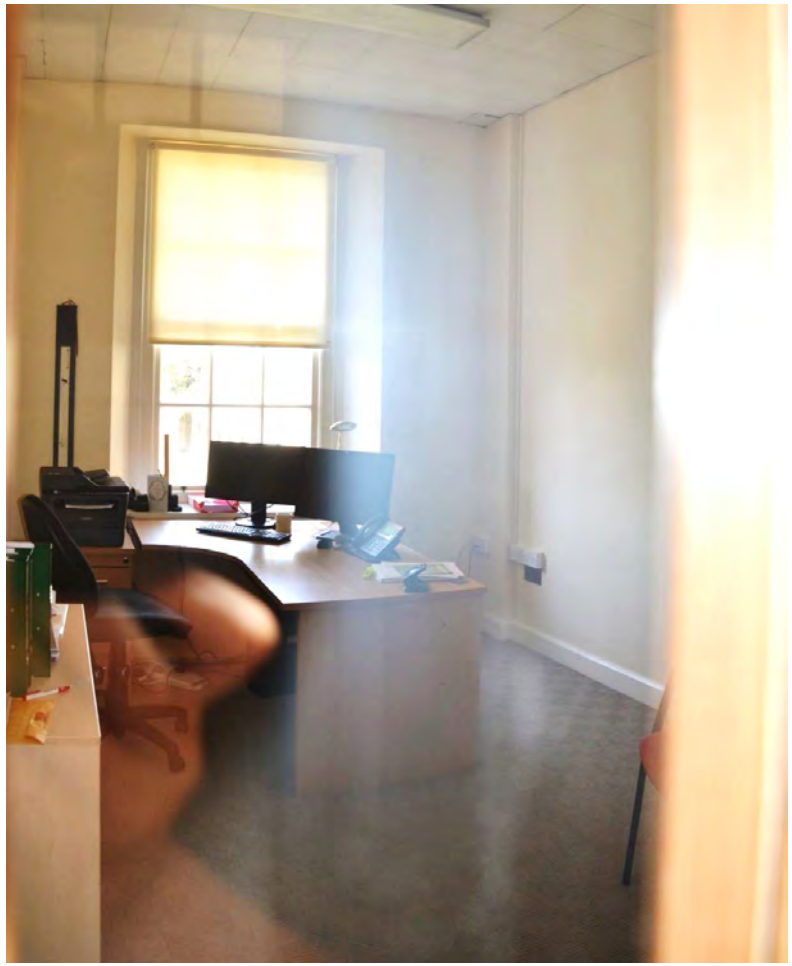
10. Room F.05

11. Room F.06

12. Room F.07



13. Room F.08



14. Room F.09

15. Room F.10

16. Room F.11

17. Room F.12

18. Room F.13

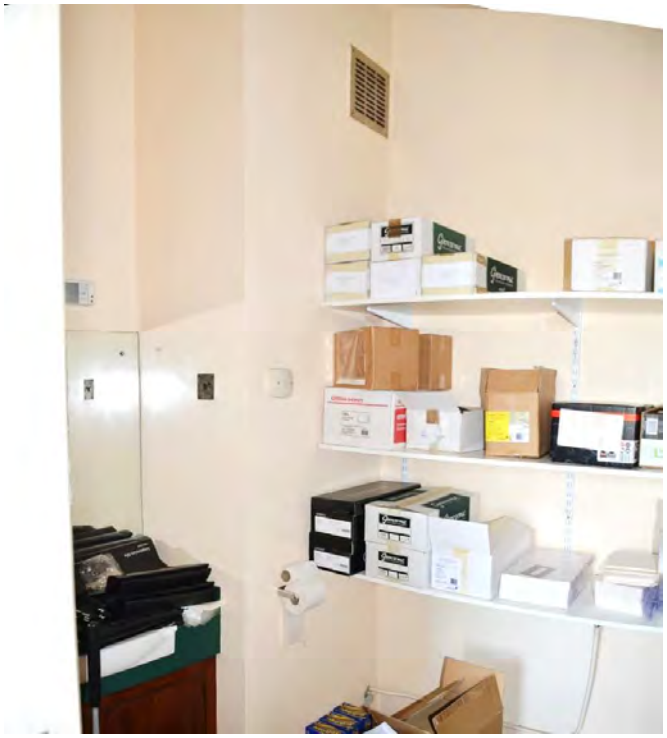
19. Room F.14

20. Room F.15

21. Room F.16

22. Room F.17

23. Room F.18



24. Room F.19

25. Room F.20

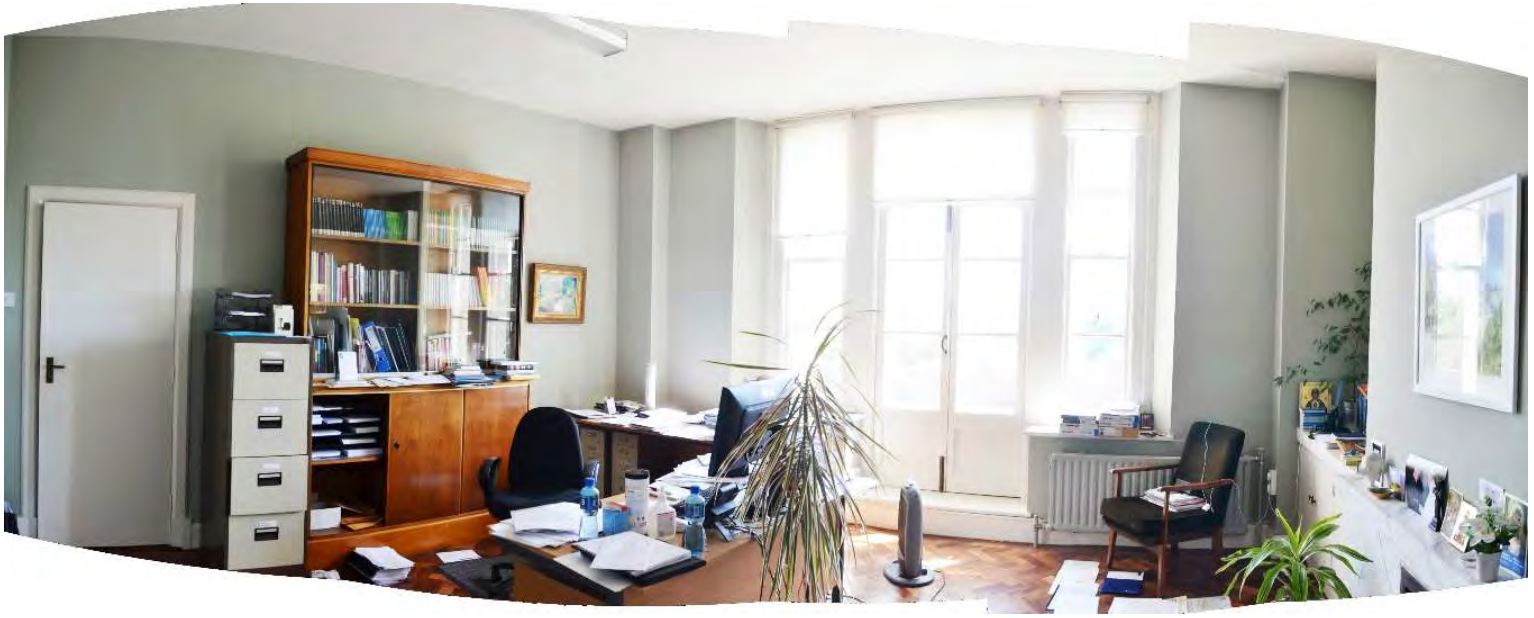
26. Room F.21

27. Room F.22

28. Room F.23

29. Room F.24

30. Room F.24



31. Room F.24

32. Room F.25

33. Room F.26

34. Room F.26

35. Room F.27

36. Room F.27

37. Room F.27

38. Room F.28

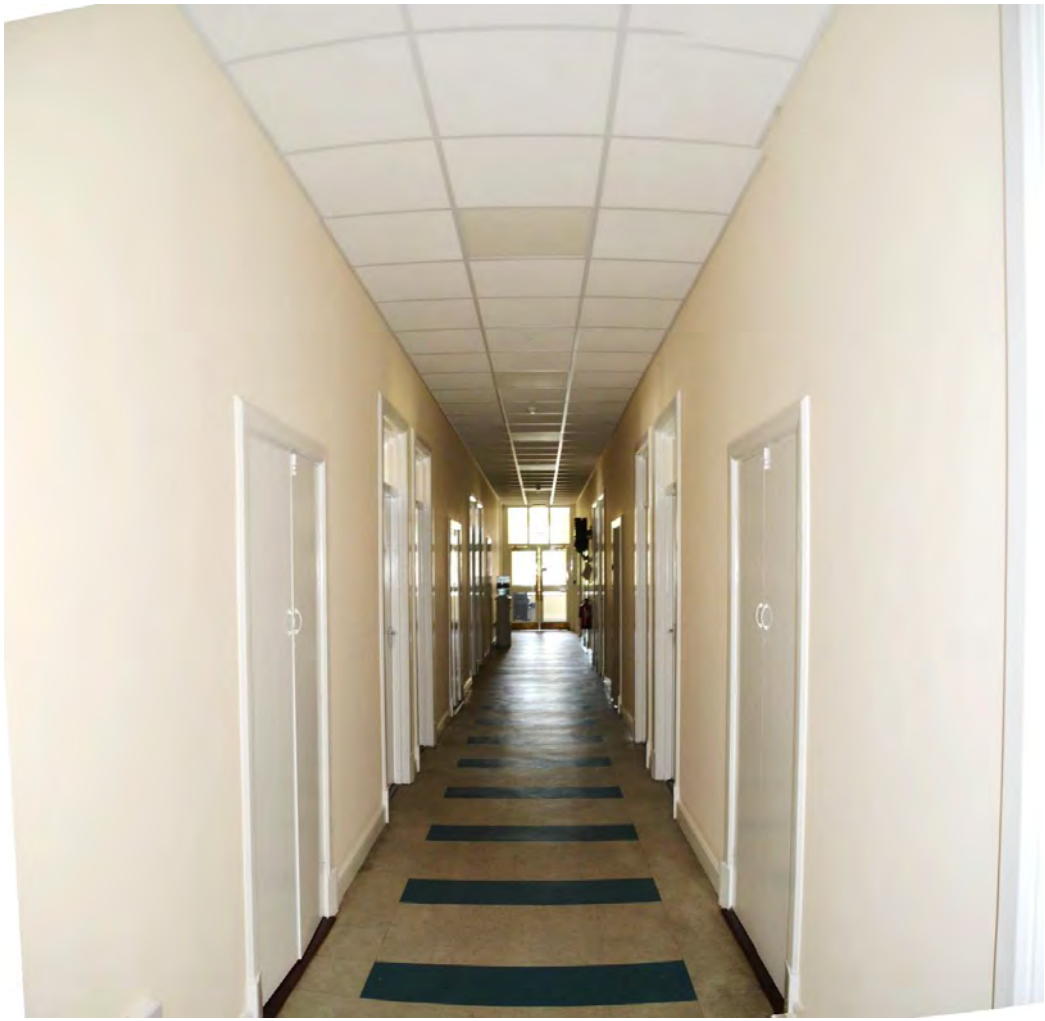
39. Room F.29

40. Room F.30

41. Room F.31

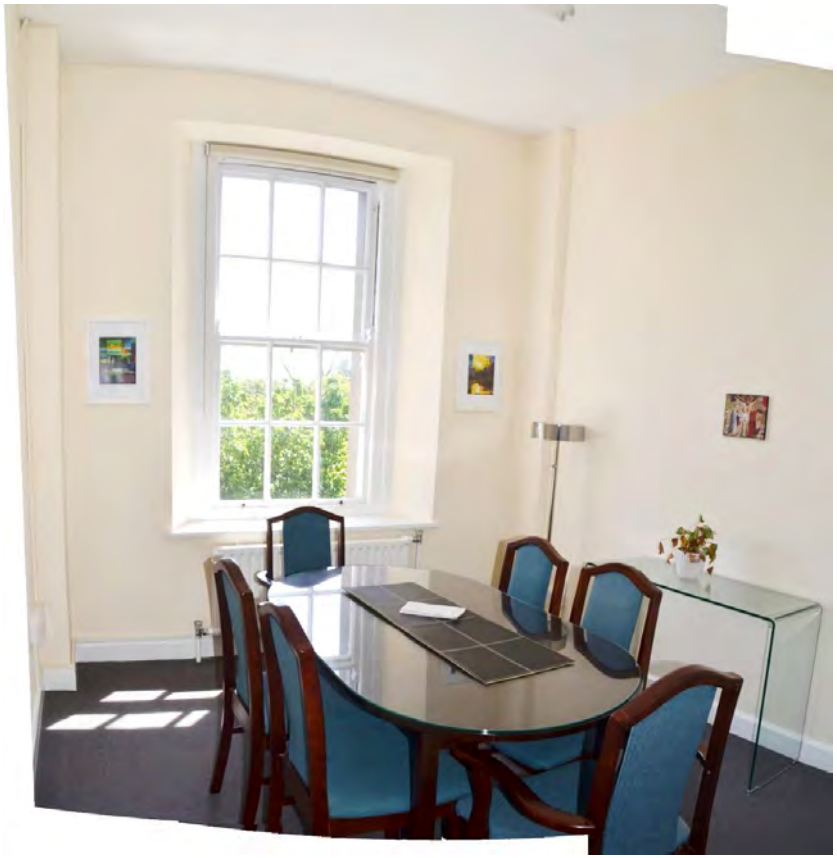
42. Room F.32

43. Room F.32

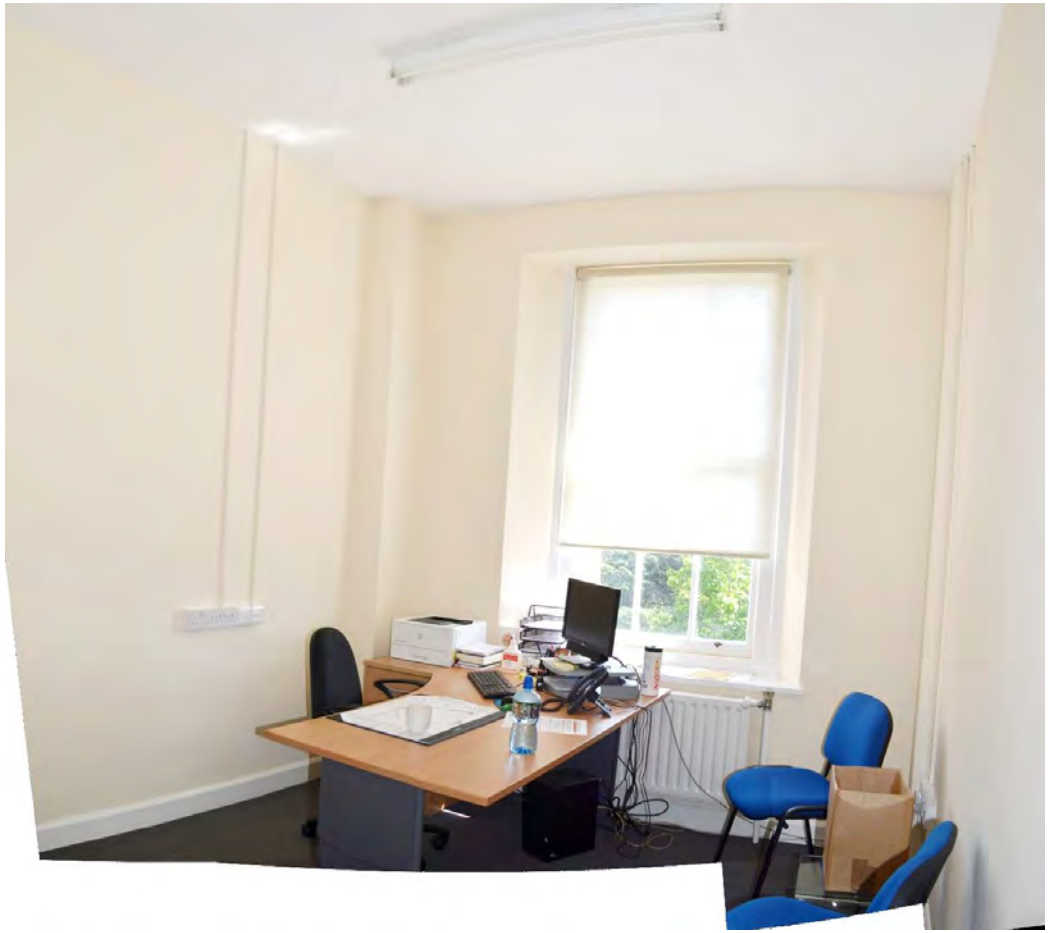


44. Room F.32

45. Room F.33



46. Room F.34

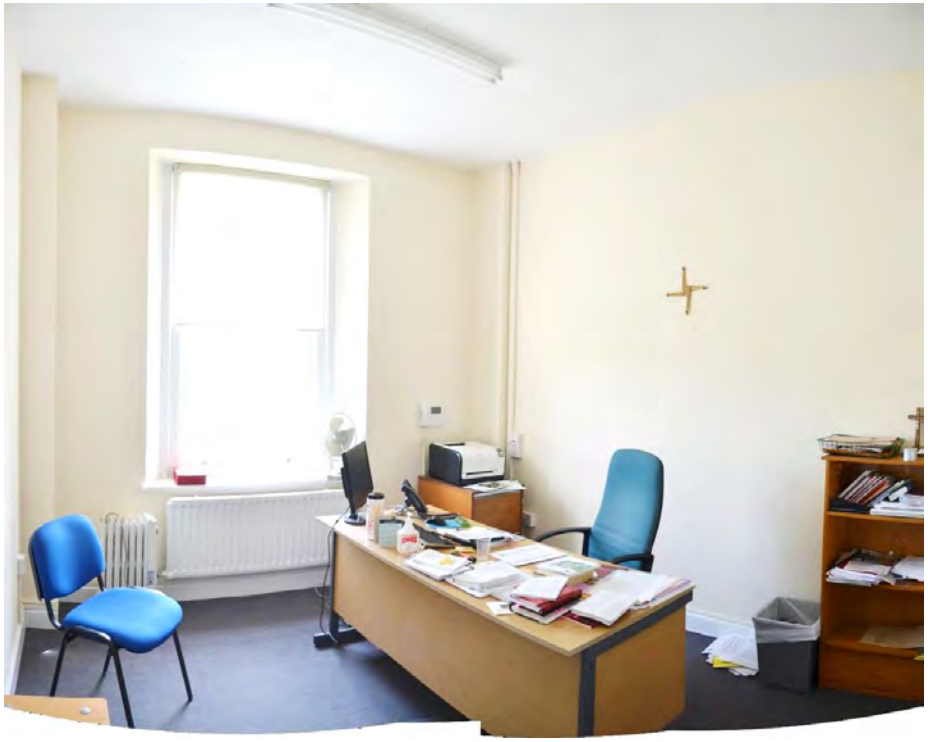


47. Room F.35

48. Room F.36

49. Room F.37

50. Room F.37

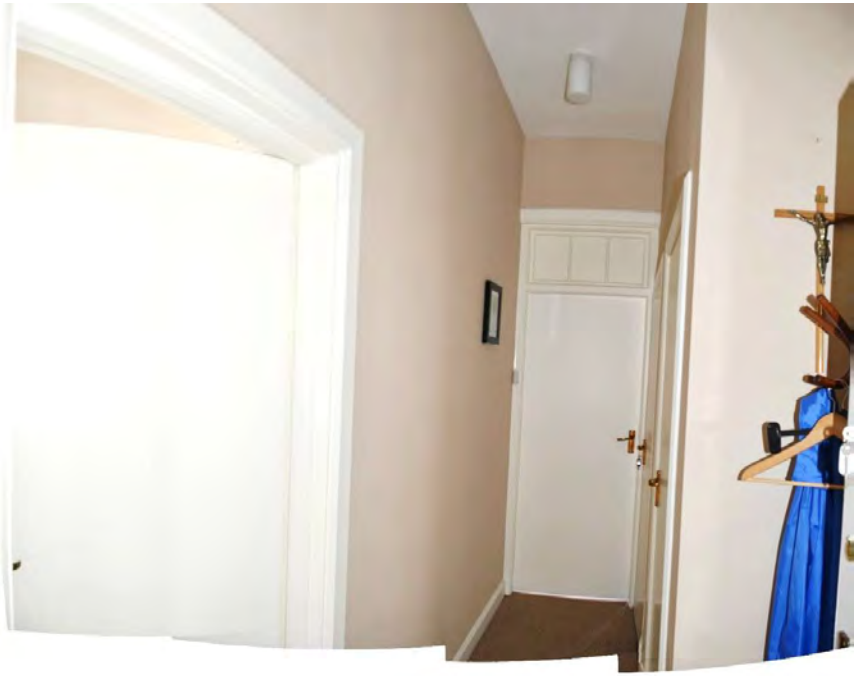


51. Room F.38

52. Room F.39

53. Room F.40

54. Room F.41



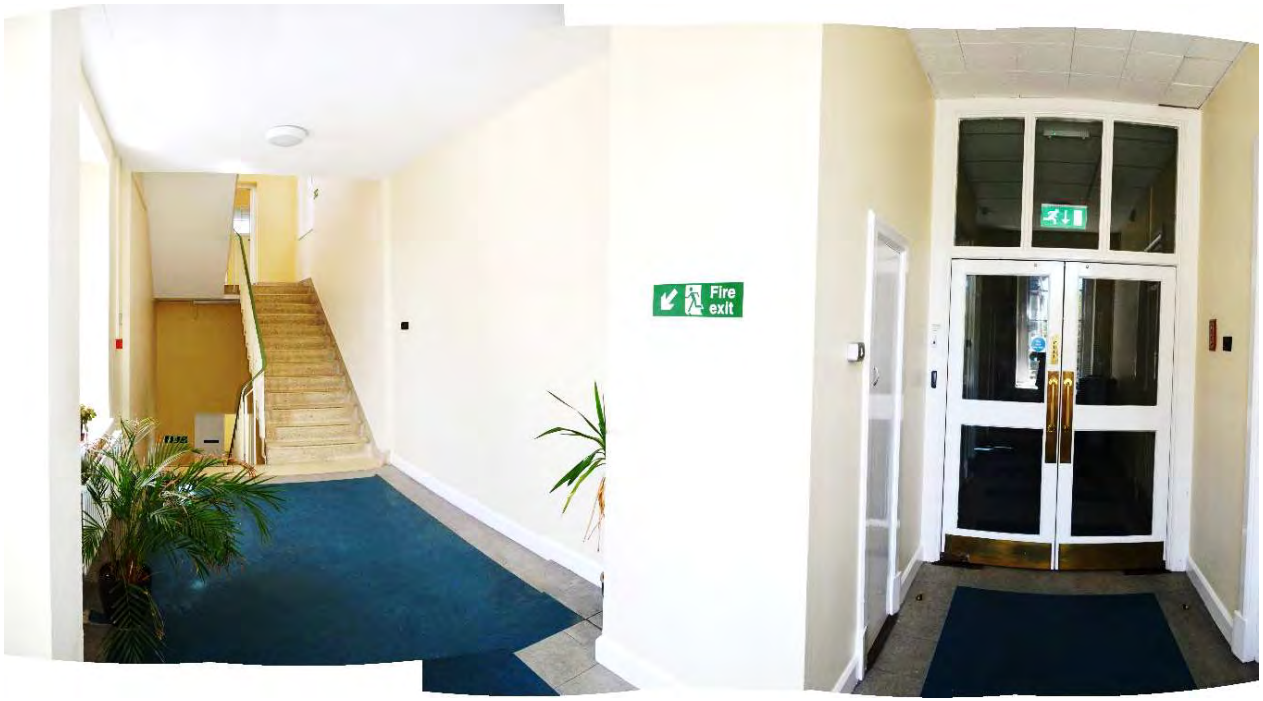
55. Room F.42

56. Room F.43

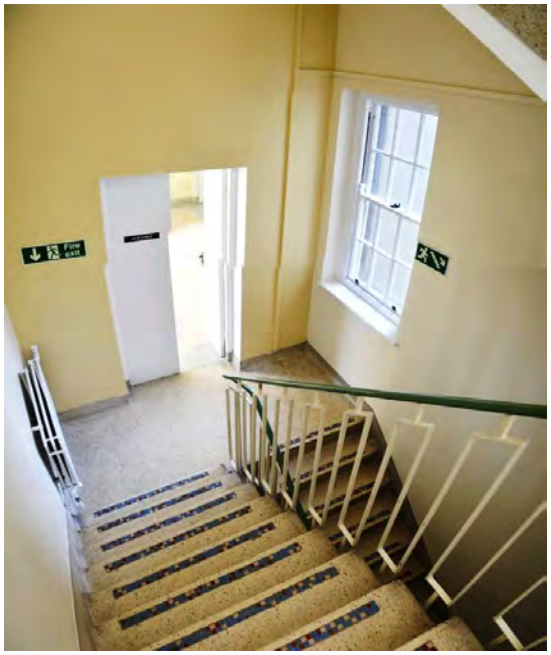
57. Room F.44

58. Room F.45

59. Room F.46



60. Room F.46

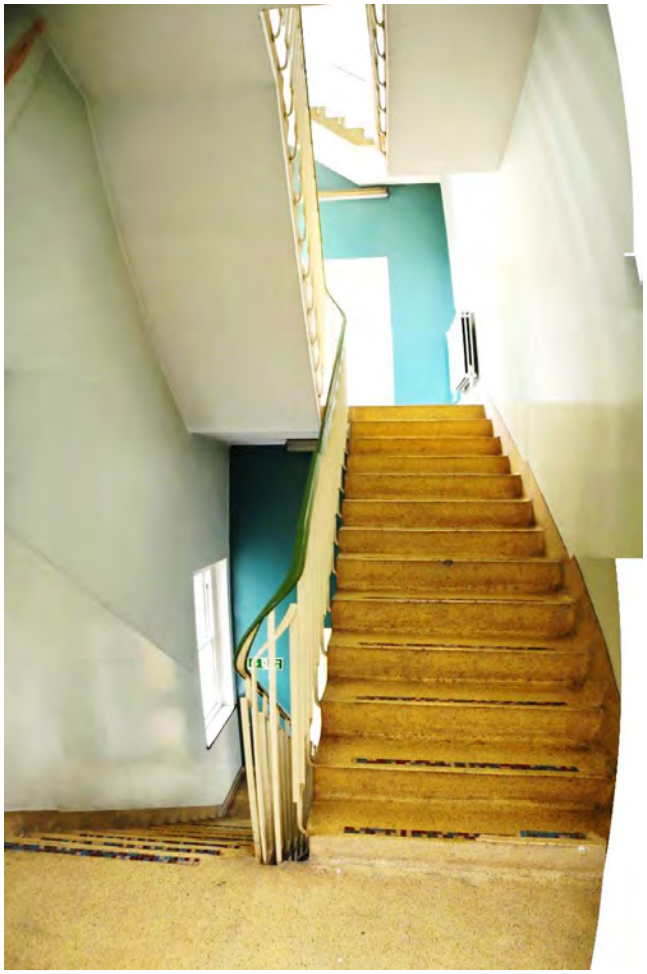


61. Room F.47

62. Room F.47

63. Room F.48

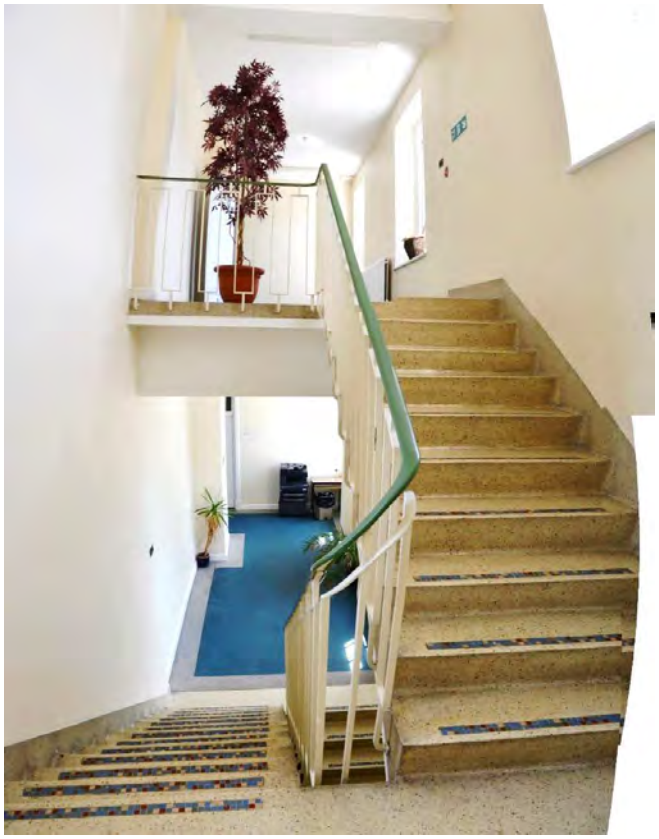
64. Room F.49



65. Room F.49

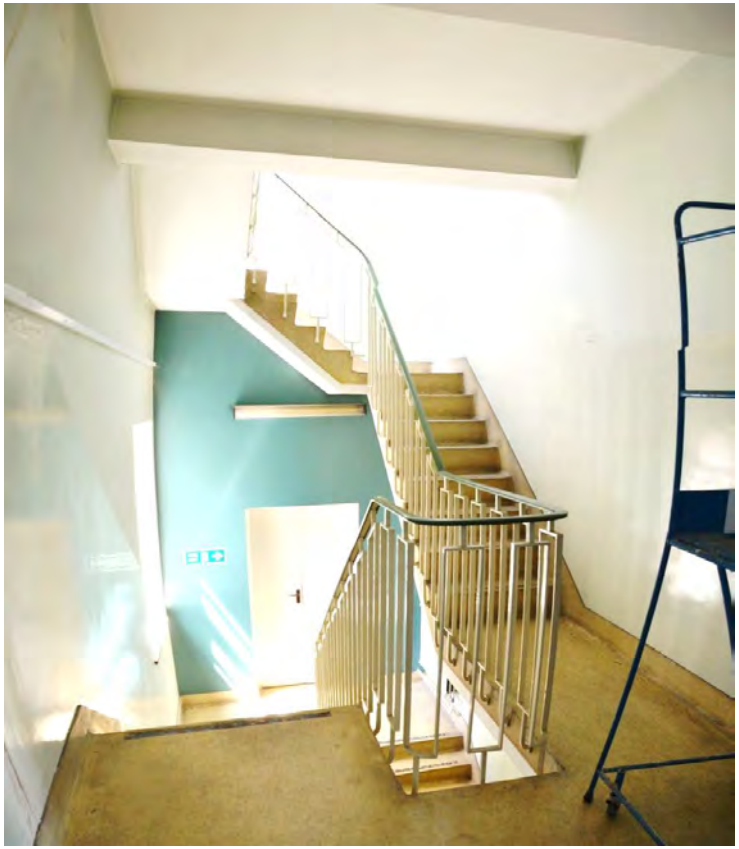
Main Seminary Block, Holy Cross College, Clonliffe.

Internal Photos – Second Floor



1. Room S.01

2. Room S.02



3. Room S.03

4. Room S.04

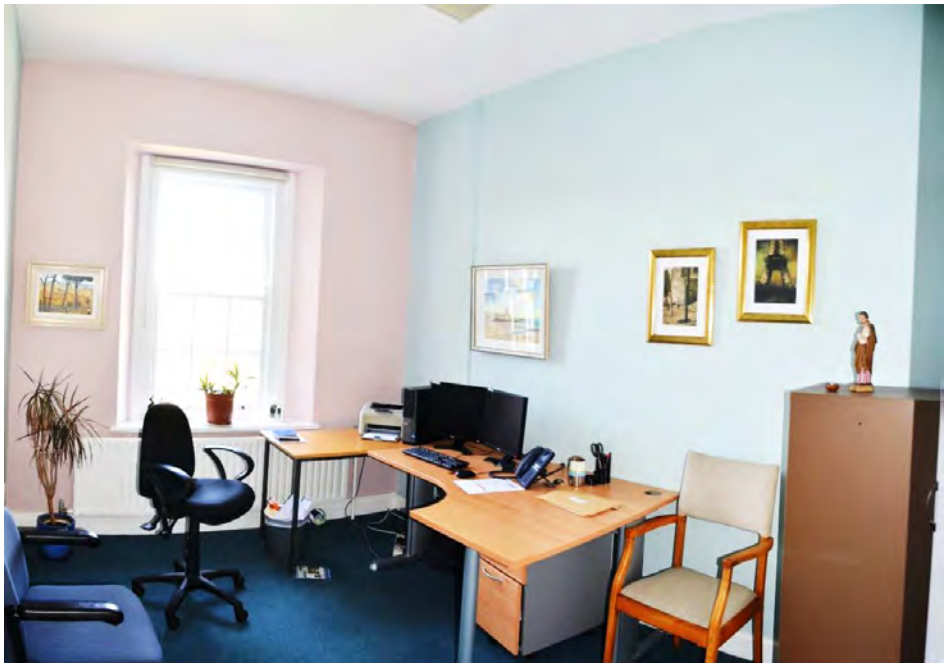
5. Room S.05

6. Room S.05

7. Room S.07

8. Room S.07

9. Room S.06



10. Room S.08

11. Room S.09

12. Room S.10

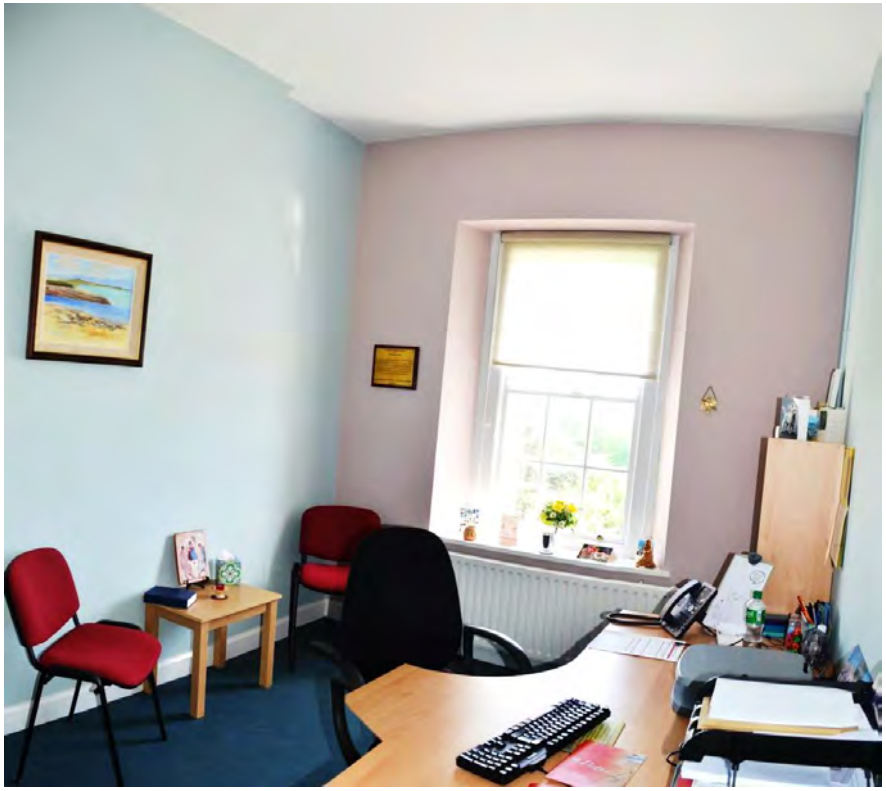
13. Room S.11

14. Room S.11

15. Room S.12

16. Room S.13

17. Room S.14



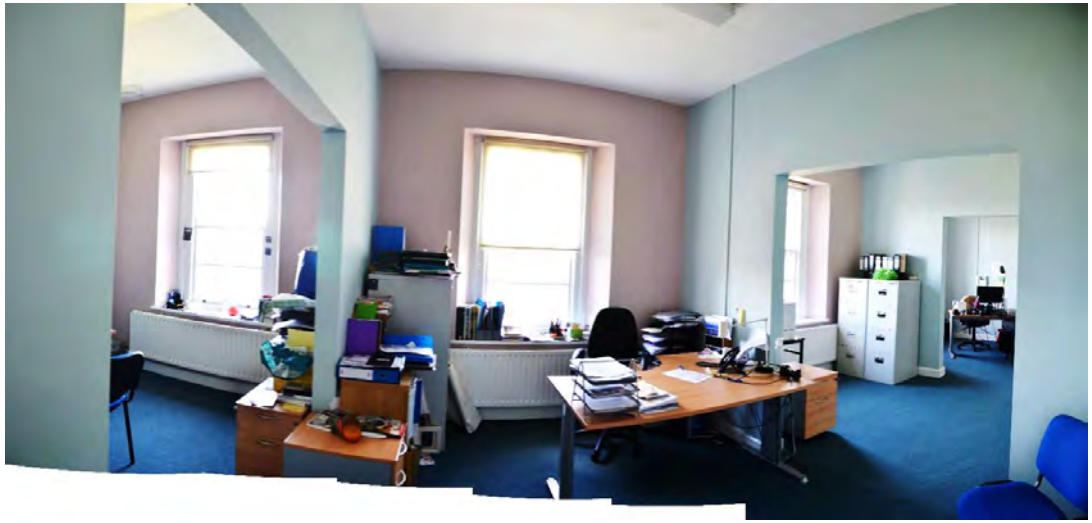
18. Room S.15

19. Room S.16

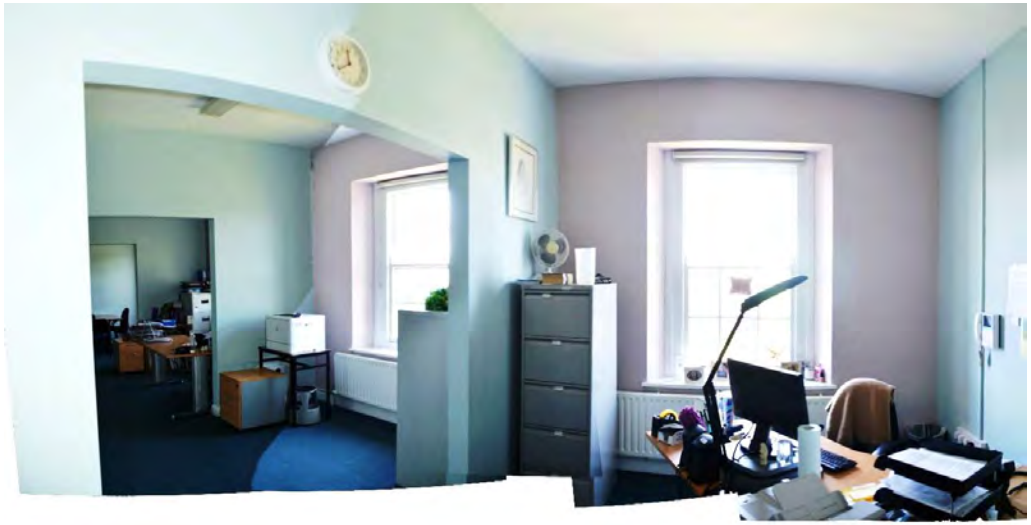
20. Room S.17

21. Room S.17

22. Room S.17

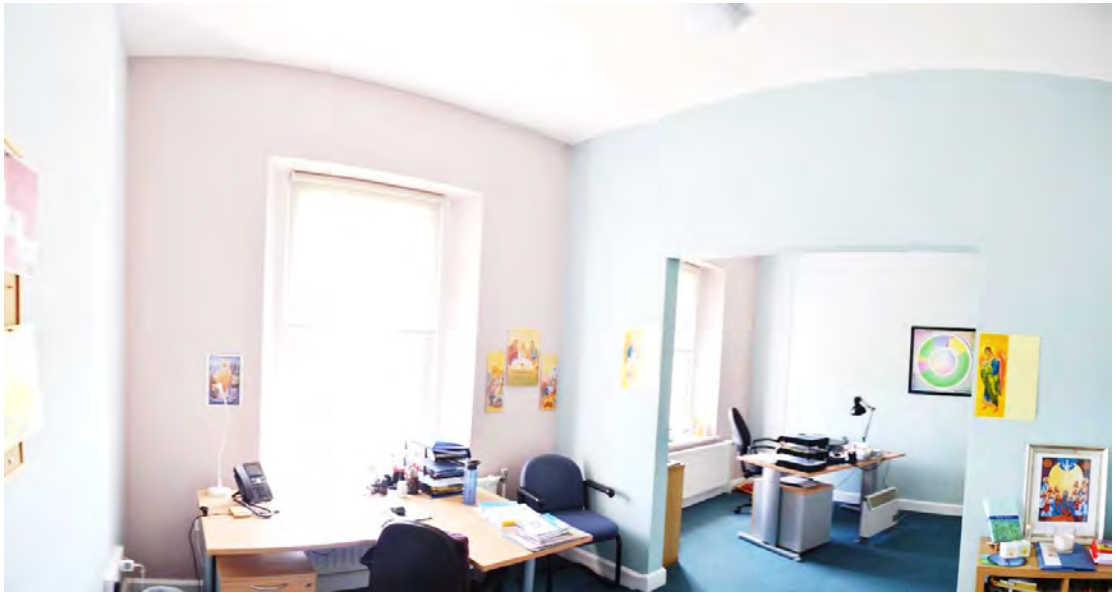


23. Room S.17



24. Room S.17

25. Room S.18



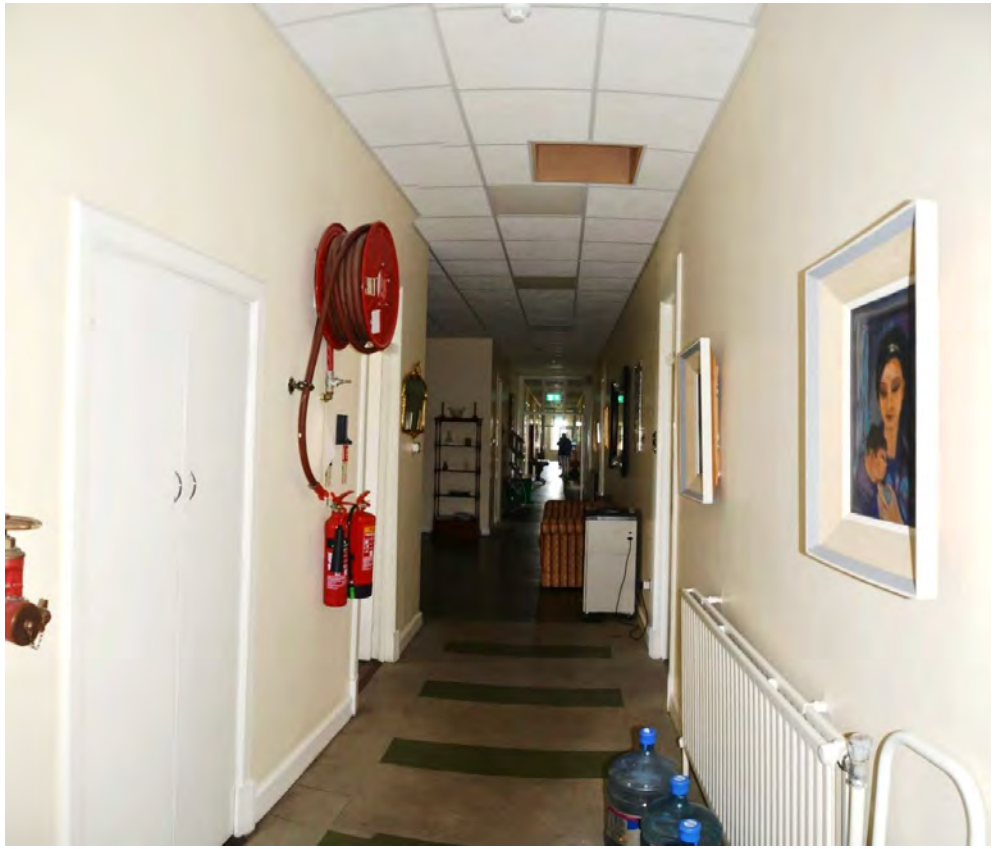
26. Room S.18

27. Room S.19

28. Room S.20

29. Room S.21

30. Room S.21



31. Room S.22

32. Room S.23

33. Room S.24

34. Room S.25

35. Room S.26

36. Room S.26

37. Room S.27

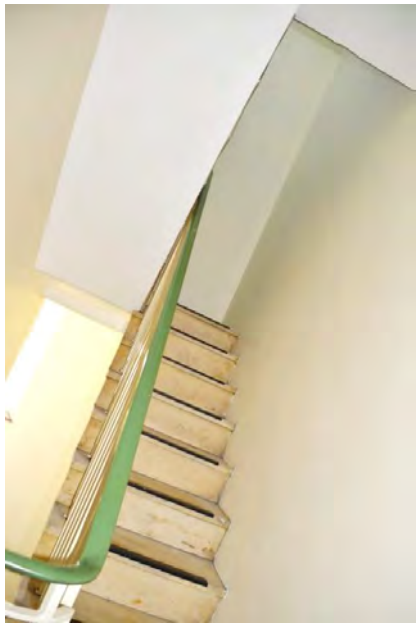
38. Room S.28

39. Room S.29

40. Room S.30

41. Room S.30

42. Room S.30

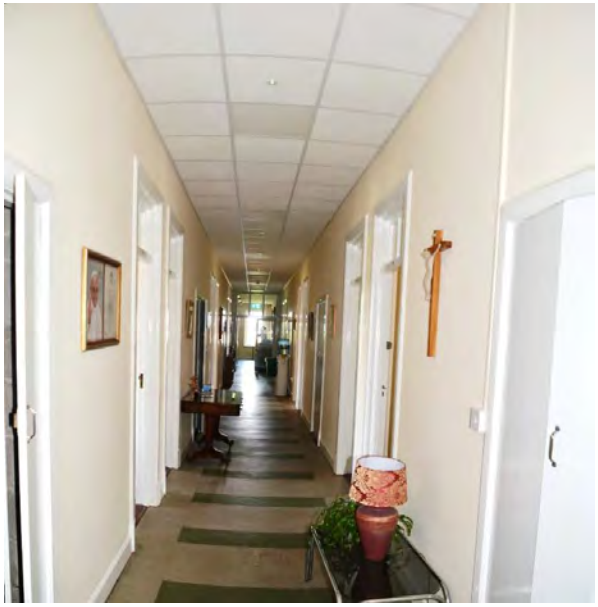


43. Room S.31

44. Room S.32

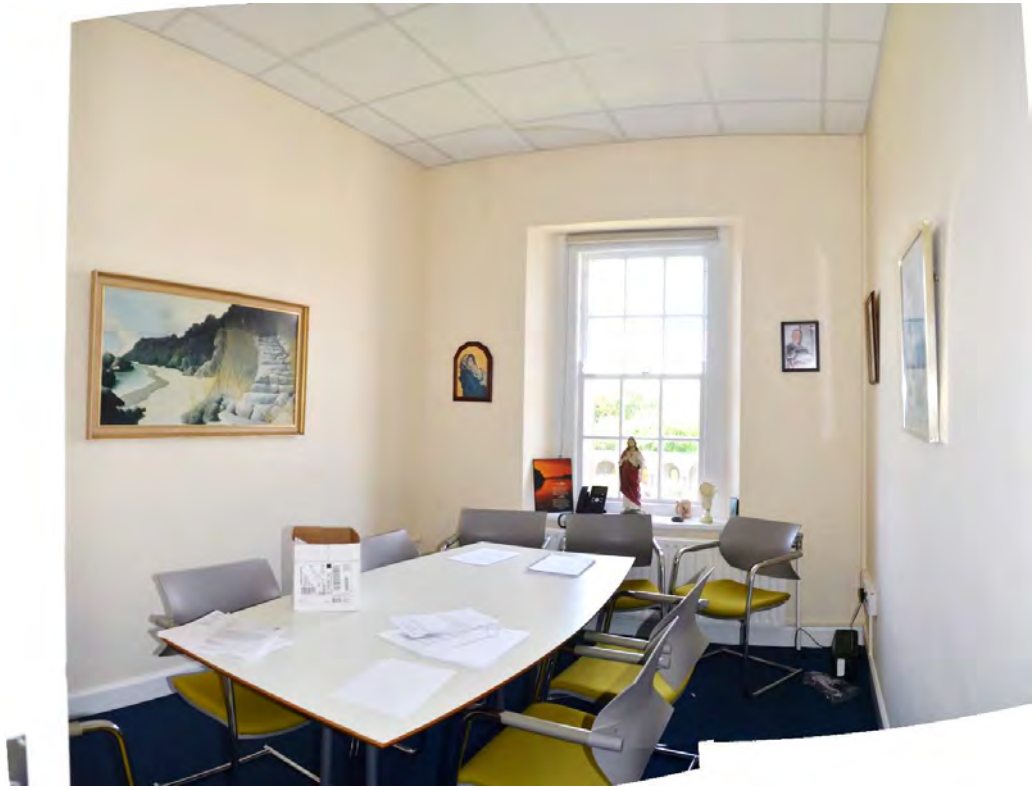
45. Room S.33

46. Room S.34



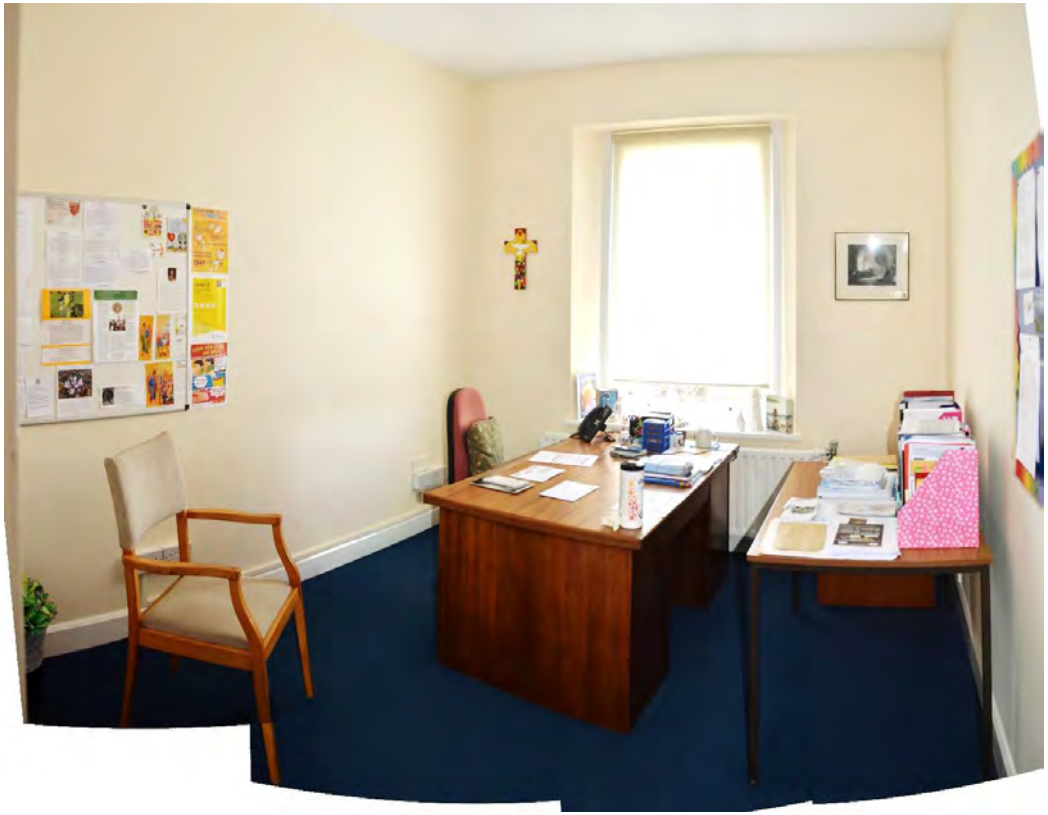
47. Room S.35

48. Room S.35



49. Room S.36

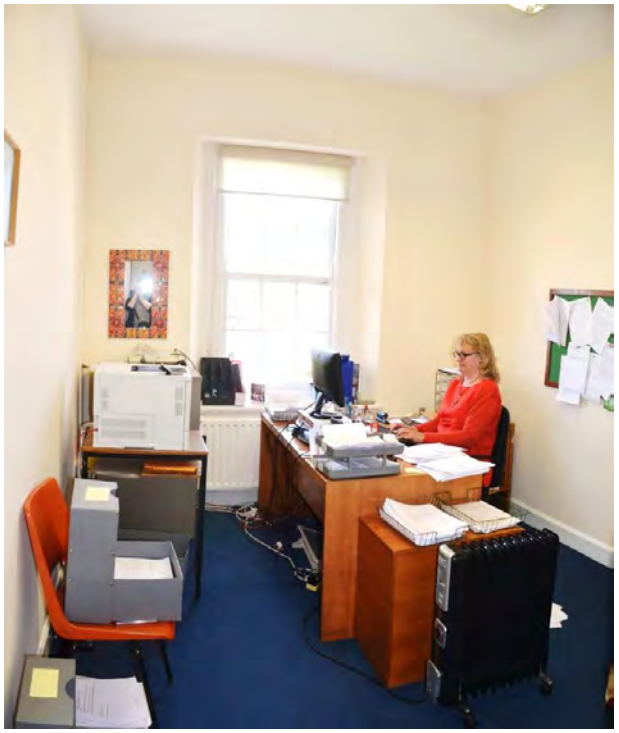
50. Room S.37



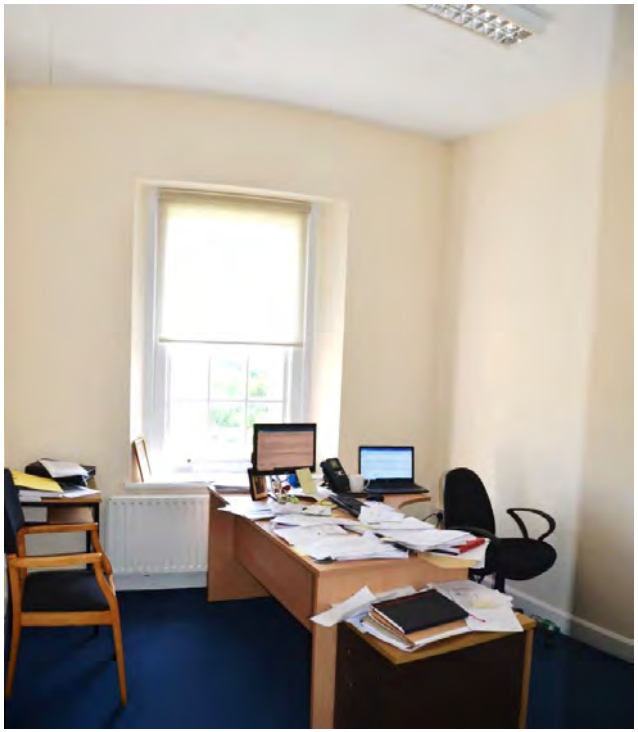
51. Room S.38

52. Room S.39

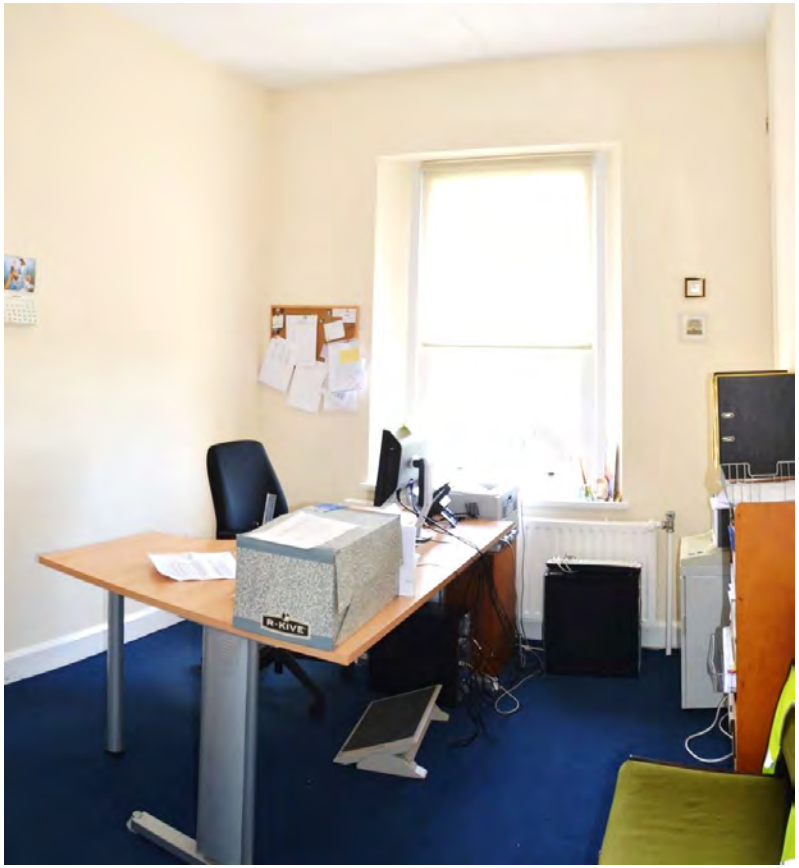
53. Room S.40



54. Room S.41

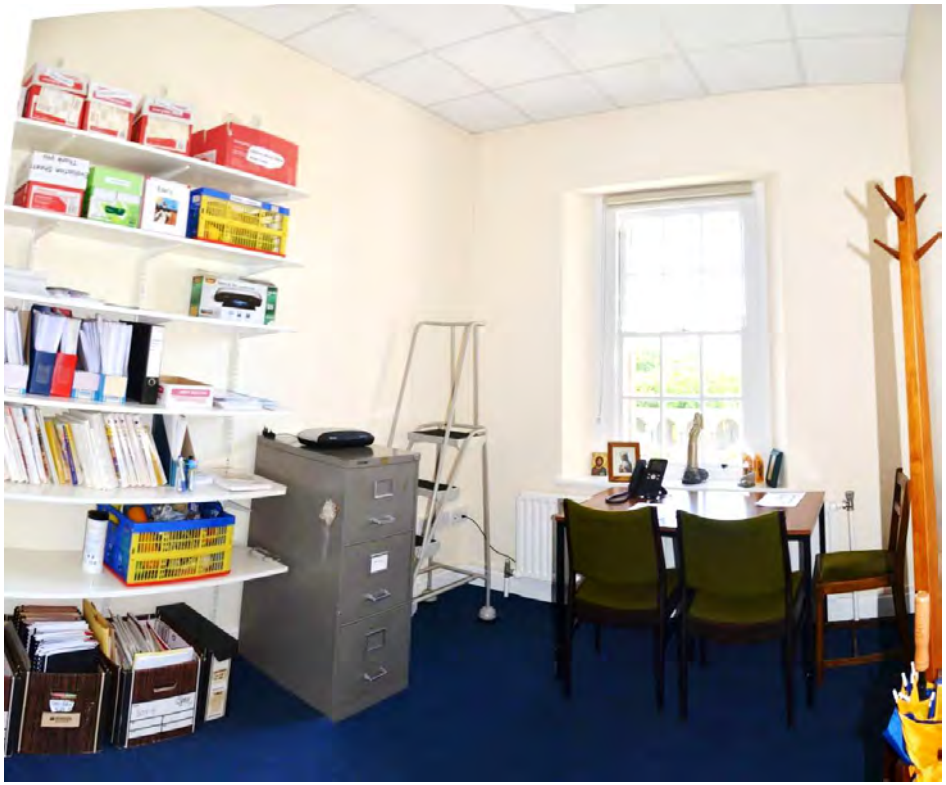


55. Room S.42



56. Room S.43

57. Room S.44



58. Room S.45

59. Room S.46

60. Room S.47

61. Room S.48

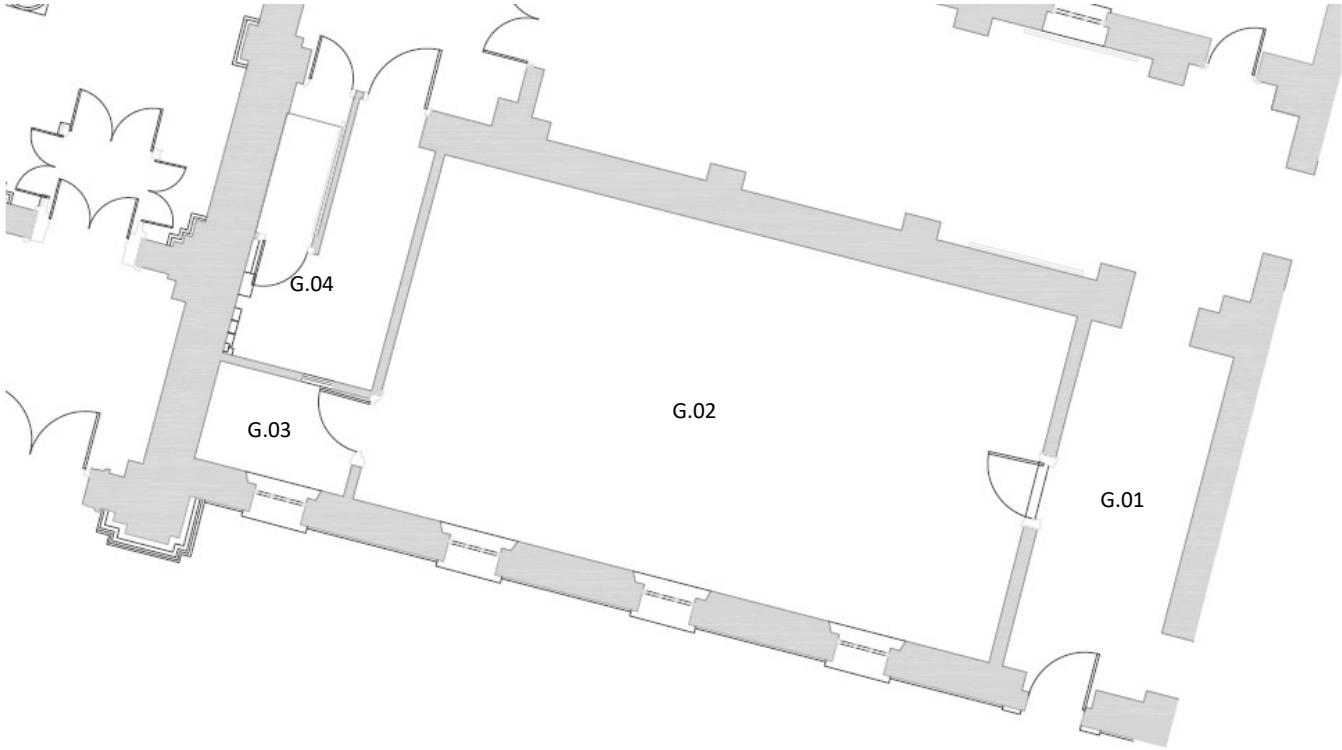
62. Room S.48

63. Room S.49

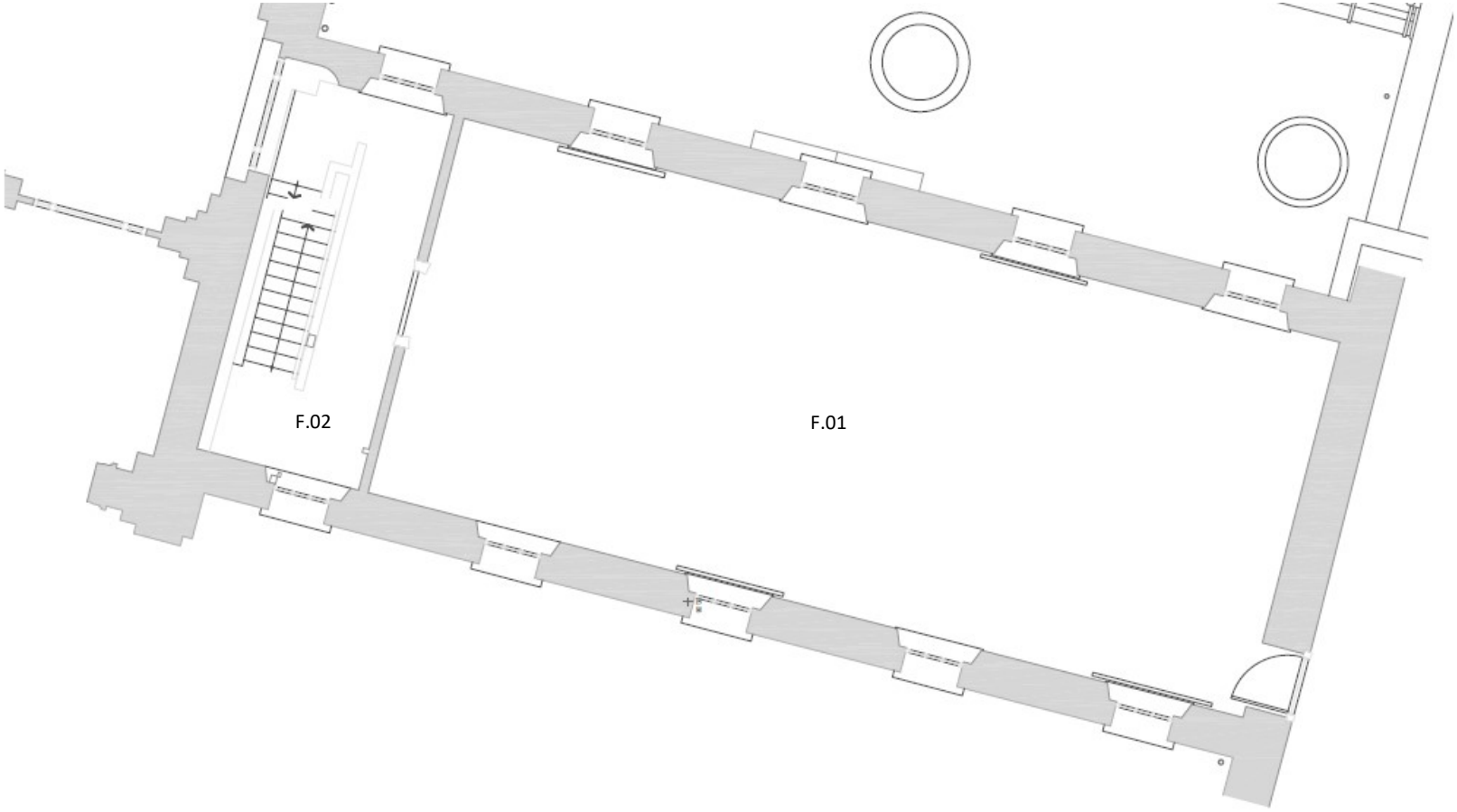
A14.6 Photographic Record – South Link Building

Holy Cross College, Clonliffe Road, Dublin 3.

Key Plans – South Link Building



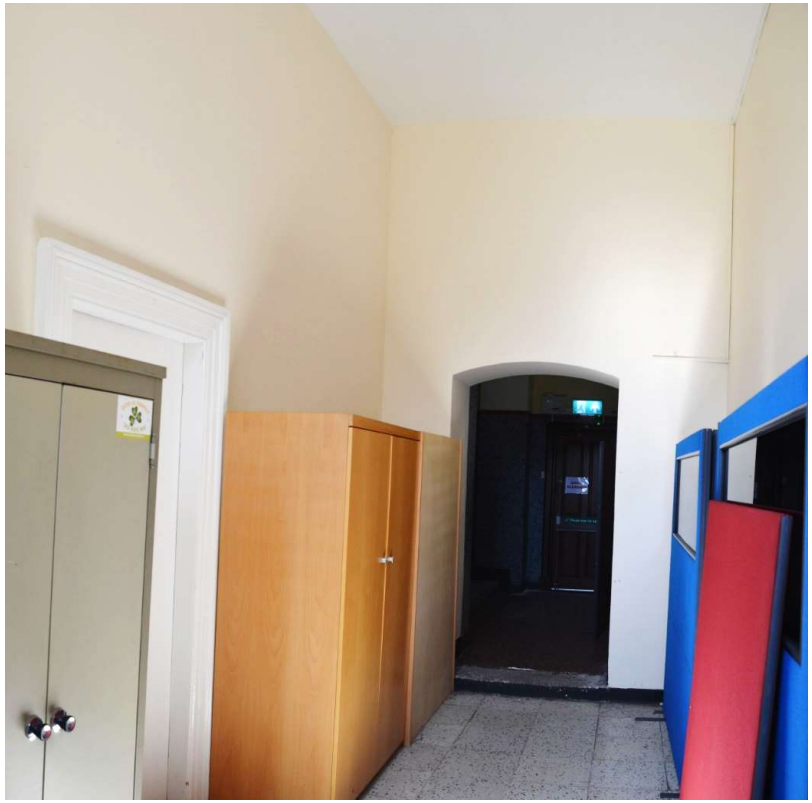
1. Key Plan – South Link Building – Ground Floor Level



2. Key Plan – South Link Building – First Floor Level

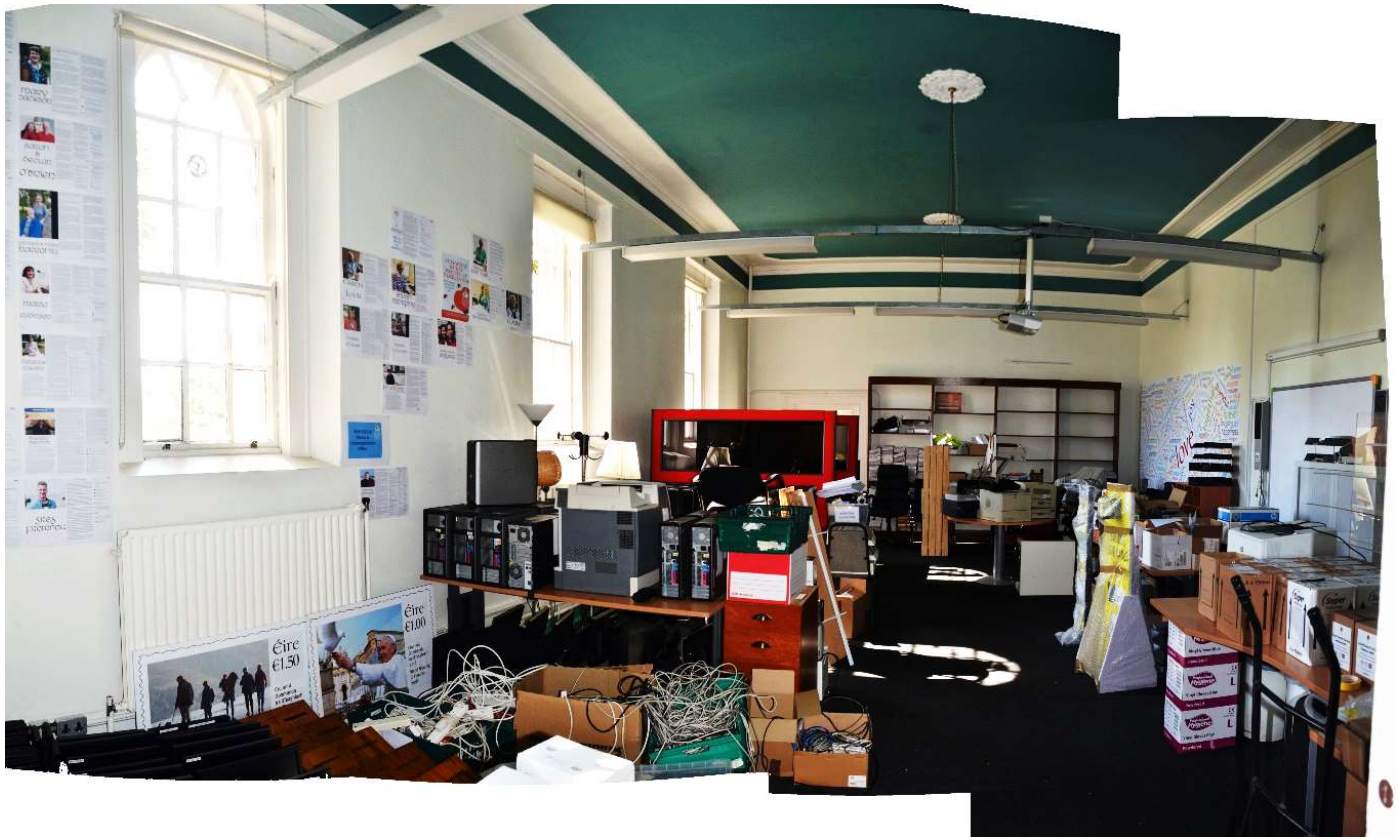
South Link Building, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Ground Floor

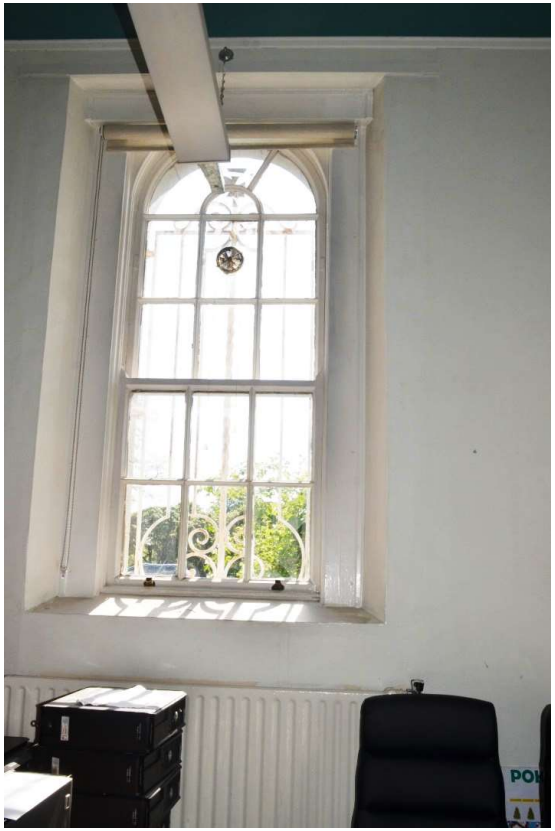


1. Room G.01

2. Room G.01

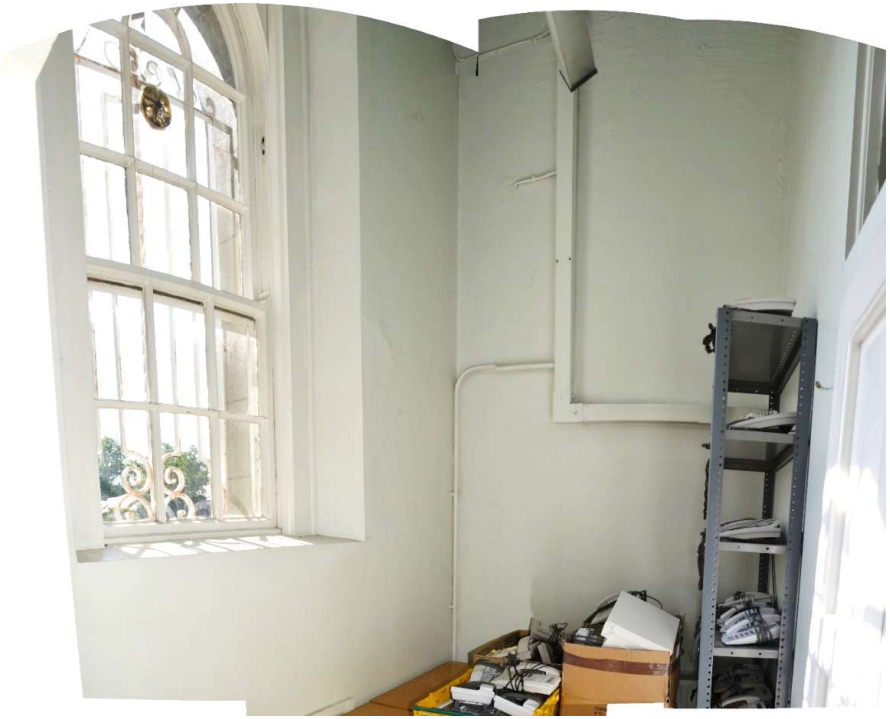


3. Room G.02

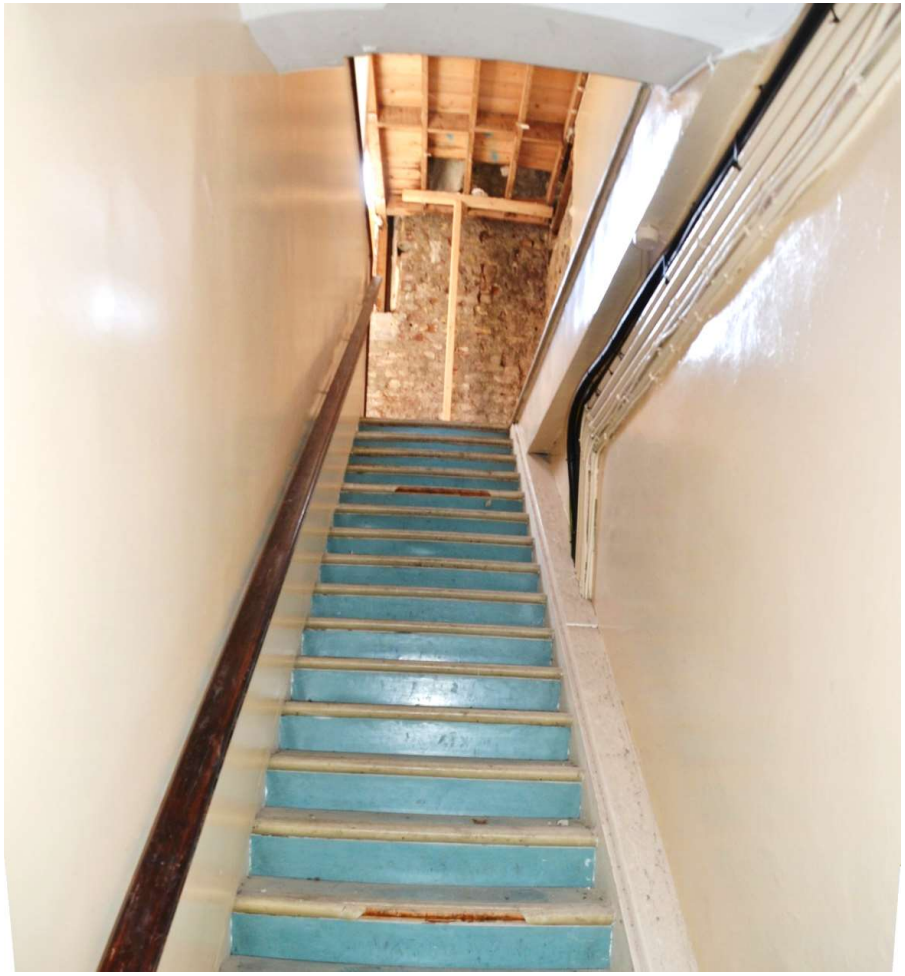


4. Room G.02

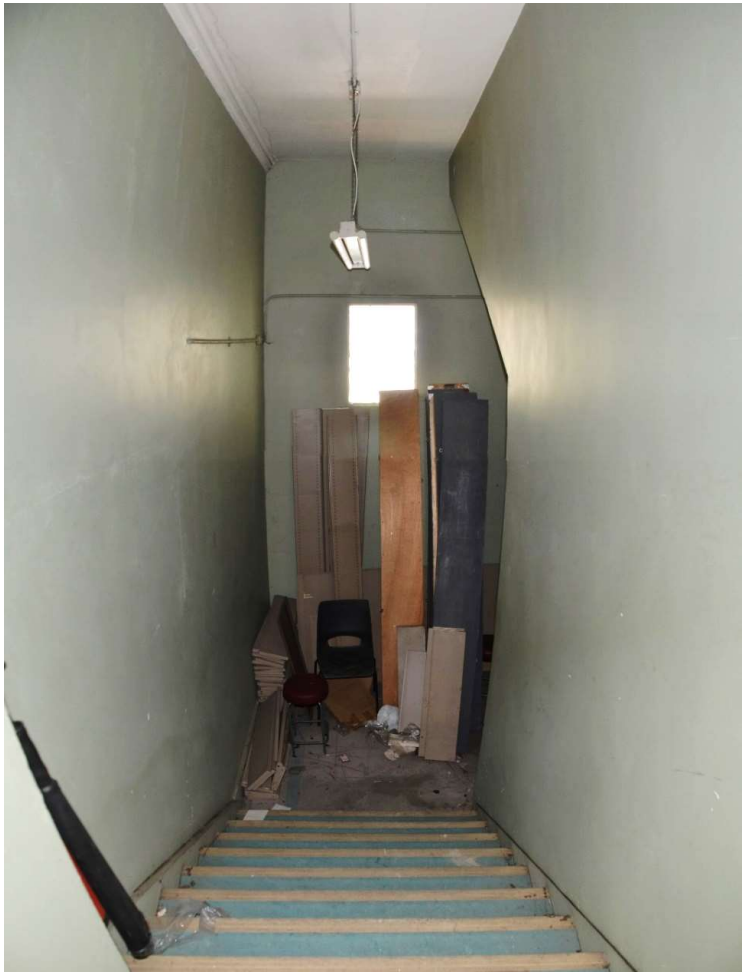
5. Room G.02



6. Room G.03



7. Room G.04



8. Room G.04

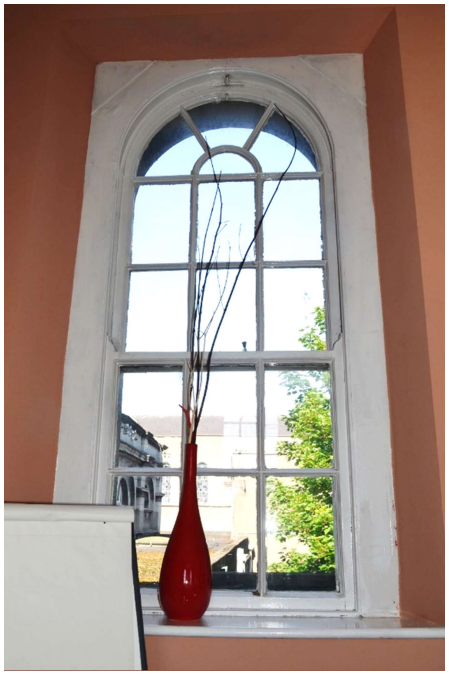
South Link Building, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – First Floor

1. Room F.01

2. Room F.01

3. Room F.01



4. Room F.01

5. Room F.01

6. Room F.02

A14.7 Photographic Record – College Church

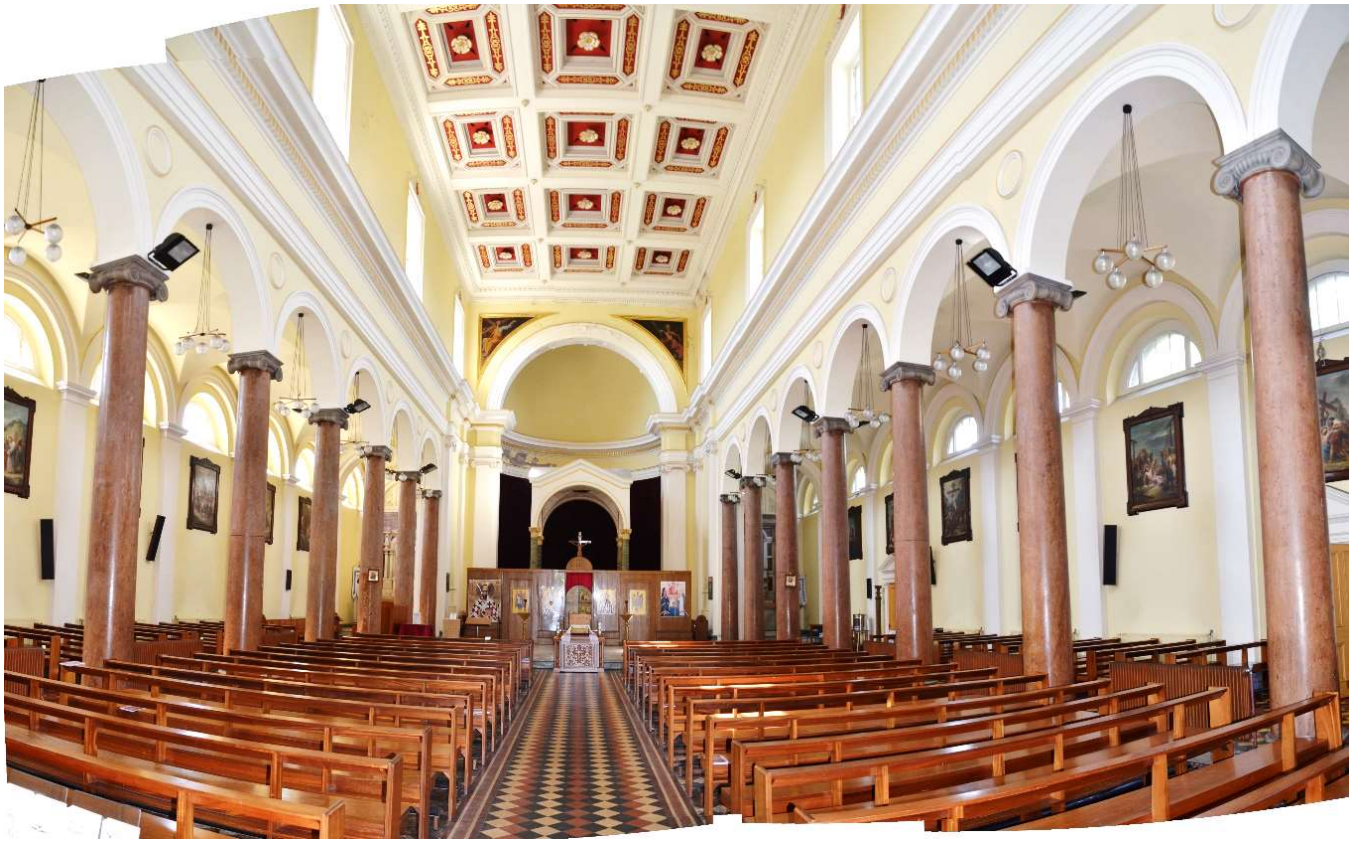
Holy Cross College, Clonliffe Road, Dublin 3.

Key Plans – College Church

1. Key Plan – College Chapel – Ground Floor Level

Church, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Church

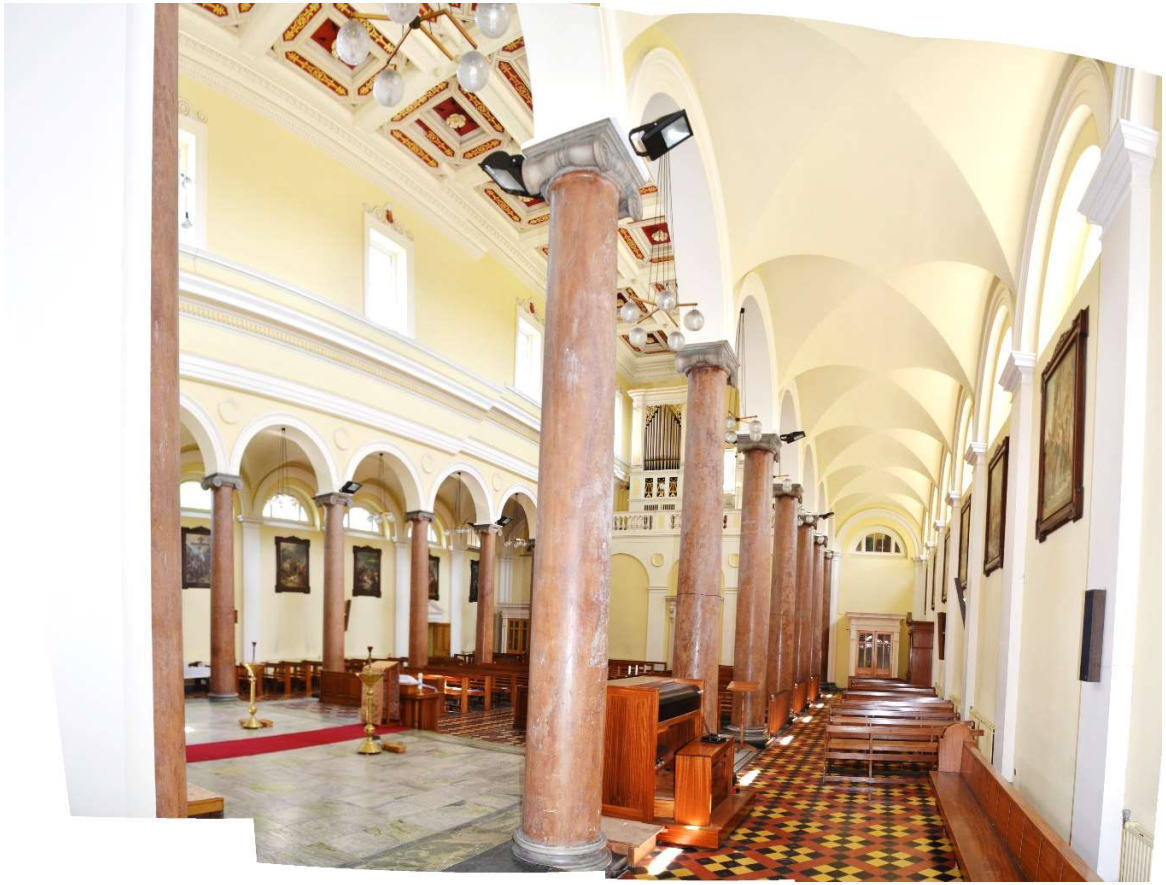


1. Room G.01

2. Room G.01

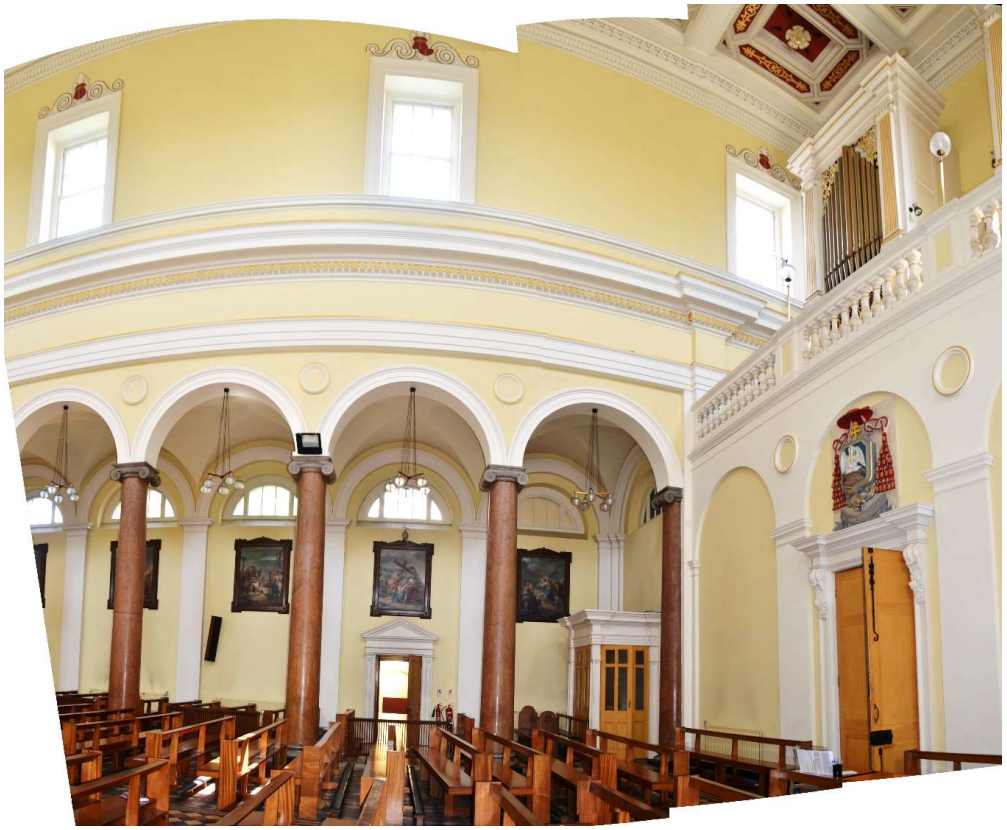
3. Room G.01

4. Room G.01

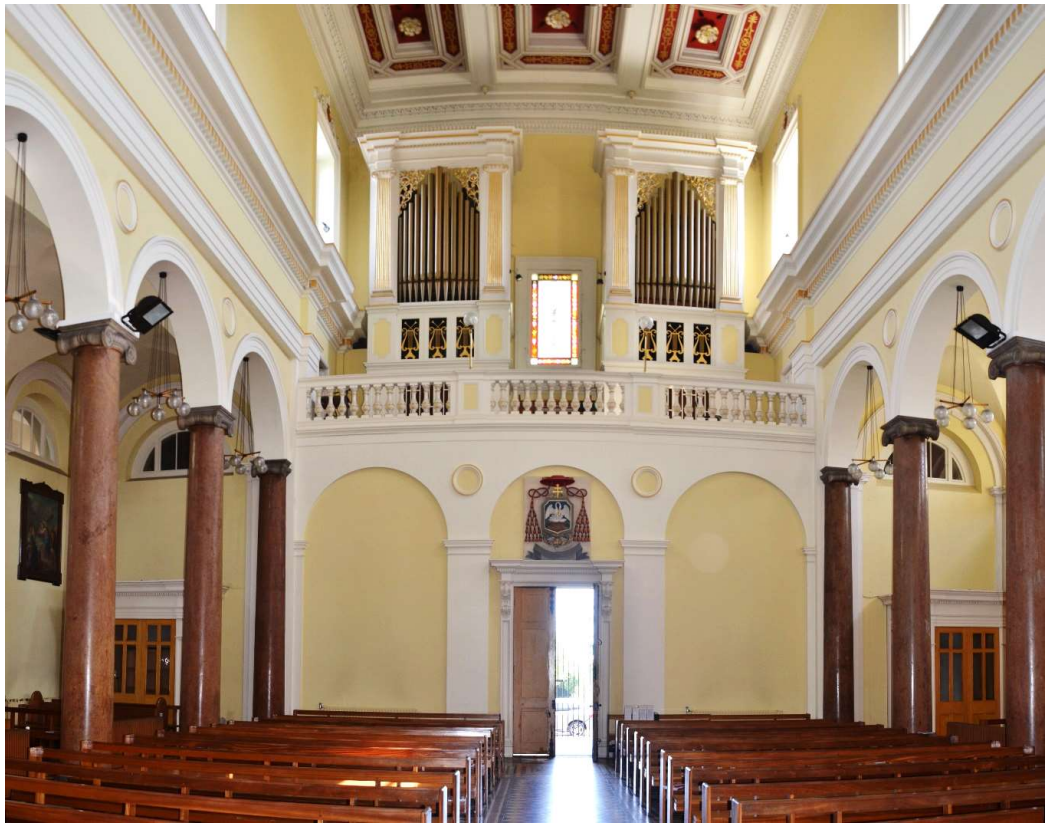


5. Room G.01

6. Room G.01

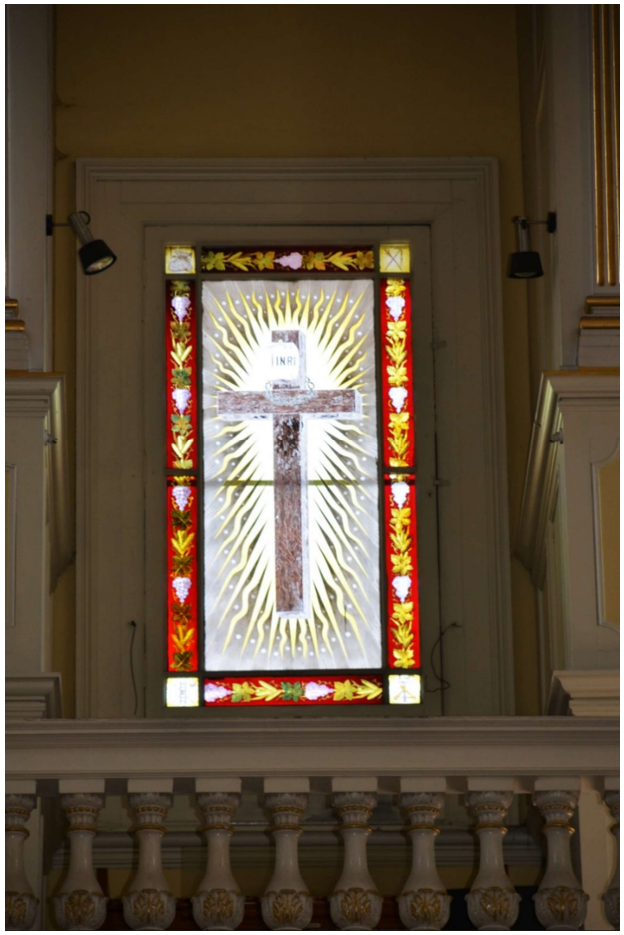


7. Room G.01



8. Room G.01

9. Room G.01

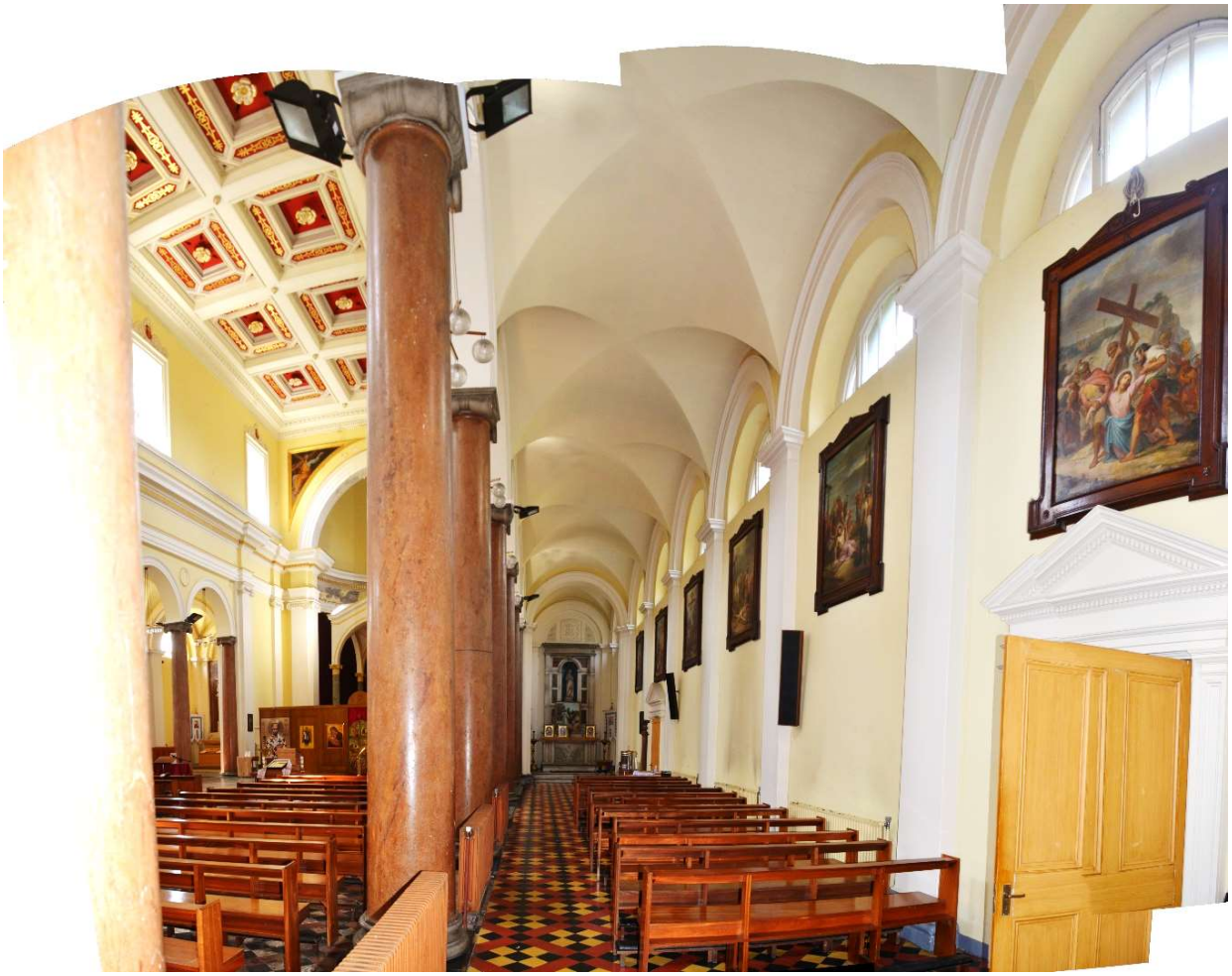


10. Room G.01

11. Room G.01

12. Room G.01

13. Room G.01

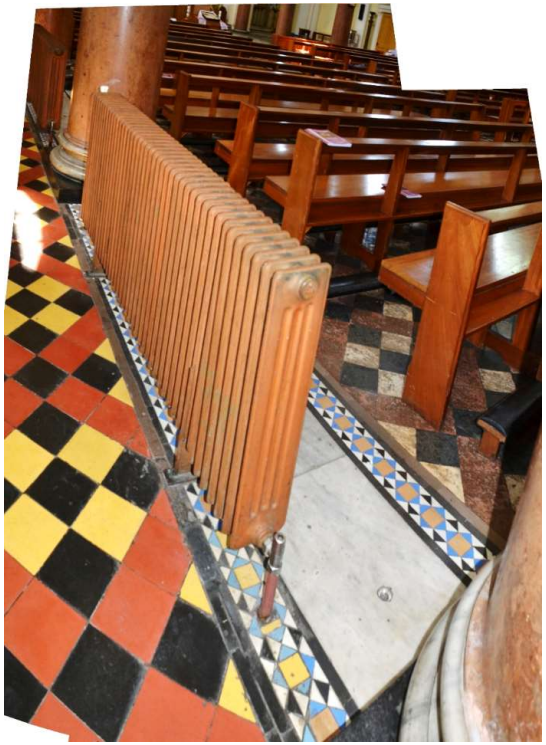


14. Room G.01

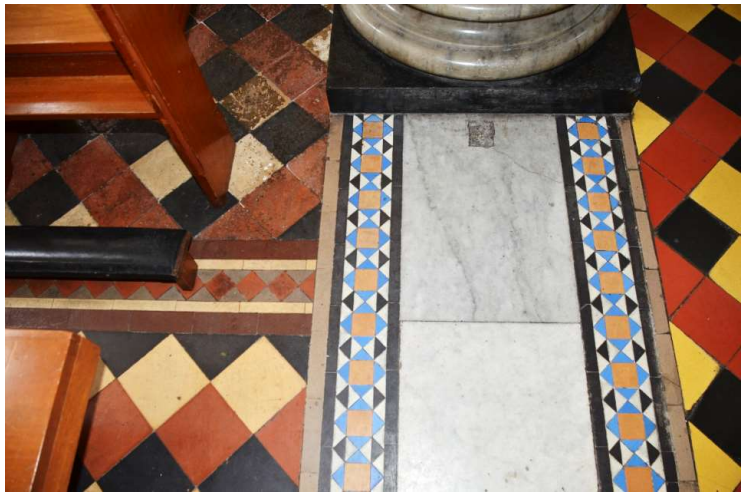
15. Room G.01

16. Room G.01

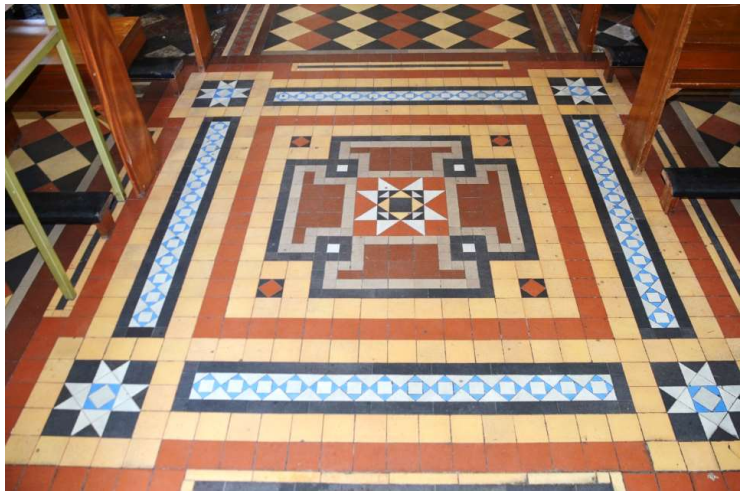
17. Room G.01



18. Room G.01



19. Room G.01



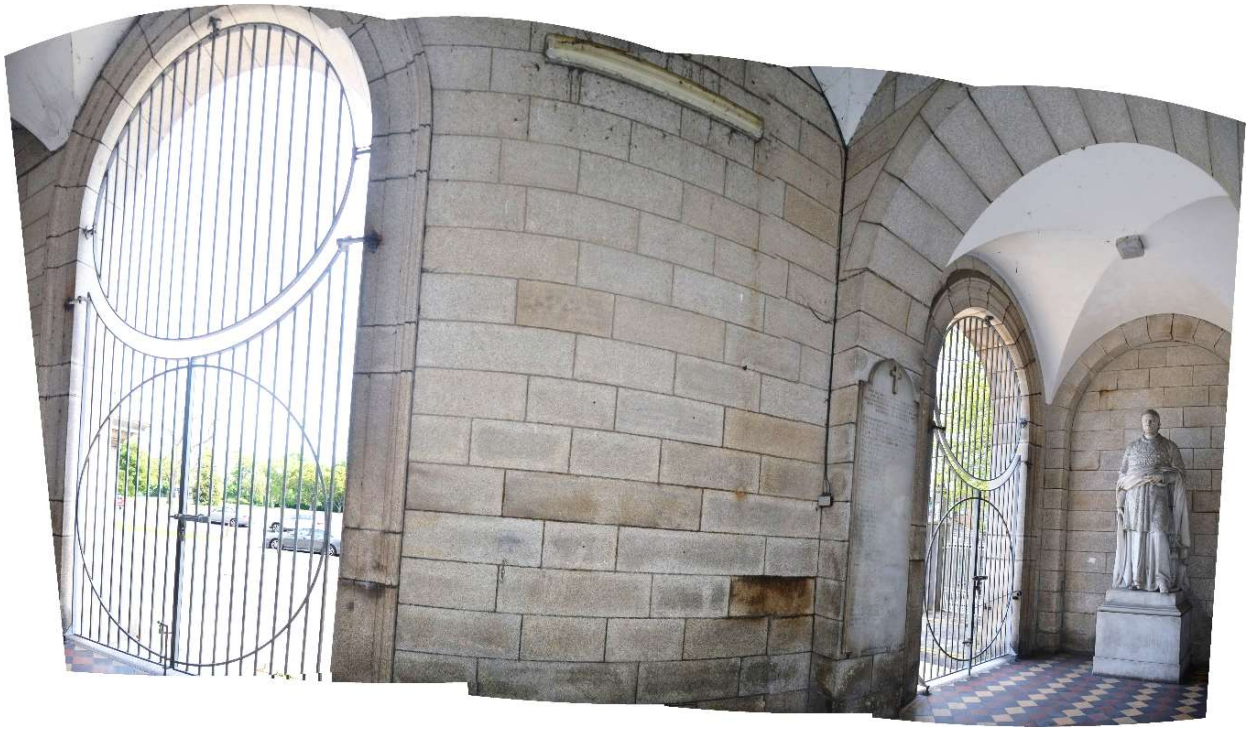
20. Room G.01

21. Room G.01

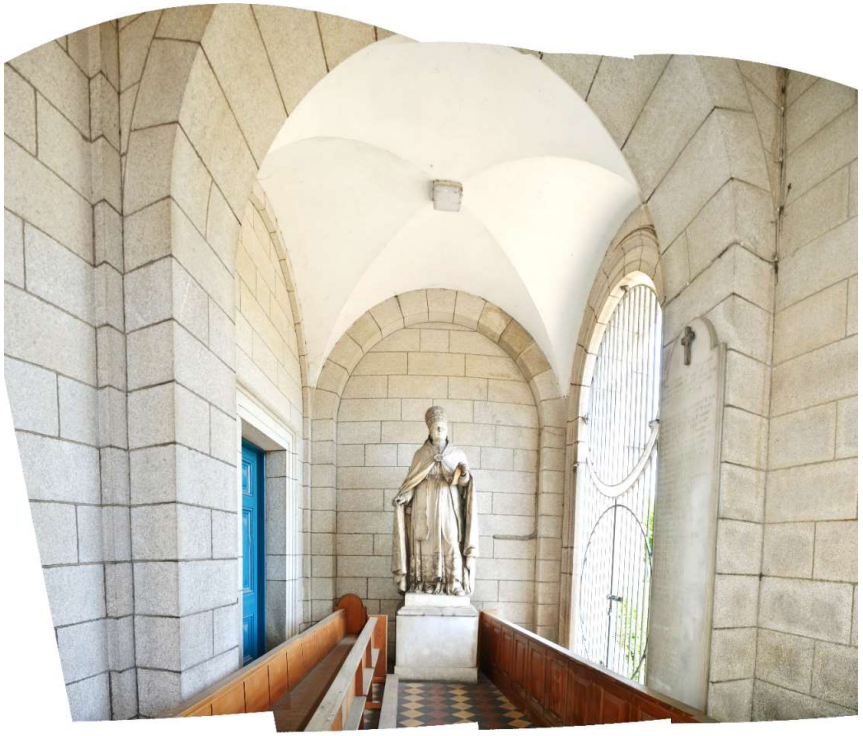
22. Room G.01

23. Room G.01

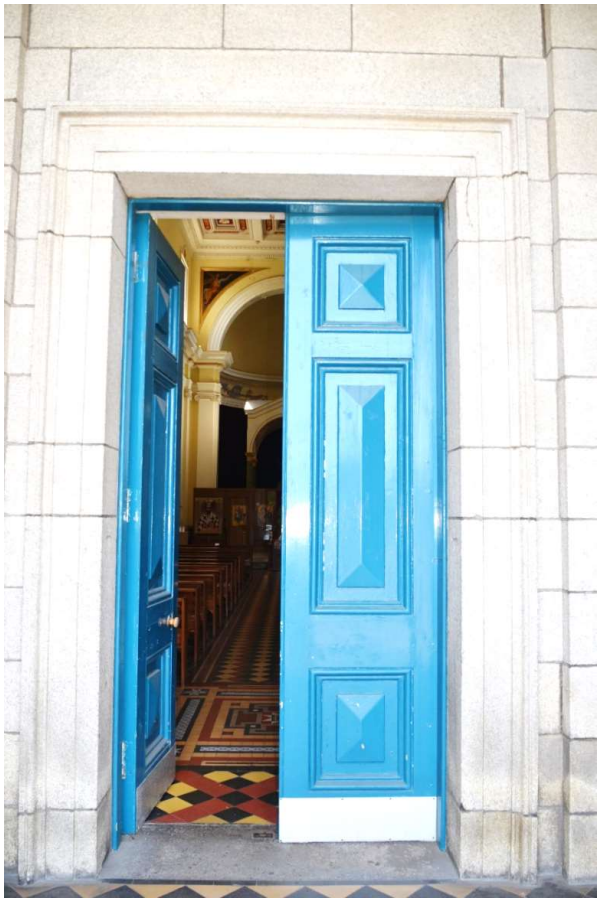
24. Room G.01



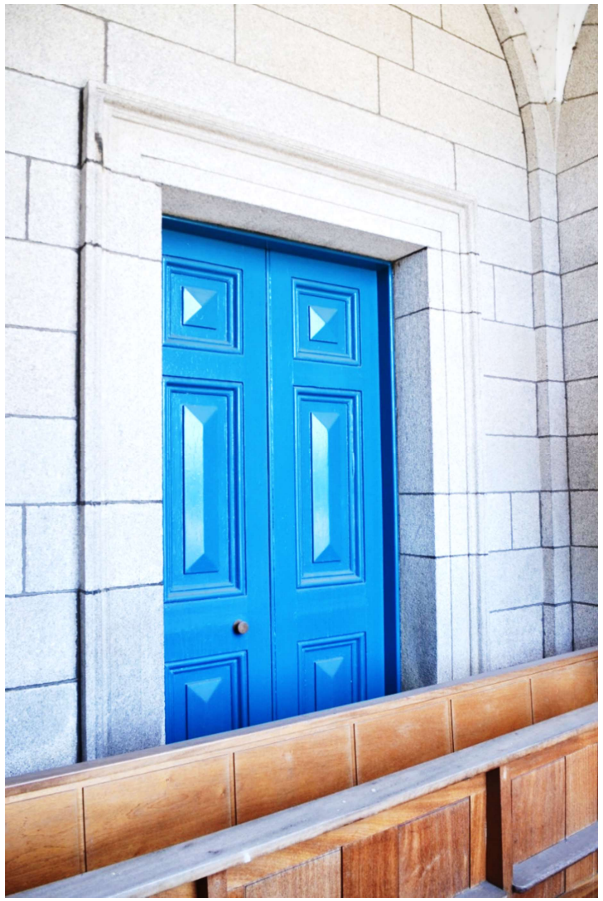
25. Room G.02



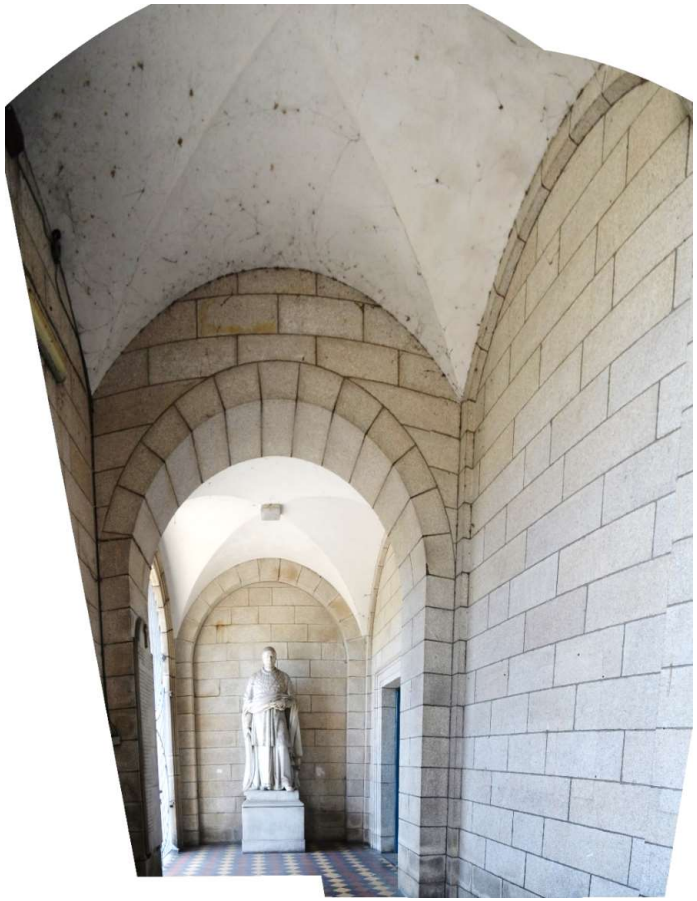
26. Room G.02



27. Room G.02

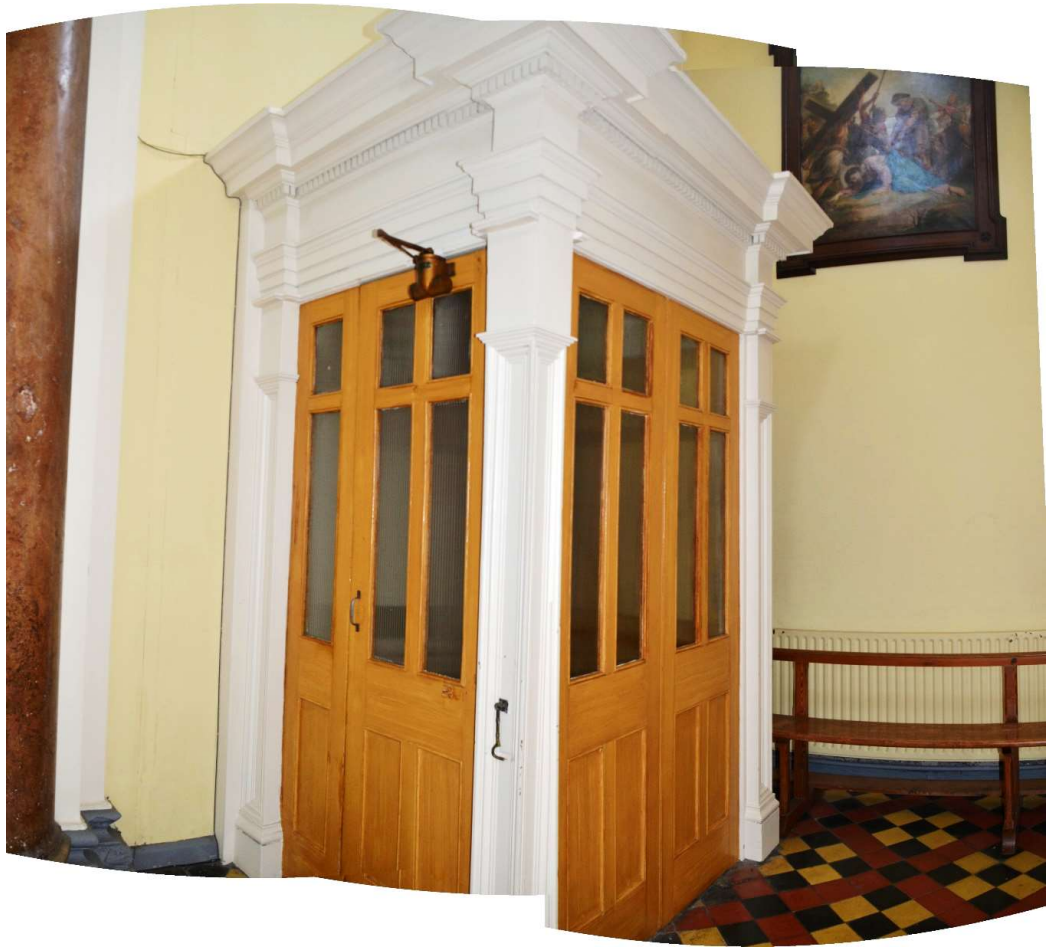


28. Room G.02



29. Room G.02

30. Room G.03



31. Room G.03

32. Room G.04

33. Room G.04

34. Room G.04

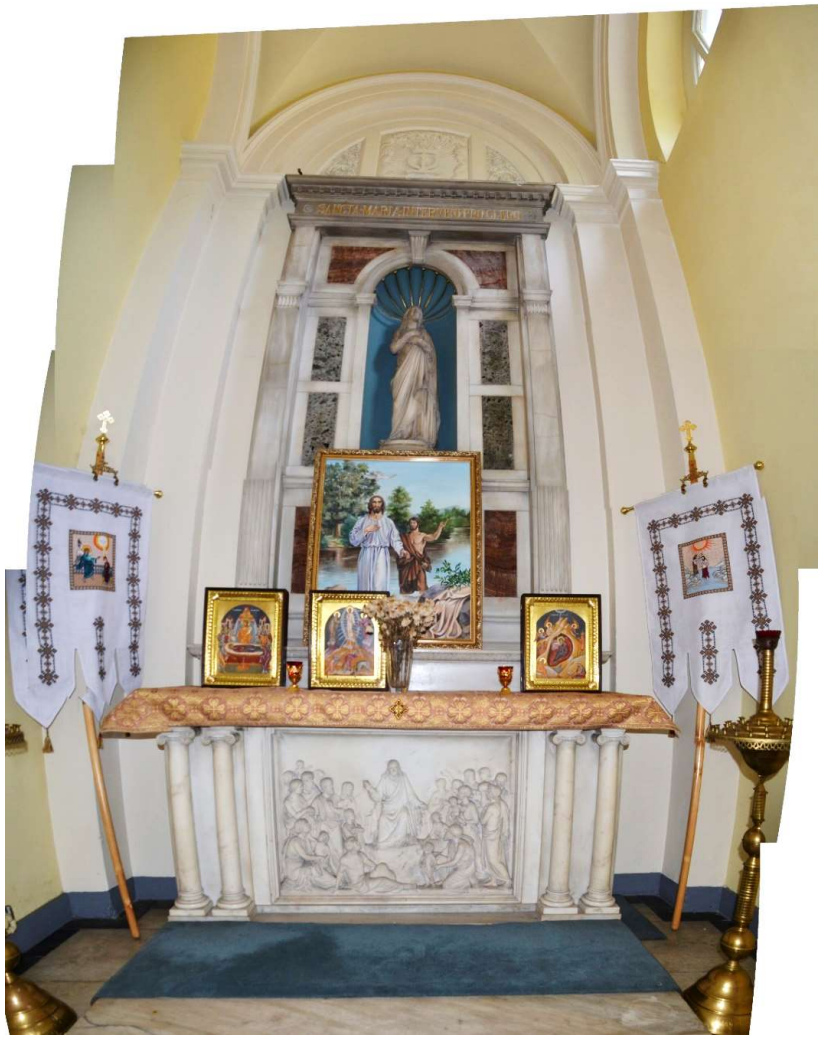
35. Room G.04

36. Room G.04

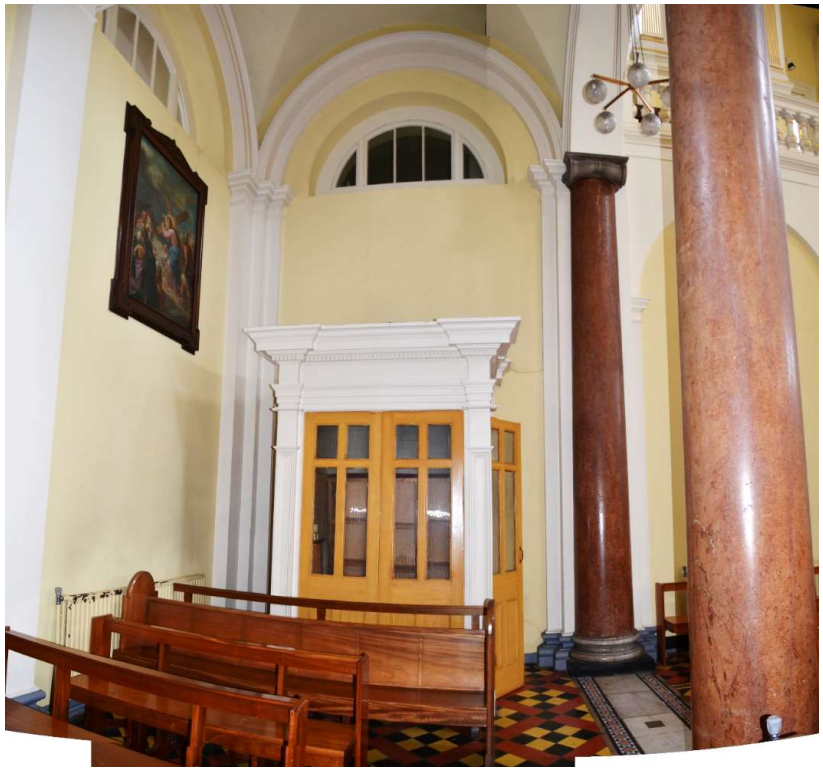
37. Room G.05

38. Room G.05

39. Room G.06

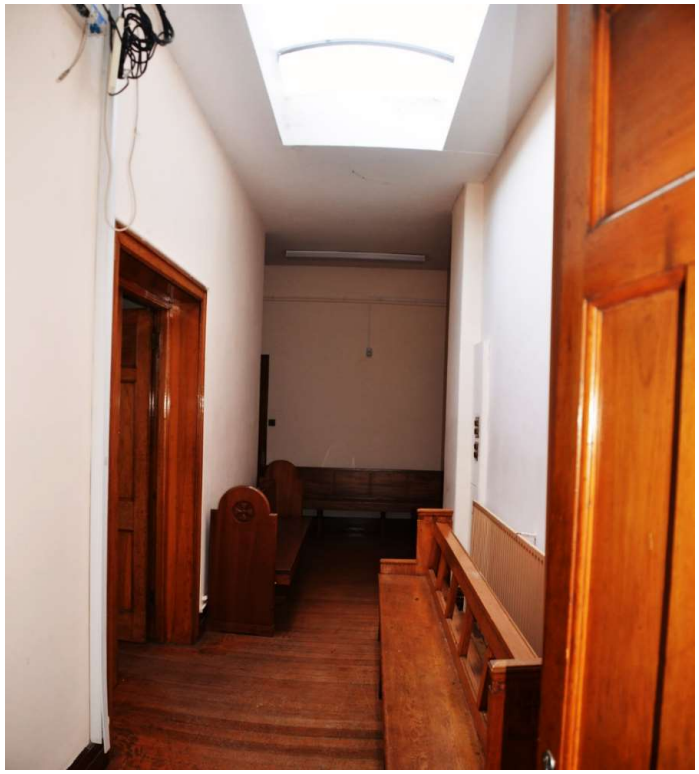


40. Room G.06



41. Room G.07

42. Room G.08

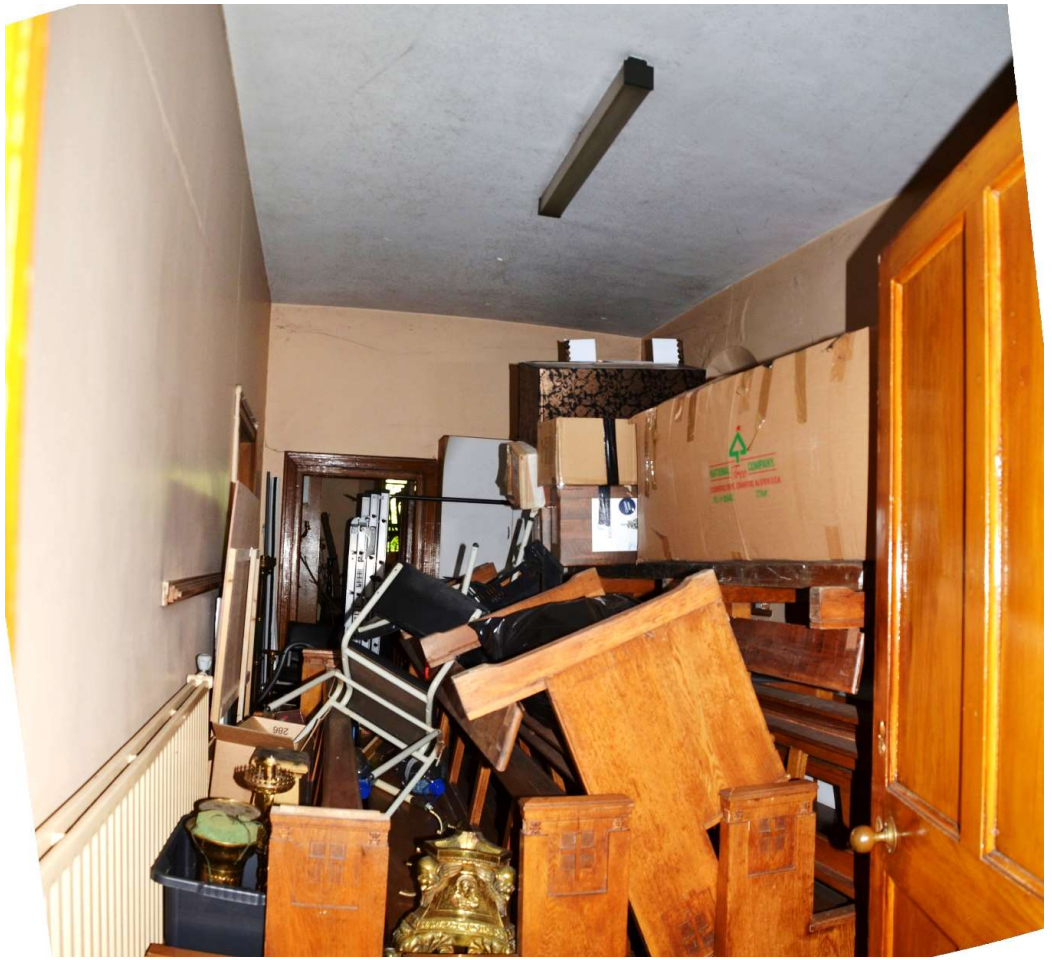


43. Room G.08

44. Room G.09

45. Room G.10

46. Room G.10



47. Room G.11

48. Room G.12

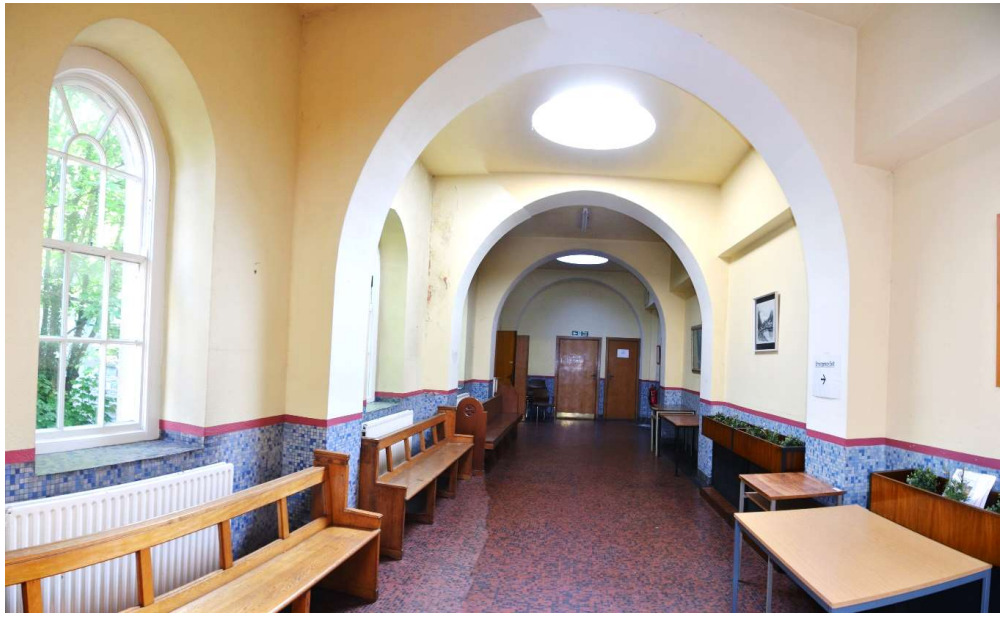
49. Room G.12

50. Room G.12

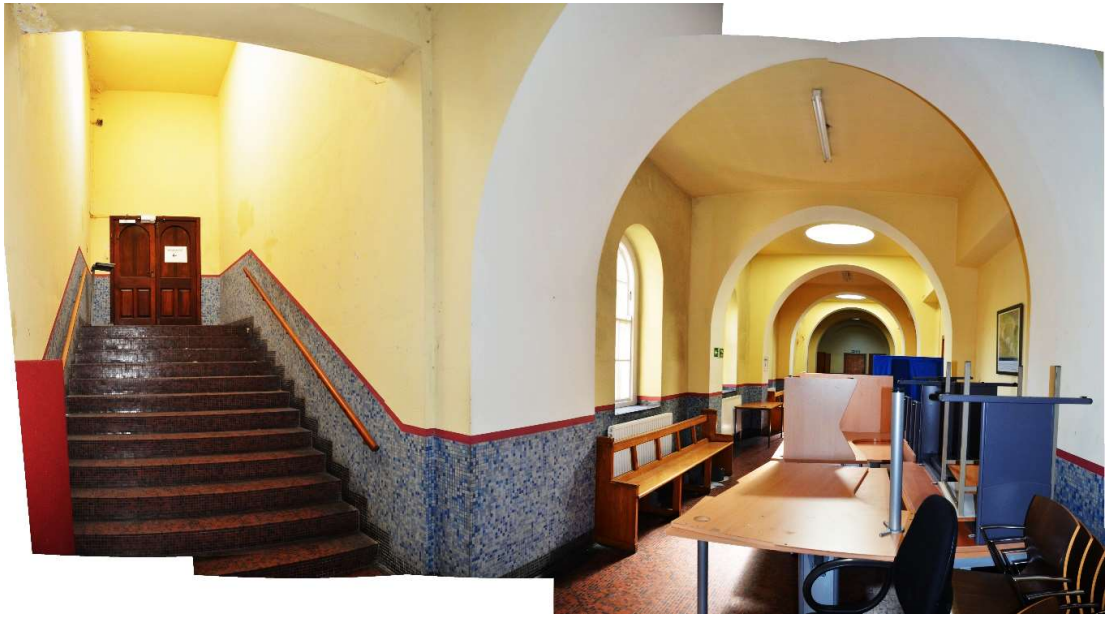
51. Room G.13

52. Room G.14

53. Room G.14



54. Room G.14

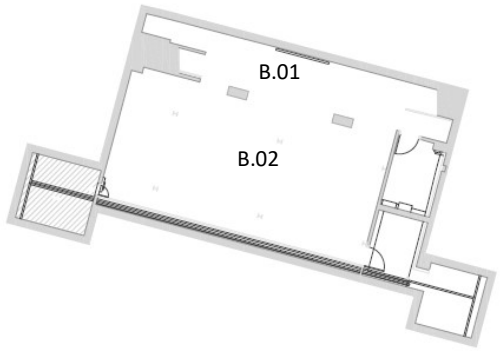


55. Room G.15

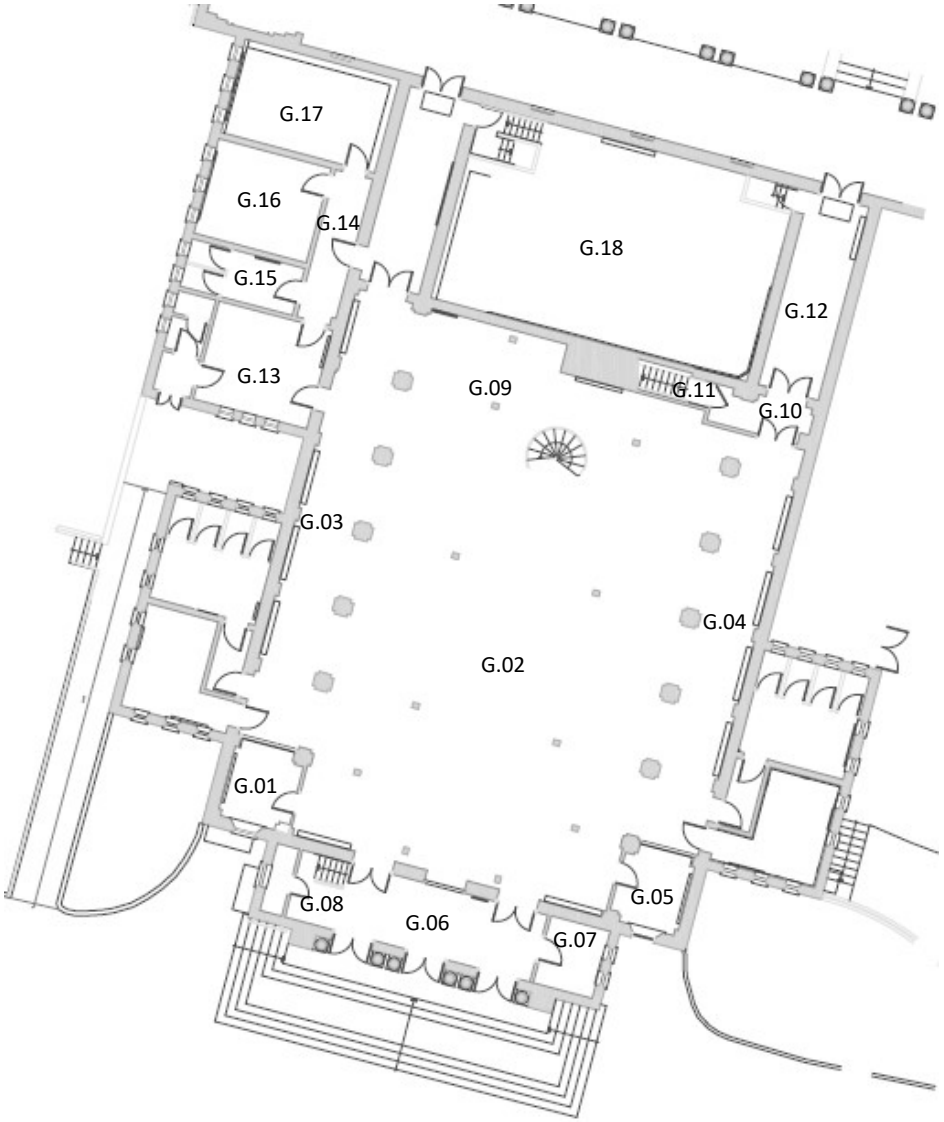
A14.8 Photographic Record – Assembly Hall

Holy Cross College, Clonliffe Road, Dublin 3.

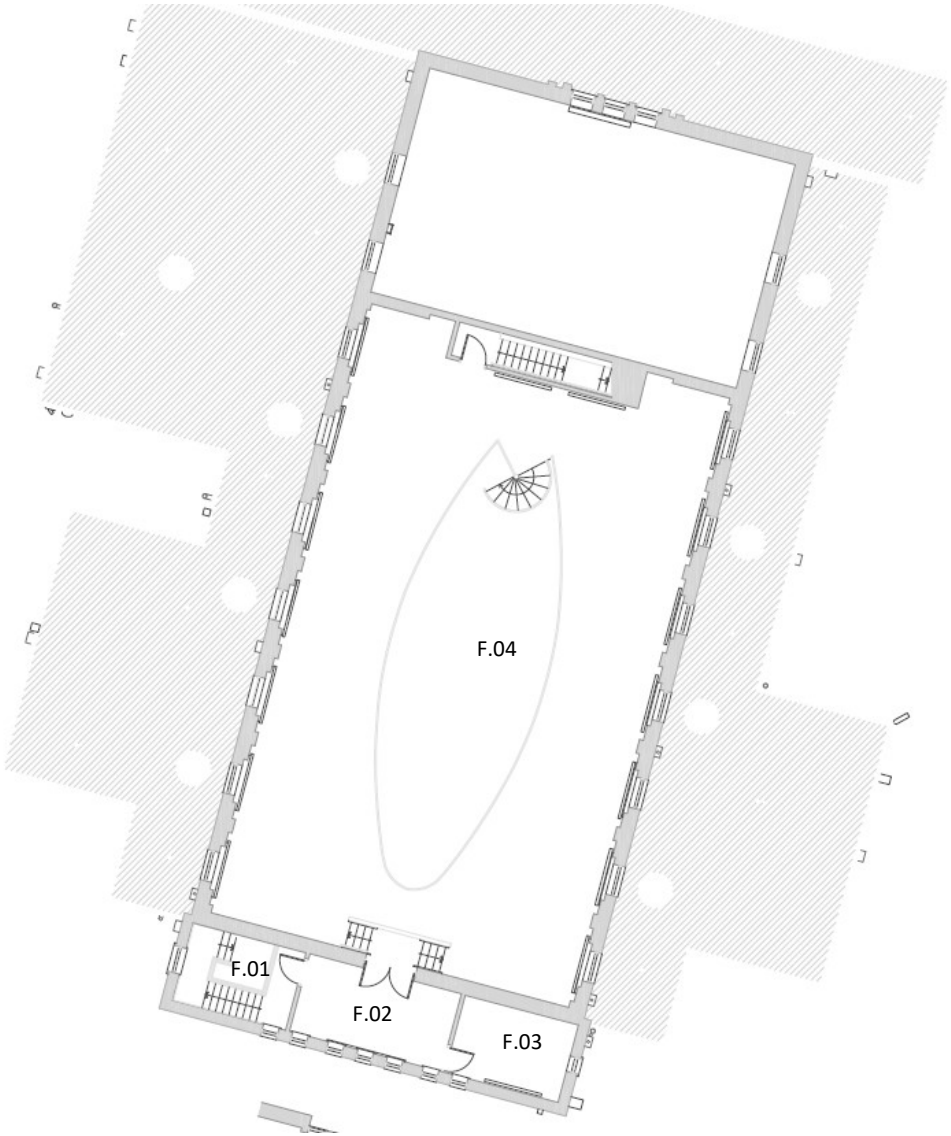
Key Plans – Assembly Hall



1. Key Plan – Assembly Hall – Basement Level



2. Key Plan – Assembly Hall – Ground Floor Level



3. Key Plan – Assembly Hall – First Floor Level

Assembly, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Part-Basement Floor

1. Room B.01

2. Room B.02

Assembly, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Ground Floor

1. Room G.01

2. Room G.01

3. Room G.02

4. Room G.03

5. Room G.03

6. Room G.04

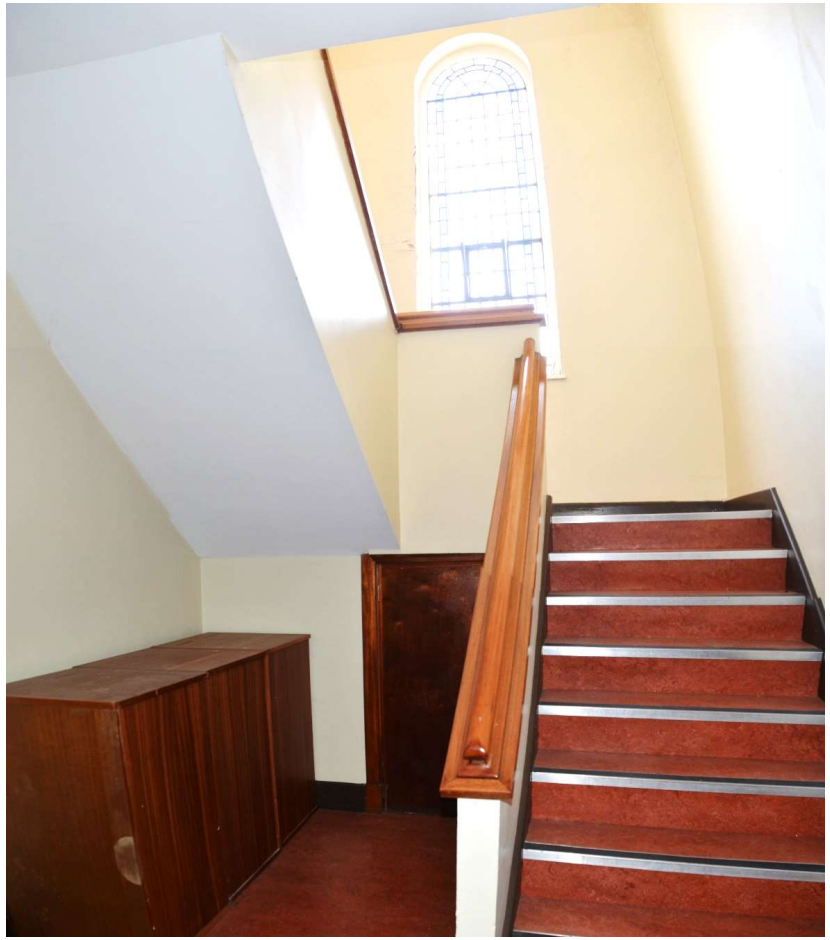
7. Room G.05

8. Room G.05

9. Room G.06

10. Room G.06

11. Room G.07

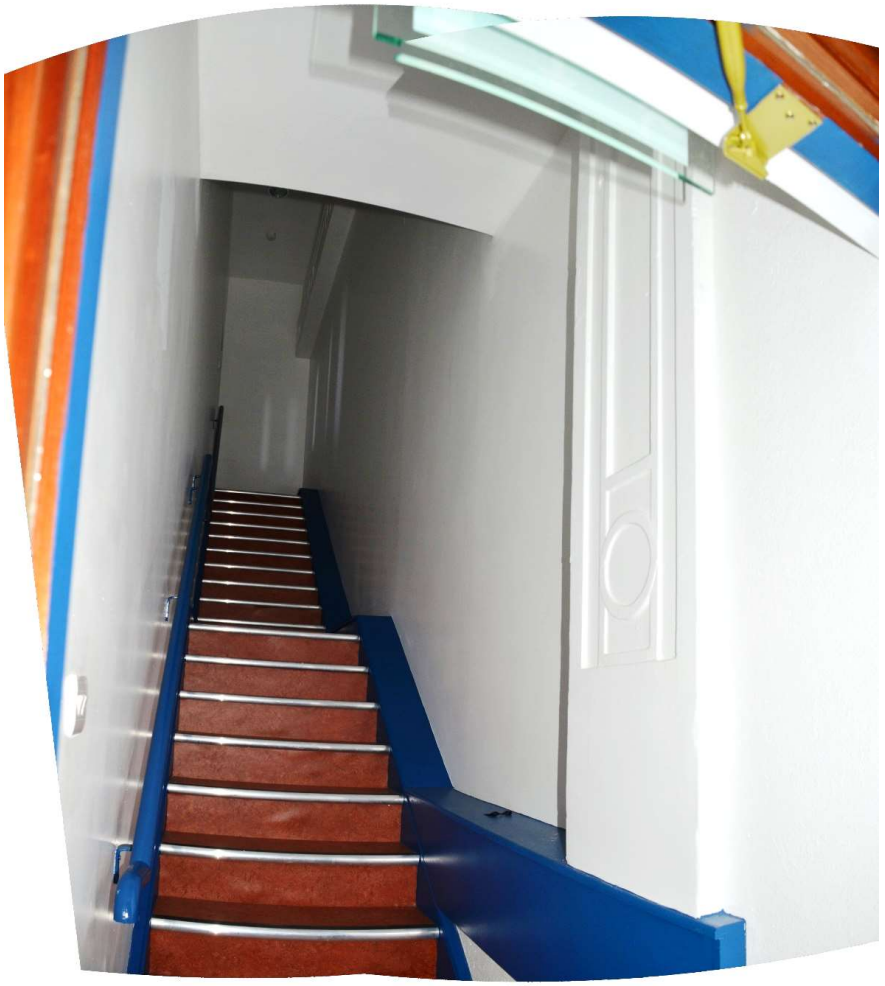


12. Room G.08

13. Room G.09

14. Room G.09

15. Room G.10



16. Room G.11

17. Room G.12

18. Room G.12

19. Room G.13

20. Room G.14

21. Room G.15

22. Room G.16

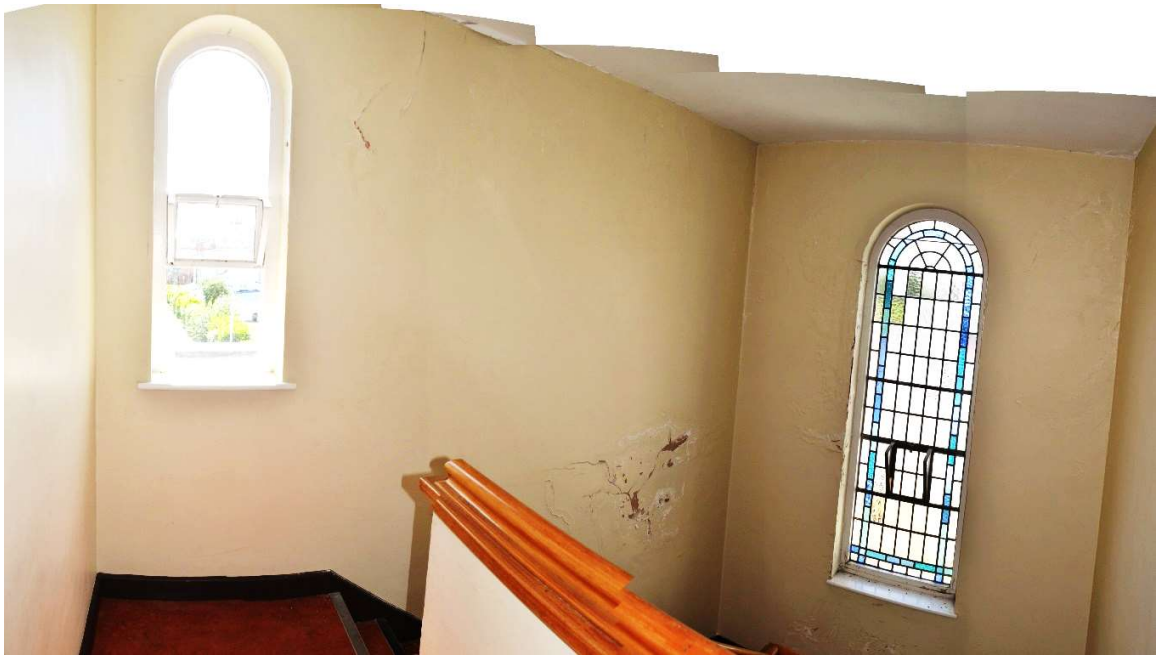
23. Room G.17

24. Room G.18

25. Room G.18

Assembly, Holy Cross College, Clonliffe.

Internal Photos – First Floor

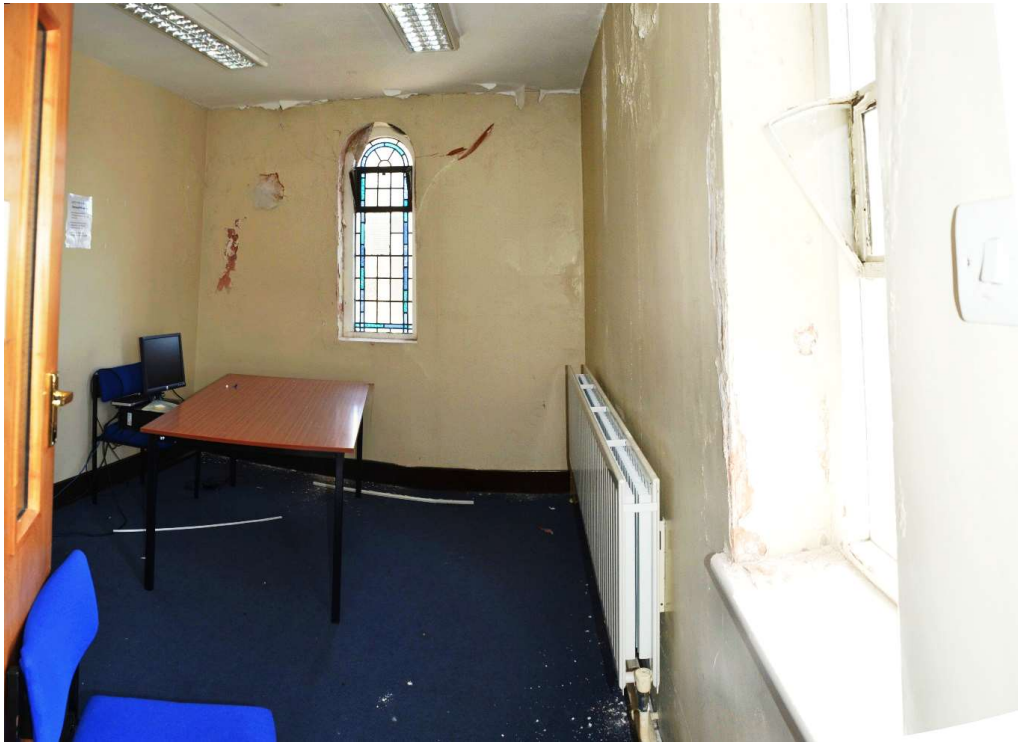


1. Room F.01

2. Room F.02

3. Room F.02

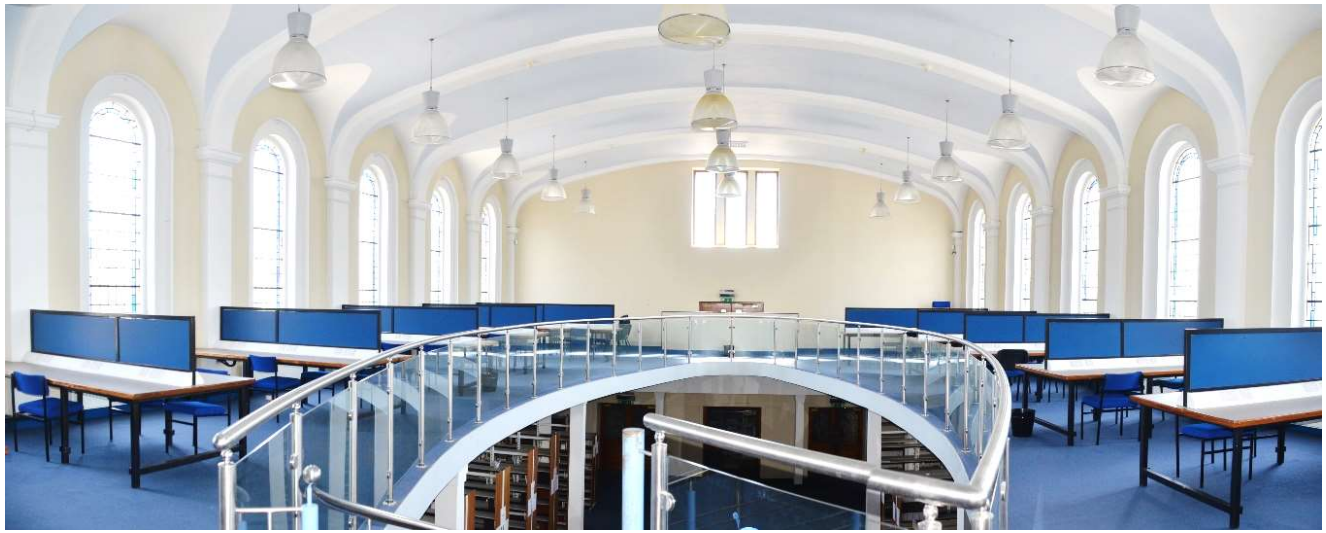
4. Room F.02



5. Room F.03

6. Room F.04

7. Room F.04



8. Room F.04

9. Room F.04

A14.9 Photographic Record – New Wing

Holy Cross College, Clonliffe Road, Dublin 3.

Key Plans – New Wing

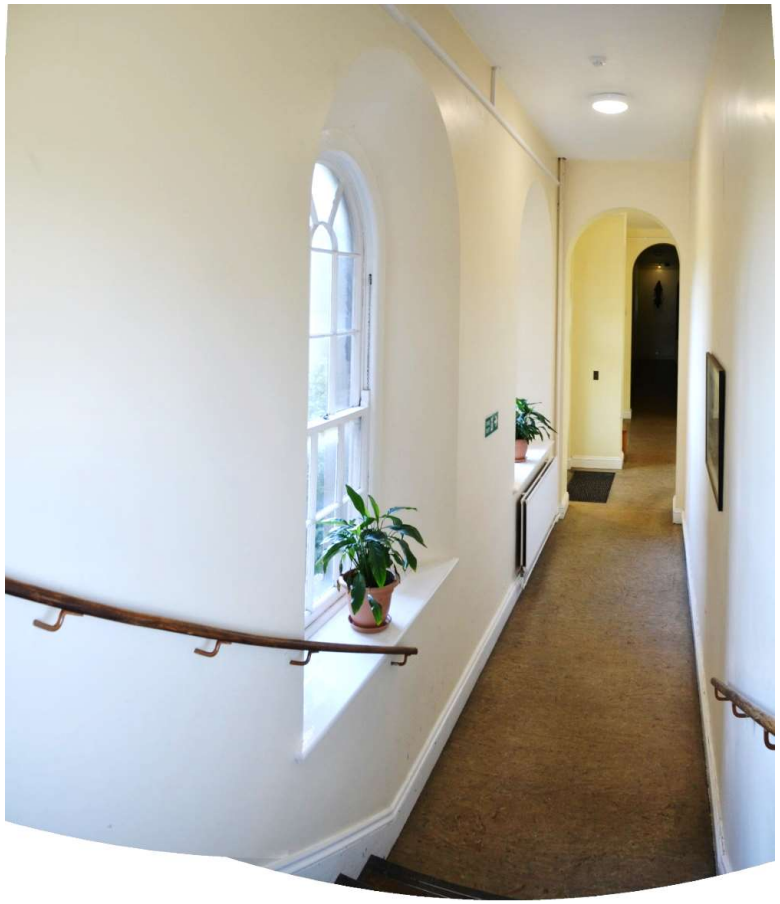
1. Key Plan – New Wing – Ground Floor Level

2. Key Plan – New Wing – First Floor Level

3. Key Plan – New Wing – Second Floor Level

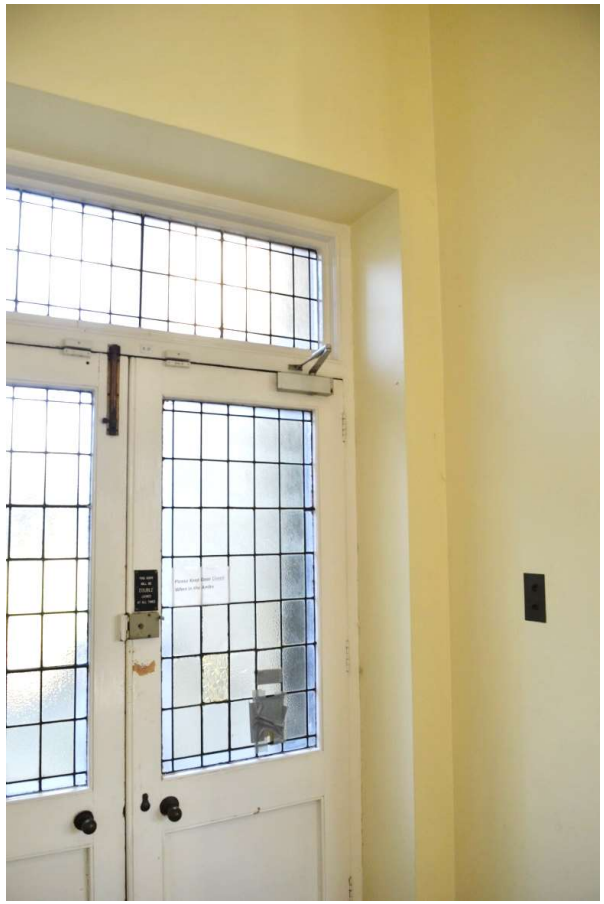
New Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Ground Floor



1. Room G.01

2. Room G.02



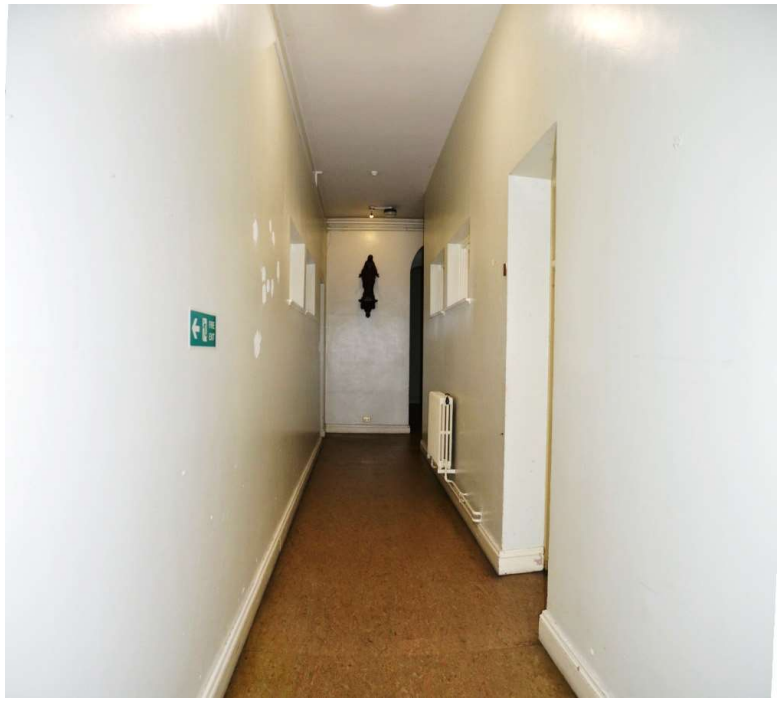
3. Room G.02

4. Room G.02

5. Room G.02

6. Room G.02

7. Room G.03



8. Room G.03

9. Room G.04

10. Room G.04

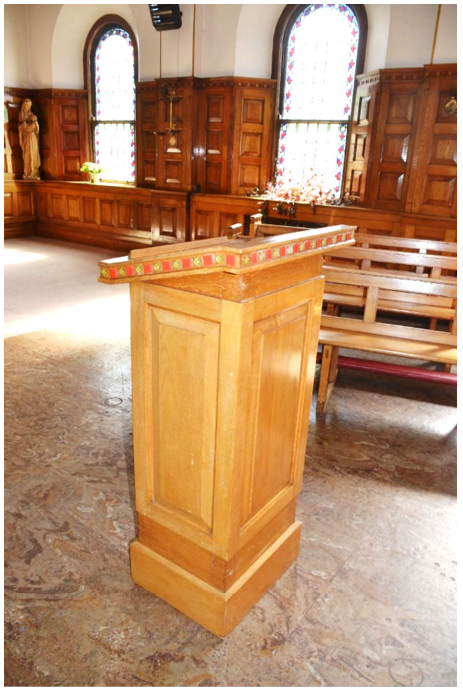
11. Room G.05

12. Room G.05

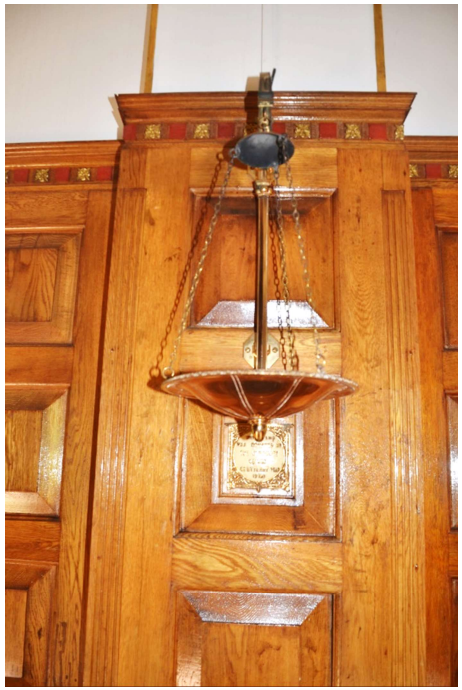
13. Room G.05

14. Room G.05

15. Room G.05



16. Room G.05



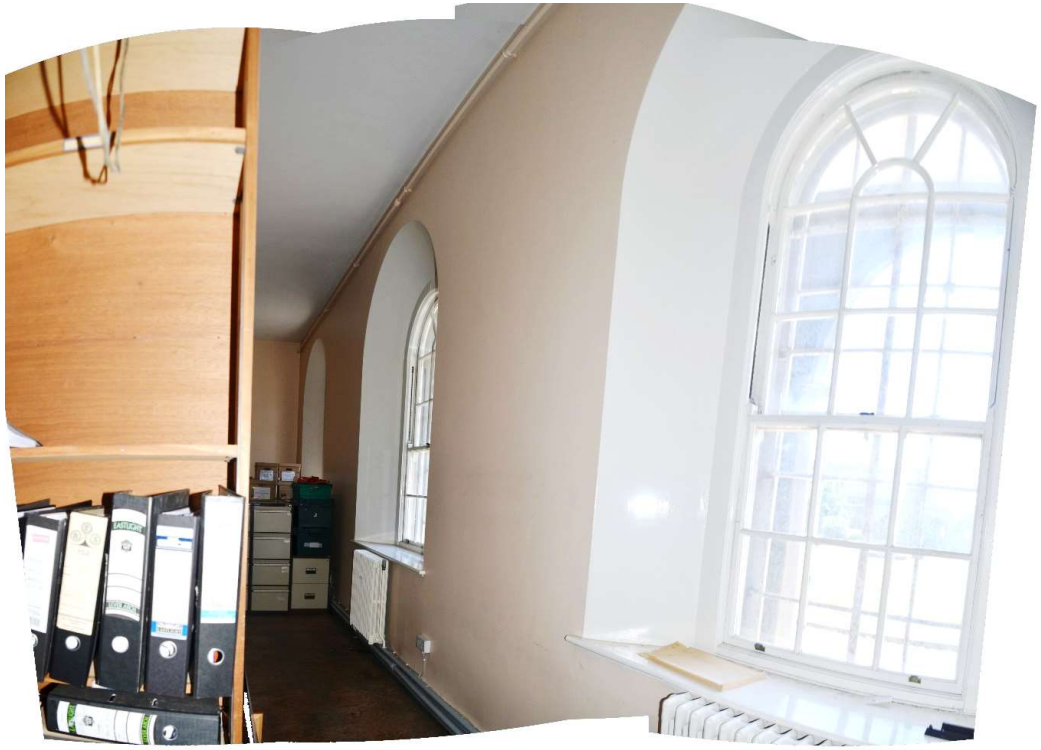
17. Room G.05

18. Room G.05

19. Room G.05

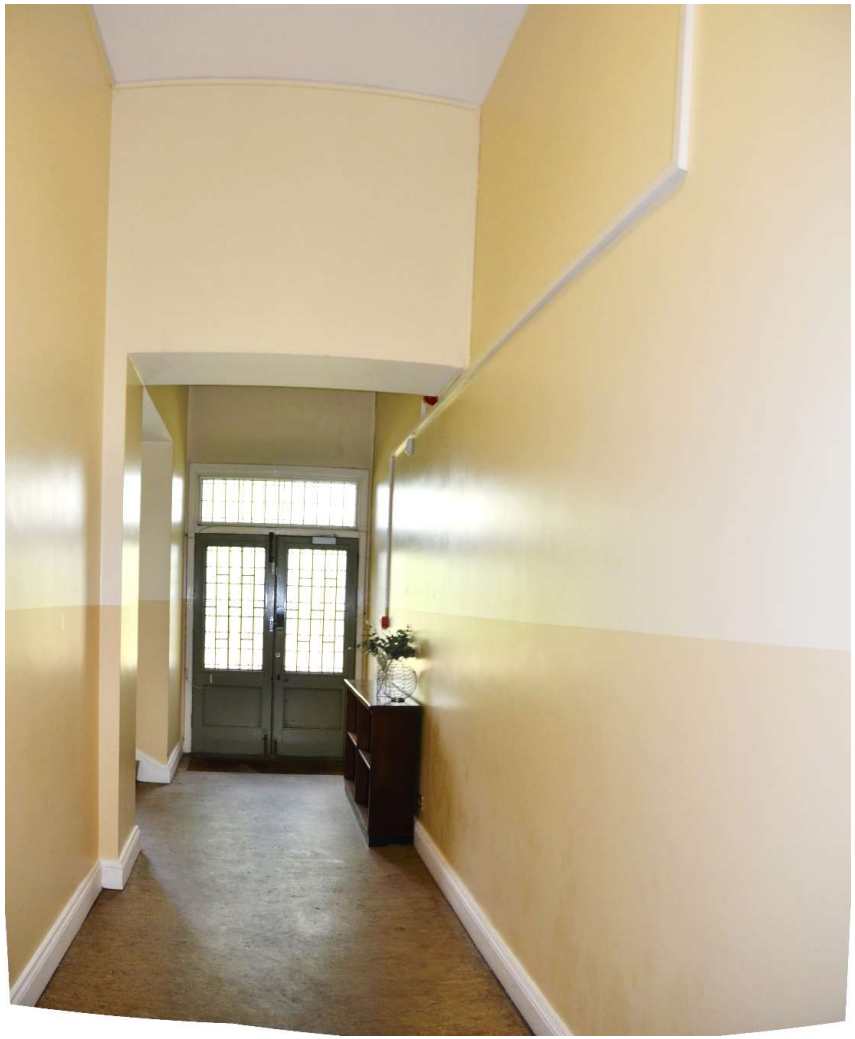
20. Room G.06

21. Room G.07



22. Room G.08

23. Room G.08

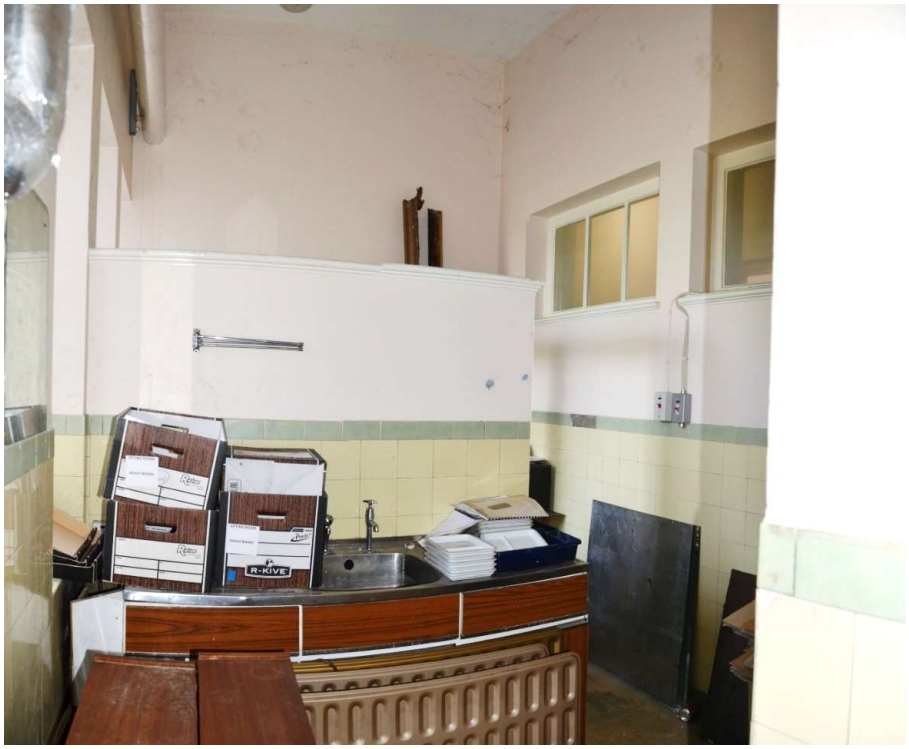


24. Room G.09

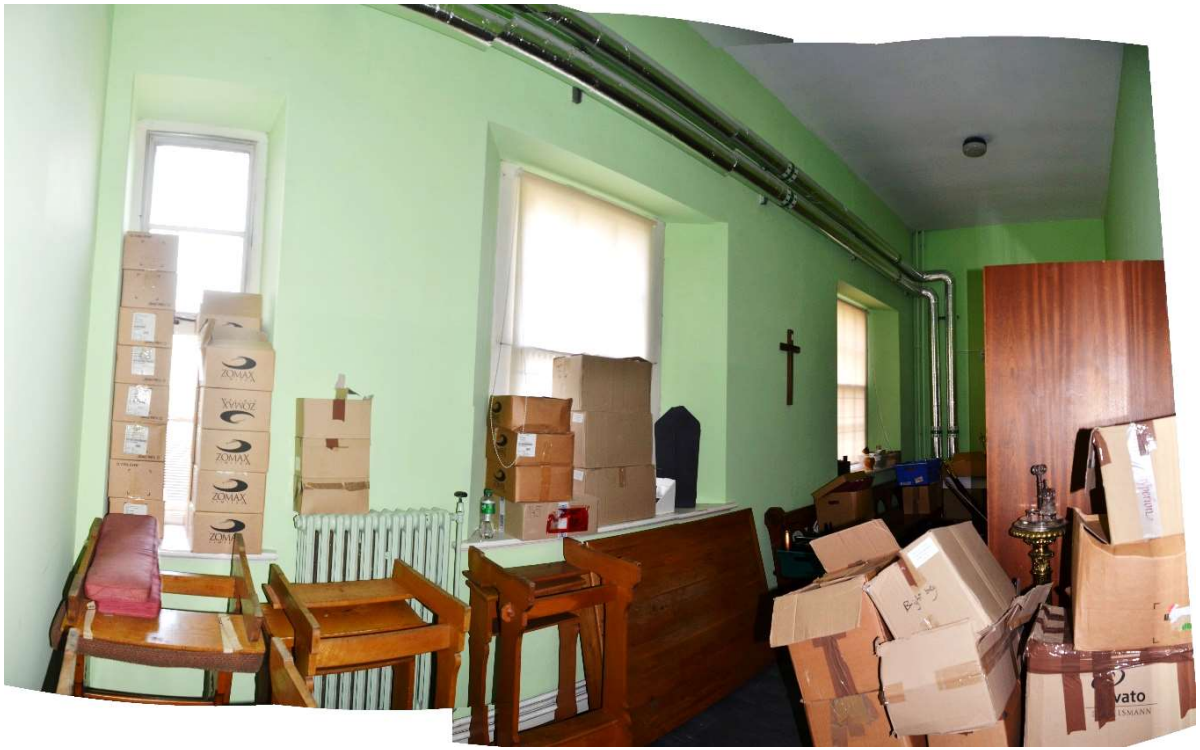
25. Room G.10

26. Room G.11

27. Room G.12



28. Room G.12



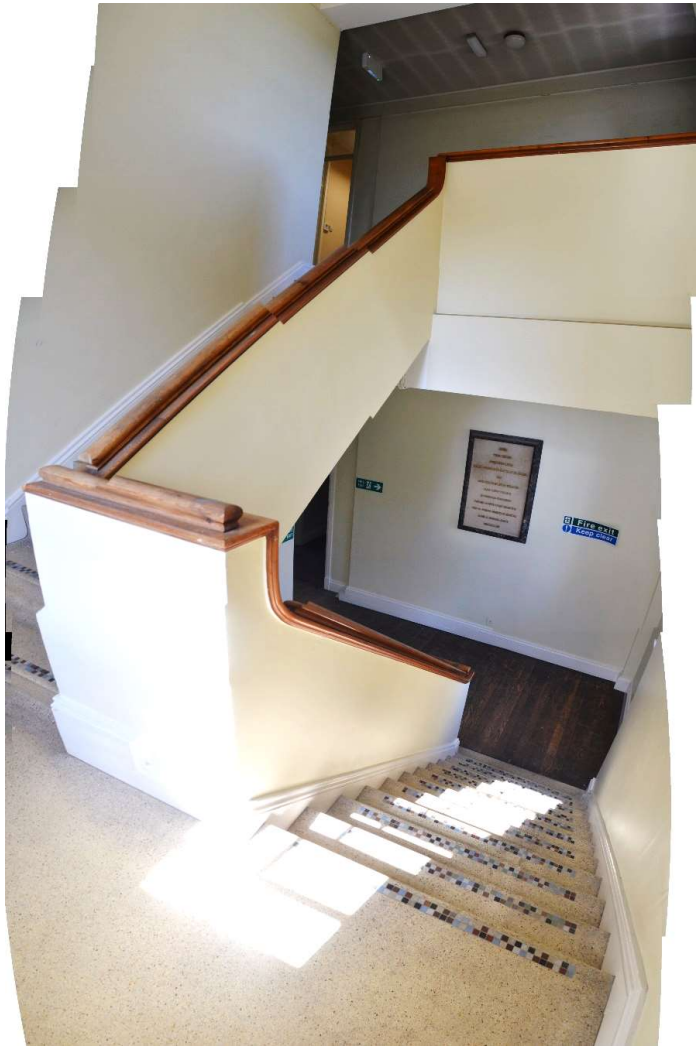
29. Room G.13

30. Room G.14

31. Room G.15

New Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – First Floor

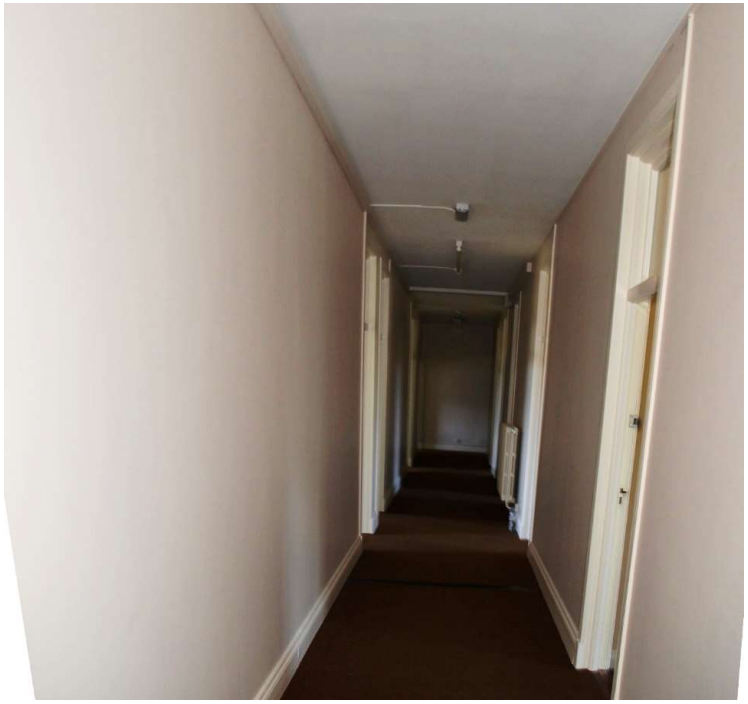


1. Room F.01

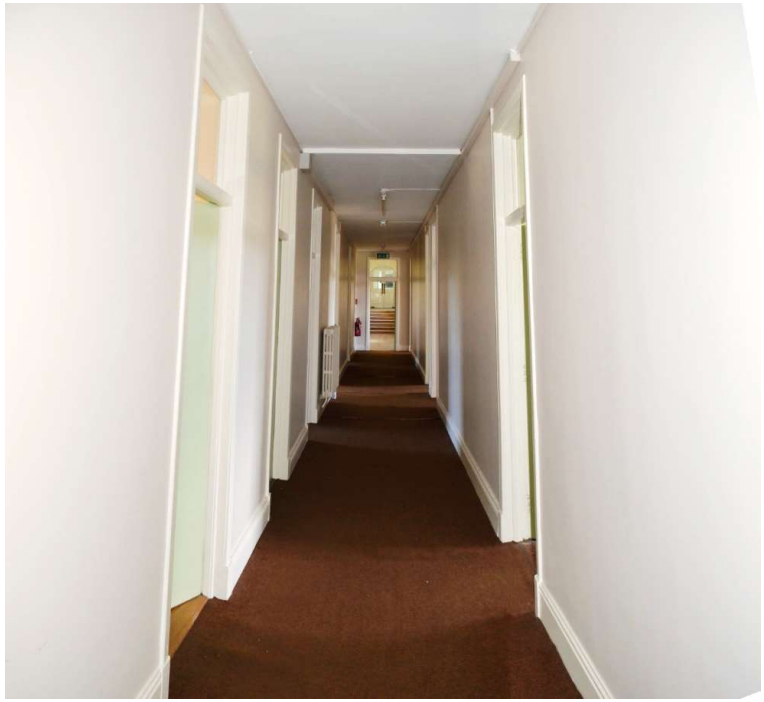
2. Room F.01

3. Room F.01

4. Room F.02



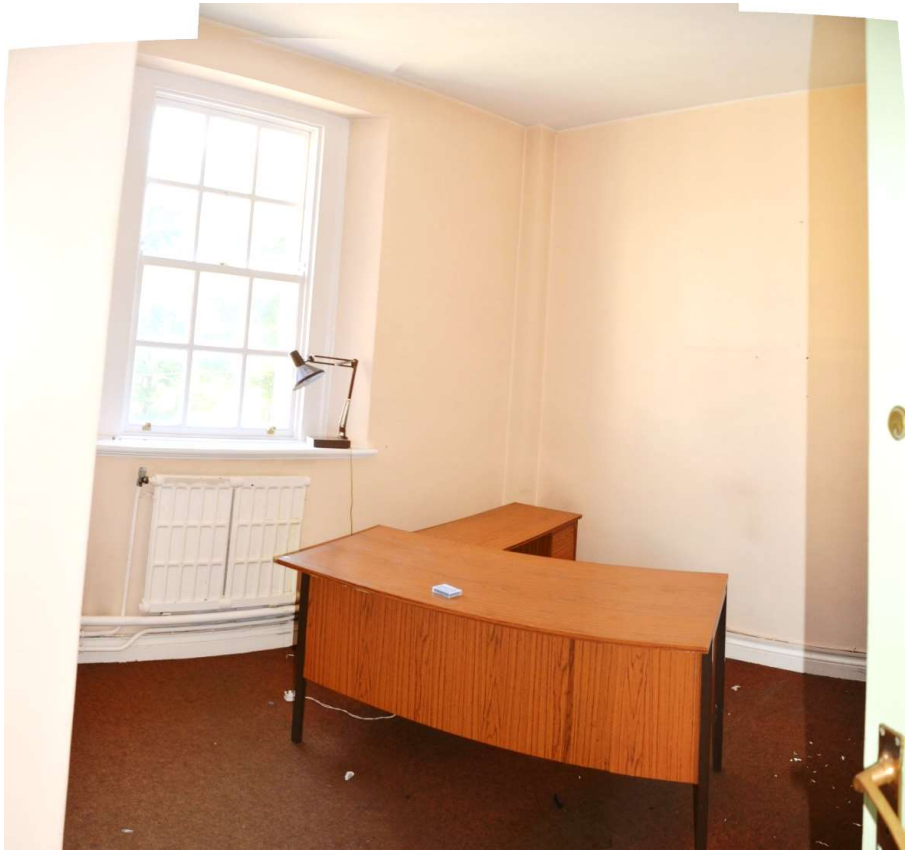
5. Room F.03



6. Room F.03

7. Room F.03

8. Room F.04



9. Room F.05

10. Room F.06

11. Room F.07

12. Room F.08

13. Room F.09

14. Room F.10

15. Room F.11

16. Room F.12

17. Room F.13

18. Room F.14

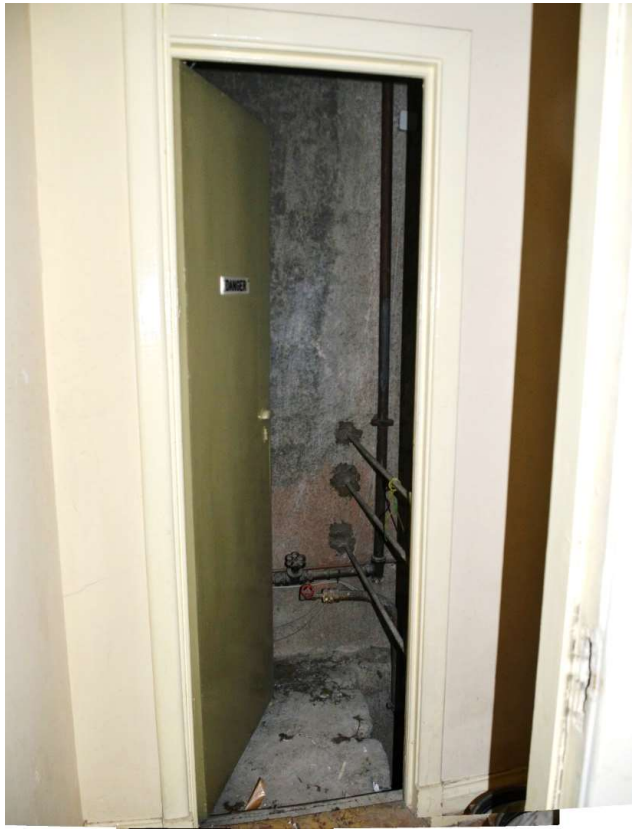
19. Room F.14

20. Room F.14A

21. Room F.15

22. Room F.16

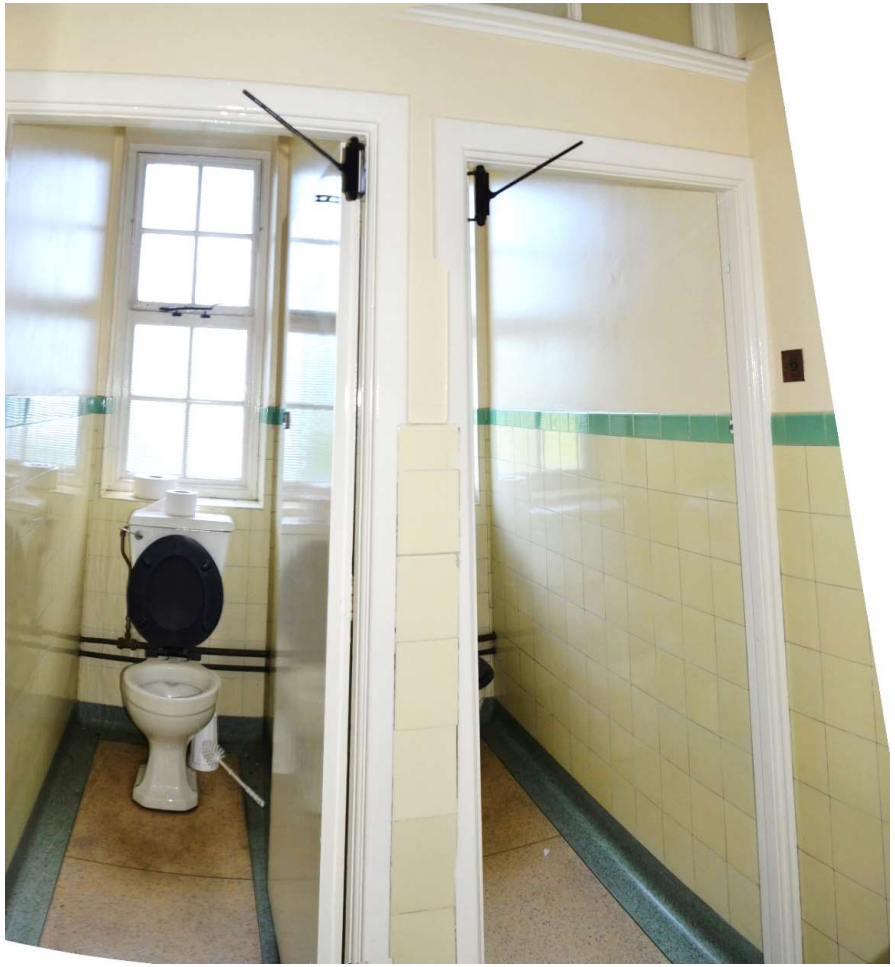
23. Room F.17



24. Room F.17A

25. Room F.18

26. Room F.19



27. Room F.20

28. Room F.21

29. Room F.22

30. Room F.23

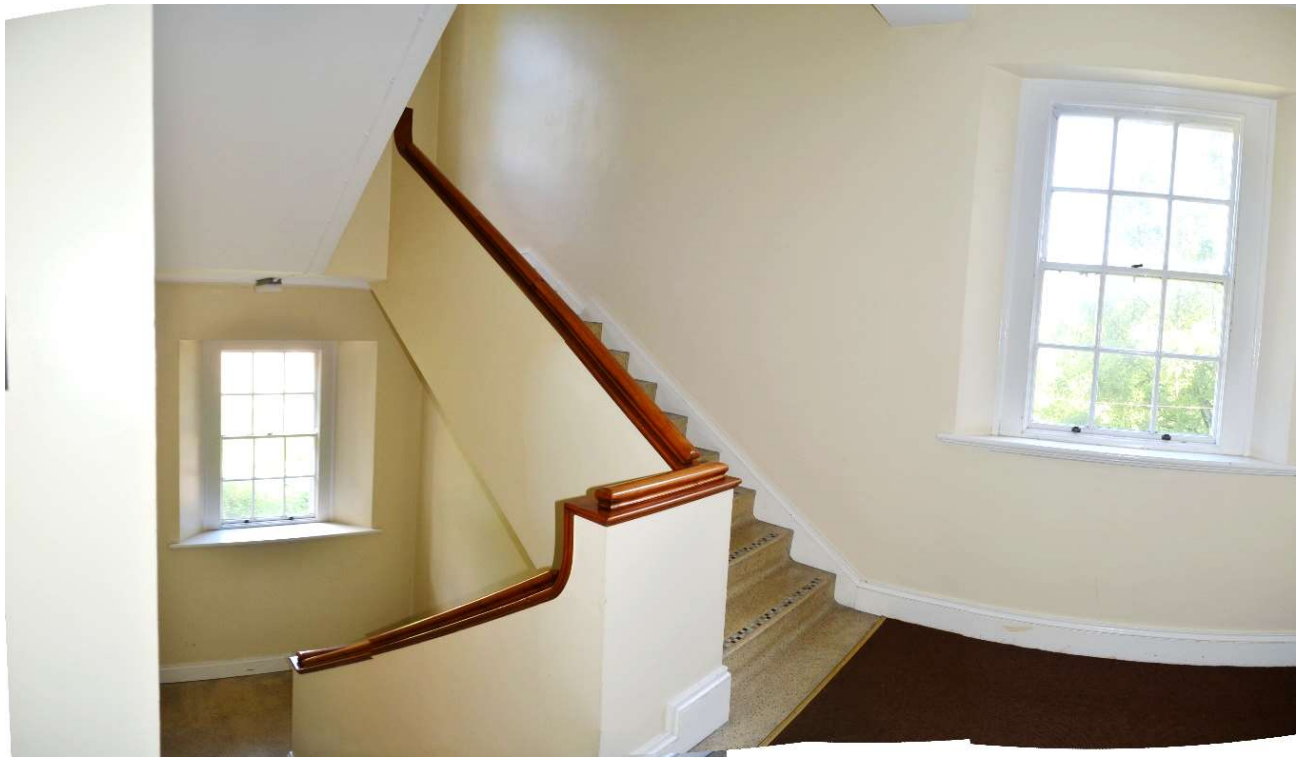
31. Room F.24

32. Room F.25

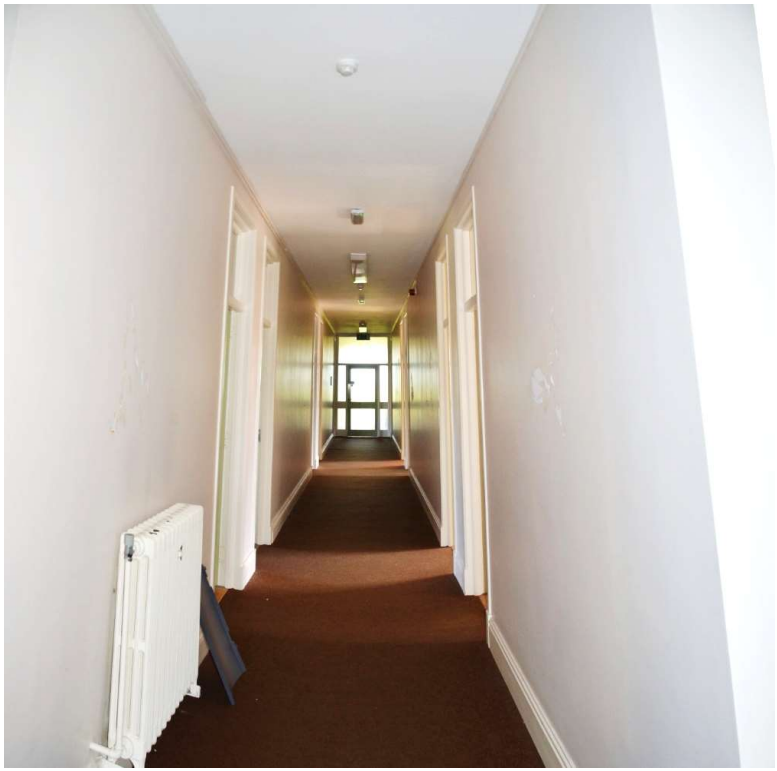
33. Room F.25

34. Room F.26

35. Room F.27



36. Room F.28



37. Room F.29

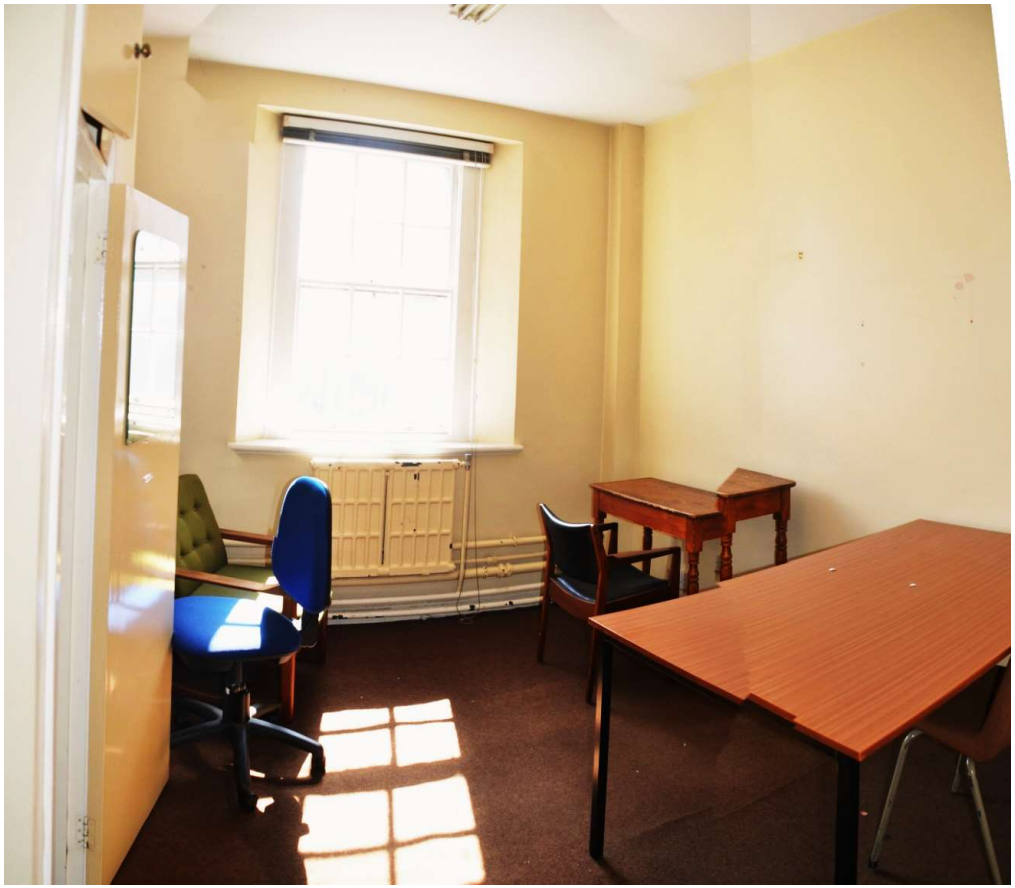
38. Room F.30

39. Room F.31

40. Room F.32

41. Room F.33

42. Room F.34



43. Room F.35

44. Room F.36

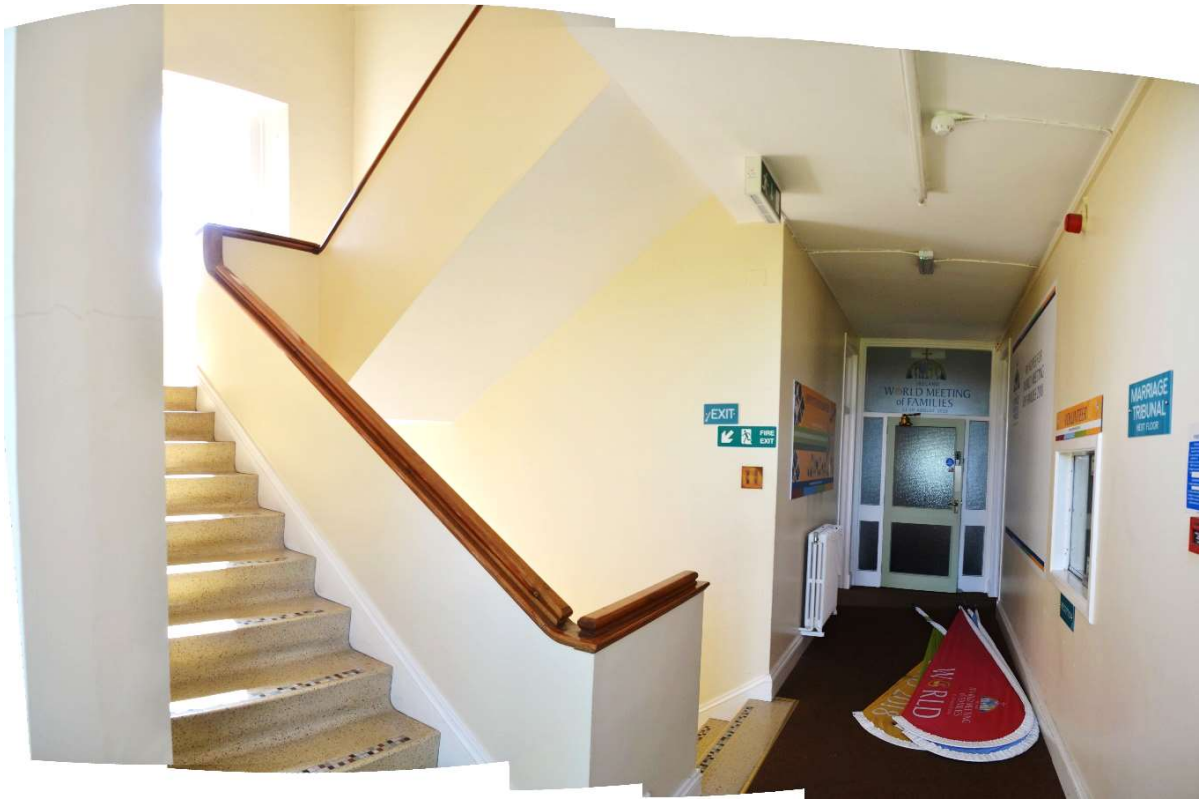
45. Room F.37

46. Room F.38

47. Room F.39

48. Room F.40

49. Room F.41



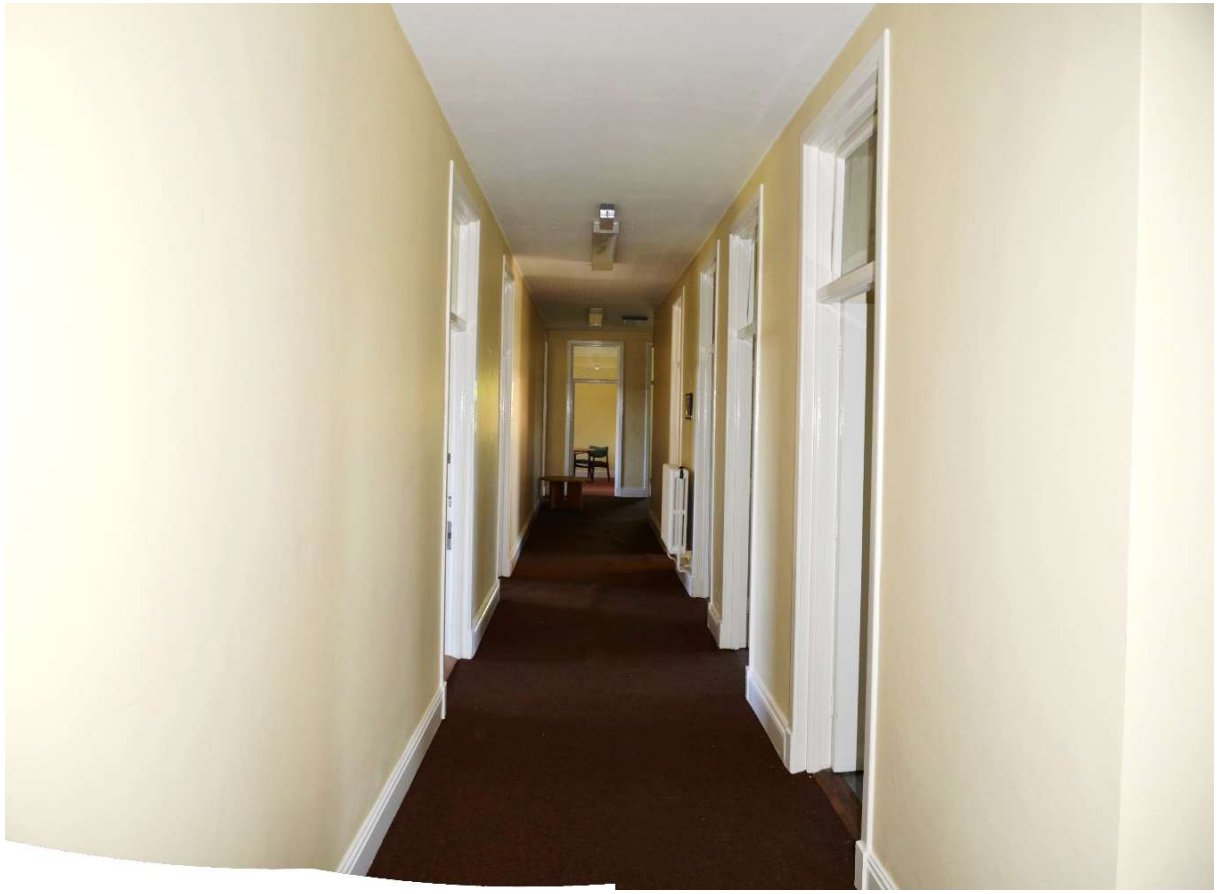
50. Room F.41

51. Room F.42

52. Room F.43

New Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Second Floor



1. Room S.01

2. Room S.02

3. Room S.03

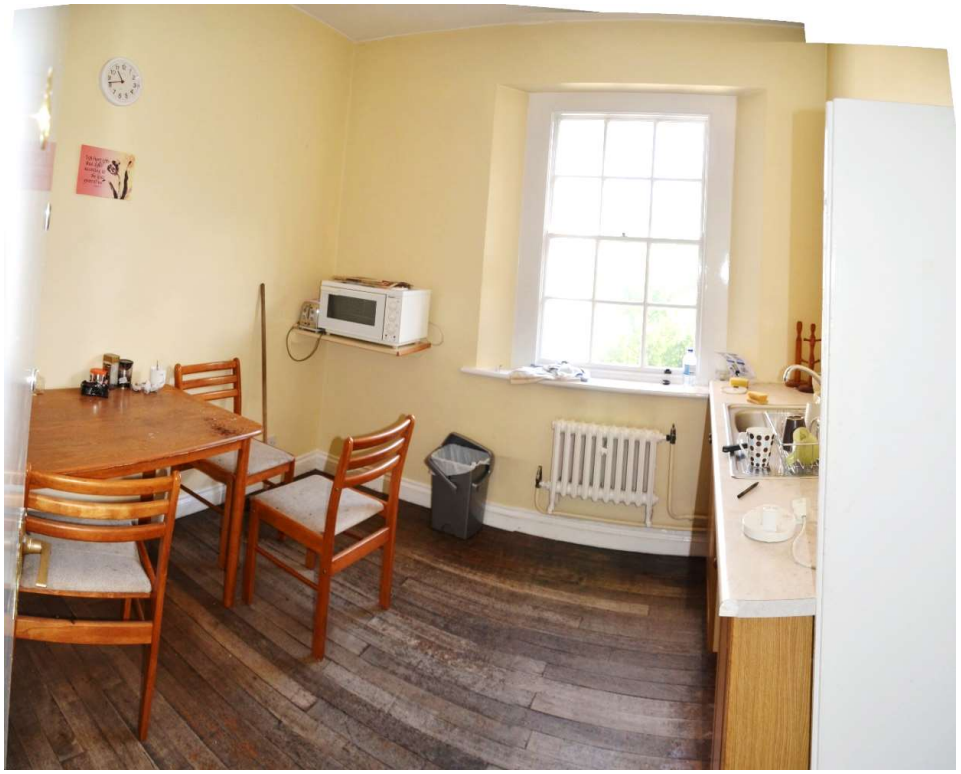
4. Room S.03

5. Room S.04

6. Room S.05

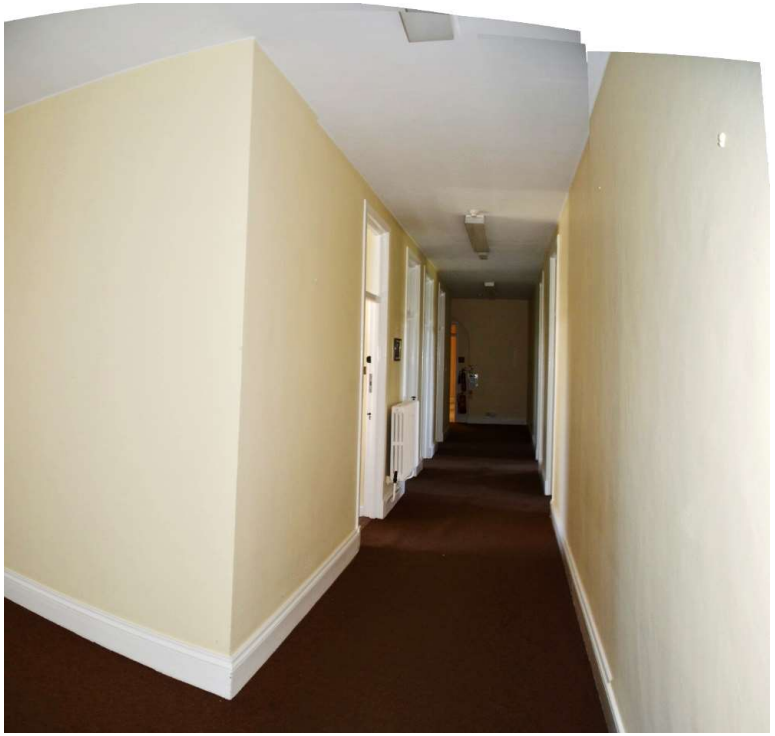
7. Room S.06

8. Room S.06

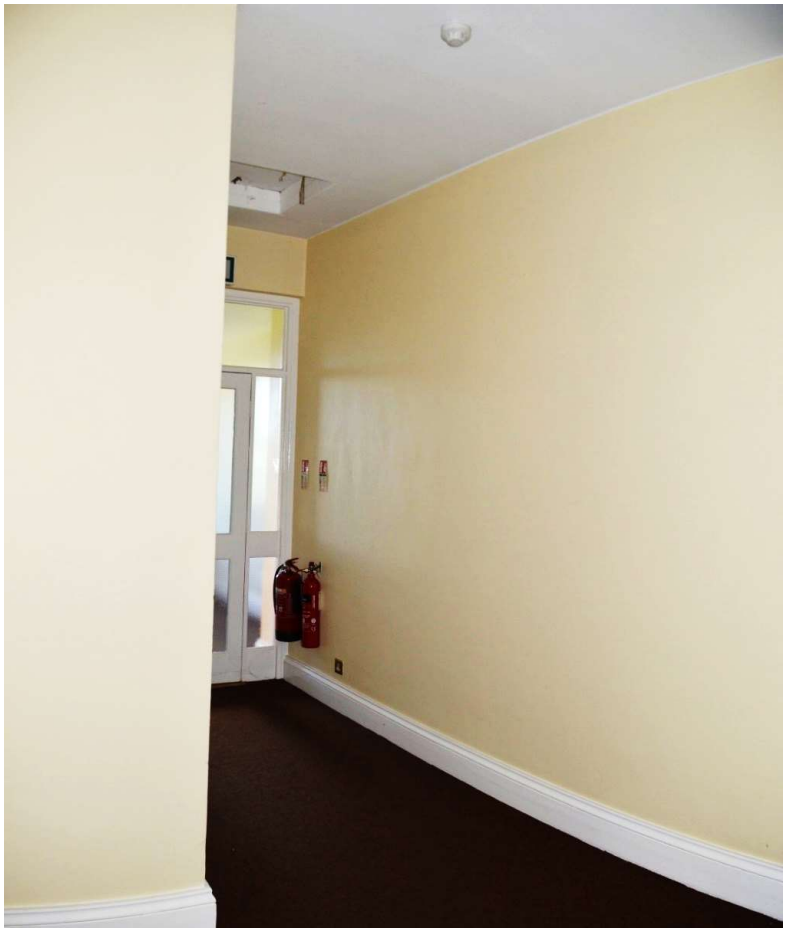


9. Room S.07

10. Room S.08



11. Room S.08



12. Room S.08

13. Room S.09

14. Room S.10

15. Room S.10

16. Room S.11

17. Room S.12

18. Room S.12

19. Room S.13

20. Room S.14

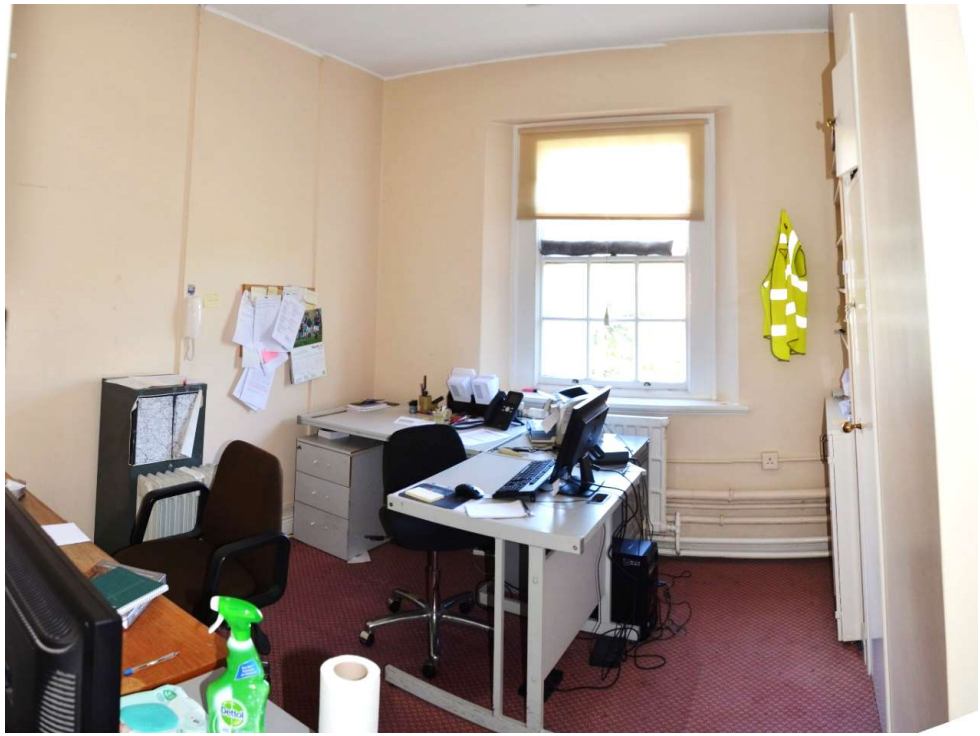
21. Room S.14

22. Room S.15

23. Room S.16

24. Room S.17

25. Room S.18

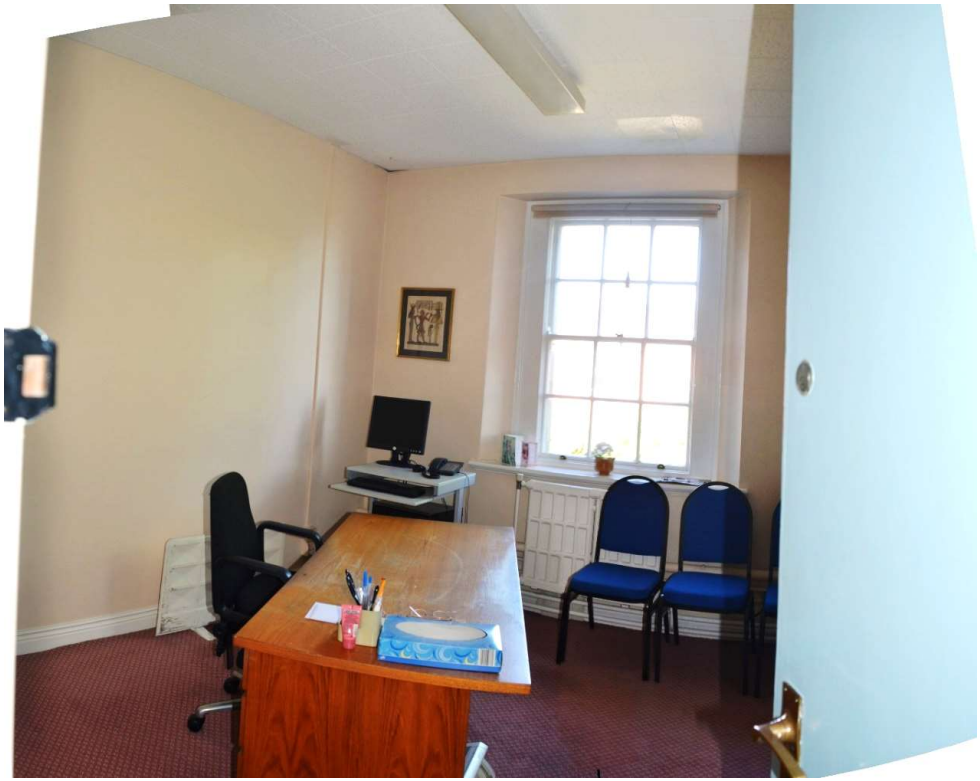


26. Room S.19

27. Room S.20

28. Room S.21

29. Room S.22



30. Room S.23

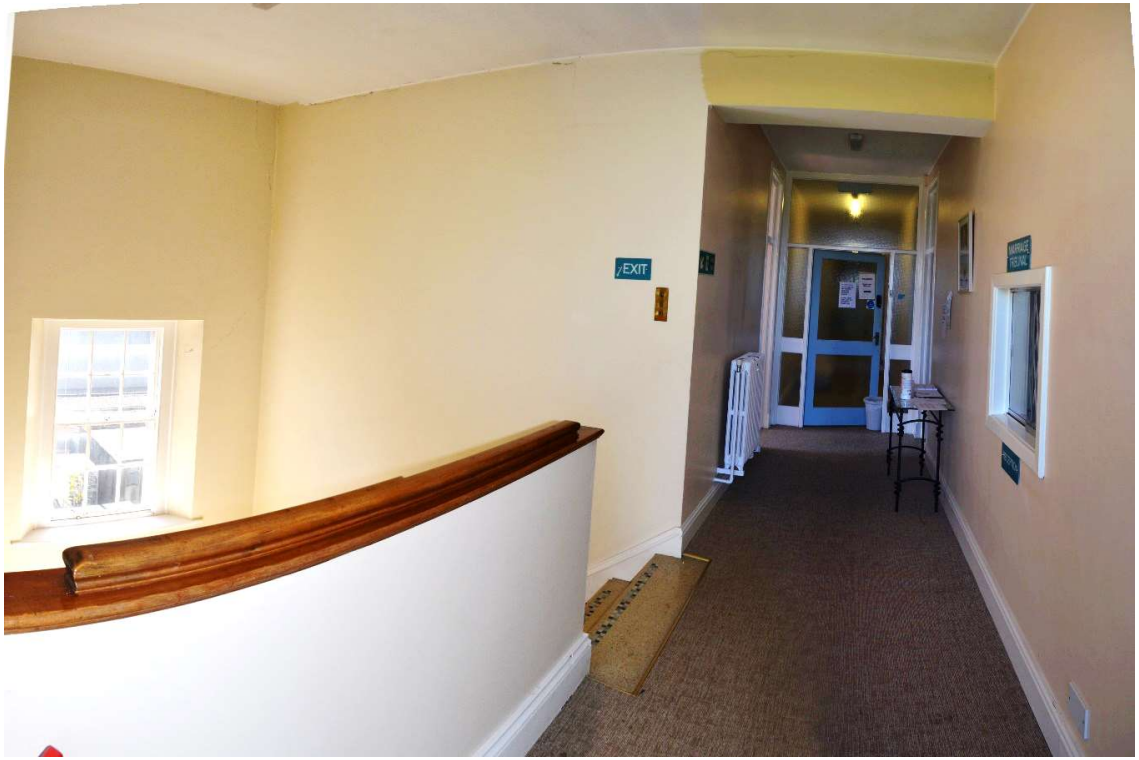
31. Room S.24

32. Room S.25

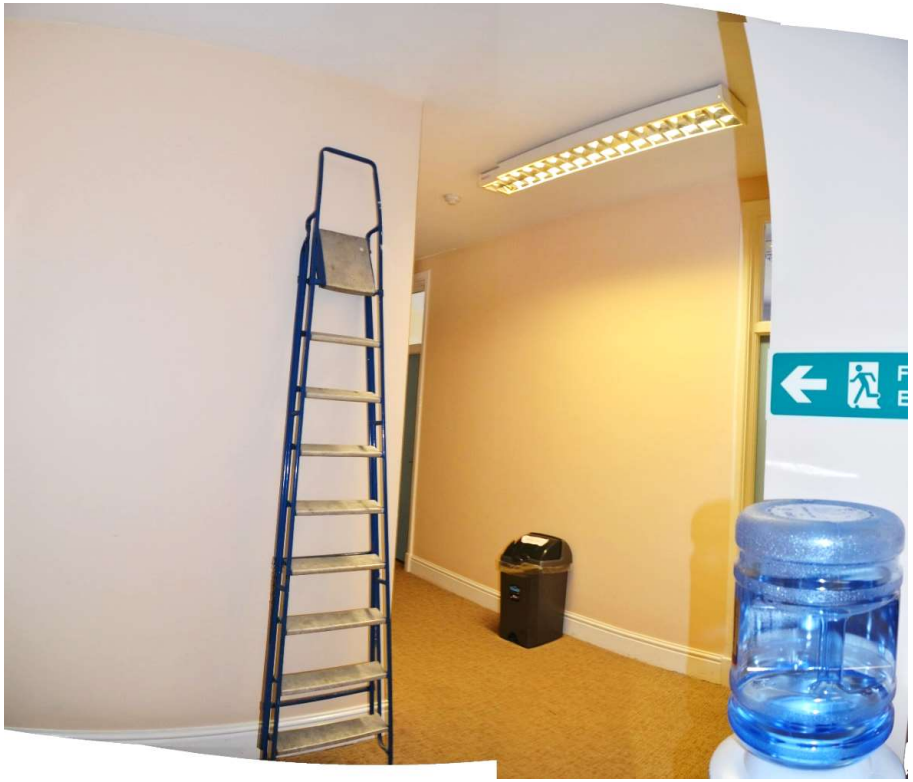
33. Room S.26

34. Room S.26A

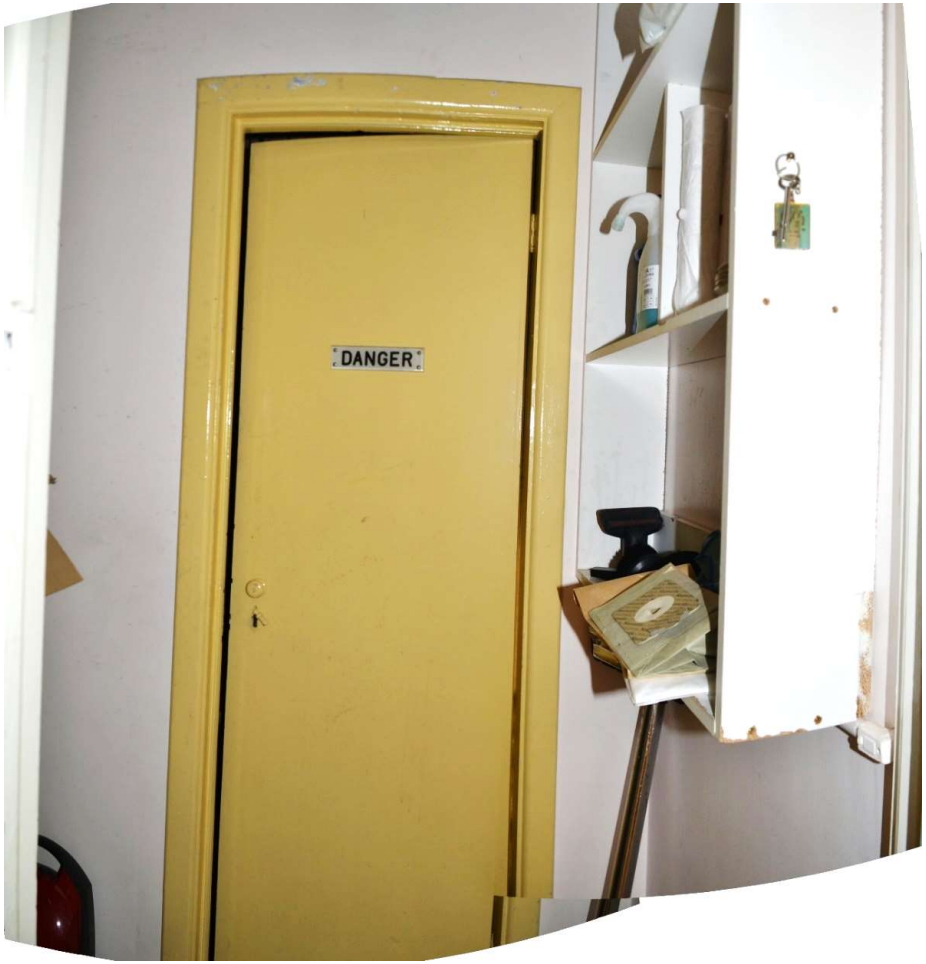
35. Room S.26A



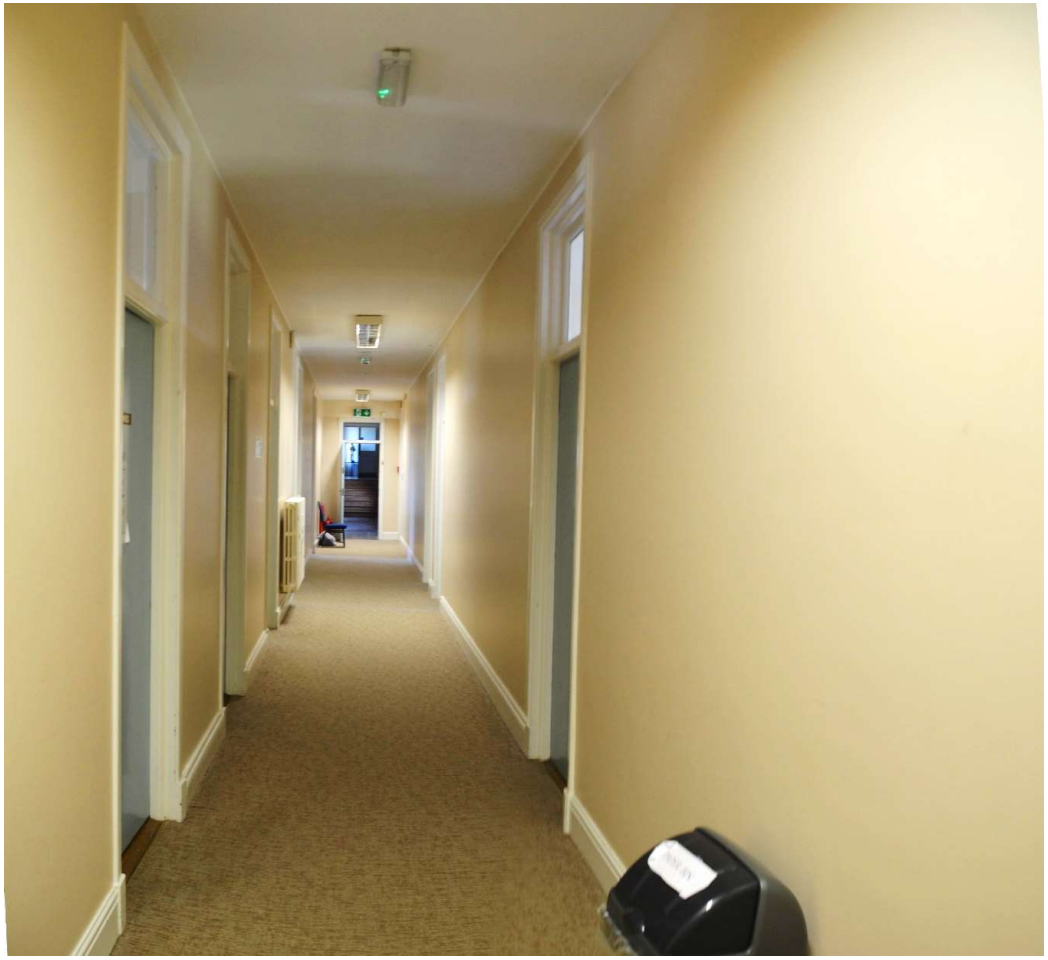
36. Room S.26



37. Room S.27



38. Room S.27A



39. Room S.28

40. Room S.29

41. Room S.30

42. Room S.31

43. Room S.32

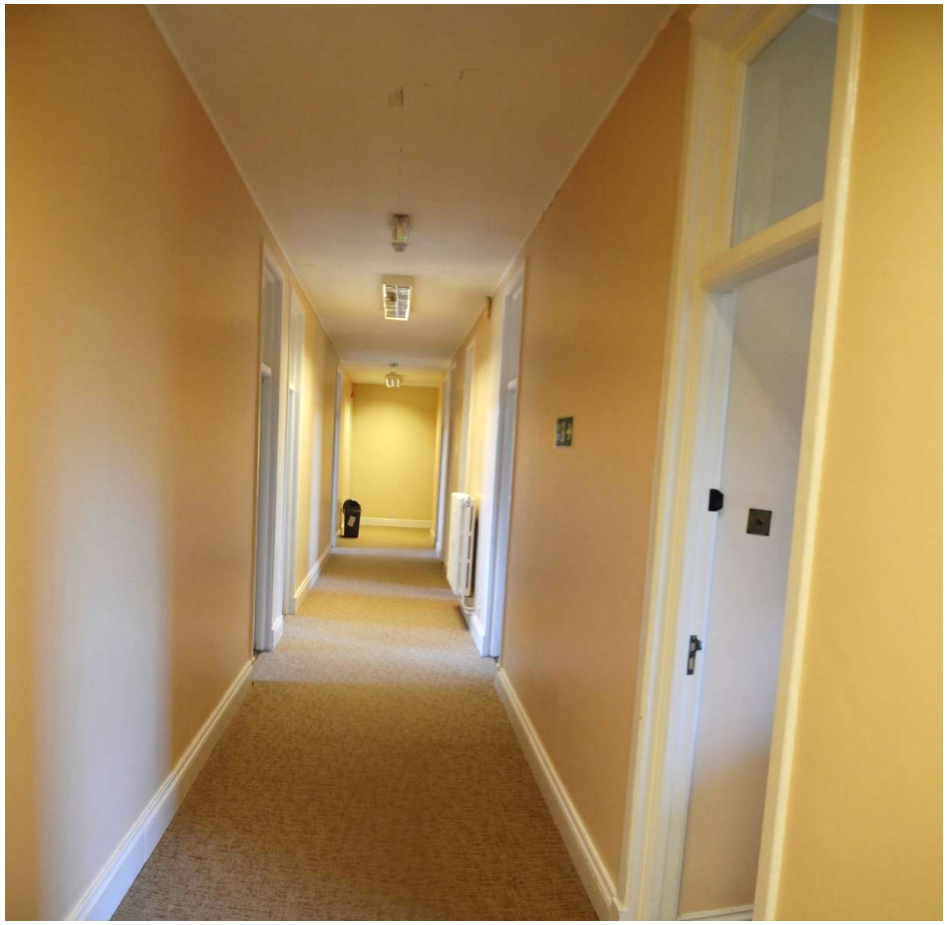
44. Room S.33

45. Room S.34

46. Room S.35

47. Room S.36

48. Room S.37



49. Room S.28

50. Room S.38

51. Room S.39

52. Room S.40

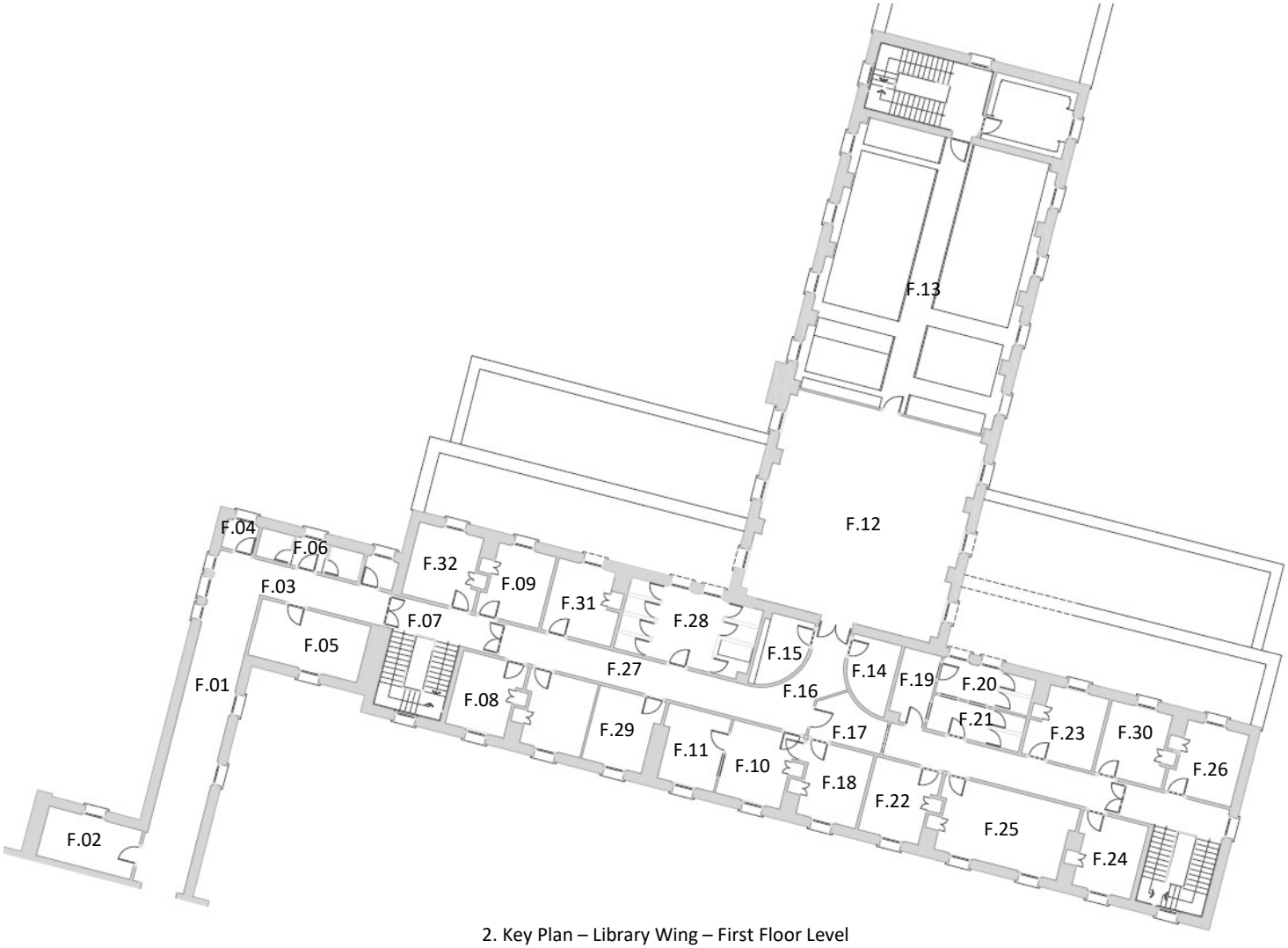
53. Room S.39

A14.10 Photographic Record – Library Wing

Holy Cross College, Clonliffe Road, Dublin 3.

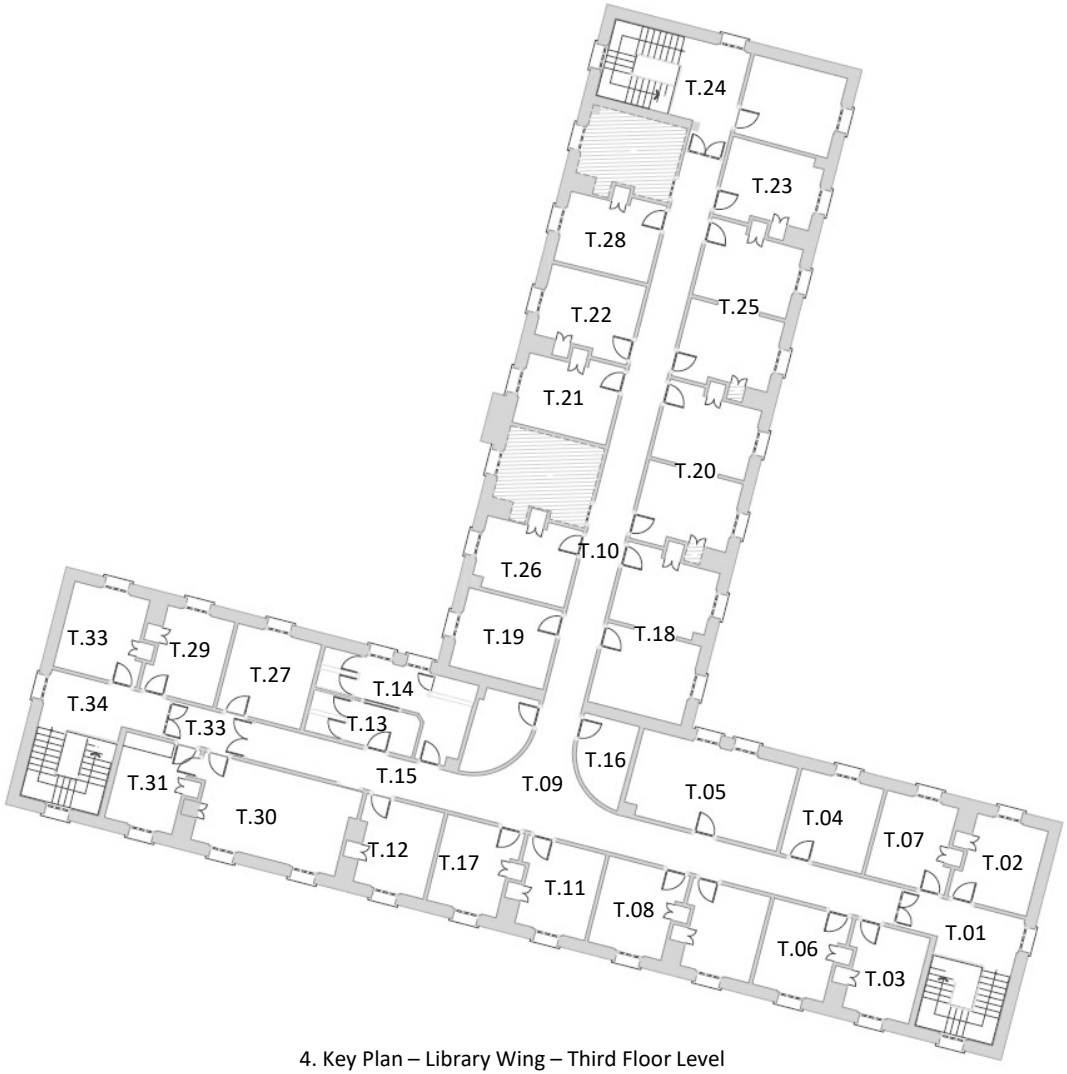
Key Plans – Library Wing

1. Key Plan – Library Wing – Ground Floor Level



2. Key Plan – Library Wing – First Floor Level

3. Key Plan – Library Wing – Second Floor Level

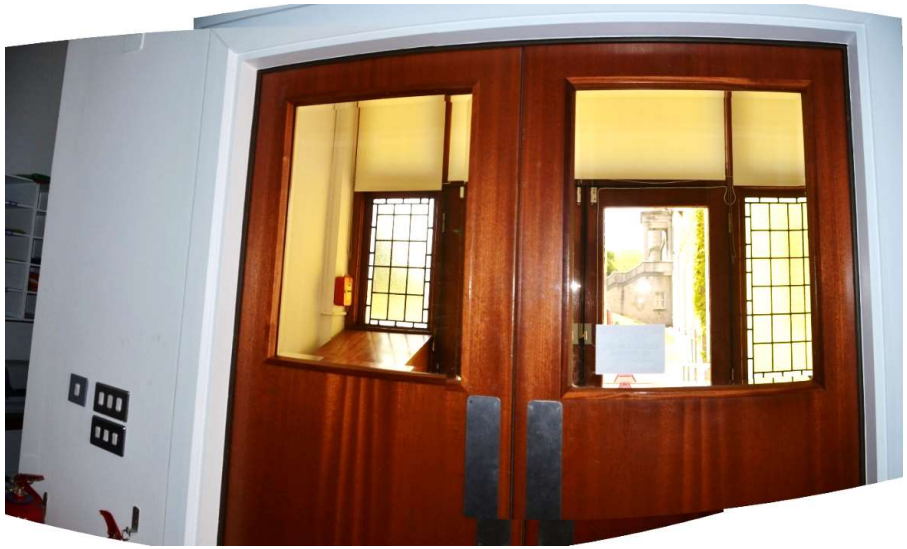


4. Key Plan – Library Wing – Third Floor Level

Library Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Ground Floor

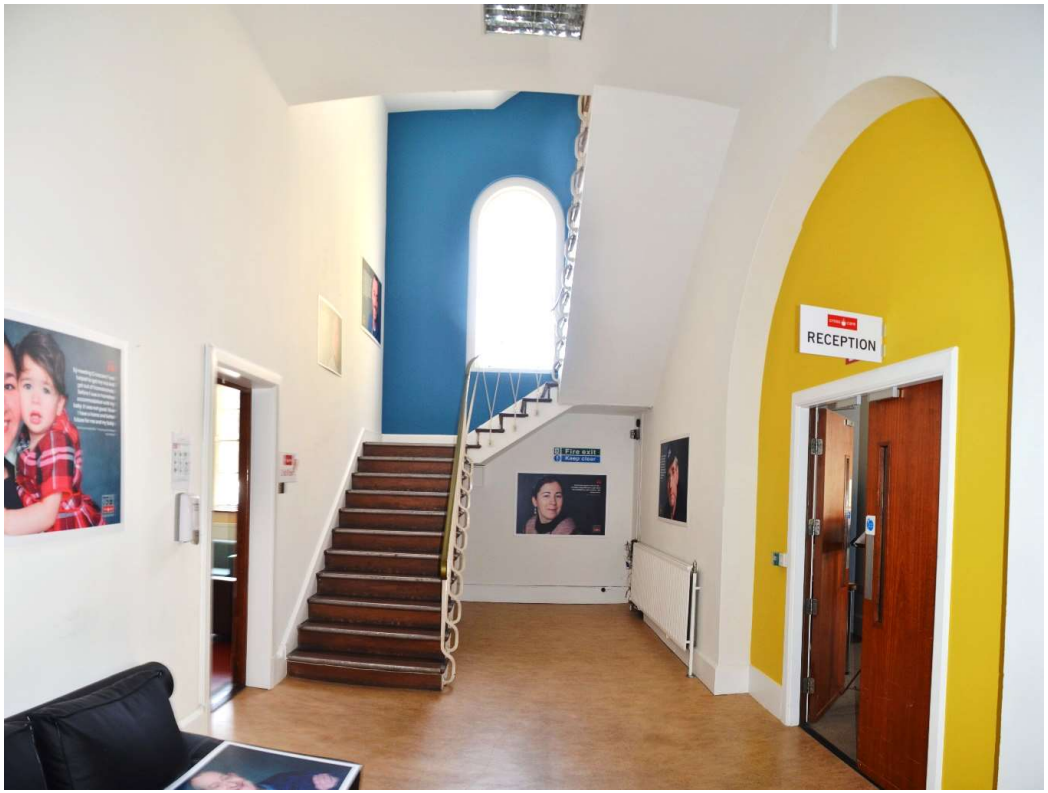
1. Room G.01



2. G.01A

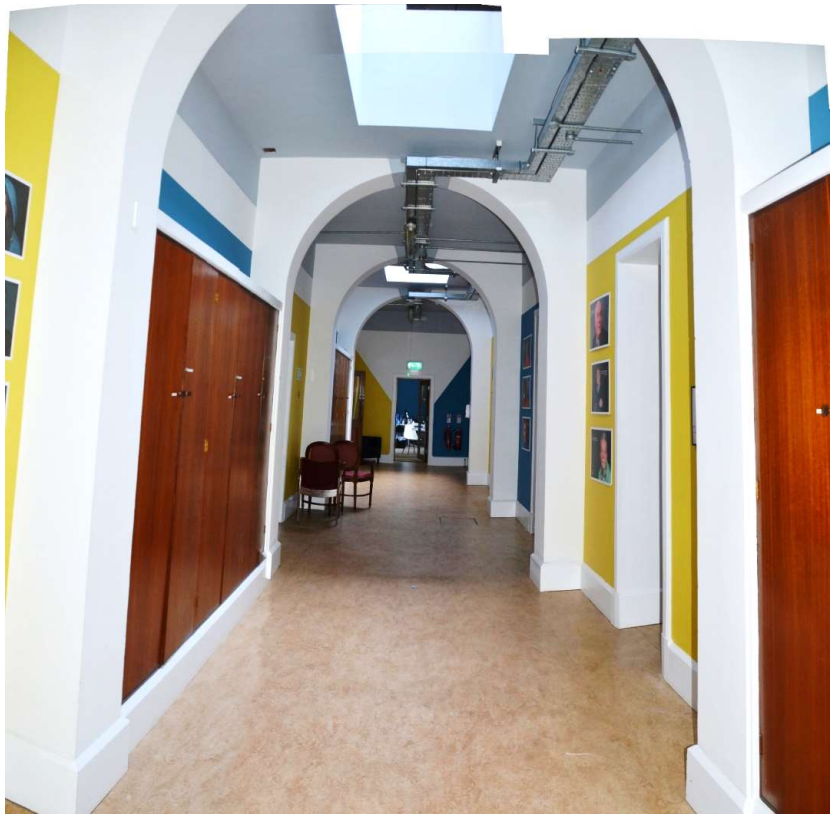
3. Room G.01

4. Room G.02

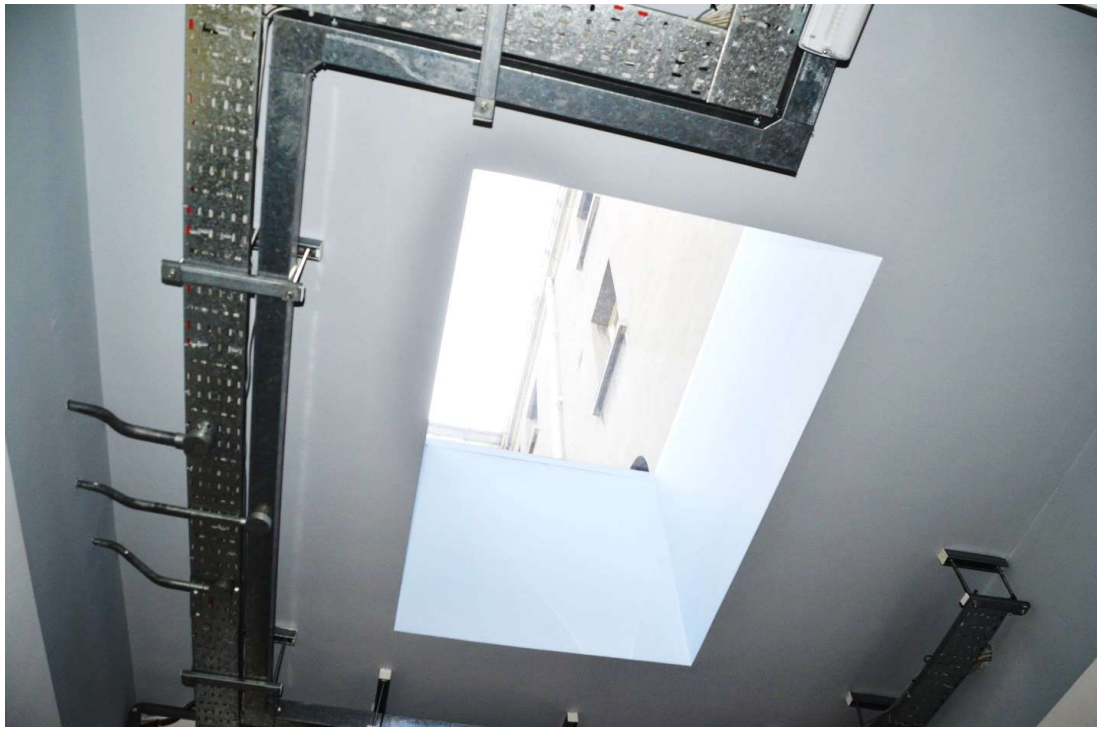


5. Room G.02

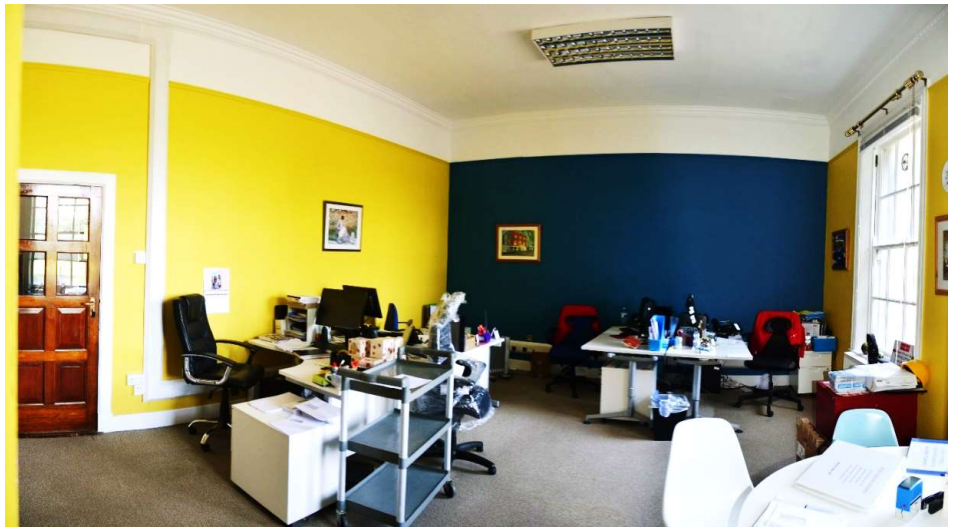
6. Room G.03



7. Room G.03



8. Room G.03



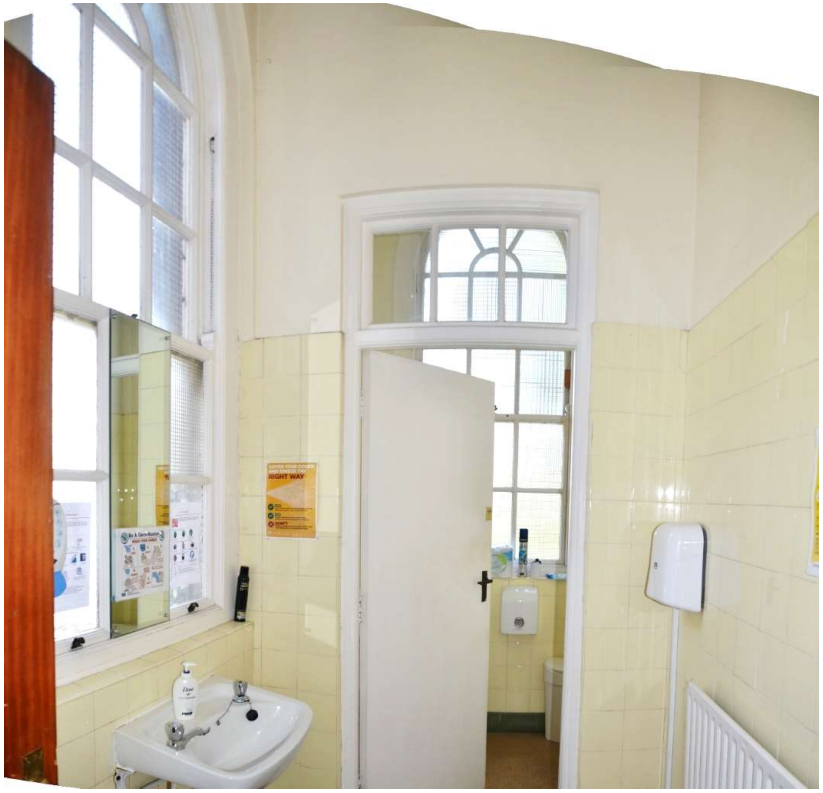
9. Room G.04

10. Room G.04

11. Room G.05

12. Room G.05

13. Room G.05

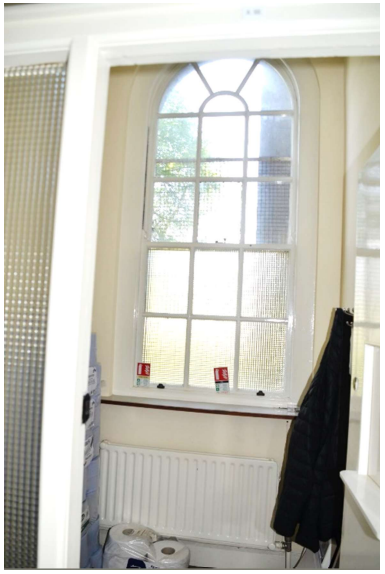


14. Room G.06

15. Room G.07

16. Room G.08

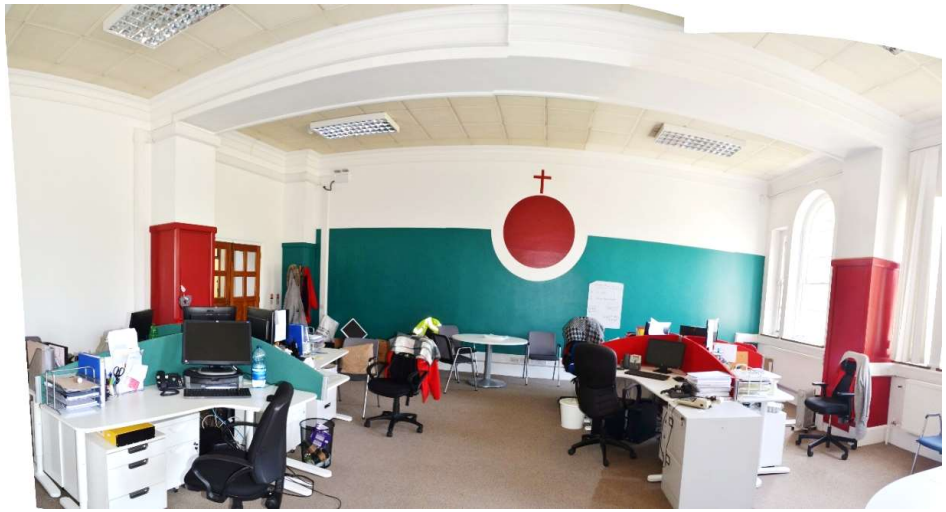
17. Room G.09



18. Room G.10

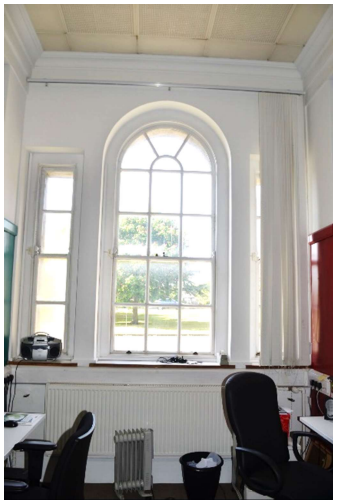
19. Room G.11

20. Room G.11

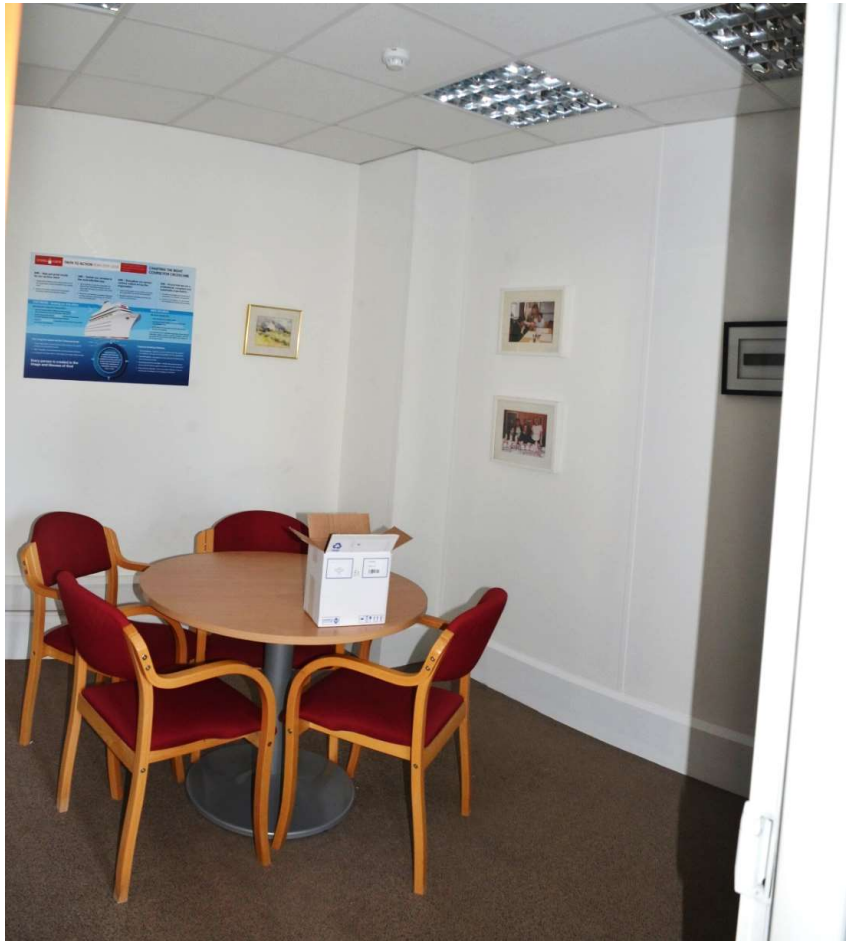


21. Room G.11

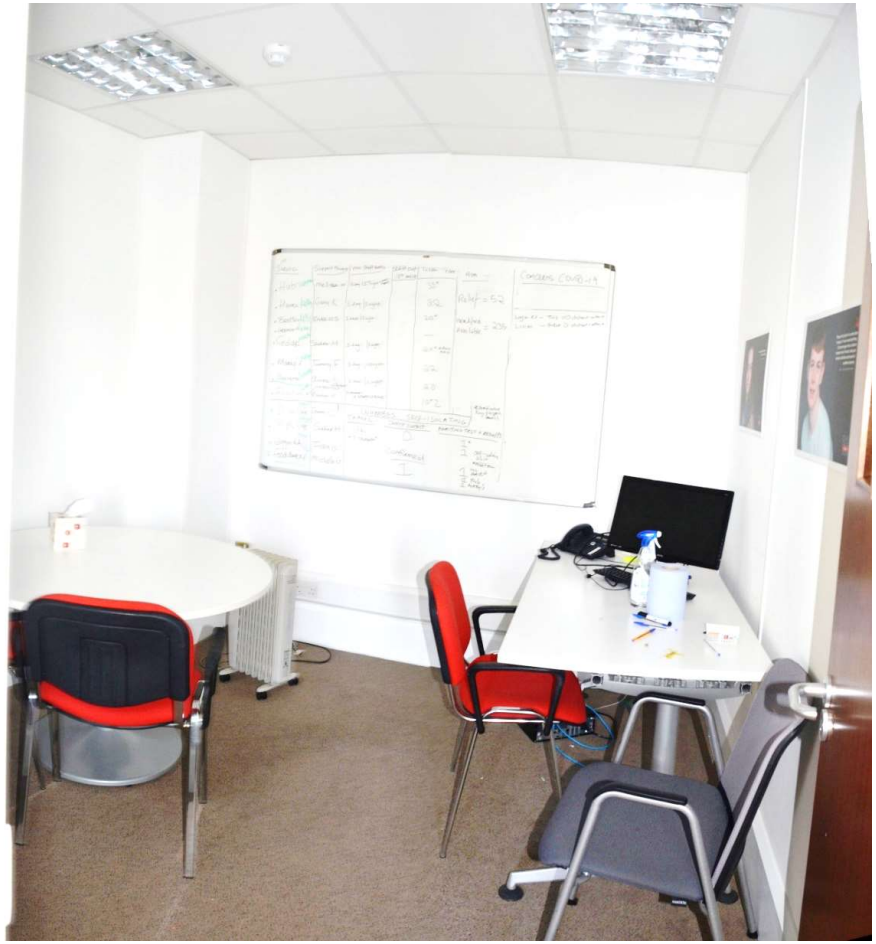
22. Room G.11



23. Room G.11



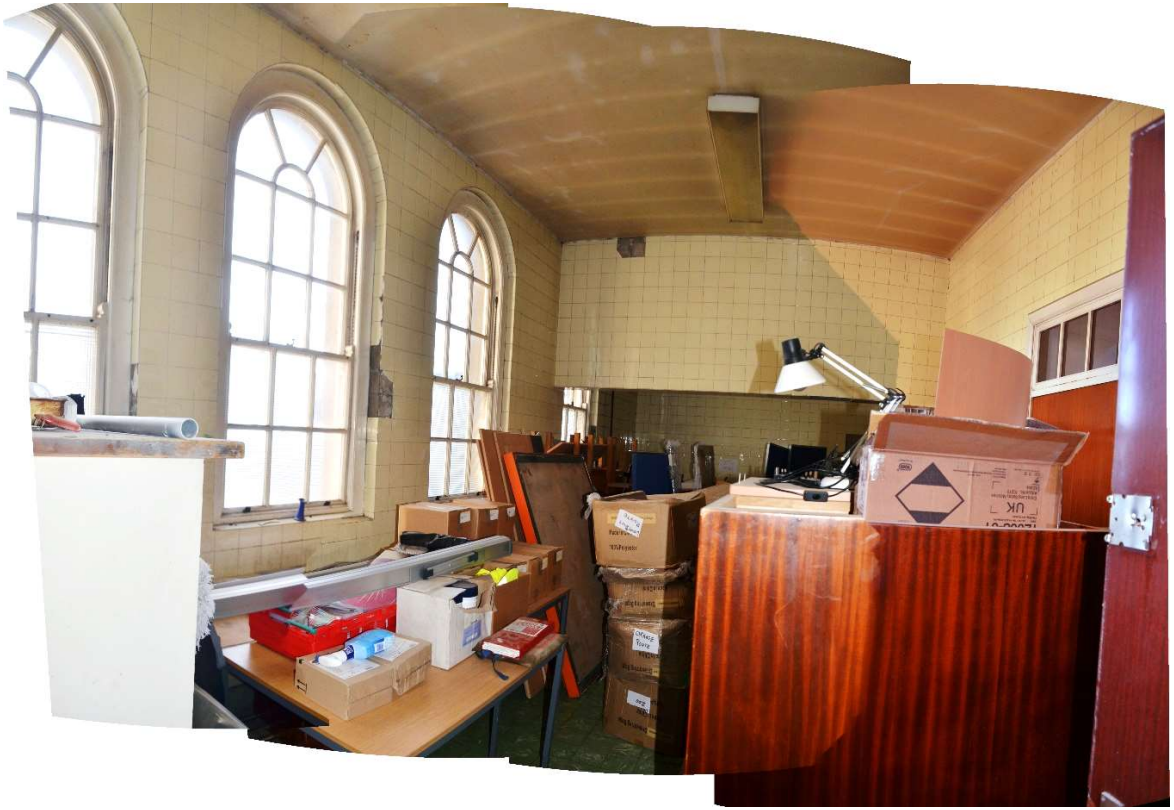
24. Room G.12



25. Room G.13

26. Room G.14

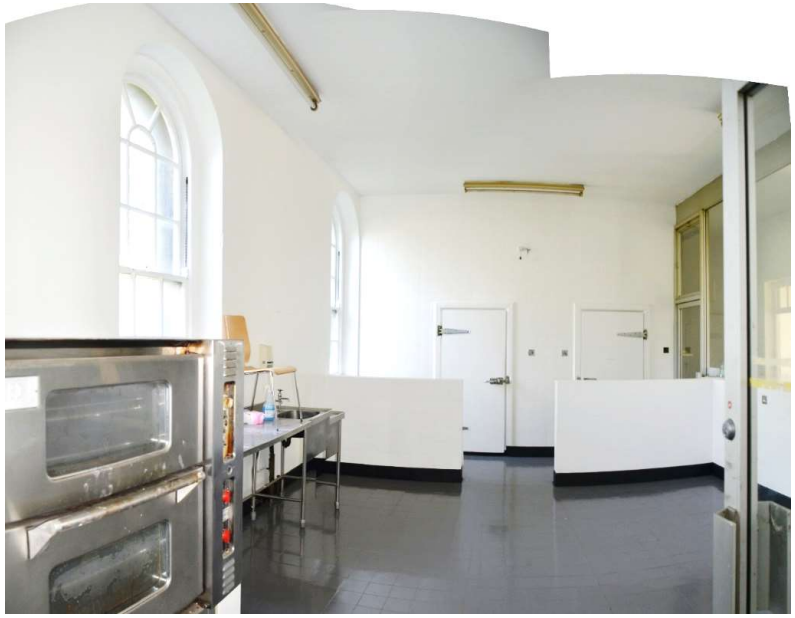
27. Room G.15



28. Room G.16

29. Room G.17

30. Room G.18



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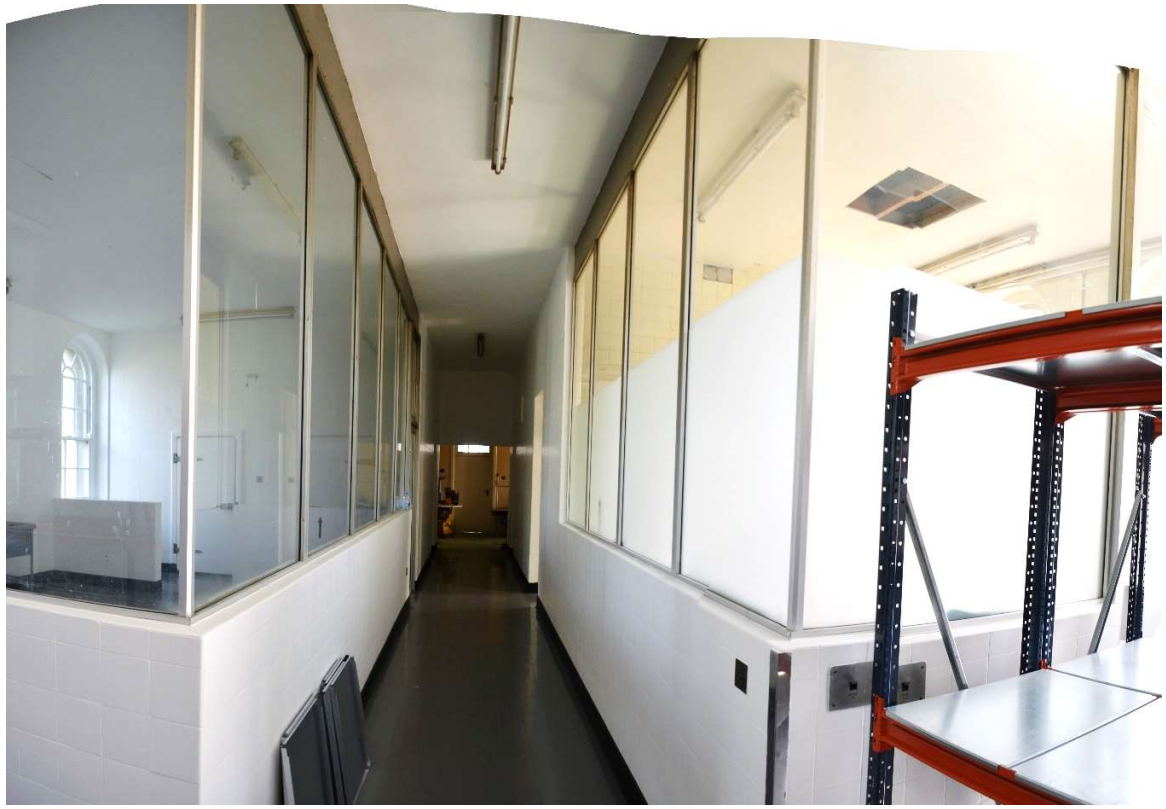
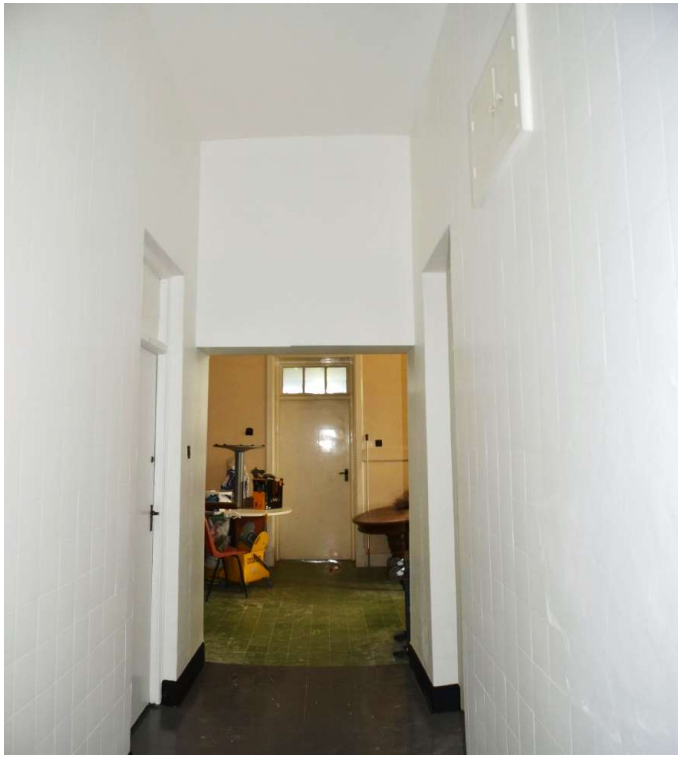


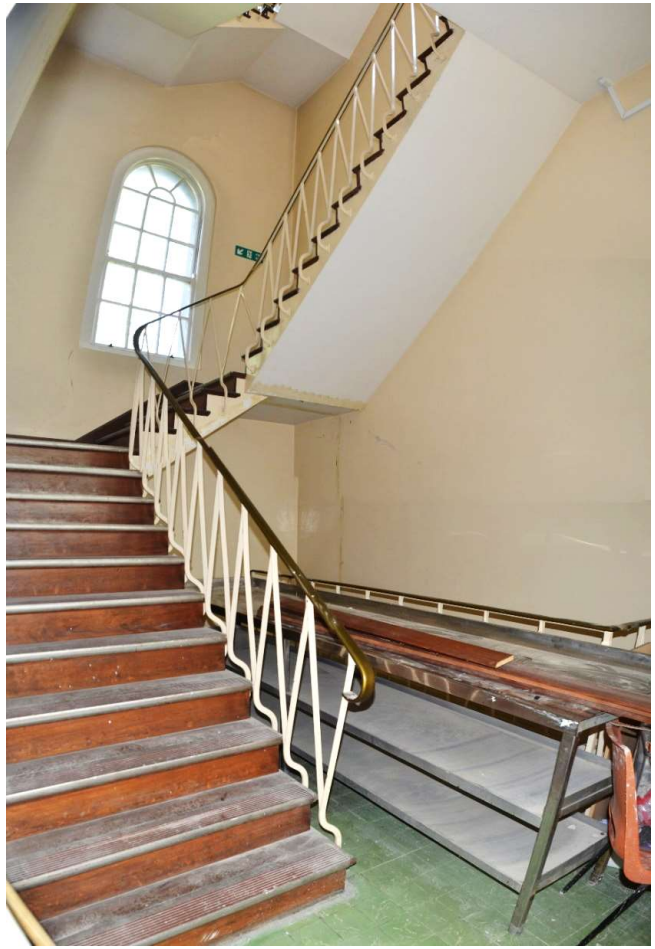
32. Room G.20

33. Room G.21



34. Room G.22

35. Room G.23

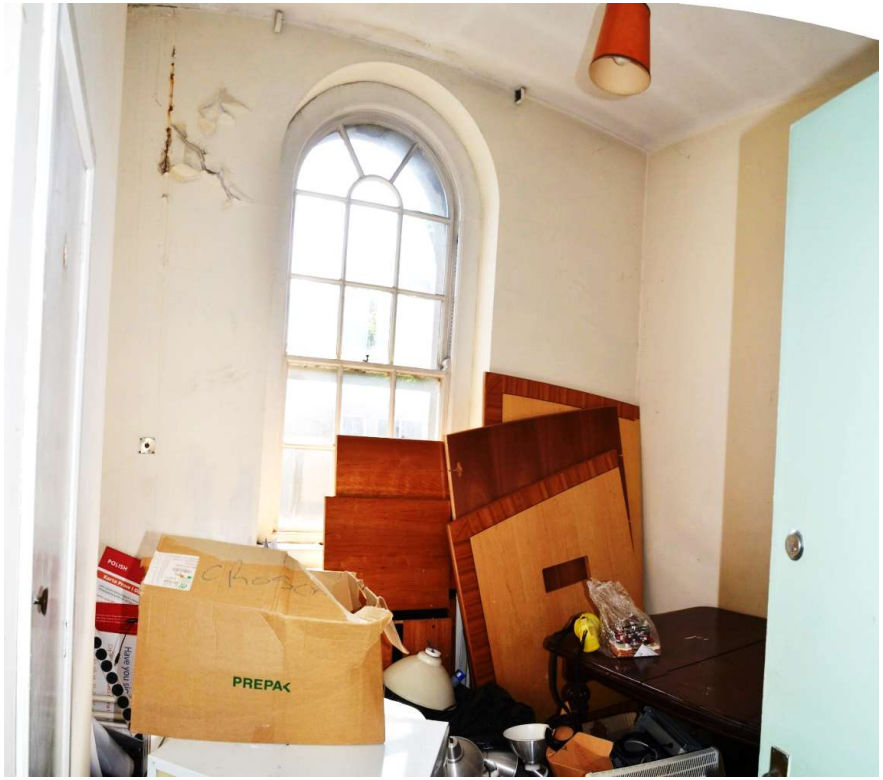


36. Room G.23

37. Room G.23

38. Room G.24

39. Room G.24



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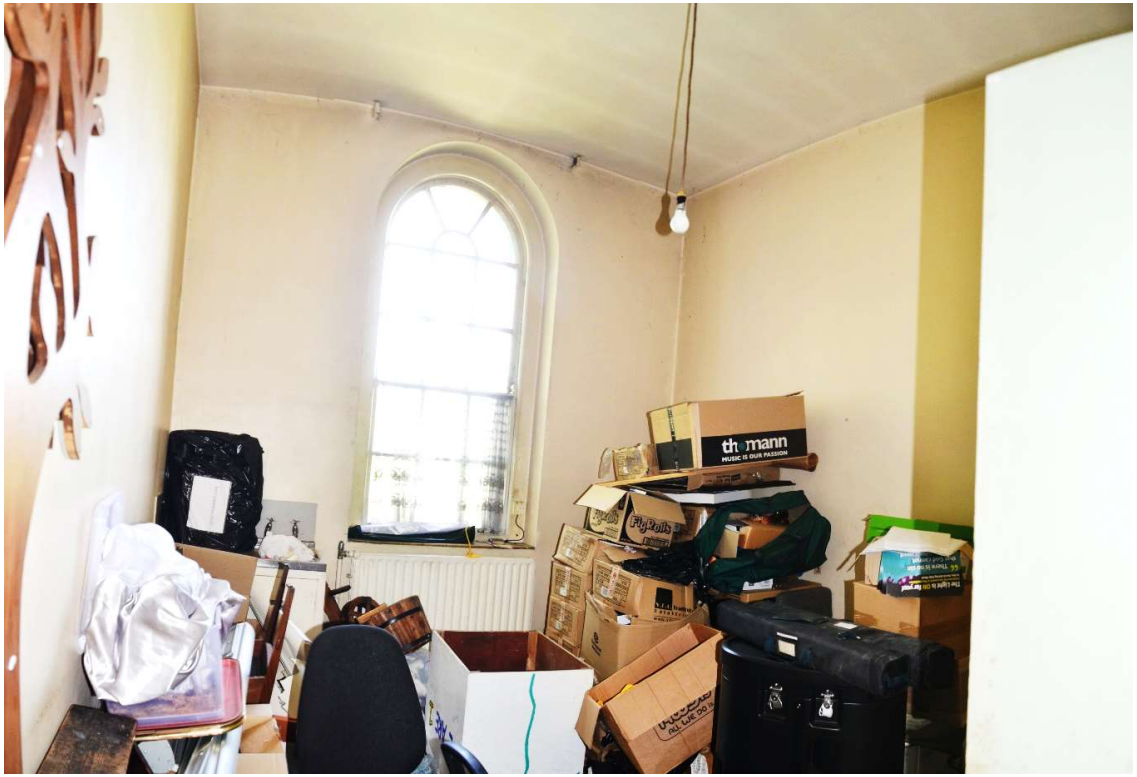
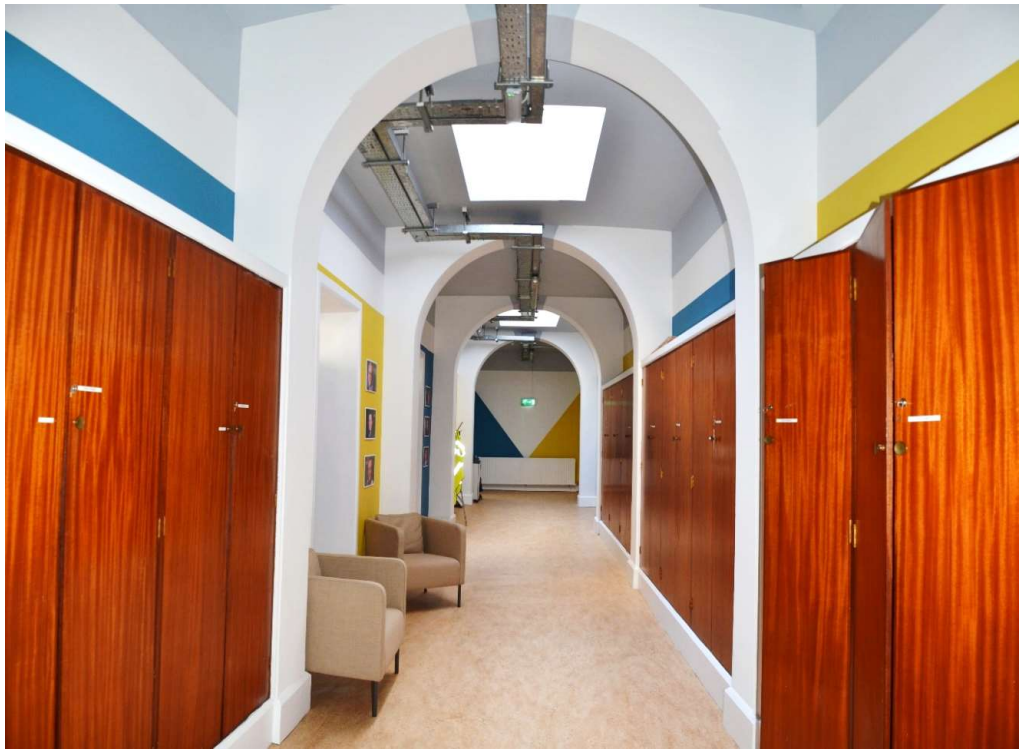


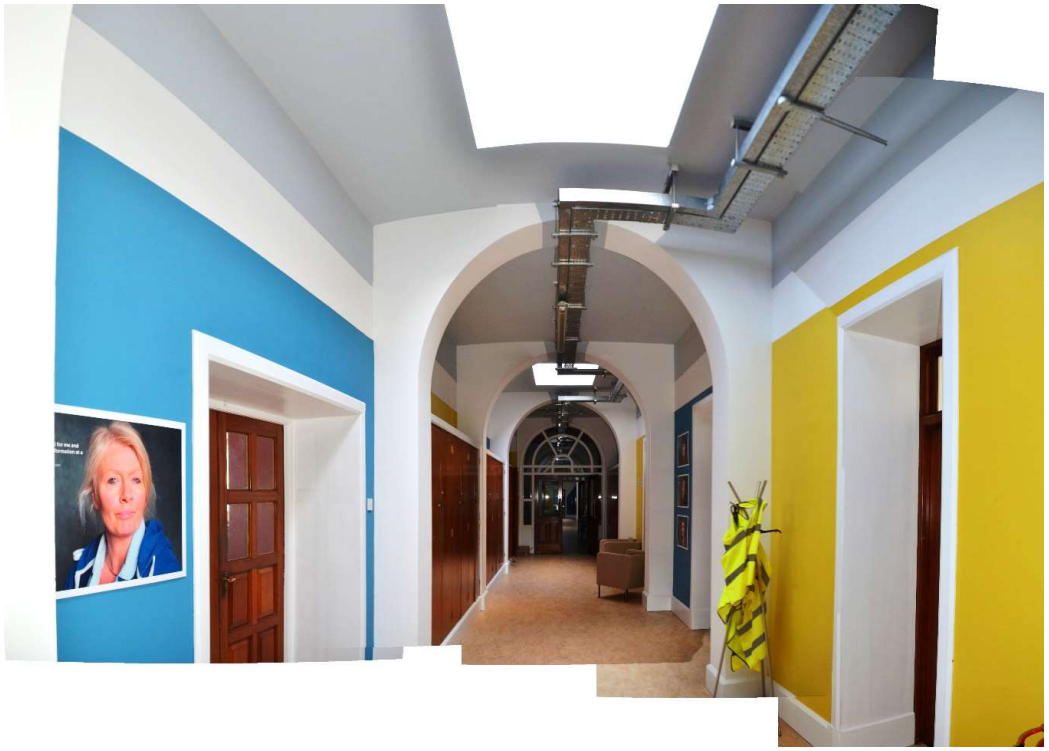
41. Room G.26

42. Room G.27

43. Room G.28



44. Room G.29



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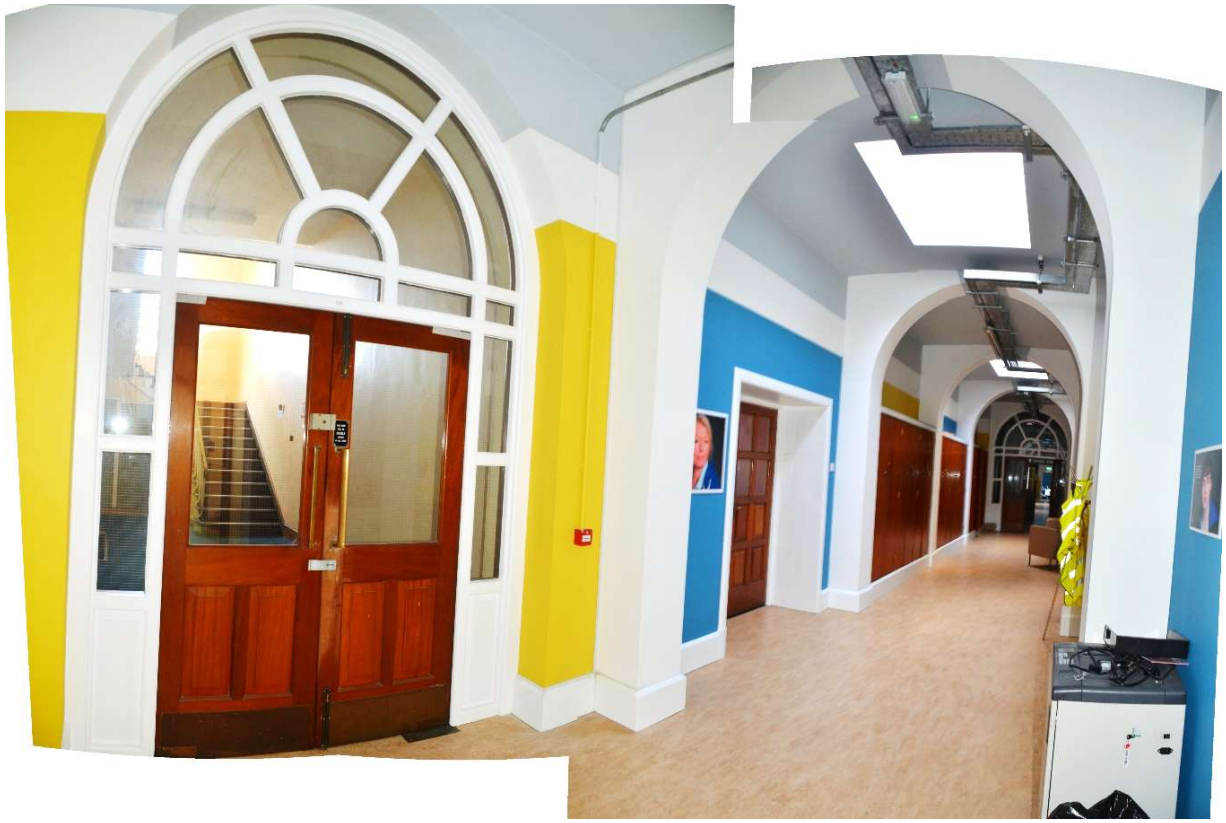
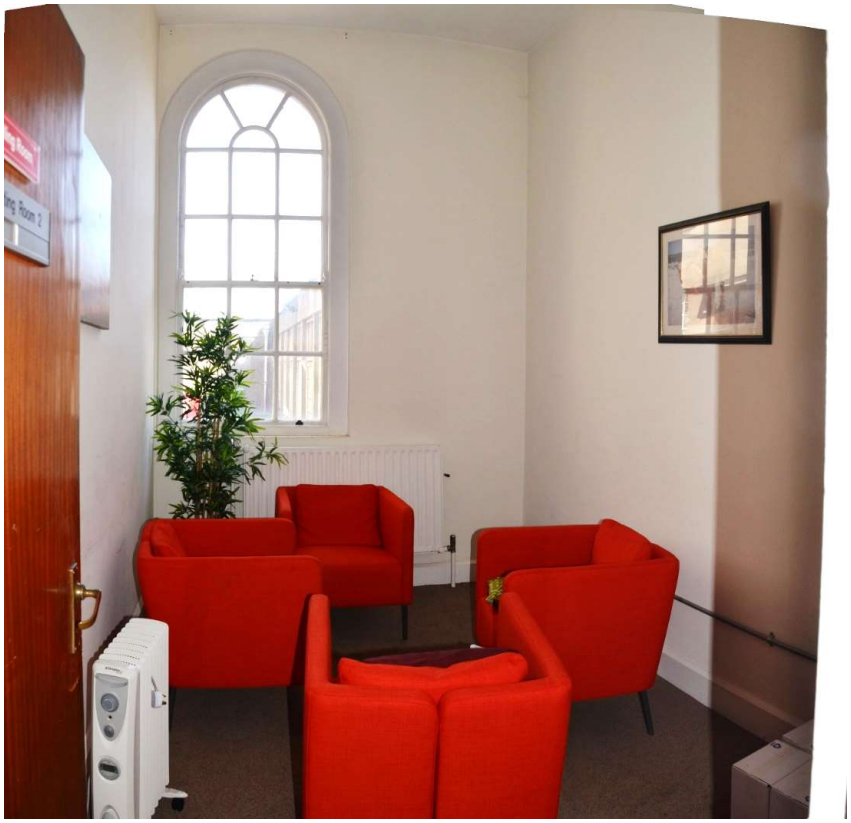
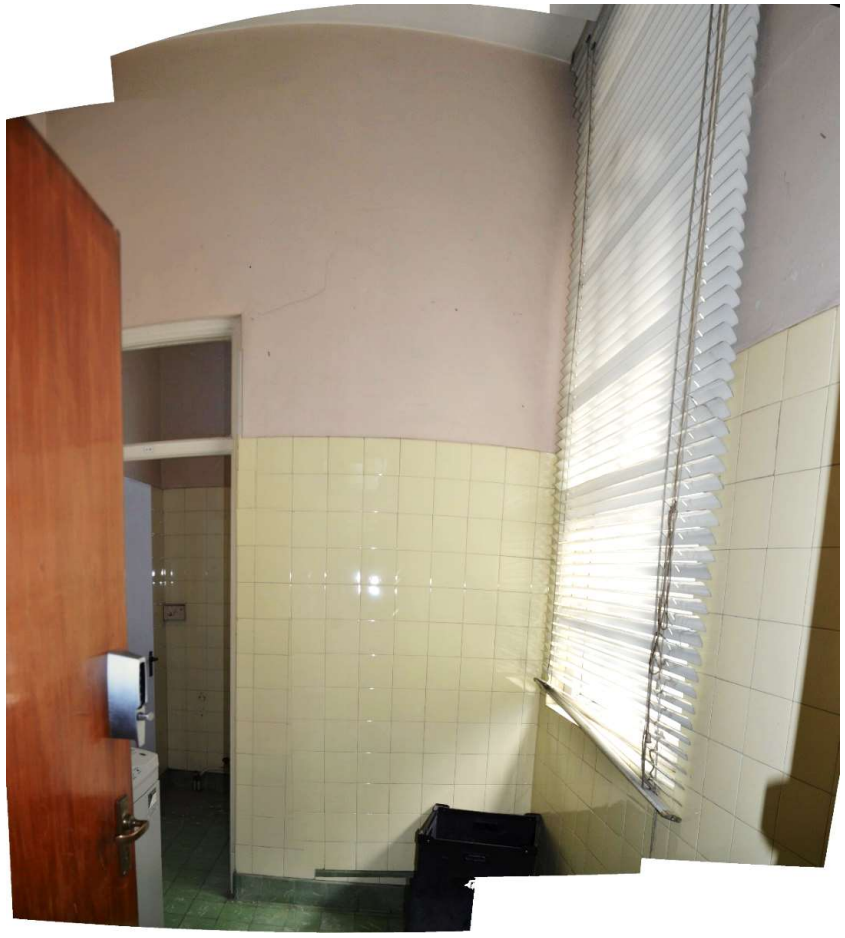


46. Room G.29



47. Room G.30



48. Room G.31

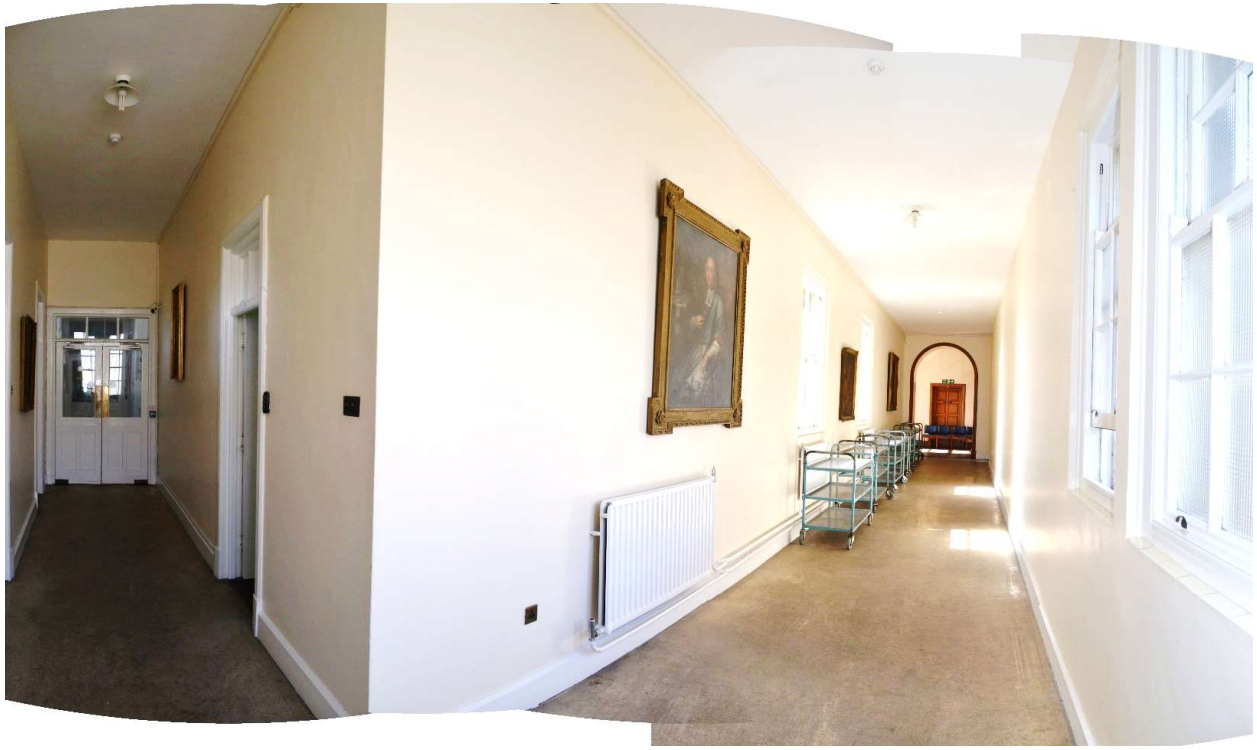
49. Room G.32

Library Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – First Floor

1. Room F.01

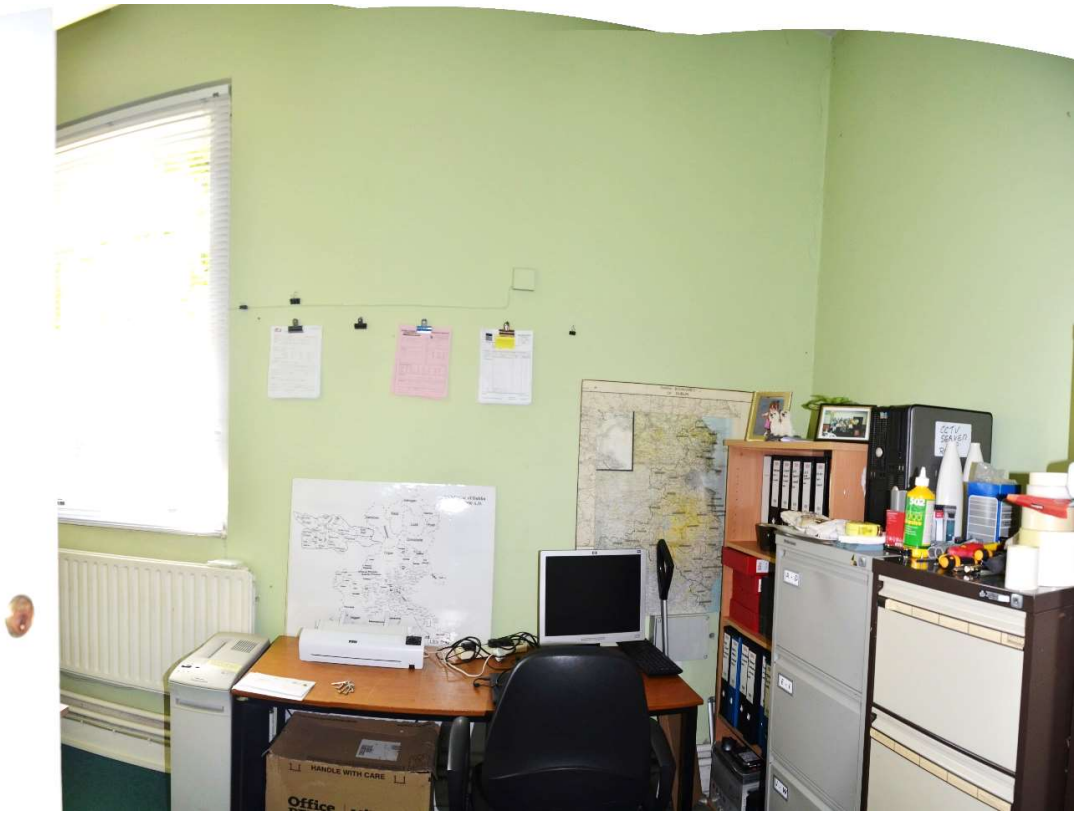
2. Room F.02



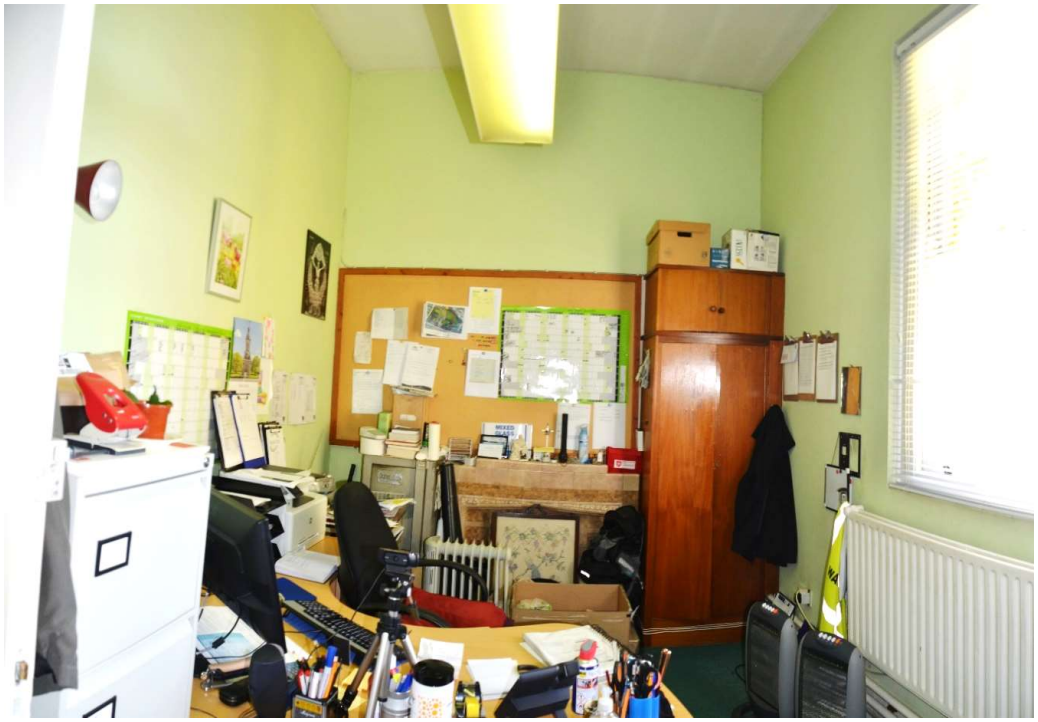
3. Room F.03

4. Room F.04

5. Room F.05



6. Room F.05



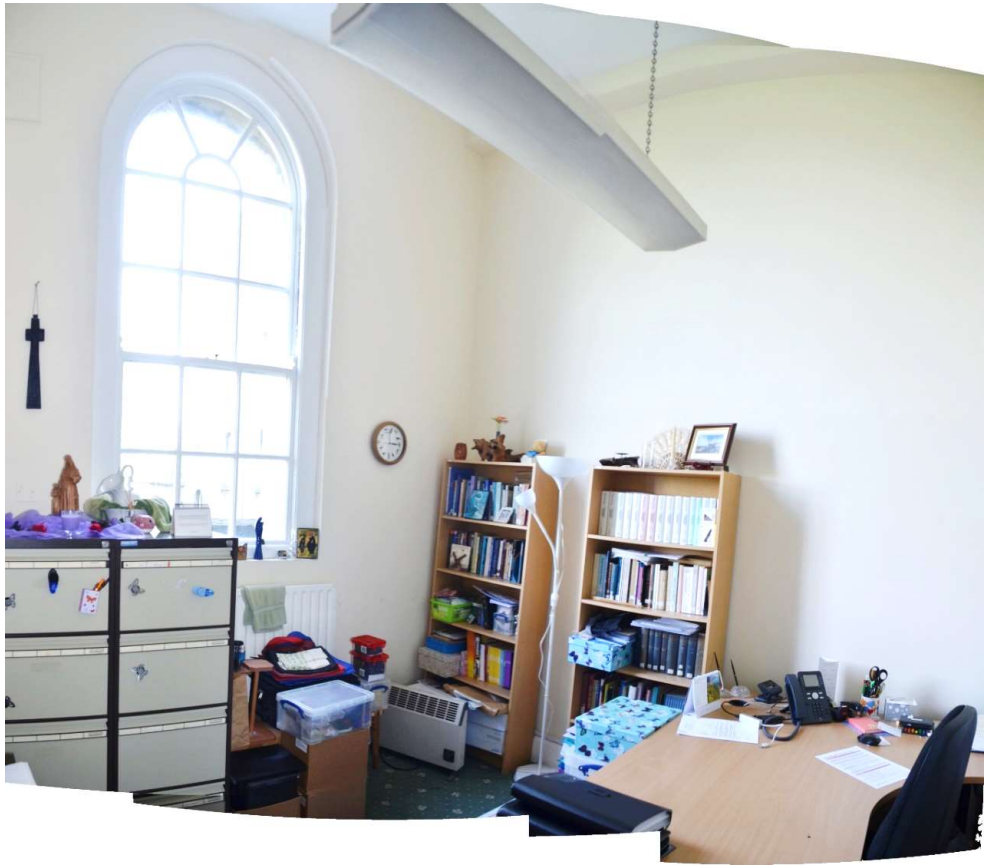
7. Room F.05

8. Room F.06

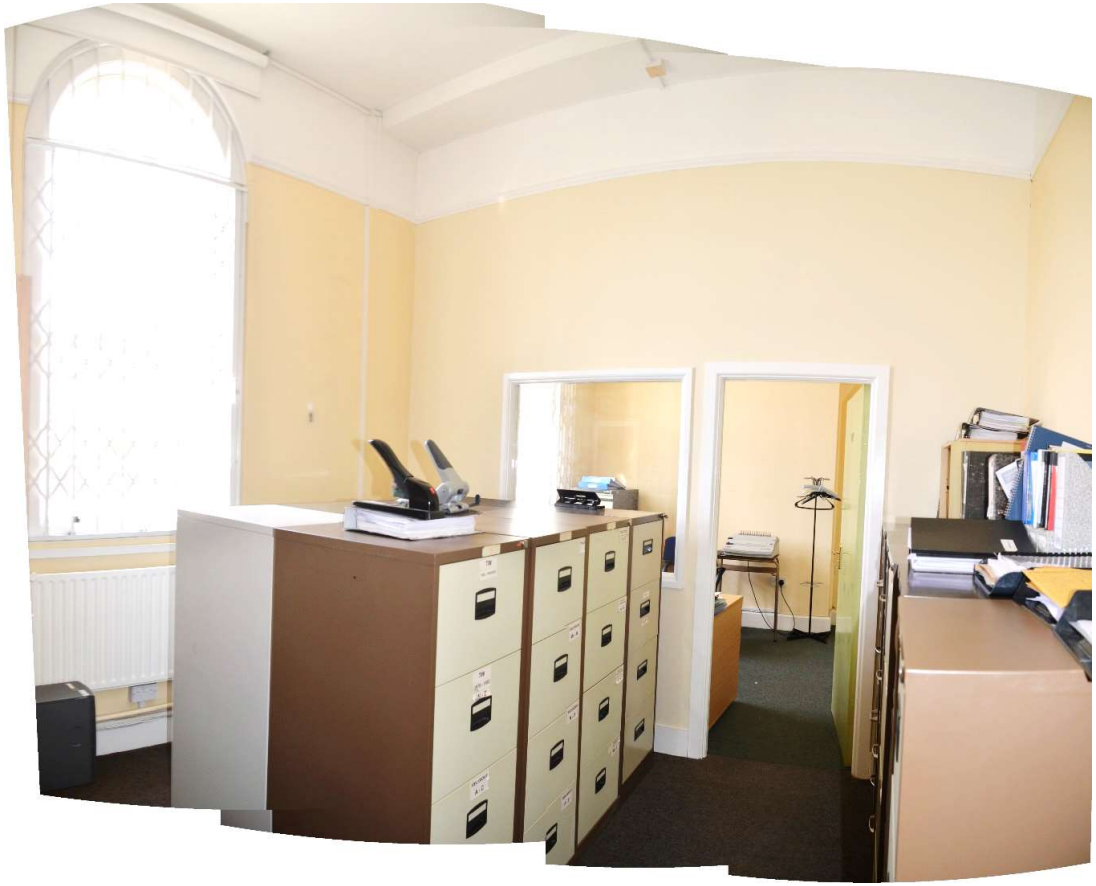
9. Room F.07

10. Room F.07

11. Room F.08

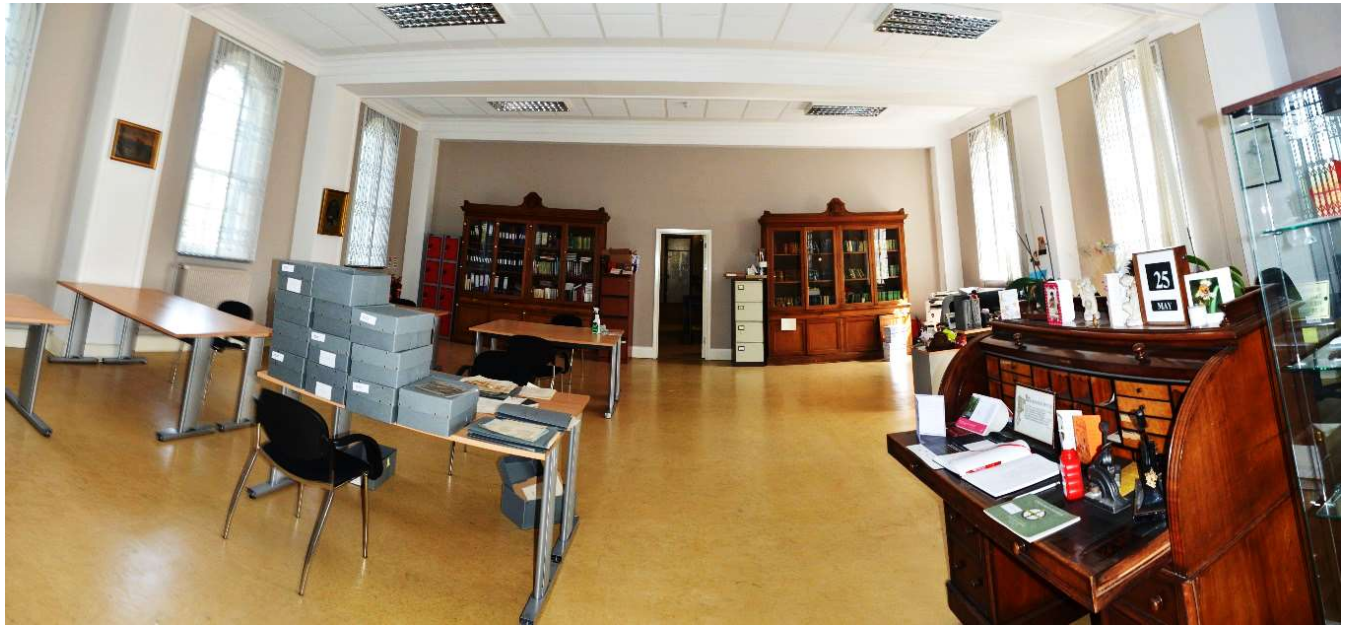


12. Room F.09



13. Room F.10

14. Room F.11



15. Room F.12

16. Room F.12

17. Room F.12

18. Room F.13

19. Room F.13

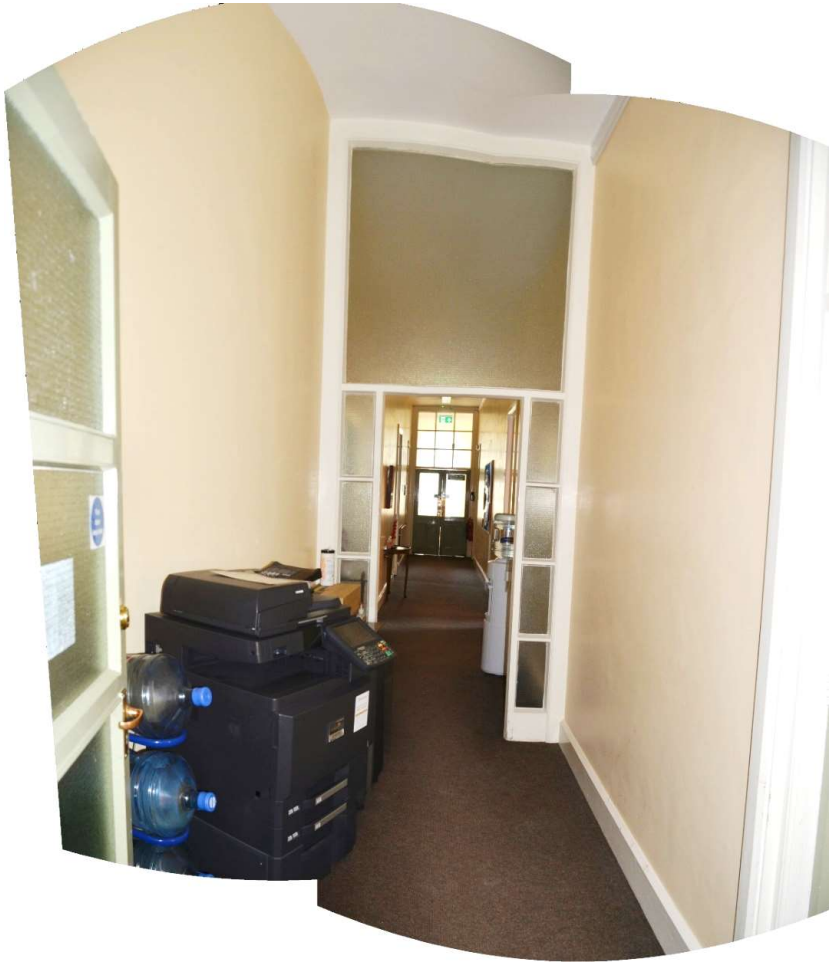
20. Room F.14

21. Room F.15

22. Room F.16

23. Room F.17

24. Room F.17



25. Room F.17

26. Room F.18

27. Room F.19

28. Room F.20

29. Room F.21

30. Room F.22

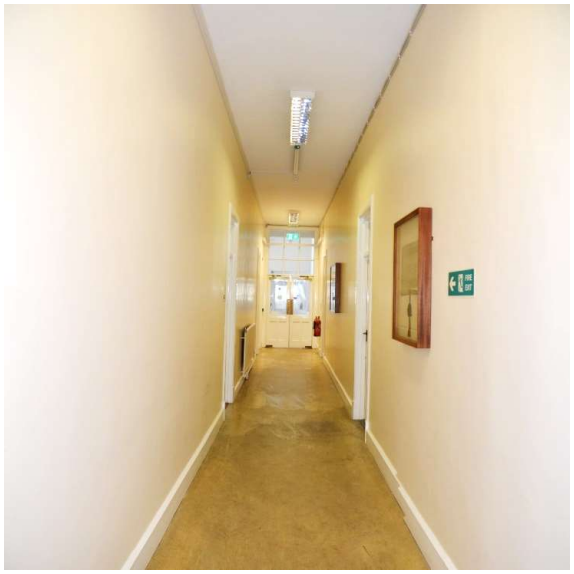
31. Room F.23

32. Room F.24

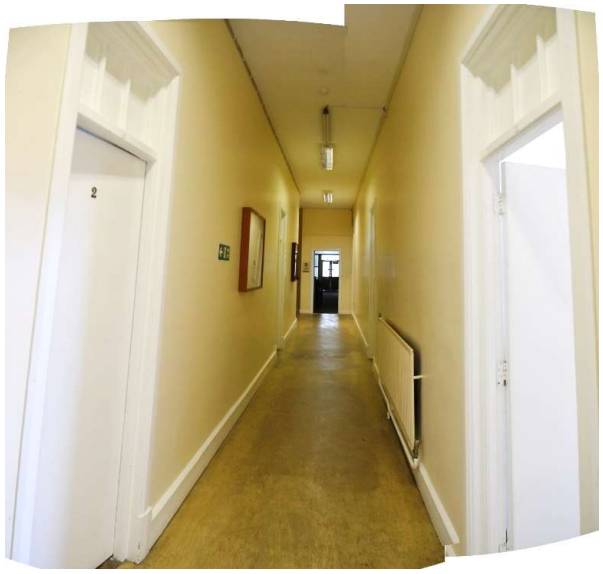
33. Room F.25

34. Room F.25

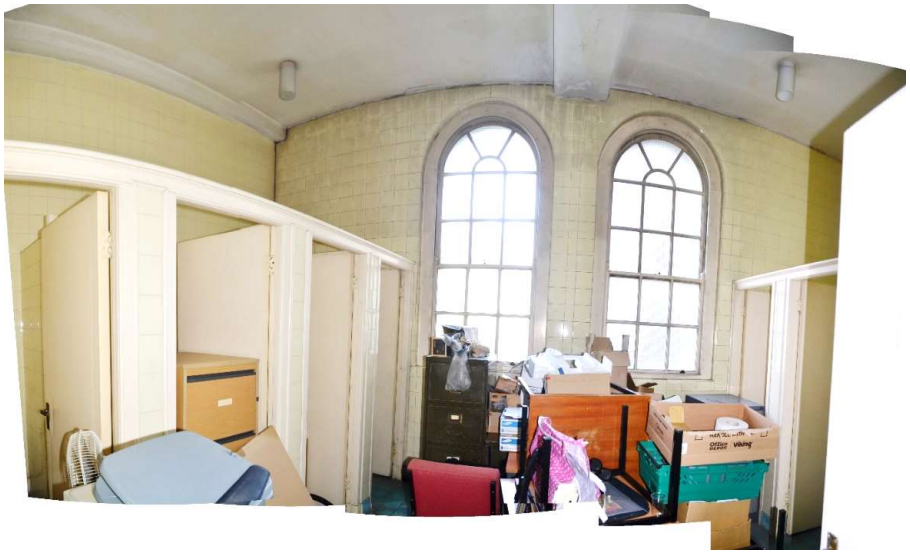
35. Room F.26



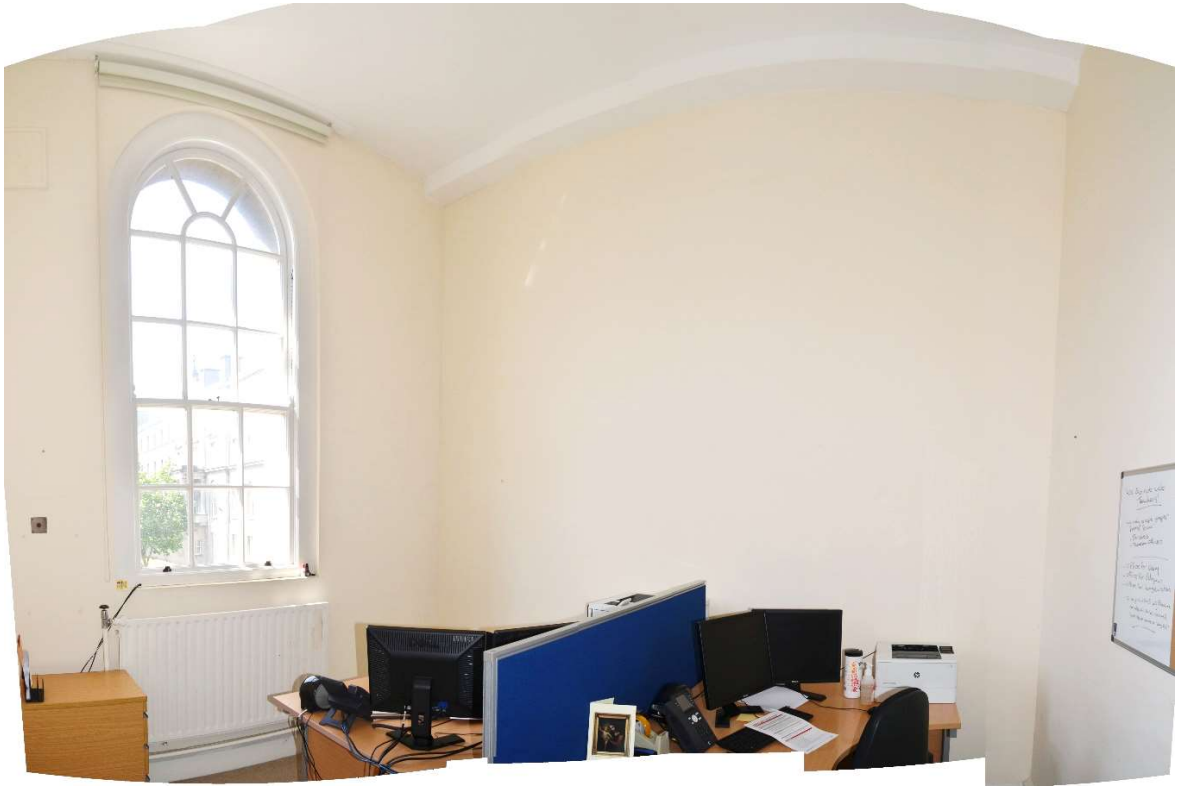
36. Room F.27



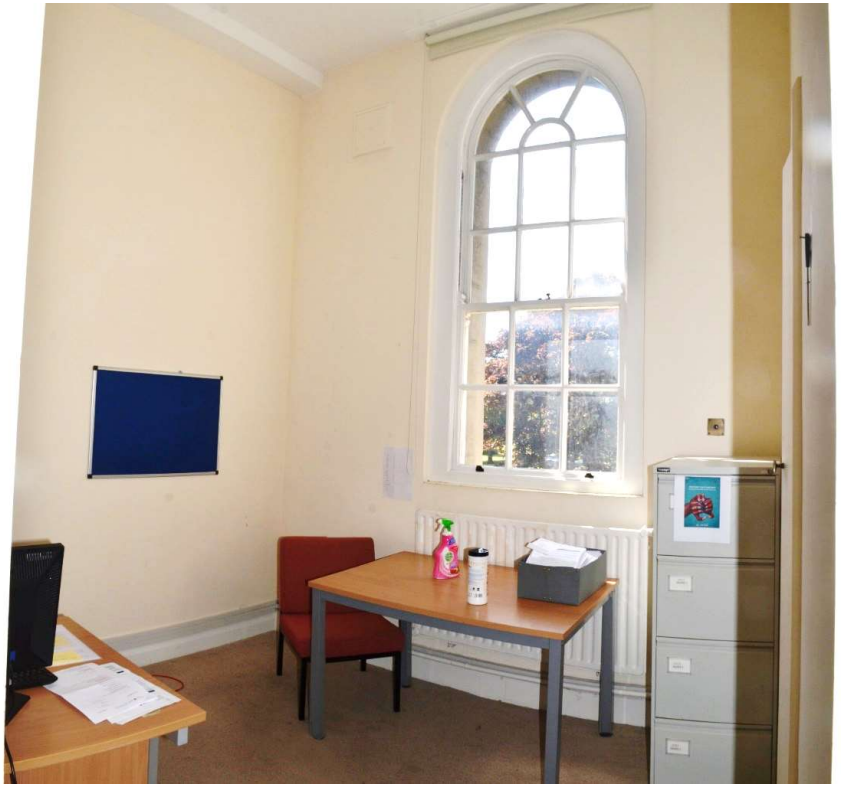
37. Room F.27



38. Room F.28

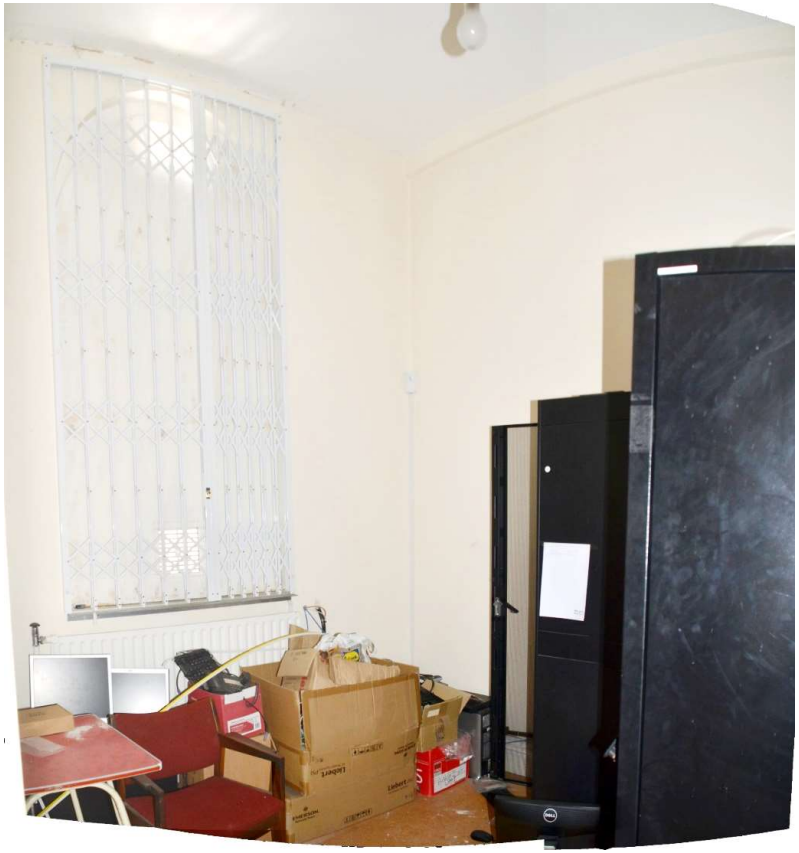


39. Room F.29



40. Room F.30

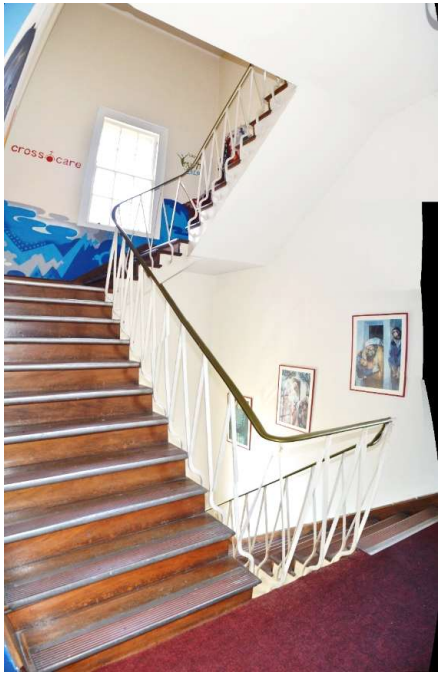
41. Room F.31



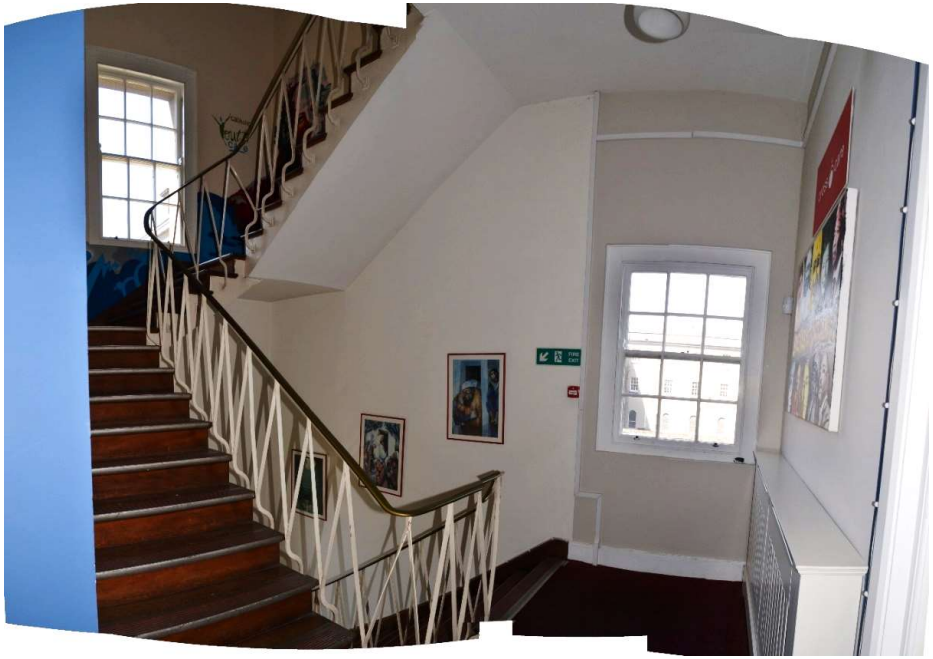
42. Room F.32

Library Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Second Floor



1. Room S.01



2. Room S.01

3. Room S.01

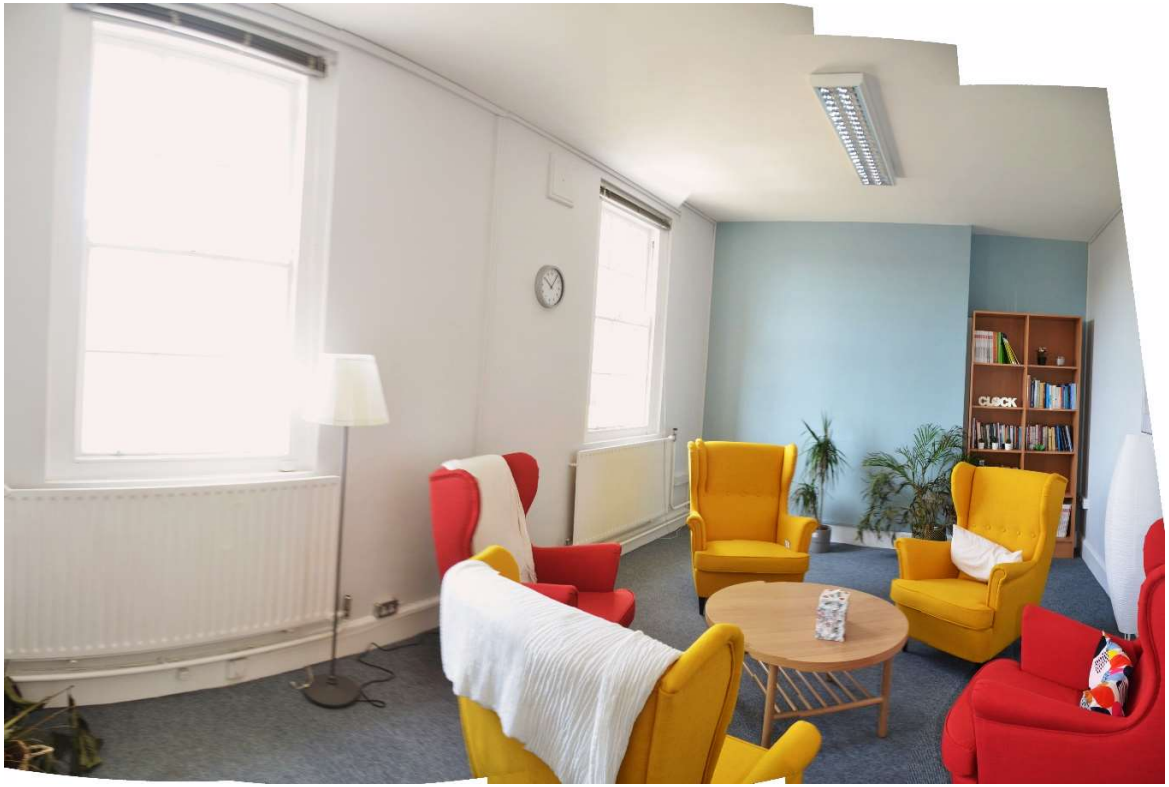
4. Room S.02

5. Room S.02

6. Room S.03

7. Room S.04

8. Room S.04

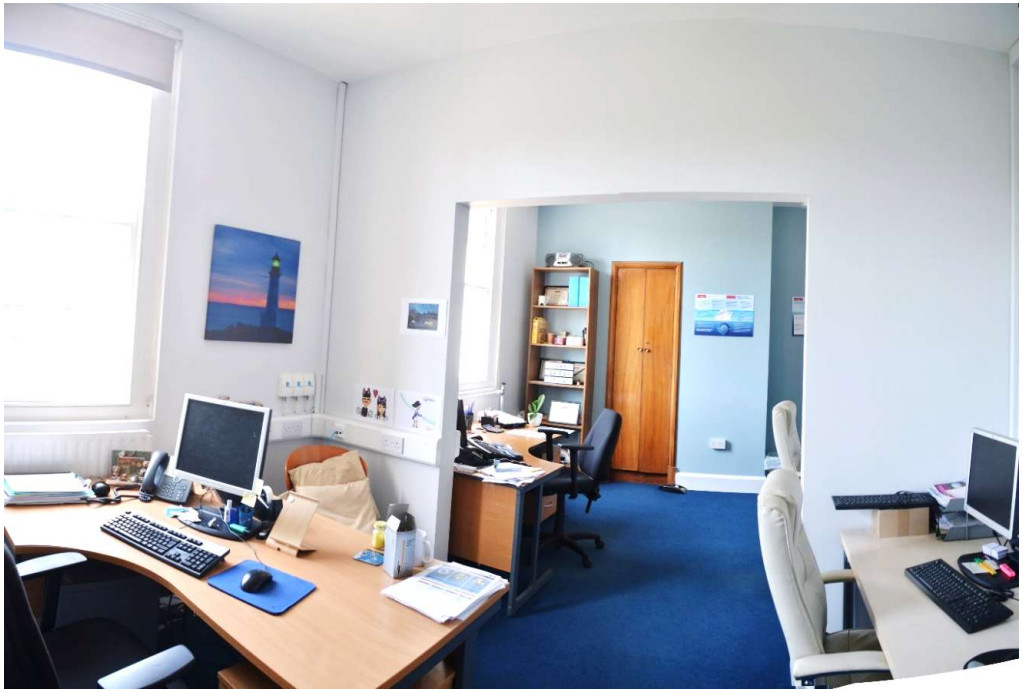


9. Room S.05

10. Room S.05

11. Room S.06

12. Room S.07



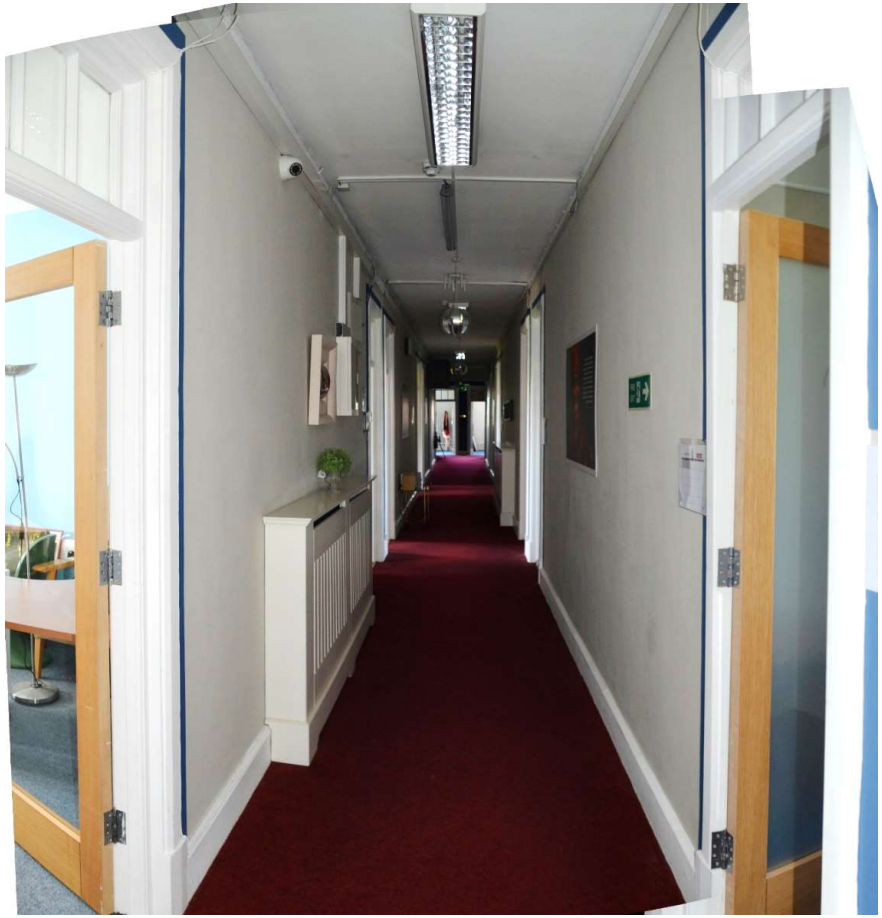
13. Room S.07

14. Room S.08

15. Room S.08

16. Room S.09

17. Room S.10



18. Room S.10

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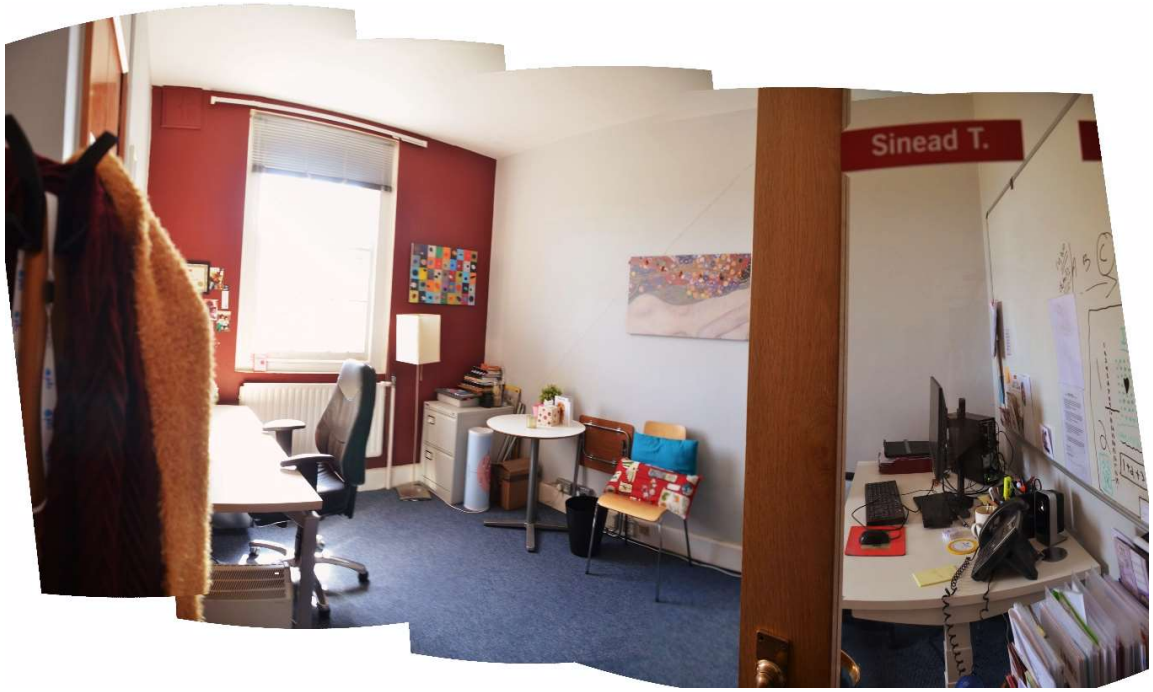

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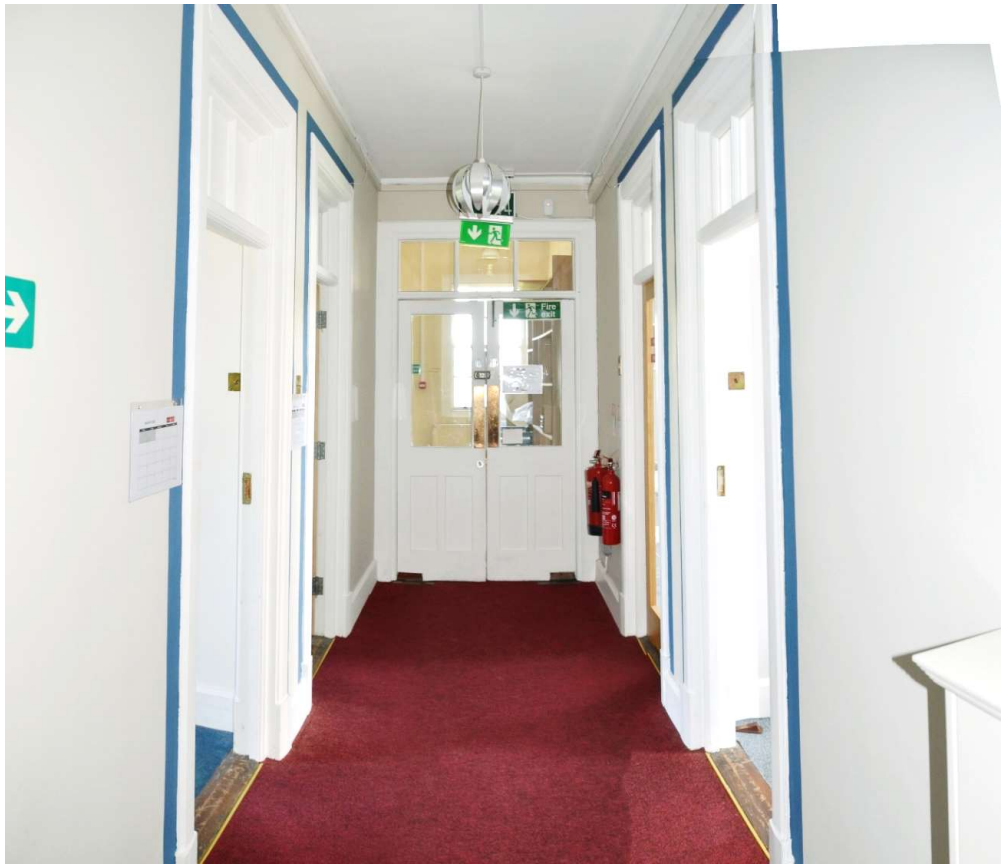

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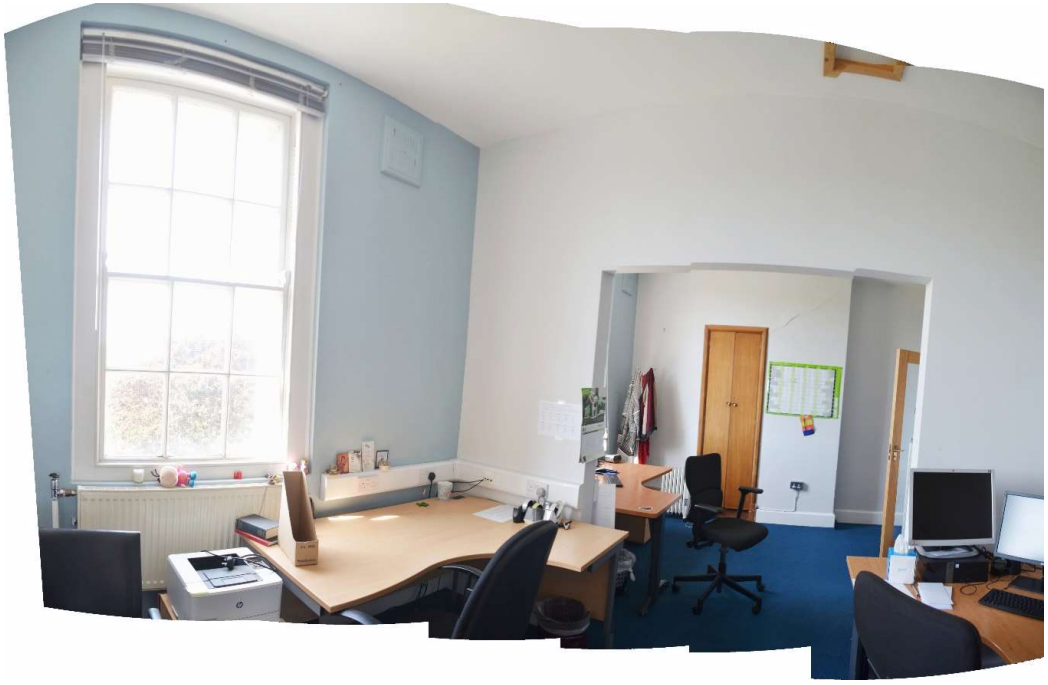

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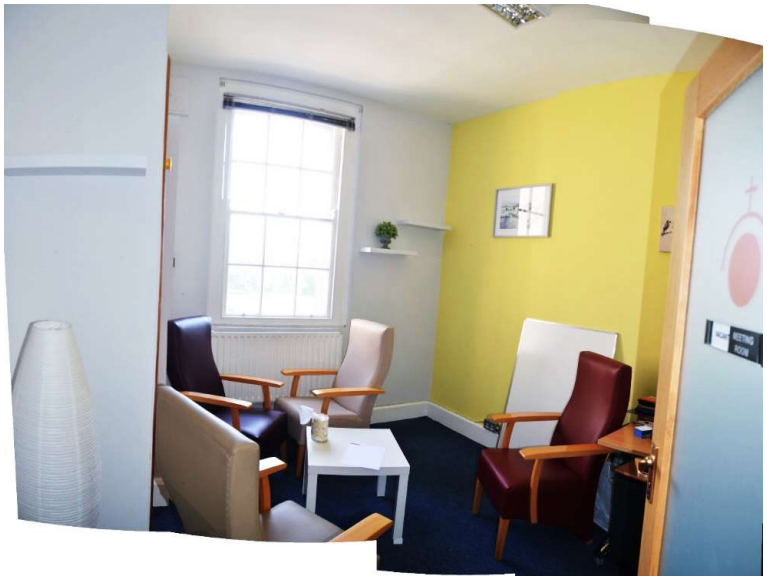

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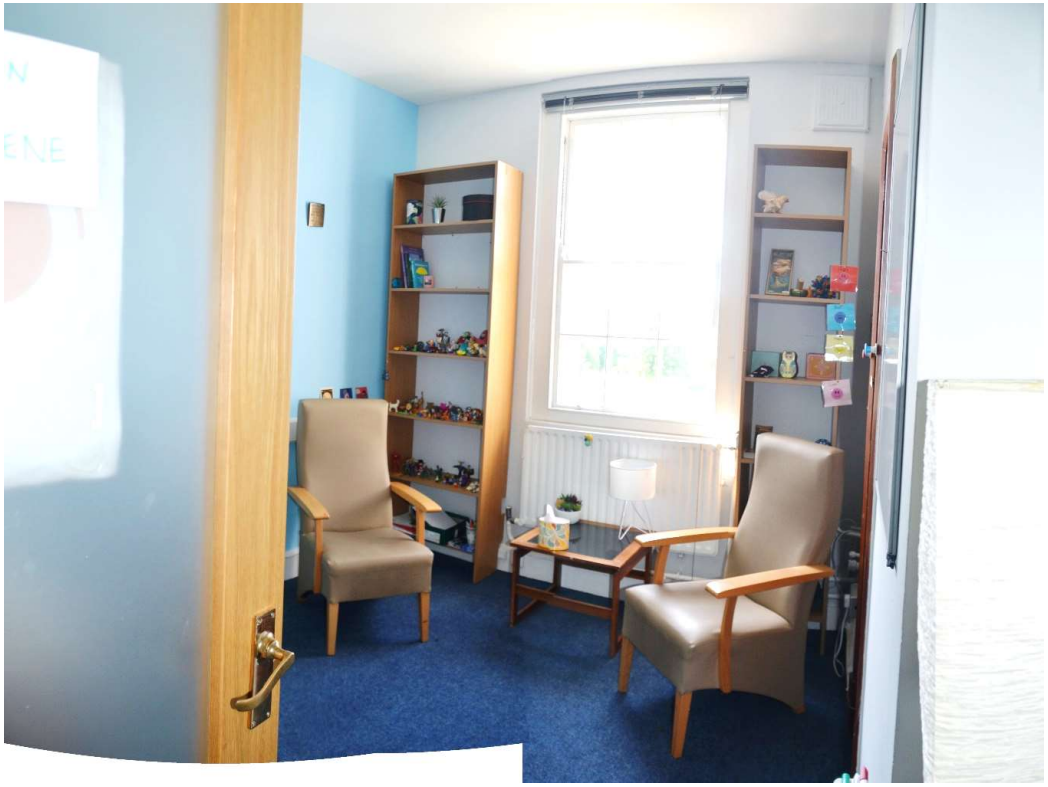
43. Room S.32



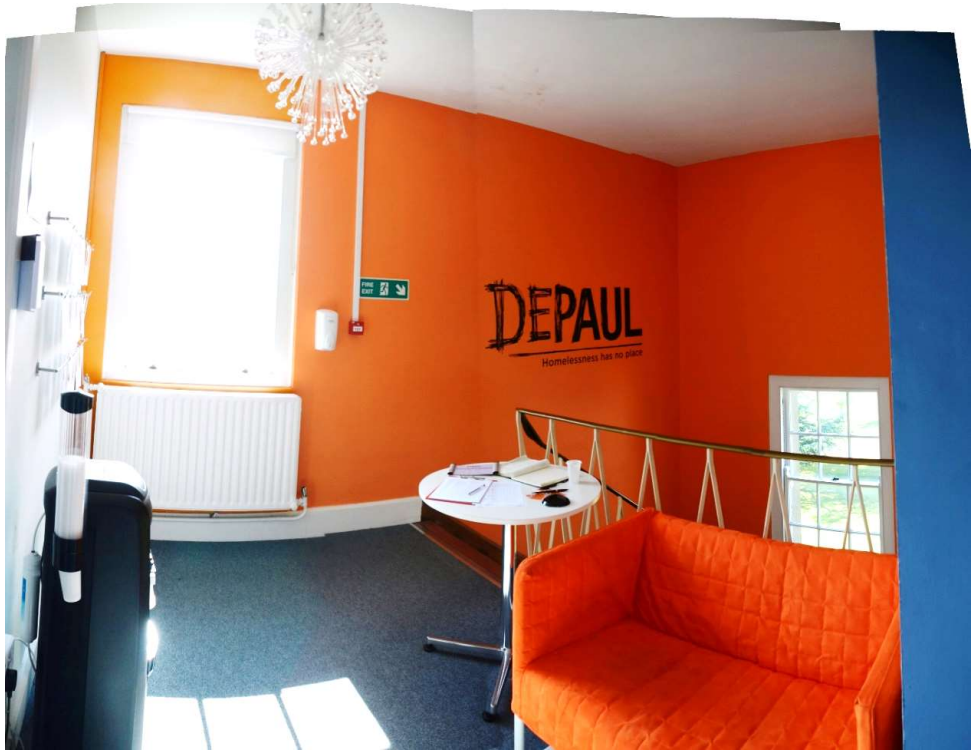
44. Room S.33


PUSH
Fire door keep shut
DO YOU HAVE YOUR KEYS ?
LEAVING THE SECOND FLOOR
STOP
• Check to see if you are the last to leave the secon or Let the last person know that you have left
• Make sure that ALL 3 doors are locked properly.

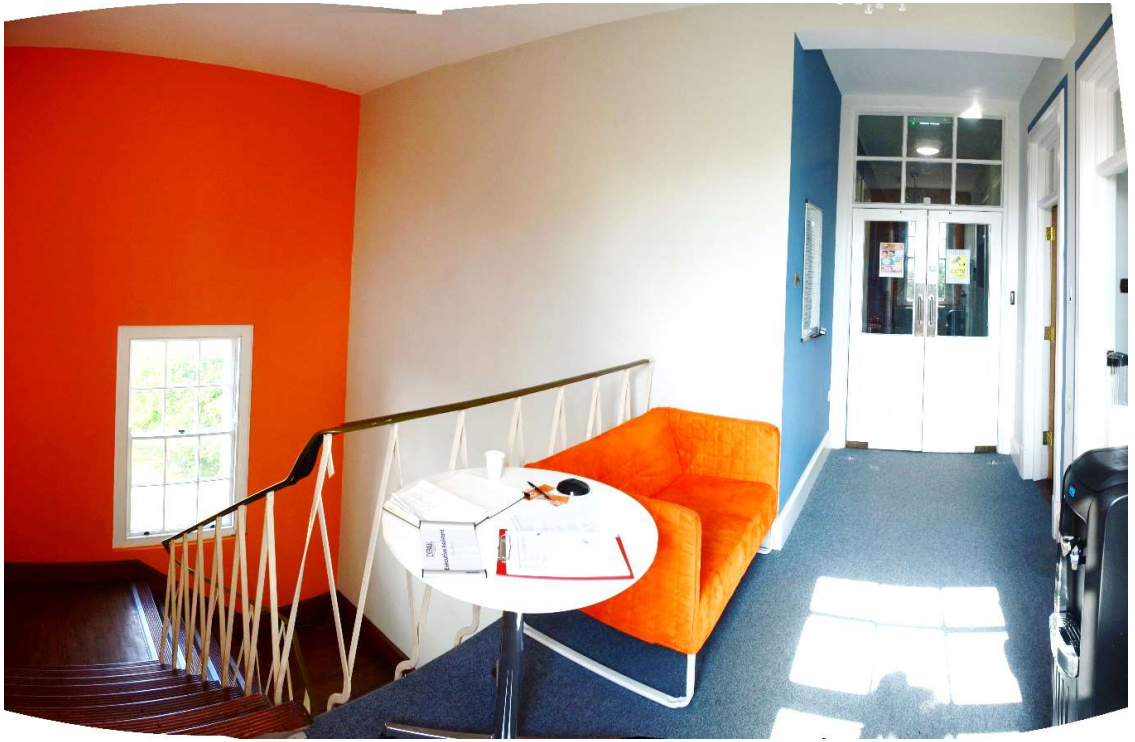
45. Room S.34

Library Wing, Holy Cross College, Clonliffe, Dublin 3.

Internal Photos – Third Floor

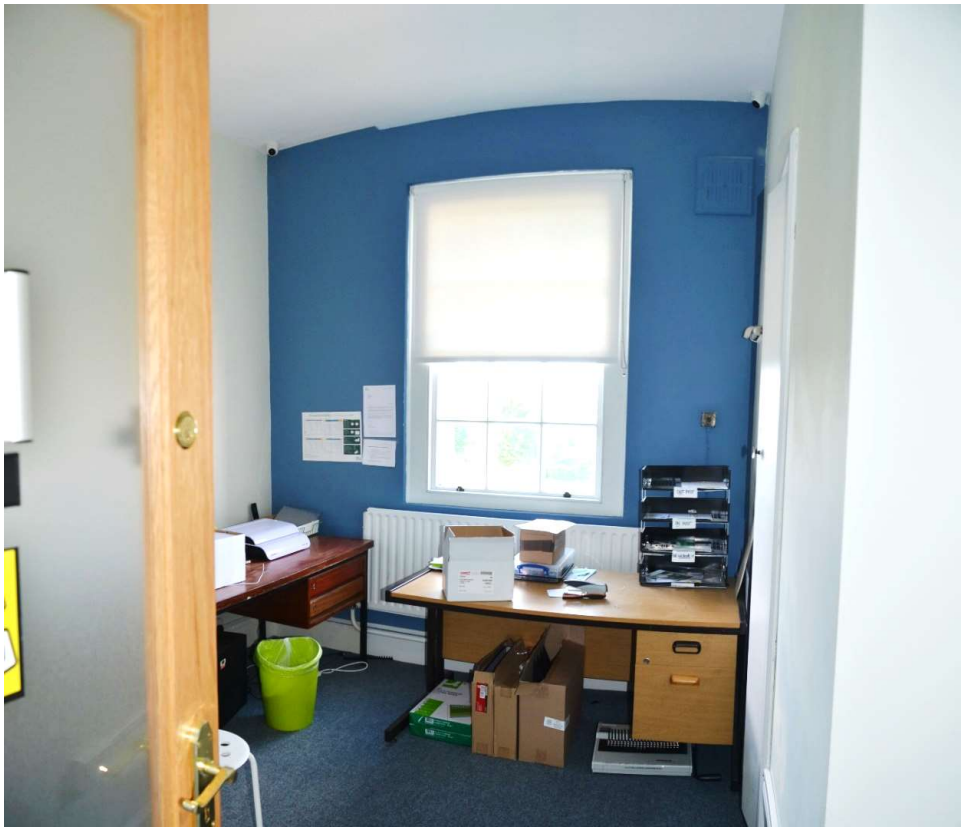


1. Room T.01



2. Room T.01

3. Room T.02



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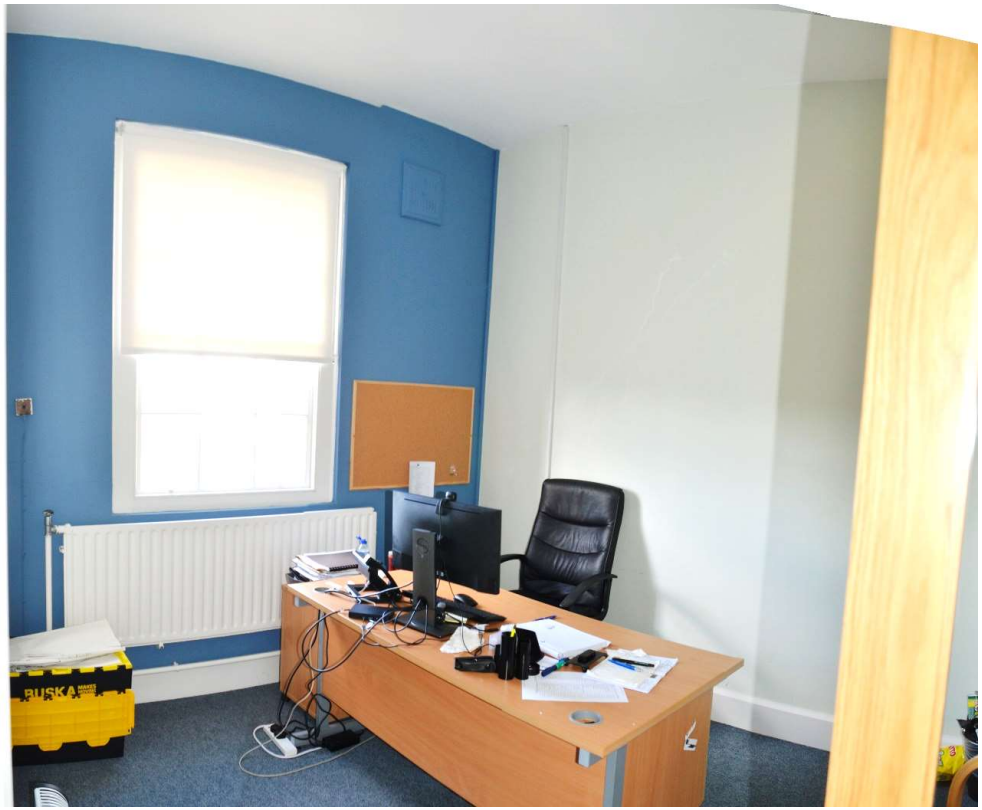

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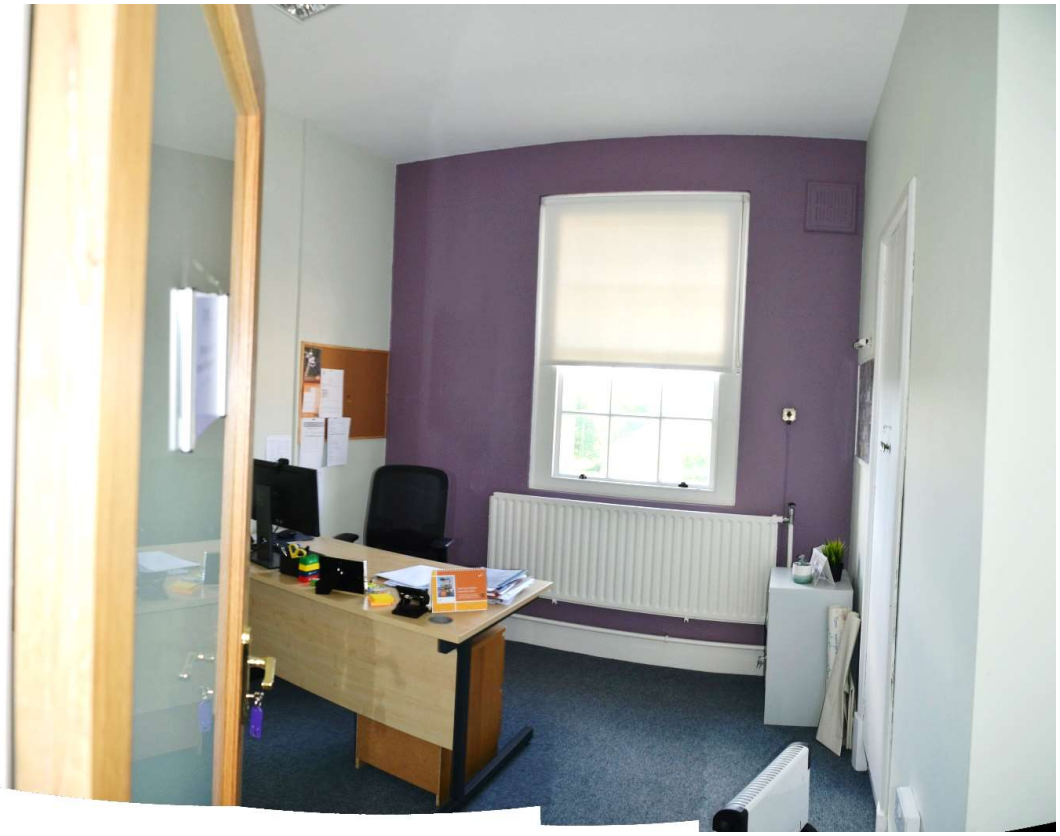
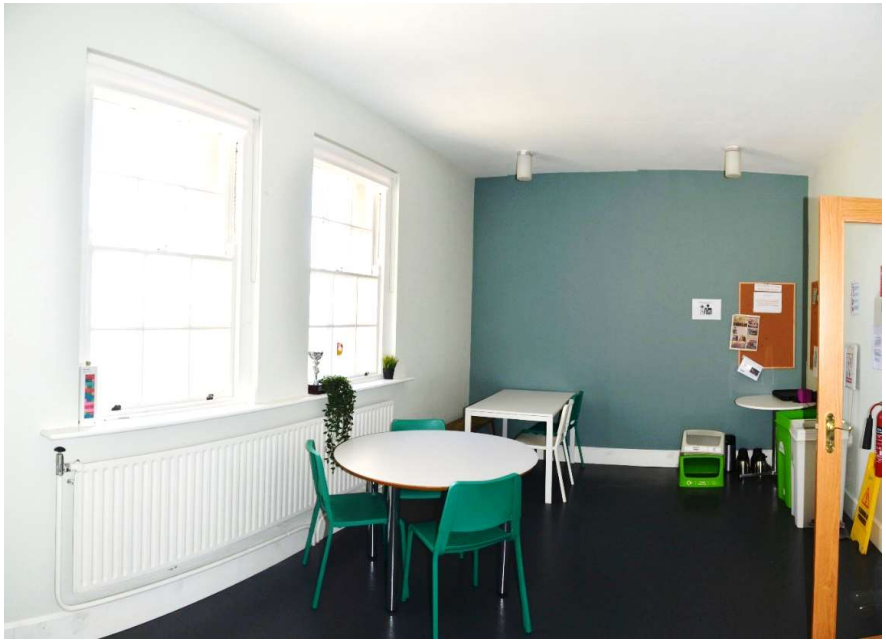


6. Room T.04A

7. Room T.05



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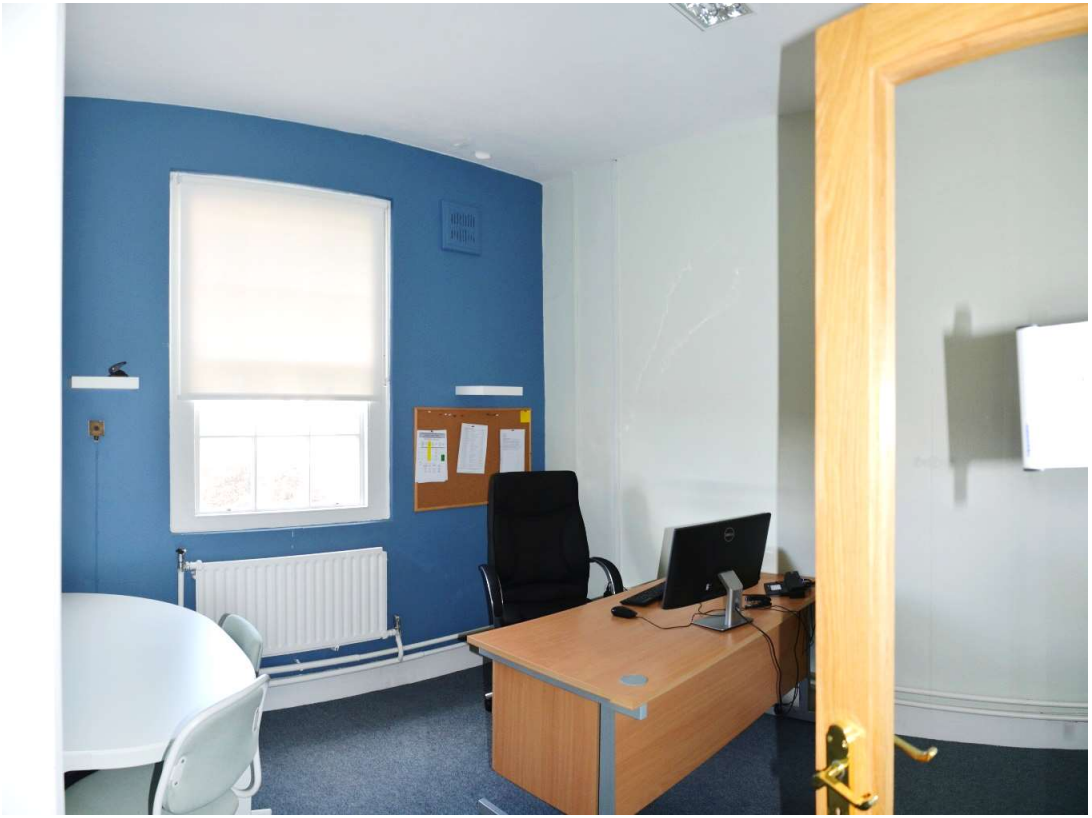

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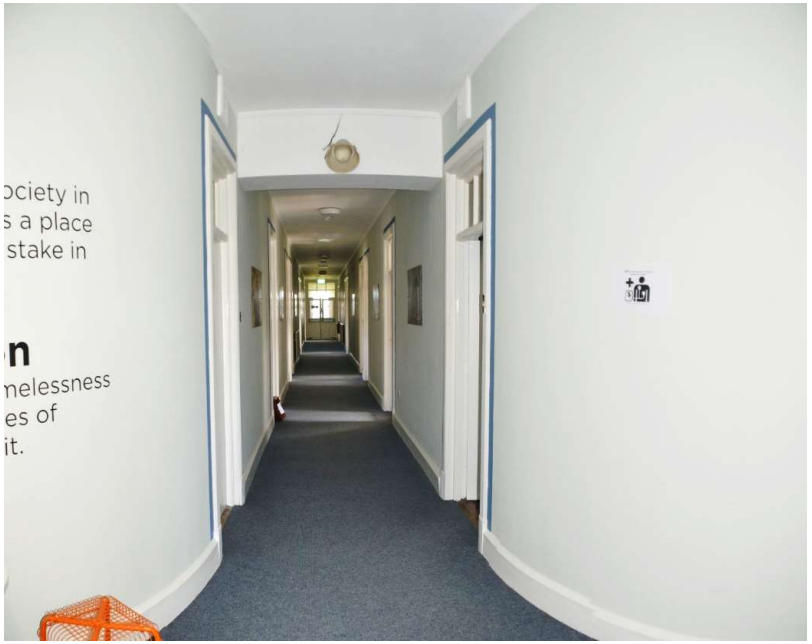
11. Room T.08

12. Room T.09



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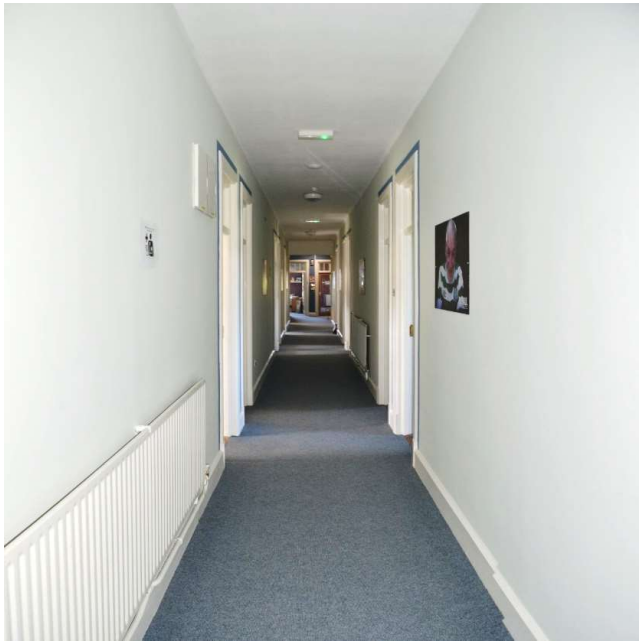

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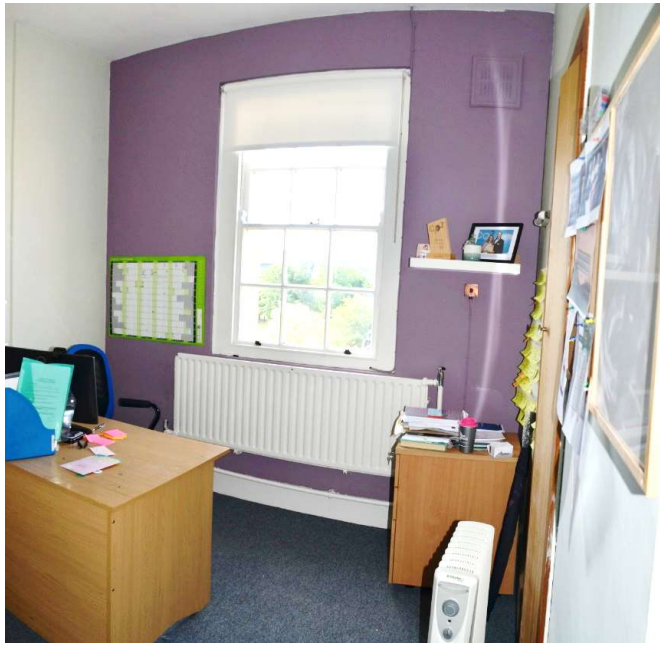

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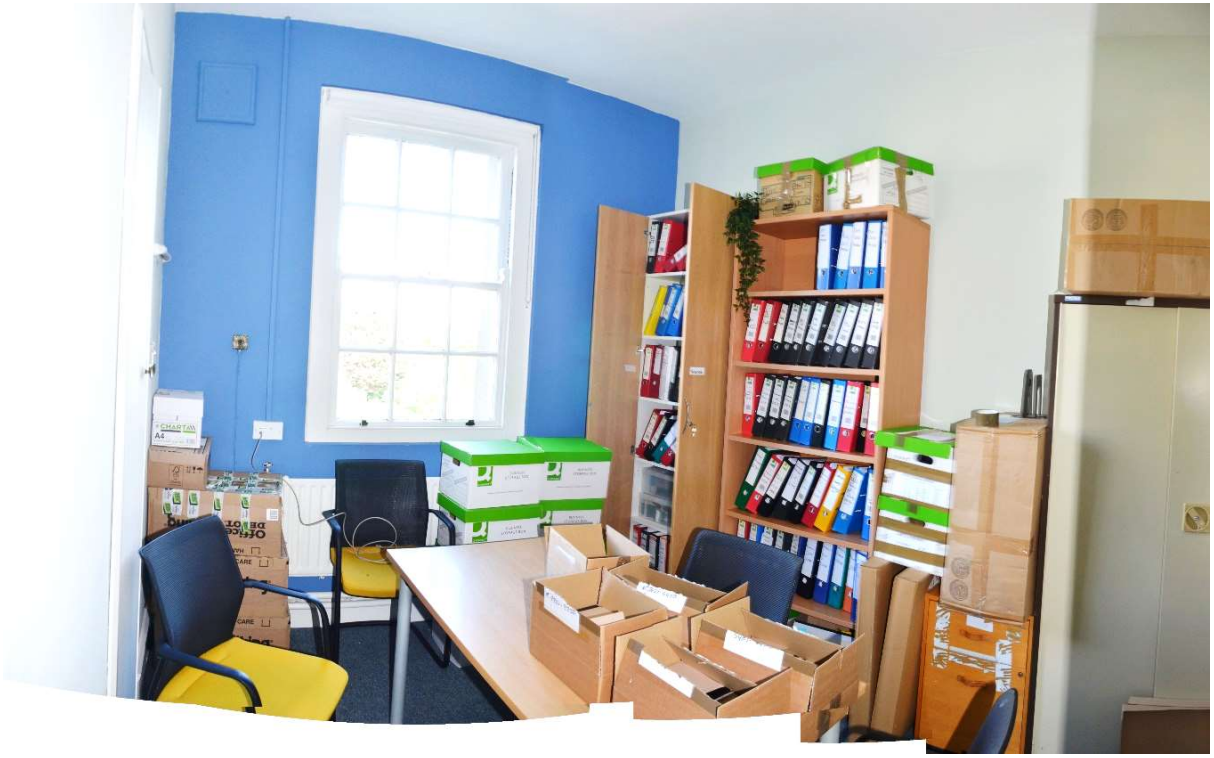

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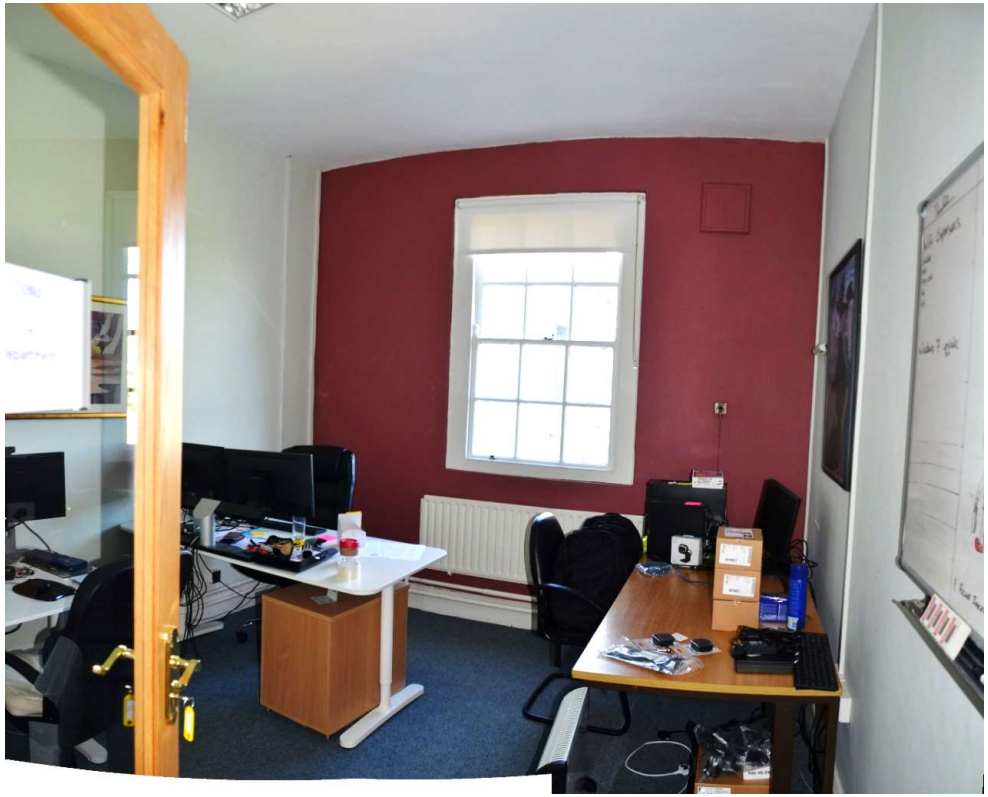

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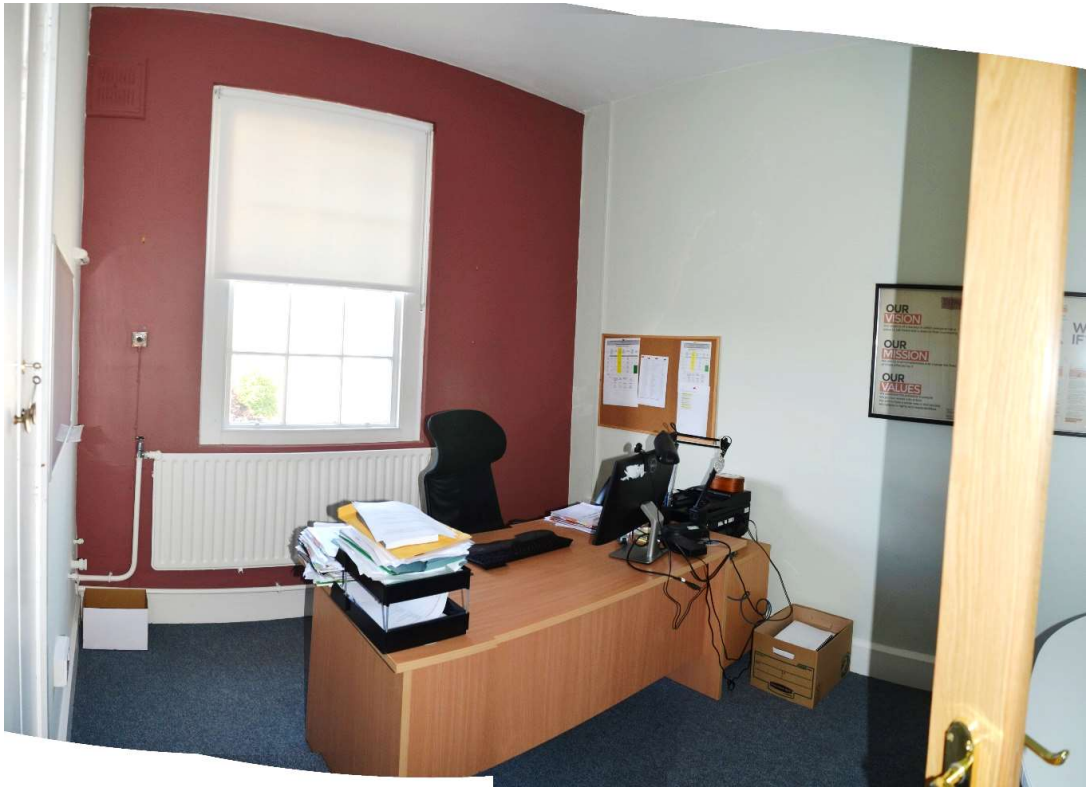

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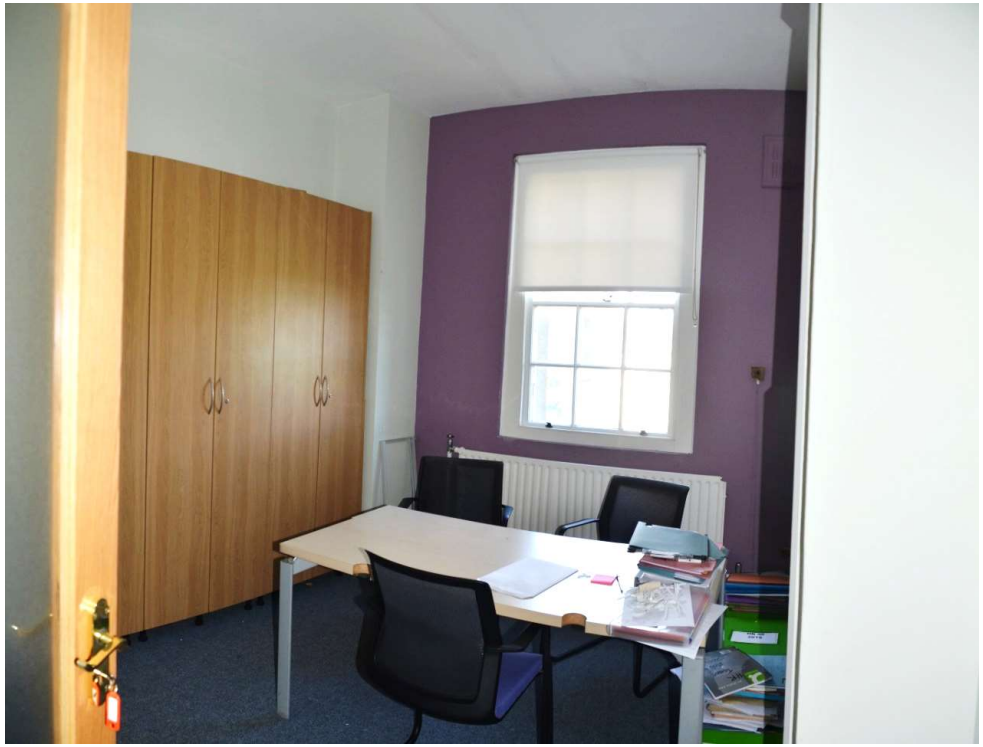

34. Room T.28

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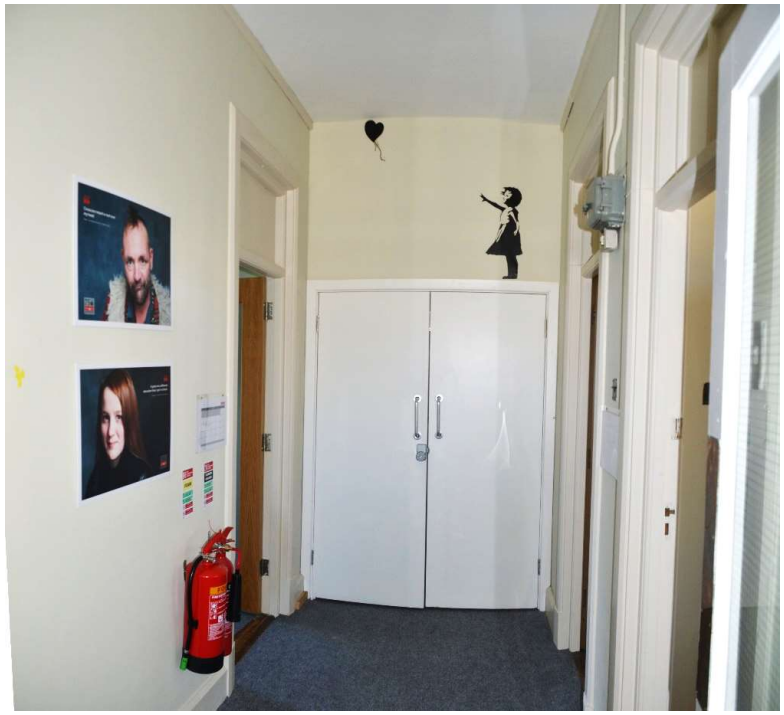
37. Room T.31



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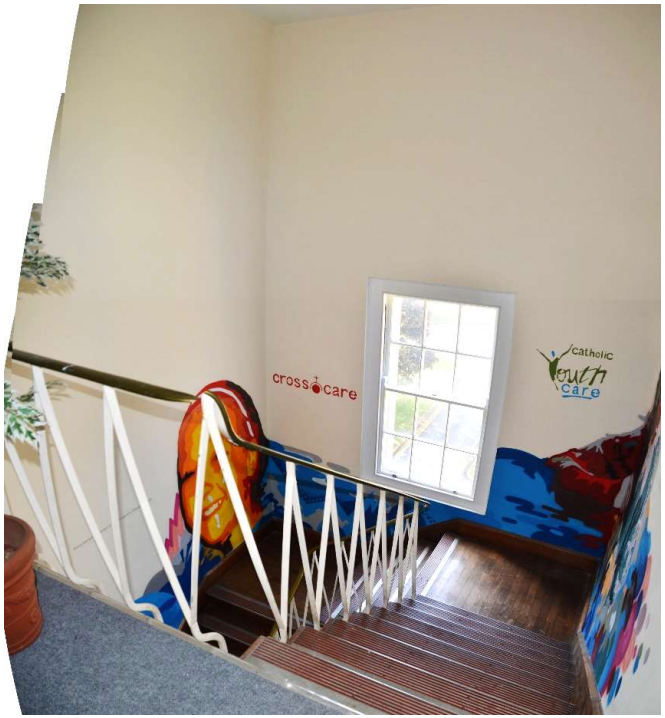

40. Room T.34

A14.11 Outline Conservation Specification

OUTLINE CONSERVATION

SPECIFICATION

FOR

WORKS TO BE CARRIED OUT

AT

THE FORMER HOLY CROSS COLLEGE

CLONLIFFE ROAD,

DUBLIN 3.

June 2021

DAVID SLATTERY – Architect – Historic Buildings Consultant
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e-mail: info@slatteryconservation.ie

CONTENTS

Section 1 Introduction

1.1. General

The works shall be carried in compliance with *RIAI Guidelines for the Conservation of Buildings* (3rd edition December 2010), and the conservation charters referenced therein, in addition to the publication *Architectural Heritage Protection: Guidelines for Planning Authorities* (as issued by the Department of Arts, Heritage & the Gaeltacht 2011).

1.2. Preliminary Method Statement

General
The Contractor will be required to prepare a detailed method statement for the works and to amend or augment this statement to take account of matters discovered during the works. He will be required to obtain the Architect's approval for the statement at each stage during the works and amend the statement as necessary to achieve the Architect's approval.

Guidance
The contractor will be advised that all works must be completed in accordance with good conservation practice and in conformity with the publication "*Architectural Heritage Protection: Guidelines for Planning Authorities – DoAHG, 2011."*

Guidance on the application of conservation practice is to be found in the following documents which shall be adhered to:

- Architectural Heritage Protection: Guidelines for Planning Authorities. Department of the Arts, Heritage & the Gaeltacht 2011.
- Archaeology in the Planning Process. (Planning Leaflet PL13) Department of the Environment, Heritage and Local Government, 2007.

Drawings and Schedules
The Contractor may be required to prepare full survey drawings of each element to be repaired before commencing, together with full size details of the various components, joints, profiles etc. etc. and schedules of the various components to enable the correct procedure for repair. A full photographic record should also be kept. In addition, the various components shall be clearly labelled and recorded on the drawings. When fully examined, the full size details of the various repairs necessary will be prepared by the Contractor before commencing any repair works and all repairs scheduled. The Architect's approval to this documentation shall be obtained at each stage before proceeding to the next stage and two copies of all such documentation shall be given to the Architect for his records.

Deviations
No deviations from the Architect's details will be permitted without prior approval. No deviation from the approved full sized drawings will be permitted without the Architect's prior approval. All dimensions as shown on the drawings shall be finished sizes unless otherwise indicated.

General Matters
All components shall be carefully examined to determine the method of assembly. All items shall be referenced and locations logged. No damage to the items shall be result from these works other than that unavoidable arising from the examination. The full records shall be handed to the Architect upon completion.

Detailed Method Statement
Based on this document and the results of the contractor's preliminary inspection, the contractor will prepare a detailed method statement covering all aspects of the works. He will be required to submit this statement to the Architect before any works is put in hands and to adjust, amend and revise the statement until the Architect is satisfied that is offers the most appropriate methodology for the works and approves the statement. It should be noted that it will be necessary for the contractor to further adjust, amend and revise the statement as works progress to take account of particular matters encountered during the works. Such alterations will be subject to the same approval process as the original statement. Once the statement, or alterations to the statement have been approved, the contractor may embark on the works, however, such approvals shall not relieve the contractor for any liability for unavoidable damage to the items.

Tests
Should the contractor feel that, in order to prepare his detailed method statement, it would be necessary to undertake test disassembly or removal operations, he will be permitted to do so with the prior approval of the Architect and under the constant monitoring of Architect's representatives. The Architect will co-operate with the contractor in designating the most appropriate items to be the subject of such tests. However, if any test is deemed to be causing damage to any item, it must be stopped immediately upon the Architect's request to do so. In such cases, an alternative item may be designated for test if the Architect deems such a course of action is appropriate.

Records
All items shall be fully recorded by photograph, highlighting all extant damage to the items and any other means considered necessary to properly record the extant appearance and condition of the items. The Contractor shall include for all costs in connection with the proper photographic recording of all necessary items including ceilings, walls, tiling, stonework and repair works to same. The contractor will be held responsible for any damage not recorded before removal or disassembly. The precise location shall be recorded and coded so each item or dismantled part of each item can be precisely located. This code shall be marked on each item or dismantled item by such means as cannot be accidentally removed but can be easily removed without blemish upon completion of the repairs at a later stage. Similarly, each individual disassembled part of an item shall be coded so that its relationship to adjoining parts can be precisely identified and recorded on drawings, photographs or other approved means. Two copies of the above records shall be handed to the Architect upon completion of these works.

Detailed Inspection
Before commencing disassembly or removal and following the approval of the Detailed Method Statement, the contractor shall very carefully examine the item to confirm or otherwise the accuracy and effectiveness of his proposed method. The Contractor's attention is drawn to the fact that items may have different methods of assembly or that individual parts may differ from those already disassembled or removed and he will be required to adjust his work methodology to accommodate these variations. He will be require to undertake such detailed inspection on a continual basis during the complete disassembly and removal operations.

Damage
Any damage not recorded before disassembly and removal or arising from disassembly and agreed with the Architect as unavoidable, shall be the responsibility of the contractor. He will be required to repair the damage at his own expense or to reimburse the Architect for the

cost of such repairs by means of deductions from any payments made by the Architect to the contractor.

Repairs
When all of the components are ready for inspection, the Contractor shall, in conjunction with the Architect, prepare a detailed schedule of necessary repairs to the shelving including re-finishing. He shall prepare all necessary full sized details to illustrate each and every type of repair and agree the details with the Architect before commencing the repair operations. All repairs shall be executed as specified later in this document. The Contractor shall note that existing repairs shall be undone and remade if the standard is not acceptable or may be left if the standard is acceptable. The repaired work shall be finished to match the original.. All softwood originally intended to be unfinished shall remain unfinished. All moving or movable parts shall be checked and repaired as necessary to ensure proper operation.

Reinstatement
Reinstatement shall be undertaken in the reverse order or removal. Great care shall be taken to ensure that each item and component is reinstated in its original location. Any damage caused by the reinstatement shall be made good or replaced at the Contractor's expense to the Architect's satisfaction. Any damage to the finishes shall be repaired in such a manner that the repair is not visible.

1.3. General Conservation Methodology

1.3.1. Protection Of Existing Structures And Materials

The Contractor shall ensure that no damage occurs to the Existing Structures as a result of the execution of the Works.

1.3.2. Protection Method Statement

The Contractor shall prepare a site specific method statement detailing the proposed protection measures to be implemented in respect of the Existing Structures. This shall include, as a minimum, details of the following:

- Measures to ensure protection of the existing roof structure and materials during the course of the Works;
- Measures to ensure protection of existing building fabric, both external and internal, during the course of the Works;
- Measures to prevent water ingress during execution of the Works;
- Proposed method of access to roof Areas – both during the Construction Period and Service Period;
- Measures to ensure the stability and protection of Existing Structures during repair and replacement works to the structural fabric of the Existing Structures; and
- Details of other measures required to address Site specific issues.

The Conservation Architect shall review all such method statements for compliance with conservation best practice.

1.3.3. Protection And Storage

The Contractor shall ensure that retained floors along the main construction route must be protected.

Storage of builder's equipment and materials must be in designated compound Area/s. While works are underway, equipment and materials being transported around the Project Facility, temporarily stored and used, must be carefully positioned so that retained historic fabric and surfaces are not damaged.

1.3.4. Movement Of Equipment And Material

Transport & erection of scaffolding poles / planks pose a particular threat to fabric. These and all long items such as floor boards must be carried by minimum of two operatives at all times to ensure no damage and impact to fabric.

Loading
Positioning of any removed or stored materials shall not overload the existing structure.

Fixing to Historical Fabric
Scaffolding and working platforms must be independently supported and may not be fixed to the Existing Structures. Full plywood protections must be provided between scaffolding supports and retained historic flooring / paving of Existing Structures.

Specialist Contractors
The Contractor shall ensure that all parties engaged to undertake works to Existing Structures are competent to undertake the elements for which they are engaged. Contractors must have the relevant training and experience to carry out specialist works within historic buildings.

1.3.5. Works Methodology

The Contractor shall prepare a Site specific method statement detailing the proposed methodology and sequencing to be implemented in respect of the retained fabric of the Existing Structures.

The methodology shall also describe how mitigation measures set out in the conservation impact assessments forming part of the Planning Decision are complied with.

1.3.6. Recording

The Contractor shall clearly and comprehensively record all Areas opened up within Existing Structures through the use of good digital photographs (minimum 10.1MP). Photographs shall record all principle features uncovered including architectural and structural elements, service routes, chases, floor voids and areas that will be closed up. As-built record drawings are to be provided to the Authority at the completion of the works including with referenced digital photographs.

1.4. Extent of Conservation Works

The following is a outline of the work to be carried out. Please refer to drawings, schedules and specifications for more detailed descriptions of the proposal.

The areas for the relevant works are identified on the drawings by McCullough Mulvin Architects. Following is a summary of the proposed conservation works –

- Repair and conservation of the external render to the Main Seminary Block, College Church, South Link Building, Assembly Hall and Ambulatory
- Repair and conservation of surviving historic decorative plasterwork
- Localised repairs to the roofs of the Main Seminary Block, College Church, South Link Building, Assembly Hall and Ambulatory
- Taking down of the existing entrance at Clonliffe Road and reconstruction of the gate posts in a new location, using the existing brick
- Taking down of the existing entrance at Drumcondra Road and reconstruction of the gate posts in a new location, using the original stone
- Repair and conservation of historic metalwork, including decorative railings to the surroundings of the Church, and the gates at the Drumcondra Road
- Repair and conservation of surviving historic timber windows
- Repair and conservation of surviving internal joinery

The works will also include for the careful taking down, removal and salvage of items of architectural/historic/artistic or other interest which will not be retained within the proposed scheme. This includes:

- All fitting and fixtures in the Oratory at the Ground Floor of the New Wing
- All surviving mid-century cast-iron radiators in the New Wing
- Decorative plaques at the stair hall of the New Wing.
- All decorative features within the College Church which will be retained by the Church

Section 2 Specifications

2.1. Internal Plasterwork and Works to Ceilings

2.1.1. General

Specification

Lath and Plaster Ceilings
Services may not be pulled over or laid on top of lath and plaster ceilings or decorative plaster mouldings. All services within voids above lath and plaster ceilings shall be supported from the structure above.

Measures shall be put in place to ensure that retained ceilings are protected from above when floorboards are lifted.

Plaster Removal
Care is to be taken where removing existing modern plaster internally to historic masonry, or adjacent to historic plaster, not to damage substrate.

The Contractor shall ensure that removal of defective or damaged lime plaster to masonry is to be carried out in such a way that the absolute minimum necessary amount is removed.

Removal of lime plaster to areas of lath is to be carried out in stages in such a way that the plaster is removed leaving lathing in position. Where sound lathing shall be retained, re-fixed in position, accurately cut if necessary and re-plastered. Lath and plaster must be carefully cut at cornices so that cornices are not damaged.

Plaster Repairs
Must be carried out by suitable experienced crafts people, working under the supervision of the Conservation Architect.

Materials

Cement
Cement for plastering work to be as previously specified.

Sand
Sand for rendering beds and backings shall conform to B.S. 1699.
Sand for finishing shall be fine plastering grade sand.

Lime
Lime shall be hydrated lime and shall comply with I.S. 8. Lime for lime putty shall conform to B.S.890 (Clause A) and shall be run into lime putty and matured for at least three weeks before required for use.

Water
Water shall be clean, fresh and free from organic matter. River water shall not be used.

Beads
Stop beads shall be galvanised mild steel by Expamet Ltd. or equal approved.

Timber formers
Timber formers to arrises and the like shall be 25mm diameter hardwood.

Expanded Metal Lathing
Expanded Metal Lathing for internal use shall be galvanised mild steel 'Riblath' or equal approved.

Plasterboard
Plasterboard shall be gypsum based, securely fixed to substrate.

Scrim
Scrim shall be 100mm wide jute to Architect's approval.

Bonding agents shall be of a type recommended by the manufacturer of the plaster, or other approved.

Workmanship

General
All materials shall be delivered to the site in their original packages bearing the trade name of the material concerned and shall be stored off the ground, under cover and away from all source of damp.

Store cement, lime and gypsum plaster separately by different types, off the ground, in a dry, well ventilated space.

Use cement in rotation within three months of delivery.

Lime putty shall be matured for at least one month before use.

Internal plastering shall be carried out strictly in accordance with BS 5492:1990

Workmanship
Do not begin work until:

(1) All required openings, chases or other apertures have been cut,
(2) All pipes, fixtures, fixing pads and plugs have been fixed,
(3) All making good has been completed.

Protection
Protect all existing work and approaches, with boards, dust sheets, etc. All droppings on to finished work to be cleaned off immediately. Protect all concrete surfaces from contamination by gypsum plaster.

Cleanliness
Ensure that all plant and tools are kept clean and free from previous mixes.

Scrubbing
Remove all traces of mould oil, paint, grease, dirt and other materials incompatible with plasterwork by scrubbing with water containing detergent.

Scudding
Throw onto surfaces scudding of cement-sharp sand (1:3) and leave rough. Keep wet with fine water-spray until set and allow to harden before applying undercoat.

Protection
Protect surfaces to be coated from weather, to ensure that they are reasonably dry before starting work.

Solid Backgrounds
Before coating, adjust porosity to give uniform suction.

Gauge Boxes
Measure plaster constituents by volume, using gauge boxes made to sizes to suit volumes required. Overfill gauge boxes and strike off excess material with a straight edge.

Contamination
Avoid contamination of one type of plaster by another.

Mix
Mortar thoroughly so that individual constituents are incorporated evenly, and to a consistency suitable for the particular plastering work.

Wash Out
Mixer four times daily if in continuous use, and after each batch if mixer is used intermittently, or if a different constituent is used.

Discharge
Mixes onto a bunker or onto barrows.

Do Not Use
Discard mixes after initial set has taken place. Re-tempering or reconstitution of mixes will not be permitted.

Admixtures
Do not use admixtures without prior approval.

Beads and Stops
Fix plumb, square and true to line and level. Protect cut edges with black tar based paint.
Fix beads to solid backgrounds with plaster dabs each side at 600 centres or less.
Fix beads to timber supports with 38mm clout nails each side at 600mm or less.
Fix rounded arris and panel beads by cross nailing.

Junctions
At junctions in the same plane between differing wall backgrounds fix 1 length metal stop beading to each side with plaster dabs.

Projections
Hack off projections.

Chases
Cover all service chases with expanded metal lath, fixed both sides with plaster dabs at 600mm centres maximum. Cover all conduit not chased in with scrim bedded in finish coat mix, pressed flat and trowelled in.

Brushing
Remove efflorescence, laitance, dirt and other loose material by thoroughly brushing.

Dubbing Out
If necessary to correct inaccuracies, dub out in thickness of not more than 10mm in the same mix as first coat. Allow to dry out before next coat is applied. Cross scratch surface of each coat immediately after set.

2.1.2. Lime Plaster

Plaster Mixes
Sand for render shall conform to BS 1200 and shall be non-staining. Lime shall be as previously specified. Sand for use in the preparation of Course Stuff shall be as specified in that section. In particular, the Contractor shall ensure that the sands do not contain any material that would tend to retain water or slow the natural drying of the render thus interfering with the proper carbonation of the lime.

The Contractor shall refer to the relevant Technical Guidance Documents published by Historic Scotland for guidance on the proper preparation and use of lime and ensure that the methodology implemented on site complies with their recommendations.

Mixes for scudding, scratch coats, base coats, etc., shall be defined by volume and unless otherwise indicated shall be one part lime putty and 3 parts sand, prepared from Coarse Stuff or Fine Stuff as specified below. The mix for finishing coats shall be one part lime putty and 3 parts sand prepared from fine plastering sand, as approved by the Architect.

The Contractor shall note that he will be required to match the render to an area sound original render selected by the Architect as regards colour, texture, surface finish, grading of grains etc.

Preparation of Course Stuff and Fine Stuff
Sand for plasters shall generally conform to B.S. 882 and 1199/1200 and the Technical Guidance Documents published by Historic Scotland. The particles shall be sharp and angular and samples delivered to the Architect for approval before work is put in hands. The Contractor shall note the requirement to match the original plaster type and finish extant on the buildings. To this end, the Architect will indicate an area on the building which will be the standard for the finish which the Contractor will be required to replicate.

For Coarse Stuff it shall be graded as the table below:

Sieve Size	% Particles passing
5.00mm	95%
2.36mm	80%
1.18mm	60%
0.60mm	35%
0.30mm	22%
0.15mm	7%

Hydrated lime shall comply with I.S.8. Lime for lime putty shall conform to B.S.890 (Clause A) and shall be run into lime putty and matured for at least one month before required for use and obtained from an approved source.

Lime Putty:
If the lime putty is delivered in 25kg tubs, it shall be allowed to stand undisturbed for 48 hours before use to allow the fines to settle. Any limewater on top of the tubs when opened shall be carefully decanted and stored for possible use.

Coarse Stuff and Fine Stuff:
Coarse Stuff and Fine Stuff shall be prepared by thoroughly mixing the lime putty and sand. The mixing operation is critical and compression will be required - a roller pan mixer is advisable as the normal rotary drum mixer does not provide the necessary compression. The proportions shall be 1 parts of lime putty to 6 parts sand, by volume which may be adjusted to suit the individual sand with the Architect's approval. There should be adequate water in the lime putty for mixing provided sufficient compression and / or beating and chopping is provided during mixing. If additional water is required, the decanted limewater shall be added in small quantities under strict control. The actual proportions of lime / cement to sands may vary depending on the particular characteristics of the sands. This shall be determined by test and on-site trials.

The mixed Coarse Stuff and Fine Stuff shall be set aside to mature, stored in air-tight containers or a heap covered with hessian or straw etc., kept moist at all times and the air excluded, for a minimum period of 3 weeks.

Knocking up:
When required for use, the coarse stuff or fine stuff shall be taken from storage and re-mixed until such time as the workable material has returned. This may be achieved successfully in a rotary drum mixer or by hand. Any material that has dried or shows any signs of carbonation shall be discarded before the knocking up commences. It should be noted that hand preparation will require a minimum of 15 - 20 minutes for proper mixing and to ensure the proper workability of the mix is achieved without the addition of any water.

In general, it should not be necessary to add additional water to achieve a workable mixture, but if such addition proves necessary, the stored limewater shall be used in small quantities using the minimum to achieve a workable mix. The Contractor shall note that if the mix is too wet when used, this will contribute to crazing and shrinkage cracks. All work that exhibits any such defects, be they the result of too much water, improper preparation, application, aftercare or from other cause, will be required to be removed and replaced at no cost to the Employer.

Coarse Stuff or Fine Stuff should only be gauged with white cement in quantities that can be used within 30 minutes. Any gauged mix not placed within this time shall be discarded. On no account shall the mixture be knock-up and used after this time.
Where the mortar is required to be black in colour, Lamp Black, or other approved natural colorant, shall be used in sufficient quantities to give the required colour.

Hydraulic Lime
Should the Contractor desire to use hydraulic lime to replace the non-hydraulic lime or cement in part or in whole, he will be required to submit at method statement to the Architect for his approval. This statement shall be modified as necessary to obtain approval before the works commence and it is likely that sample panels will be required. Only hydraulic lime from an approved source will be permitted and the Contractor will be required to submit certificates confirming that no cement has been used or added to the powder. Hydraulic lime shall be delivered in bags with the manufacture's name, the contents and use by date clearly marked on the outside. It shall be stored under similar conditions as for cement. All mixes

incorporating hydraulic lime shall be placed within 30 minutes of water being added to the mixture, any mixes not used by that time shall be disposed of and never 'knocked up' and used in the work.

Ambient Conditions
It is essential that ambient climatic conditions are observed during the preparation and use of the mixture and the batch size adjusted accordingly. It is imperative that the mixture is not allowed to become dry or be subject to freezing conditions. In addition, the precaution of suspending operations until the temperature reaches 6^0C on a rising thermometer or drops to 8^0C on a falling thermometer shall be strictly observed.

Hair
Goat hair or other approved animal hair may be added to the base coat if approved by the Architect. This should be body hair that is clean, free from impurities such as grease, dirt, skin etc., and carefully teased into the mixture to achieve the even dispersion of the hair throughout the mixture.

Dubbing Out
In order to keep the layer thickness as even as possible, major depressions in the wall surface shall be dubbed out in several layers to reduce the possibility of shrinkage as previously specified. In all cases, the previous clauses relating to adjusting the suction and aftercare etc., shall be strictly observed.

Scudding
Where necessary, the surfaces shall be scudded by throwing the gauged mortar onto the surface to obtain an even key. The surface shall be left rough and the clauses relating to aftercare strictly observed until the scudding is set. The clauses relating to adjustment of suction shall be strictly observed.

Base Coat
When a stable keyed base has been achieved, the base coat shall be applied in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 10 - 12mm thick in diagonal strokes applying a slight pressure to create an effective bond. The coat shall be kept to as even a thickness as possible with only minor fluctuations permitted.

The surface should be scratched immediately in a diagonally crossed pattern to provide a key for the succeeding coat. Great care must be taken to ensure that the scratching is slightly undercut, not too deep and executed in such a manner as not to disturb the bond.

Correct aftercare is essential and the mortar must be dampened from time to time and protected from extremes of temperature etc., as previously specified.

Levelling Coat
When the base coat has dried sufficiently the levelling coat shall be laid on in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 8 - 10mm thick in diagonal strokes applying a slight pressure to create an effective bond. These strokes shall be in the opposite direction to the base coat. The surface shall be brought to an even level surface using levelling screeds in the normal manner, the screeds being removed and filled with mortar before the initial set has taken place.

Top Coat
When the base coat has sufficiently cured, the top coat shall be applied 4 - 6mm thick by trowel as specified for the base coat, ensuring that the strokes are in the opposite direction to the levelling coat. Particular care shall be taken to ensure all arrises are straight and true and a fair finish is achieved. The proportions of lime to sands will be adjusted for this coat from the base coats as may be the sands grading.

Particular care must be taken to ensure that the surface is "polished" in a manner to avoid any cracking or crazing when the final set is achieved. The surface shall be finished to a fine smooth, regular, surface by the use of a steel float. On no account should any marks of the float or drag marks from the aggregate be visible in the finished work. No textural variations will be permitted.

The provisions of the 'Aftercare' clause shall be strictly observed during curing, a period which shall extend to 28 days after completion of the coat.

Reveals, Jambs, etc.
All arrises etc., shall be true and straight.

Sample Panels
The Contractor shall be required to execute sufficient sample panels to demonstrate the quality and type of workmanship for the Architect's approval. Each sample panel shall measure at least 1 meter x 1 meter. The approved panel shall be retained undisturbed as a quality and finish control panel until such time as the Architect indicates a completed area of render is approved to serve this purpose.

2.1. External Render

2.1.1. General

Preparation

Hacking off
All existing render for repair shall be carefully hacked off, taking care to avoid disturbance to adjoining sound render. The Contractor should note that this operation may be the source of immense potential damage and he will be required to take the utmost care particularly at existing joints, arrises. It will be the Contractor's responsibility to repair any damage caused, to the Architect's satisfaction, at his own expense. In particular, great care shall be taken in situations where decorative features are to be retained in-situ and ensure that no damage occurs to these features.

Hacking off may be undertaken by hand or using mechanical equipment, providing the forgoing is strictly observed. The Contractor shall note that the level of vibration during this operation will be critical and must be controlled. The Contractor shall prepare a method statement covering his proposed procedure for hacking off and indicating how he will comply with the above requirements for the Architect's approval before any work is put in hand. On no account shall any damage be permitted to any features and the Contractor may be required to use manual techniques or small controllable "dentistry" type power tools when hacking of render in these areas. All debris, hacked off render etc., shall be removed from site at regular intervals and not permitted to accumulate on site.

Materials

The materials for rendering shall be prepared from Coarse Stuff and Fine Stuff, stored, used and protected as specified under Stonework. The mixes for the various coats shall be as specified in that section, but may be modified by the results of the laboratory analysis of the original samples. Allowances shall be made for the particular differences from that already specified as indicated in the remainder of this section.

Workmanship

General
Prior to commencement, the contractor shall ensure that all required openings, chases or other apertures have been cut, all fixtures, fixing pads and plugs have been fixed, all making good has been completed, and the lime mortar in stone repairs has fully carbonated.

Protection
The contractor shall ensure that surfaces tare adequately sheltered from weather to ensure that they are reasonably dry before starting work.

Cleanliness
The contractor shall ensure that all plant and tools are kept clean and free from previous mixes.

Scrubbing
All traces of mould, oil, paint, grease, dirt and other incompatible material shall be removed by scrubbing with water containing detergent.

Solid Backgrounds
Before coating, adjust porosity to give uniform suction.

General
Surface Preparation BS 5262 Code of Practice for External Renderings and BS 8000 Code of Practice Workmanship on Building Sites Part 10 should be followed.

The quantity of material required for a given area should be of the one batch or a number of batches thoroughly mixed together.

When applying in hot weather, it is advisable to ensure that work coincides with the shaded areas of the building.

Dubbing Out
All dubbing out, filling and repairing must confirm to BS 5262 Code of Practice for External renderings.

Substrates - Poor Existing
Poor existing substrates should be removed back to a sound and stable substrate. Loose or friable brick, block or stonework, should be replaced.

Preparation
All surfaces must be clean, suitably dry, sound and free from anything that may interfere with the adhesion of the materials to be applied.

Arrises & Feature Stops
Form all angles and feature stops with clean straight timber battens to achieve a true straight line. In certain locations and only under special circumstances, the Architect may permit the use of proprietary beads and stops as specified. In these cases, the manufacturers' instructions as regards use, fixing and application of material shall be strictly followed.

Masking
Masking should be used to give protection to adjacent work and to give clean straight edges. It should be removed immediately after finishing.

Splashes
Remove splashes of material from glass or other surfaces immediately to prevent marking the surface.

Aftercare, Curing and Protection
Care must be taken to protect applied work from rapid drying conditions i.e. exposure to direct sunlight or drying winds. In these conditions it should be kept evenly damp for up to 30 days, depending on ambient conditions and the rate of set, by lightly spraying periodically with clean water. In addition the surface shall be protected from the action of frost.

Polythene, hessian or other approved sheeting shall be used during curing and should be arranged to hang clear of the face of the wall in such a way that it does not form a tunnel through which the wind could increase the evaporation of water from the rendering. The polythene or hessian sheeting must not have intermittent contact with the render as this may cause a patchy appearance.

In areas exposed to direct sunlight, the possibility of a "greenhouse" effect must be avoided, either by shading the polythene or by substituting woven cloth materials.

2.1.2. Render Methodology

The render shall be executed in 3 coats using a basic proportion of 1 part lime putty to 3 parts sand. Coarse Stuff or Fine Stuff shall be prepared as specified under Stonework and Brickwork.

Ambient Conditions
It is essential that ambient climatic conditions are observed during the preparation and use of the mixture and the batch size adjusted accordingly. It is imperative that the mixture is not allowed to become dry or be subject to freezing conditions. In addition, the precaution of suspending operations until the temperature reaches 6^0C on a rising thermometer or drops to 8^0C on a falling thermometer shall be strictly observed.

Hair
Goat hair or other approved animal hair may be added to the base coat if approved by the Architect. This should be body hair that is clean, free from impurities such as grease, dirt, skin etc., and carefully teased into the mixture to achieve the even dispersion of the hair throughout the mixture.

Dubbing Out
In order to keep the layer thickness as even as possible, major depressions in the wall surface shall be dubbed out using the gauged mortar and small pieces of stone or brick to reduce the possibility of shrinkage as previously specified. In all cases, the previous clauses relating to adjusting the suction and aftercare etc., shall be strictly observed.

Scudding
Where necessary, the surfaces shall be scudded by throwing the gauged mortar onto the surface to obtain an even key. The surface shall be left rough and the clauses relating to aftercare strictly observed until the scudding is set. The clauses relating to adjustment of suction shall be strictly observed.

Base Coat
When a stable keyed base has been achieved, the base coat shall be applied in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 12 - 15mm thick in diagonal strokes applying a slight pressure to create an effective bond. The coat shall be kept to as even a thickness as possible with only minor fluctuations permitted.

The surface should be scratched immediately in a diagonally crossed pattern to provide a key for the succeeding coat. Great care must be taken to ensure that the scratching is slightly undercut, not too deep and executed in such a manner as not to disturb the bond.

Correct aftercare is essential and the mortar must be dampened from time to time and protected from extremes of temperature etc., as previously specified.

Levelling Coat
When the base coat has dried sufficiently the levelling coat shall be laid on in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 10 - 12mm thick in diagonal strokes applying a slight pressure to create an effective bond. These strokes shall be in the opposite direction to the base coat. The surface shall be

brought to an even level surface using levelling screeds in the normal manner, the screeds being removed and filled with mortar before the initial set has taken place.

Top Coat
When the base coat has sufficiently cured, the top coat shall be applied 8-10mm thick by trowel as specified for the base coat, ensuring that the strokes are in the opposite direction to the levelling coat. Particular care shall be taken to ensure all arrises are straight and true and a fair finish is achieved. The proportions of lime to sands will be adjusted for this coat from the base coats as may be the sands grading.

Particular care must be taken to ensure that the surface is not "polished" to avoid any cracking or crazing when the final set is achieved. The surface shall be finished to a flat, smooth, regular, surface by the use of a fine wooden float. On no account should any marks of the float or drag marks from the aggregate be visible in the finished work. No colour or textural variations will be permitted.

The provisions of the 'Aftercare' clause shall be strictly observed during curing, a period which shall extend to 28 days after completion of the coat.

'Ashlar' Finish
Where the finish is required to exhibit lining simulate stonework, the surface shall be carefully marked with an appropriate round edged tool to replicate ashlar stonework. The joints shall be 3mm wide and shall not penetrate the surface deeper than 4mm maximum. On no account shall the marking be allowed to drag the aggregate or otherwise damage the surface of the render. To this end, the Contractor will be responsible for determining the appropriate time when the render has sufficiently set to enable the marking to be undertaken. In general, the markings should be placed at 300 to 350 mm vertically with a proportion of 1:1.5 to 1.75 for the perpends. All horizontals should be straight and lever and all perpends should be vertical, break joint on succeeding courses and line up with those on every second course above and below.

Samples of the finish and markings shall be undertaken and approved by the architect before the work is put in hands. The approved samples shall remain on site as a standard until such time as the Architect nominates a section of the completed work to act a standard.

The Contractor's attention is drawn to the recessed jointing pattern of the basement wall at the front elevation of No. 15. He will be required to replicate this recessed jointing pattern in the new render. In all respects, the requirements stated above will apply to this work.

Reveals, Jambs, etc.
Where reveals, jambs etc., are encountered, these shall be finished to match the original. It is imperative that the finishing to these is completed in advance of the top coat in order to achieve a fair finish. All arrises etc., shall be true and straight.

Junction with String Courses, Parapets, Plinths etc.
The render shall be finished to the full thickness or to match the original detail as directed by the Architect and lined to replicate a 3mm ashlar stonework joint as specified.

Sample panels
The Contractor shall be required to execute sufficient sample panels to demonstrate the quality and type of workmanship and finish is to the Architect's satisfaction. Each sample panel shall measure at least 1 meter x 1 meter. The approved panel shall be retained undisturbed

as a quality and finish control panel until such time as the Architect indicates a completed area of render is approved to serve this purpose.

2.2. Roofworks

2.2.1. Roofing

Slating
The slating shall comply in all respects with the requirements of BS 5534 and 8000. In special circumstances, deviations from this standard will be permitted by prior approval of the Architect provided the Contractor shall satisfy the Architect that the proposed deviation shall not reduce the standard of the completed work.

The Contractor shall note that the condition of the slates indicate that an amount of original slate will be available for salvage and re-use. Therefore, he shall include for carefully removing the existing slate to the entire area of the roof, grading and setting aside for re-use as referred to under Taking Down & Removals. The existing fibre cement slates to the roof should be discarded.

Slates
Slates shall be sourced from the Penrhyn Quarry of the Cambrian deposits of Gwynedel, North Wales and shall satisfy the requirements of B.S. 680. They shall be fixed in strict accordance with the manufacturer's recommendations to B.S. 534 incorporation all required battens, counter battens, felt etc.

The use of salvaged slate, either from the building or other sources, will be permitted provided the Contractor can satisfy the Architect that they comply with BS 680 or that such compliance can be reasonably inferred.

New slates are to be pre-holed, centre-nailed 600 X 300 X 6-7mm thick Blue Bangor slates from Penrhyn Quarry in Wales unless approved otherwise by Conservation Architect. The contractor is to assume a salvage of the existing slates of at least 50% and is to notify Conservation Architect if there is any deviation from this without delay. The contractor is to refer to the specification in detail in relation to standards of materials and workmanship etc. required for slating. Salvaged slates are to be stored as close to the roof as possible, in order to avoid possible damage to them in transit. If possible they should be kept in the working area at roof level, making sure they are secured and cannot be a falling hazard.

Grading
The Contractor shall note that the existing slates may be graded according to size, the largest at the bottom and the smallest at the top. This pattern of size shall be carefully recorded before any work of stripping the roof is commenced and the new or salvaged slate shall be laid in a matching pattern.

Salvaged slates shall be graded for re-use. In general, the salvaged slates will be of a larger size than the new slates and shall be used on the outer visual pitches of the roofs.

Ventilation
Ventilation of the roof timbers, where indicated, shall be achieved by means of proprietary p.v.c. continuous eaves ventilators, and/or proprietary p.v.c. in line slate vents, all fitted in accordance with the manufacturer's recommendations. Ventilating slates shall be size and colour matched to the new or salvaged natural slates, shall be fitted with insect mesh, and shall be self-draining.

Ridge and Hip fittings.
The existing ridge and hip fittings shall be re-used where they are in good condition and undamaged. Where insufficient are available from the works, new or re-cycled fittings to match the originals shall be provided to match the original in all respects. All new fittings shall comply with BS 402.

Underlay
Underlay shall comply with BS 747 and shall be reinforced breathable fabric.

Battens and Counter-battens
All battens and counter-battens (if required) shall be completely replaced with new material. New battens and counter-battens shall be pre-treated with double vacuum pressure impregnated softwood, in sizes to suit the application as defined by BS 5534, and replicating the original as previously specified. They shall be free of decay, insect attack, splits, shakes, wany edges etc. and shall have a moisture content of less than 18% when fixed. They shall comply with BS 881 and 589 as regards species and shall comply with BS 4978 as regards grading. All timber shall have the grade marked on each and this shall be re-marked with the prefix 'R' where the original marking is removed by working. The timber shall be of the appropriate grade for the use intended as defined by BS 4978.

All cuts etc. that break the treated timber shall be brush coated with two coats of the same preservative used for impregnation, using the type appropriate for brush application. It is imperative that the pressure impregnation treatment does not adversely affect the fixings.

Boarding
All damaged or defective boarding shall be replaced with new boarding as previously specified in the exact sizes of the original. All relevant aspects of the previous clause shall apply to this clause.

Nails
Nails for fixing slates shall comply with BS 1202 and shall be copper clout nails.

Nails for fixing battens shall comply with BS 1202 and shall be galvanised steel.

Nails for fixing underlay shall be galvanised steel extra-large head to BS 1202.

Mortar
Mortar shall be as specified elsewhere for bedding and pointing.

Undercloaks
Undercloaks shall be formed from the specified slate.

Storing and Handling materials
Shall comply generally with the relevant clauses elsewhere in this specification.

Underlays shall be stored upright on clean, flat, dry surfaces.

Slates shall be stored upright on a level surface of timber battens or in the original pallets and kept dry.

Removal of existing
The existing damaged slates shall be carefully removed by manual means, avoiding all unnecessary further damage to adjoining slates. The Contractor shall note that this is a difficult operation to complete without damaging the slates etc. In special circumstances, areas where the slate is not of sufficient quality to be re-used shall be agreed with the Architect before the stripping commences and these may be removed and disposed of by the most efficient means.

Protection
The Contractor shall be responsible for providing and maintaining all necessary protection, temporary coverings, temporary roofs etc. to ensure that no water is permitted to enter the building during these works. This shall be deemed to include all work necessary to the roofs, leadwork and other areas affected by the works.

Repairs
The Contractor shall carefully examine the roof structure, wall plates, fixings etc. and carry out all necessary repairs to ensure the roof is structurally sound upon completion. All defects noted during this examination shall be brought to the Architect's attention and the methodology of repair agreed with him before any work is put in hands.

Following the removal of the damaged slates, battens and counterbattens, all the boarding shall be carefully examined. All areas of defective or damaged boarding shall be replaced or repaired as instructed by the Architect.

Preliminary checks
Before commencing the insertion of replacement slates, the Contractor shall check that all necessary repairs, all works to the flashings, rainwater goods, penetrating pipes etc. etc. are complete and shall ensure that all the necessary materials etc. for the completion of the works are on site.

Counterbattening
Counterbattens (if required), as previously specified, shall be laid at the required centres and securely fixed with nails to satisfy BS 5534. Only long lengths, with a minimum length of 2 meters shall be used unless the particular detail on the building demands a shorter length. All the relevant matters of the Clause 'Battening' below shall apply to this clause.

Abutments, Parapets
The slate shall be cut to the required line and fixed with all necessary metal soakers etc. to ensure a watertight finish. The previous requirements in relation to short slates shall apply here.

Completion
The entire work shall be completed to the Architect's satisfaction, all debris removed and the roof left in a neat weathertight condition.

2.3. Brickwork

2.3.1. General

The Contractor shall ensure that brick work and repair is carried out by competent and suitably experienced crafts persons.

Brick shall be of prime quality and match the existing brick on Site.

Code of Practice – Brick
The Contractor will be required to comply with the relevant sections of the latest editions of the following: -

- BS 5628 (Parts 1-3) Code of practice for the use of masonry;
- BS 8221-2:2000 Code of practice for cleaning and surface repair of buildings. Surface repair of natural stones, brick and terracotta.
- BS 8221-1:2012 Code of practice for cleaning and surface repair of buildings. Cleaning of natural stone, brick, terracotta and concrete (incorporating corrigendum No. 1).
- BS 5628-1:2005 Code of practice for use of masonry. Structural use of unreinforced masonry (incorporating Corrigendum No.1) (No longer current but cited in Building
- Regulations)
- BS 7913:1998 Guide to the principles of the conservation of historic buildings.
- IS EN 459-2:2010 Building lime - Test methods.
- IS EN 459-1:2010 Building limes - definitions, specifications and conformity criteria.
- IS EN 12440:2008 Natural stone - Denomination criteria.
- IS EN 12326-1:2004 Slate and stone products for discontinuous roofing and cladding - Product specification.
- IS EN 771 - Specification for masonry units.
- BS 5385-2:1991 Wall and floor tiling. Code of practice for the design and installation of external ceramic wall tiling and mosaics (including terracotta and faience).

Standards
The works shall be carried out in all respects to comply with British Standards 1014, 1217, 5589, 5390 and 6270. Scaffolding shall comply with B.S. 5973 and 5974. Variations may be permitted from these standards with the prior written permission of the Architect.

Materials

Brick
New brick, etc., where required, shall match the existing, when cleaned as specified later, as regards type, colour, texture, porosity, crushing strength, appearance etc. Samples of such brick shall be delivered to the Architect's office for his selection. All brick shall be free of all vents, cracks, fissures, soft beds, firing defects etc. or other defects which may affect durability. All arrises shall be true and straight and no damage will be permitted. The Contractor shall note that it may be necessary to have the brick specially manufactured by an approved manufacturer in order to ensure that the brick properly matched the original in all respects.

The Contractor shall note that different matching bricks may be required for repairs to the house. In addition, specials, particularly voussoir bricks will be required for the window heads and these specials will be required to match the brick elsewhere on the elevation. He will be

expected to have made all necessary allowances for the amounts of each distinct type of brick required for the works and no extra will be allowed for his failure to do so.

The Contractor's attention is specifically drawn to the possible different sizes of the existing bricks which will have to be replicated in the repair brickwork. On no account will larger (or smaller) joint dimensions be permitted to allow the use of standard bricks or to reduce the number of differing sizes required for the works.

With regard to the specials, the Contractor will be permitted to arrange for the various sizes and specials necessary to be specially manufactured or to be worked (cut and / or rubbed) from larger sized bricks. In either case, all such bricks shall match the adjacent 'common' brick in all respects as noted earlier and the manufacturing or working process shall in no way interfere with or be damaging to the durability, stability, weathering characteristics or visual characteristics of the brick.

Salvaged Brick

The Contractor shall note that while all the brickwork included in the works has been specified to be new brick, the use of sound salvaged brick will be permitted with the Architect's prior approval. Salvaged brick shall match the original in all respects as specified in the earlier clauses and shall have all old mortar, splashes etc. removed without damage to the fire skin, arrises etc. Salvaged brick may be sourced from a suitable supplier or may be suitable brick arising from the works and will be subject to the Architect's approval. Such approval, once given, shall not relieve the Contractor from his responsibility to ensure that the brick complies with the requirements of this specification. Should any brickwork built from such approved salvaged brick subsequently exhibit any damage or inherent or latent defects that would have led to its rejection at the time of approval if such characteristics had been apparent at that time, it shall be removed and replaced at no additional cost. The Architect's decisions shall be final and binding in all these matters.

The Contractor shall note that it would be the Architect's intention to use as much as possible of the original brick, salvaged from the works and meeting the above specification, in the works. However, it is not possible to give any indication as to the quantities that might be available for re-use. Therefore, any reductions in the amount of new brick necessary for the works arising from the re-use of original salvaged brick shall be treated as a credit on the contract.

Brick for repair

All brick for repair shall be from bricks specifically selected for that purpose by the Architect and shall match the original in all respects, including size, colour, texture, porosity, finish etc. This brick may be either re-cycled salvaged brick or new brick with the Architect's prior approval. New brick shall be sourced from a specialist manufacturer approved by the Architect as specified earlier. The Contractor shall make provision for the erection of 3 trial panels as directed by the Architect, each panel measuring a minimum of 1 m. x 1 m. All repairs shall be so worked and finished that they are not visible when viewed from a distance of 4 meters. The Contractor’s attention is drawn to the construction of flat and arched lintols, where purpose-made shaped voussoir bricks will be required.

Cement

Cement shall be white or grey Portland cement, to comply with BS EN197.

Repair Mortars

Repair Mortars shall be specialised materials supplied by a specialist supplier approved by the

Architect. They shall be specially prepared to match the parent material in all respects as regards colour, texture, durability, porosity, density, compressive strength etc. Approved suppliers would include repair mortars supplied by Messrs Keim, Messrs. Jahn, Messrs. Remmers and Messrs. SBD. Samples of the colour matched material shall be approved by the Architect before any work is put in hands. Preference shall be given to mortars that can be left proud and worked back once the initial set has been completed to avoid the 'case hardening' effect of the worked surface and any residual cracking in the competed repair.

Water
Water for the works shall be clean, potable and free from any impurities, deleterious matter or harmful chemicals.

Lime
Lime shall conform to BS EN459 for the purpose required and shall be hydrated or lime putty

Sand
Sand shall comply with BS EN13139. Where sands are to be used in lime mortars or gauged lime mortars, great care shall be taken to ensure that no water retaining properties are contained within sands which would interfere with the carbonation of the lime. The Contractor shall note the coarse and fine sands used in the varying pointing types extant on the building and will be required to obtain sands that will match these gradings.

Mortar Mix
The mortar mix shall be in accordance with Tables 4 and 5 of B.S. 6270 part 1, or as specified elsewhere in this document.

Fixings
All fixings, dowels, cramps, restraints etc. shall be of non-corrodible, non-ferrous metal or stainless steel grade 316 as selected by the Architect to the appropriate B.S.

Cleaning Chemicals
Chemicals for cleaning brickwork shall be approved by the Architect. These chemicals will be from the Neolith, Intrachem, Remmers and or Prosoco ranges of chemicals. Trials must be completed in advance of the cleaning programme to determine the appropriate times for application of chemicals. The Contractor should keep in mind that these materials contain injurious chemicals and the manufacturer's safety precautions must be prominently displayed, and adhered to at all times. The chemicals must be applied in accordance with the manufacturer's recommendations. The recommended Safety First Aid Kit should be maintained on site and readily available during operations.

2.3.2. Repointing Brickwork

Raking Out
The raking out shall be carried out using chisels or other appropriate instruments. Mechanical systems, hand saws or hand discs for raking out shall not be used excepts with the prior approval of the Architect and the Contractor, if he desires to use such methods, will be required to demonstrate the effectiveness of the methodology to the Architect. If such demonstrations fail to satisfy the Architect, the Contractor may demonstrate further developments if he so wishes in order to obtain the Architect's approval. However, the Architect retains the right to instruct that the raking out must be undertaken by manual means at no additional cost to the Employer notwithstanding the results of all or any of such tests.

Areas indicated on site and on the drawings by the Architect to be re-pointed shall be carefully raked out to a depth equal to twice the width of the joint with a minimum depth of 15 mm. Great care shall be taken to ensure that the brick or any arrises are not damaged. Upon completion of the raking out all loose matter shall be carefully removed.

Pointing Generally
All the existing brickwork shall be fully re-pointed. The mortar mix shall be as specified above and must always be slightly weaker and slightly more porous than the masonry and bedding mortar being pointed. Re-pointing shall be carried out from the top, the joints having being first wetted, and proceed in one continuous operation, all mortar being carefully rammed well home into the joints to ensure no voids remain. The finishing of the pointing shall be as directed by the Architect and would include a lightly brushed finish.

All areas of pointing shall be fully protected from sun, wind, rain, extremes of temperature etc. to ensure that the mortar dries and cures and carbonates properly. In particular, the Contractor shall guard against any of the protection forming microclimates, wind tunnels etc. which would adversely affect the finished joint - refer to the relevant Technical Guidance Documents published by Historic Scotland.

The amount of water used to dampen the joints shall be carefully controlled to prevent the joints being saturated and only those amounts necessary to adjust the 'suck' due to the porosity of the substrate shall be used. On no account shall water be allowed to lodge in the joints and on no occasion shall any pointing be undertaken while water is lodging. Should any instances of the pointing mortar being damaged by lodging water become apparent, these shall be removed and replaced by the Contractor at his own expense to the Architect's satisfaction.

All joints between windows and brickwork shall be carefully raked out, packed with a compressible bitumen impregnated foam, and pointed up in mortar. Alternatively, joints may be packed with mortar as required and pointed with translucent or colour matched two pack Polysulphide or Silicon Mastic to B.S. 5215 or 5889 applied in strict accordance with the manufacturers' instructions.

If deemed necessary by the Architect, all joints shall be taped to prevent the mortar staining the surfaces of the masonry. It is imperative that the tape should not damage the face of the masonry and is able to withstand the pointing operations. Samples shall be approved by the Architect before the work is put in hands.

On no account shall individual bricks be pointed in isolation. If necessary, pointing shall be delayed within a 1 m. radius of isolated repairs in order to achieve an acceptable visual appearance. All such instances shall be brought to the Architect's attention and his instructions carefully followed.

Sample Panels
The Contractor shall provide for carrying out sample panels of the pointing under the Architect's direction. When the Architect is satisfied that there is a sample panel for each type of pointing finish required, he will nominate these panels as the standard by which the executed work on the building is to be judged. All rejected panels shall be immediately removed from site or raked out to ensure that no confusion shall exist. The standard panels shall remain undisturbed until such time as the Architect nominates a panel of the completed work to be the standard, at which time the original shall be removed. All pointing work which fails to match the standard shall be raked out and re-pointed to match the standard at no

expense to the Employer and the Architect's decision shall be final and binding in all such matters.

Existing Mortar Repairs
Existing Mortar repairs will be removed by the works. All marks, residues etc. of this mortar left on adjoining brick shall be carefully removed without damage to the sub-strata.

Crack Injection
Where indicated on the Drawings or on site by the Architect or Engineer, cracks shall be injected by a specialist company approved by the Architect. In situations where it is necessary to create a structural bond, the injection shall consist of epoxy, polyester or other approved resin. Where a structural bond is not required, the material shall be a non-shrink latex formulation to prevent the ingress of water.

In all situations, care shall be taken in the location and installation of nipples, reservoirs etc. to ensure that no disfigurement of the surface results.

The crack shall be sealed to prevent the spillage of the injected material and to ensure complete filling of the crack. All splashes, runs etc. shall be immediately removed to prevent disfigurement. It may be necessary to use a variety of low viscosity and thixotropic material to ensure complete crack filling and, where appropriate, the proper structural bond is created. The injection shall be undertaken by means of hand pumping and wherever necessary, the resins shall be heated to assist flow characteristics. At all times during these operations, continual monitoring shall be provided to ensure the resin does not emerge where not expected. The nipples, reservoirs shall be so placed to form a checking system of the penetration as resin exudes from adjoining nipples, but care must be taken that this does not 'short-circuit' the coverage.

Upon completion, the nipples, reservoirs, injectors, etc. shall be carefully removed, the areas cleaned and the surface of the crack pointed in a colour matched mortar so that it is not visible when viewed from a distance of 3 meters from the repair. Particular care shall be taken where the nipple fixative and crack sealant sets to a hard bond to ensure their removal does not disfigure the surrounding brick.

2.4. Stonework

2.4.1. Cleaning Granite

Standards.
These works shall comply with the requirements of BS 6270 and BS 5390

Methods
It is generally intended that granite shall be cleaned by fine, low pressure abrasive applied dry, with localised cleaning by means of poultice, where necessary. Limestone will be cleaned by low pressure steam, with localised chemical applications as necessary. Contractors will however be required to consider the use of alternative methods, where the foregoing methods fail to yield the desired result.

Materials
Chemicals for cleaning stone shall be approved by the Architect. Algaecides would include Alkutex paste from the Remmers range of chemicals, Algae-Rem from the Intrachem range of chemicals or Neolith 800 from the Neolith range of chemicals. Cleaning chemicals will be from the Neolith range of chemicals and will include Neolith HDL, or from the Intrachem range of chemicals, including HD400s and SC100 or from the Prosoco range of chemicals, including 766 Limestone & Masonry Prewash, Limestone & Masonry Afterwash and 1217 Heavy Carbon Poultice. Trials must be completed in advance of the cleaning programme to determine the appropriate times for application of chemicals. As these chemical cleaners differ slightly in their effectiveness on differing substrates, the Contractor shall allow for the Architect to select whichever chemical he deems most effective to be used on the works. The Contractor should keep in mind that these materials contain injurious chemicals and the manufacturer's safety precautions must be prominently displayed, and adhered to at all times. The chemicals must be applied in accordance with the manufacturer's recommendations. The recommended safety First Aid Kit should be maintained on site and readily available during operations.

Cleaning generally.
Only fully experienced and trained workpeople shall be permitted to carry out cleaning works, and full protection for the operatives, scaffold, woodwork, glass, ironwork, different adjoining masonry material types etc., shall be provided. In addition, full protection for persons and property in the vicinity of cleaning operations shall be provided. All safety recommendations shall be strictly adhered to.

Steam Cleaning Methodology

Extent of Cleaning
The Cleaning shall be undertaken before the pointing is raked out and, following raking out, the Contractor shall agree areas of residues to be cleaned as part of the final rinse down operation.

Cleaning Methodology
Steam cleaning shall be carried out using a low pressure, high temperature system, DOFF or equal and approved system designed to eliminate water penetration. Only skilled operatives should undertake this work and the manufacturers specification must be exactly followed. Extreme care must take to avoid saturation of the stonework.

As with all operations involving water on the surface of the building, operations shall be suspended during time when freezing conditions apply or can be expected. To this end, no work shall be undertaken below a temperature of 4 degrees centigrade on a rising thermometer or below 6 degrees centigrade on a falling thermometer. In addition, the effect of wind conditions may also require the suspension of operations.

Chemical Cleaning Methodology

Extent of Cleaning

The Cleaning shall be undertaken before the pointing is raked out and, following raking out, the Contractor shall agree areas of residues to be cleaned as part of the final rinse down operation.

Cleaning Methodology

Initial cleaning shall comprise of the removal of all algaecidal, biocidal and fungicidal growths, particularly where these have built up on the surface of the stonework. The stonework shall then be treated with an approved sterilising fluid as specified earlier (Remmers Alkutex Paste, Intrachem Algae-Rem or Neolith 800) used strictly in accordance with the manufacturer's recommendations and safety requirements. Particular care must be taken to ensure that the chemical is well worked into the friable surfaces of the stone without damaging the stone. It shall be permitted to remain in contact with the stone for the length of time recommended by the manufacturer or as determined by the on-site trials. Upon completion of this contact time, it shall be rinsed off as recommended by the manufacturer using warm water where appropriate, care being taken to ensure that none of the stone is saturated. If necessary, repeat applications shall be applied to ensure all spores, seeds, etc. etc. are fully sterilised.

Following the application of the sterilising fluid, all stone shall be cleaned as specified below. The Contractor should note that while a single manufacturer's product is included in this specification, he may use similar chemicals of other manufacturer's as specified under 'Materials'. The Contractor should note that the Architect may require that the material chemical from one particular manufacturer must be used in the works if the tests indicate that this particular chemical is the most effective. The general intention is that material from a single manufacturer should be used for all stages in this cleaning process.

Stonework shall be cleaned with specific manufacturer's materials as previously specified, always used in strict accordance with the manufacturer’s instructions and safety recommendations. In all cases, the cleaning shall be undertaken in panels coinciding with a natural break in the building - details of these panels to be agreed with the Architect before the works commence.

All adjoining different masonry materials, quoins, etc, in granite, glass, metalwork etc. shall be carefully protected before commencement. On no account should any chemical, or rinse water from areas cleaned with chemical, be permitted to come in contact with dry masonry. Areas at particular risk are those underneath the current site of operations. It is imperative that all such areas are fully protected before operations commence and rinse guttering provided.

Particular care must be taken at junctions between stone to be cleaned and stone not being cleaned, particular at the granite quoins or other decorative stonework at such interfaces. On no account shall the cleaning be allowed to affect the adjoining stone or to alter the appearance of this stone. In such instances, the Contractor will be required to provide plywood

cut-outs or similar and approved protection to ensure that the adjoining stonework is not affected.

Sample panels are to be completed before the cleaning commences in areas selected by the Architect, to enable contact times to be established. In all cases, tests to ensure the surface is chemically neutral shall be undertaken 3 days after completion of the cleaning using litmus or another approved method.

As an alternative, or in addition to the liquid chemical cleaning, AB57 Poultice may be used on Calcareous materials. The recipe for the poultice and use methodology is contained in an Appendix to BRE Digest 280 and these instructions shall be strictly followed. In particular, the precise type, strength, chemical composition and use of the constituents of the poultice shall be strictly followed and no deviations will be permitted.

Resistant staining staining shall be removed by poultice or other methods recommended in B.S. 6270 or B.R.E. Digest 280 and approved by the Architect.

Paint disfigurement shall be completely removed. This may be achieved by the use of Neolith HDL or Intrachem SC100 as specified above, but where this is unsuccessful, or where a 'shadow' of the stain remains, these shall be removed by 'Peelaway', Remmers (Interchem) or Tensid 'AGS Graffiti Removers' or similar and approved paint removal poultice, used in strict accordance with the manufacturer's recommendations.

As with all operations involving water on the surface of the building, operations shall be suspended during time when freezing conditions apply or can be expected. To this end, no work shall be undertaken below a temperature of 4 degrees centigrade on a rising thermometer or below 6 degrees centigrade on a falling thermometer. In addition, the effect of wind conditions may also require the suspension of operations.

Where the cleaning operations are undertaken above the roof level or at junctions with roof finishes etc. great care must be taken to ensure that these operations do not cause damage to adjoining finishes.

Abrasive Cleaning Methodology

Cleaning shall be achieved by the following methodology in strict accordance with the manufacturer's recommendations.

The masonry shall be cleaned using the NeoClean 300 System or similar and approved mild abrasive cleaning system in strict accordance with the manufacturers instructions and safety recommendations. The abrasive to be used shall be fine grade calcium carbonate applied dry. No water shall be used. Great care will be required to ensure that no salts within the stone are liberated by the cleaning which may result in staining due to the deposit of the salt on the surface of the stone, iron ores are particularly damaging in this respect. On no account shall the pressure of the abrasive at the nozzle be permitted to exceed 10 p.s.i. and shall be, wherever possible, less (in the 5-10 p.s.i. range) to obviate the possibility of damage. As far as practical, the finer grades of abrasive shall be used, but the Contractor's attention is drawn to the fact that heavy encrustations of dirt, plaster residues etc. may have to be removed using the coarser grades to reduce the necessary contact time and prevent damage to adjoining fragile stonework.

Before the work commences, the Contractor shall undertake sample panels as directed by the Architect to determine the grade of abrasive, the contact time and the optimum pressure for the operations.

The cleaning operations shall be undertaken by holding the nozzle approximately 1 meter from the surface of the stone at an angle of 45 degrees to the plane of the surface of the stone, unless the 'Joss' type nozzle, which delivers the abrasive mixture moving in a spiral motion, is being used in which case the nozzle shall be at right angles to the plane of the surface of the stone. The nozzle shall be moved over the surface in gentle, even strokes both vertically and horizontally to achieve an even clean appearance to the stone without causing any damage to fragile areas, particularly fine, weathered arrises. In areas where there is any doubt, cleaning operations shall be suspended before any damage occurs and the residual dirt allowed to remained until such time as the Architect has inspected the work and given instructions as to the procedure to be followed to complete the cleaning work. On no account shall 'gun shading' be permitted to occur or the surface of any stone cleaned by these operations.

The Contractor shall complete the initial cleaning of each area in a single pass operation and subsequently return to clean isolated areas that have particularly heavy or stubborn accumulations, plaster residues etc. until a clean even visual appearance to the Architect's satisfaction is achieved. The Contractor may, if he so wishes, commence operations by removing heavy or stubborn accumulations at the outset before the general cleaning, but in either case, each section must be completed in a single operation and there can be no instances leaving any section incomplete.

The Contractor shall, before the work commences, agree with the Architect the programme and limits of the areas to be cleaned. As far as possible, the boundaries shall occur at natural breaks in the facade, changes of plane, string courses, cornices, etc.

Spent abrasive shall never be allowed to accumulate on the scaffold or on the face of the building and must be bagged and removed at appropriate times during the day's work. The Contractor should note that the calcium carbonate abrasive tends to form a slurry and stick to the surface of the stonework. This must be cleaned away immediately as the effectiveness of the completed cleaning cannot be determined while such deposits contaminate the surface.

The Contractor should note that the use of J Blast Finesse will generally not be permitted.

At all times, a pressure gauge incorporating a hypodermic type needle shall be on site to enable the pressure to be checked.

Residual Staining

Residual staining shall be removed by poultice or other methods recommended in B.S. 6270 or B.R.E. Digest 280 and approved by the Architect.

As noted at the beginning of this work section, the Contractor will be expected to have made all necessary allowances for all necessary test cleaning to establish the most appropriate cleaning methodology. This would include a number of distinct visits to site to complete individual trials, time to assess the effects of the cleaning over a period of weeks and the provision to reverse the cleaning process to commence with the NeoClean system and to subsequently clean areas by the chemical cleaning where the NeoClean system has been unsuccessful. No extra will be allowed by his failure to make such allowances or the inadequacy of his assessment.

2.5. Metalwork

2.5.1. Cleaning and Surface Preparation

General.
The preparation of a sound surface shall involve removal of old paint, rust, loose mill scale and soluble corrosion salts. It should be noted that paint removal may reveal cracks, corrosion and casting defects which were not previously visible. Allowance should therefore be made at the outset for dealing with these.

Old paint and repainting
All paint which is loose, perished or flaking shall be removed. Only wet hand processes should be used because of the risk from dust from lead pigments.

Small areas of paint can be removed with thixotropic paint strippers such as methylene chloride. Their residues must be removed by white spirit or water, as appropriate.

Flame cleaning and hot air blowers are also effective paint removers. These must be used with care on thin cast iron because of the thermal stresses which can be set up by localised overheating.

Mill Scale
Loose or defective mill scale must be removed. Evidence suggests that wrought iron receives corrosion protection from sound, adherent mill scale, and for this reason flame cleaning is the preferred treatment.

Soluble corrosion salts
Ferrous sulphate and ferrous chloride and other water-soluble salts must be removed from the bottom of pits within an iron surface. They are not readily removed by cleaning with large-sized abrasive particles.

Degreasing
All oil or grease shall be removed. Large quantities should be physically removed by scraping. The rest is best removed by warm water and detergent followed by thorough water rinsing. Non-caustic degreasing agents will also be permitted.

Manual preparation
The simplest form of surface preparation of iron involves chipping, scraping and brushing with hand-held implements. It should be noted that while surfaces prepared in this way may appear burnished and clean, only about 30% removal of rust and scale may be achieved. Scoring of valuable surfaces and loss of detail may also occur. Manual preparation should therefore only be used where alternative methods are not available. A corrosion-inhibiting primer such as red lead or zinc phosphate should then be used.

Mechanical preparation
These processes involve use of power-driven tools such as grinders and rotary wire brushes and provide a marginal improvement in efficiency over manual preparation. Rust or other deposits in pits and crevices are rarely removed. Needle-guns, however, can be used successfully to access awkward corners and angles inaccessible to other equipment.

Flame cleaning
An oxyacetylene or oxypropane flame should be passed across the iron, resulting in the detachment of rust and loose mill scale, which should be removed by wire brushing. Thin sections of wrought iron of less than 2 mm may warp during flame cleaning unless the method is used with care. Extreme care should be taken to avoid the fusing of un-bonded scale and other foreign matter.

Acid pickling
Items should be immersed in a bath of warm dilute sulphuric acid or dilute phosphoric acid to dissolve and remove mill scale and rust. On removal from the bath the iron must be thoroughly rinsed with clean water. Hydrochloric acid and sodium hydroxide (caustic soda) leave soluble salts on the metallic surface and should not be used. Site application of acid washes will not be permitted.

Dry Abrasive cleaning
Abrasive cleaning shall be shall only be used for cleaning new work. However, due to the softness of wrought iron it should be noted that the milled or beaten surface may be removed or roughened unless great care is taken. The success of abrasive cleaning is highly dependent on careful work by skilled operatives, the right grits and the right supply of air pressure. Test areas shall be carried out to determine the correct air pressure and size of grit. In general abrasive cleaning to new iron and steel components shall be carried to Swedish S.S.I. 2½ standard.

Wet abrasive cleaning
Wet abrasive cleaning reduces the level of dust, and is preferable to dry especially where lead-based paint is to be removed. Cleaning should be carried out using a nozzle with independent control over air, water and abrasive. Wet abrasive cleaning may, however, cause unwanted water penetration at junctions, and the surfaces should be allowed to dry thoroughly prior to priming.

Precautions for wet and dry abrasive cleaning
For both methods great care must be taken to mask surrounding surfaces. All caulking which is dislodged must be replaced. It is necessary to ensure that operatives are adequately protected and the potential environmental hazards such as dust, spent abrasive, and abrasive-laden run-off are dealt with properly.

Re-rusting of cleaned surfaces
Cast iron or wrought iron members which have been cleaned by flame or dry abrasive should be primed before rust starts to form. If this is not possible the surface should be flash cleaned immediately prior to priming.

Galvanising
On completion of the cleaning and repair work all components shall, if possible, be hot-dip galvanised. Where, in the opinion of the Architect, the assembly of the components precludes galvanising, the Contractor shall prime all surfaces with an approved primer prior to painting.

The importance of good site supervision
Proper site supervision by competent staff is important at all stages of work on a historical iron structure but in particular during the preparation for and application of paint. Test areas on all types of surface present, e.g. bars and decorative work, should be observed to ensure the correct methods of cleaning and painting are chosen.

2.5.2. Painting Ironwork

Primers and inhibiting pigments
All surfaces to be painted shall first be primed with a zinc phosphate primer. A zinc primer may require a sealing coat and subsequent coatings need to be non-saponifiable, such as epoxy paints. As it is almost impossible to produce with one coat a continuous film of adequate and even thickness, free from pinholes, two coats of primer shall be applied.

In the case of galvanised surfaces, appropriate etching primers shall be used.

Where components have been removed from site for workshop repairs and in the case of new work, primers shall be applied prior to delivery, and touched up when fixed in position.

Application of Paints.
All metal surfaces to be painted shall receive two brush-applied coats of a selected two-pack epoxy paint such as 'Cotech' or other approved paint, in strict accordance with the manufacturer's instructions.

It should be noted that two-pack epoxy paints are not always suited to brush application, and the manufacturer's specification should be accurately followed.

2.6. Taking Down and Removals

2.6.1. General

Code of Practice
The works shall comply with the requirements of B.S. 6187.

Taking Down Works
The works may be undertaken by the Main Contractor provided he can demonstrate that the workforce employed on the site has the skill and experience to complete the works without damage to the adjoining structures retained or a specialist approved by the Architect and/or Engineer. In addition, the Contractor shall ensure that no additional damage is caused to the Existing Structures by the removal of services fittings and brackets.

No portion of the works shall be sub-let without the prior written approval of the Architect.

Should approval to sub-let be given it will not relieve the Contractor of his responsibility under this contract and any sub-contractor must accept fully the conditions of contract and work in accordance with the Specification. Furthermore, the Architect shall be empowered to instruct the sub-contractor who will in turn carry out such instructions as if he were the Contractor.

Nature of Site
The Contractor is specifically informed of the restricted and confined nature of the site, the proximity of other buildings. All reasonable measures shall be taken to ensure the minimum disruption to these and to the need for express specific consent regarding any proposed works adjacent to adjoining sites (or buildings).

All plant and equipment to be used in taking down shall be appropriate to the confined location and the sensitive nature of the works.

The Contractor is specifically informed of the historical nature of the site and will be obliged to report any finding which may be of historical interest to the Architect and Structural Engineer and shall await inspection by Archaeologist to assess the significance of any such finding prior to removal or further disturbance of same. In addition, the Contractor shall note that any works which would disturb the ground or other archaeological strata will be the subject of constant inspection by an Archaeologist appointed by the Employer. The Contractor will be required to co-operate with the Archaeologist and to suspend or re-programme the order of the works to facilitate archaeological investigation that may be deemed necessary by the Archaeologist. The Contractor will be deemed to have taken all the matters into account at the time of tender and no extras will be allowed for his failure to do so.

Superintendence
The Contractor shall give all necessary personal superintendence during the execution of the works and keep constantly thereon a competent general foreman with power to act in the Contractor's absence and for all purposes as his general agent.

Survey
Before starting work, the Contractor shall examine all available information, and shall carry out a survey of the structure(s), site and surrounding area and submit a survey report and method statement to the Architect and Structural Engineer covering all relevant matters listed below and set out in the relevant Health and Safety Authority Guidance Notes and the relevant clauses of B.S. 6187:

-The form, condition and removal methods of the structures.
-The form, location and removal methods of any toxic or hazardous materials.
-The type and location of adjoining or surrounding premises which may be adversely affected by noise, vibration, dust or removal of structure.
-The identification and location of services above and below ground.

Investigate risks
In accordance with BS 6187, clause 4, the Contractor shall investigate the features of the structure to determine if shock of vibration could damage the buildings being retained, surrounding building, equipment contained in the buildings, buried services and check for the existence of toxic of flammable substances or asbestos. In addition, the Contractor shall decide which portions of the existing structures need to be secured.

Bench Marks
Report to the Architect any bench marks and other survey information found on structure(s) to be taken down. Do not remove or destroy unless specifically instructed.

Feature(s) to be retained
All structure, components and features not specifically identified for removal are to be kept in place and adequately protected.

Insurance
As provided in the contract under insurance clauses, the Contractor shall prior to commencement of the works obtain the Employer's approval for all insurances. Such insurances shall indemnify the Employer against all claims arising out of:

(1) Collapse, subsidence, vibration or weakening of supports.
(2) Liability assumed under the Contract.
(3) Use of mobile or lifting plant.
(4) Claims for consequential damage and consequent loss
(5) Fire.
(6) Public and Employers Liability lnsurances against injury to persons and property as required by the contract.
(7) All Risks Insurance in the joint names of the Employer and the Contractor for the full value of the works and ancillary items required by the contract.
(8) Collapse, subsidence, vibration or weakening of supports not arising out of the negligence of the Contractor.

Service Regulations
Any work carried out to or which affects new or existing services must be in accordance with the bylaws or regulations of the relevant statutory authority.

Location of Services
The Contractor is specifically informed that live services are located in the vicinity of the site, and he shall ensure that these are investigated, located and adequately protected during the course of the work. Locate and mark the positions of services affected by the work. Arrange with the appropriate authorities for the location and marking of the positions of the mains services.

Existing Services
Disconnect and remove existing services made redundant by the works. Carefully protect all

services to be re-used. All structure, components and features not specifically identified for removal are to be kept in place and adequately protected.

Drains in Use
Protect rainwater pipes, hopperheads, vent pipes and fittings still in use and ensure that they are kept free of debris at all times. Make good any damage arising from demolition works and leave clean and in working order at completion.

Old Materials
In general, old materials removed by the works shall become the property of the Contractor, who will allow credits for any salvage value against the costs of the works. However, materials such as brick, stone, slate etc. which are to be salvaged for re-use shall remain the property of the Employer and shall be sorted and set aside for re-use as specified later. In addition, items of finishes, such as the various joinery elements, access hatches, doors and surrounds etc. shall be carefully removed where necessary, protected as necessary to ensure no damage occurs, and set aside for re-use.

Any coins, fossils, curiosities, money or articles having a monetary or intrinsic value (including historic, artistic or other values) other than ordinary building materials shall become the property of the Employer and must be handed over to the Employer.

Materials to be Salvaged for Re-use
All existing masonry to be removed and the brick, stone and slate to be retained for re-use shall be carefully removed by hand in such a manner that no damage is occasioned to the components being removed. Modern bricks used in repair or infill may be discarded. Under the direction of the Architect, the removed materials shall be carefully sorted by and the material for re-use shall be carefully placed on pallets. These materials shall be carefully cleaned to remove old mortar, plaster, render etc. at the time of sorting so that minimal works are necessary during re-building operations. No material shall be disposed of off-site until such time as its disposal is approved by the Architect and, if required, the Contractor will be required to repeat the sorting operation should any material suitable for re-use be discovered in the materials designated for disposal. The pallets shall be located close to the works so that handling and transport is kept to a minimum and the sorting, cleaning and rebuilding operations minimise any further damage during transport or other re-location of the materials. Samples of the original mortars, renders and plasters shall be retained for analysis. The Contractor shall arrange for samples designated by the Architect to be forwarded to an approved laboratory for analysis of all properties including shape, sizes, texture, grading and binder type and proportion which will be used to replicate by the original mixes.

All material unsuitable for re-use shall be retained on site until its removal is approved by the Architect. Once this approval is given, it shall be immediately removed from the site. Similarly, any material found unsuitable during the rebuilding operations shall be piled according to type and only removed when the Architect has given his approval.

Joinery elements, etc., shall be similarly carefully removed, sorted, cleaned and set aside for the Architect's approval before any material is disposed of off-site - refer to the particular sections of the specification for details.

Taking Down Methods
The Contractor shall only employ such methods that cause no shock or vibration to adjacent buildings and equipment or buried services being retained. In general, sections being taken down should be disconnected from sections being retained by hand methods before any removal

is undertaken in order to prevent any accidental damage to the fabric or structure retained. The use of explosives is forbidden.

The Contractor should note the particular difficulties in connection with the taking down works and make his own assessment as to the most appropriate methods to be used at the time of tender. He should note that it may be necessary to undertake the removal works in part or in total by hand demolition.

Where necessary, leave adequate temporary support and protection at each stage and arrange for inspection by the Architect. Maintain and alter temporary supports and protection as necessary as work progresses.

Arrange inspection and approval of a suitably qualified Engineer where any works will involve Mechanical and/or Electrical services.

Take down structure(s) causing a minimum of damage to the houses to be retained and to adjacent property and leave no unnecessary or unstable projections.
Report to the Architect any defects exposed or becoming apparent in adjoining property.

Promptly repair any damage caused to adjacent or adjoining property by demolition work. Make good to ensure safety, stability, weather protection and security.

Structure(s) to be retained
Adequately protect parts of existing structure(s) which are to be kept in place.

Cut away and strip out the minimum necessary and with care to reduce the amount of making good to a minimum.

Prevent debris from overloading any part of the structure which is not to be taken down.

Services which are to remain
Notify the Architect and service authority of any damage. Make all arrangements for repair to the satisfaction of the Architect and service authority. Bear any costs arising.

Method Statement
The Contractor will be required to prepare a method statement detailing the precise details of his proposals for the demolition works and submit same to the Architect for this approval before the work is put in hands. He will be required to modify the method statement as necessary until such approvals are obtained. Such approvals, once given by the Architect shall not relieve the Contractor of any responsibility for any aspect of the taking down works including safety, preventing damage to fabric retained, preventing damage to materials to be salvaged for re-use etc. etc..

Schedules of Works and Programme

The Contractor shall submit to the Architect:

(a) A Schedule of his intended working procedures and taking down works for approval.
(b) An itemised programme chart. This shall be kept continuously up to date during the progress of the works.

The Contractor shall include for the erection of shores and ties where required. He shall satisfy himself that the proposals are adequate, and shall include for, and put forward his alternative proposals if he feels they are not. Drawings and details of such alternative proposals shall be submitted for comment by the Architect in advance.
All propping, needling and shoring required shall be designed, erected (and, where applicable, removed) in accordance with latest codes of practice.

No approval issued by the Architect shall relieve the Contractor of his responsibility for the safety of the general public, site personnel and adjoining properties during the course of the demolition works.

Safety Precautions
Take all safety precautions necessary, including those noted in BS 6187, Clause 5, and relevant Health and Safety Authority Guide Notes. Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of taking down to be used.

Taking down in confined areas and adjacent to structure and fabric to be retained shall be carried out by hand. On no account shall the buildings, scaffolding etc., become overloaded by debris etc. The site shall be kept secure at all times.

General Precautions to Avoid Damage
The Contractor shall carry out the work in such manner as to cause as little inconvenience as possible to the owners and/or occupants of the adjoining premises or the public and shall include in his tender for any costs such as the provision of water for sprinkling the debris to keep down dust. In particular, noise and vibration shall be kept to a minimum, and the Contractor shall take all necessary steps to abate these to avoid inconvenience to others.

The Contractor shall protect adjoining properties roads and footpaths from damage and provide adequate support to them at each stage of taking down, and adapt and re-arrange such support as necessary from time to time. He shall provide all necessary temporary shoring, screens and coverings.

The Contractor shall make good at his own expense any damage done to public roads and footpaths which may be caused by his operations.

The Contractor shall provide all necessary watching and lighting including lights on hoardings or scaffoldings projecting over public footpaths during the progress of the works and shall be responsible for any damage arising from insufficient watching or lighting.

Temporary Supports
The Contractor shall be responsible for the design and provision of all necessary temporary supports, needling, shoring, raking shoring, horsing etc.

Nuisance
The Contractor shall be responsible for the prevention of all nuisance arising from the works, in particular, noise, dust etc. To this end, all dry material shall be periodically dampened to prevent dust rising and no debris shall be allowed to be deposited on the public roadway or adjoining building either during the works and transport of debris from the site.

Health Hazard
Take adequate precautions to protect site operatives and the general public from health

hazards associated with dangerous fumes and dust arising during the course of the works.

Debris
All debris, demolished materials etc., shall be removed from the site and deposited in an approved site provided by the Contractor.

Burning Material
On no account will the burning of material be permitted on site,

Gas or Vapour Risks
Take adequate precautions to prevent **fire** or explosion caused by gas or vapour.

Decayed Timber
All decayed or infested timber shall be carefully removed to prevent the spread of spores or larvae, immediately wrapped before removal from the building and disposed off site. Similarly, other materials adjoining the site of such decayed timber shall, if necessary, be carefully removed and disposed off site or treated with an approved chemical to prevent contamination spreading to adjoining retained structures.

Adjacent Structures
Areas for taking down shall be disconnected from areas being retained by hand by means least likely to cause damage to the retained structures and approved by the Architect. All unnecessary projections shall be removed.

Make Good
The Contractor shall make good as required to ensure safety stability and security of the retained buildings and provide such weather protection to the retained structures as may be necessary.

Protection
Provide all necessary protection as required under BS 6187, Clause 5. In addition, the Contractor shall provide all necessary temporary screens etc., as required for safety, control of noise and dust, temporary weather protection, security etc., or to facilitate the works.

Partly Demolished Structure(s)
Leave partly demolished structure in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse.

Prevent debris from overloading scaffolding platforms.

Prevent access of unauthorised persons to partly demolished structure(s). Leave safe outside working hours.

Asbestos-based Materials
Report immediately to the Architect any suspected asbestos-based materials discovered during taking down work. Avoid disturbing such materials. Agree with the Architect / Engineer methods for safe removal.

Unknown Hazards
Inform the Architect of any unrecorded voids, tanks, chemicals, etc., discovered during taking down work. Agree with the Architect and Engineer, methods for safe removal, filling, etc.

Completion
Clear away all debris and leave the site in a tidy and safe condition on completion.

2.7. Carpentry

CARPENTRY

Relevant Standards

BS 1202 Parts 1-3 1974	Specification for nails.
BS 1204 Part 1 1979 (1991)	Specification for gap filling adhesives.
BS 1204 Part 2 1979 (1991)	Specification for close contact adhesives.
BS 1579 1960	Specification for connectors for timber.
BS EN 10143 1993	Specification for continuously hot dip metal coated steel sheet and strip.
BS 4169 1988	Specifications for the manufacture of glued laminated timber structural members.
BS 4190 1967	Specification for ISO metric black hexagon bolts, screws and nuts.
BS 4471 1987	Specification for sizes of sawn and processed softwood.
BS 4978 1988	Specifications for softwood grades for structural use.
BS 5268 Part 2 1991	Code of practice for permissible stress design, materials and workmanship.
BS 5268 Part 3 1985 (Including amendments)	Code of practice for trussed rafter roofs.
BS 5268 Part 4 1979 (Including amendments)	Fire resistance of timber structures.
BS 5268 Part 5 1989	Code of practice for the preservative treatment of structural timber.
BS 5950 Part 1 1990	Code of practice for design in simple and continuous construction: hot rolled sections.
BS 6399 Part 1 1984	Design loading for buildings. Code of practice for dead and imposed loads.
BS 6399 Part 2 1995	Code of practice for wind loads.
BS 6399 Part 3 1988	Loading for buildings. Code of practice for imposed roof loads.
IS 193 1986	Timber trussed rafters for roofs.

Generally

Design of Timber Structures
Where the design of timber structural members or connections is not provided by Consulting Engineers, the Contractor shall make provision in his rates for all costs associated with the design of the timber structures by a competent firm of Engineers experienced in the design of comparable structures. The Contractor shall submit to the Engineer for his approval, design calculations and stress diagrams for all structural members and connections as well as the specification for the proposed materials to be used.

Member and connection design shall comply with BS 5268 Part 2 1991, IS 193 and BS 5950 Part 2 where applicable, and shall be submitted in such detail as the Engineer may require to satisfy himself as to the adequacy of the structure through all stages of construction and the

serviceable life of the building.

Dead loads shall be based on all the materials and finishes used and shall take into consideration any slopes etc., which may affect the structure.

Fire Resistance
Where a fire rating is stipulated on the drawings, specifications or required by the building regulations Fire Protected member design shall be carried out and calculations etc. submitted to the Architect for approval.

Shop Drawings
Shop drawings are required for assembled components. Drawings should give full details of connections, cuts and grades of timber. Approval of such shop drawings will in no way mitigate the Contractor's responsibility in respect of the adequacy of the structure during erection and through its serviceable life, in accordance with conditions of contract.

Materials

Species and grade
In the absence of notes on drawings to the contrary: Imported Whitewood Special Structural grade or an approved equivalent of comparable strength and stiffness (i.e. strength Class 4 BS 5268 Part 2 or an equivalent Irish Timber strength class C to SR11 : 1988) unless otherwise specified on the drawings.

Other species/grade combinations or strength classes may be used subject to the Architect's approval providing member sizes are adjusted as necessary to compensate for lower design stresses and reduced stiffness.

The Contractor's attention is specifically drawn to the requirement to match the grain pattern, density, durability and all other properties of the existing timber to be repaired. To this end, he will be required to specially select new softwood for these repairs including an end grain density – the historic softwood would typically exhibit a grain density of 24 to 26 annular rings per 25mm when cut at right angles to the line of vertical growth whereas modern commercially grown softwoods currently available on the open market tend to have a grain density of 8 to 12 annular rings per 25mm. He will be required to source softwood, if necessary from overseas, that will match the historic grain density.

Stress Grading
The timber shall be stress graded and marked in accordance with BS 4978 or to an alternative acceptable standard to which the Engineer's approval has to be given.

Grading shall be carried out by persons deemed qualified to do so by Eolas or mechanically in accordance with BS 4978.

The marking of the graded timber shall conform to the requirements of Eolas and NSAI.

The Contractor shall make provision for segregating and storing the graded material in secure compounds, pending fabrication.

Moisture Content
The moisture content of timber at erection and in service shall not exceed the requirements of table 1 BS 5268: Part 2 1984.

Timber shall not be exposed to conditions likely to increase moisture content or otherwise induce deterioration.

Preservation
All new structural timbers shall be factory treated with preservative. Refer to BS 5268 Part 5 for guidance on the preservation of structural timbers.

Treatments shall be double vacuum treated with organic solvent (OS) preservative including a contact insecticide. Composition of treatment shall be in accordance with the relevant specifications of the British Wood Preserving Association (BWPA) Nos. 112 - 116 and 188. A water repellent grade shall be used for timber in an external situation.

Proposals for the treatment of each structural element should be submitted to the Architect and Engineer and approved by him prior to fabrication.

Approval should be obtained in writing from the Architect and Engineer prior to fabrication for any structural elements where the contractor considers that no treatment is required.

All existing timbers to be retained shall receive an application of preservative to be spray applied once the damaged timbers have been removed.

Wallplates
Wallplates shall be stress graded in accordance with the Structural Engineer's specification.

Floor Joists
Flooring timbers, including joists trimmers and bridging shall be stress graded in accordance with the Structural Engineer's specification.

Boarding
Flooring boards shall be square edged, straight and free from defects.

Rafters and Ceiling Ties
Rafters and ceiling joists shall be graded as beams. No increase in the size of knots outside the middle of their length shall be allowed.

Internal struts and Ties
When visually graded these members shall be graded as compression and as tension members in their respective classes.

Battens
Joints in battens shall be sawn square ended and not more than 25% of battens shall be joined on any one rafter. Joined battens shall not occur in a continuous sequence.

Fixing nails shall be 10 gauge round wire and 38mm longer than the batten thickness. At joints the nails shall be skew driven on each side of the joint.

Shakes and Splits
Shakes and splits will not be permitted.

Wane
Wane shall not be permitted within 100mm of the edge of metal plate fasteners, nor within

the area of any joint at the time of fabrication.

Fissures
Fissures shall not be permitted within 100mm of the edge of metal plate fasteners at the time of fabrication.

Dead Knots
Dead knots or knot holes shall not be permitted within 100mm of any plate fastener.

Live Knots
Live knots shall be allowed within the plate area provided that nails and teeth can be embedded satisfactorily in the material of the knots.

Underlay
Roofing underlay felt shall be non-tearable reinforced with polyester fabric, to conform to the relevant British and Irish standards.

Roof Ventilation
Refer to Architects drawings for ventilation details.

Connectors
Connectors shall conform to BS 1579. Bolts shall conform to BS 4190 and BS 5950 Part 2. Screws and nails shall conform to BS 1202. End and edge distances and spacings, shall not be less than the dimensions recommended in BS 5268: Part 2.

All nails, screws, and bolts, in joints likely to be exposed to the weather, shall be galvanised or sheradized or otherwise treated to the Engineer's satisfaction.
Where necessary nails shall be driven into pre-bored holes of diameter not greater than four fifths of the nail diameter.

Nails shall never be driven into splits.

Spacing of nails, screws and bolts shall conform to BS 5268 Part 2 and in no case shall be so spaced as to induce splitting.

Metal Fasteners and Connections
The material used shall be hot-dip zinc coated steel sheet or coil conforming to Class 2A BS 2989, or equivalent approved.

The plate shall be so manufactured that it conforms with the characteristics of the fastener on which the calculations were based. The minimum thickness of plate shall be 0.91mm.

Patent Connectors
Patent connectors, where used, shall carry an Agreement Board Certificate, either No 73/232 or 76/358, and shall be designed and fixed in accordance with the stipulations and conditions of these certificates. All metal plate fasteners shall be stamped with the manufacturers' identification mark.

The fasteners shall be at least the size specified and shall be located to ensure that the correct number of teeth as required by the design are embedded in each member.

Metal plate fasteners shall not project beyond the upper or lower edges of the connecting

members.

Fasteners shall be fully embedded to ensure full penetration of teeth only, and plate to a maximum depth of one quarter of its thickness.

Plywood Gusset Plates
Plywood gusset plates shall comply with BS 5268: Part 2: and shall be designed in accordance with correct and relevant standard structural engineering analytical methods for direct, bending and shear forces.

Plywood shall be suitably protected against damp and the type used shall be appropriate to the exposure condition.

Inspection and Testing
The Architect and Engineer shall have access at all reasonable times to the fabricators yard and works, and shall be provided with the necessary facilities to inspect and test materials at their discretion and at no expense to the Employer.

Workmanship

Timber Dimensions
All timber shall be sawn, planed, drilled or otherwise machined in accordance with the detailed drawings and specifications. The dimensions of the various structural elements shall conform to the Engineer's drawings or otherwise the specialist supplier's approved drawings, subject only to those permissible deviations given in BS 4471. Dimensions and spacing shall not be scaled from drawings or prints.

Bolted joints, toothed plate connector joints, split ring connector joints, shear plate connector joints and glued joints shall be in accordance with BS 5268.

Joints
Surfaces at any joint in the structure shall have a good sawn or planed finish.

Bearing surfaces or notches shall be true and smooth in relation to the other surfaces of the assembly.

Surfaces at any joint will be such that the parts may be brought together over the whole area of the joint before connectors are inserted or any pressure or restraint from fastenings is applied.

Joint details including those of nailed joints, screwed joints, bolted joints toothed plate connector joints split ring connector joints, shear plate connector joints and glued joints shall be in accordance with BS 5268 Part 2 and BS 5950 Part 2.

Patent Metal Plate Connectors
In the case of patent metal plate connectors being used the fabricator's assembly procedure shall utilise the plant and equipment and written instructions of the manufacturer of those connectors.

Fixing and Strapping
Gable and wall plate strapping should be in accordance with the Building Regulations.

Handling
Erection and handling procedures shall be such that the structures are not over stressed during these various stages.

When erected, structural elements shall be braced and fixed in position until complete. The Contractor shall provide for all anchorage's, ties and bracing for maintaining stability during all phases of erection, and during the serviceable life of the structure.

Storage of Timber
Timber and timber products shall be stored in such a manner as to ensure that it is not damaged by the elements, in that the moisture content will be increased or that uneven heat is applied.

If site storage is unavoidable treatment with approved moisture retardants may be required by the Architect at no extra cost.

Should timber or timber products be stored under polythene provision shall be made for adequate ventilation.

Timber should be ordered to a programme that will reduce site storage time to a minimum.

Safety Regulations
All statutory safety regulations shall be adhered to in respect of the erection of the structure and all reasonable care shall be taken as a precaution against accidents. The Contractor shall provide for the necessary labour and materials to meet those requirements.

Decayed Timbers
All decayed timbers shall be carefully cut away to good sound timber under the direction of a specialist. Existing and new repair timbers shall be liberally treated with preservative. Surrounding masonry shall be drilled and irrigated by an approved specialist. Sawn ends of repair timbers to be vulcanised by wrapping in self-adhesive bitumen-based membrane.

2.8. Windows

2.8.1. General

General.
This specification is outline in nature and intended to provide the basis for which the windows will be repaired. The Contractor will be required to prepare a detailed method statement and to amend and adjust it until such time as the Architect approves the document. The Contractor will be required to continually update the method statement as the work proceeds to take account of the various matters discovered during the works and to obtain the Architect's approval for each update as required for his original statement.

Existing Windows
All existing windows being retained are to be carefully removed and set out to enable a detailed assessment of their condition and the necessary repairs to be undertaken. The Contractor shall carefully record the original position of each window and code the opening and window as the numbering system shown on the drawings, to ensure each window is returned to its original opening. It is the intention to repair the windows as far as possible as opposed to replacements; however, there are a considerable number of modern replacements which do not match the original style and these are to be replaced with new windows to match the original style. Upon completion of the repairs, the windows are to be reinserted into their original opes with new fixings and all plasterwork, window boards, linings etc. to be reinstated or renewed as necessary.

Removal of Windows
The Contractor shall carefully remove all windows from their openings. It is likely that this will require the careful removal of the window boards and the stripping of any plasterwork to the reveals. Where decorative linings, shutter boxes etc. are encountered, these are to be removed as a single composite item as far as possible unless the Contractor can demonstrate to the Architect that it is necessary to remove them by element. In all cases, no damage shall be allowed to occur to the windows or any associated items of joinery as mentioned above and he will be responsible to repair or replace any damaged at his own expense and as decided by the Architect and at his own expense. The Demolition Contractor will remove windows from the areas of the building to be removed and these will be available for salvage and as components for repairs to those retained. In the case of the modern windows or incorrect style, these shall be disposed of off-site by the Contractor.

Once removed, the windows shall be stored in dry, well ventilated conditions in such a manner that no damage, distortion or other harm comes to them. In addition, to enable a full assessment to be undertaken, the sashes shall be removed from the frames and any sash weights or other mechanical components shall be labelled with the window code and location of the component and safely stored. All such windows and components shall be stored in such a manner that they can be fully accessed to enable a detailed assessment of the windows and associated components to be completed.

Historic Glass
The Contractor's attention is drawn specifically to the sashes that contain historic glass – that is, glass manufactured by historic processes. Generally, this appears to be spun cylinder or cathedral glass. He should note that such glass tends to be thinner than modern glass and is brittle and very easily broken. He will be required to protect all such glass and any pane broken during the works shall be replaced with modern glass manufactured by the historic process to

replicate the original panes. **The Contractors attention is specifically drawn to the cost of such glass, which is considerably in excess of modern glass.**

Detailed Assessment
The Contractor shall undertake a detailed assessment of each window to be retained and schedule the repairs necessary to return it to a durable working condition. It is the intention that any repairs or replacements should not be visible when the repairs have been completed and the window re-inserted in its original opening and decorated. When the detailed assessment has been completed, the Contractor shall agree the repairs necessary to each window with the Architect before the work is put in hands – the Contractor shall note that he may be required to amend the works to the window before the Architect's approval is obtained. In the case of the modern windows to be replaced, no detailed assessment will be required as new windows to match the original style are to be provided.

Repairs
Where repairs are being undertaken, the decayed timber shall be carefully cut out and replaced with new timber approved by the Architect. As far as possible, timber match the original grain density and pattern should be used, salvaged timber from demolished buildings may offer a source of such timber or suitable hardwood should be used. In all cases, the timbers shall be carefully jointed in such a manner as to provide a durable joint that will exclude water. All staff beads and parting beads shall be renewed in hardwood to match the size and moulding except in areas where the Architects indicate that draught-proofing will be required when an approved system such as 'Ventrolla' or similar and approved shall be provided by the Contractor. All foxings shall be reinstated to form a draught-proof seal or new foxings provided.

It may be necessary to remove the glass from the sashes to effect proper repairs. In cases where historic glass is present, the Contractor will be required to carefully remove the panes without any damage. Should a pane become damaged during the work, the Contractor will be required to replace it with matching historic glass at his own expense. To avoid any confusion, the Contractor will be required to prepare a survey of all damaged glass panes in the windows before the work commences and to supply copies to the Architect for his approval before any work is put in hands.

All timber shall be stripped back to the original face and all paint removed. Particular care shall be taken to ensure that the weathered surface of timbers, any existing shakes, splits etc. are all stabilised and, if necessary filled, to ensure the durable adhesion of the new paint coatings.

All loose or perished putty shall be carefully removed and replaced with putty to match the original profile. Any damaged glazing beads shall be replaced in timber as noted above and re-building in putty or other materials will not be permitted.

Hanging Sashes
All sashes to be hung shall be carefully weighed and the existing sash weights adjusted as required. Where sash weights are missing or cannot be altered sufficiently, the Contractor shall provide new sash weights of the appropriate weight. Upon completion, the windows should open and close with the minimum of effort and should remain in the position set and not slide up or down. Only best quality cotton sash cord of the appropriate grade shall be used.

Installing Windows
All repaired or replaced window frames shall be reinstated in their original openings using new grounds and fixings to match the originals or alternatives that have been approved by the Architect. In all cases, the external interface with the masonry, rendered or other walls shall be neatly pointed with a two pack polysulphide or silicon mastic bed.
All internal window boards, plaster linings and linings, shutter boxes etc. shall be reinstated in such a manner that, when the decoration is complete, there is no evidence of their removal.

Decoration
All surfaces of the windows shall be prepared, primed and undercoated before installation. After installation, any damage to the undercoat shall be repaired, the exposed surfaces gently sanded and painted with one coat undercoat and one finishing coat to selected colours. When the paint has been fully dried, each window shall be checked to ensure it operates properly and any that fail to do so shall be adjusted as required. On no account shall the sash cord be painted and any contaminated with paint shall be replaced at the Contractor's expense.

2.9. Doors

2.9.1. General

General
Existing doors to be evaluated for suitability for upgrading to achieve the necessary fire-rating.

Hinges and ironmongery to be evaluated and upgraded if necessary.

New mortices may need to be 'pieced in'.

Warped doors to be examined to identify specific warped elements, and dismantled if necessary, to enable new replacement components to be fabricated using the original as a template and the doors to be reassembled incorporating the replacement parts.

Preparation
Ensure surface is sound, clean, dry and free from dirt, grease, wax, loose material and surface contamination. Sand down. Dust down. Ensure working area is clean, dry and warm.

2.9.2. Fire

Fire & Smoke Seals
Fire and Smoke seals to be fitted to doors and door frames. Door and frame to be routed to receive intumescent strips. This should be carried out with great care and painted white to match the remainder of the door when complete. The architraves will be carefully removed from the door frame and wall where intumescent material will fill any voids behind the architrave. The architraves will then be refitted in exactly the same position that they had been before the treatment.

Application of Intumescent Coating with Card Faced Intumescent Material
In order to achieve 60 minute fire-rated doors it is necessary to fit 1mm thick carded intumescent material to the panels of the existing doors. The carded intumescent material will be cut using a sharp knife to suit the size of the existing panels. They will fit neatly into the panels and are completely reversible if they need to be removed at a later date.

Prime the door panels with E093 Envirograf Stabond. Allow to dry (approx 1 hour). Apply Envirograf E046 - IA Adhesive, with a comb applicator to the panel and to the rough side of the intumescent card and adhere together. Allow to dry overnight.

- **Step 1.** Apply 1 coat of HWAP/WB Adhesion Primer at 12 m2 per litre to the beading, rails and stiles.
- **Step 2.** Apply 2 coats HW01 White Intumescent coating at 8 m2 per litre, per coat to the beading, rails and stiles.
- **Step 3.** Once dried, apply 1 coat of WBI White protective topcoat at 10 m2 per litre, to the whole surface of the door.

Door closers to be fitted to all fire doors leading onto main staircase.
The above treatment will upgrade existing doors to 60 minute fire rated doors in compliance with BS476 Part 22.

2.10. Floors

2.10.1. General

Floors
Floors are to be protected prior to carrying out any overhead work.

Recording of Floorboards
Where floorboards are being opened up, all existing floorboards are to be carefully recorded and numbered both photographically and on a drawing of the Area. A detailed plan is to be prepared to indicate numbering of each board, its location and direction of the board.

Boards are to be clearly tagged underneath in a consistent manner for reinstatement in the same exact position. It is not always necessary to remove thresholds and skirting's when floorboards are being lifted and in some cases it is preferable to retain edge boards to keep skirting/thresholds intact.

Removal of Floorboards
Before lifting of boards, carefully remove the skirting boards and thresholds.

Floorboards are to be carefully removed for re-use without undue force in order to reduce damage to the board and also vibrations that may cause damage to the ceiling below. As the removal of board's proceeds, temporary plywood sheeting is to be screw fixed to the joists. At no time shall an individual joist to be loaded by foot traffic or otherwise.

Floorboards shall be carefully stored in the Areas from which they were removed. All efforts shall be made to protect existing floors from damage, dirt, moisture and thermal shock.

Pugging in Floor & Ceiling Voids
Where historic pugging is encountered within floor voids the Contractor shall ensure that where this is required to be carefully removed by hand and by soft nozzle vacuum cleaner, great care to be taken to avoid damage or loosening of the plaster key to lath of the ceiling below.

In specific cases this may require a plasterwork specialist.

Structural Timbers
Other than by specific prior agreement with the Authority, notching or drilling of floor joists is not permitted.

Reinstatement
All floorboards are to be reinstated in exact position as removed from according to recording method above. Reinstated skirting boards and thresholds are also to be replaced in exact position as removed.

2.11. Ancillary Joinery

2.11.1. General

General Joinery
Timber for joinery to be decorated with opaque coatings (paint) be as follows:

a) Hardwood shall be Class 2 to BS 1186, specially selected as suitable for usage intended as described in Appendix B and C. Hardwoods described as 'resinous' shall not be used.
b) Moisture content shall not exceed the recommendations set out in Section 3 and Table 3. On no account shall the moisture content for external joinery exceed 17%.
c) No exposed piths, arris knots, shakes, compression wood, sapwood, brittle heart, plugs, inserts or other natural defects or repairs will be permitted on any face of the hardwood. All timber shall be free from all decay and insect attack.
e) The grain shall be clean and straight with clearly defined arrises, with the grain slope not exceeding 1:8. Exposed faces shall show the same grain characteristics throughout and shall be free from knots, stains, discoloration and checks.

Samples
The Contractor shall provide samples of the types of hardwood he proposes to use for the Architect's approval. All hardwoods used in the works shall be of an equal or greater standard to the approved sample.

Timber for Grounds etc.
Timbers to be permanently concealed and used for grounds etc. shall be free from decay and all defects that would affect its long term stability and durability or the accuracy of the completed works. It shall be treated with an approved preservative.

Hardwood for Lippings, Beads etc.
Hardwoods for lippings, beads etc. shall be virtually straight grained with good matching qualities and be of the same species as the Hardwood for the joinery.

Timber Sizes
Sizes shall be finished sizes and no deviation from these sizes will be allowed without the Architect's prior approval. In general, they should comply with the requirements of BS 5450.

Seasoning and Moisture Content
All timber shall be seasoned to the specified moisture content before the works commence. The Contractor shall prepare kiln drying schedules to ensure that the required time for drying, seasoning, sections size and ultimate usage are taken into account and kilning defects are avoided.

Plywood
Generally shall comply with BS 1455. Use as follows:

Grade 1 veneer	where clear finish required
Grade 2 veneer	where oil painting required
Grade 3 veneer	for concealed surfaces
Bonding type M.R.	for interior use

Bonding type W.B.P	for exterior use
Bonding type I.N.T.	not to be used
Marine plywood to BS 1088	for exterior use.

Medium Density Fibreboard
Medium density fibreboard shall be 'Medite' from Medite Ltd. Clonmel or other equal and approved, shall be the waterproof quality (Medite 313 - Moisture Resistance M.D.F.) with given centre core to the thickness shown on drawings.

Fixings
Fixings and adhesives shall be as specified in CARPENTRY.

Nail Lengths
Nail lengths to be not more than total thickness of sections to be joined less 3mm but otherwise not less than 2 times thickness of board/strip at point of fixing.

Screw Lengths
Screw lengths to be not more than total thickness of sections to be joined less 3mm but otherwise not less than twice thickness of board/strip at point of fixing.

Mastic
Mastic shall be non-setting butyl mastic to the approval of the Architect.

Glue
Glue shall be best quality synthetic resin glue and shall be approved by the Architect.

Adhesives
Adhesives for exterior use shall be synthetic resin type complying with BS 1304: Part 1, type "W.B.P." Adhesives for interior use shall be synthetic resin type complying with BS 1304: Part1, type "M.R." Unless otherwise stated, the following grades of glue bonding shall be used:

a) INT for internal work.
b) MR for internal work in humid areas.
c) WBP for external work.
d) Mastic shall be non-setting non-staining two pack polysulphide or silicon mastic to BS 5215 or 5889 to the approval of the Architect.

<u>Workmanship</u>

Standard
Frame accurately and execute in a sound workmanlike manner in accordance with best practice and complying with BS 1385: Part 2, but to true lengths and levels and avoid the use filling pieces.

Profiles and Mouldings
Existing mouldings and profiles, both for new works and repair works, shall be accurately replicated and the Contractor's attention is drawn to the subtle variation that exists throughout the six houses and that will be required to be replicated. The Contractor will be required to submit full sized drawings of each and every moulding and profile type to the Architect and shall be responsible for the accuracy of all such mouldings and profiles. Full sized samples of the original fabric (where these are available) and the Contractors proposed replicas shall be submitted to

the Architect to demonstrate compliance with this requirement. Profiles of sections shall not be modified from those shown on drawings without prior approval.

Surface Treatment
Sand and produce a smooth surface to joinery requiring a clear finish. Use approved filler to overcome the coarse grain, to uneven suction conditions or where growth rings are coarse. Coat all knots and stop nail and other holes to match adjacent wood. Joinery detailed to be oil painted is to give a surface such that if it is properly painted in gloss paint no imperfections will be apparent.

Finish
Plane, thoroughly clean, sandpaper and leave unstained for finishing as required.

Arrises
Arrises shall be as shown on drawings.

Punching
All nail heads shall be punched below timber surfaces which will be visible when completed.

Countersinking
All screw heads shall be countersunk not less than 2mm.

Pelleting
All screw heads shall be sunk 6mm below timber surfaces that are to be clear finished. Grain matched pellets not less than 6mm thick and cut from matching timber shall be glued in place and finished off flush with face.

Proprietary components
All proprietary components shall be fixed in accordance with manufacturer's recommendation.

2.11.2. Fixing Frames: Preparation and Positioning

Priming and Sealing
All frames shall be primed or sealed as specified before fixing.

Loading
Frames must not carry any structural loads unless designed to do so.

Opening Lights
All opening sections shall be kept closed and secured during all operations until fixed, retaining any clamping devices in position.

Horns
All horns shall be removed before fixing.

Placing
All frames shall be plumb, level and square.

Damp Proof Courses
D.p.c.'s shall not be displaced and should be positioned correctly in relation to frames.

Building In
All frames shall be supported and braced as necessary to prevent distortion during erection of adjacent structure.

Prepared Openings
All joints shall be packed to maintain specified widths, including at positions where fixings tighten frame against structure.

Packing
The unobstructed depth of joint recommended by manufacturer of sealants shall be strictly observed.

Distortion
Extreme care should be taken to avoid distortion of frames when driving edges or other packing, or when tightening fixings. Adequate clearance shall be maintained for opening parts. If necessary, packing and fixings should be adjusted to eliminate binding. On no account should frames be cut, plane or sand to remedy distortion.

Fixing Positions
Fixings shall be at approximately 150 mm. from bottom edge and not more than 600mm centres unless shown otherwise.

Architraves
Architraves shall be fitted in un-jointed lengths with mitred angles between joints unless otherwise specified, and fixed securely to prevent pulling away, deflection etc., during use.

2.12. Services Installation Philosophy

In general, the electrical works should attempt to reuse existing cable and duct positions, improving or adding to these where necessary. The addition of new trunking, ducting and cabling for the electrical will therefore be decreased and any new chasing/opening-up/notching etc. will be significantly reduced.

There is no existing mechanical provision in the house so any mechanical works will be more intrusive than the electrical services. In general, mechanical services will follow the lines of existing joists and, in all cases, will avoid the removal of any decorative fabric.

A brief list of 'dos' and 'don'ts', in relation to the M&E interventions is given below. It is not exhaustive but has been useful in guiding the design.

Do's
Make redundant, unsightly wiring, through use of wireless systems.
Removal of unsightly redundant wiring, surface trunking etc.
Existing services routes which are seen to be particularly intrusive within the historic structure should be revised and routed away to less critical locations.
Careful patching, making good and redecoration of any chases/holes in plasterwork and joinery that have been made previously.
Repairs of any notching in structures that has caused weakening.
Confine works, where possible, to single vertical and horizontal locations, away from areas of decoration.

Don'ts
Where possible, avoid any chasing into walls. If required, note on drawings now.
Where possible, avoid any opening up of ceilings or other historic fabric. If required, note on drawings now.
Drop down boxings to contain new ducts are not acceptable and are likely to be unsightly and have an impact on architectural features. If absolutely necessary, these should be noted on drawings now.

2.13. Painting

2.13.1. General

Standards

The works shall comply with the requirements of BS 6150, BS 5593 and BRE Digest 261 as relevant.

White Spirit to be to I.S. 17.

Knotting shall be made with pure shellac and industrial methylated spirits conforming to I.S. 17.

The priming paint for woodwork to be oil painted, shall comply with I.S. 18.

The primer for ironwork shall be red lead priming conforming to I.S.18.

The primer for galvanized metalwork shall an etching type primer or Calcium plumbate primer to B.S. 3698 Type A.

Red oxide linseed oil priming paint shall be to B.S. 2524.

Emulsion Paint shall not be of lesser standard than that required by I.S. 179

Oil Finishing Paint shall not be of lesser standard than that required by I.S. 32

Breathable paints shall have an Sd (permeability) value of around 0.02m to 0.5m.

Materials

Paint removers, cleaning agents, rust inhibitors, glue size, knotting, stopping, fillers and other preparation materials for painting work shall be types recommended by the manufacturer of the coating to be used.

Stopping for woodwork to receive opaque finish, plywood, and fibreboard, shall be as approved and tinted to match colour of undercoat.

Stopping for woodwork to receive clear finish, shall be tinted to match surrounding Woodwork.

Woodwork to be oil painted, shall be an approved oil resin primer containing aluminium of the same manufacturer as the undercoating.

Primer and thinner for polyurethane lacquer shall be as recommended by the Manufacturer of the lacquer being used.

Coating materials are to be delivered in sealed containers, clearly labelled as follows:

1. Type of material.
2. Brand name.
3. Intended use.
4. Manufacturer's batch numbers.

Batch deliveries of coating materials dated for use in order of delivery.

Paints other than water based and bituminous, delivered in containers of not more than 5 Litres capacity.

Store materials in a clean, dry area protected from extreme temperatures.

Priming coats, undercoats and finishing coats for any one surface must be obtained from the same manufacturer.

All materials shall be used in strict conformity with the manufacturer's recommendations, paying particular attention to initial preparation of the base.

Preparation

Prepare surface for decorative coating in accordance with the manufacturer's recommendations.

Strippers.
Use paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, size, stopping, knotting and fillers in accordance with their manufacturer's recommendations.

Defects.
Ensure that all holes, cracks, defective joints and other defects in surfaces to be prepared and coated have been made good.

Pre-Primed Surfaces.
Ensure that surfaces have been properly prepared and that primer is of suitable type firmly adhering and in good condition.

Drying Out.
Before decorating allow surfaces to dry thoroughly.

Brush Down.
Brush down all surfaces, immediately before decorating, to remove dust, dirt and loose material.

Sample Areas.
Before applying coatings, prepare representative areas of each type of surface, to Architect's approval.

Existing Surfaces.
Existing woodwork shall have all existing coatings removed to expose the original timbers. Any timbers showing defects shall be repaired to the Architect's satisfaction; any loose or defective putty shall be removed and replaced. New and existing timber surfaces shall be sanded to form a smooth, stable base. Knot, stop, prepare, prime and paint all surfaces with two coats undercoat and one coat full gloss oil paint to colours selected by the Architect.

Painting Work To Be Done

Preparation.
Prepare as specified generally. Prime, stop, fill, prime again and paint two undercoats and one finishing coat.

All existing joinery shall be stripped to the bare wood, sanded smooth and painted as specified for new wood.

Newly plastered internal walls, finished in lime, shall not be painted until the lime has cured sufficiently, and shall be painted with breathable paint

Newly gypsum skimmed plasterboard shall be primed and painted as specified.

Coating materials generally
Check that all materials to be used are recommended by their manufacturers for the particular substrate and conditions of exposure, and that they are compatible with each other. Inform the Architect of any discrepancy and obtain instructions before proceeding with application of coating.

Generally.

Control Sample(s)
Complete representative sample areas of each type of coating, including preparation of surfaces. Obtain approval of appearance before proceeding.

Previous Treatments
Where surfaces have been treated with preservatives or fire retardants, check with treatment manufacturer that coating materials are compatible with the treatment.

Cleanliness
Keep all brushes, tools and equipment in a clean condition. Keep all surfaces clean and free from dust during coating and drying. Provide suitable receptacle for liquids, slop washings etc.

Preparation Of Materials

Generally
Prepare coating materials as recommended by their manufacturers.

Strain
Through fine gauze any coating materials showing bittiness in application.

Do Not Intermix different coating materials.

Stir coating materials to attain an even consistency before use unless otherwise recommended by manufacturers.

Protection

Damage
Adequately protect freshly applied surface coatings from damage.

Adjacent Surfaces
Adequately protect surfaces adjacent to those being covered.

Generally
Apply coatings in accordance with their manufacturers' recommendations, to clean, dry surface in dry atmospheric conditions and after any previous coats have hardened.

Unsuitable Conditions
Do not apply coatings to surfaces affected by moisture or frost, when ambient temperature is below 4 degrees C or when heat is likely to cause blistering or wrinkling.

Priming Generally
Apply priming coats by brush unless other methods are approved by the Architect. Work primer into surface, joints, angles and end grain. Ensure that priming coats are of adequate thickness and suit surface porosity. Ensure that any primed surfaces which have deteriorated on site or in transit are touched up or re-primed.

Priming Joinery
Prime all surfaces before joinery leaves the joinery shop.

Priming Metal
Prime metal surfaces on same day as they have been cleaned.

Undercoats
Apply an even film over all exposed surfaces, avoiding uneven thickness at edges and angles.

Use different tints for successive coats.

Finishing Coats
Apply an even film over all exposed surfaces avoiding brush marks, sags, runs and other defects.

Rub Down all priming and undercoats to a smooth surface with abrasive paper and remove all dust before applying the next coat.

Cut In neatly and cleanly. Do not splash or mark adjacent surfaces.

Brush Painting
Apply all paints by brush unless otherwise specified. Lay off all areas evenly, and ensure that finished surfaces are free from brush marks.

OUTLINE CONSERVATION

SPECIFICATION

FOR

WORKS TO REMOVE & RELOCATE STATUARY ETC

AT

THE FORMER HOLY CROSS COLLEGE

CLONLIFFE ROAD,

DUBLIN 3.

June 2021

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Conservation Specification for Works to Remove and Relocate the Statuary & Altars etc during the Enabling Works Contract to the Chapel at Former Holy Cross College, Clonliffe Road, Drumcondra – a Protected Structure

1. INTRODUCTION

This Specification sets out the Works Requirements to the statuary and altar elements including the organ, the main altar, side altars, and statues of Cardinal Cullen and Pope Pius IX (scheduled and drawn in detail by McCullough Mulvin Architects) during the Enabling Works Contract. The Contractor shall provide a detailed Method Statement for each individual Phase of the Works once appointed.

The Works have been divided into three main Phases as follows:

PHASE 1 Removal of Altars, Statuary etc and Transport.

A. Preliminary Inspection.
B. Detailed Method Statement.
C. Detailed Inspections.
D. Records of Stonework
E. Work Site Requirements
F. Disassembly and Removal.
G. Removal and Transportation of Statue Base
H. Transport
I. Removal of Substructure
J. Temporary Reinstatement of Surfaces Following Removal of Elements.

PHASE 2 Temporary Relocation for Display and Storage.

A. Detailed Method Statement
B. Work Site Requirements for New Location
C. Re-erection of Altars, Statuary etc for Temporary Display.
D. Cleaning & Conservation of Items on Temporary Display.
E. Ongoing Maintenance Requirements over the full Phase 2 Works Period.
F. Unpacking, Laying out and Storage Item at Contractor Storage Facility.

PHASE 3 Removal/Transport from Temporary Display/Storage and Final Reinstatement.

A. Detailed Method Statement
B. Work Site Requirements at New Temporary Location
C. Removal of Items on Temporary Display.
D. Removal and Transport of Altars, Statuary etc.
E. Transport from Temporary Display area and Contractor Storage Facility
F. Work Site Requirements at Permanent New Location
G. Final Reinstatement of the Altars, Statuary etc.
H. Cleaning Down and Completion.

2. RECENT CONSERVATION

There have been no known recent significant conservation works to the elements within the chapel.

3. DESCRIPTION OF THE ITEMS

The items are fully scheduled and described in the drawings and schedules provided by McCullough Mulvin Architects.

4. PHASED WORKS STRUCTURE

4.1 PHASE 1 REMOVAL OF ELEMENTS AND TRANSPORT

A Preliminary Inspection

All items shall be carefully inspected and assessed prior to the commencement of any physical Works to determine the precise methods of assembly. This preliminary inspection will assist the Contractor in preparing his Detailed Method Statement for Phase One of the Works.

B Detailed Method Statement

The Contractor shall be required to produce a detailed Method Statement which covers all aspects of the Works required for Phase One. The detailed Method Statement shall be fundamentally based upon the Conservation Architects Specification but shall be further developed and enhanced by the Specialist Sub-Contractor.

The Contractor shall be required to submit the detailed Method Statement to the Employer's Representative for approval ten days in advance of any physical Works commencing. The Employer's Representative will respond with amendments within five working days. It shall be necessary for the Contractor to further adjust, amend and revise

the detailed Method Statement as the Works progress to take account of the statuary assembly etc as the Works progress.

Any necessary alterations to the detailed Method Statement that may arise during the execution of the Works shall require the Employers Representatives pre-approval.

C. Detailed Inspections

Before commencement of any physical Works on the altars, statuary etc. and subsequent to the Employers Representative approval of the Contractors detailed Method Statement, the Contractor shall carry out a detailed inspection of each element to confirm or otherwise the accuracy and effectiveness of his approved detailed Method Statement.

The Contractor is required to undertake routine detailed inspections on a continual basis during the Phase One Works to capture any alterations that may be required from the approved Method Statement for Phase One of the Works.

D. Records of Stonework, Etc.

All items shall be fully recorded by photograph and all existing damage to the items noted and submitted in report format to the Employer's Representative, five days in advance of physical works commencing on the element. The Contractor shall be held responsible for any damage not included in this report in advance of the Works.

The precise location of items of stonework etc. shall be recorded as per drawings supplied by McCullough Mulviin Architects and coded so each item or dismantled part of each item can be precisely located. The Contractor will be required to produce further drawings recording the precise location of internal stonework as Works to remove the element progress. The drawings will be in the same format as McCullough Mulvin Architects drawings and shall be submitted to the Employer's Representative three days in advance of the agreed date for site meetings.

The code shall be marked on each item or dismantled item by such means as cannot be accidentally removed but can be easily removed without blemish upon completion of the repairs at a later stage. The Contractor is required to maintain these markings for the duration of the Works. Similarly, each individual disassembled part of stonework shall be coded so that its relationship to adjoining parts can be precisely identified and recorded on drawings, photographs or other approved means.

All records shall be handed to the Employer's Representative upon completion of Phase One of the Works.

E. Work Site Requirements

The Contractors specific site establishment and site management measures shall be compliant with all specifications and requirements in the architect's specifications.

F. Disassembly and Removal

The Works to disassemble and remove the Monument shall be executed in compliance with the detailed Method Statement agreed with the Employer's Representative.

In general, all pointing joints in stonework shall be carefully opened and existing pointing removed. The raking out shall be carried out by manual means using chisels, hacksaw blades or other appropriate instruments. Mechanical systems, hand saws or hand discs for raking out shall not be used except with the prior approval of the Employer's Representative. If the Contractor desires to use such methods he shall be required to demonstrate the effectiveness of the methodology to the Employer's Representative. However, the Employer's Representative retains the right to instruct that the raking out shall be undertaken by manual means.

Dowels or other fixings shall be carefully removed without damage. The Contractor shall check for the existence of lead beds or skids and note their location. All such original fixings shall be carefully retained, placed in a suitable container and coded and taped to the item from which they were removed in such a manner that the original fixings can be re-used in their original locations (if condition permits) during later reinstatement - all such fixings shall be retained regardless of condition.

Separating joints between individual stones shall be undertaken by gently and carefully prising apart using timber wedges where necessary. Before attempting to undo a joint, the Contractor shall carefully check all faces of the joint to ensure that all joints in stonework have been carefully inspected on an individual case basis to determine if such procedures are appropriate. The timber wedges should be driven into the stone bed gradually along the length of the bedding joint at regular centres between 200mm and 300mm. Where individual stones are exposed on more than one face they should be wedged up on all sides. When the stone has been wedged free timber spacing battens (60mm x 30mm) should be inserted at regular intervals to support the stone and to allow for the insertion of canvas straps for lifting.

The latent construction of some elements is unknown and will need to be reviewed once facing stones are removed.

Individual stones/carvings depending on their size shall be lifted clear by crane following the removal of all pointing and bedding material on carefully positioned canvas slings to fully support each stone adequately and to ensure that no damage occurs to the arises of the ashlar. This may require the insertion of timber spacers between the stones and the

canvas slings. Stones shall be carefully placed on wooden pallets in such a manner as to avoid any risk of damage; and does not allow for stacking items of cut stone The Contractor shall include a methodology for palleting of stone as part of the detailed Method Statement, which shall be subject to agreement of the Employer's Representative. The Contractor shall be required to remove original bedding mortar samples from a selected number of locations (six maximum) for petrographic analysis at appropriate laboratory in order to determine the contents and ratios of the original mixes for matching purposes in the reassembly/reconstruction.

G. Removal and Transportation of Items

The Contractor shall provide full protection to all stone features from accidental impact and damage. This will require the careful application of flexible layers of foam based material to all surfaces and in particular to projecting items in advance of any physical Works commencing.

The craning of the statuary will require extreme levels of care in providing adequate levels of protection to the figures prior to removal and in the location of canvas lifting straps. The Contractors detailed Method Statement shall be required to provide an in-depth methodology for the protection and lifting of the statue.

The fixings of statuary and detail shall be fully determined and released prior to removal of statuary. All fixings shall be salvaged and labelled.

Wedge up the joints between the base of statuary and the stonework until the joints are free. Secure the statuary with canvas slings as necessary ensuring that the location of the slings do not impact on any projecting elements. Connect slings to lifting crane and ensure prior to craning that the statues are fully secure and balanced for lifting vertically. Transfer stone figure to appropriate transporter for delivery.

The Contractor shall be required to remove by crane the statue at such a time as to minimise disruption. The Contractor shall supply suitable crane and flatbed vehicle and to remove the items.

H. Transport

When an item of stonework has been disassembled and removed it shall be carefully inspected for damage and any additional damage not previously recorded shall be recorded and reported to the Employer's Representative. The items or parts of an item shall be checked to ensure the coding has been correctly applied and recorded and carefully packed as necessary to obviate any damage during transport. The packed items shall be loaded onto a suitable enclosed vehicle and transported to the storage facility. Individual stones shall be separated vertically and horizontally to ensure no damage results to stonework or arises from contact with adjoining stones. The packing in the

vehicle shall be undertaken in such a manner to ensure that no items fall, rub against adjoining items or the sides of the vehicle or move during transport. Suitable restraints shall be provided during transport. The items shall be transported as suitable loads are available and not stored on site and removed in a single operation when the Works of removal and / or disassembly has been completed.

I. Removal of Substructure

Parts of the Works includes for excavation below ground level in order to remove any substructure. All other items of stone or associated elements of the substructure of the element shall be carefully recorded, and placed on pallets for transport to the Heritage Contractors Storage facility.

J. Temporary Reinstatement of Surfaces Following Removal of Element

The Contractor shall be required to fill in the excavations following the removal of the element and to reinstate the surface areas formerly occupied. The surface finishes shall match the existing paving finishes.
The Contractor shall reuse salvage material available on site or source new stone as required for this work.

4.2 PHASE 2 TEMPORARY RELOCATION FOR DISPLAY AND STORAGE

A. Detailed Method Statement

The Contractor shall be required to produce a detailed Method Statement which covers all aspects of the Works required for Phase Two. The detailed Method Statement shall be developed and enhanced by the Heritage Works Contractor in light of the Works completed and the detailed Method Statement developed in Phase 1 of the Works.

The Contractor shall be required to submit the detailed Method Statement for Phase 2 to the Employer's Representative for approval ten days in advance of any physical Works commencing on the element. The Employer's Representative will respond with amendments within five working days. It shall be necessary for the Contractor to further adjust, amend and revise the detailed Method Statement as the Works progress to take account of the elements needs as Works progress.

Any necessary alterations to the detailed Method Statement that arise during the execution of the Works shall require the Employers Representatives pre-approval.

B. Work Site Requirements at Temporary Display Location

The Contractors specific site establishment and site management measures shall be compliant with all specifications and requirements in the architect's specifications.

C. Re-erection of Element Items for Temporary Display

Temporary bases for any element will need to be provided at any new display location to an approved structural engineer's specification.

D. Cleaning & Conservation of Elements on Temporary Display

These elements will require evaluation and assessment following their careful positioning and fixing on the temporary base. Methods shall be based on the Cleaning and Conservation specifications elsewhere and shall be included in the Contractor's detailed Method Statement

E. Ongoing Maintenance Requirements over the entire Phase 2 Works

The Contractor shall be required to carry out all ongoing necessary maintenance to the elements including inspections and reports on their condition during temporary display.

F. Unpacking, Laying out and Storage of Items at the Storage Facility

Upon arrival at the storage facility, each item or part of an item shall be carefully unpacked and checked for damage - any damage shall be recorded and reported to the Employer's Representative.

The items shall be laid out in such a manner agreed with the Employer's Representative to permit easy access and inspection of all items individually.

The Contractor shall submit an annual report to the Employer's Representative detailing ongoing storage issues and conditions.

4.3 PHASE 3 REMOVAL/TRANSPORT FROM TEMPORARY DISPLAY/STORAGE AND FINAL REINSTATEMENT

A. Detailed Method Statement

The Contractor shall be required to produce a detailed Method Statement which covers all aspects of the Works required for Phase Three. The detailed Method Statement shall be further developed and enhanced by the Heritage Works Contractor in light of the Works completed and the detailed Method Statement developed in Phase One & Two of the Works.

The Contractor shall be required to submit the detailed Method Statement to the Employer's Representative for approval prior to any physical Works commencing on the element. It shall be necessary for the Contractor to further adjust, amend and revise the

detailed Method Statement as the Works progress to take account of the Monuments needs as the Works progress.

Any necessary alterations to the detailed Method Statement that may arise during the execution of the Works shall require the Employers Representatives pre-approval.

The Contractor shall submit the revised method statement to the Employer's Representative three days in advance of the site meeting, for review and agreement.

B. Work Site Requirements at Temporary Location/Storage Area

The Contractors specific site establishment and site management measures shall be compliant with all specifications and requirements in the architect's specifications.

C. Removal of Items on Temporary Display

Elements shall be removed from their temporary display locations for reinstatement in permanent locations once established. The procedures followed in the original transfer of the statue and its temporary erection in Phase 2 shall generally be repeated in reverse. The Contractor shall be required to remove and dispose of any temporary foundations/bases and to make good the ground in the area where the temporary display took place.

The Works to disassemble and / or remove the items of stonework shall be executed in compliance with conservation specifications addressing stonework.

D. Removal and Transportation of Elements

The Contractor shall provide full protection to all features from accidental impact and damage. This shall require the careful application of flexible layers of foam based material to all surfaces and in particular to projecting items in advance of Works commencing.

The craning of the statuary shall require extreme levels of care in providing adequate levels of protection to the figure prior to removal and in the location of canvas lifting straps. The Contractors Method Statement shall be required to provide a detailed methodology for the protection and lifting. The fixings of statuary shall be released prior to removal of statuary.

Wedge up the joints between the stones and the temporary base until the joints are free. Secure the statuary with canvas slings as necessary ensuring that the location of the slings do not impact on any projecting elements. Connect slings to lifting crane and ensure prior to craning that the statues are fully secure and balanced for lifting vertically. Transfer figure to appropriate transporter for delivery to final location.

The stone figure shall be carefully secured and protected to obviate any damage during transport.

E. Transport of Stonework from Contractor Storage Facility

The packed items of Stonework shall be loaded onto a suitable enclosed vehicle and transported from the Contractor storage facility to final location. Individual stones shall be separated vertically and horizontally to ensure no damage results to stonework or arises from contact with adjoining stones. The packing in the vehicle shall be undertaken in such a manner to ensure that no items fall, rub against adjoining items or the sides of the vehicle or move during transport. Suitable restraints shall be provided during transport. Appropriate items should be transported as required to enable the reinstatement of the element from the base upwards. When an item of stonework has been delivered to the Works Site it shall be carefully inspected for damage and any additional damage not previously recorded shall be recorded and reported to the Employer's Representative. The items or parts of an item shall be checked to ensure the coding has been correctly applied and that the correct items are reinstated in the precise locations to facilitate complete and accurate reinstatement.

F. Work Site Requirements at Final Locations

The Contractors specific site establishment and site management measures shall be compliant with all specifications and requirements in the architect's specifications.

G. Final Reinstatement of the William Smith O'Brien Monument

The procedures for reconstruction shall generally follow the reverse order of the demounting procedures, and in any case shall comply with the revised method statement for Phase 3.

The Contractor shall be required to provide a new foundation constructed in accordance with the structural details provided by structural engineers.

All corroded ferrous metal, fixings, cramps etc. shall be removed and replaced by matching bronze cramps and fixings. If, for structural reasons, it is not possible to remove all of such metal, then it shall be cut back as far as possible, grit blasted to remove all visible rust, primed with red lead or a zinc-rich primer and painted with two coats of Bituminous paint. The Contractor shall allow for 100% replacement of original cramps and fixings.

Mortar for bedding and pointing. (Please refer to spcecifications on mortars/stone elsewhere)
The properties of the original mixes as determined by petrographic analysis shall be replicated by the new mixes. Any deviation from the original mixes shall be approved by the Employer's Representative.

The base of the element shall be reconstructed ensuring that bed heights and coursing match the original and that all stones are relocated to their original position. Bedding mortar for reconstruction shall be as per specification (2.25 sand : 0.25 crushed limestone : / natural hydraulic lime (NHL) 3.5). The joints shall be raked back to allow for separate pointing up of all the stonework following the completion of the reconstruction of the monument.

All stonework shall be repointed as per as per specification above. This shall include for the taping of all joints prior to repointing in order to minimise on spillage and runoff of mortar. (Spec ref to be included)

H. Cleaning Down and Completion

All stonework in shall be cleaned down using water (steam where necessary) as per specifications. In the event of heavy staining the Contractor shall be required to clean the stonework using a medium grade glass powder at 20 psi. This method was found to be more effective than using the fine grade powder at a higher pressure. A degreasant may be applied to food and drink stains around the base. All methods to be approved by the Employer's Representative.

On completion of Phase 3 of the Works the Contractor shall supply full and complete records to the Employer's Representative.

A17.1 Results of Wind Modelling

Appendix 17.1: Results of Wind Modelling

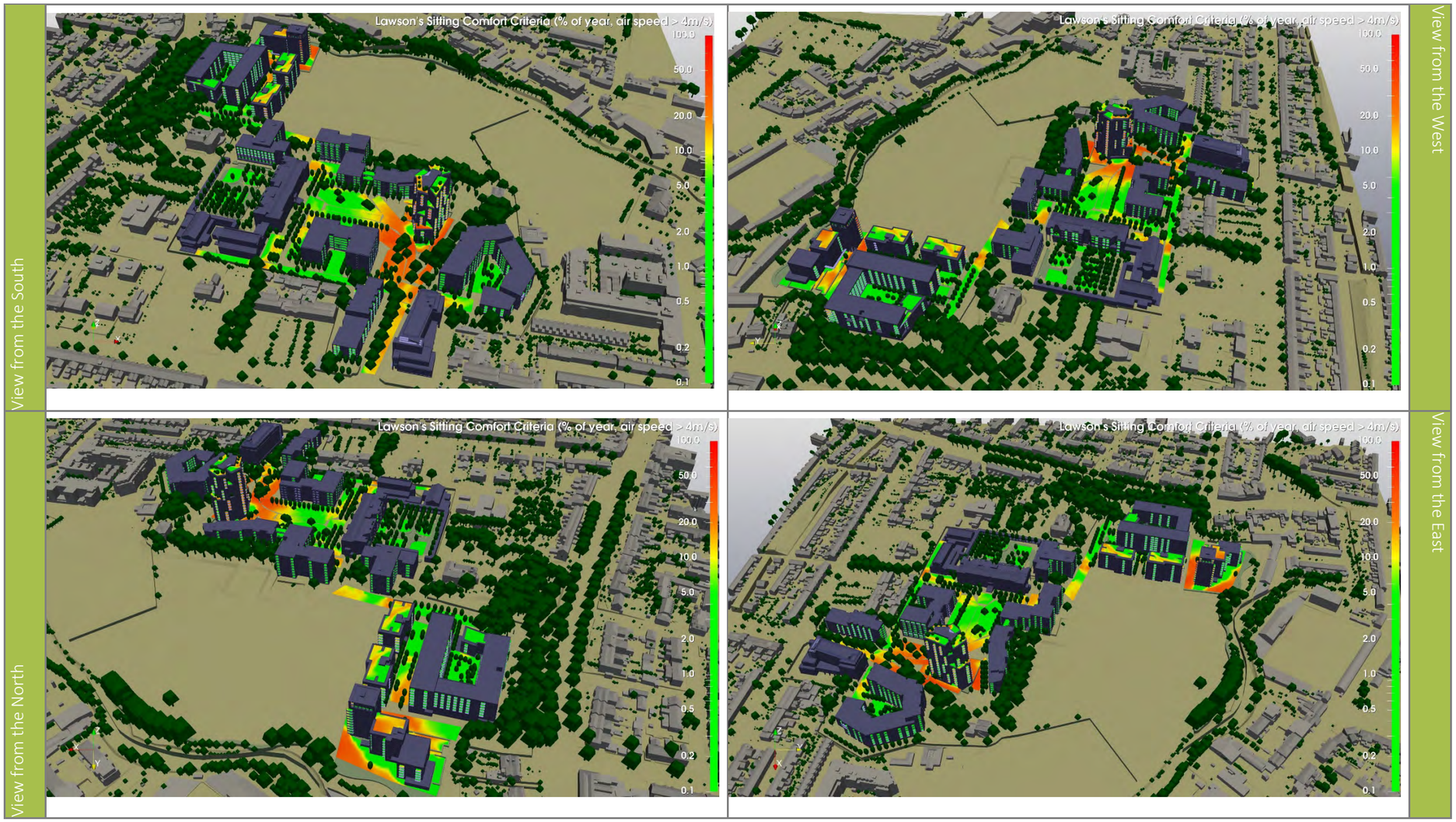
Comfort Criteria: All Seasons

Sitting Comfort Criteria

Figures 17.1.1 – 17.1.8 show the percentage of the year the hourly wind speed exceeds the threshold value for the sitting comfort criteria for all seasons. The threshold value is 4m/s.

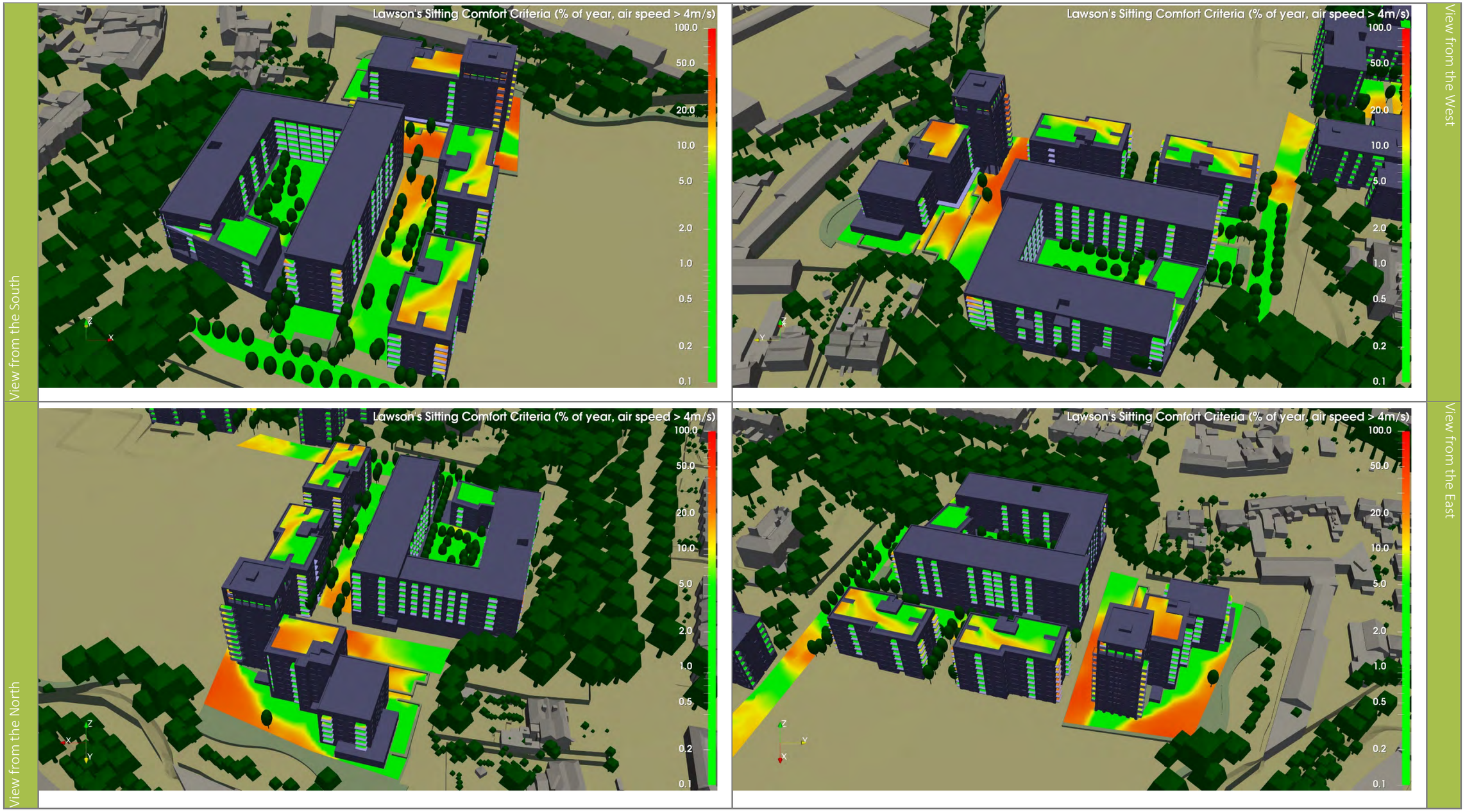
Overall Site

Figure 17.1.1: Sitting Comfort Criteria: Overall Site



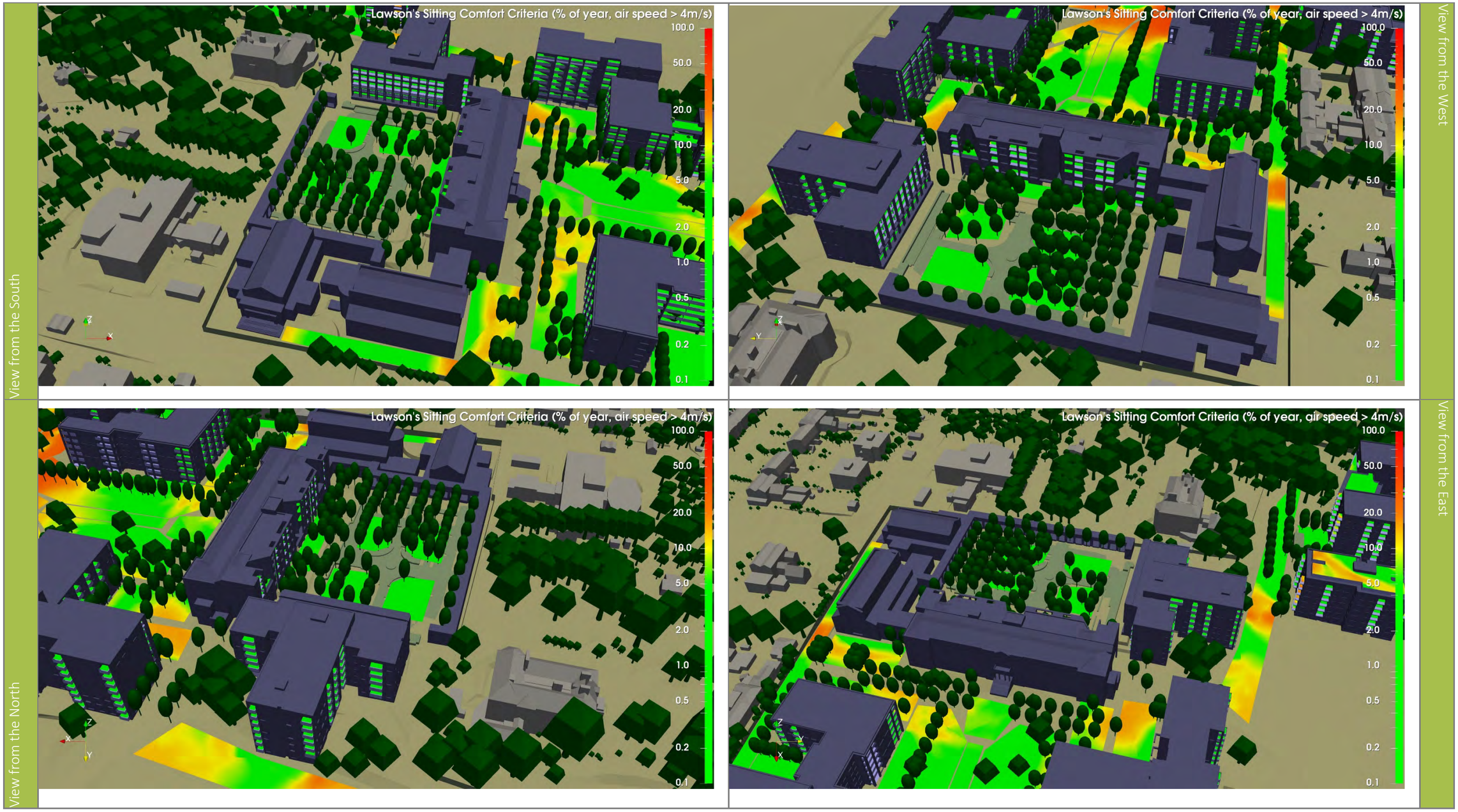
Blocks A1 to A4

Figure 17.1.2: Sitting Comfort Criteria: Blocks A1 to A4



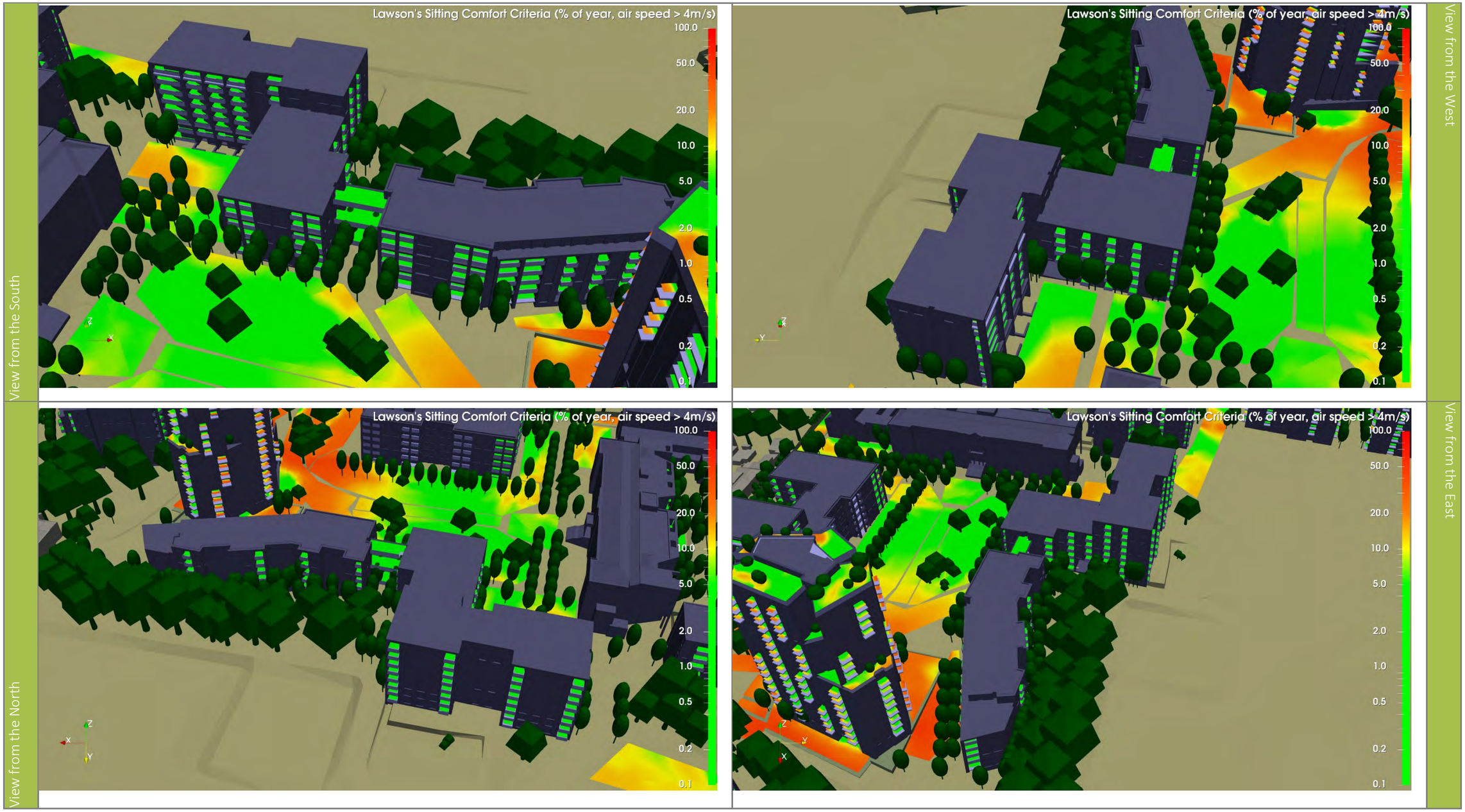
Block B1 and MCM Extension

Figure 17.1.3: Sitting Comfort Criteria: Block B1 and MCM Extension



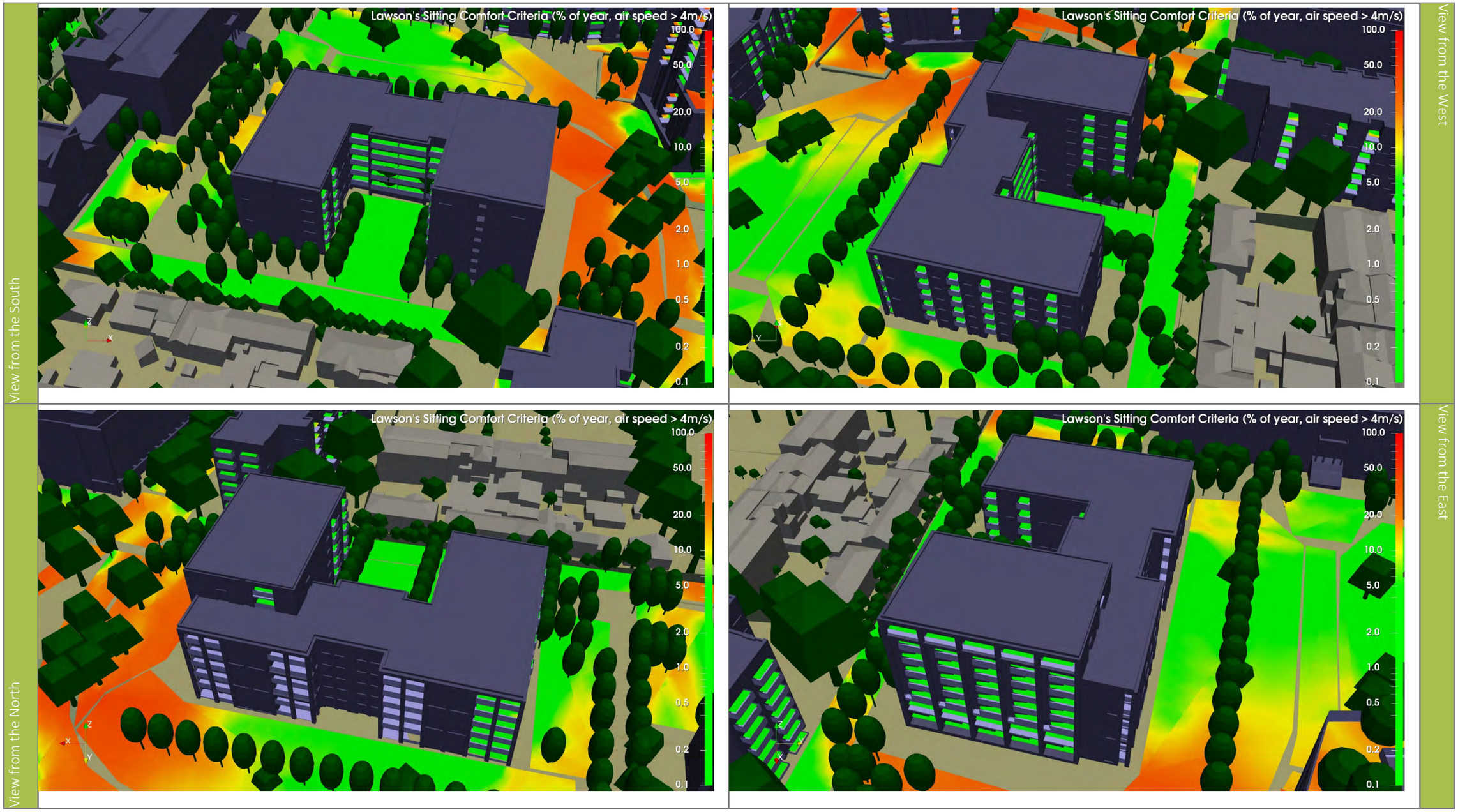
Block B2 & B3

Figure 17.1.4: Sitting Comfort Criteria: Blocks B2 and B3



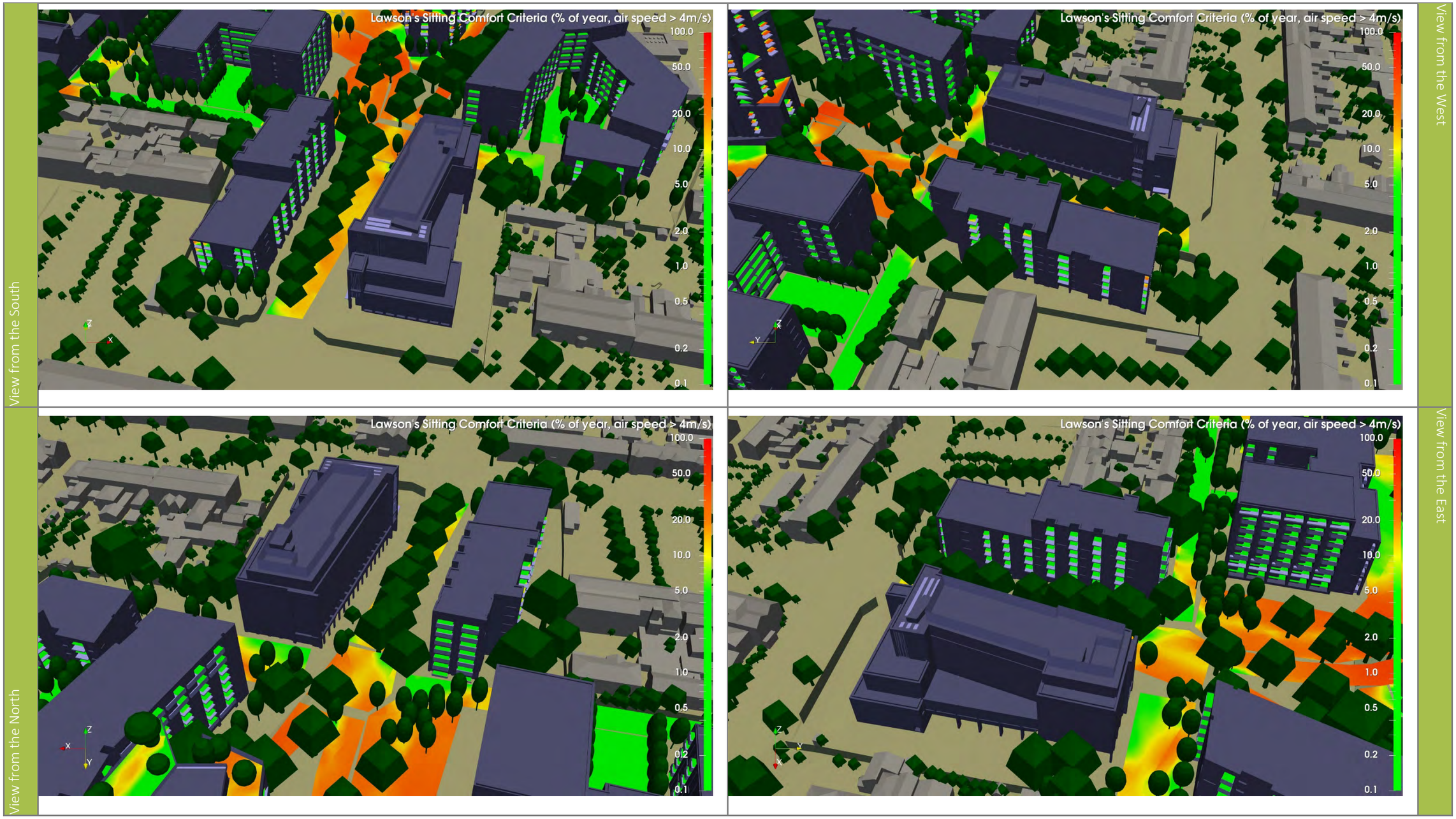
Block C1

Figure 17.1.5: Sitting Comfort Criteria: Block C1



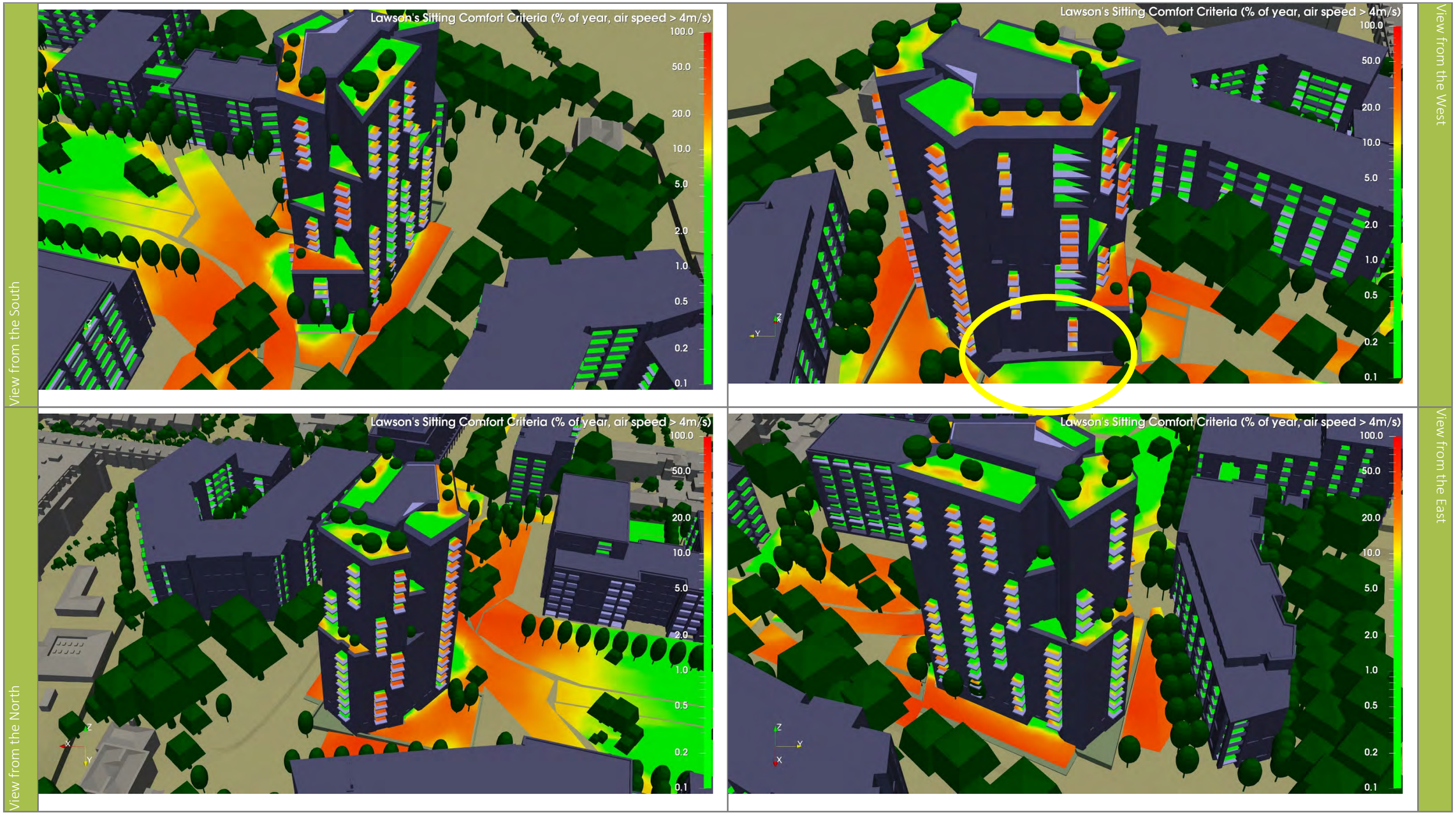
Block C2

Figure 17.1.6: Sitting Comfort Criteria: Block C2



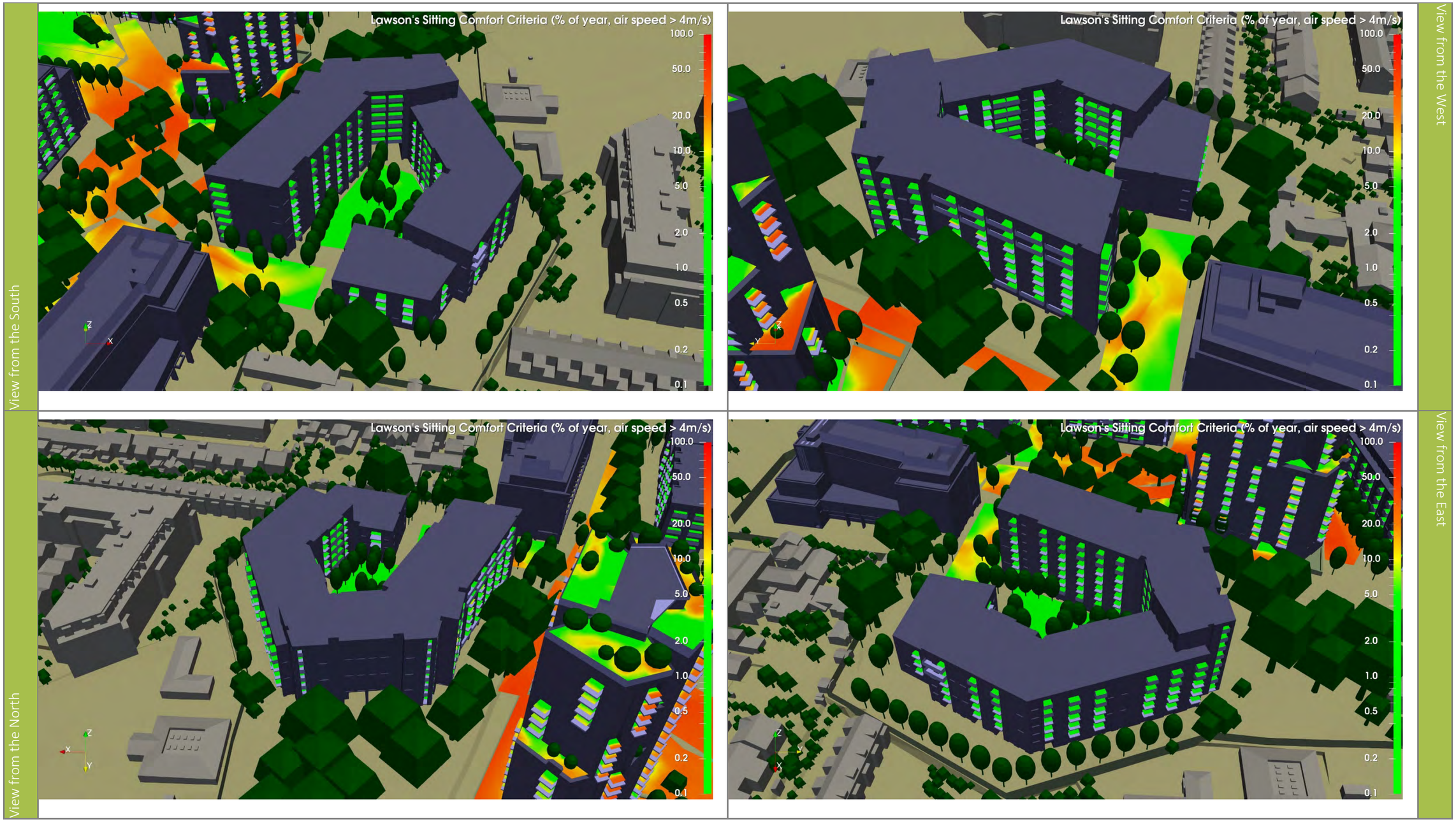
Block D1

Figure 17.1.7: Sitting Comfort Criteria: Block D1



Block D2

Figure 17.1.8: Sitting Comfort Criteria: Block D2

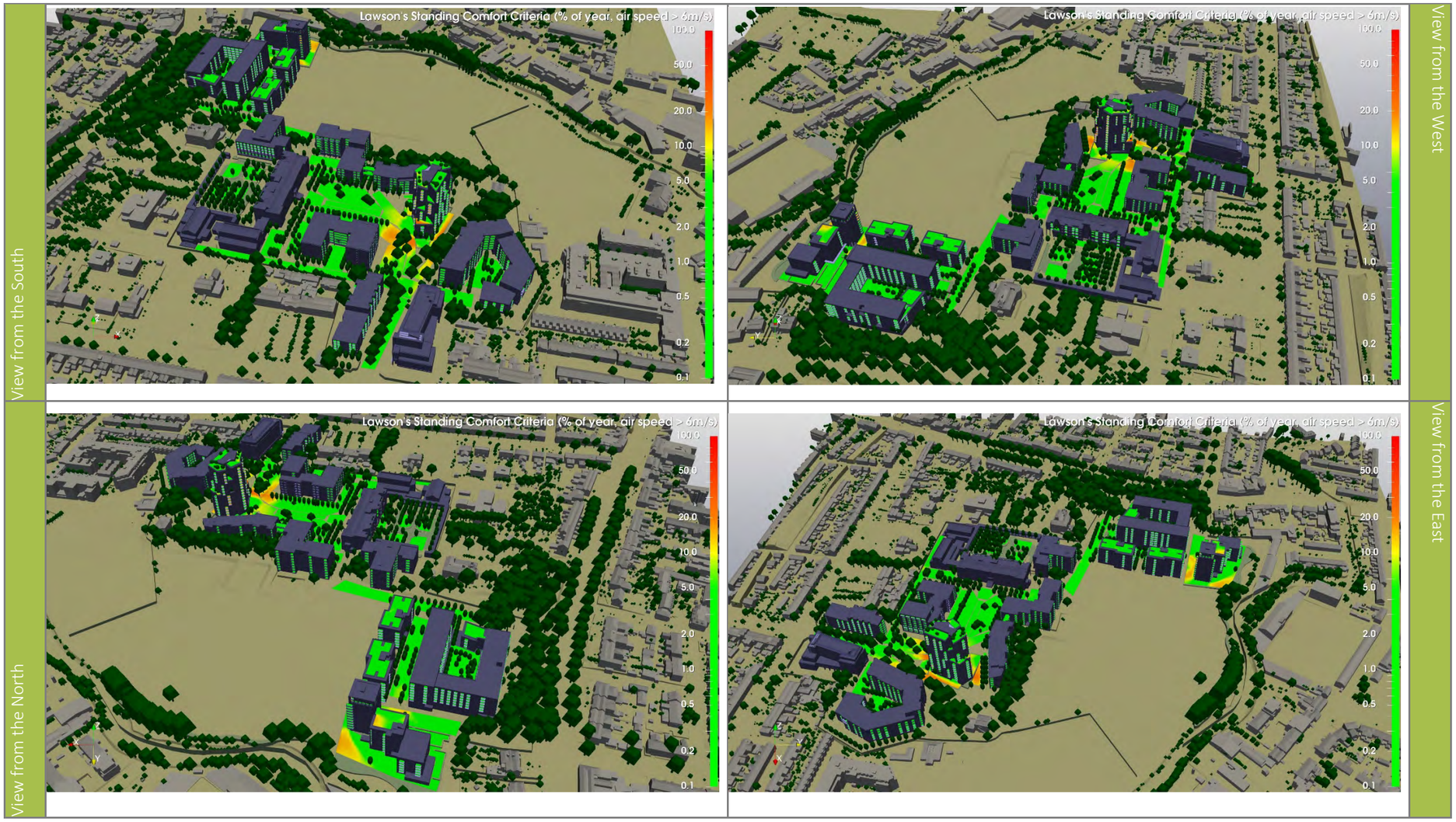


Standing Comfort Criteria

Figures 17.1.9 – 17.1.16 show the percentage of the year the hourly wind speed exceeds the threshold value for the sitting comfort criteria for all seasons. The threshold value is 4m/s.

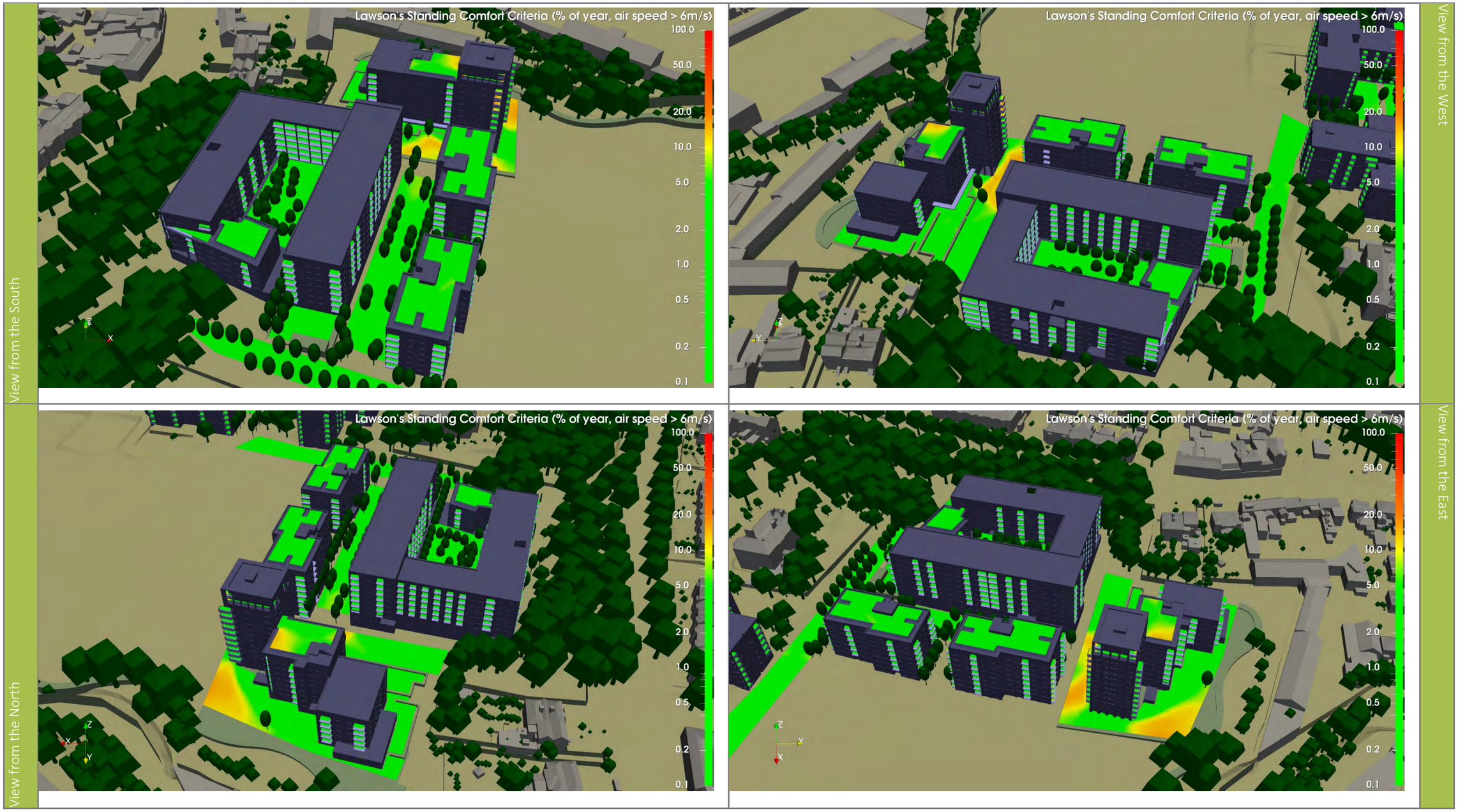
Overall Site

Figure 17.1.9: Sitting Comfort Criteria: Overall Site



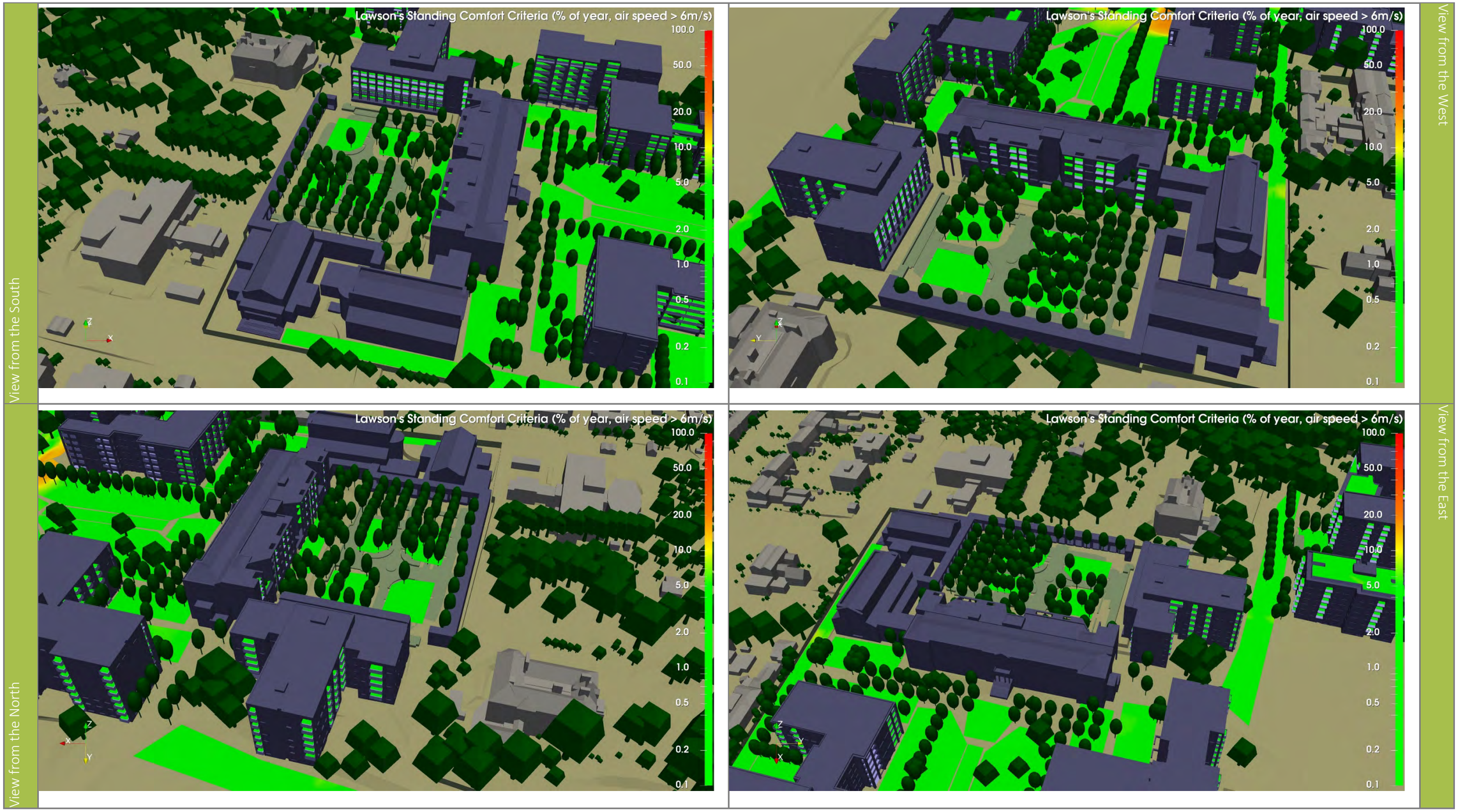
Blocks A1 to A4

Figure 17.1.10: Standing Comfort Criteria: Blocks A1 to A4



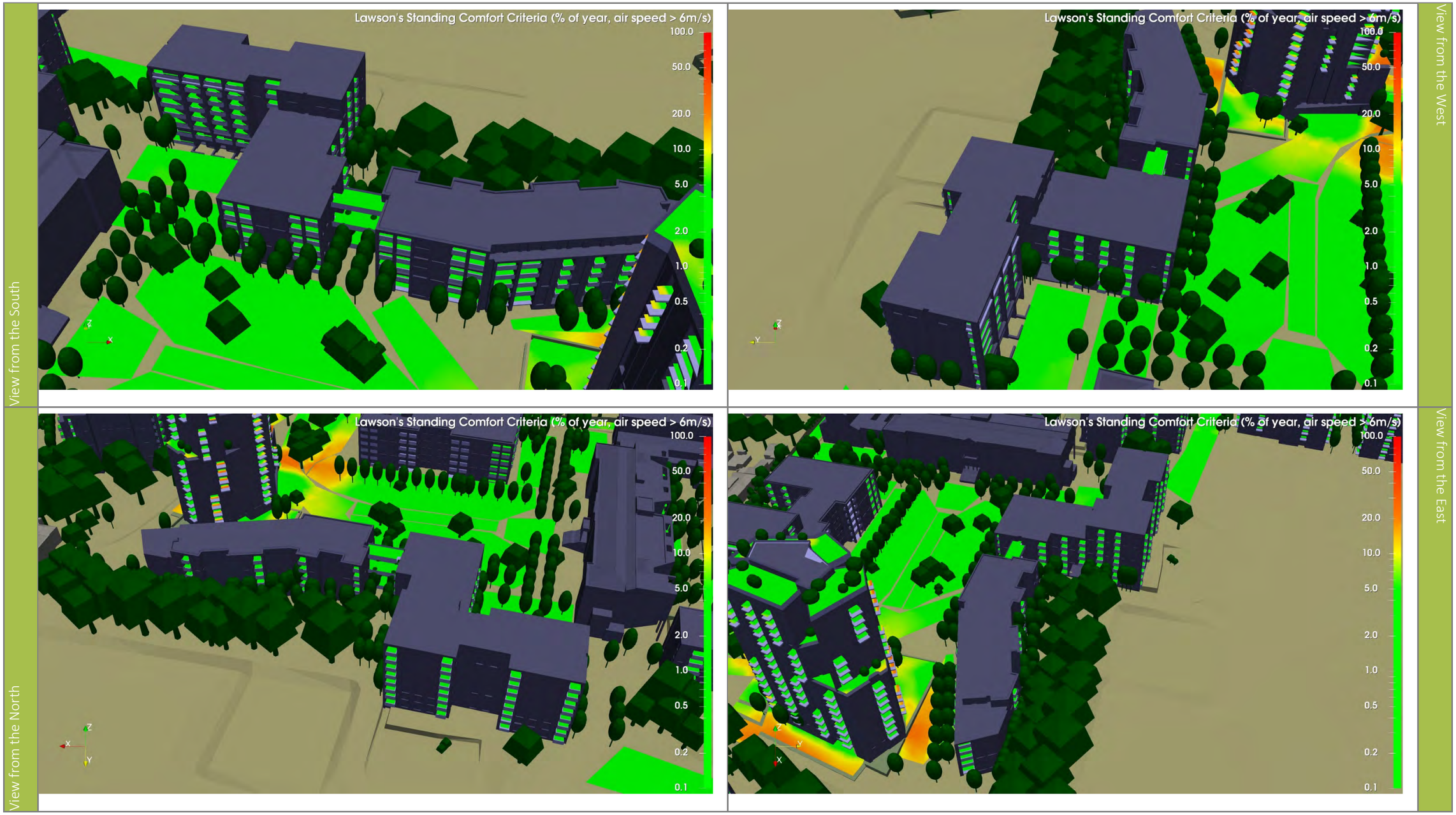
Block B1 and MCM Extension

Figure 17.1.11: Standing Comfort Criteria: Block B1 and MCM Extension



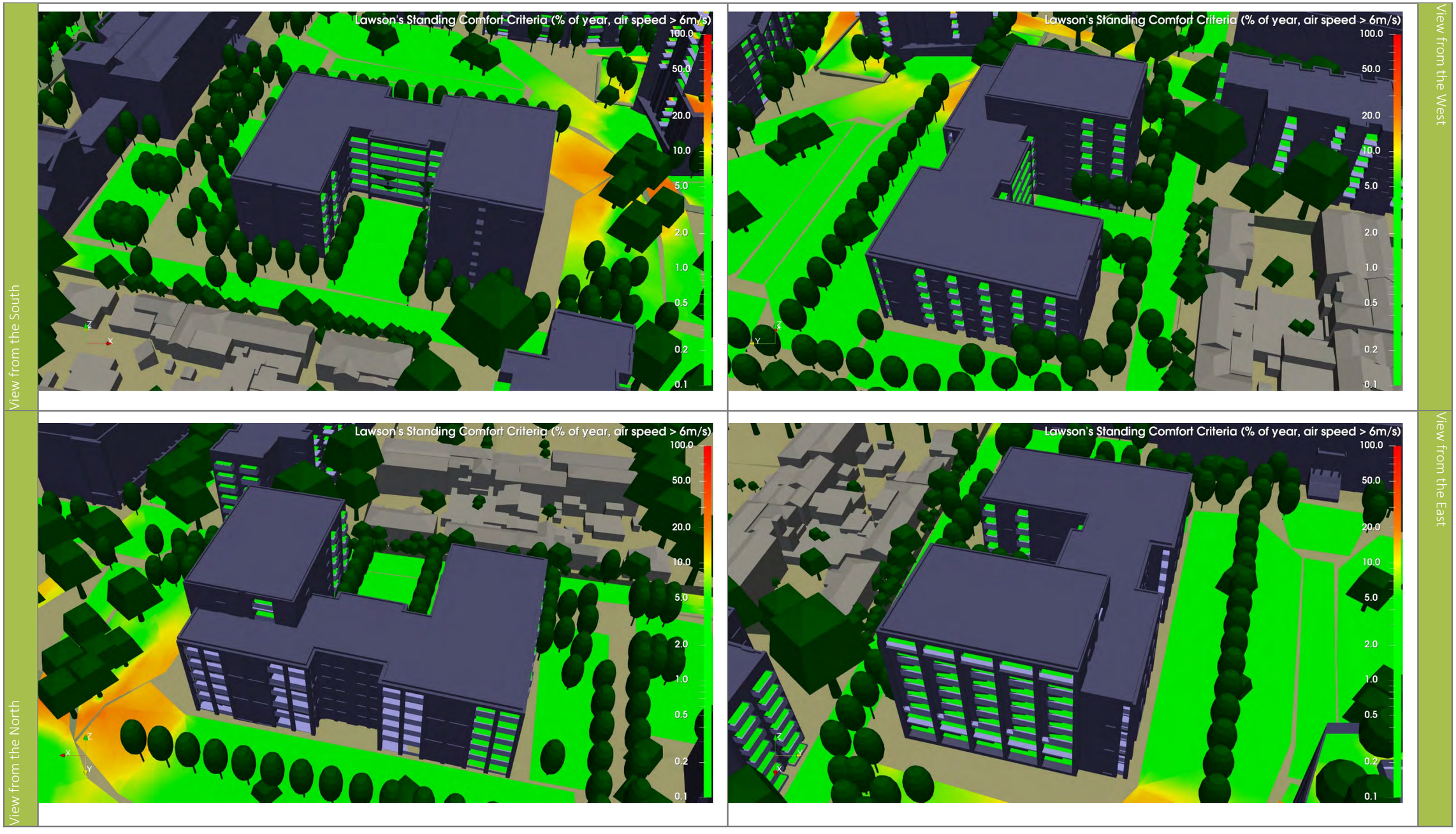
Block B2 & B3

Figure 17.1.12: Standing Comfort Criteria: Blocks B2 and B3



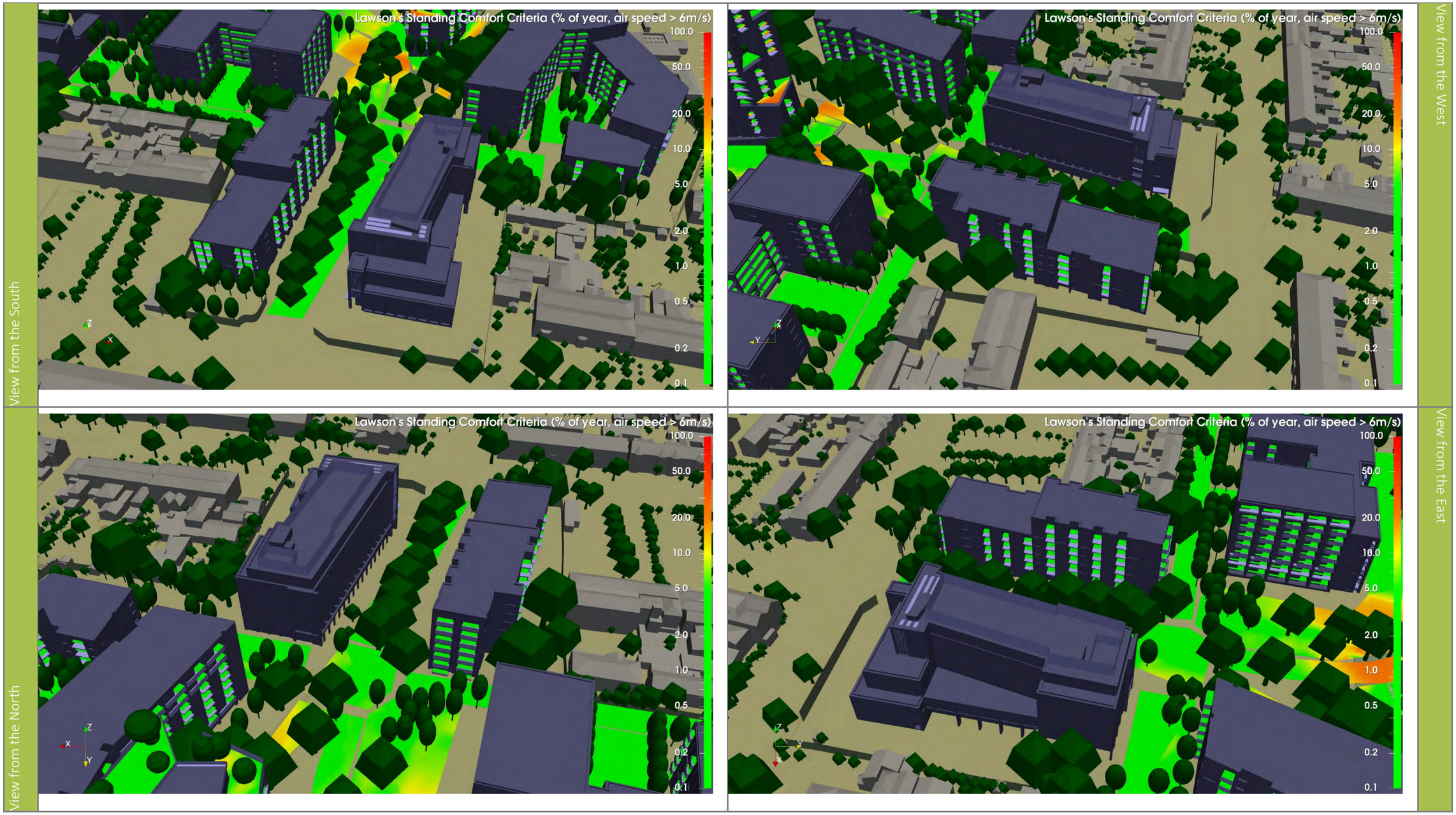
Block C1

Figure 17.1.13: Standing Comfort Criteria: Block C1



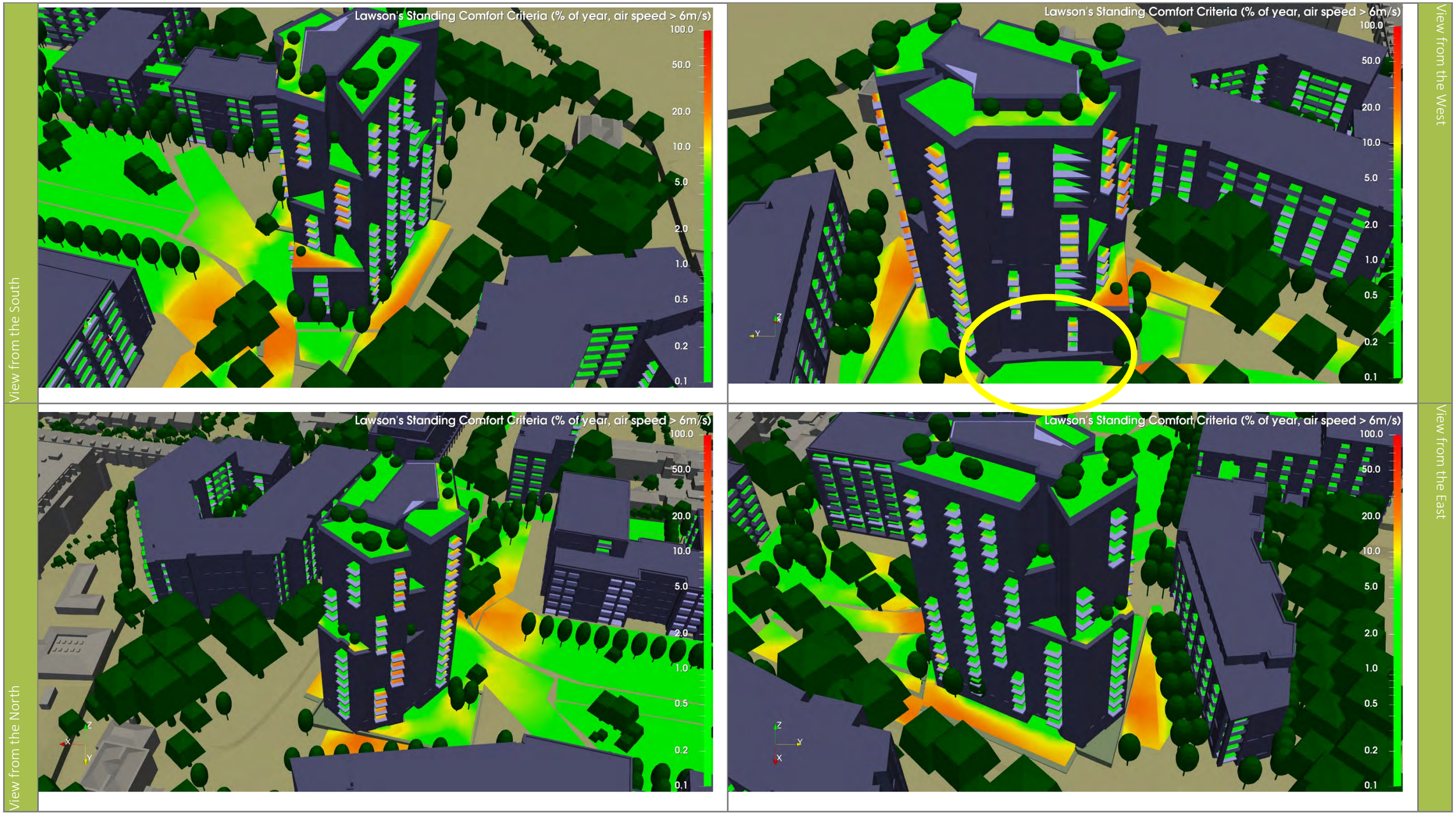
Block C2

Figure 17.1.14: Standing Comfort Criteria: Block C2



Block D1

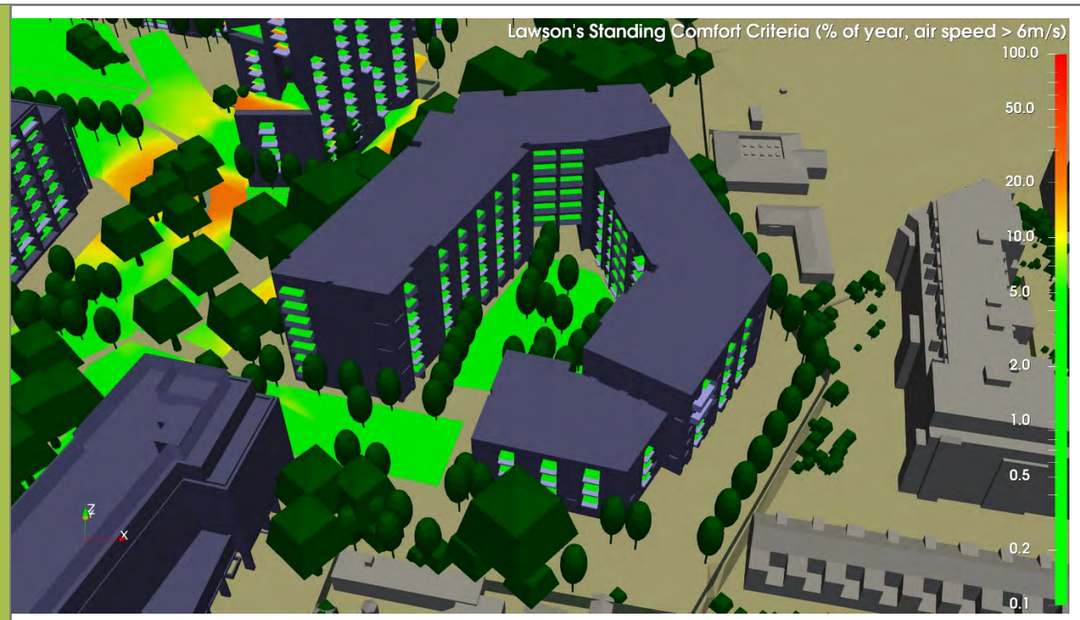
Figure 17.1.15: Standing Comfort Criteria: Block D1



Block D2

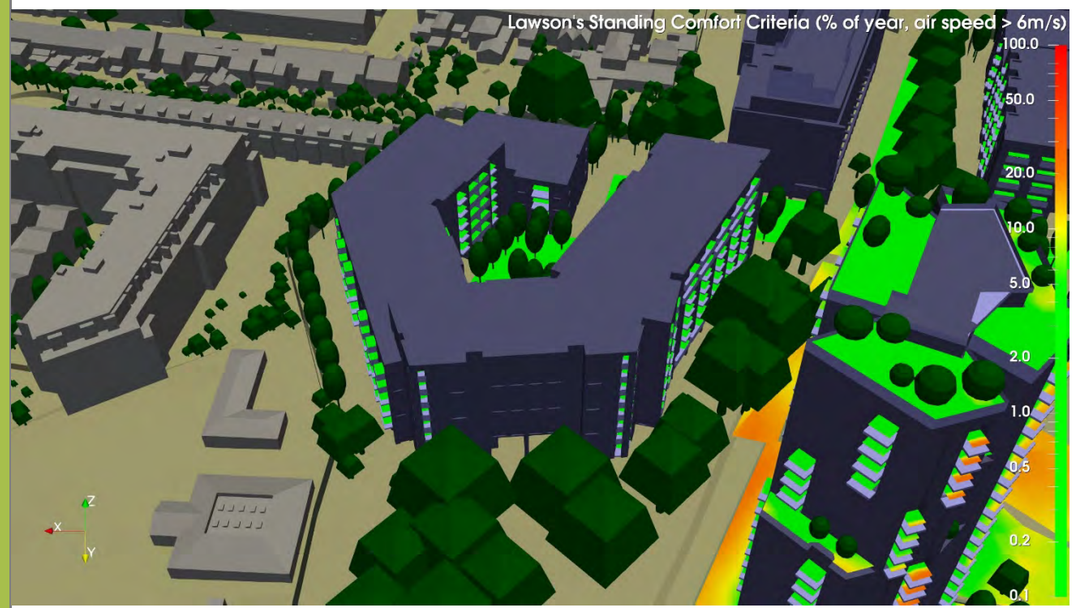
Figure 17.1.16: Standing Comfort Criteria: Block D2

View from the South

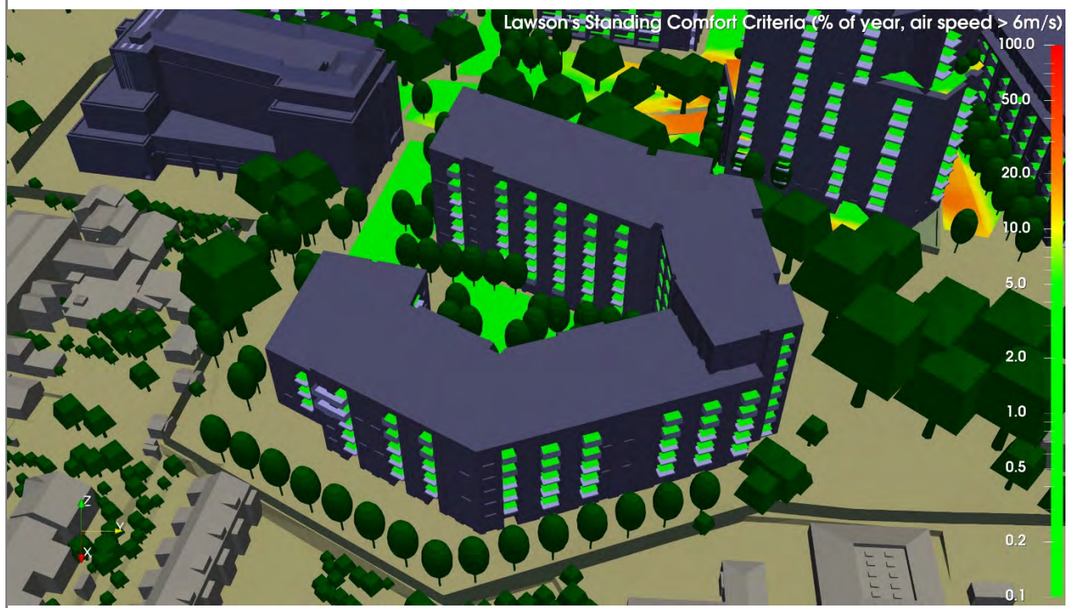


View from the West

View from the North



View from the East

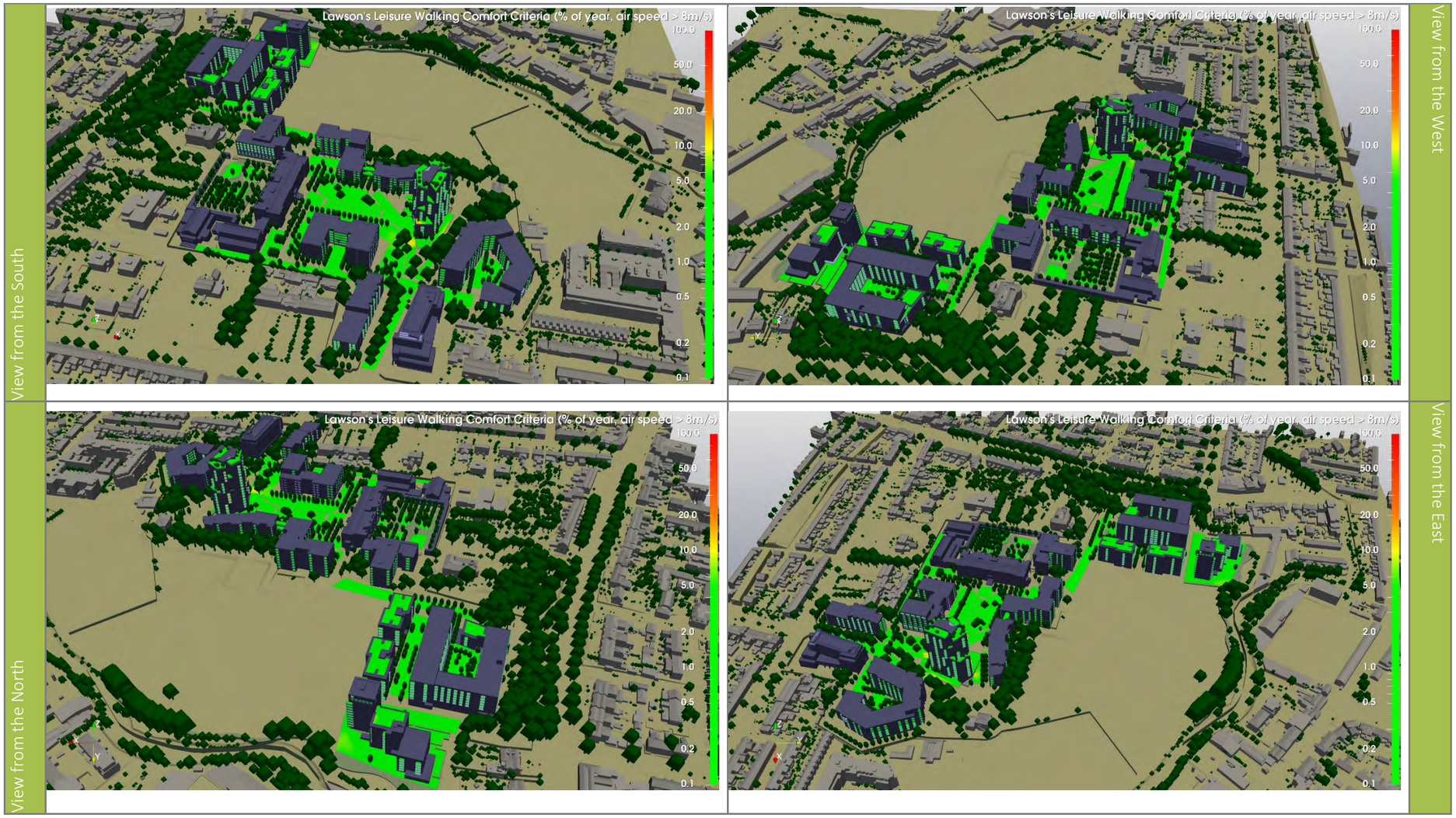


Leisure Walking Comfort Criteria

Figures 17.1.17 – 17.1.24 show the percentage of the year the hourly wind speed exceeds the threshold value for the Leisure Walking comfort criteria for all seasons. The threshold value is 4m/s.

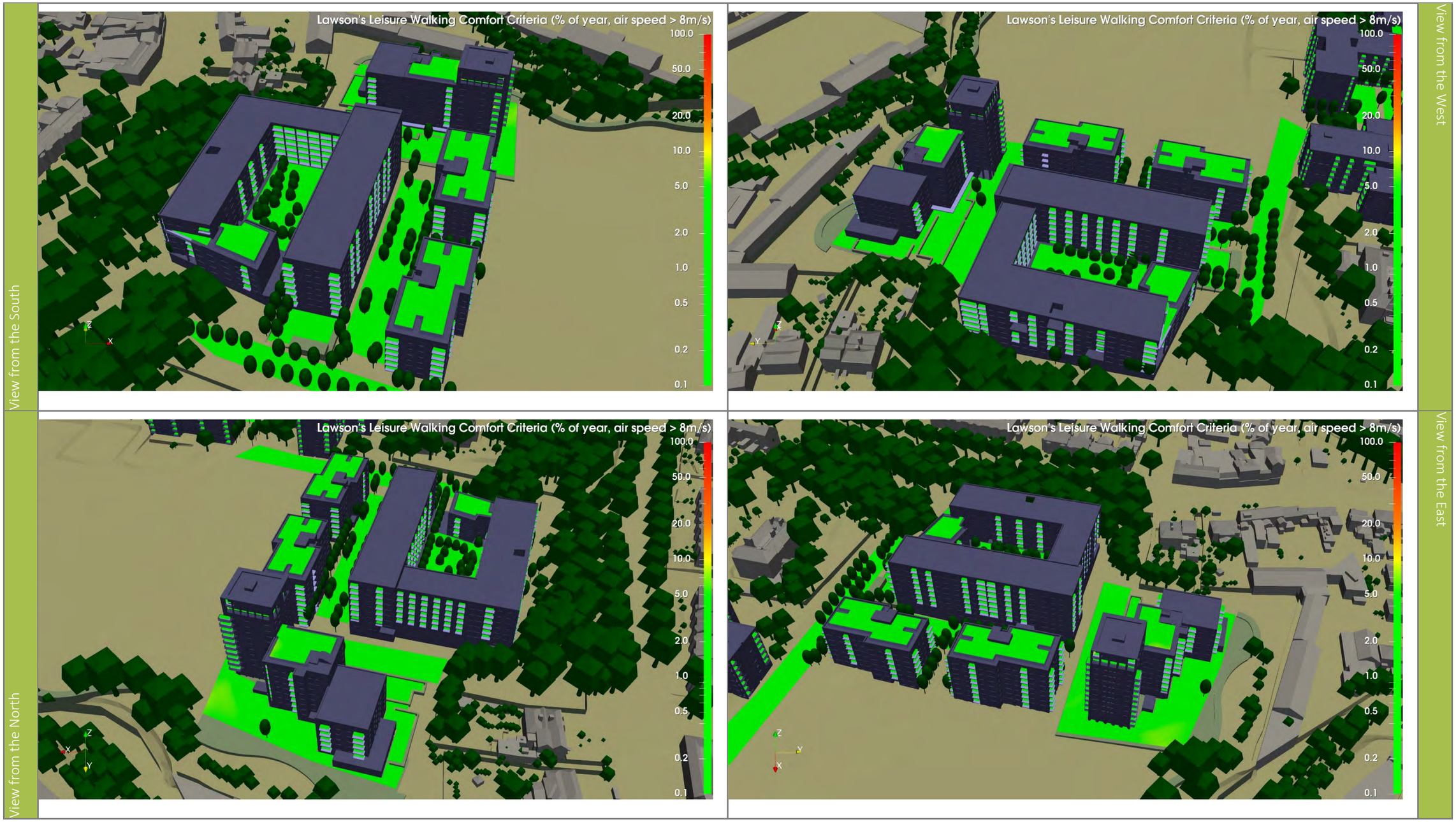
Overall Site

Figure 17.1.17: Leisure Walking Comfort Criteria: Overall Site



Blocks A1 to A4

Figure 17.1.18: Leisure Walking Comfort Criteria: Blocks A1 to A4



Block B1 and MCM Extension

Figure 17.1.19: Leisure Walking Comfort Criteria: Block B1 and MCM Extension

View from the South

View from the West

View from the North

View from the East

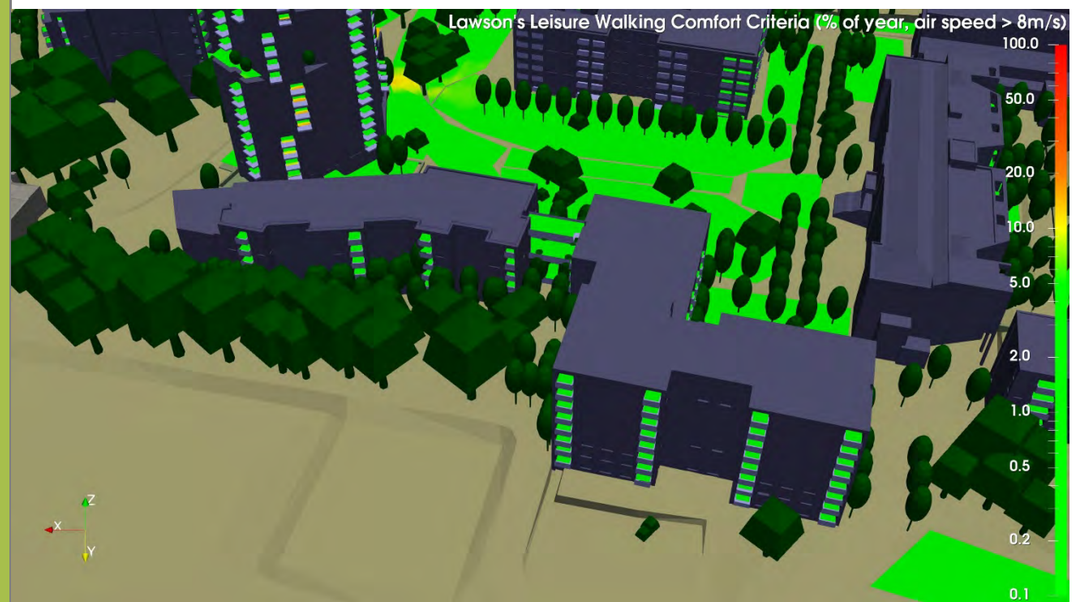
Block B2 & B3

Figure 17.1.20: Leisure Walking Comfort Criteria: Blocks B2 and B3

View from the South

View from the West

View from the North

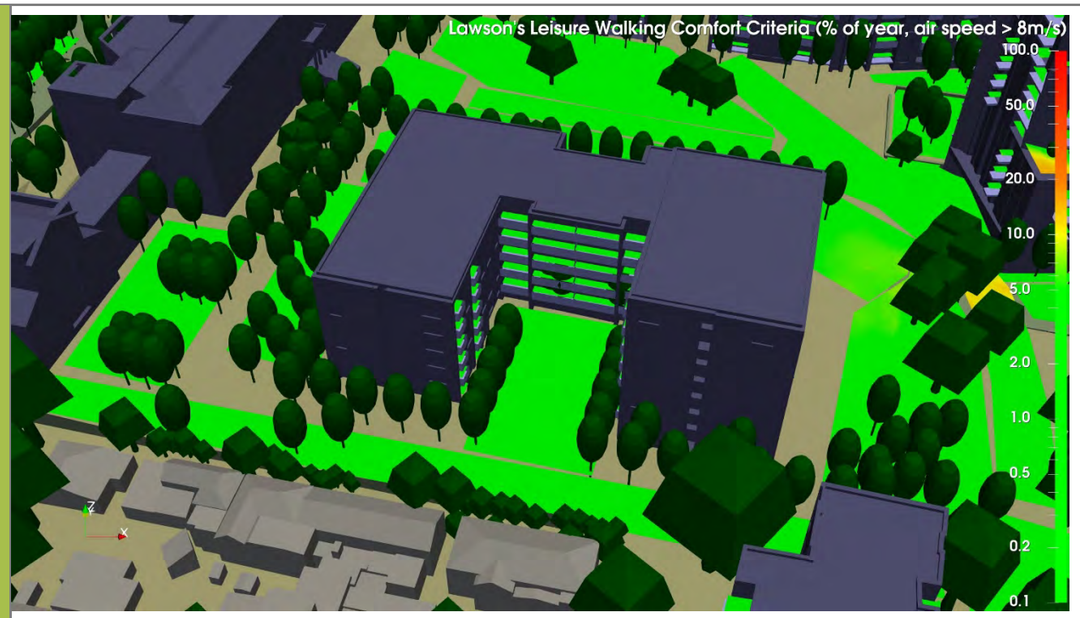


View from the East

Block C1

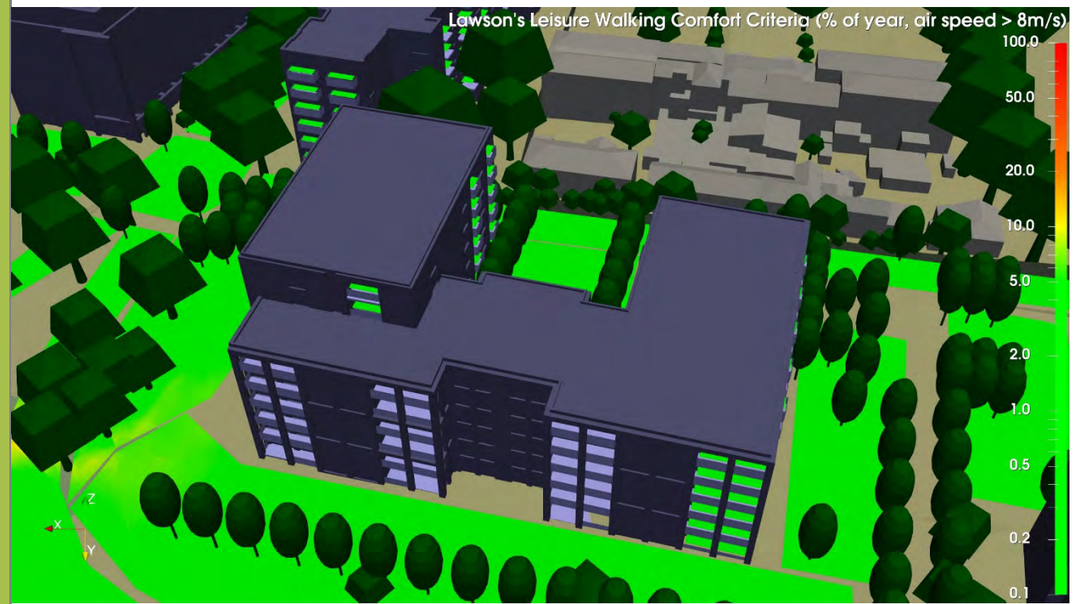
Figure 17.1.21: Leisure Walking Comfort Criteria: Block C1

View from the South



View from the West

View from the North

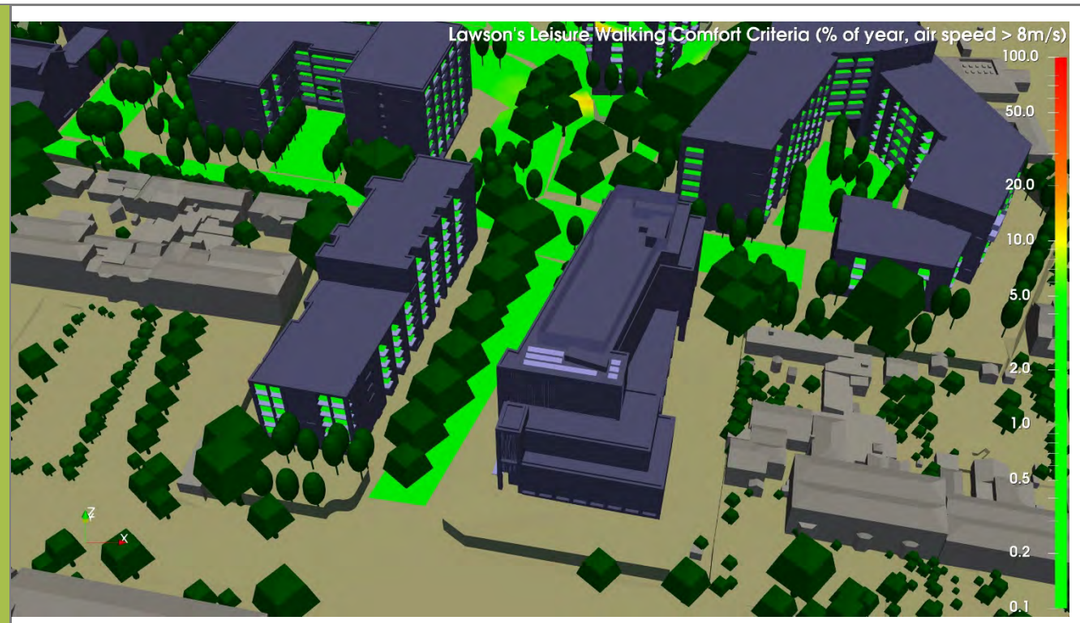


View from the East

Block C2

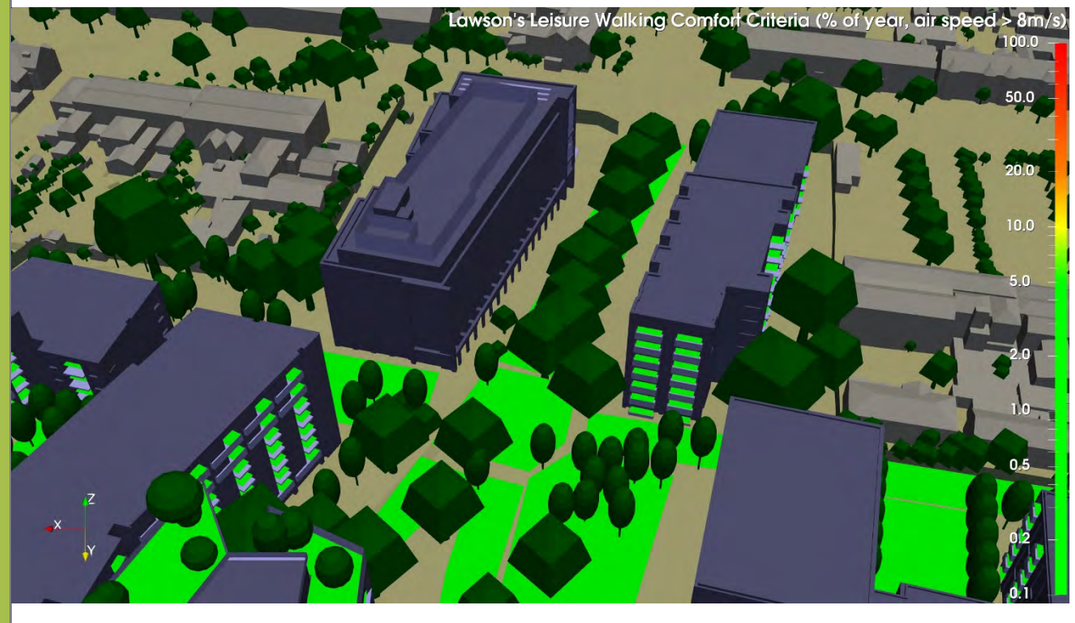
Figure 17.1.22: Leisure Walking Comfort Criteria: Block C2

View from the South

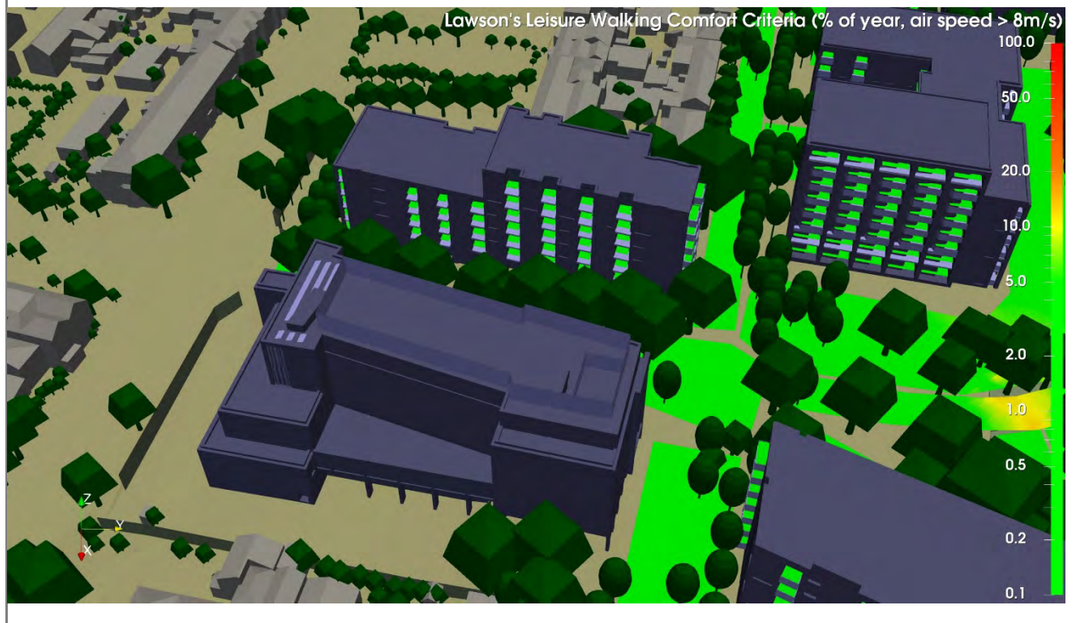


View from the West

View from the North

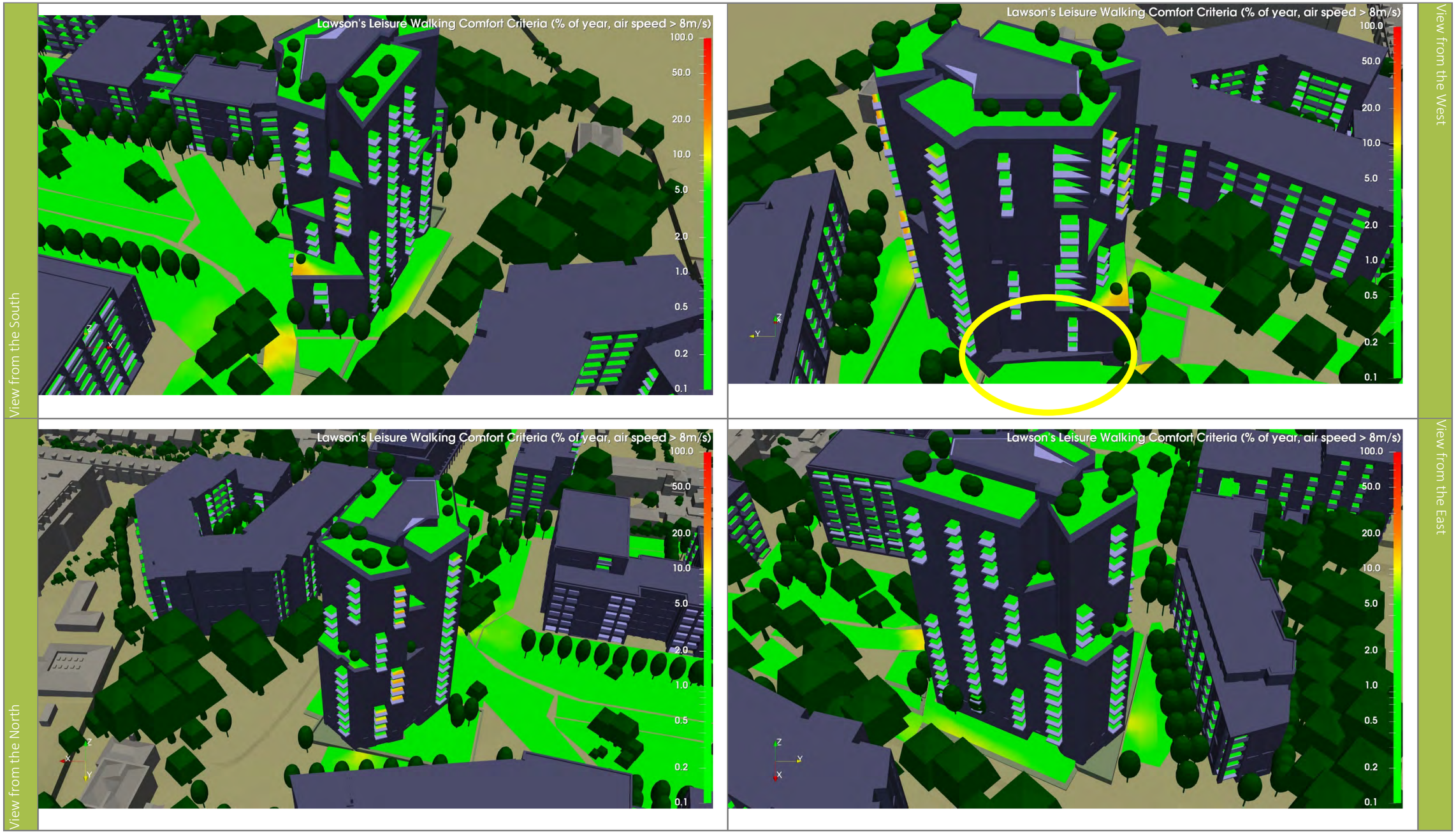


View from the East



Block D1

Figure 17.1.23: Leisure Walking Comfort Criteria: Block D1



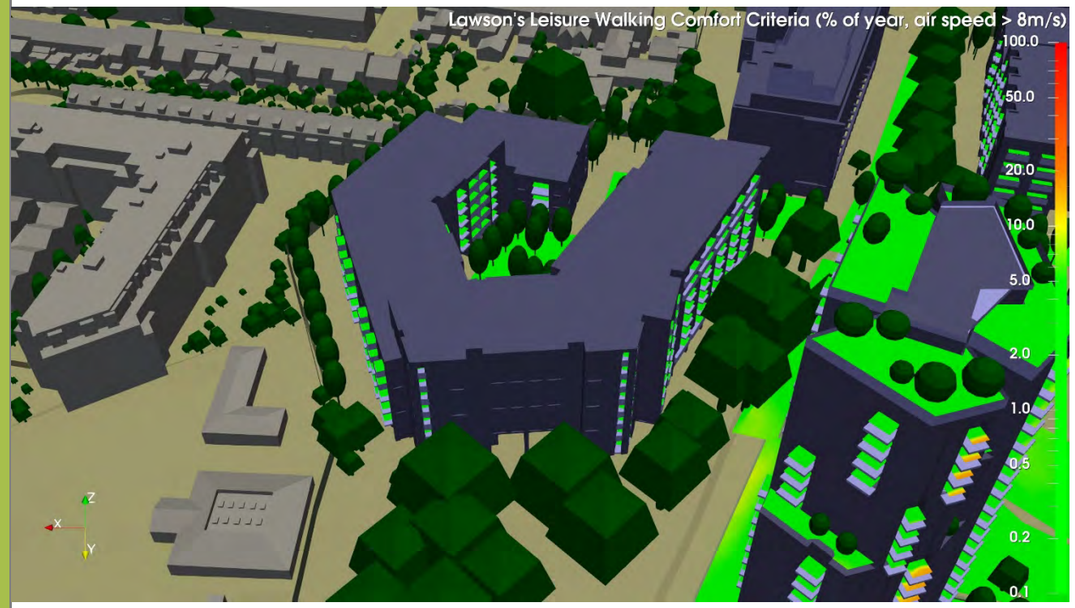
Block D2

Figure 17.1.24: Leisure Walking Comfort Criteria: Block D2

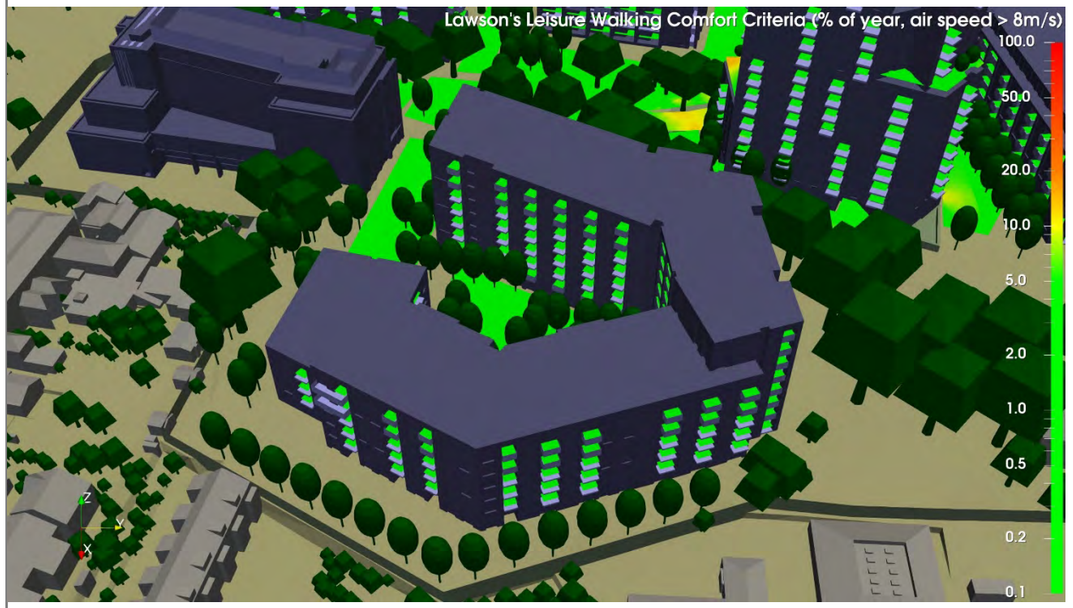
View from the South

View from the West

View from the North



View from the East

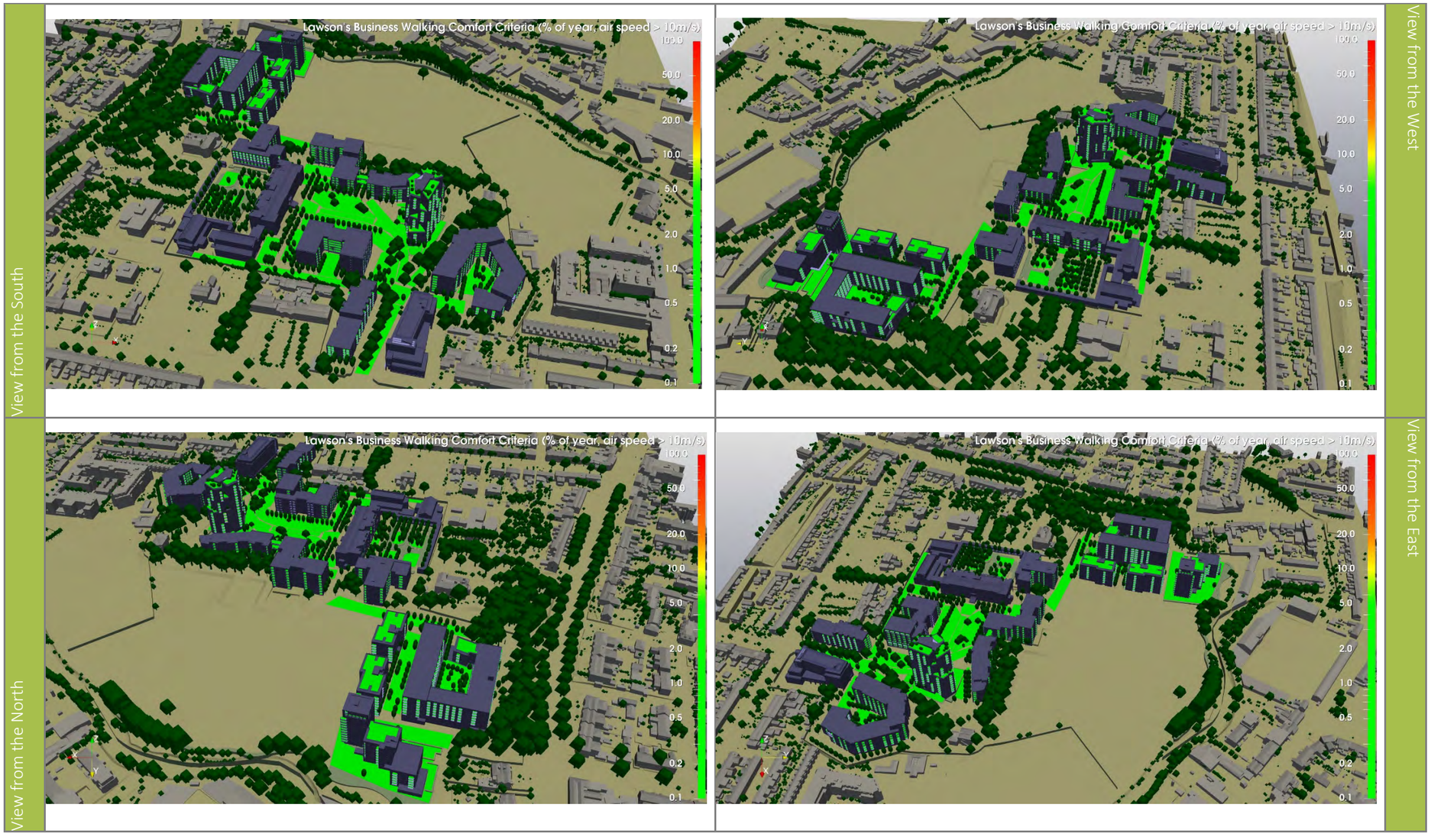


Business Walking Comfort Criteria

Figures 17.1.25 – 17.1.32 show the percentage of the year the hourly wind speed exceeds the threshold value for the Business Walking comfort criteria for all seasons. The threshold value is 4m/s.

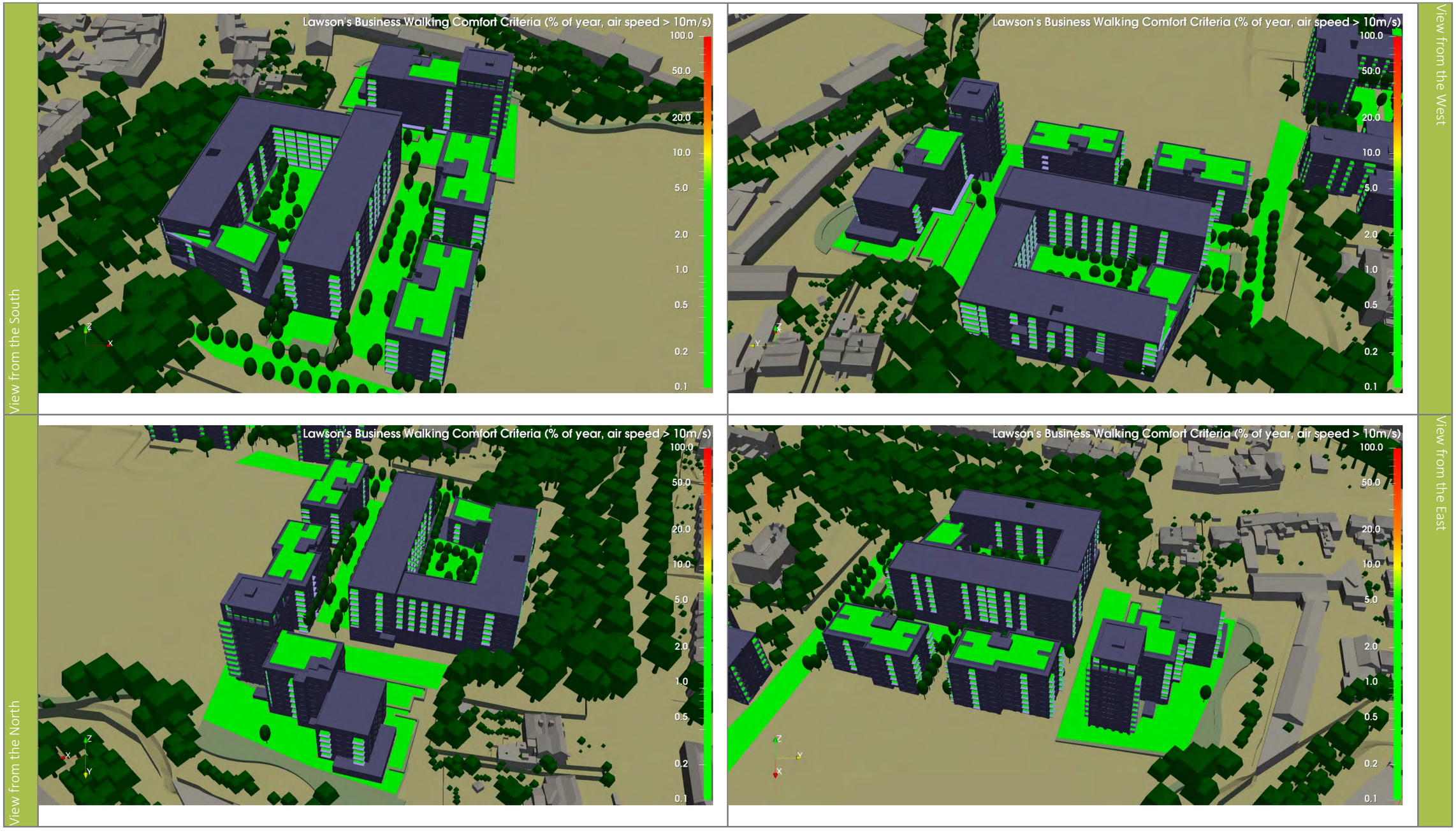
Overall Site

Figure 17.1.25: Business Walking Comfort Criteria: Overall Site



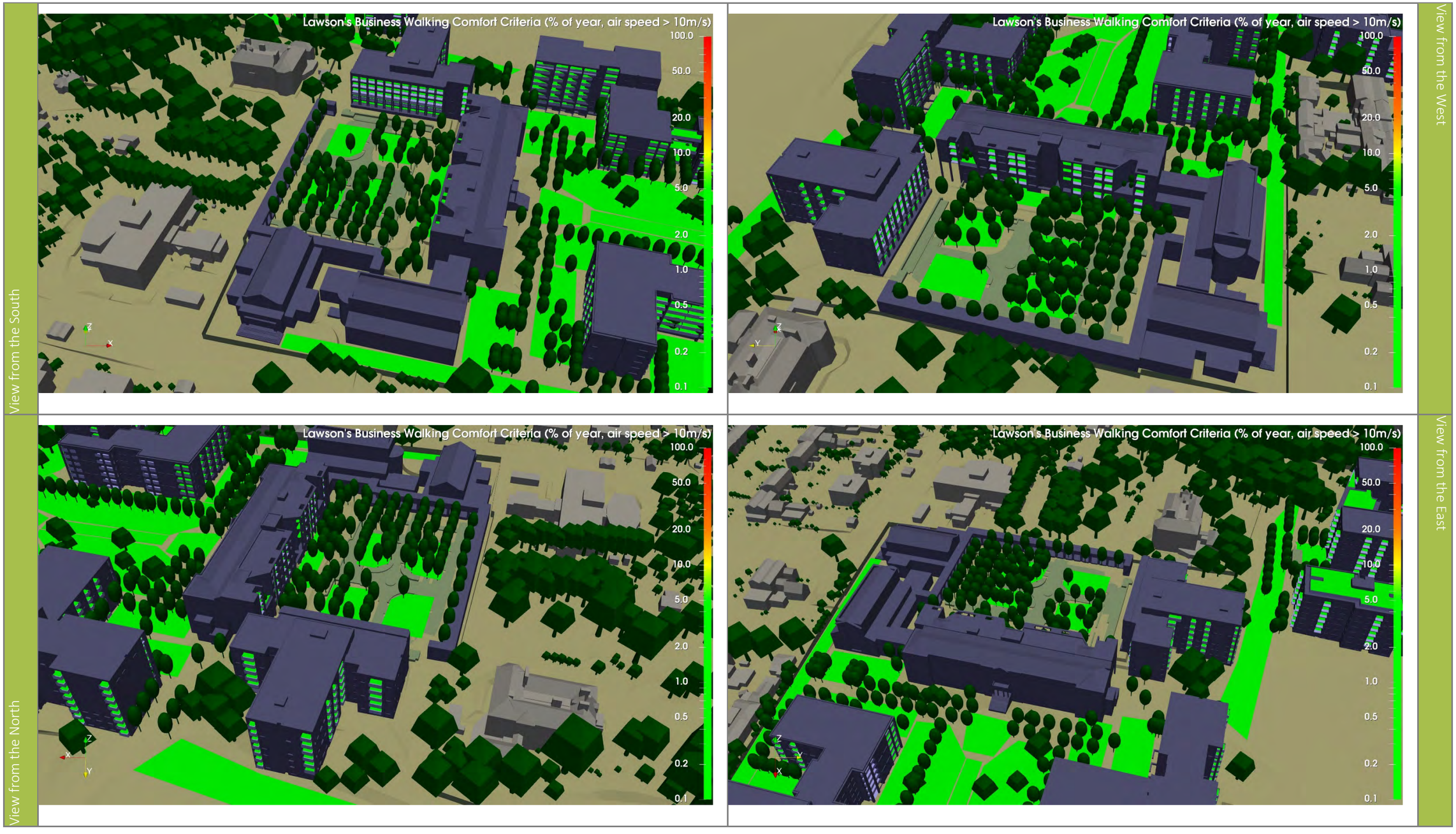
Blocks A1 to A4

Figure 17.1.26: Business Walking Comfort Criteria: Blocks A1 to A4



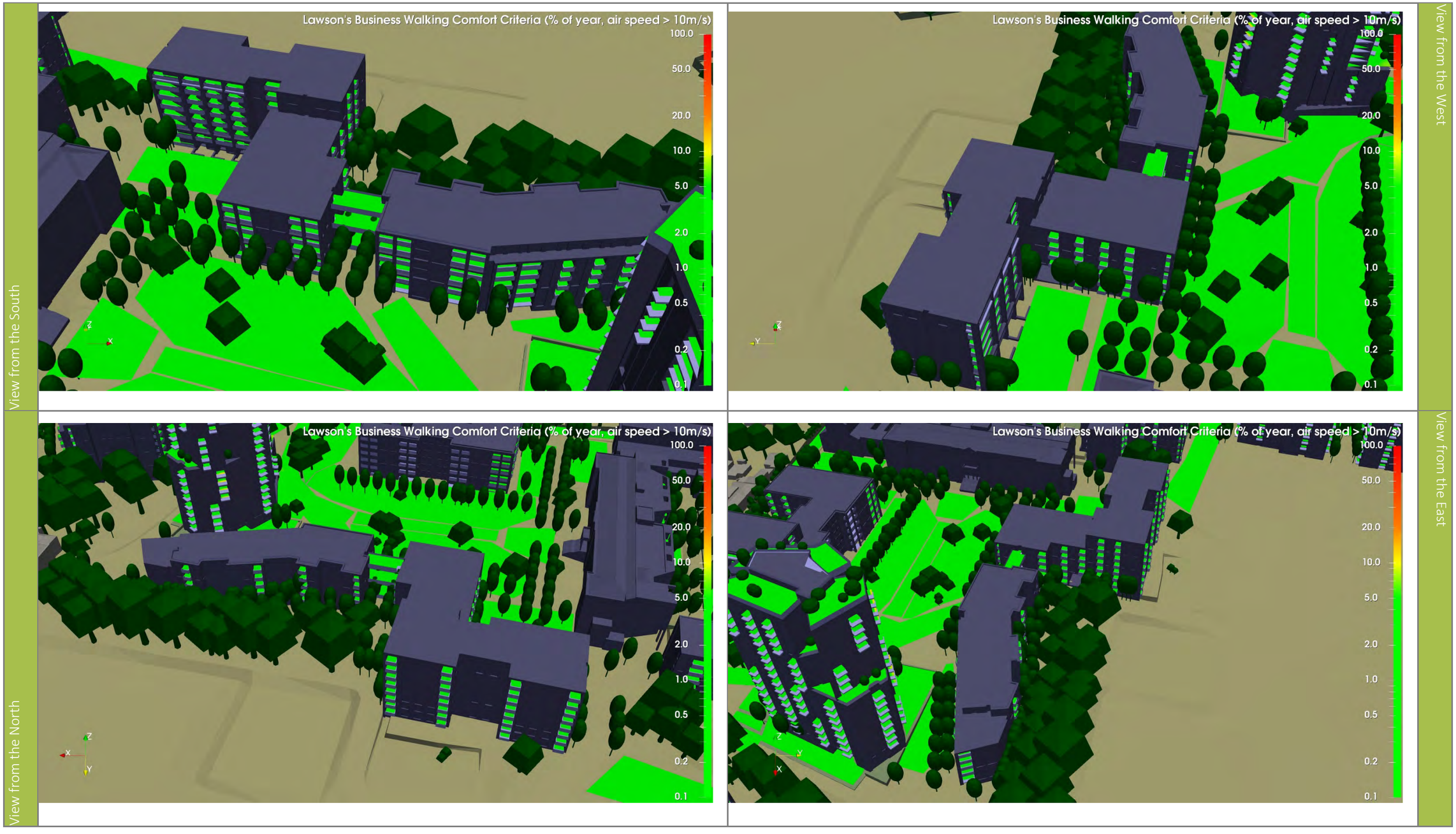
Block B1 and MCM Extension

Figure 17.1.27: Business Walking Comfort Criteria: Block B1 and MCM Extension



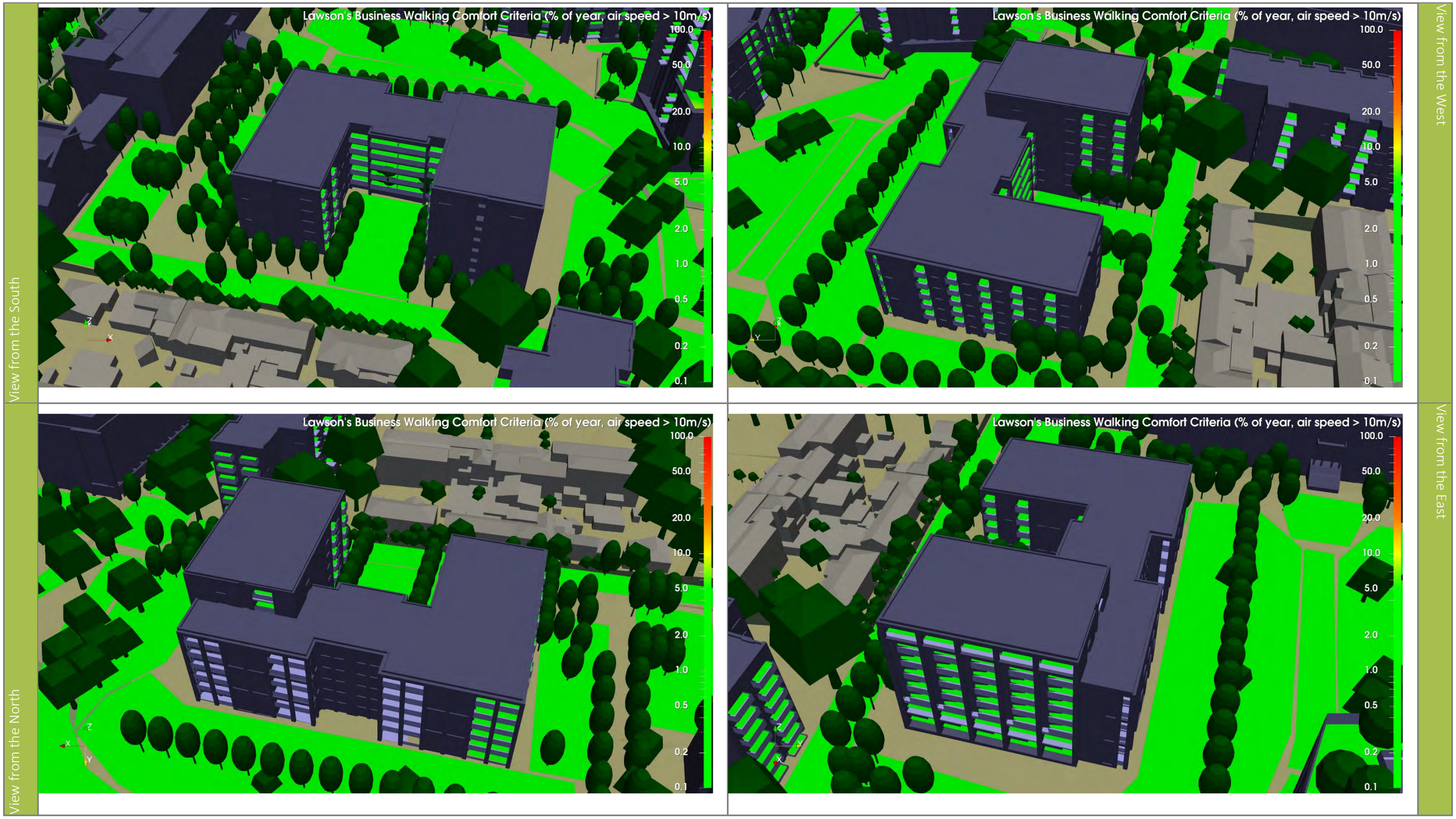
Block B2 & B3

Figure 17.1.28: Business Walking Comfort Criteria: Blocks B2 and B3



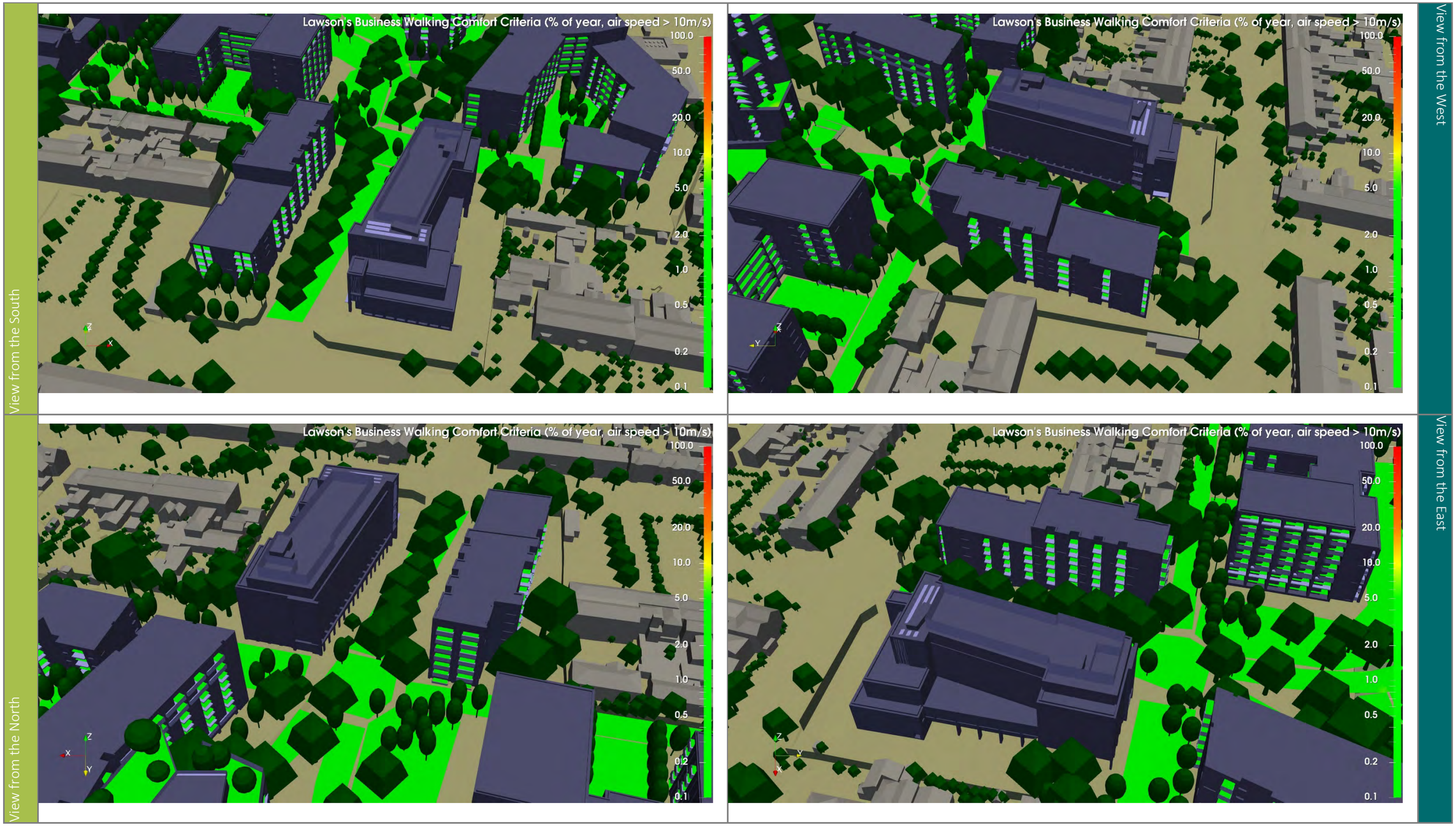
Block C1

Figure 17.1.29: Business Walking Comfort Criteria: Block C1



Block C2

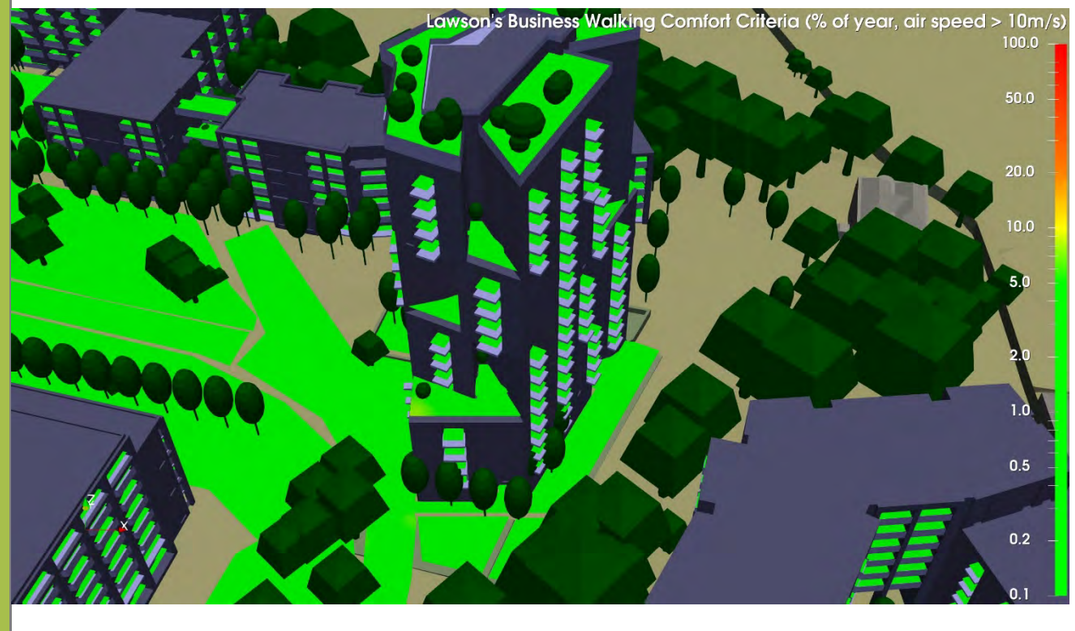
Figure 17.1.30: Business Walking Comfort Criteria: Block C2



Block D1

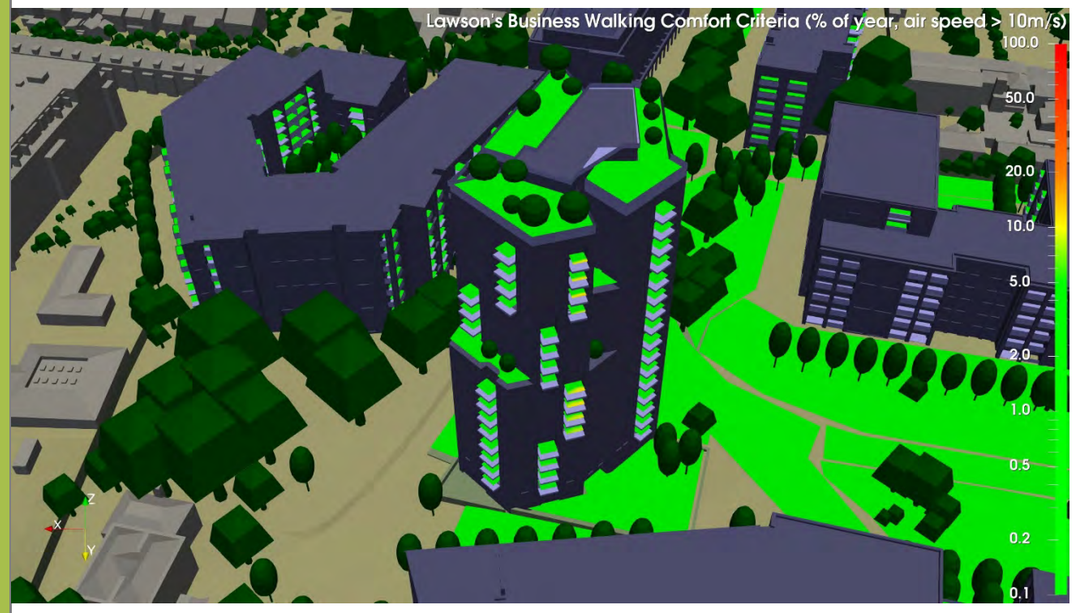
Figure 17.1.31: Business Walking Comfort Criteria: Block D1

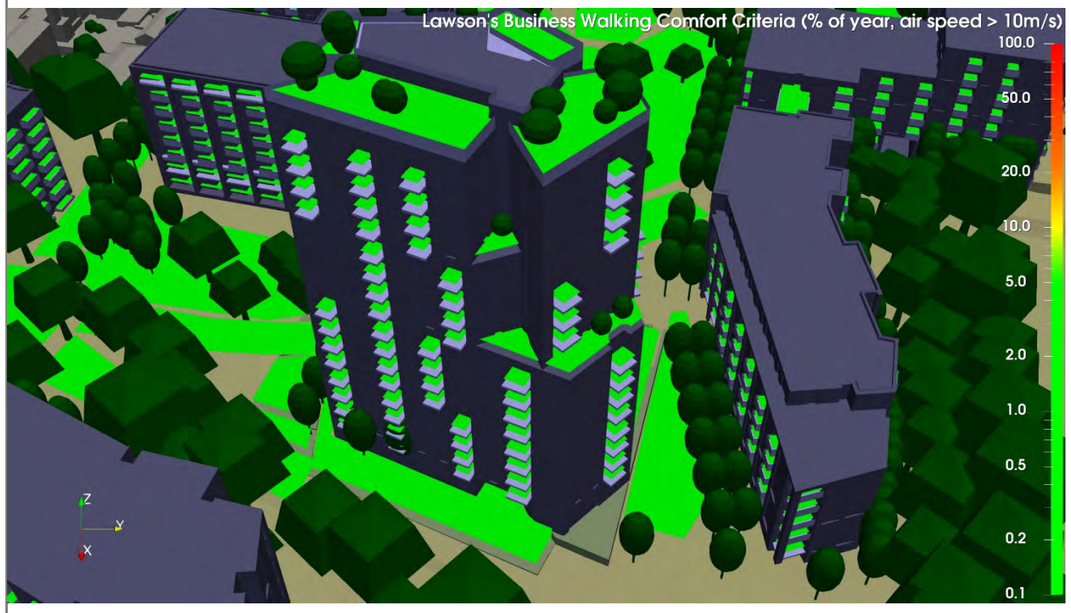
View from the South



View from the West

View from the North

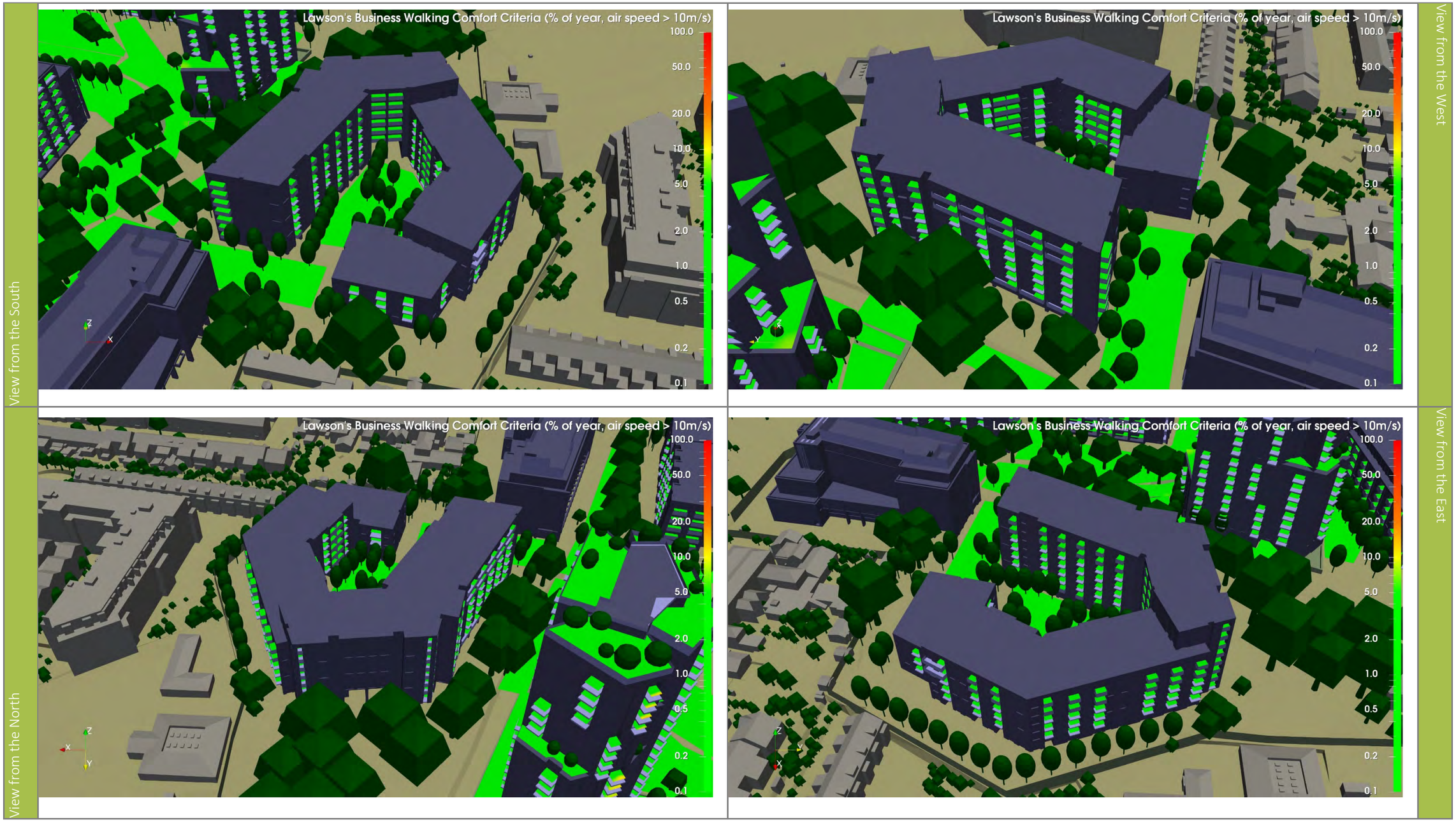




View from the East

Block D2

Figure 17.1.32: Business Walking Comfort Criteria: Block D2



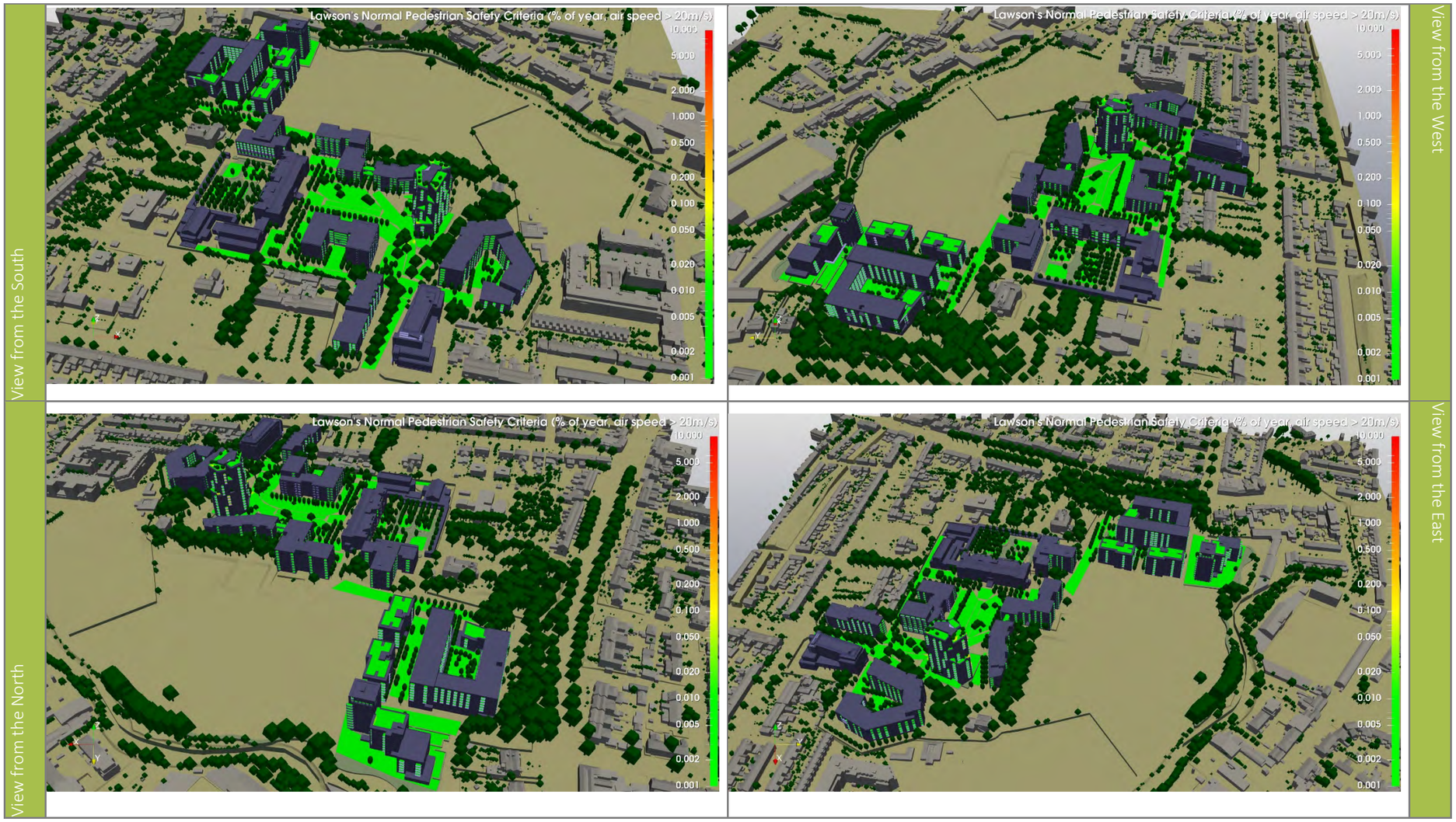
Safety Criteria

Normal Pedestrian Safety Criteria

Figures 17.1.33 – 17.1.40 show the percentage of the year the hourly wind speed exceeds the threshold value for the Normal Pedestrian Safety criteria for all seasons. The threshold value is 4m/s.

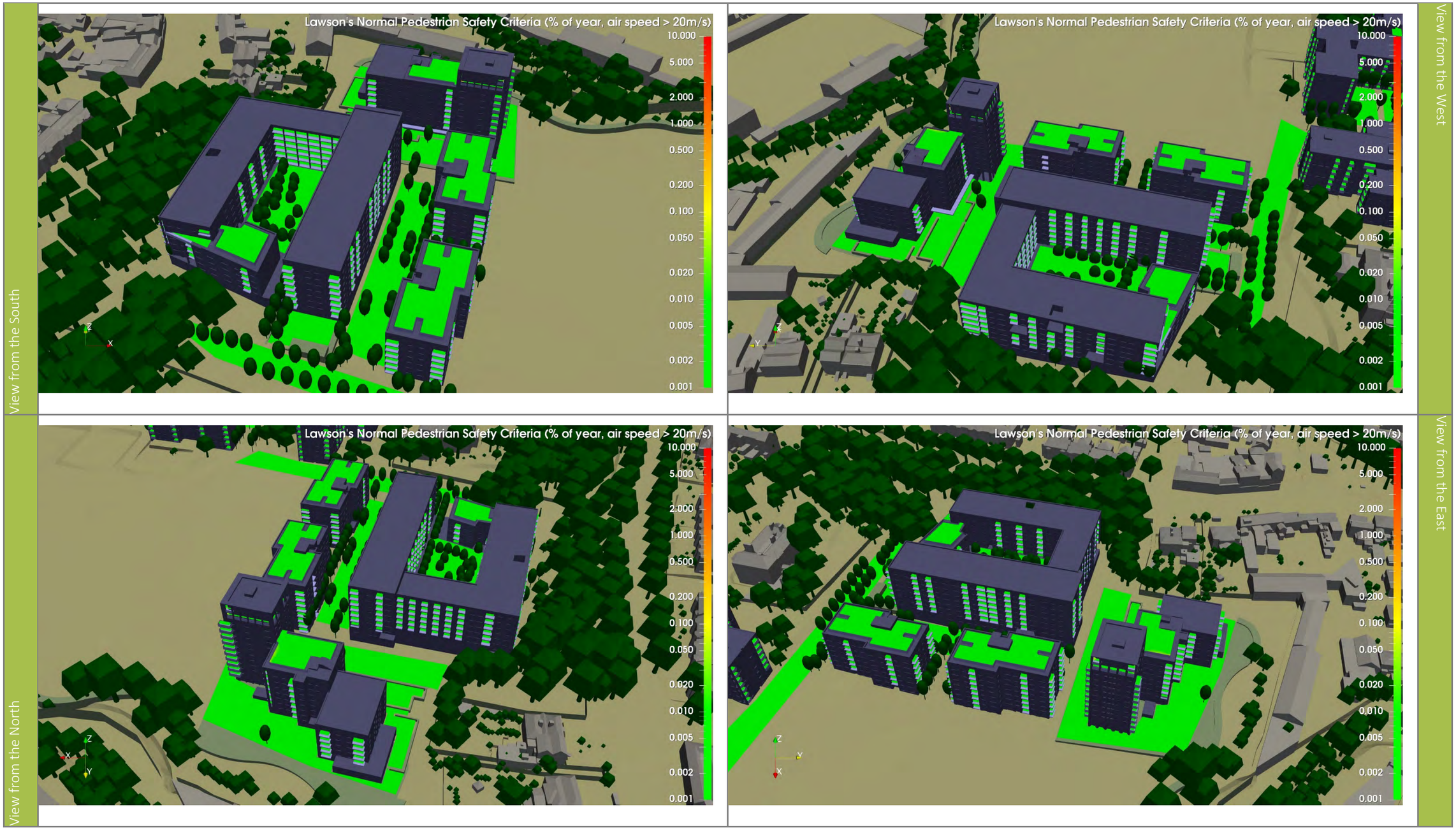
Overall Site

Figure 17.1.33: Normal Pedestrian Safety Criteria: Overall Site



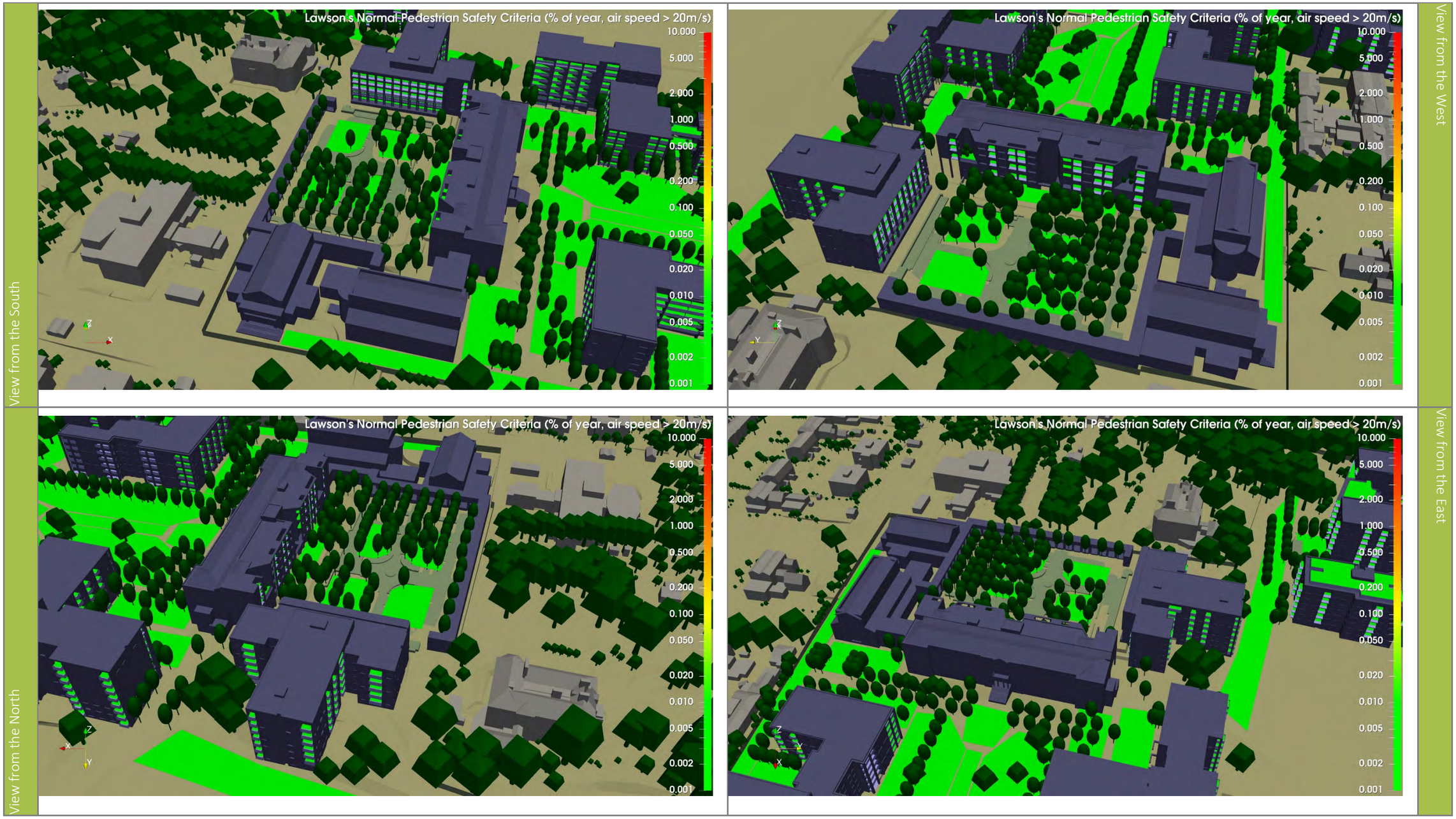
Blocks A1 to A4

Figure 17.1.34: Normal Pedestrian Safety Criteria: Blocks A1 to A4



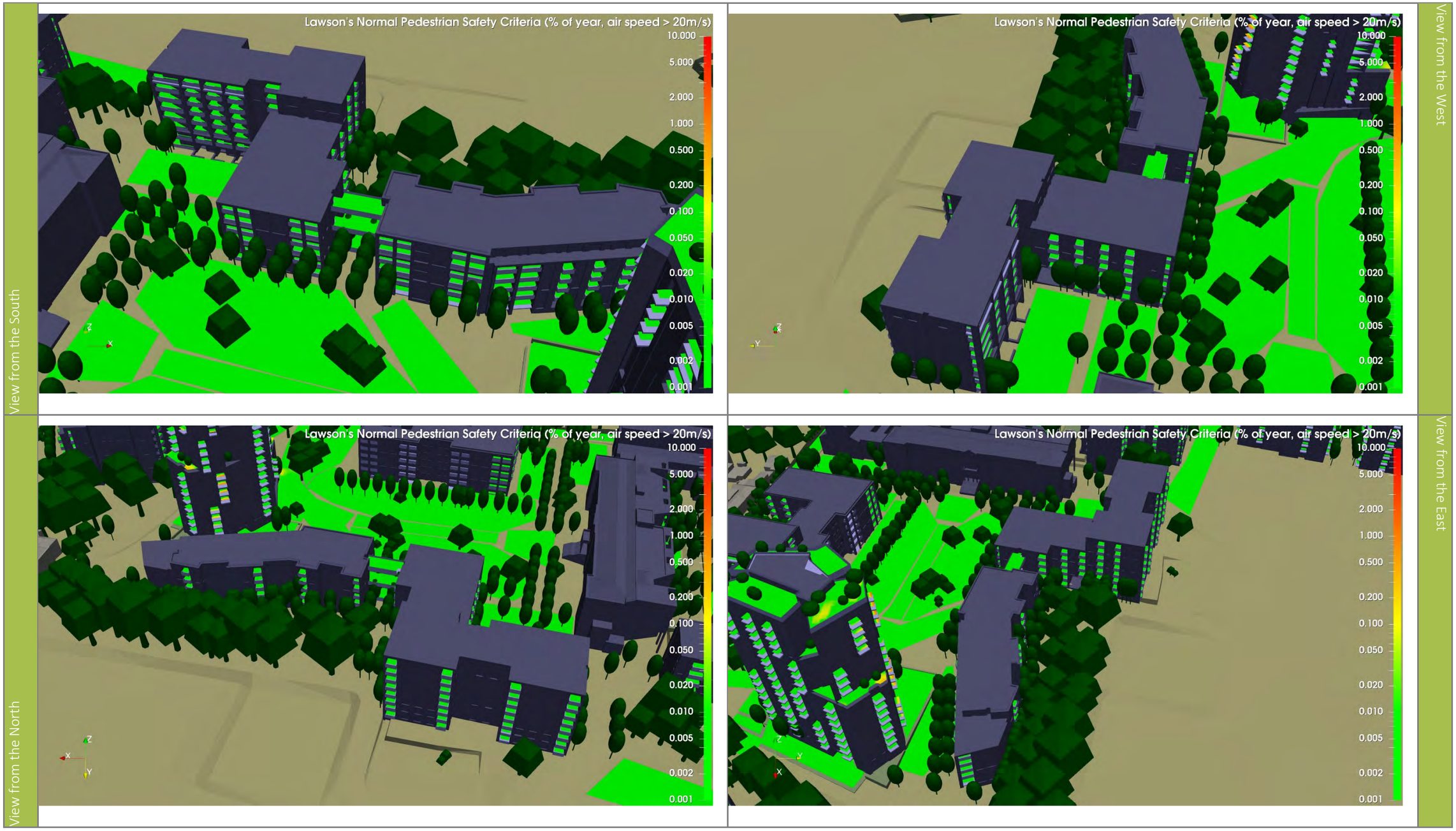
Block B1 and MCM Extension

Figure 17.1.35: Normal Pedestrian Safety Criteria: Block B1 and MCM Extension



Block B2 & B3

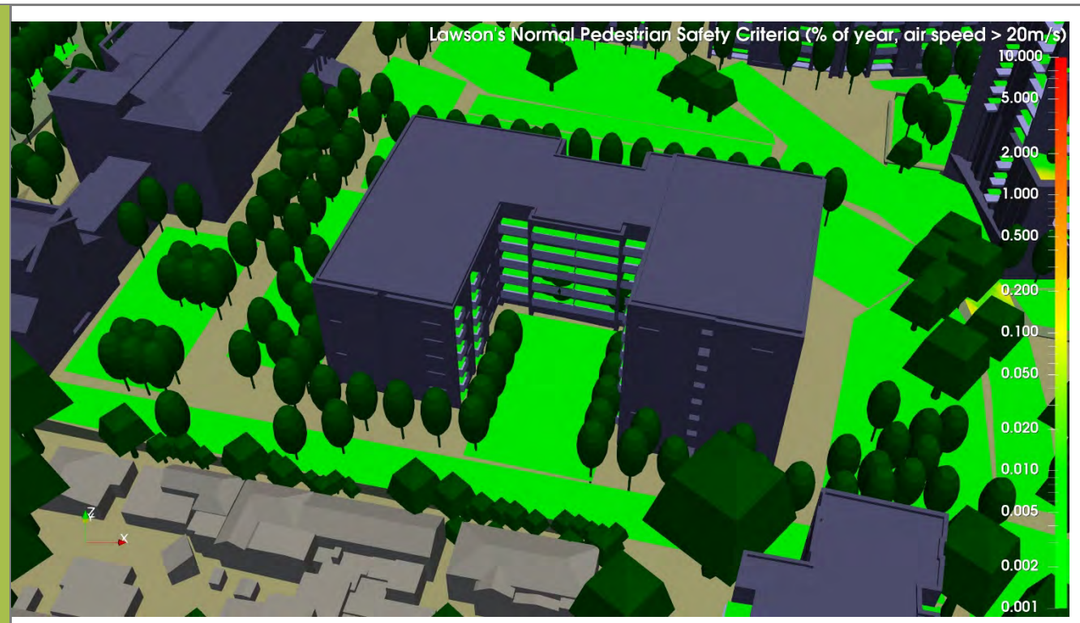
Figure 17.1.36: Normal Pedestrian Safety Criteria: Blocks B2 and B3



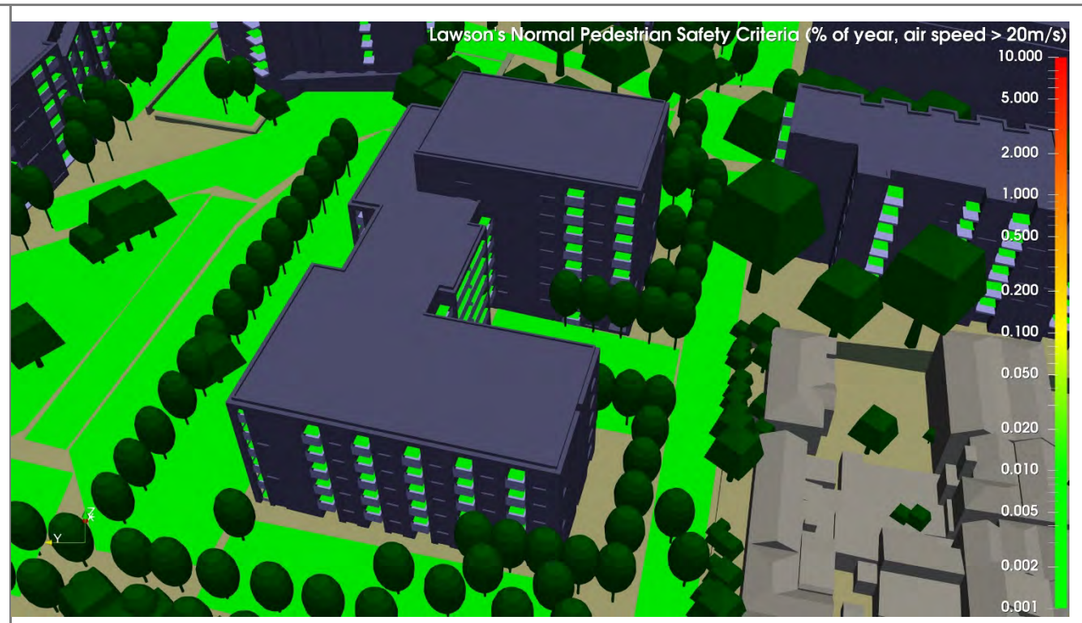
Block C1

Figure 17.1.37: Normal Pedestrian Safety Criteria: Block C1

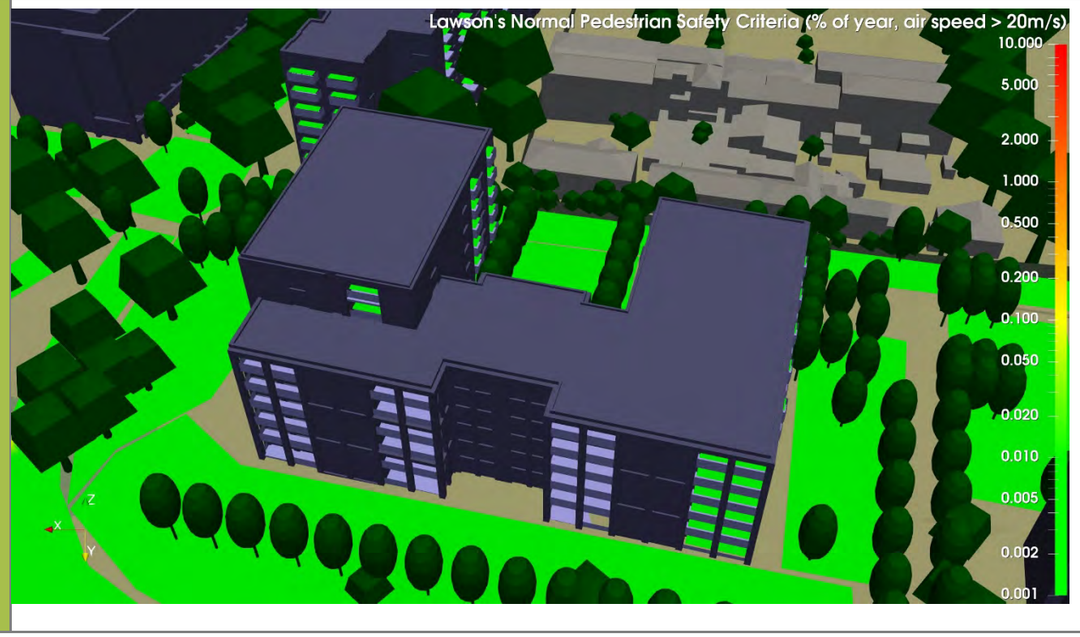
View from the South



View from the West



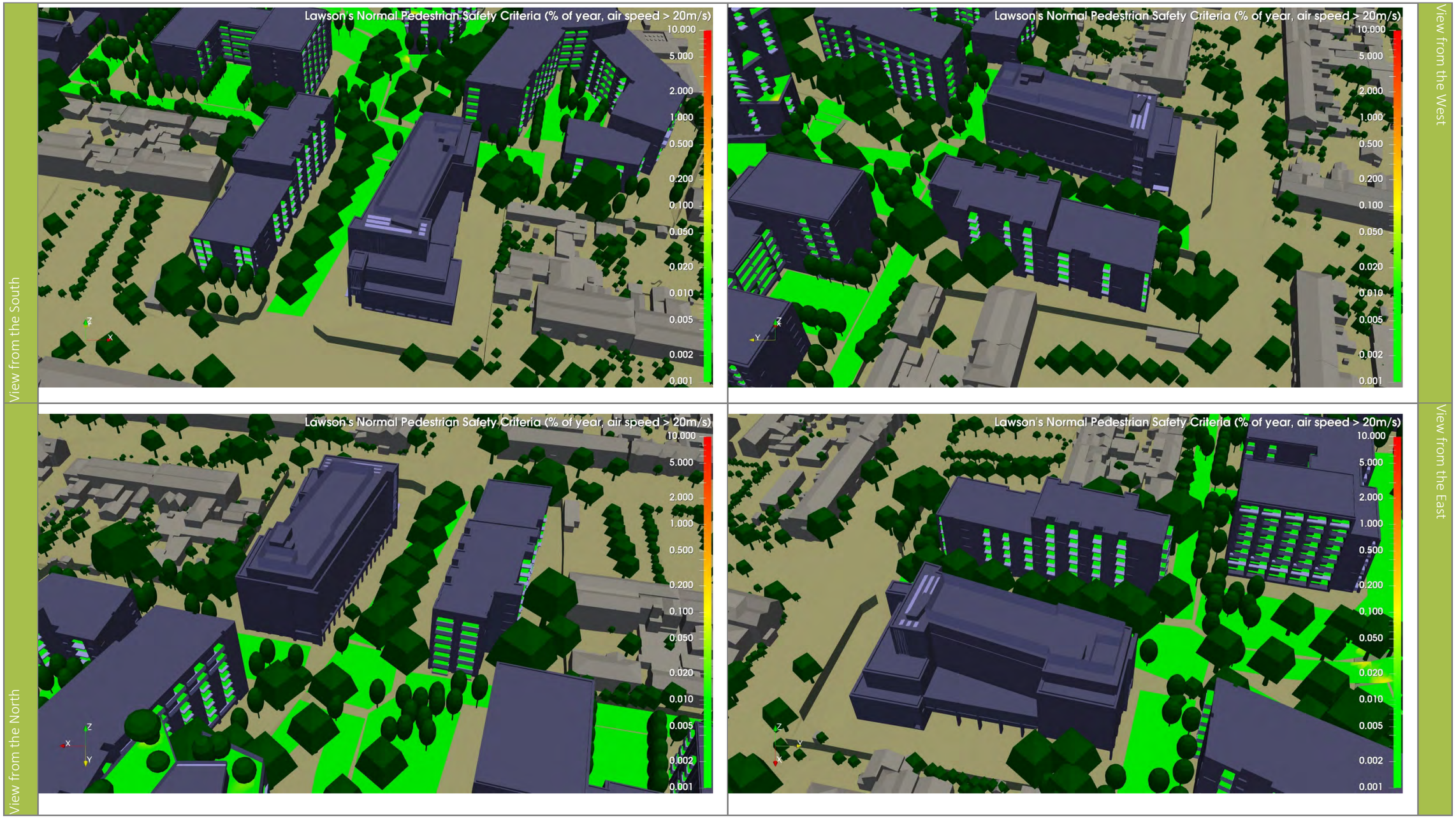
View from the North



View from the East

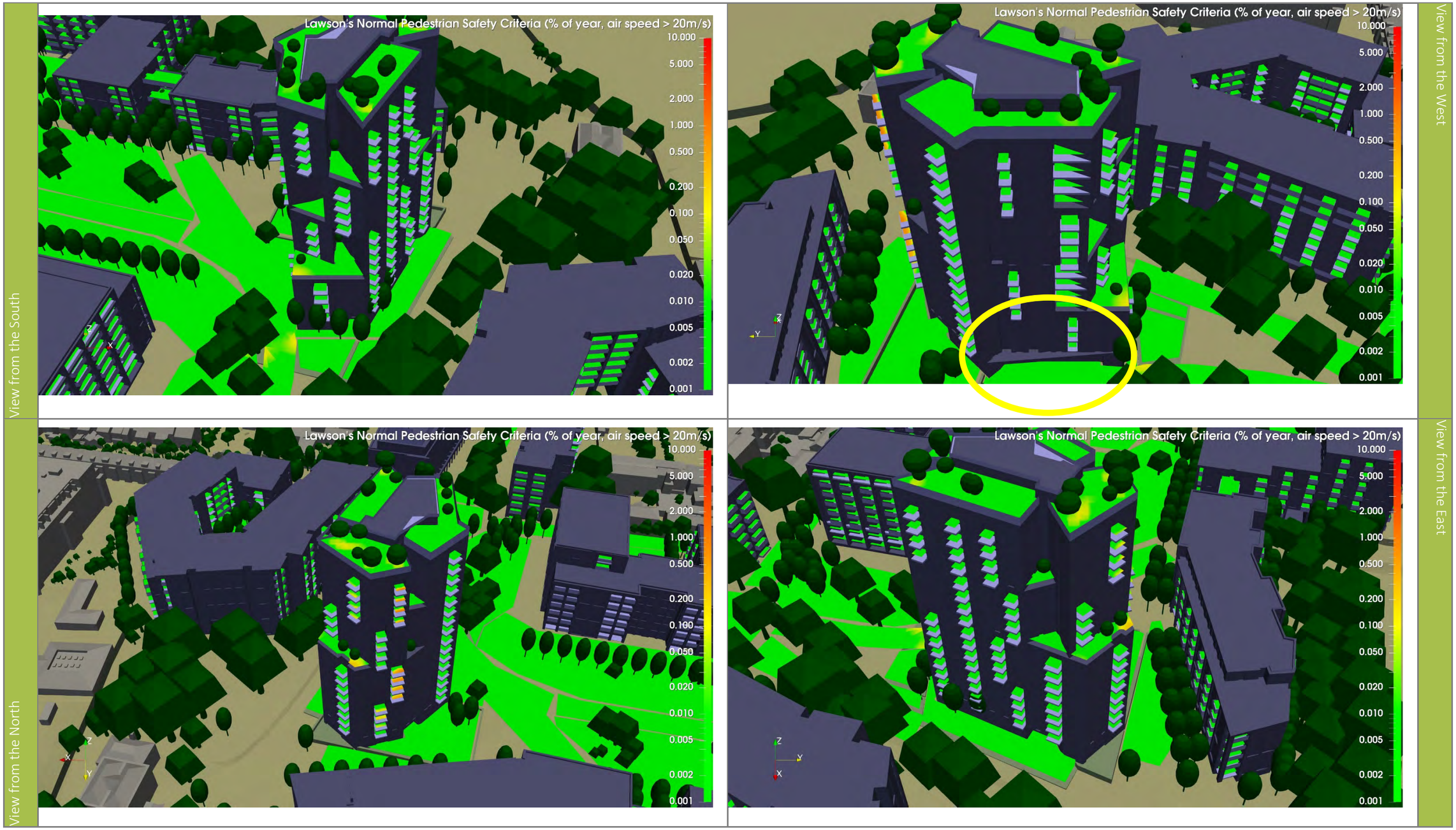
Block C2

Figure 17.1.38: Normal Pedestrian Safety Criteria: Block C2



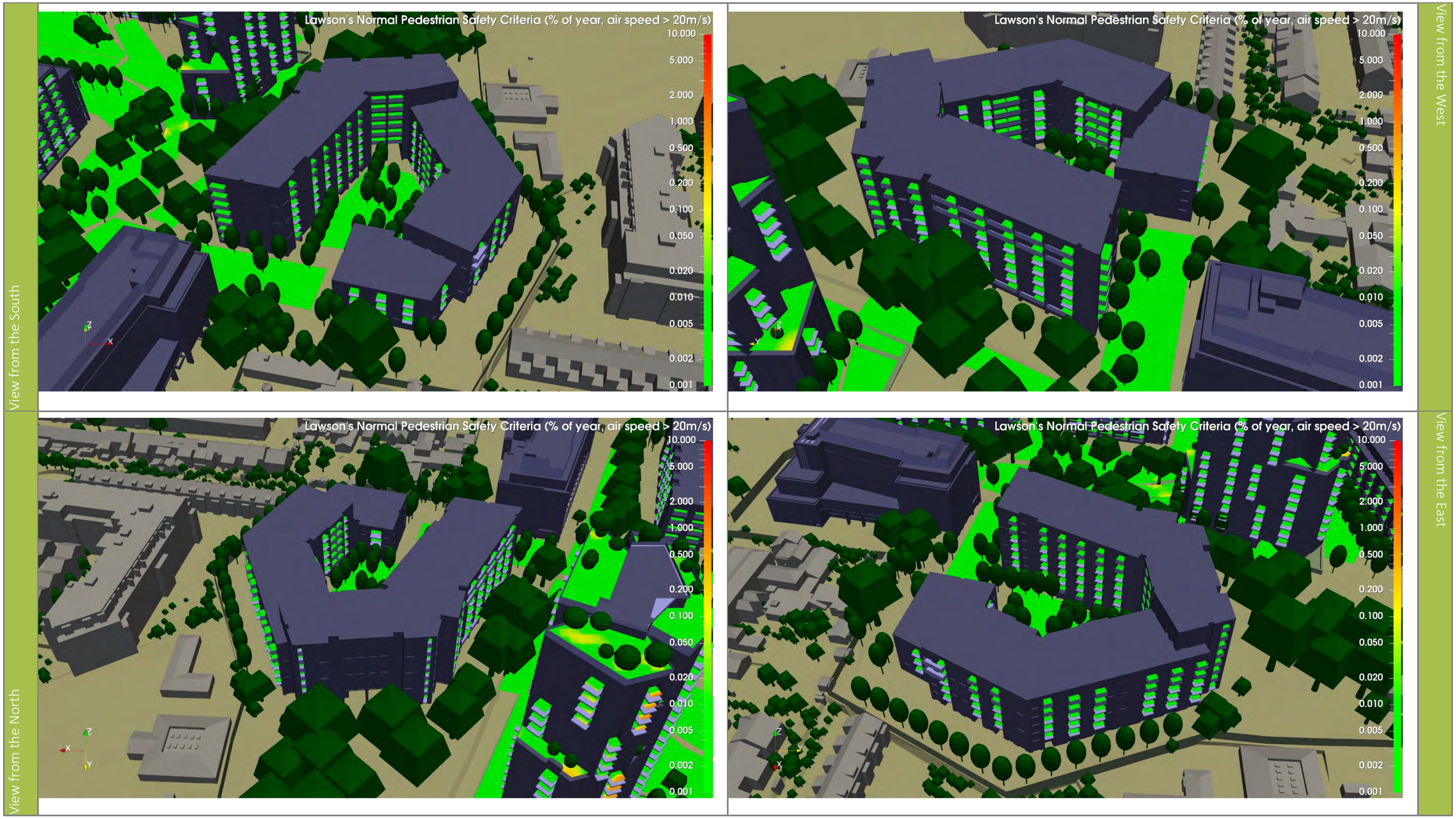
Block D1

Figure 17.1.39: Normal Pedestrian Safety Criteria: Block D1



Block D2

Figure 17.1.40: Normal Pedestrian Safety Criteria: Block D2

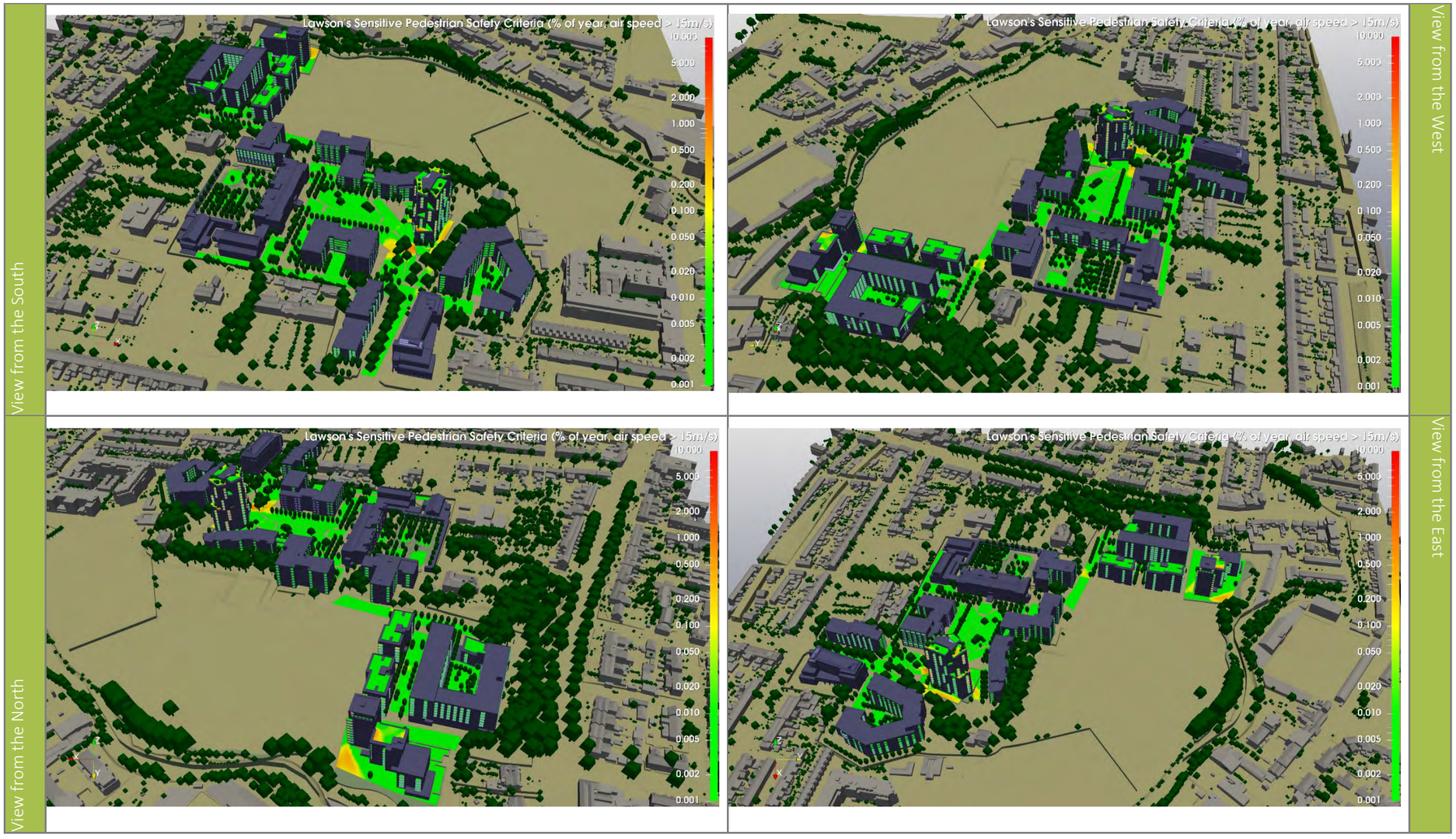


Sensitive Pedestrian Safety Criteria

Figures 17.1.41 – 17.1.48 show the percentage of the year the hourly wind speed exceeds the threshold value for the Sensitive Pedestrian Safety criteria for all seasons. The threshold value is 4m/s.

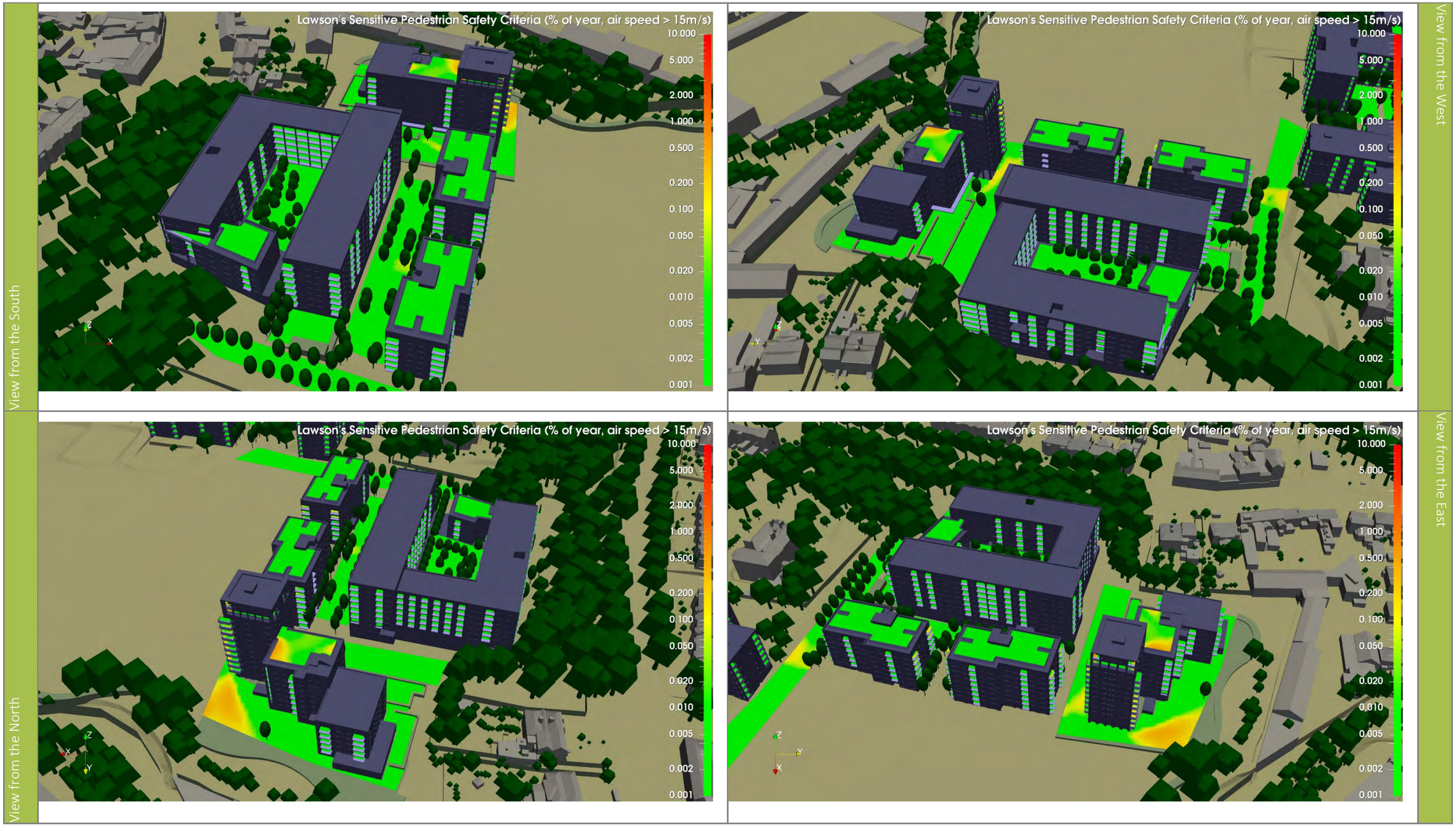
Overall Site

Figure 17.1.41: Sensitive Pedestrian Safety Criteria: Overall Site



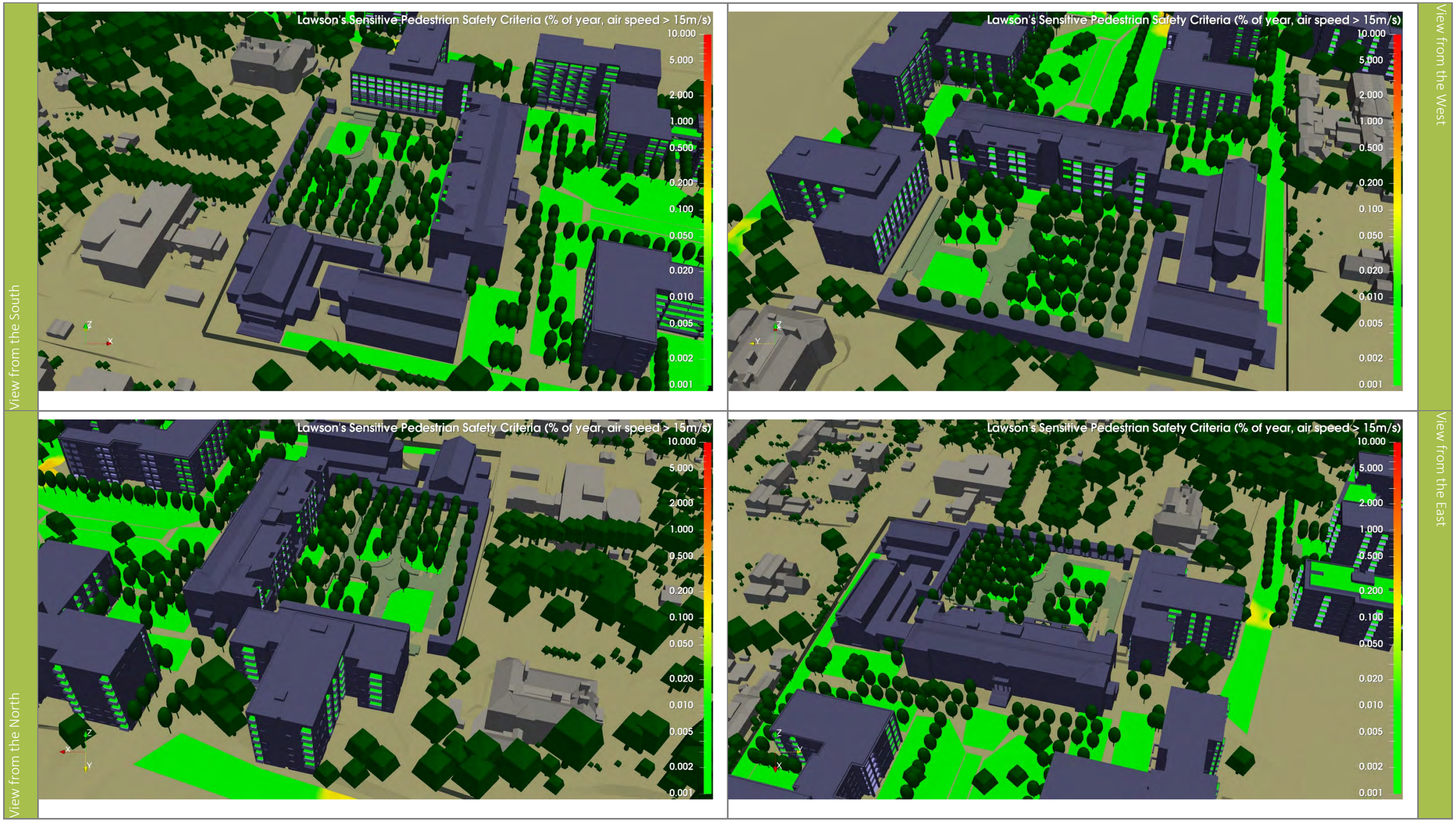
Blocks A1 to A4

Figure 17.1.42: Sensitive Pedestrian Safety Criteria: Blocks A1 to A4



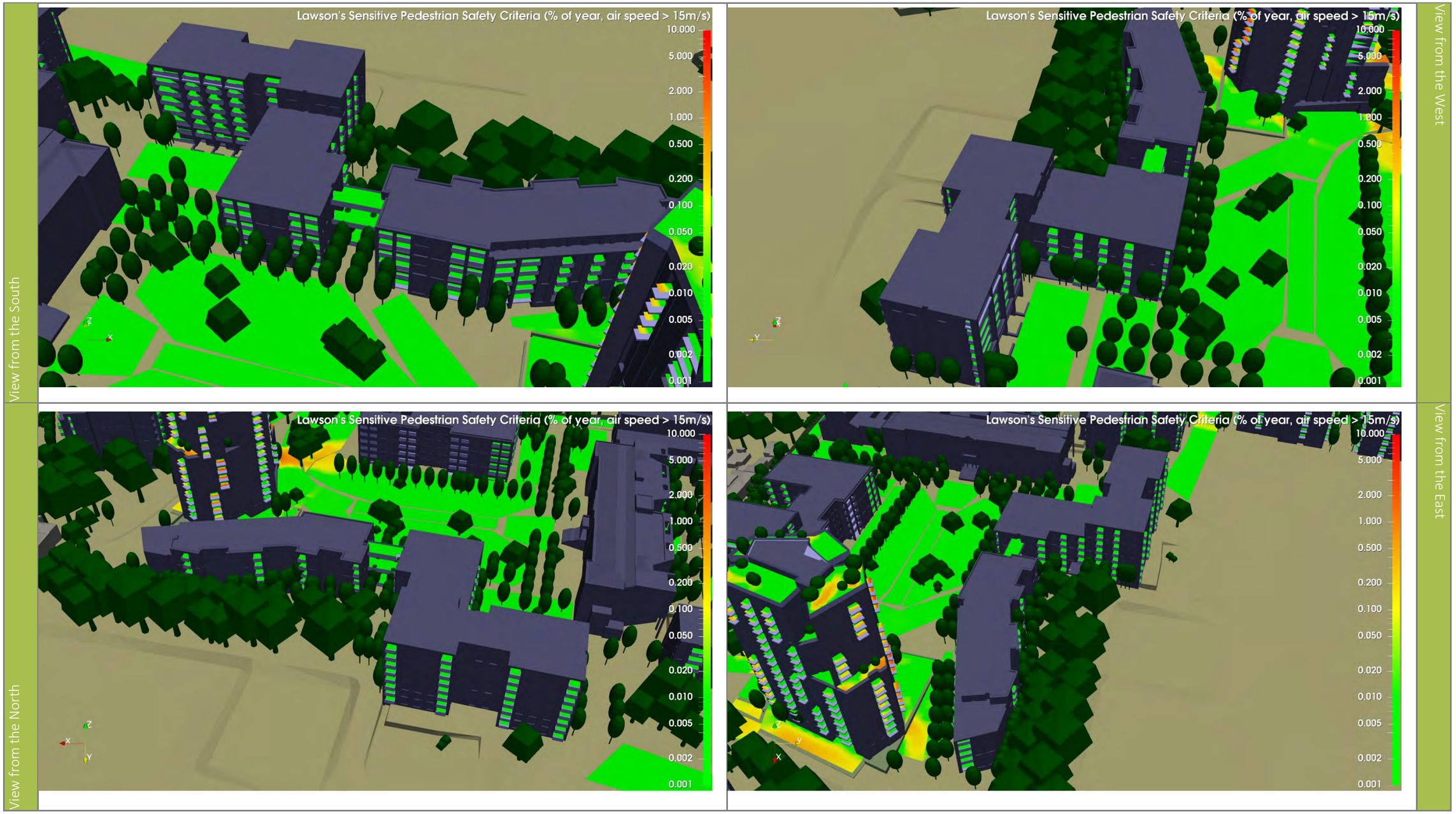
Block B1 and MCM Extension

Figure 17.1.43: Sensitive Pedestrian Safety Criteria: Block B1 and MCM Extension



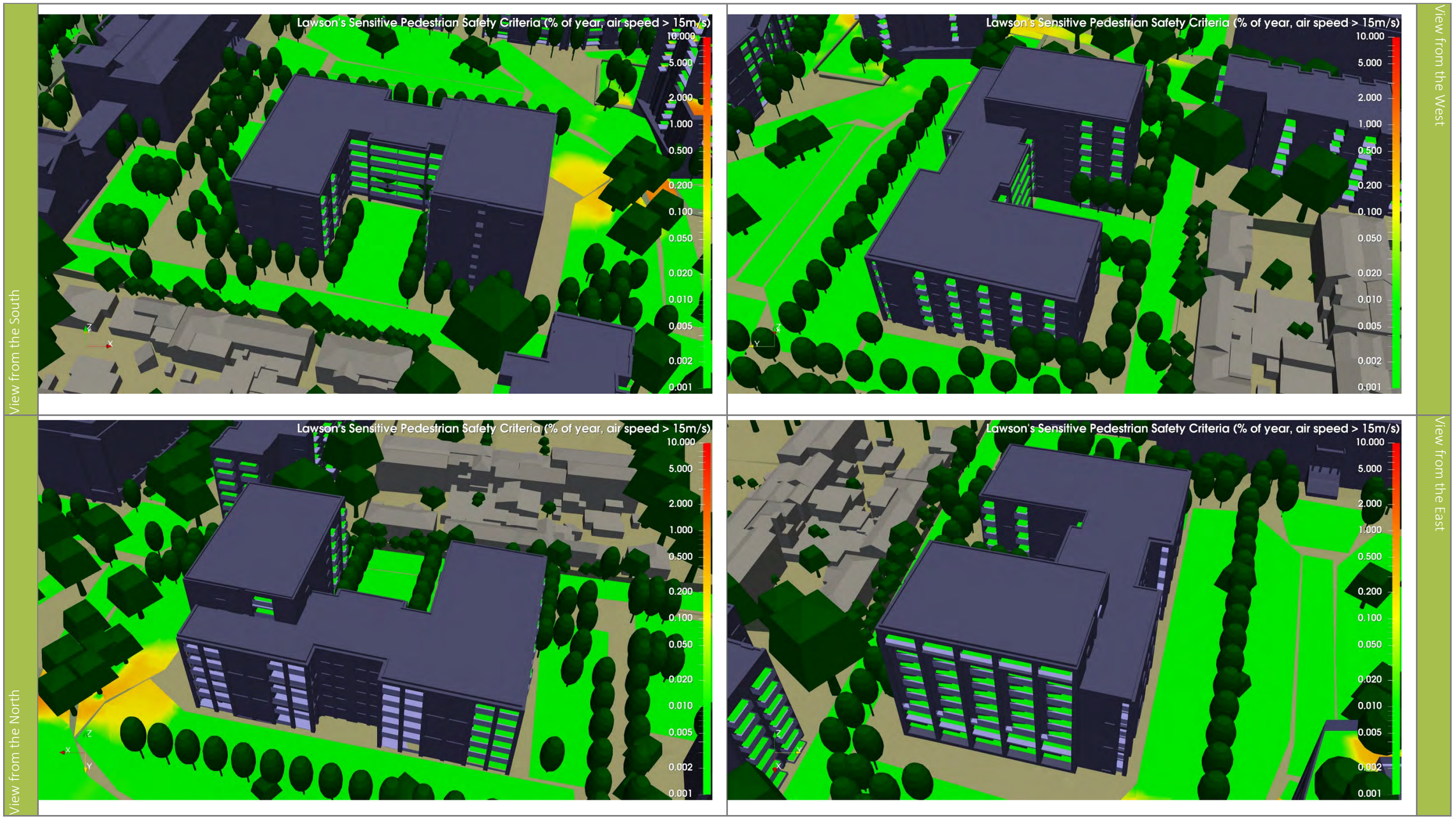
Block B2 & B3

Figure 17.1.44: Sensitive Pedestrian Safety Criteria: Blocks B2 and B3



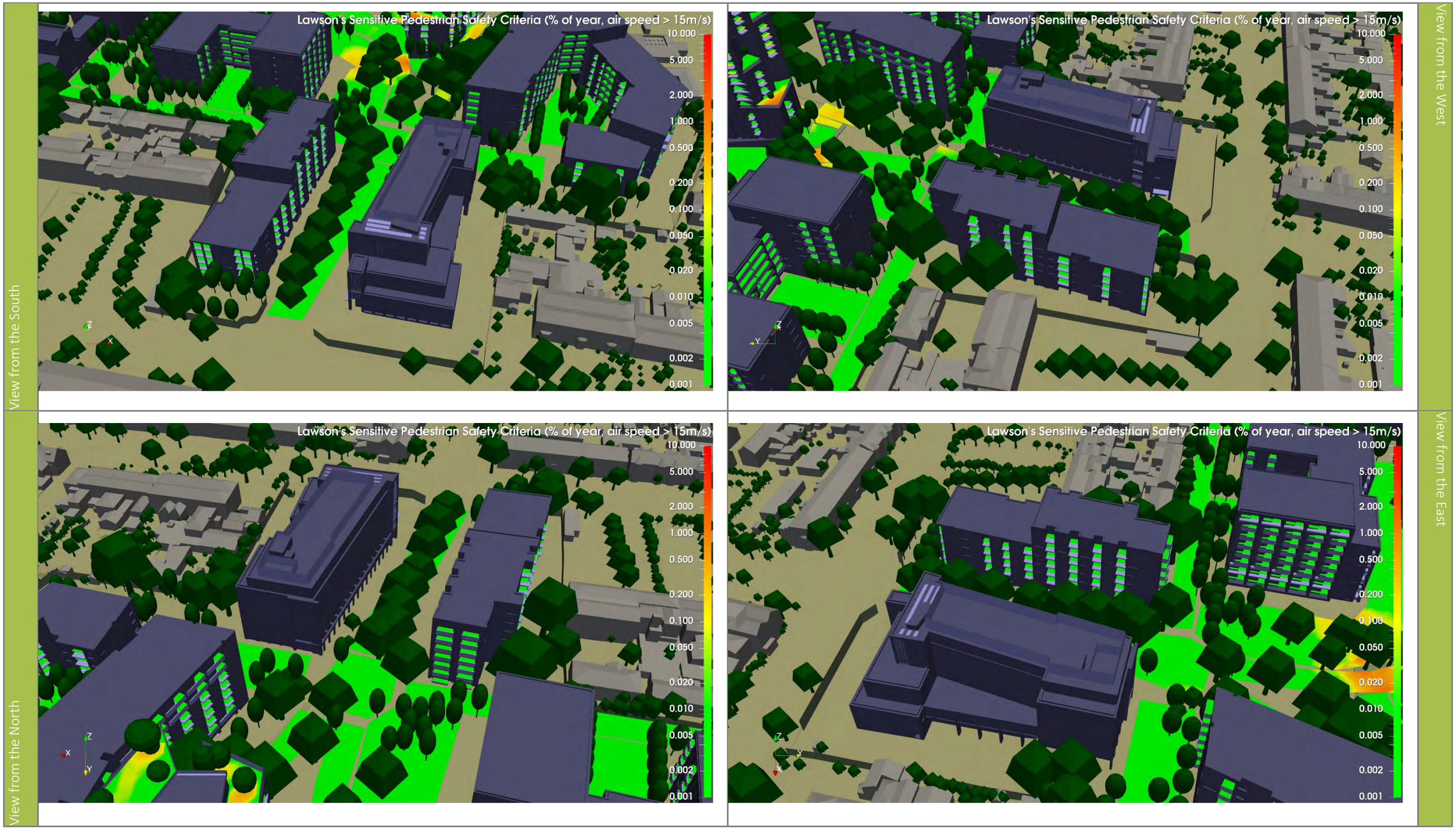
Block C1

Figure 17.1.45: Sensitive Pedestrian Safety Criteria: Block C1



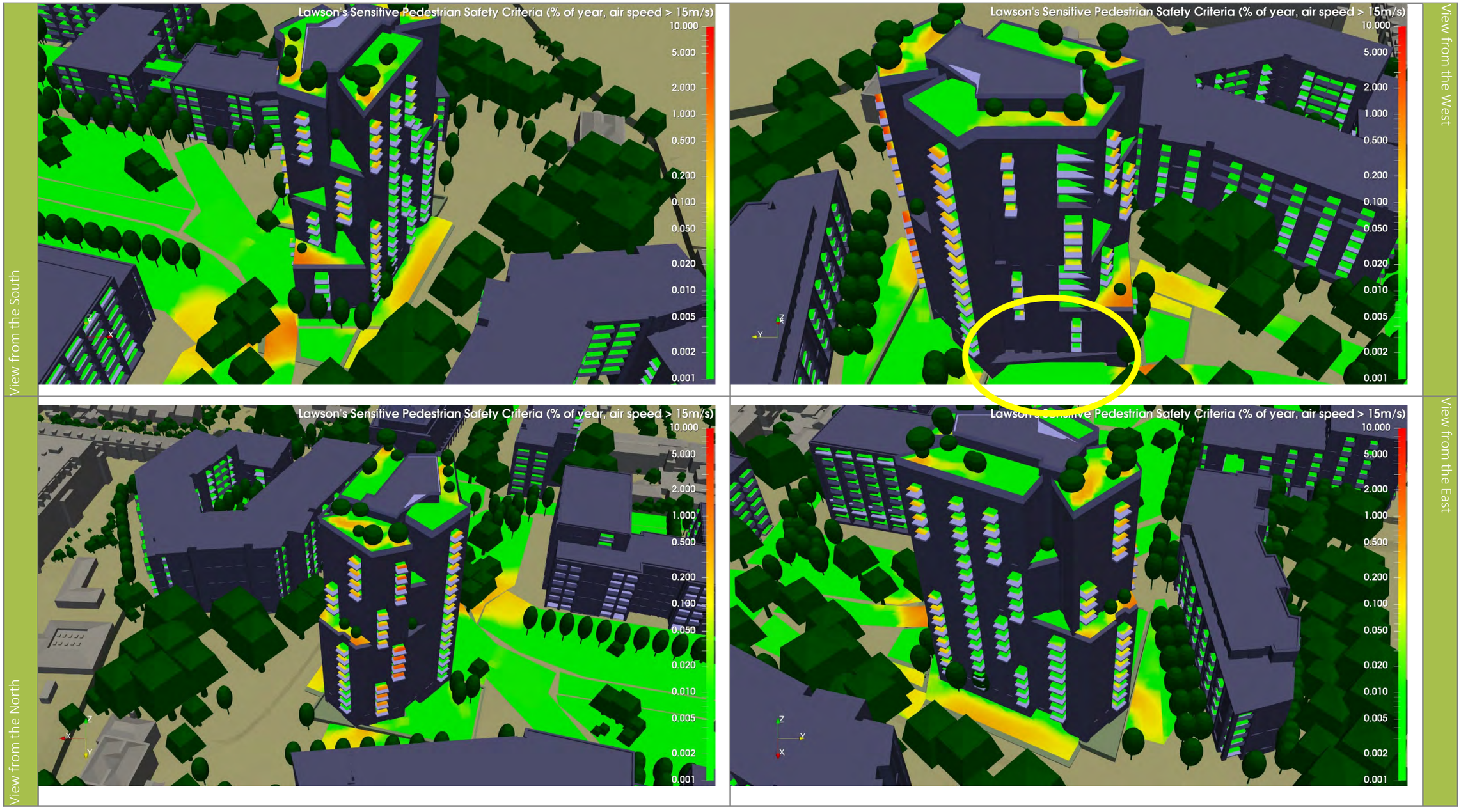
Block C2

Figure 17.1.46: Sensitive Pedestrian Safety Criteria: Block C2



Block D1

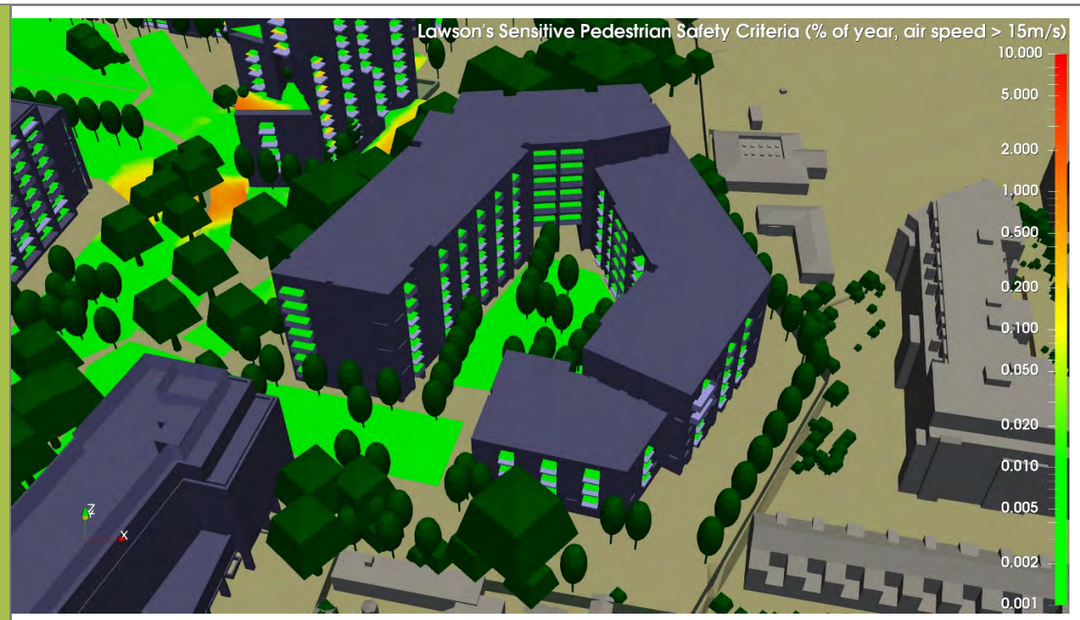
Figure 17.1.47: Sensitive Pedestrian Safety Criteria: Block D1



Block D2

Figure 17.1.48: Sensitive Pedestrian Safety Criteria: Block D2

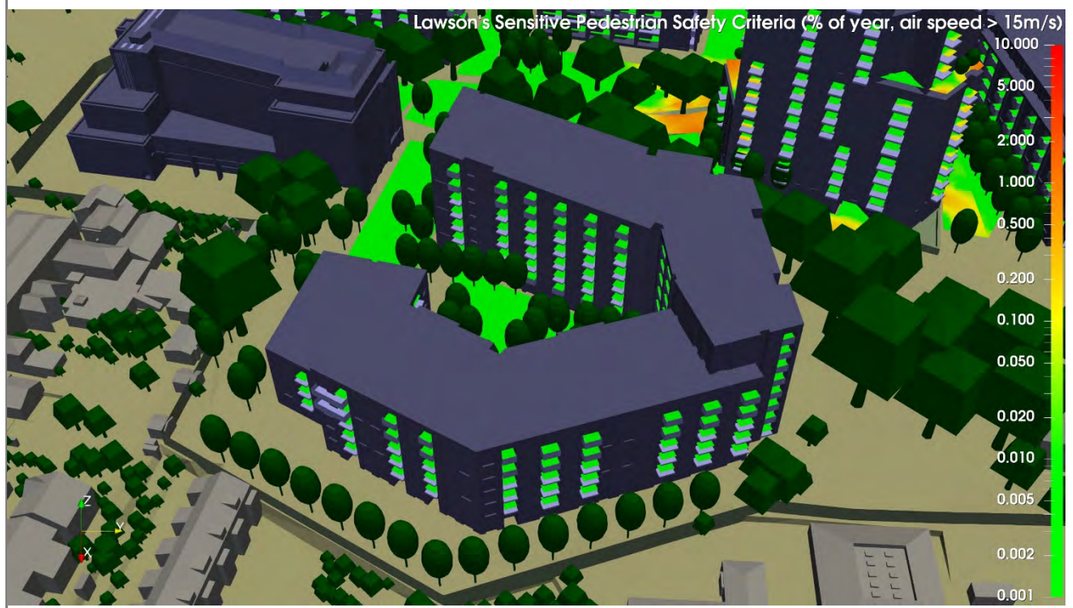
View from the South



View from the West

View from the North

View from the East



A19.1 Construction & Demolition Waste Management Plan

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W: www.awnconsulting.com

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN FOR A PROPOSED RESIDENTIAL DEVELOPMENT

HOLY CROSS COLLEGE SHD

Report Prepared For

CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund

Report Prepared By

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Our Reference

CB/20/11566WMR02

Date of Issue

04 May 2021

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Contents Page

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&D WMP) on behalf of CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund. The development will principally consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 3 to 18 storeys, to accommodate residential apartments and including a retail unit, a café unit, a crèche, and residential tenant amenity spaces.

This plan will provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations [1], *Protection of the Environment Act 2003* as amended [2], *Litter Pollution Act 1997* as amended [3] and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* [4]. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998*, Changing Our Ways*[5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste'* [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020 the government released a new national policy document outlining a new action plan for Ireland and its waste to cover the period of 2020-2025. This plan, 'A Waste Action Plan for a Circular Economy' [7], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan 'A Resource Opportunity (2012)'It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document

shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already in place (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* [8] in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- New residential development of 10 houses or more; and
- Demolition/renovation/refurbishment projects generating in excess of 100 m^3 in volume, of C&D waste.

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [9] , published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC). The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC area published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other*

recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste, which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012.*

The *Dublin City Development Plan 2016 – 2022* [10] sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended

- Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
- European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended;
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended

- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended [11].

European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 2.1).

Figure 2.1 *Waste Hierarchy (Source: European Commission)*

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Developer ensures that the waste contractors engaged by demolition and construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a Waste or Industrial Emissions Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The development will consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 2 to 18 storeys, to accommodate 1614 no. apartments including a retail unit, a café unit, a crèche, and residential tenant amenity spaces. The development will include a single level basement under Blocks B2, B3 & C1, a single level basement under Block D2 and a podium level and single level basement under Block A1 to accommodate car parking spaces, bicycle parking, storage, services and plant areas. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The proposed development sits as part of a wider Site Masterplan for the entire Holy Cross College lands which includes a permitted hotel development and future proposed GAA pitches and clubhouse.

The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory. The application proposes the renovation and extension of the Seminary Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as residential tenant amenity. The wider Holy Cross

College lands also includes Protected Structures including The Red House and the Archbishop's House (no works are proposed to these Structures).

The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Rd. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. Access from the Clonliffe Road entrance will also facilitate vehicular access to future proposed GAA pitches and clubhouse to the north of the site and to a permitted hotel on Clonliffe Road.

The proposed application includes all site landscaping works, green roofs, boundary treatments, PV panels at roof level, ESB Substations, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

3.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of some of the existing buildings, renovations and updating to other existing structures and removal of some hardstanding areas on site, as well as from the excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete, etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. The project quantity surveyors have estimated that 100,000m^3 of material will need to be excavated to do so. It is currently envisaged that 30,000m^3 will be able to be retained and reused onsite for landscaping and fill, the remaining material, will need to be removed offsite due to the limited opportunities for reuse on site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer

/ toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 Potential Hazardous Wastes Arising

3.3.1 Contaminated Soil

Site investigations and environmental soil testing were undertaken between February and March 2020, along with a further survey in June 2020 by Ground Investigations Ireland (GII).

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design. Environmental and Chemical testing as required by the specification, including the Rilta Suite, pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.

The suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH). Results can be found in the Site Investigation report submitted with this application.

If any potentially contaminated material is encountered, it will need to be segregated from clean / inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [12] using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC* [13], which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify DCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

For further information in relation to contaminated land, please refer to Chapter 9 of the EIAR for the proposed Project (Land, Soils, Geology & Hydrogeology).

3.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel / oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are

trained in the appropriate refuelling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

3.3.3 Invasive Plant Species

A site invasive species surveys were undertaken by Invas Biosecurity in December 2020. This included a site walkover survey of the entire site, and around part of the outside perimeter to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011.

Evidence of an extensive Japanese Knotweed (*Fallopia japonica*) stand was recorded at the north-west perimeter of the Site, adjacent to Cian Park Industrial Units; and a second stand was located to the perimeter bordering the Archbishop's Palace grounds. There was evidence that these have previously been treated by the Church's grounds maintenance contractor over the past number of years.

The Contractor will be required to adhere to any mitigation measures / conditions prescribed in relation to invasive plant species. For further information on this topic, please refer to Chapter 8 of the EIAR for the proposed Project (Biodiversity).

3.3.4 Asbestos

Multiple asbestos refurbishment / demolition surveys were undertaken by Phoenix Environmental Safety Ltd in May 2020. As is normal at this stage of the project the scope of the surveys was confined to all accessible areas of the existing buildings which are due for demolition and / or refurbishment in the future.

Asbestos Containing Materials (ACM) were detected in several locations within some of the buildings, including in floor tiling, insulating boards, downpipes, bitumen and stair nosings.

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACMs will only be removed from Site by a suitably permitted / licenced waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All material will be taken to a suitably licensed or permitted facility.

3.3.5 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner / cartridges, batteries (Lead, Ni-Cd or Mercury) and / or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (applicable as of 1 June 2015) (also referred to as the European Waste Code (EWC)) for each waste stream is also shown.

Table 3.1 *Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)*

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

** Individual waste type may contain hazardous substances*

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

The demolition stage will involve the demolition and renovation of multiple brick buildings on-Site. The demolition areas are identified in the planning drawings provided with this application under separate cover. The anticipated demolition waste and rates of reuse, recycling / recovery and disposal are shown in

Table 4.1, below.

Table 4.1 Estimated off-site reuse, recycle and disposal rates for demolition waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	324.0	0	0.0	85	275.4	15	48.6
Concrete, Bricks, Tiles, Ceramics	1836.0	30	550.8	65	1193.4	5	91.8
Plasterboard	144.0	30	43.2	60	86.4	10	14.4
Asphalts	36.0	0	0.0	25	9.0	75	27.0
Metals	540.0	5	27.0	80	432.0	15	81.0
Slate	288.0	0	0.0	85	244.8	15	43.2
Timber	432.0	10	43.2	60	259.2	30	129.6
Asbestos	5.0	0	0.0	0	0.0	100	5.0
Total	**3605.0**		**664.2**		**2500.2**		**440.6**

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* [14] *and the joint EPA & GMIT study* [15]

Table 4.2: *Waste materials generated on a typical Irish construction site*

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	**100**

Table 4.3, below, shows the estimated construction waste generation for the proposed Project based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m^2, using the waste breakdown rates shown in Table 4.2. These have been calculated from the schedule of development areas provided by the architect.

***Table 4.3**: Predicted on and off-site reuse, recycle and disposal rates for construction waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	2261.8	10	226.2	80	1809.4	10	226.2
Timber	1919.1	40	767.6	55	1055.5	5	96.0
Plasterboard	685.4	30	205.6	60	411.2	10	68.5
Metals	548.3	5	27.4	90	493.5	5	27.4
Concrete	411.2	30	123.4	65	267.3	5	20.6
Other	1028.1	20	205.6	60	616.8	20	205.6
Total	**6853.8**		**1555.8**		**4653.8**		**644.3**

In addition to the waste streams in Table 4.3, there will be c. 100,000 m^3 of soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on Site is expected to be limited and all of the excavated material except for 30,000 m^3 is expected to be removed off-Site for appropriate reuse, recovery and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on-Site, where it is practical. Where the on-Site segregation of certain wastes types is not practical, off-Site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source, where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-Site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

During construction, some of the sub-contractors on Site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (per Article 30 (1) (b) of the Waste Collection Permit Regulations 2007, as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste off-Site in their work vehicles (which are

not designed for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off-Site for appropriate reuse, recycling, recovery and / or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required.

The anticipated management of the main waste streams is outlined as follows:

Soil, Stone, Gravel & Clay

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

When material is removed off-Site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on Site. Any excavated rock is expected to be removed off-Site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on-Site, the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from Site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off-Site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible. If concrete is to be crushed on-Site, the appropriate mobile waste facility permit will be obtained from DCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues, etc., will be disposed of in a separate skip and recycled off-Site.

Metal

Metals will be segregated, where practical, and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The Site Manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages / receptacles / pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic, are generated, these will be segregated at source into dedicated skips and removed off-Site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip / receptacle will be examined by a member of the waste team (see Section 7.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

Any asbestos or ACM found on-Site should be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.*

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and / or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on-Site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from DCC and the destination of the accepting waste facility will be supplied to the DCC waste unit.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 7.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 7.0) will maintain a copy of all waste collection permits on-Site.

If the waste is being transported to another site, a copy of the Local Authority waste COR / permit or EPA Waste / Industrial Emissions Licence for that site will be provided to the nominated project Waste Manager (see Section 7.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all Local Authorities in Ireland) and kept on-Site along with details of the final destination (COR, permits, licences, etc.). A receipt from

the final destination of the material will be kept as part of the on-Site waste management records.

All information will be entered in a waste management recording system to be maintained on-Site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle / recovery / disposal costs associated with the requirement for a waste contractor to take the material off-Site. Clean and inert soils, gravel, stones, etc., which cannot be reused on-Site may be used as access roads or capping material for landfill sites, etc. This material is often taken free of charge or at a reduced fee for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate, which can be offset against the costs of collection and transportation of the skips. Clean, uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste. Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber, from a site than mixed waste.

5.3 Disposal

Landfill charges are currently at around €130 - €150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc., is also used as fill / capping material, wherever possible.

6.0 DEMOLITION PROCEDURES

The demolition stage will involve the demolition of multiple brick style buildings on-Site. The demolition areas are identified in the planning drawings submitted as part of this application, under separate cover. A formal demolition plan including safety procedures will be prepared by the demolition contractor. However, in general, the following sequence of works should be followed during the demolition stage:

Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including asbestos, ACMs, electrical power lines or cables, gas reticulation systems, telecommunications, unsafe structures and fire / explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily be comprised of metal; however, may also include timbers, doors, windows, wiring and metal ducting, etc.

Removal of Roofing

Steel roof supports, beams, etc., will be dismantled and taken away for recycling / salvage.

Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

7.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project Waste Manager to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the project.

7.1 Waste Manager Training and Responsibilities

The nominated Waste Manager will be given responsibility and authority to select a waste team if required, i.e. members of the Site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The Waste Manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The Waste Manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

7.2 Site Crew Training

Training of Site crew in relation to waste is the responsibility of the Waste Manager and, as such, a waste training program should be organised. A basic awareness course will be

held for all Site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other Site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

8.0 RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log should be used to track each waste movement from the Site. On exit from the Site, the waste collection vehicle driver should stop at the Site office and sign out as a visitor and provide the security personnel or Waste Manager with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by, e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC / LoW

The waste vehicle will be checked by security personal or the Waste Manager to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the Site.

The waste transfer dockets will be transferred to the Waste Manager on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the DCC Waste Regulation Unit when requested.

Alternatively, each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on Site by the main contractor as required.

Waste receipts from the receiving waste facility will also be obtained by the Site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on Site as required.

9.0 OUTLINE WASTE AUDIT PROCEDURE

9.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the Site during the C&D phase of the proposed Project. Contact details for the nominated Waste Manager will be provided to the DCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from Site.

9.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the demolition and construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

10.0 CONSULTATION WITH RELEVANT BODIES

10.1 Local Authority

Once construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-Site, details of the proposed destination of each waste stream will be provided to the DCC Waste Regulation Unit.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

10.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will be collected and transported off-Site, and the recycling / reclamation process each material will undergo off-Site.

11.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 430 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
   - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
7. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
8. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
9. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and Site Managers* (2002).
10. Dublin City Council (DCC), Dublin City Council Development Plan 2016-2022 (2016)

11. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended

12. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)

13. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

14. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.

15. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).

A19.2 Operational Waste Management Plan

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OPERATIONAL WASTE MANAGEMENT PLAN FOR PROPOSED RESIDENTIAL DEVELOPMENT

HOLY CROSS COLLEGE SHD

Report Prepared For

CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund

Report Prepared By

Chonaill Bradley, Senior Environmental Consultant

Our Reference

CB/20/11566WMR01

Date of Issue

04 May 2021

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CONTENTS

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) on behalf of CWTC Multi Family ICAV acting on behalf of its sub-fund DBTR DR DR1 Fund. The proposed Project will principally consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 3 to 18 storeys, to accommodate residential apartments and including a retail unit, a café unit, a crèche, and residential tenant amenity spaces.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed Project is undertaken in accordance with the current legal and industry standards including, the Waste Management Act 1996 – 2011 as amended and associated Regulations [1], Protection of the Environment Act 2003 as amended [2], Litter Pollution Act 2003 as amended [3], the *'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021'* [4] and Dublin City Council (DCC) 'Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws' 2018 [5]. In particular, this OWMP aims to provide a robust strategy for the storage, handling, collection and transport of the wastes generated at Site.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed Project during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 entitled *'Changing Our Ways'* [6], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, *Changing Our Ways* stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document, *'Preventing and Recycling Waste – Delivering Change'* was published in 2002 [7]. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled *'Making Irelands Development Sustainable – Review, Assessment and Future Action'* [8]. This document also stressed the need to decouple economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled *'Taking Stock and Moving Forward'* [9]. Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management

plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

In September 2020, the government released a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan *'A Waste Action Plan for a Circular Economy'* [10], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan *"A Resource Opportunity"* (2012).

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and back up the production chain. To support the policy, regulation is already in place (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic *'National Waste (Database) Reports'* [11] detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The *2018 National Waste Statistics*, which is the most recent study published, along with the national waste statistics web resource (August 2020) reported the following key statistics for 2018:

- **Generated –** Ireland produced 2,912,353 t of municipal waste in 2018. This is almost a 5% increase since 2017. This means that the average person living in Ireland generated 600 kg of municipal waste in 2018.
- **Managed –** Waste collected and treated by the waste industry. In 2018, a total of 2,865,207 t of municipal waste was managed and treated.
- **Unmanaged –**Waste that is not collected or brought to a waste facility and is, therefore, likely to cause pollution in the environment because it is burned, buried or dumped. The EPA estimates that 47,546 t was unmanaged in 2017.
- **Recovered –** The amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. In 2018, around 85% of municipal waste was recovered – an increase from 77% in 2017.
- **Recycled –** The waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. The recycling rate in 2018 was 38%, which is down from 41% in 2017.
- **Disposed –** Less than a quarter (15%) of municipal waste was landfilled in 2018. This is a decrease from 23% in 2017.

2.2 Regional Level

The proposed Project is located in the Local Authority administrative area of Dublin City Council (DCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan applicable to the DCC administrative area, which was published in May 2015.

The regional plan sets out the following strategic targets for waste management in the region that are relevant to the proposed development:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130-150 per tonne of waste, which includes a €75 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2013.

The *Dublin City Development Plan 2016 – 2022* [13] sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies a need to further reduce the role of landfilling in favour of higher value recovery options. Waste policies and objectives with a particular relevance to this proposed Project are as follows:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin city and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*
- *SI22: To ensure that effect is given as far as possible to the "polluter pays" principle.*

Objectives:

- *SIO16: To require the provision of adequately-sized-recycling facilities in new commercial and large scale residential developments, where appropriate.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015 - 2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the proposed Project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (No. 36 of 2001), 2003 (No. 27 of 2003) and 2011 (No 20 of 2011). Sub-ordinate and associated legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulation 2007 (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended

- European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended
- European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended
- *European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)*
- European Union (Properties of Waste Which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended

- Environmental Protection Act 1992 (S.I. No. 7 of 1992) as amended;
- Litter Pollution Act 1997 (Act No. 12 of 1997) as amended and
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended [13]

These Acts and subordinate Regulations transpose the relevant European Union Policy and Directives into Irish law.

European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 2.1).

Figure 2.1 *Waste Hierarchy (Source: European Commission)*

One of the guiding principles of European waste legislation, which has in turn been incorporated into the Waste Management Act 1996 - 2011 and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal.) As it is not practical in most cases for the waste

producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is, therefore, imperative that the residents and the proposed building management company undertake on-Site management of waste in accordance with all legal requirements and that the facilities management company employ suitably permitted / licenced contractors to undertake off-Site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contactor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007, as amended, or a Waste or Industrial Emissions (IE) Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and / or disposed of at the specified site.

2.3.1 Dublin City Council Waste Management Bye-Laws

The DCC "Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018)" were bought into force in May 2019. These bye-laws repeal the previous Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste. The bye-laws set a number of enforceable requirements on waste holders with regard to storage, separation and presentation of waste within the DCC administrative area. Key requirements under these bye-laws of relevance to the operational phase of the proposed Project include the following:

- Kerbside waste presented for collection shall not be presented for collection earlier than 5.00 pm on the day immediately preceding the designated waste collection day;
- All containers used for the presentation of kerbside waste and any uncollected waste shall be removed from any roadway, footway, footpath or any other public place no later than 10:00 am on the day following the designated waste collection day, unless an alternative arrangement has been approved in accordance with bye-law 2.3;
- Documentation, including receipts, is obtained and retained for a period of no less than one year to provide proof that any waste removed from the premises has been managed in a manner that conforms to these bye-laws, to the Waste Management Act and, where such legislation is applicable to that person, to the European Union (Household Food Waste and Bio-Waste) Regulations 2015; and
- Adequate access and egress onto and from the premises by waste collection vehicles is maintained.

The full text of the bye-laws is available from the DCC website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the residential sector in the DCC region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the regional waste management plan, there is a decreasing number of landfills available in the region. Only three municipal solid waste landfills remain operational and all are operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second in Poolbeg in Dublin.

There is a DCC Recycling Centre at Gullistan Terrace, Rathmines, located c.1.28 km to the north-east of the Project Site, which can be utilised by the residents of the proposed Project for other household waste streams, if needed, while a bottle bank can be found c. 1.38 m to the north east at the Rathmines Road Tesco. Note that glass recycling bins will be provided for residents on-Site as detailed in Section 5.0, below.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPO website and all Waste / Industrial Emissions Licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The development will consist of the construction of a Build To Rent residential development set out in 12 no. blocks, ranging in height from 2 to 18 storeys, to accommodate 1614 no. apartments including a retail unit, a café unit, a crèche, and residential tenant amenity spaces. The development will include a single level basement under Blocks B2, B3 & C1, a single level basement under Block D2 and a podium level and single level basement under Block A1 to accommodate car parking spaces, bicycle parking, storage, services and plant areas. To facilitate the proposed development the scheme will involve the demolition of a number of existing structures on the site.

The proposed development sits as part of a wider Site Masterplan for the entire Holy Cross College lands which includes a permitted hotel development and future proposed GAA pitches and clubhouse.

The site contains a number of Protected Structures including The Seminary Building, Holy Cross Chapel, South Link Building, The Assembly Hall and The Ambulatory. The application proposes the renovation and extension of the Seminary Building to accommodate residential units and the renovation of the existing Holy Cross Chapel and Assembly Hall buildings for use as residential tenant amenity. The wider Holy Cross College lands also includes Protected Structures including The Red House and the Archbishop's House (no works are proposed to these Structures).

The residential buildings are arranged around a number of proposed public open spaces and routes throughout the site with extensive landscaping and tree planting proposed. Communal amenity spaces will be located adjacent to residential buildings and at roof level throughout the scheme. To facilitate the proposed development the scheme will involve the removal of some existing trees on the site.

The site is proposed to be accessed by vehicles, cyclists and pedestrians from a widened entrance on Clonliffe Road, at the junction with Jones's Road and through the opening up of an unused access point on Drumcondra Road Lower at the junction with Hollybank Rd. An additional cyclist and pedestrian access is proposed through an existing access point on Holy Cross Avenue. Access from the Clonliffe Road entrance will also facilitate vehicular access to future proposed GAA pitches and clubhouse to the north of the site and to a permitted hotel on Clonliffe Road.

The proposed application includes all site landscaping works, green roofs, boundary treatments, PV panels at roof level, ESB Substations, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

3.2 Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the proposed Project will include the following:

- Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- Organic waste – food waste and green waste generated from internal plants / flowers;
- Glass; and
- Mixed Non-Recyclable (MNR)/General Waste.

In addition to the typical waste materials that will be generated at the development on a daily basis, there will be some additional waste types generated less frequently / in smaller quantities which will need to be managed separately including:

- Green / garden waste may be generated from external landscaping;
- Batteries (both hazardous and non-hazardous);
- Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- Printer cartridges / toners;
- Chemicals (paints, adhesives, resins, detergents, etc.);
- Light bulbs;
- Textiles;
- Waste cooking oil (if any generated by the residents and tenants);
- Furniture (and, from time to time, other bulky wastes); and
- Abandoned bicycles.

Wastes should be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* [14] and *Hazardous Waste List* [15] were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* [16], which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA '*Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [17], applicable since the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, CORs, permits and licences and the EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code (EWC)) for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1, below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW/EWC Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators*	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE*	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.) *	20 01 13*/19*/27*/28/29*30
Fluorescent tubes and other mercury containing waste*	20 01 21*
Bulky Wastes	20 03 07

** Individual waste type may contain hazardous materials*

4.0 ESTIMATED WASTE ARISINGS

A waste generation model (WGM) developed by AWN has been used to predict waste types, weights and volumes expected to arise from operations within the proposed Project. The WGM incorporates building area and use and combines these with other data, including Irish and US EPA waste generation rates.

The estimated quantum / volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units. While the floor area usage (m^2) has been used to estimate the waste arising from the crèche and retail units.

The estimated waste generation for the proposed Project for the main waste types is presented in Tables 4.1 – 4.4.

Table 4.1 *Estimated Waste Generation for Residential Blocks A1 – A4*

Waste Type	**Waste Volume (m^3 / week)**			
	Block A1.1 & A 1.2	**Block A2**	**Block A3**	**Block A4**
Organic Waste	3.96	0.99	1.19	1.56
Dry Mixed Recyclables	27.10	6.79	8.13	10.64
Glass	0.77	0.19	0.23	0.30
Mixed Non-Recyclables	18.03	4.52	5.40	7.08
Total	**49.87**	**12.49**	**14.95**	**19.58**

Table 4.2 *Estimated Waste Generation for Residential Blocks B1 – C1*

Waste Type	Waste Volume (m^3 / week)			
	Block B1	**Block B2**	**Block B3**	**Block C1**
Organic Waste	1.26	1.85	1.12	1.95
Dry Mixed Recyclables	8.63	12.66	7.66	13.31
Glass	0.24	0.36	0.22	0.38
Mixed Non-Recyclables	5.74	8.42	5.09	8.85
Total	**15.88**	**23.29**	**14.09**	**24.49**

Table 4.3 *Estimated Waste Generation for Residential Blocks C2 – E1*

Waste Type	Waste Volume (m^3 / week)			
	Block C2	**Block D1**	**Block D2**	**Block E1**
Organic Waste	1.19	2.13	3.15	0.67
Dry Mixed Recyclables	8.15	14.58	21.56	4.57
Glass	0.23	0.41	0.61	0.13
Mixed Non-Recyclables	5.42	9.70	14.34	3.04
Total	**14.99**	**26.83**	**39.67**	**8.41**

Table 4.4 *Estimated Waste Generation for Residential Block E2 and Commercial Units*

Waste Type	Waste Volume (m^3 / week)			
	Block E2	**Creche (A4)**	**Retail (A4)**	**Retail (D1)**
Organic Waste	0.58	0.04	0.09	0.04
Dry Mixed Recyclables	3.96	1.40	1.85	0.76
Glass	0.11	0.01	0.05	0.02
Mixed Non-Recyclables	2.63	0.76	0.77	0.32
Total	**7.28**	**2.21**	**2.77**	**1.14**

BS5906:2005 Waste Management in Buildings – Code of Practice[18] has been considered in the calculations of waste estimates. AWN's modelling methodology is based on recently published data and data from numerous other similar developments in Ireland and is based on AWN's experience, it provides a more representative estimate of the likely waste arisings from the proposed Project.

5.0 WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the Site will be stored and collected. This has been prepared with due consideration of the proposed Site layout as well as best practice standards, local and national waste management requirements, including those of DCC. In particular, consideration has been given to the following documents:

- *BS 5906:2005 Waste Management in Buildings – Code of Practice,*
- *EMR Waste Management Plan 2015 – 2021;*
- *Dublin City Council Development Plan 2016 – 2022 (Appendix 10);*
- DCC Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018); and
- *DoEHLG, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (2020) [19].

Waste Storage Areas

Locations of all Waste Storage Areas (WSAs) can be viewed on the drawings submitted with the planning application under separate cover.

Residential Block A 1.1 & A 1.2

Two (2 no.) shared communal WSAs have been allocated within the development design for the residential apartment blocks. These have been strategically located on the ground and basement floor level, in close proximity to cores.

Residential Block A2 & A3

One (1 no.) shared communal WSA per building, has been allocated within the development design for the residential apartment blocks. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block A4

Two (2 no.) shared communal WSAs have been allocated within the development design for the residential apartment blocks. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block B1

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. This has been strategically located on the lower ground floor level, in close proximity to the core.

Residential Block B2, B3 & C1

One (1 no.) shared communal WSA per building has been allocated within the development design for the residential apartment blocks. These have been strategically located on the basement floor level, in close proximity to cores.

Residential Block C2

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. This has been strategically located externally at ground floor level, in close proximity to the building.

Residential Block D1

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. This has been strategically located at ground floor level, in close proximity to the cores.

Residential Block D2

Three (3 no.) shared communal WSAs have been allocated within the development design for this residential apartment block. These have been strategically located at basement floor level, in close proximity to the cores.

Residential Block E1 & E2

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. This has been strategically located at ground floor level, in close proximity to the cores.

Creche & Retail Block A4

One (1 no.) shared communal WSAs has been allocated within the development design for the commercial units in this block to share. This has been strategically located at ground floor level, in close proximity to the cores.

Retail Block D1

The retail unit in this block will store locked bins within the residential WSA, described above. Bins from the proposed Project will be brought to collection points by the waste contractor or facilities management, immediately prior to collection. The basement level carparks are insufficient in height for a waste truck to access; therefore, all waste will be collected at grade. All locations for collection can be viewed on the drawings submitted with the planning application under separate cover.

Using the estimated waste generation volumes in Tables 4.1 – 4.4, above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSA. It is envisaged that organic waste and glass will be collected on a weekly basis while MNR and DMR will be collected on a twice weekly basis.

Waste Storage Requirements

Estimated waste storage requirements for the operational phase of the proposed Project are detailed in Table 5.1, below.

Table 5.1 *Waste storage requirements for the proposed development*

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Block A1.1 & A1.2	9 no. 1100 L	13 no. 1100 L	4 no. 240 L	17 no. 240 L
Block A2	2 no. 1100 L	3 no. 1100 L	1 no. 240 L	5 no. 240 L
Block A3	3 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block A4	4 no. 1100 L	5 no. 1100 L	2 no. 240 L	7 no. 240 L
Block B1	3 no. 1100 L	4 no. 1100 L	1 no. 240 L	6 no. 240 L
Block B2	4 no. 1100 L	6 no. 1100 L	2 no. 240 L	8 no. 240 L
Block B3	3 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 240 L
Block C1	4 no. 1100 L	6 no. 1100 L	2 no. 240 L	8 no. 240 L
Block C2	3 no. 1100 L	4 no. 1100 L	1 no. 240 L	5 no. 120 L
Block D1	5 no. 1100 L	7 no. 1100 L	2 no. 240 L	9 no. 240 L
Block D2	7 no. 1100 L	10 no. 1100 L	3 no. 240 L	14 no. 240 L
Creche Unit (A4)	5 no. 1100 L	9 no. 1100 L	2 no. 240 L	6 no. 240 L
Retail Unit (A4)	1 no. 1100 L 1 no. 240 L	2 no. 1100 L 1 no. 240 L	1 no. 240 L	2 no. 240 L

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Retail Unit (D1)	1 no. 1100 L	2 no. 1100 L	1 no. 120 L	1 no. 120 L

Note: 1 = Mixed Non-Recyclables
2 = Dry Mixed Recyclables

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type. Waste storage receptacles as per Table 5.1, above, (or similar appropriate approved containers) will be provided by the building management company in the residential WSA.

As outlined in the current *Dublin City Development Plan*, it is preferable to use 1,100 L wheelie bins for waste storage, where practical. However, in the case of organic and glass waste, it is considered more suitable to use smaller waste receptacles due to the weight of bins when filled with organic and glass waste. The use of 240 and 120 L bins, as recommended in Table 5.1, will reduce the manual handling impacts on the building management personnel and waste contractor employees.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSAs are shown in Figure 5.1. All waste receptacles used will comply with the IS EN 840 2012 standard for performance requirements of mobile waste containers, where appropriate.

Figure 5.1 *Typical waste receptacles of varying size (240 L and 1100 L)*

5.1 Waste Storage – Residential Units

Residents will be required to segregate waste into the following main waste streams:

- DMR;
- MNR;
- Glass; and
- Organic waste.

Residents will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSAs are illustrated in the drawings submitted with the planning application under separate cover.

Space will be provided in the residential units to accommodate 3 no. bin types to facilitate waste segregation at source.

Each bin / container in the WSAs will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which waste types can be placed in each bin.

Access to the apartment block WSAs will be restricted to authorised residents, facilities management and waste contractors by means of a key or electronic fob access.

Other waste materials such as textiles, batteries, printer toner / cartridges, light bulbs and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.5.

5.2 Waste Storage – Crèche

Staff at the crèche will be required to segregate their waste into the following waste categories within their own units:

- DMR;
- MNR;
- Organic waste; and
- Glass.

As required, the staff will need to take segregated DMR, MNR, glass and organic waste to their allocated shared WSA.

Each bin / container in the WSA will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which waste types can be placed in each bin.

Other waste materials such as textiles, batteries, printer toner / cartridges and WEEE may be generated infrequently by the tenants. Tenants will be required to identify suitable temporary storage areas for these waste items within the crèche and dispose of them appropriately. Further details on additional waste types can be found in Section 5.5.

5.3 Waste Storage – Retail Units

The commercial tenants will be required to segregate waste within their own units into the following main waste types:

- DMR;
- Organic waste;
- Glass;
- MNR; and
- Carboard

As required, the staff will need to bring segregated DMR, MNR, glass and organic waste to their WSA. All café bins will be locked and, where possible, segregated off from residential bins when stored in the same room as residential waste. Café waste will not be mixed with residential waste.

Suppliers for the commercial tenants should be requested by the tenants to make deliveries in reusable containers, minimize packaging or remove any packaging after delivery, where possible, to reduce waste generated by the proposed Project.

All bins / containers in the commercial tenants' areas as well as in the WSA will be clearly labelled and colour coded to avoid cross contamination of the different waste

streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Other waste materials such as batteries, WEEE and printer toner / cartridges will be generated less frequently. The tenant will be required to store these waste types within their own unit and arrange collection with an appropriately licensed waste contractor. Facilties management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.5.

5.4 Waste Collection

There are numerous private contractors that provide waste collection services in the Dublin City area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered / permitted / licensed facilities only.

Bins from the development will be brought to collection points by the waste contractor or facilities management, immediately prior to collection. The basement level carparks are insufficient in height for a waste truck to access; therefore, all waste will be collected at grade. All locations for collection can be viewed on the drawings submitted with the planning application under separate cover.

A trolley / tug or suitable vehicle may be required to convey the bins to and from the collection area. The building management or waste contractor will ensure that empty bins are promptly returned to the WSAs after collection / emptying.

It is recommended that bin collection times are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is on-Site. This will be determined during the process of appointment of a waste contractor.

5.5 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

<u>Green Waste</u>
Green waste may be generated from gardens, external landscaping and internal plants / flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants / flowers can be placed in the organic waste bins.

<u>Batteries</u>
A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the Waste Management Batteries and Accumulators Regulations 2014, as amended. In accordance with these regulations, consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The commercial tenants cannot use the civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling / recovery of their waste batteries by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive (Directive 2002/96/EC) and associated Waste Management (WEEE) Regulations have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition, consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the commercial tenants cannot use the civic amenity centre. They must segregate their WEEE and either avail of the take-back / collection service provided by retailers or arrange for recycling / recovery of their WEEE by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Printer Cartridge / Toners

It is recommended that a printer cartridge / toner bin is provided in the commercial unit, where appropriate. The commercial tenant will be required to store this waste within their unit and arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste printer cartridge / toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals

Chemicals (such as solvents, paints, adhesives, resins, detergents, etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery / recycling / disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the commercial units that is classed as hazardous (if they arise) will be appropriately stored within the tenants' own space. Facilties management may arrange collection, depending on the agreement.

Any waste cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents should be brought to a civic amenity centre.

Light Bulbs

Waste light bulbs (fluorescent, incandescent and LED) may be generated by lighting at the commercial units. It is anticipated that commercial tenants will be responsible for the off-site removal and appropriate recovery / disposal of these wastes. Facilties management may arrange collection, depending on the agreement.

Light bulbs generated by residents should be taken to the nearest civic amenity centre for appropriate storage and recovery / disposal.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse. Commercial and residential tenants will be responsible for disposing of waste textiles appropriately.

Waste Cooking Oil

If the commerial tenants use cooking oil, waste cooking oil will need to be stored within the unit on a bunded area or spill pallet and regular collections by a dedicated waste

contractor will need to be organised as required. Under sink grease traps will be installed in any cooking space.

If the residents generate waste cooking oil, this can be brought to a civic amenity centre.

Furniture & Other Bulky Waste Items

Furniture and other bulky waste items (such as carpet, etc.) may occasionally be generated by the commercial tenant. The collection of bulky waste will be arranged, as required by the tenant. If residents wish to dispose of furniture, this can be brought a civic amenity centre.

Abandoned Bicycles

Bicycle parking areas are planned for the proposed Project. As happens in other developments, residents sometimes abandon faulty or unused bicycles, and it can be difficult to determine their ownership.

Where it has come to the attention of building management that a bicycle appears to have been abandoned, after an appropriate period of time, the bicycle should be removed. Depending on the quality of the bicycle in question, abandoned bicycles may be donated for reuse, or to charity, second-hand shops or bicycle repair shops, or disposed of appropriately. The priority in the first instance should be to promote reuse in accordance with the waste hierarchy. The building management company may employ various means, as they see fit, to notify residents of impending removal of bicycles, e.g. notices attached to bicycles, email, notice in public area. A holding period may also be applied, if deemed appropriate, to allow for residents to reclaim bicycles which have been removed.

The building management company may refer to the *DCC Procedure for the Removal of Abandoned Bicycles within the Dublin City Council Jurisdiction* (2018) for a more detailed indication of approaches which may be used in dealing with abandoned bicycles.

Covid-19 Waste

Any waste generated by residential and commercial tenants that have tested positive for Covid-19 should be manged in accordance with the current Covid-19 HSE Guidelines at the time that that waste arises. At the time this report was prepared, the HSE Guidelines require the following procedure for any waste from a person that tests positive for Covid-19:

- Put all waste (gloves, tissues, wipes, masks) from that person in a bin bag and tie when almost full;
- Put this bin bag into a second bin bag and tie a knot;
- Store this bag safely for 3 days, then put the bag into the non-recyclable waste / general waste wheelie bin for collection / emptying.

Please note that this guidance is likely to be updated by the time the proposed Project is open and occupied and the relevant guidance at the time will need to be reviewed.

5.6 Waste Storage Area Design

The WSAs should be designed and fitted-out to meet the requirements of relevant design Standards, including:

- Be fitted with a non-slip floor surface;
- Provide ventilation to reduce the potential for generation of odours with a recommended 6-10 air changes per hour for a mechanical system for internal WSAs;

- Provide suitable lighting – a minimum Lux rating of 220 is recommended;
- Be easily accessible for people with limited mobility;
- Be restricted to access by nominated personnel only;
- Be supplied with hot or cold water for disinfection and washing of bins;
- Be fitted with suitable power supply for power washers;
- Have a sloped floor to a central foul drain for bins washing run-off;
- Have appropriate signage placed above and on bins indicating correct use;
- Have access for potential control of vermin, if required; and
- Be fitted with CCTV for monitoring.

The building management company, tenants and residents will be required to maintain the resident bins and storage areas in good condition as required by the DCC Waste Bye-Laws.

6.0 CONCLUSIONS

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the proposed Project.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus contributing to the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *DCC Waste Bye-Laws.*

The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7.0 REFERENCES

1. Waste Management Act 1996 (S.I. No. 10 of 1996) as amended 2001 (S.I. No. 36 of 2001), 2003 (S.I. No. 27 of 2003) and 2011 (S.I. No. 20 of 2011). Sub-ordinate and associated legislation includes:
    - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended
    - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
    - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended
    - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended
    - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014)
    - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
    - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
    - European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
    - Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
    - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended 2015 (S.I. No. 190 of 2015)
    - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
    - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended 2000 (S.I. No. 73 of 2000)
    - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended
    - *European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)*
    - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
2. Environmental Protection Act 1992 (Act No. 7 of 1992) as amended;
3. Litter Pollution Act 1997 (Act No. 12 of 1997) as amended;
4. Eastern-Midlands Waste Region, *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021* (2015)
5. DCC *Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018*)
6. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998)
7. Department of Environment, Heritage and Local Government (DoEHLG) *Preventing and Recycling Waste - Delivering Change* (2002)
8. DoELG, *Making Ireland's Development Sustainable – Review, Assessment and Future Action (World Summit on Sustainable Development)* (2002)
9. DoEHLG, *Taking Stock and Moving Forward* (2004)
10. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (2020).
11. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.

12. DCC*, Dublin City Development Plan 2016 – 2022* (2016)
13. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended 2010 (S.I. No. 30 of 2010) and 2015 (S.I. No. 310 of 2015).
14. European Waste Catalogue - Council Decision 94/3/EC (as per Council Directive 75/442/EC).
15. Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
16. EPA, *European Waste Catalogue and Hazardous Waste List* (2002)
17. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)
18. BS 5906:2005 Waste Management in Buildings – Code of Practice.
19. DoEHLG, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018).

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