Norwich Western Link

Airport Safeguarding Assessment

Appendix 2: Obstacles Limitation Surfaces Analysis

Author: Cyrrus Limited

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Foreword

Norfolk County Council, as Highway Authority (hereafter referred to as 'the Applicant'), is seeking to obtain planning permission for the proposed Norwich Western Link Road (hereafter referred to as the Proposed Scheme) located to the north-west of Norwich.

Cyrrus Limited has been commissioned by the Applicant to produce this Obstacles Limitation Surfaces Analysis to support the planning application.

The work areas subject to the assessment as described in this document are shown in the Planning Application Drawings references 2.03.00 General Arrangement Plans, 2.06.01 to 2.06.09 Structures Drawings, 2.07.00 Landscape Design Plans, 2.08.00 Drainage Layout Plans and 2.08.01 Drainage basin details.

Glossary of Abbreviations

AANE	Airport Air Navigation Equipment
AGL	Above Ground Level
AIP	Aeronautical Information Publication
BRA	Building Restricted Area
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
DME	Distance Measuring Equipment
DOC	Designated Operational Coverage
ICAO	International Civil Aviation Organization
I	Inner Horizontal Surface
ILS	Instrument Landing System
NDB	Non-Directional Beacon
OHS	Outer Horizontal Surface
OLS	Obstacle Limitation Surfaces
PSR	Primary Surveillance Radar
RF	Radio Frequency
ODPM	Office of the Deputy Prime Minister
DfT	Department for Transport
NATS	National Air Traffic Services

1 Legislation

1.1. The Applicant has completed an Obstacles Limitation Surfaces Analysis to comply with UK legislation set out in the DfT/ODPM Circular 1/2003 The Town and Country Planning (safeguarded aerodromes, technical sites and military explosives storage areas) Direction 2002, updated in December 2016. The principal reference documentation and design guidelines obtained and used in this safeguarding report include:

- CAA, CAP6–0 - Air Traffic Services Safety Requirement–s - Issue–3 - 1/2019".
- ICAO, EUR DOC 015 European Guidance Material on Managing Building Restricted Areas, Third Edition, 2015.
- CL-5147-RPT-003 Issue 1 – Radar Safeguarding – 30 September 2015.
- UK CAA CAP 738, Safeguarding of Aerodromes, Version 3, 29 October 2020.
- CAA, UK Regulation (EU) 139/2014, First Edition, January 2024.
- NATS, UK Aeronautical Information Publication, Effective 25 January 2024
- ICAO Annex 14 – Aerodromes, Vol I 9th Ed, dated July 2022.

2 Assessment objective

2.1. Cyrrus Limited has been engaged by the Applicant to conduct a Technical Safeguarding Assessment and a Physical Safeguarding Assessment on the Proposed Scheme. The project involves the construction of a major new road near Norwich Airport and as such an assessment is required to determine the potential impact to the Airport's Air Navigation Equipment and Radar.

2.2. The main findings of the study are as follows:

- The Proposed Scheme will not infringe the safeguarded areas of the Instrument Landing System (ILS) Localiser, ILS Glidepath, Distance Measuring Equipment or Non-Directional Beacon facilities at Norwich Airport;

- The proposed scheme lies outside the safeguarded areas of the Radar Safeguarding Map for Norwich Airport. Therefore, there will be no operational impact to the Airport's Primary Surveillance Radar;
- The proposed scheme does not penetrate the Obstacle Limitation Surfaces at Norwich Airport.

2.3. Full details of the investigation and findings are contained within the body of this report.

3. Introduction

3.1. Background

3.1.1. The Applicant has requested Cyrrus Limited to undertake a Technical Safeguarding Assessment and Physical Safeguarding Assessment in relation to the Proposed Scheme. The Proposed Scheme involves the construction of a new section of dual carriageway to the west of Norwich Airport. The closest point of the proposed development is approximately 4.3 Nautical Miles from the Aerodrome Reference Point, which is the designated geographical location of the aerodrome.

3.1.2. The aim of this report is to understand the potential impact the development may have on the radar, Airport Air Navigation Equipment (AANE), and Obstacle Limitation Surfaces (OLS) at Norwich Airport.

3.1.3. The Red Line boundary and Site Boundary of the Proposed Scheme is shown in Figure 1 below.

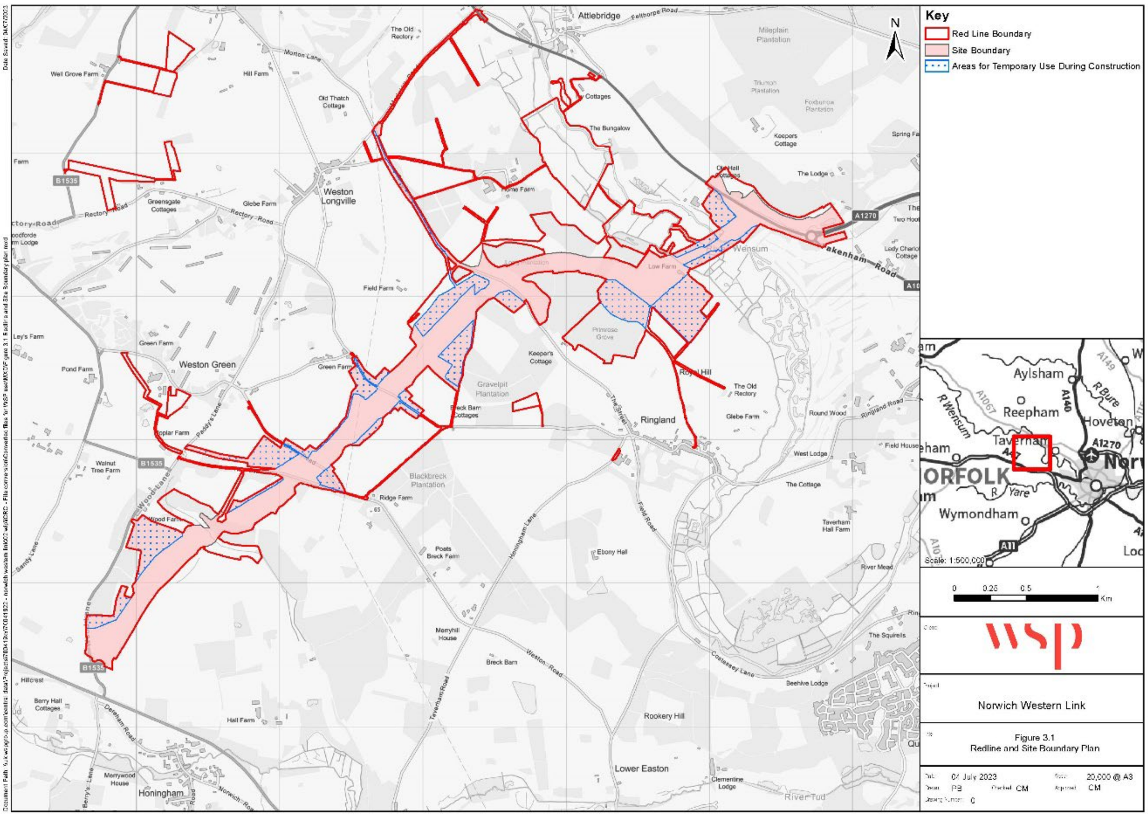

Figure 1: Proposed Scheme (Red Line Boundary and Site Boundary)

3.1.4. Figure 2 illustrates the location of the Proposed Scheme (outlined in red) with respect to Norwich Airport.

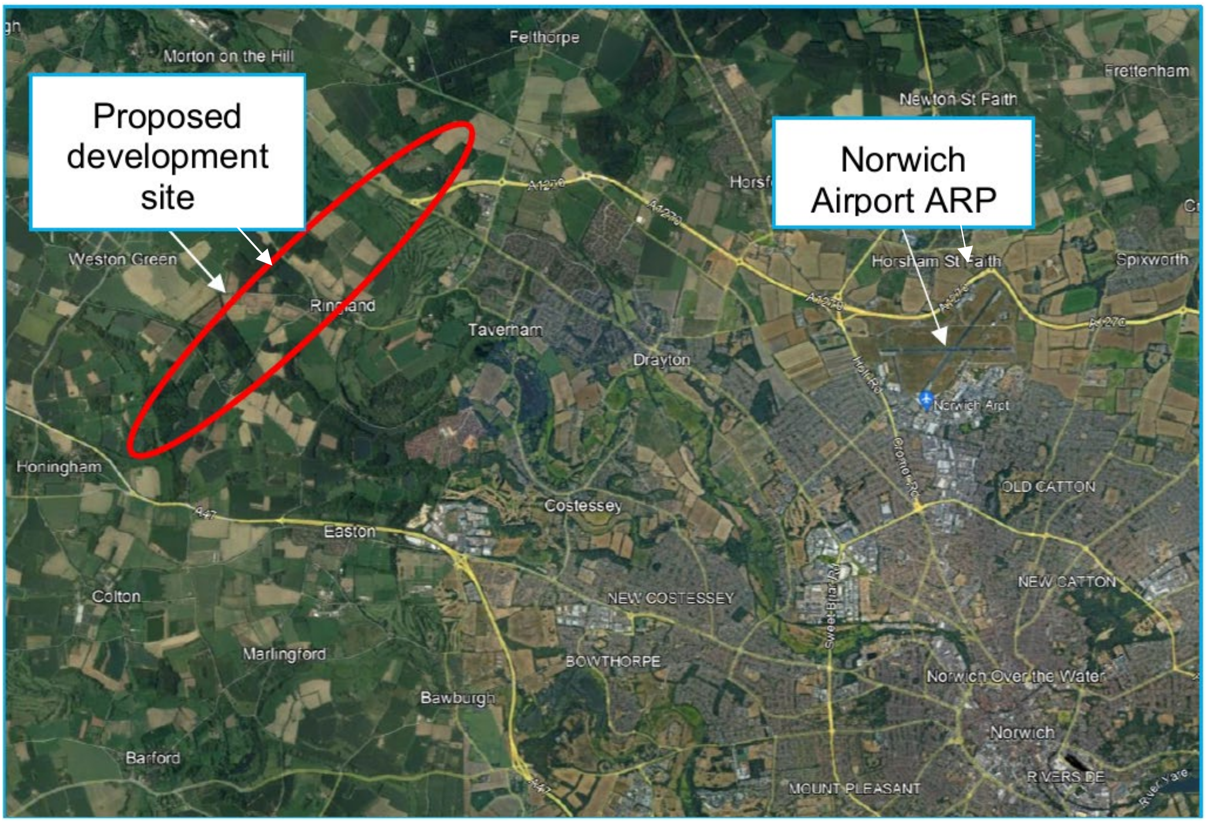

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Figure 2: Location of Proposed Scheme with Respect to Norwich Airport

4. Instrument Landing system, Distance Measuring Equipment and Non-Directional Beacon Analysis

4.1. General

4.1.1. Prior to the construction of a new development at or near an airport, it is important to consider the potential resultant effect on the AANE.

4.1.2. For example, the Instrument Landing System (ILS) provides both lateral and vertical guidance by means of radio signals to enable aircraft to approach and land without visual reference to the ground in times of poor visibility. By using this system, approach and landing may be carried out either automatically or by suitable instrument guidance to the pilot. To ensure the safety and integrity of such systems, it is necessary to provide a high level of safeguarding of the system performance.

4.1.3. Site modelling of ILS performance allows the potential impact of a new development to be assessed. This may allow the airport operator to support the development or propose changes which would make the development acceptable in terms of navigation aid performance and, hence, user safety.

4.1.4. Cyrrus can provide the airport operator with data and recommendations, but the final decision on the response to a new development must remain the responsibility of the airport operator once all factors affecting such a decision have been considered.

4.2. Rationale

4.2.1. The approach taken for this evaluation is detailed in the following paragraphs. Each study is unique, but the steps taken are similar.

4.2.2. The first stage is to evaluate the Proposed Scheme. This includes building details, position, and the local environment.

4.2.3. A detailed examination of flight inspection data follows, with due regard to equipment type and configuration. This gives an overview of the existing system performance and is also used later to validate the computer model.

4.2.4. A survey may be carried out to determine the building position and to record the local topography. The visibility of the development from the navaid under investigation is assessed; terrain or existing buildings may mask part or all the proposed development.

4.2.5. Should the proposed development infringe the safeguarded areas of the technical facilities at the Airport, computer modelling may be carried out to assess the extent of any potential impact.

4.3. AANE Under Consideration

4.3.1. The AANE under consideration at Norwich Airport consists of an ILS Localiser and Glidepath serving Runway 27, a Distance Measuring Equipment (DME) and a Non-Directional Beacon (NDB). The locations of the AANE under consideration are indicated in Figure 3.

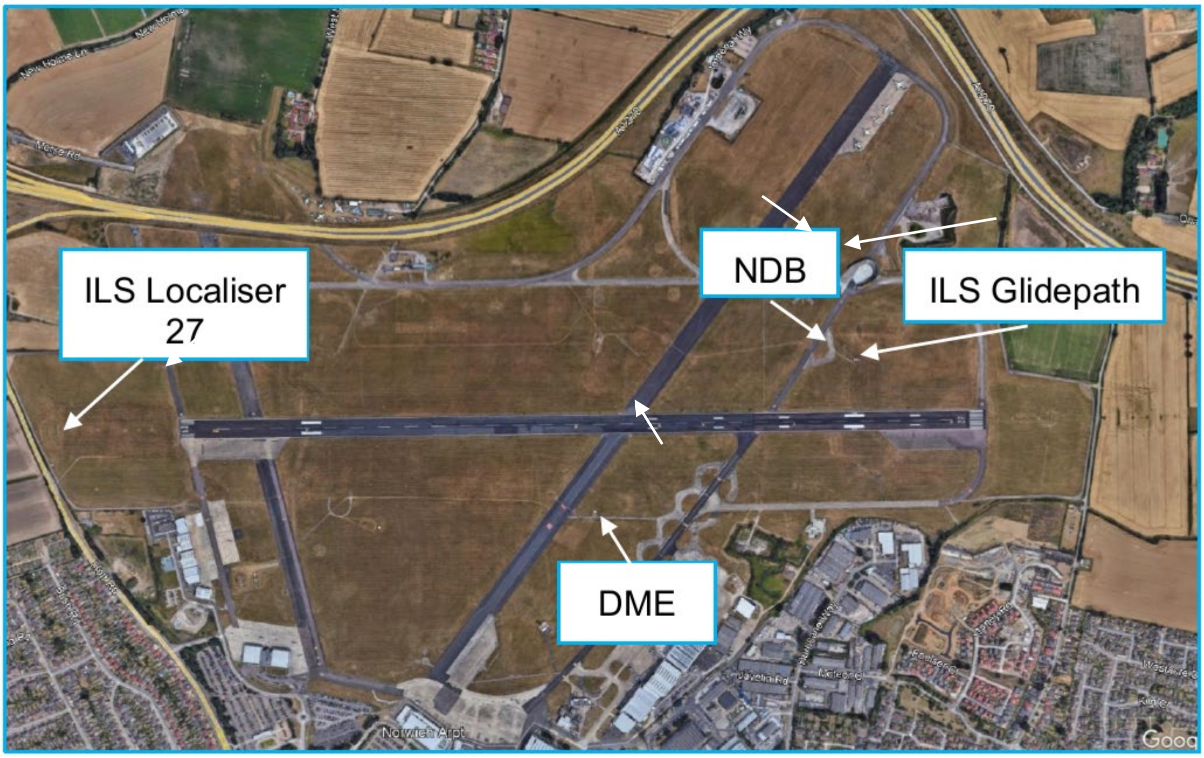

Figure 3: AANE Under Consideration at Norwich Airport

4.3.2. The ILS Localiser provides lateral guidance to approaching aircraft and is capable of guiding aircraft to within 200 feet above Runway 27 at Norwich without the pilot having a visual reference.

4.3.3. The ILS Glidepath provides vertical guidance to approaching aircraft and is capable of guiding aircraft to within 200 feet above Runway 27 at Norwich without the pilot having a visual reference.

4.3.4. The DME provides the pilot of an aircraft with direct and continuous visual indication of the distance between the DME antenna and the aircraft and is offset to give zero range at the runway thresholds.

4.3.5. The NDB is a ground based radio transmitter that broadcasts signals in all directions (omnidirectional) and provides suitably equipped aircraft with a relative bearing to the beacon.

4.3.6. In order to protect the AANE signals, safeguarded areas are established around the facility sites. The purpose of the safeguarded areas is to identify developments with the potential for causing unacceptable interference to navigation facilities. Developments that infringe a safeguarded area must undergo technical assessments to determine the degree of interference, if any, and whether the interference will be acceptable to the Airport operator

4.4. CAP 670 Safeguarded Areas

4.4.1. The minimum safeguarded areas for technical facilities are defined in the UK Civil Aviation Authority (CAA) CAP 6701.

4.4.2. The ILS Localiser safeguarded area is defined as follows: -

"A sector of 750 metres radius centred on the localiser and ±60° about the runway centreline at ground level, in the direction of the runway threshold."

"A sector, centred on the localiser, ±15° about the runway centreline and 1500 m along the runway, at ground level, in the direction of the runway threshold."

4.4.3. The ILS Glidepath safeguarded area is defined as follows: -

4.4.4. "A sector of 750 metres radius ±60° about a line originating at the base of the glide path aerial parallel to the approach runway centreline."

4.4.5. The DME safeguarded area is defined as follows: -

4.4.6. DME Associated with ILS: "An inverted cone of 500 m radius with a 2% (1:50) slope, originating at the base of the DME aerial."

4.4.7. DME non-ILS: "A 2% slope surface originating at the Ground Level extending 300 m radially."

4.4.8. The NDB safeguarded area is described as: -

4.4.9. "From the centre of the aerial, at a height of 5 m out to 30 m radius, with a further slope to a height of 14 m above ground, out to 90 m radius."

4.4.10. The ILS, DME and NDB safeguarded areas are shown in Figure 4 overleaf.

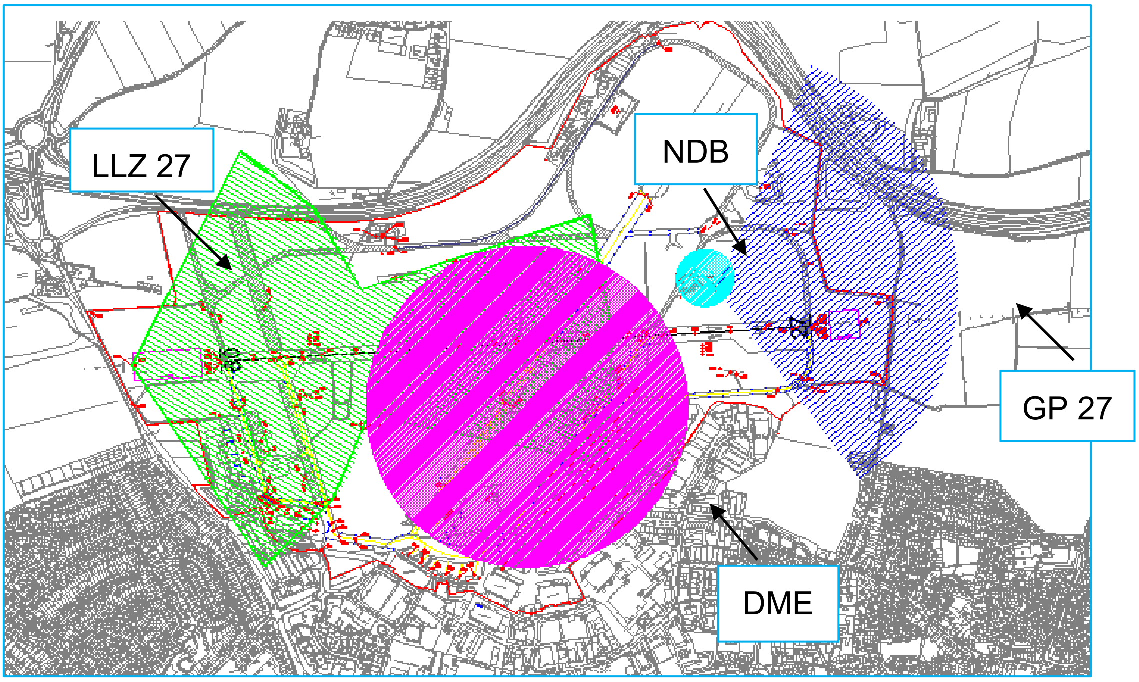

Figure 4: CAP 670 Safeguarded Areas

4.4.11. Figure 5 clearly shows that the safeguarded areas lie well away from the Proposed Scheme.

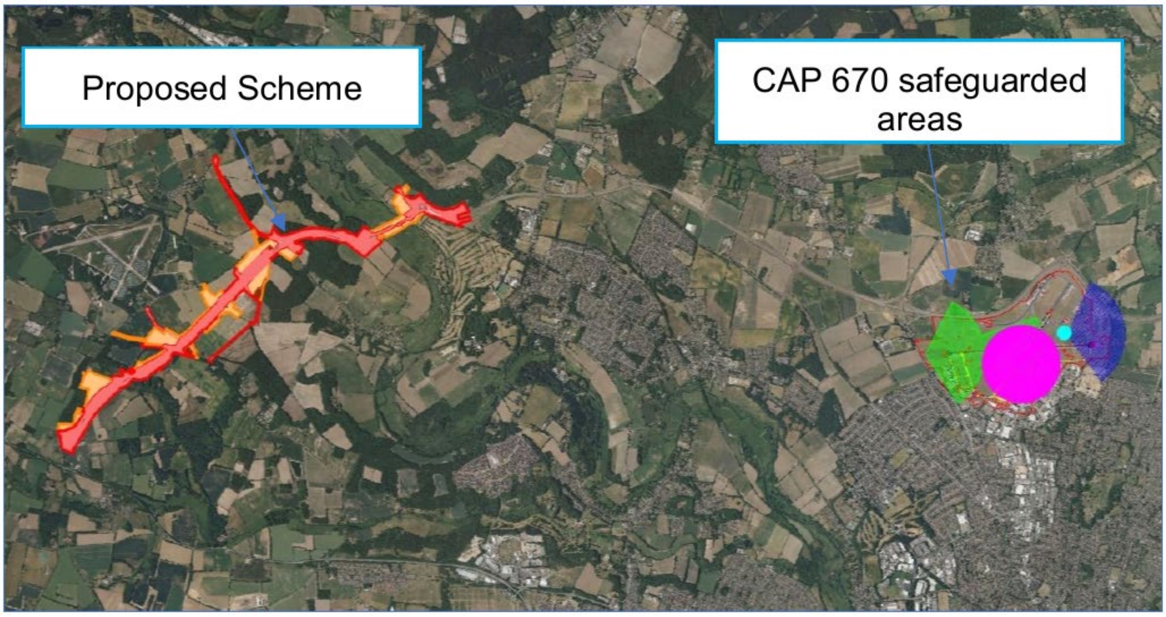

Figure 5: CAP 670 Safeguarded Areas Relative to Proposed Development

4.5. EUR 015 Building Restricted Areas

4.5.1. The International Civil Aviation Organization (ICAO) has also defined safeguarded areas for AANE facilities. These safeguarded areas are defined in the document ICAO EUR DOC 0152 and are more conservative, covering a wider area than those defined in CAP 670. Therefore it is prudent to assess the development against these larger and more restrictive safeguarded surfaces.

4.5.2. Figure 6 shows an example of the Building Restricted Area (BRA) shape for directional navigation facilities, as depicted in ICAO EUR DOC 015 Figures 3.1, 3.2, 3.3 and 3.4.

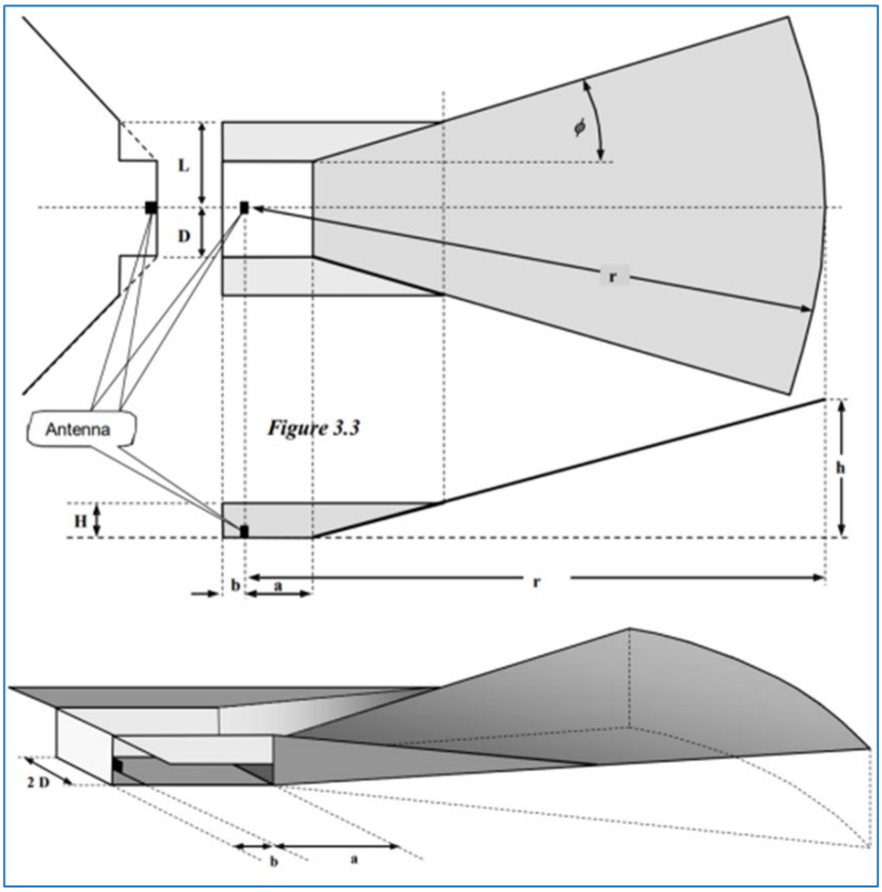

Figure 6: ICAO EUR DOC 015 Figures 3.1-3.4 - BRA Shape for Directional Facilities

4.5.3. Applicable dimensions to be applied for the various directional navigation facilities are reproduced in Figure 7 overleaf.

Type of **navigation** facilities	A (m)	b (m)	h(m)	r (m)	D (m)	H (m)	L (m)	φ (°)
ILS LLZ (medium aperture single frequency)	Distance to threshold	500	70	a+6000	500	10	2300	30
ILS LLZ (medium aperture dual frequency)	Distance to threshold	500	70	a+6000	500	20	1500	20
ILS GP M-Type (dual frequency)	800	50	70	6000	250	5	325	10
MLS AZ	Distance to threshold	20	70	a+6000	600	20	1500	40
MLS EL	300	20	70	6000	200	20	1500	40
DME (directional antennas)	Distance to threshold	20	70	a+6000	600	20	1500	40

Figure 7: ICAO EUR DOC 015 Table 2 - Harmonised Guidance Figures for Directional Navigation Facilities

4.5.4. Figure 8 shows an example of the BRA shape for an omni-directional navigation facility, as depicted in ICAO EUR DOC 015 Figures 2.1 and 2.2.

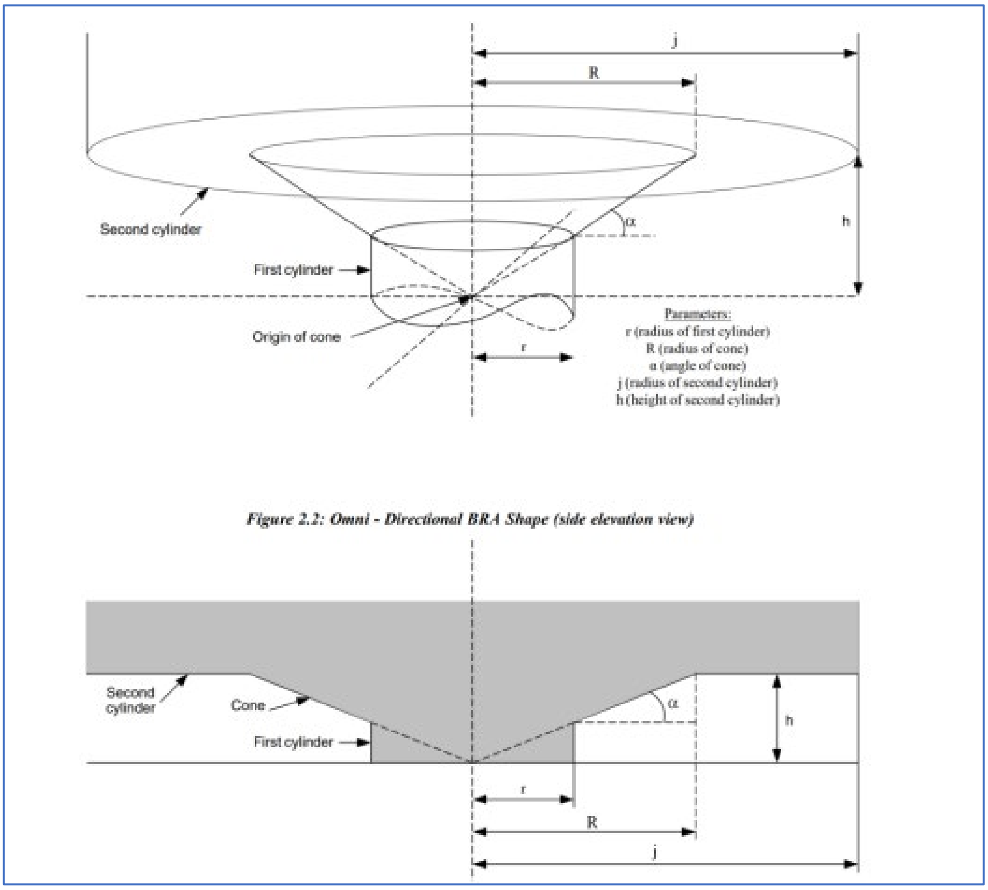

Figure 8: ICAO EUR DOC 015 Figures 2.1 and 2.2 - BRA Shape for Omni-Directional Facilities

4.5.5. Applicable dimensions to be applied for the various omni-directional navigation facilities are reproduced in Figure 9.

*Type of **navigation** facilities*	*Radius (r – Cylinder) (m)*	*Alpha (a – cone) (°)*	*Radius (R- Cone) (m)*	*Radius (j – Cylinder) (m) Wind turbine(s) only*	*Height of cylinder j (h -height) (m) Wind turbine(s) only*	*Origin of cone and axis of cylinders*
DME N	300	1.0	3000	N/A	N/A	Base of antenna at ground level
CVOR	600	1.0	3000	15000	52	Centre of antenna system at ground level
DVOR	600	1.0	3000	10000	52	Centre of antenna system at ground level
Direction Finder (DF)	500	1.0	3000	10000	52	Base of antenna at ground level
Markers	50	20.0	200	N/A	N/A	Base of antenna at ground level
NDB	200	5.0	1000	N/A	N/A	Base of antenna at ground level
GBAS ground Reference receiver	400	3.0	3000	N/A	N/A	Base of antenna at ground level
GBAS VDB station	300	0.9	3000	N/A	N/A	Base of antenna at ground level
VDB station monitoring station	400	3.0	3000	N/A	N/A	Base of antenna at ground level

Figure 9: ICAO EUR DOC 015 Table 1 - Harmonised Guidance Figures for Omni-Directional Navigation

4.5.6. Figure 10 shows the proposed development site with respect to the ICAO safeguarded surfaces.

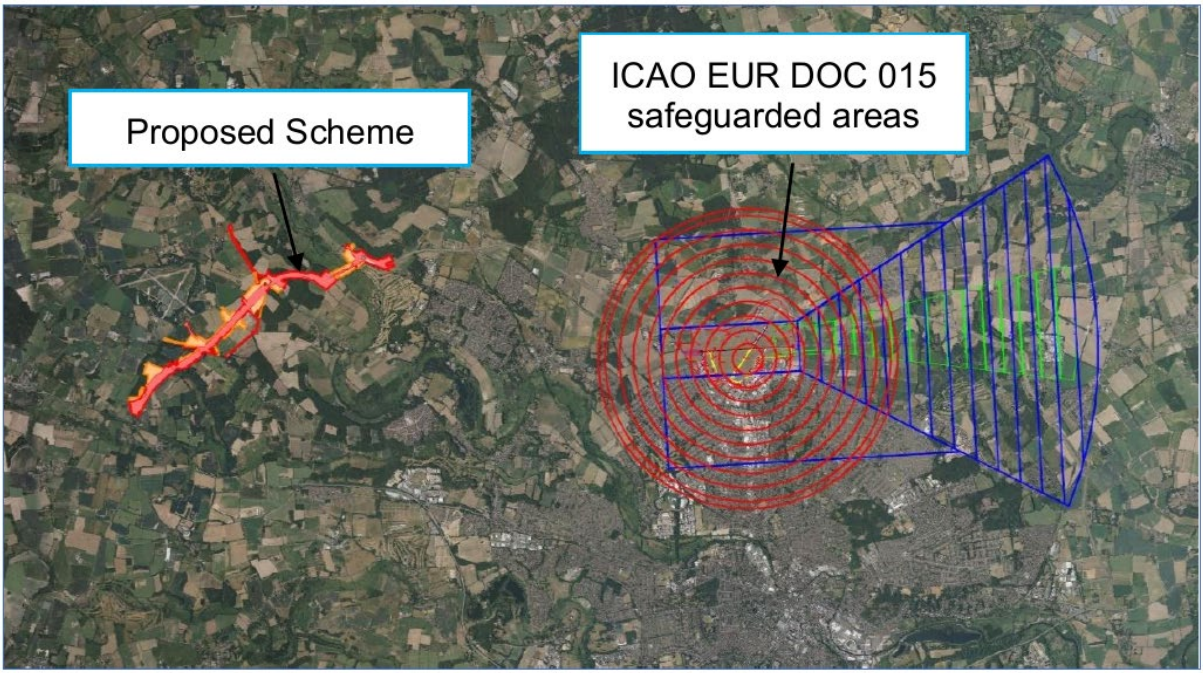

Figure 10: ICAO EUR DOC 015 Safeguarded Areas

4.5.7. The Proposed Scheme lies outside of these more conservative safeguarded areas and so no further assessment of the AANE at Norwich Airport is deemed necessary.

5. Radar Analysis

5.1. Primary Surveillance Radar

5.1.1. The type of radar installed at Norwich International Airport is a Thales Star 2000 Primary Surveillance Radar (PSR).

5.1.2. A PSR operates by transmitting short pulses of high energy Radio Frequency (RF) radiation. Some of this energy is reflected back to the PSR antenna by aircraft targets. The time interval between transmission and reception determines the range of the aircraft target.

5.1.3. The azimuth of the radar antenna at the time gives bearing information, allowing the aircraft position relative to the radar to be determined.

5.1.4. The transmitted radar pulse also illuminates everything on the ground in the local area. Reflections from unwanted ground targets create ‘clutter’, which can compromise the ability of the radar to correctly detect wanted aircraft targets.

5.2. PSR Issues

5.2.1. Large structures can have three unwanted effects on PSR:

- Shadowing – this is where the building forms a physical obstruction, causing a radar shadow behind a structure. This may result in the loss of radar detection of wanted targets in a particular volume of airspace;
- Reflections – radar energy may be reflected from the faces of the building which may result in the detection of false targets. Radar energy reflected from the flat roof of a structure can cause fading of targets over a particular azimuth sector. Reflections also add additional clutter, which may serve to desensitise the radar, resulting in reduced ability to detect wanted targets;
- Beam forming – structures close to the radar antenna can affect the forming of the radar beam as the beam is not fully formed until circa 282m from the radar antenna for this type of PSR.

5.3. Norwich Airport Radar Safeguarding Map

5.3.1. To ensure that the radar continues to operate to the desired level of performance, a Radar Technical Safeguarding map details the constraints to which proposed developments near the airport must adhere.

5.3.2. Developments which penetrate the radar safeguarding frame must be assessed to determine if they are likely to introduce any of the previously mentioned effects.

5.3.3. Cyrrus has previously detailed the methodology and construction of the Radar Safeguarding Map in the report 4.05.02. The safeguarding map is presented in Annex A of this report.

5.3.4. The map is divided into coloured squares which represent the difference in elevation between the terrain and the radar safeguarding surface. Each square is equal to an area 250m x 250m. The clearance in each grid square is banded according to the guidance found in CAP 7384. All buildings, structures, erections and works must be assessed if they lie within, and infringe, the height limitations of each grid square. These are defined as:

- Red = Any development exceeding 10 metres in height Above Ground Level (AGL);
- Green = Any development exceeding 15 metres in height AGL;
- Yellow = Any development exceeding 45 metres in height AGL.

5.3.5. Figure 11 shows the radar safeguarding map with respect to the proposed development.

Figure 11: Radar Safeguarding Map Relative to Proposed Development

5.3.6. The closest point of the Proposed Scheme lies well outside of the perimeter of the safeguarded area. The closest distance between the proposed scheme and the Radar safeguarding areas is approximately 2km. Therefore, the development is unlikely to have any significant operational impact on the PSR at Norwich Airport.

6. Physical Safeguarding Assessment

6.1. Assumptions and Constraints

6.1.1. Assumptions and Constraints

6.1.2. Norwich Airport is a certificated aerodrome in accordance with UK Regulation (EU) No 139/2014. It has a single code 4 runway (09/27).

6.1.3. In the absence of OLS drawings for Norwich Airport, Cyrrus Limited has used the requirements set in UK Regulation (EU) No 139/2014 and the International Civil Aviation Organisation (ICAO) Annex 14 to construct the OLS for the Airport. CAP 1732 survey data dated 2022 was used for the construction of the OLS supported by the data published in the Aeronautical Information Publication (AIP).

6.2. Description of the OLS

6.2.1. A brief description of some of the Obstacle Limitation Surfaces is given below:

6.2.2. Approach Surface. An approach surface is an inclined plane or combination of planes preceding the threshold and is established for each runway direction intended to be used for the landing of aircraft.

6.2.3. Take-Off Climb Surface. A take-off climb surface is an inclined plane located beyond the end of the take-off run available or the end of the clearway where one is provided and is established for each runway direction intended to be used for take-off. There are clearways established at the end of Runway 09/27 at Norwich Airport.

6.2.4. Transitional. A transitional surface is a complex surface sloping up to the inner horizontal surface from the side of the runway strip and from part of the side of the approach surface. Transitional surfaces are established for every runway intended to be used for landing.

6.2.5. Inner Horizontal. An inner horizontal surface (IHS) is a horizontal plane located above an aerodrome and its vicinity. It represents the level above which consideration needs to be given to the control of new obstacles and the removal or marking of existing obstacles to ensure safe visual manoeuvring of aeroplanes in the vicinity of the aerodrome. The inner horizontal surface is contained in a horizontal plane located 45m above the elevation of the lowest runway threshold at the aerodrome.

6.2.6. Conical Surface. A conical surface slopes upwards and outwards from the periphery of the IHS.

6.2.7. Outer Horizontal Surface. An Outer Horizontal Surface (OHS) extends from the periphery of the Conical Surface to a defined radius around the aerodrome. The OHS is a level surface at the elevation of the outer edge of the Conical Surface.

6.3. Why are OLS required?

6.3.1. Obstacles in the vicinity of an aerodrome can pose risks of collision and reduction in safety margins for aircraft. Therefore, it is extremely important that any construction is assessed and scrutinised to ensure that it does not cause an obstacle risk.

6.3.2. OLS are a series of complex 3D surfaces described around a runway within which the control of obstacles is necessary. Figure 12 gives a 3D depiction of the OLS.

6.3.3. If a proposed construction does penetrate the OLS, then the impact on aerodrome operations must be assessed and mitigation strategies considered to ascertain whether the development would have an unacceptable effect on airport operations.

6.3.4. Objects which penetrate the OLS may in certain circumstances cause an increase in obstacle clearance altitude/height for an instrument approach procedure or any associated visual circling procedure or have other operational impact on flight procedure design.

6.3.5. When obstacles penetrate the OLS the safety measures could be:

- Promulgation in the AIP of appropriate information;
- Marking and/or lighting of the obstacle;
- Variation of the runway distances declared as available;
- Reducing the height of the obstacle.

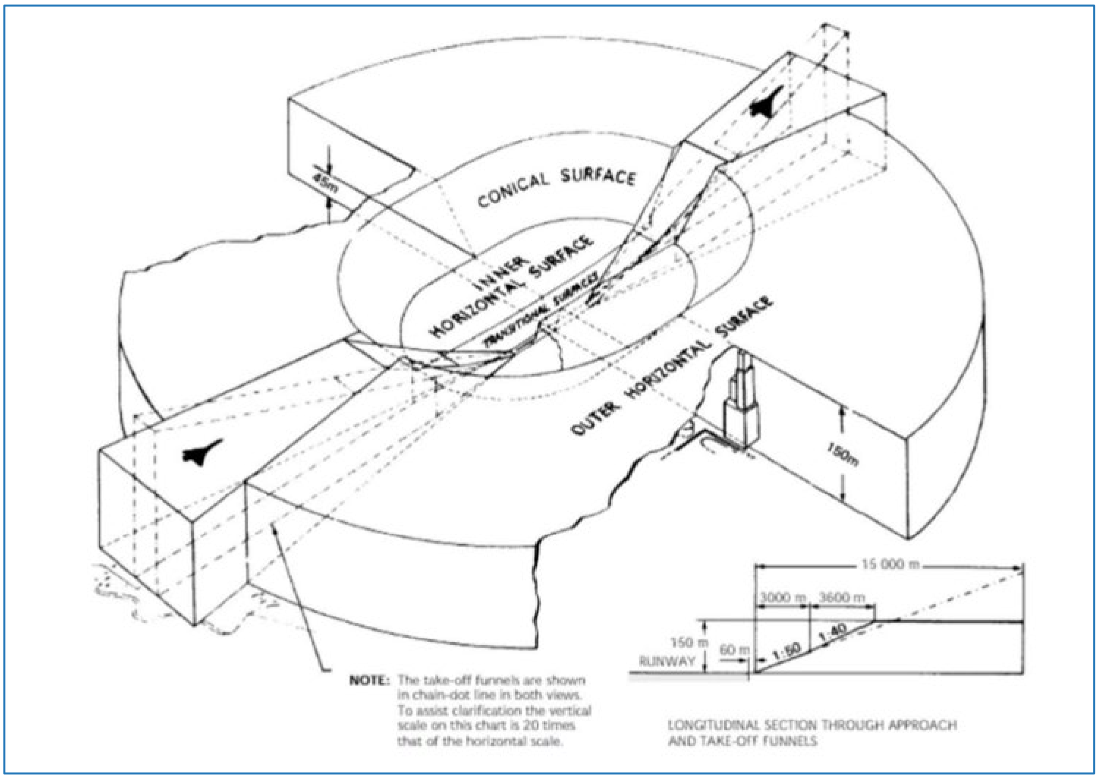

Figure 12: Three-Dimensional Depiction of the OLS

6.4. Location within the OLS

6.4.1. Figure 13 shows the OLS for Norwich Airport. The proposed development lies within the Approach surface for Runway 09, the Take-off Climb surface for Runway 27 and the Outer Horizontal surface for Runway 09/27.

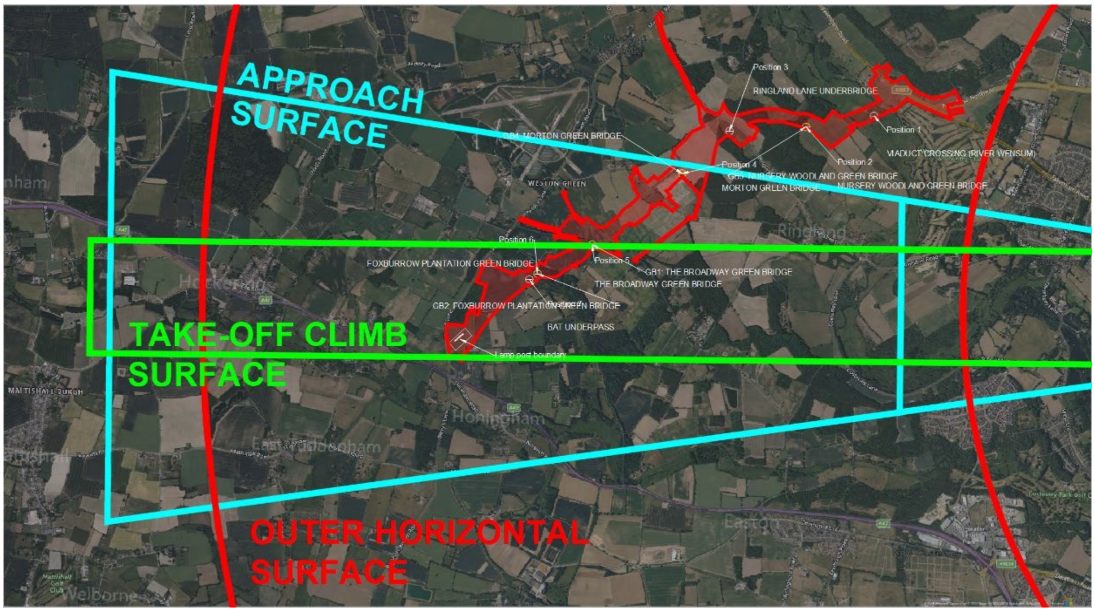

Figure 13: Site Location with Reference to the OLS

6.5. Runway 09 Approach Surface

6.5.1. The OLS Runway 09 Approach surface assessment results are indicated below in Table 1.

Name	Latitude (WGS84)	Longitude (WGS84)	Alt. (m)	Surf. alt. (m)	Penetration (m)	Infringing
Contour	52°40'05.72"N	001°06'06.87"E	108.1	185.7	-77.6	No
Contour	52°40'49.77"N	001°07'18.67"E	108.1	185.7	-77.6	No
Contour	52°40'39.29"N	001°06'48.18"E	99.1	185.7	-86.6	No
Contour	52°40'37.32"N	001°06'43.63"E	94.1	185.7	-91.6	No
Contour	52°41'15.06"N	001°08'08.46"E	93.1	185.7	-92.6	No
Green Bridge 1: Broadway	52°40'48.47"N	001°07'18.73"E	66.0	185.7	-119.7	No
Contour	52°40'16.13"N	001°06'11.97"E	62.0	185.7	-123.7	No
Green Bridge 2: Foxburrow Plantation	52°40'38.00"N	001°06'48.23"E	57.0	185.7	-128.7	No
Green Bridge 4: Morton	52°41'13.76"N	001°08'08.52"E	50.7	185.7	-135.0	No

Table 1: OLS RWY 09 Obstacle Assessment - Checked Obstacles Approach

6.5.2. As indicated in Table 1, no obstacles associated with the Proposed Scheme penetrate the Approach surface.

6.6. Runway 27 Take-off Climb Surface

6.6.1. The Runway 27 Take-off Climb surface assessment results are indicated below in Table 2.

Name	Latitude (WGS84)	Longitude (WGS84)	Alt. (m)	Surf. alt. (m)	Penetration (m)	Infringing
Contour	52°40'43.71"N	001°07'36.50"E	108.1	221.5	-113.4	No
Contour	52°40'42.98"N	001°06'41.18"E	108.1	242.3	-134.2	No
Contour	52°40'39.29"N	001°06'48.18"E	99.1	239.7	-140.6	No
Contour	52°40'39.29"N	001°06'48.18"E	99.1	239.7	-140.6	No
Contour	52°40'43.03"N	001°06'19.21"E	108.1	250.5	-142.5	No
Contour	52°40'35.30"N	001°06'11.87"E	108.1	253.4	-145.3	No
Contour	52°40'37.32"N	001°06'43.63"E	94.1	241.4	-147.3	No
Contour	52°40'37.32"N	001°06'43.63"E	94.1	241.4	-147.3	No
Contour	52°40'08.54"N	001°05'57.75"E	108.1	258.9	-150.8	No
Contour	52°40'20.19"N	001°05'55.98"E	108.1	259.5	-151.4	No
Contour	52°40'14.81"N	001°05'55.30"E	108.1	259.8	-151.7	No
Green Bridge 1: Broadway	52°40'48.47"N	001°07'18.73"E	66.0	228.3	-162.3	No
Green Bridge 2: Foxburrow Plantation	52°40'38.00"N	001°06'48.23"E	57.0	239.9	-182.9	No
Contour	52°40'16.13"N	001°06'11.97"E	62.0	253.5	-191.5	No
Contour	52°40'18.55"N	001°06'08.21"E	62.0	254.9	-192.9	No
Contour	52°40'10.98"N	001°06'02.98"E	62.0	256.9	-194.9	No
Contour	52°40'13.40"N	001°05'59.23"E	62.0	258.3	-196.3	No

Table 2: OLS RWY 27 Obstacle Assessment - Checked Obstacles - Take-Off

6.6.2. As indicated in Table 2, no obstacles associated with the Proposed Scheme penetrate the Take-off Climb surface.

6.7. Runway 27/09 Outer Horizontal Surface

6.7.1. The Outer Horizontal surface assessment results are indicated below in Table 3.

Name	Latitude (WGS84)	Longitude (WGS84)	Alt. (m)	Trees (m)	Surf. alt. (m)	Penetration (m)	Infringing
Contour	52°40'05.72"N	001°06'06.87"E	108.1	0.0	185.7	-77.6	No
Contour	52°40'49.77"N	001°07'18.67"E	108.1	0.0	185.7	-77.6	No
Contour	52°40'39.29"N	001°06'48.18"E	99.1	0.0	185.7	-86.6	No
Contour	52°40'37.32"N	001°06'43.63"E	94.1	0.0	185.7	-91.6	No
Contour	52°41'15.06"N	001°08'08.46"E	93.1	0.0	185.7	-92.6	No
Contour	52°41'30.03"N	001°08'34.60"E	86.1	0.0	185.7	-99.6	No
Contour	52°41'32.15"N	001°09'17.87"E	84.1	0.0	185.7	-101.6	No
Green Bridge 1: Broadway	52°40'48.47"N	001°07'18.73"E	66.0	0.0	185.7	-119.7	No
Contour	52°41'36.55"N	001°09'56.13"E	63.1	0.0	185.7	-122.6	No
Contour	52°40'16.13"N	001°06'11.97"E	62.0	0.0	185.7	-123.7	No
Green Bridge 2: Foxburrow Plantation	52°40'38.00"N	001°06'48.23"E	57.0	0.0	185.7	-128.7	No
Green Bridge 4: Morton	52°41'13.76"N	001°08'08.52"E	50.7	0.0	185.7	-135.0	No
Green Bridge 5: Nursery Woodland	52°41'30.86"N	001°09'17.93"E	41.5	0.0	185.7	-144.2	No

Table 3: OLS RWY 27 Obstacle Assessment - Checked Obstacles - Outer Horizontal

6.7.2. As indicated in Table 3, no obstacles associated with the Proposed Scheme penetrate the Outer Horizontal surface.

6.8. OLS Assessment Conclusion

6.8.1. The Proposed Scheme does not penetrate the OLS surfaces at Norwich Airport.

7. External Lighting

7.1. Street Lighting

7.1.1. Aerodrome safeguarding aims to ensure the safety of all aircraft in the vicinity of an aerodrome by controlling potentially hazardous developments and activities around it. This consists of the control of the location, heights, brightness, type, and pattern of lights around the aerodrome, with an overall caveat that “no light” should be directed or pointed towards any aircraft.

7.1.2. At night and in periods of poor visibility during the day, pilots rely on the pattern of aeronautical ground lights, principally the approach and runway lights, to assist in aligning themselves with the runway and to land at the correct point.

7.1.3. As an officially safeguarded aerodrome, Norwich airport has a Lighting box which extends 750m either side of the runway centreline and 4.5km into the aircraft approach. All external lighting proposals within this box could be subject to further airport restrictions depending on the lighting design specifications. The Applicant can confirm that no part of the Proposed Scheme sits within this Lighting box and therefore it is not anticipated that the safeguarding team at Norwich airport will request further lighting restrictions to this project.

7.1.4. Additionally, although outside of the Lighting box for Norwich Airport, The Applicant can confirm that only 15 new lighting columns will be installed and shall be of a flat glass, full cut off design, mounted horizontally, and shall ensure that there is no light spill above the horizontal.

Annex A – Radar Safeguarding Map