100 Chalk Farm Road

Solar Glare Report

Prepared by Consil

Submitted on behalf of Regal Chalk Farm Ltd

January 2024

CONTENTS

PAGE

Appendices

1 INSTRUCTIONS AND BRIEF

1.1 This solar glare report has been prepared by Consil on behalf of Regal Chalk Farm Limited ('the Applicant') in support of an application for full planning permission for the redevelopment of 100 Chalk Farm Road ('the Site') within the London Borough of Camden ('LBC').

1.2 A listed building consent application accompanies the application for works to the adjacent Roundhouse, which is a Grade II* listed building.

1.3 The Site is located on the south-western side of Chalk Farm Road and borders the mainline railway into Euston, with the Juniper Crescent Housing Estate to the south. It lies within the Regents Canal Conservation Area, to which the existing building on the Site is a neutral contributor. To the west, the site is adjacent to the Grade II* listed Roundhouse theatre and live music venue. Beyond that, to the north-west is Chalk Farm Underground Station. To the east is the Petrol Filling Station site, which forms part of the Camden Goods Yard development and is currently in use as a temporary supermarket.

1.4 The development will provide 265 student accommodation units, together with 824 sqm (GIA) of commercial space, 24 affordable residential units, with public realm improvements, new areas of landscaping, amenity and play space, and improved accessibility to the site ('the Development').

1.5 The description of Development is as follows:

"Demolition of existing buildings and redevelopment of the site to provide two buildings containing purpose-built student accommodation with associated amenity and ancillary space (Sui Generis), affordable residential homes (Class C3), ground floor commercial space (Class E) together with public realm, access, servicing, and other associated works."

1.6 Full details and scope of the planning application is described in the submitted Town Planning Statement, prepared by Gerald Eve LLP.

1.7 Consil have considered the potential for disabling glare or glint to train drivers using the railway branch line between the Primrose Hill Junction and the Camden Road West Junction, immediately south of the Development.

1.8 The West Coast Main Line, leading to London Euston, is approximately 100 metres from the Site at its closest point meaning there is no possibility of disabling glare occurring and further technical analysis is not required. Our understanding is that the branch line is infrequently used for transporting freight and by London Overground trains returning to the depot, all of which travel at a reduced speed.

1.9 Our study has been undertaken by preparing a three-dimensional computer model of the Site, surrounding buildings and branch line and analysing the reflections of sunlight from across the external facades of the Development across the year and throughout the day, using our bespoke software. Our assessment is based on a visual inspection, the information detailed below and estimates of relevant distances, dimensions and levels which are as accurate as the circumstances allow.

1.10 We have received the following documents and used them in preparing this report:

- Carto Metro: Greater London Transport Tracks Map (October 2022);
- Cloud 10 Limited: 3D survey model of the Site and surrounding properties received on 11 October 2022;
- DSDHA: Proposed scheme drawings received on 16 January 2024.

1.11 Image 1 depicts the Development and railway to the south within our 3D model, with the Development shaded blue.

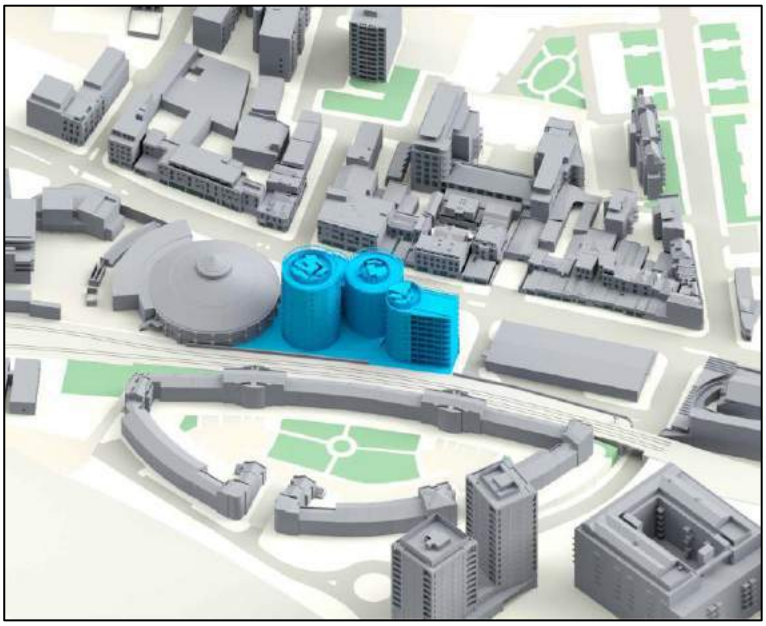


Image 01: 3D View of the Development

2 GUIDANCE

2.1 BRE 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice'

2.1.1 Section 5.8 of 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' (2022) states:

"Glare or dazzle can occur when sunlight is reflected from a glazed façade or area of metal cladding. This can affect road users outside and occupants of adjoining buildings. There are two types of reflected glare problem that can occur. Discomfort glare causes visual discomfort without necessarily affecting the ability to see. Disability glare happens when a bright source of light (such as the reflected sun) impairs the vision of other objects. The bright light is scattered in the eye, making it harder to see everything else. Outdoors, disability glare is easily the more serious problem, as it can affect motorists' and train driver's ability to drive safely.

The problem can occur either when there are large areas of reflective glass or cladding on the facade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus, solar dazzle is only a long-term problem for some heavily glazed (or mirror clad) buildings. Photovoltaic panels tend to cause less dazzle because they are designed to absorb light.

If it is likely that a building may cause solar dazzle the exact scale of the problem should be evaluated. This is done by identifying key locations such as road junctions and railway signals, and working out the number of hours of the year that sunlight can be reflected to these points. BRE Information Paper IP 3/87 gives details.

Where solar reflection can happen, the next step is to calculate the angle between the driver's [field] of [vision] and the reflected sun. For vertically mounted clear double glazing facing a driver on a level road, solar dazzle could be a significant issue if this angle is less than 10°."

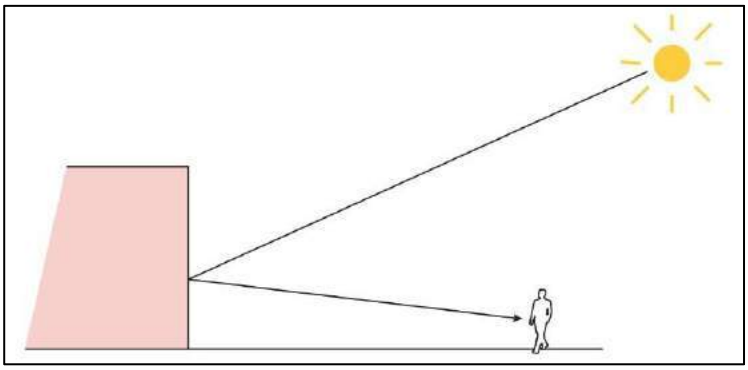


Image 02: Reflection of low angle sunlight from a vertical façade (Figure 42, BRE Report).

2.1.2 Calculating the angles of reflected sunlight on the Development façade requires the assumption of reflective surfaces as 'mirrors' and will yield a summary table like the one shown in Image 3 below. The coloured squares represent the months of the year and times of day where there is a geometric possibility for the sun's rays to be reflected into the field of vision of the driver at each location. The dates of the year are shown as colours on the building's façade.

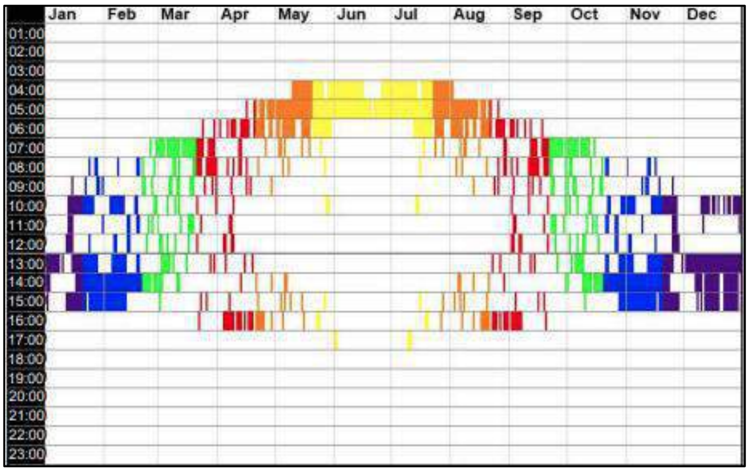


Image 03: Summary table representing sunlight reflected into a single field of vision, throughout the year.

2.1.3 Each summary table is paired with an image from the driver's field of vision, like that shown in Image 4. The image shows the times of day when the sun's rays can be reflected as points on the 'mirrored' parts of the Development, with the colours corresponding to the height of the sun in equivalent months either side of the solstice.

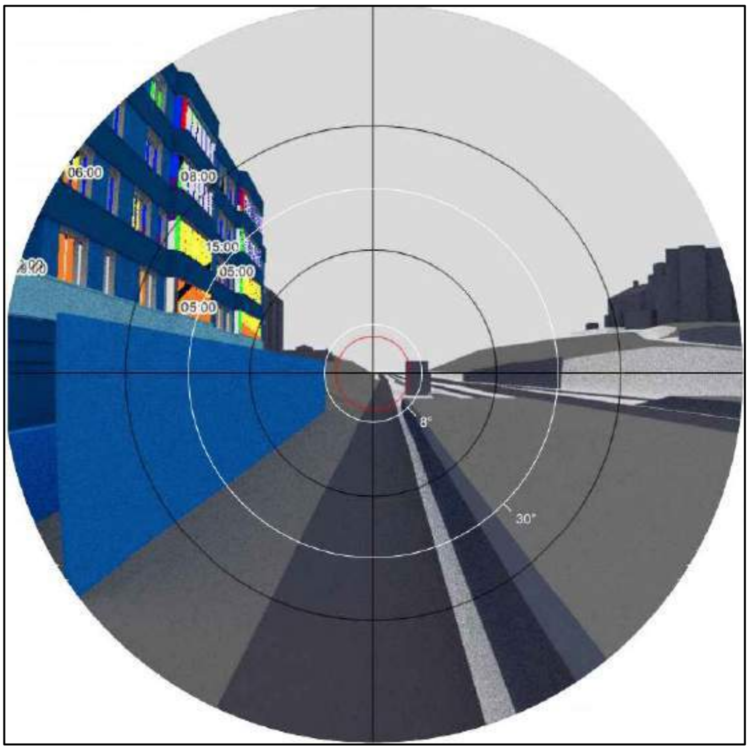


Image 04: Driver's field of vision depicting locations of reflected sunlight, corresponding to the summary table.

2.1.4 An overlay of the angles from the driver's field of vison have additionally been included on Image 04, divided into increments of 5°, 8°, 20°, 30°, 40° with a maximum angle of 60°. The white circles correspond to 8°and 30° either side of the central line of sight chosen along the track i.e., the latter being the division between *central* and *peripheral* vision.

2.2 BRE Information Paper IP 3/87

2.2.1 With regard to potential glare, IP 3/87 states: *"Coated glazing tends to reflect sunlight; and while this property may be desirable to the occupants of the glazed building, it can be a nuisance to the owners of adjoining property, or to road users outside. Even ordinary glass can be reflective enough to cause problems in this respect. Generally speaking vertical mirror glazed facades only create difficulties when the sun is low in the sky, near dawn or sunset."* (p.1)

"Around the proposed building key areas will have been identified where solar dazzle would be unwelcome. These would include road junctions, pedestrian crossings, other road hazards, windows of nearby buildings and sports areas." (p.2)

2.2.2 Page 3 of Information Paper IP 3/87 explains that *"solutions to [solar dazzle] could include the provision of landscaping and trees."*

2.3 The International Commission on Illumination (CIE) 146:2002 Collection 10

2.3.1 Regarding glare, (CIE) 146:2002 states:

"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low.

Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows.

The magnitude of the veiling luminance depends on the intensity and distance of the glare source which together determine the relevant parameter glare, the illuminance at the eye caused by the glare source, and the angle between the glare source and the line of sight.

Glare instances are exacerbated with the effects of age and eye pigmentation. The closer the instance of glare to the line of sight of the viewer, the worse the veiling effect becomes."

2.4 Network Rail Standard NR/L2/SIG/10157 '*Signal Sighting Assessment Process*' (2021)

2.4.1 Section 4 states that *"for the purpose of this standard, driver's eye level is assumed at 2750 mm above Rail Level."*

2.4.2 Further, on page 11 of the document it states that, *"The requirements of RIS-0737-CCS shall be applied to the signal sighting assessment process".*

2.5 RSSB Rail Standard RIS-0737-CCS '*Signal Sighting Assessment Requirements*' (June 2016)

2.5.1 In setting out the national signal sighting assessment process, RIS-0737-CCS considers potential obscuration to signal sighting, including the effect of reflections and glare. Appendix A.5 (of the Standard) states:

"G A.5.1.2 [Reflections and Glare] are present if direct glare or reflected light is directed into the eyes or into the lineside signalling asset that could make the asset appear to show a different aspect or indication to the one presented.

G A.5.1.3 [Reflections and Glare] are relevant to any lineside signalling asset that is capable of presenting a lit signal aspect or indication.

G A.5.1.5 Problems arising from reflection and glare occur when there is a very large range of luminance, that is, where there are some objects that are far brighter than others. The following types of glare are relevant:

a) Disability glare, caused by scattering of light in the eye, can make it difficult to read a lit display.

b) Discomfort glare, which is often associated with disability glare. While being unpleasant, it does not affect the signal reading time directly, but may lead to distraction and fatigue.

G A.5.1.6 Examples of the adverse effect of disability glare include a) When a colour light signal presenting a lit yellow aspect is viewed at night but the driver is unable to determine whether the aspect is a single yellow or a double yellow. b) Where a colour light signal is positioned beneath a platform roof painted white and the light reflecting off the roof can make the signal difficult to read.

G A.5.1.7 Options for militating against [Reflections and Glare] include a) Using a product that is specified to achieve high light source: phantom ratio values. b) Alteration to the features causing the glare or reflection. c) Provision of screening."

2.5.2 Appendix F.6 explains where objects within the *Field of Vision* of a driver would be most noticed:

“F.6.1 The field of vision, or visual field, is the area of the visual environment that is registered by the eyes when both eyes and head are held still. The normal extent of the visual field is approximately 135° in the vertical plane and 200° in the horizontal plane.

F.6.2 The visual field is usually described in terms of central and peripheral regions: the central field being the area that provides detailed information. This extends from the central point (0°) to approximately 30° at each eye. The peripheral field extends from 30° out to the edge of the visual field.

F.6.3 Objects positioned towards the centre of the observer’s field of vision are seen more quickly and identified more accurately because this is where our sensitivity to contrast is the highest. Peripheral vision is particularly sensitive to movement and light.

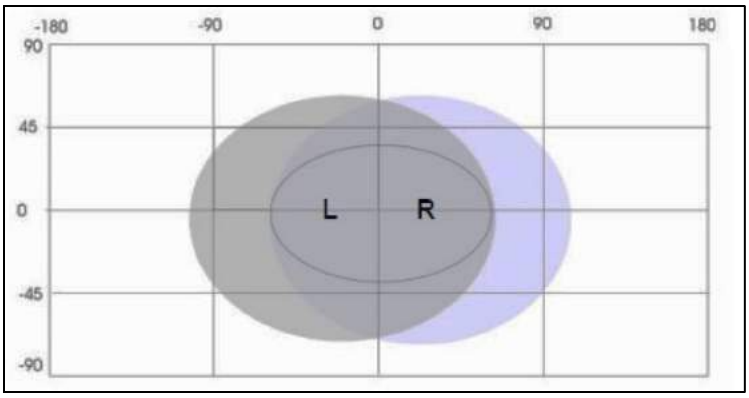


Image 05: Field of view (Figure G 21, RSSB Rail Standard RIS-0737-CCS)

F.6.4 *In [Image 5 above], the two shaded regions represent the view from the left eye (L) and the right eye (R) respectively. The darker shaded region represents the region of binocular overlap. The oval in the centre represents the central field of vision.*

F.6.5 Research has shown that drivers search for signs or signals towards the centre of the field of vision.

F.6.6 Signals, indicators and signs should be positioned at a height and distance from the running line that permits them to be viewed towards the centre of the field of vision. This is because: a) As train speed increases, drivers become increasingly dependent on central vision for asset detection. At high speeds, drivers demonstrate a tunnel vision effect and focus only on objects in a field of + 8° from the direction of travel. b) Sensitivity to movement in the peripheral field, even minor distractions can reduce the visibility of the asset if it is viewed towards the peripheral field of vision. The presence of clutter to the sides of the running line can be highly distracting (for example, fence posts, lampposts, traffic, or non-signal lights, such as house, compatibility factors or security lights).”

2.5.3 In terms of signal positions relative to the driver's *Field of Vision*, [Image 06] below provides a visual guide as to options available, and G 2.7.5.6 (a) states:

"Main signal aspects and indications should be presented close to the centre of the driver's normal field of vision, taking account of the constraints of the structural gauge, electrical clearances and any requirements for the display to be readable also when drivers are not positioned in the normal driving position (for example, option 1 or 2 [in Image 06 below]*."*

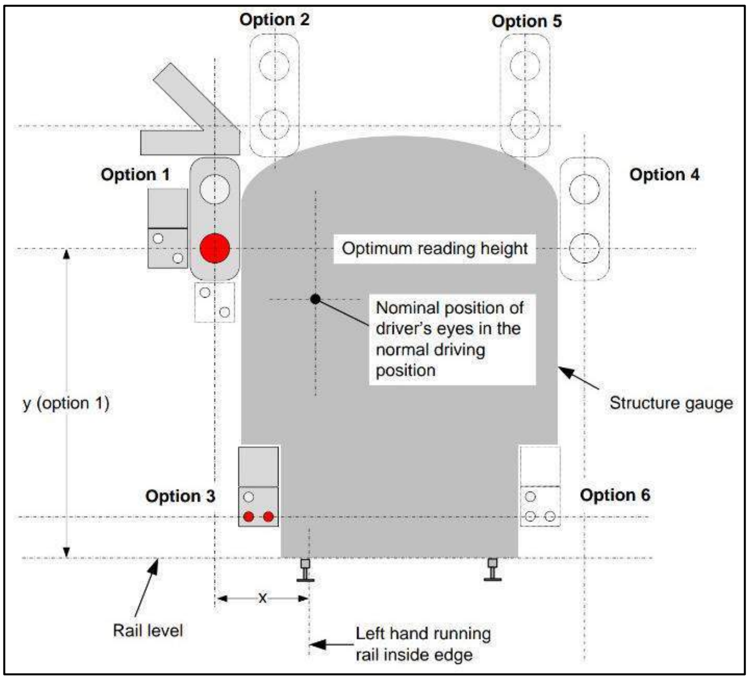


Image 06: Some asset configuration examples (Figure G 2, RSSB Rail Standard RIS-0737-CCS)

2.5.4 Regarding whether a signal will remain within the radius of an 8° cone when there is a bend in the line of track ahead, this is also addressed in Appendix F:

"F.6.7 [Image 07] *and* [Table 1] *identify the radius of an 8° cone at a range of close-up viewing distances from the driver's eye. This shows that, depending on the lateral position of a stop signal, the optimal (normal) train stopping point could be as far as 25 metres back from the signal to ensure that it is sufficiently prominent."*

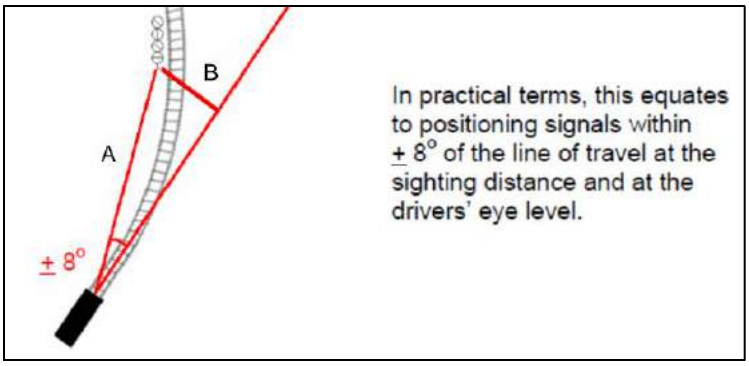


Image 07: Signal positioning (Figure G 22, RSSB Rail Standard RIS-0737-CCS)

‘A’ (metres)	‘B’ (metres)	Typical display positions
5	0.70	-
6	0.84	-
7	0.98	-
…15	2.11	A stop aspect positioned 3.3 m above rail level and 2.1 m from the left hand rail is within the 8° cone at 15.44 m in front of the driver.
…18	2.53	A stop aspect positioned 5.1 m above rail level and 0.9 m from the left hand rail is within the 8° cone at 17.93 m in front of the driver.
…25	3.51	A stop aspect positioned 3.3 m above rail level and 2.1 m from the right hand rail is within the 8° cone at 25.46 m in front of the driver.

Table 01 – 8° cone angle co-ordinates for close up viewing (Table G 5, RSSB Rail Standard RIS-0737-CCS)

2.5.5 Useful guidance is provided on the driver’s *Main Response Time* for a main signal, on pages 39-40:

“3.4.2 5 seconds [baseline response time] shall be used to calculate the [main response time] for a main signal that can be approached by a moving train, where a banner repeater indicator is also provided.

Rationale

G 3.4.2.1 When the reading time provided by the 250 metres [minimum readable distance] of the banner repeater indicator is added to the 5 seconds [main response time] of the repeated signal the overall reading time is at least 9 seconds.

Guidance

G 3.4.2.2 The driver needs at least 5 seconds to: a) Monitor the track ahead to detect and identify the signal applicable to the train being operated. b) Detect and distinguish the signal aspect and any associated route indication. c) Interpret the information conveyed by the signal and associate it with the preceding banner repeater indication. d) Cover the time between when the driver loses sight of the signal aspect and when the train actually passes the signal.

G 3.4.2.3 5 seconds should provide enough time for the driver to distinguish a flashing aspect displayed as part of a junction aspect sequence.

G 3.4.3.2 5 seconds [baseline response time] equates to approximately 305 metres at 125 mph, and 244 metres at 100 mph.”

3 DEFINITIONS

3.1 Glossary of Terms

3.1.1 Below is a simplified glossary of the solar glare terminology referred to in this report and the relevant guidance:

- **Baseline Response Time ('BRT')** – the minimum time value that can be used by the [Signal sighting committee] to specify the [minimum response time] for a particular signalling asset.
- **Central line of sight ('line of sight')** – midpoint of the driver's *Field of Vision*.
- **Cone** – Angle of view within *Field of Vision*, defined in degrees (°) and depicted as circle overlaid on a *Central line of sight*.
- **Cloud cover** – the assessment of glare assumes a clear sky year-round, however the United Kingdom sees frequent cloudy skies due to its high latitude and oceanic controlled climate.
- **Direct glare from sun** – relevant when seen at similar angles to instances of reflected solar glare from the façade of a development. This direct sunlight is often at least as bright as and often many times brighter than the direct solar glare. Due to this common source of glare, traffic signals are commonly designed with a black backing board, greatly increasing the visibility of traffic signals in such instances.
- **Disability Glare** – the presence of a high luminance source within a low luminance scene which impairs vision.
- **Distracting Glare** – excessive brightness of surfaces or luminaires within the *Field of Vision*. Causes discomfort, does not directly impair vision.
- **Duration of Glare** – the time-dependent ability of glare to cause a veiling luminance. Glare that lasts for less than 3 seconds is reported to be less likely to become Disability Glare.
- **Field of Vision** – reflected solar glare that falls outside the *Field of Vision* will be reduced in impact. Glare outside 30° from the line of sight is usually significantly reduced in intensity, and within 8° is most significant for train drivers travelling at high speeds.
- **Glare** – a continuous bright light most normally received by a stationary receptor or resulting from a stationary reflector. In effect, the main difference between glint and glare is whether the receptor is stationary or in motion.
- **Glint** – a momentary flash of light most normally experienced by a receptor in motion or resulting from reflector in motion.

- **Key Point** – standpoint from which solar glare is assessed on a driver's *Field of Vision*.
- **Lineside signalling asset ('signal')** – any of the following: a) A lineside signal, indicator or lineside operational sign (excluding signs associated with a temporary speed restriction). b) A mirror or monitor that forms part of a train dispatch system. c) Switches, plungers, signs and indicators that form part of a train dispatch system and which are used by platform staff.
- **Minimum Readable Distance ('MRD')** – the readable distance value for an asset that is calculated to provide the minimum response time (MRT), taking account of the maximum train speed.
- **Minimum Response Time ('MRT')** – the assessed minimum time needed by a driver to respond to the information presented by a specific lineside signalling asset.
- **Obscuration (of lineside signalling asset)** – a condition where 10% or more of a signal aspect, indication or lineside operational sign is not visible for all or part of the required reading time. A partial obscuration is where between 70% and 90% is visible. Anything less than 70% visible is a complete obscuration.
- **Readability** – the ease and reliability with which signal aspects and indications can be read by a driver throughout the range of operational and ambient conditions applicable to that hardware, within the operational context and while performing typical required duties. This ranges from never readable to always readable.
- **Times of day and times of year** – affecting the sun's path and height. Morning and evening sun is low in the sky and due to the filtering effect of the atmosphere, the energy in the light at these angles can commonly be up to 10 times weaker than the sun at mid-day. Similarly, the strength of the sun for much of the winter months (21st Oct to 21st Feb) is typically around a third of the intensity in midsummer.

4 ASSESSMENT

4.1 We have considered the location of two lineside signalling assets in close proximity to the Development and have produced a solar glare assessment in line with the methodology outlined in Section 2 of this Report. The analysis drawings can be found in Appendices A and B, of which extracts are used below.

4.2 This assessment does not calculate the intensity of glare, rather it is used to identify the potential for it. In instances where the potential for glare is identified, a more detailed assessment might be required involving more complex modelling and software, taking into account the reflective properties of different façade materials and atmospheric conditions.

4.3 The first stage of our assessment assumes that the glazing and clad façades will be highly reflective (Scenario 1) whereas, it is anticipated that the terracotta cladding will have a matt finish which will mitigate the risk of disabling glare occurring. As the façade specification has not been finalised, and is likely to be subject to a planning condition, we have undertaken a secondary assessment, to identify the potential for glare from the windows (Scenario 2). The results for this second assessment can be found at Appendix B.

4.4 Images 8 and 9 below illustrate the proposed building façade, including terracotta panels and aluminium fins to mitigate the potential for solar glare.

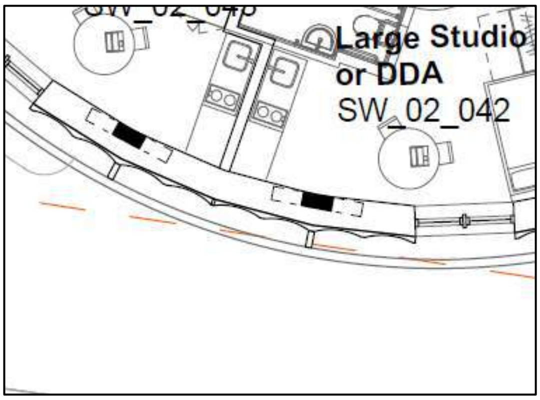


Image 08: Plan view of typical façade.

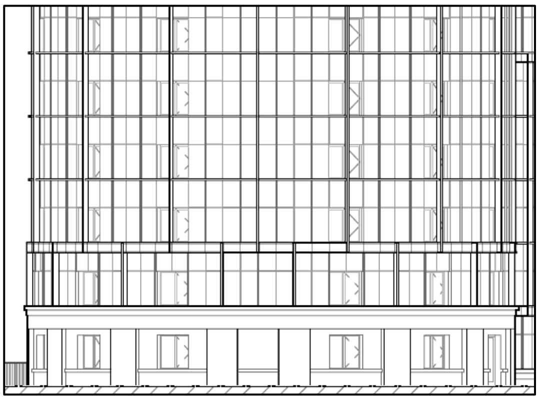


Image 09: Extract of south elevation.

4.5 <u>Development and Surrounding Receptors</u>

4.5.1 Image 10 below is an aerial view showing the Development and the branch line adjacent to it. The approximate locations of the closest signals to the Development are marked red. These have been modelled in accordance with the methodology in Section 2 and using the measured survey provided.

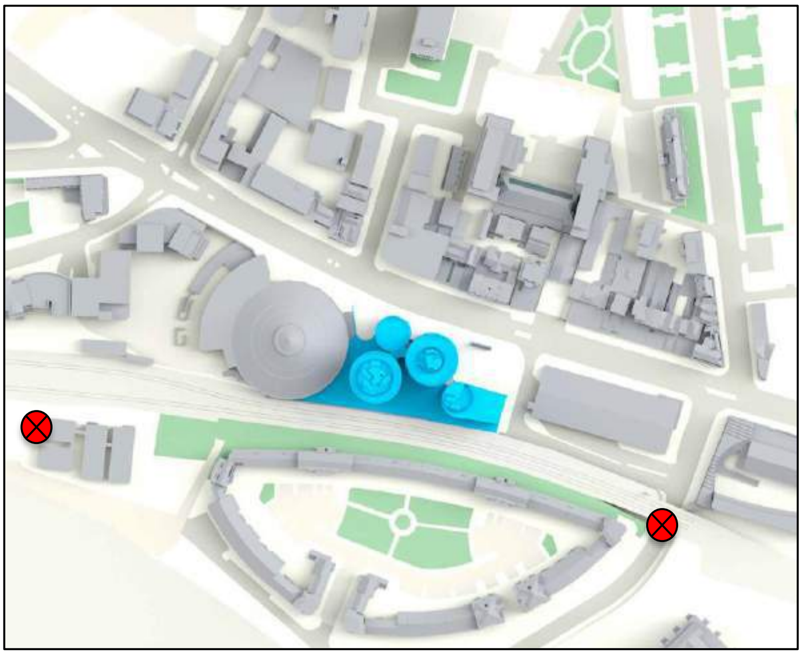


Image 10: Plan View showing the Development and locations of the closest signals.

4.5.2 The signal to the east serves trains running eastbound and the signal to the west serves trains running westbound. In accordance with the methodology detailed in Section 2, we have tested the potential for solar glare to occur 200 metres prior to the signal and at further intervals of 25 metres until the Development is no longer in the drivers line of sight.

4.5.3 Drawing 901 at Appendix A, an extract of which is at Image 11 below, shows the location of the Key Points for the driver's line of sight. These are labelled KP1 to KP8 and annotated with the direction of travel. KP01 to KP06 face east and KP07 and KP08 face west.

Image 11: Location of the Key Points (KP[x]) from which fields of vision are assessed.

4.6 Criteria of judgement and limitations

4.6.1 The BRE guidelines do not include criteria for the significance of solar glare effects and therefore professional judgement has been applied to evaluate the likely severity of reflected solar glare from the façade of the Development taking into consideration the factors described in Table 2 below.

Magnitude	Solar Glare
Significant	a) Material glare (not just small areas of glazing or transitory flicker) from within the central 8° cone from the central line of sight or b) large, unbroken glazed areas inside a 30° cone from the central line of sight, where there are insufficient mitigation factors including those inherent in the design. Glare can be seen for an extended period (e.g., greater than 3 seconds).
Moderate	Glare within 30° cone from the central line of sight, where 1. the glare covers a significant portion of the field of view; 2. glare can be seen continuously for an extended period (e.g., greater than 3 seconds), however 3. mitigation factors apply including those inherent in the design.
Minor	Glare from smaller glazed areas inside 30° cone from the central line of sight, and a) mitigation factors apply, or b) glare cannot be seen for an extended period (e.g., greater than 3 seconds).
Negligible	Glare outside a 30° cone from the central line of sight, and a) is only from small areas of the façade, or b) other significant mitigating factors are already in place.

Table 02 – Solar Glare impact magnitudes

4.6.2 When interpreting the results of our analysis and the associated magnitude of significance, the following points need to be considered:

- **A cloudless sky** – assumed throughout the year for the visual results of the analysis, nonetheless the reality is that the sky will often be overcast and so the results represent a worst-case scenario.
- **Glazing and external cladding as mirrored surfaces** – in reality, the majority of the terracotta façade will be relatively low reflectance.
- **Other surfaces as non-reflective** – in reality, some surfaces, natural or otherwise, may have a higher degree of reflectance.
- **Selection of Key Points** – although great care has been taken in identifying sensitive locations, this does not guarantee that there are no additional sensitive locations where reflected solar

glare could present a potential risk. The assessment has chosen Key Points in relation to the location of lineside signalling assets and their proximity to the Development. The central point of the driver's field of vision at each Key Point has been taken to be 2750mm above ground level, in accordance with NR/L2/SIG/10157.

- **Position of lineside signalling assets lie within radius of 8° cone** – With reference to Table 1 and Images 6-7 in the Guidance section, on tracks with minimal bend such as those passing the Development, it is safe to assume signals will lie within the radius of an 8° cone with regard to the driver's field of vision at each Key Point.

4.7 Results and Mitigation

4.7.1 Out of eight Key Points, due to the location and orientation of the Development in relation to the branch line and signals, four experience potential solar glare within the 30° cone from the central line of sight. These are KP1 to KP4, which are detailed in turn beneath and at various points travelling eastbound.

4.7.2 The remaining Key Points, KP5 to KP8, would not experience any glare within 30-degrees of the driver's line of sight and the effect of the Development can be considered negligible. This includes both points assessed for westbound trains.

4.7.3 The analysis has been undertaken in two scenarios:

- Scenario 1 = Analysis assuming that the entirety of the façades, including the windows, cladding panels and fins have high reflective properties. This presents a *"worst case"* scenario and the results are set-out in Appendix A.

- Scenario 2 = Analysis assuming that the cladding panels and fins are non-reflective, or have low reflective properties, as is the current intention. The results for this scenario are set-out in Appendix B.

KP1

4.7.4 Starting with Scenario 1, the results for KP1 can be seen below and in more detail in Drawing 902 (Appendix A).

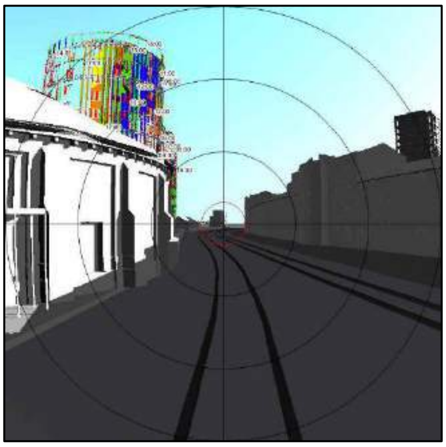


Image 11: Field of vision from KP1.

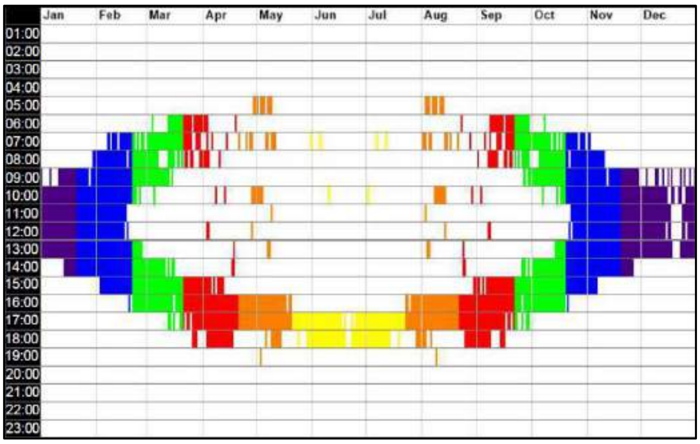


Image 12: KP1 summary table.

4.7.5 KP1 is taken 200 metres from the signal location travelling east and immediately south of the Roundhouse. The majority of glare within KP1 occurs in the peripheral vision with a smaller area extending into the top left-hand side of the central field of vision, between 14°and 30° cones from the central line of sight. No glare would occur within 8° of the driver's line of sight.

4.7.6 The majority of glare within 30° of the driver's line of sight would occur from 21 February to 21 April and from 21 August to 21 October, for a minimum period of 2 minutes up to a maximum period of 56 minutes per day.

4.7.7 Turning to Scenario 2, the results for KP1 can be seen below and in more detail in Drawing 911 (Appendix B).

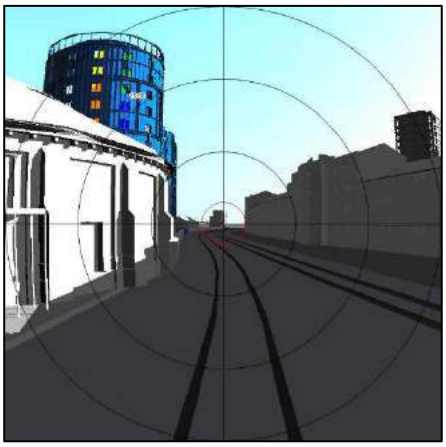


Image 13: Field of vision from KP1.

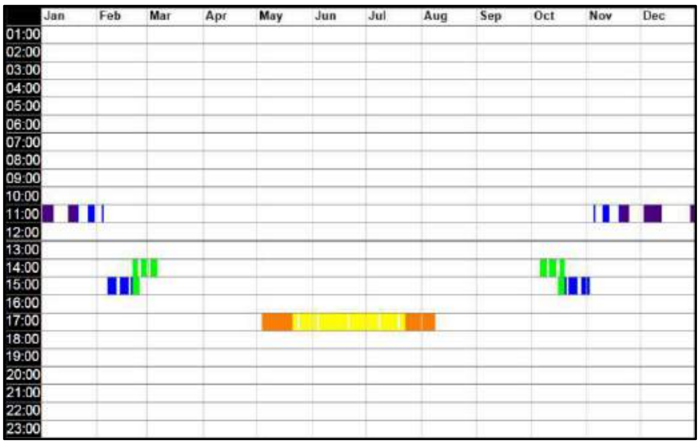


Image 14: KP1 summary table.

4.7.8 Scenario 2 shows a significant reduction in the potential for glare, with no glare within 20-degrees of the central line of sight and almost no glare within 30-degrees.

4.7.9 Therefore, the impact of glare at KP1 on trains travelling east can be considered negligible.

KP2

4.7.10 The results for KP2 can be seen below and in more detail in Drawing 902 (Appendix A).

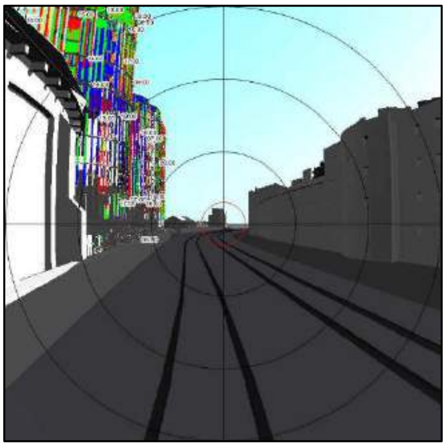


Image 15: Field of vision from KP2.

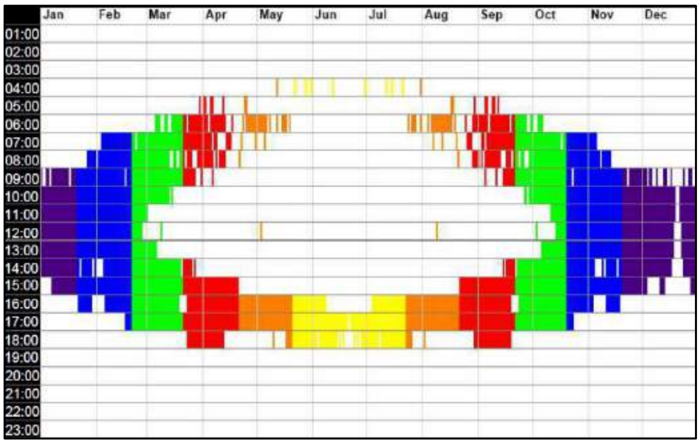


Image 16: KP2 summary table.

4.7.11 KP2 is taken 175 metres from the signal location travelling east. As with KP1, the majority of glare within KP2 occurs in the peripheral vision with an area extending into the left-hand side of the central field of vision, between 16° and 30° cones from the central line of sight. No glare would occur within 8° of the driver's line of sight.

4.7.12 The majority of glare within 30° of the driver's line of sight would occur at various times throughout the year, with the glare within 20-degrees of the driver's line of sight occurring from 21 February to 21 April and from 21 August to 21 October for a minimum period of 2 minutes up to a maximum period of 62 minutes.

4.7.13 The results for KP2 in Scenario 2 can be seen below and in more detail in Drawing 911 (Appendix B).

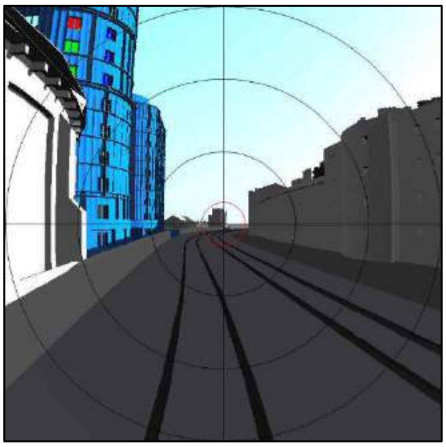


Image 17: Field of vision from KP2.

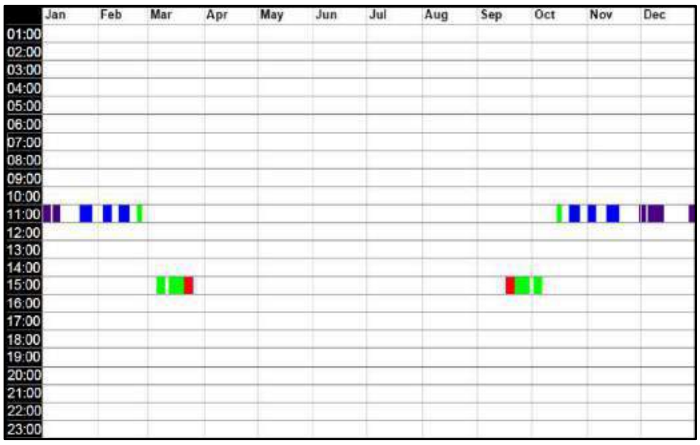


Image 18: KP2 summary table.

4.7.14 This scenario shows a significant reduction in the potential for glare, with no glare occurring within 30-degrees of the central line of sight.

4.7.15 Therefore, the impact of glare at KP2 on trains travelling east can be considered negligible.

KP3

4.7.16 The results for KP3 can be seen below and in more detail in Drawing 903 (Appendix A).

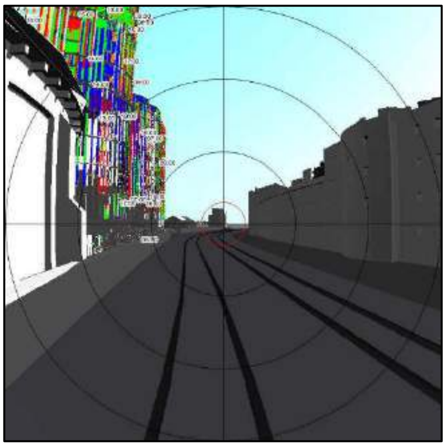


Image 19: Field of vision from KP3.

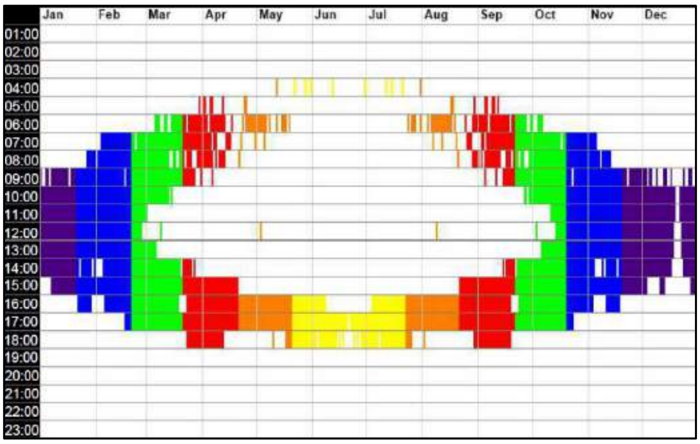


Image 20: KP3 summary table.

4.7.17 KP3 is taken 150 metres from the signal location and the majority of glare occurs in the peripheral vision with an area extending into the left-hand side of the central field of vision, between 20° and 30° cones from the central line of sight. No glare would occur within 20° of the driver's line of sight.

4.7.18 The glare within 30° of the driver's line of sight would occur at various times throughout the year for a minimum period of 2 minutes up to a maximum period of 58 minutes.

4.7.19 Turning to Scenario 2, the results for KP3 can be seen below and in more detail in Drawing 912 (Appendix B).

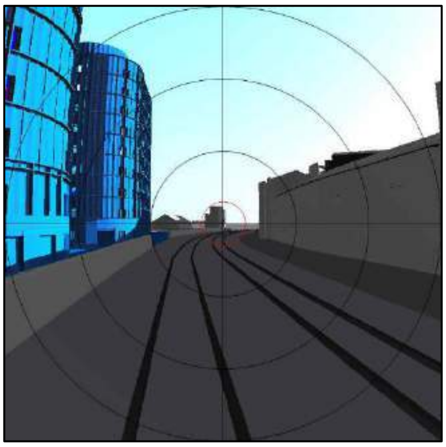


Image 21: Field of vision from KP3.

Image 22: KP3 summary table.

4.7.20 The second scenario shows a significant reduction in the potential for glare, with no glare within 30-degrees of the central line of sight.

4.7.21 Therefore, the impact of glare at KP3 on trains travelling east can be considered negligible.

KP4

4.7.22 The results for KP4 can be seen below and in more detail in Drawing 903 (Appendix A).

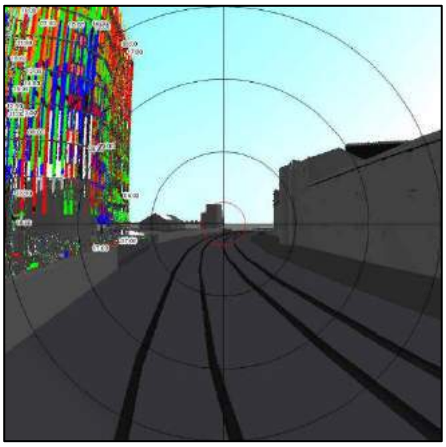


Image 23: Field of vision from KP4.

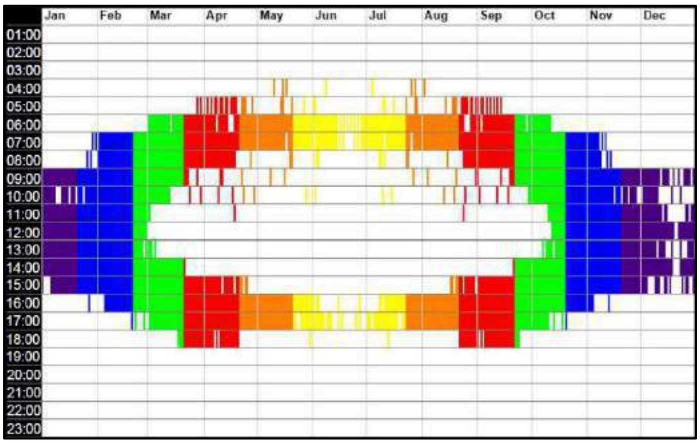


Image 24: KP4 summary table.

4.7.23 KP4 is taken 125 metres from the signal location travelling east and the majority of glare occurs in the peripheral vision with an area extending into the left-hand side of the central field of vision, between 27° and 30° cones from the central line of sight. No glare would occur within 20° of the driver's line of sight.

4.7.24 The glare within 30° of the driver's line of sight would occur from 21 February to 21 April and from 21 August to 21 October for a minimum period of 2 minutes up to a maximum period of 44 minutes.

4.7.25 The results for KP4 in Scenario 2 can be seen below and in more detail in Drawing 912 (Appendix B).

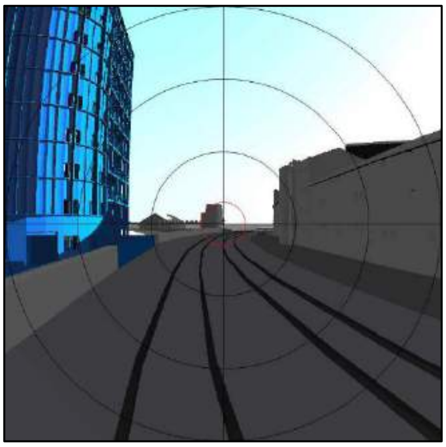


Image 25: Field of vision from KP4.

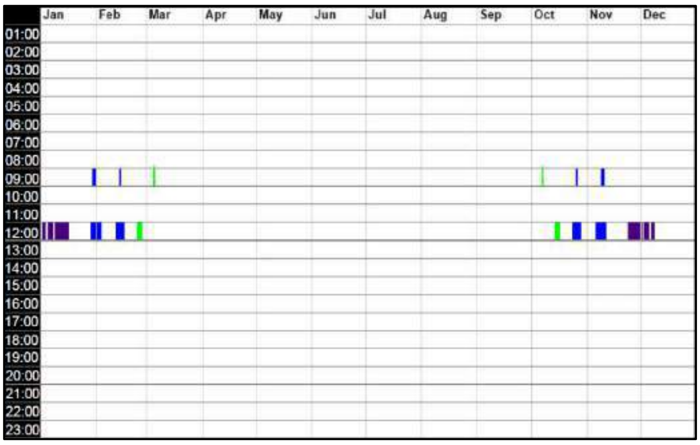


Image 26: KP4 summary table.

4.7.26 The results for Scenario 2 show a significant reduction in the potential for glare, with no glare occurring within 30-degrees of the central line of sight.

4.7.27 Therefore, the impact of glare at KP4 on trains travelling east can be considered negligible.

5 CONCLUSION

5.1 Our analysis has considered the potential for disabling glare to train drivers due to the Development which is located adjacent to the Primrose Hill Junction to Camden Road West Junction branch line. The West Coast Main Line, leading to London Euston, is approximately 100 metres from the Site at its closest point meaning there is no possibility of disabling glare occurring.

5.2 The assessment has been undertaken with reference to guidance provided by the BRE, Network Rail and the Rail Safety & Standards Board. The assessment points have been taken in relation to lineside mounted signals.

5.3 It is intended that the building will be clad using terracotta panels with aluminium fins to help mitigate solar glare from the windows. It is also anticipated that the terracotta cladding will have a matt finish which will mitigate the risk of disabling glare occurring. As the façade specification is yet to be finalised, we have undertaken the analysis in two scenarios:

- Scenario 1 = Analysis assuming that the entirety of the façades, including the windows, cladding panels and fins have high reflective properties. This illustrates the potential for glare to occur.
- Scenario 2 = Analysis assuming that the cladding panels and fins are non-reflective, or have low reflective properties, as is the current intention.

5.4 Initial analysis shows the potential for reflected solar glare within a 30-degree field of vision of train drivers approaching the Site from the west and its magnitude would be considered **moderate.**

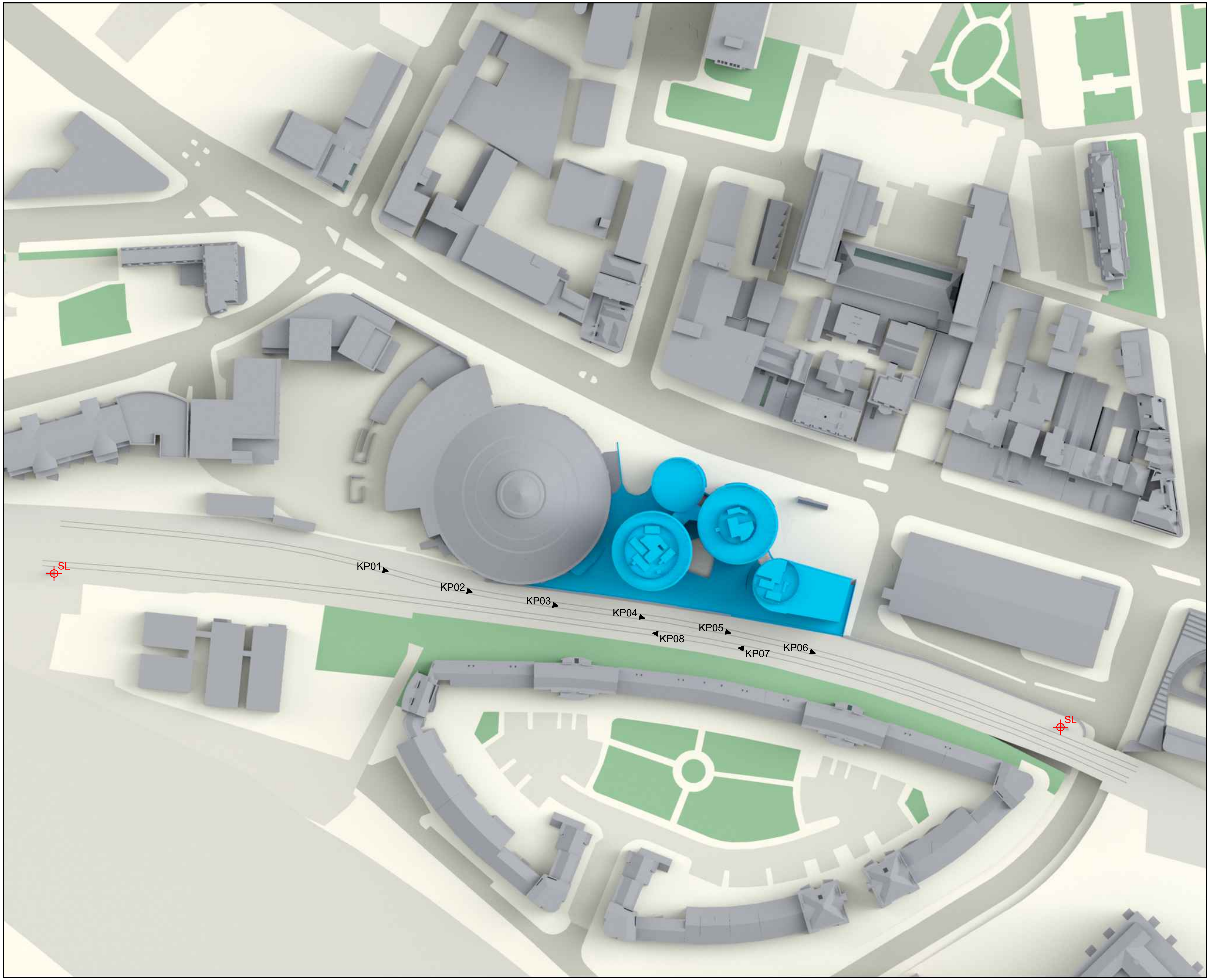
5.5 Secondary analysis with only the glazing as reflective would significantly reduce the potential for glare and we consider its magnitude to be **negligible** for the following reasons:

- The trains passing the Site are understood to be freight trains or empty TFL overground returning to the depot and travelling at low speeds. This means that drivers will have more time to interpret and react to the signals.
- Areas of reflected glare will not occur within 8-degrees of the driver's central line of vision.
- Areas of reflected glare within the 30-degrees of the driver's central field of vision are small, limited to KP1, not within 20-degrees of the driver's central vision and broken up by the non-reflective areas of facade.
- The reflectivity of the windows will be far lower than 'mirrored' assumptions, otherwise assumed for the purpose of this assessment.

5.6 Overall, in our opinion, the potential risk associated with reflected glare is low. It is envisaged that the façade materiality will be ensured by provision of an appropriately worded planning condition. Should the cladding contain reflective properties, then we would recommend that this solar glare assessment and our advice is updated.

APPENDIX A

DRAWINGS (SCENARIO 1: MIRRORED FAÇADE)



DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

- Proposed Buildings
- Analysed properties
- KPX Rail Tracks Key Points
- SL Signal Light

REV	DETAILS	DATE	BY
A	*	*	*

CLIENT
Regal Chalk Farm Limited

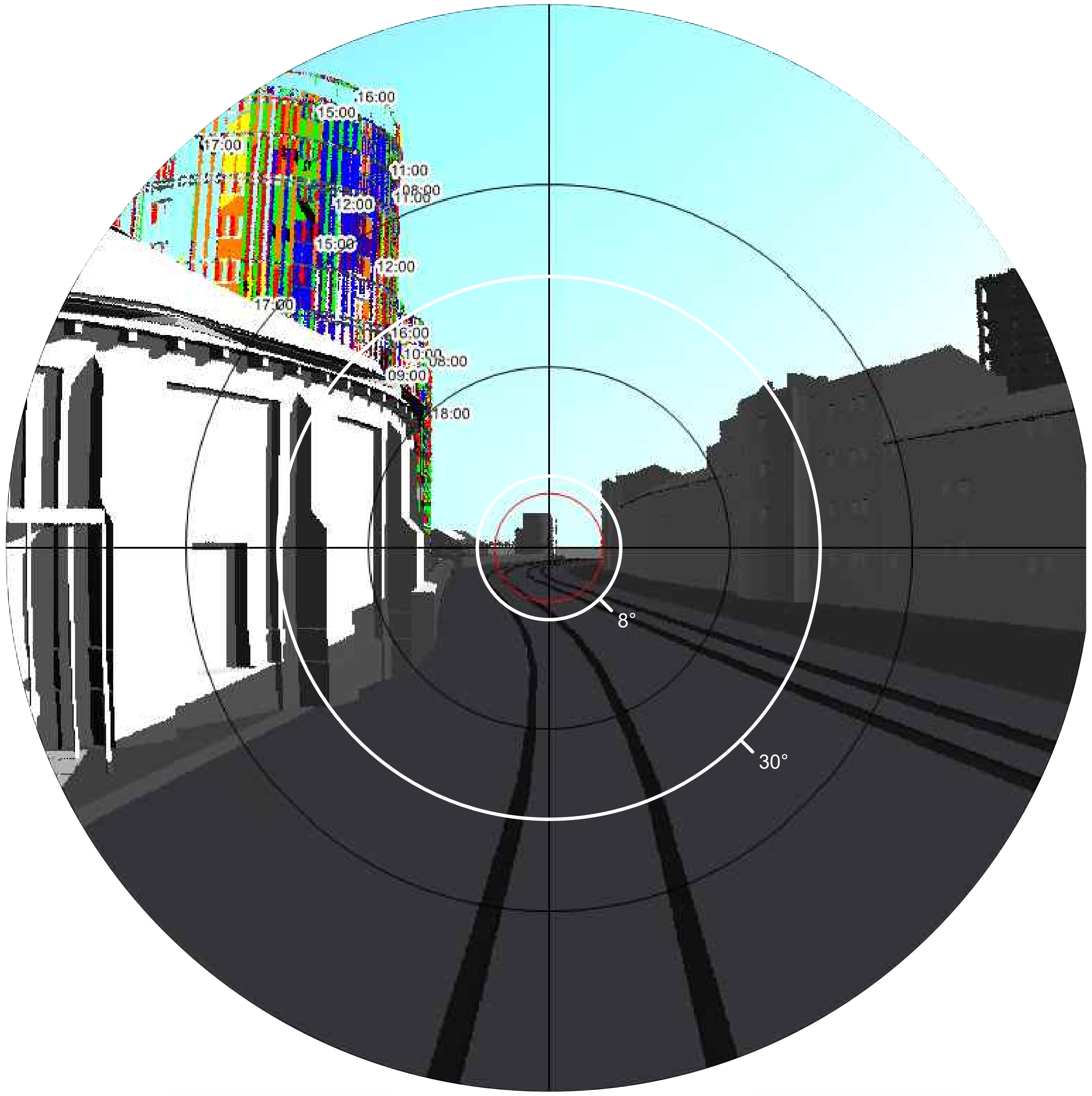
PROJECT
100 Chalk Farm Road, NW1 8EH
London

DRAWING TITLE
Potential Glare

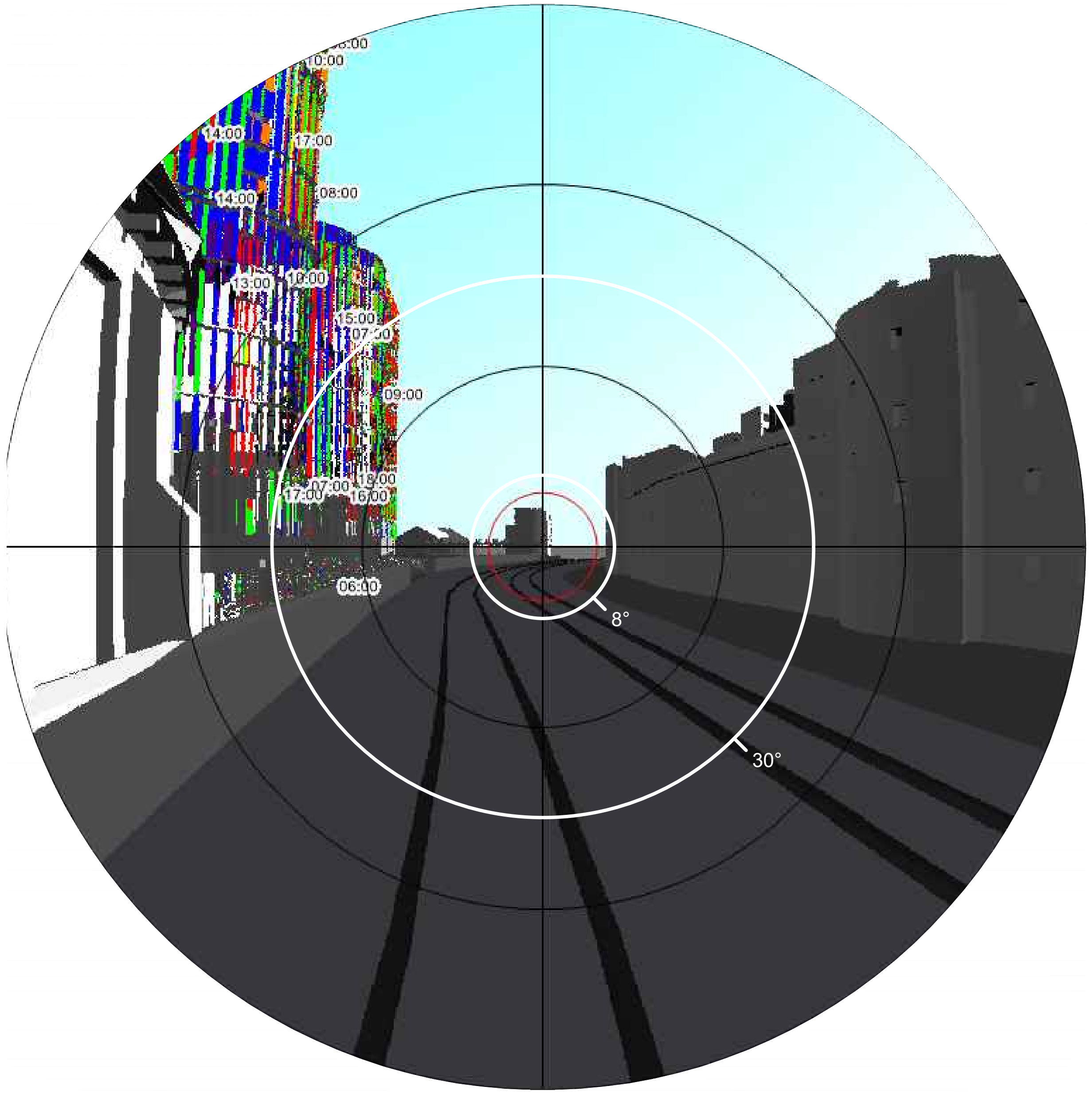
SCALE	DATE
1:1000 @A3	19/01/2024
DRAWN BY	CHECKED BY
BG	JW

DWG No.	REV.
D+S /6/ 901	

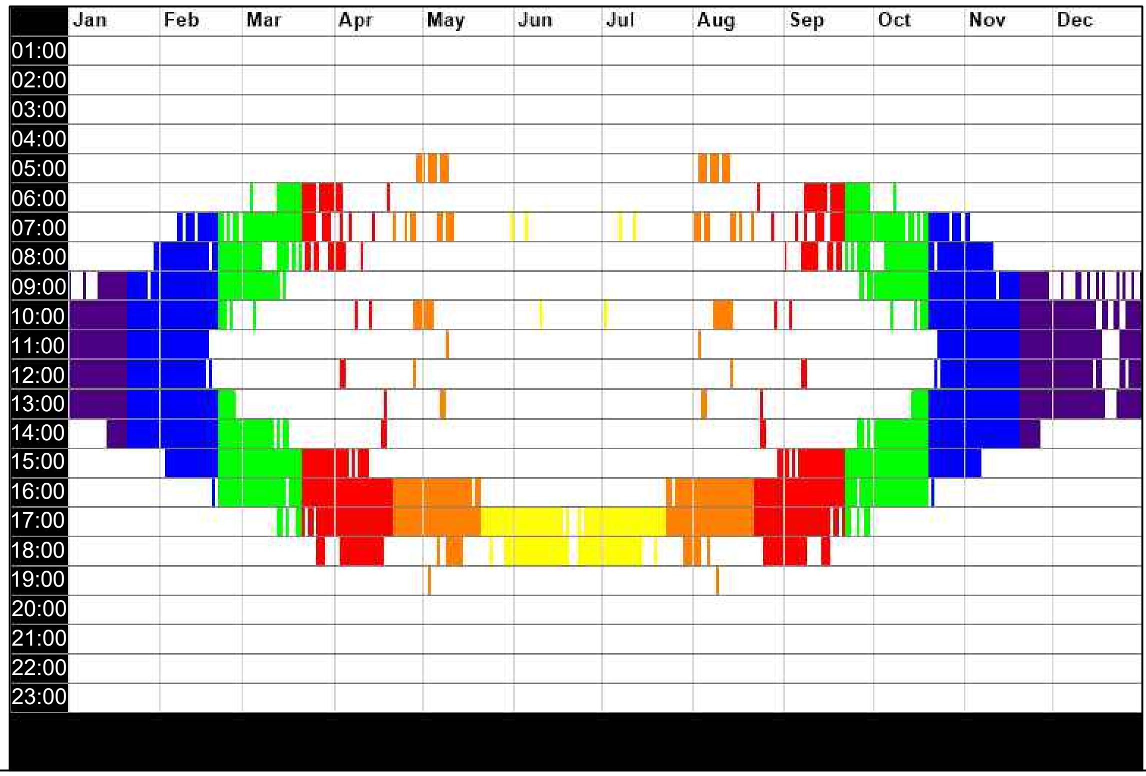
CONSIL

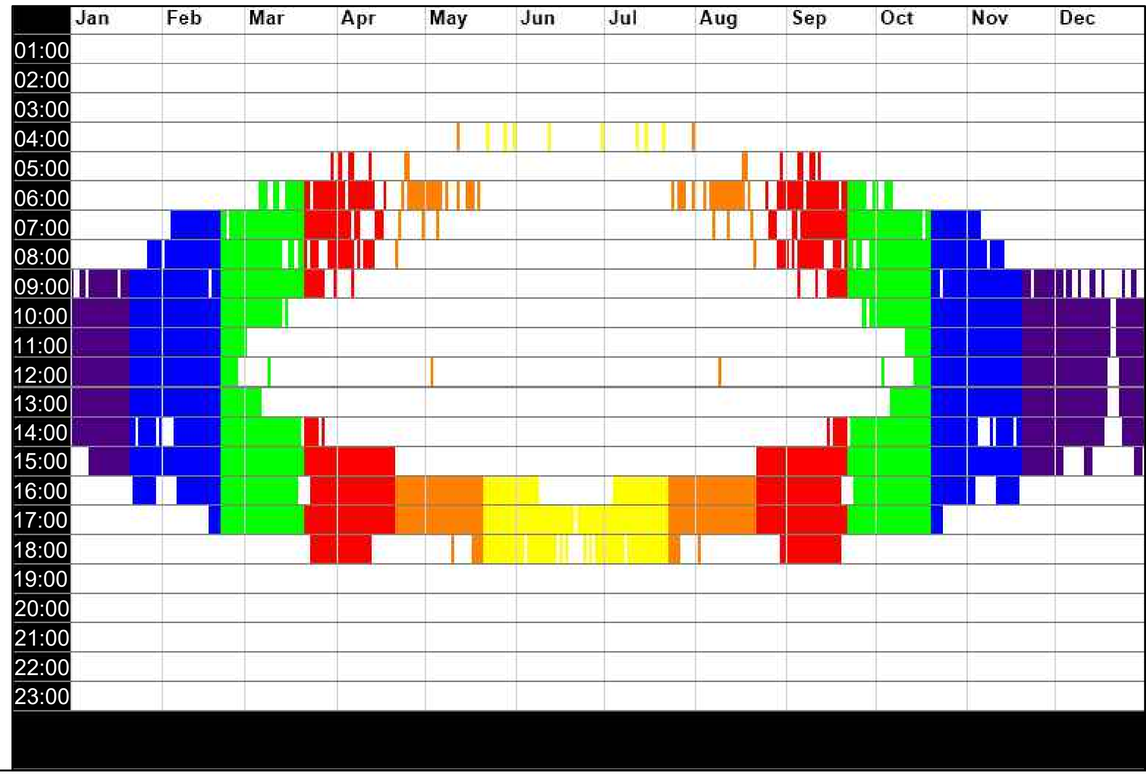


KP01



KP02





SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

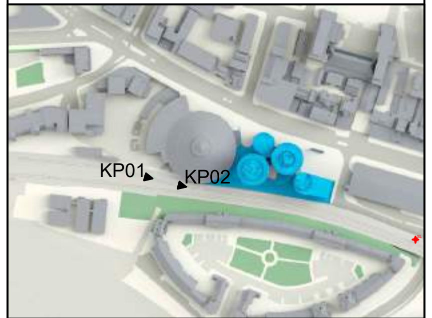
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	(yellow)	(yellow)	Jun to Jul
Apr to May	(orange)	(orange)	Jul to Aug
Mar to Apr	(red)	(red)	Aug to Sep
Feb to Mar	(green)	(green)	Sep to Oct
Jan to Feb	(blue)	(blue)	Oct to Nov
Dec to Jan	(purple)	(purple)	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

CLIENT
Regal Chalk Farm Limited

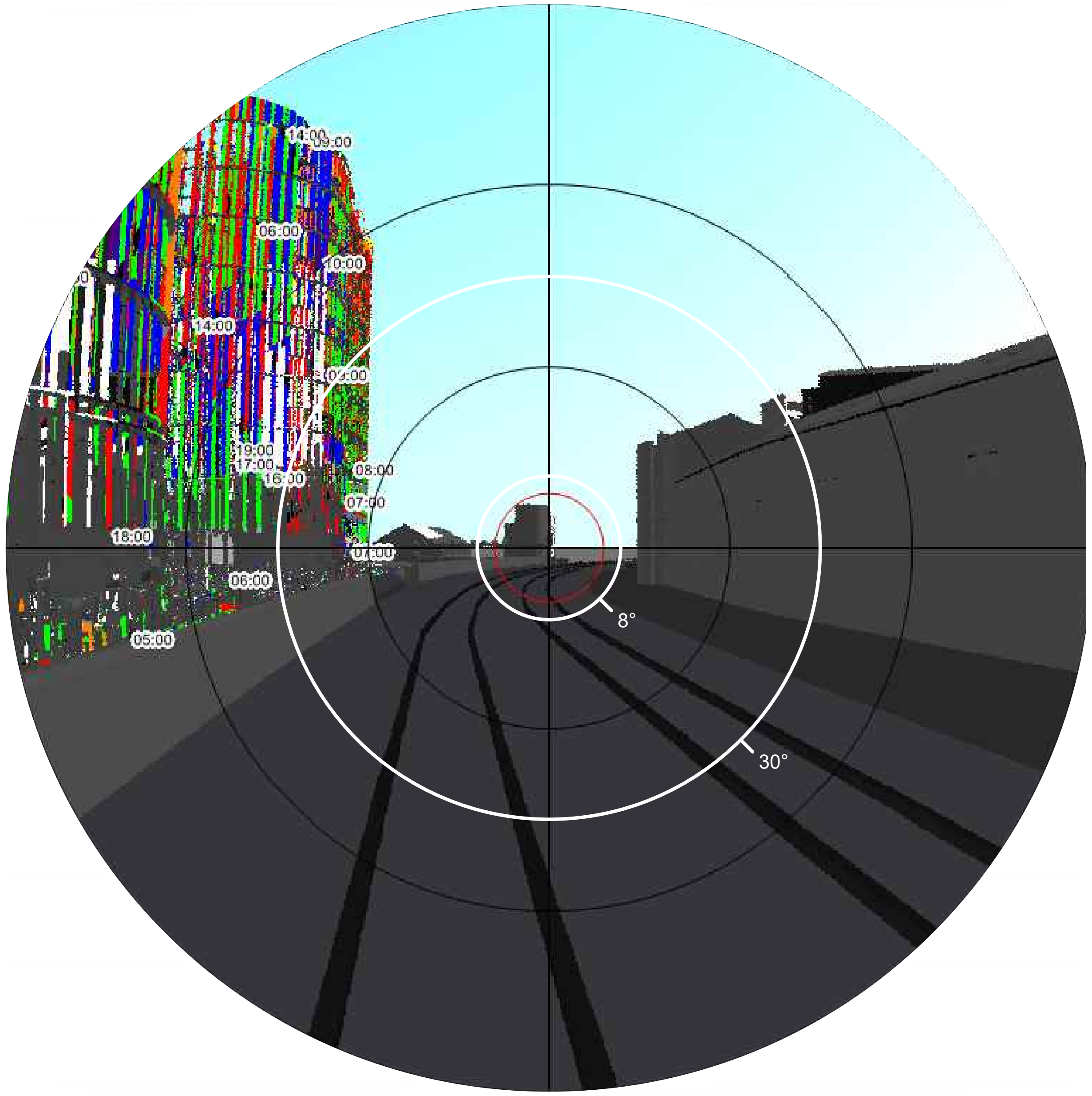
PROJECT
100 Chalk Farm Road, NW1 8EH
London

DRAWING TITLE
Potential Glare
60 degree view
KP01 & KP02

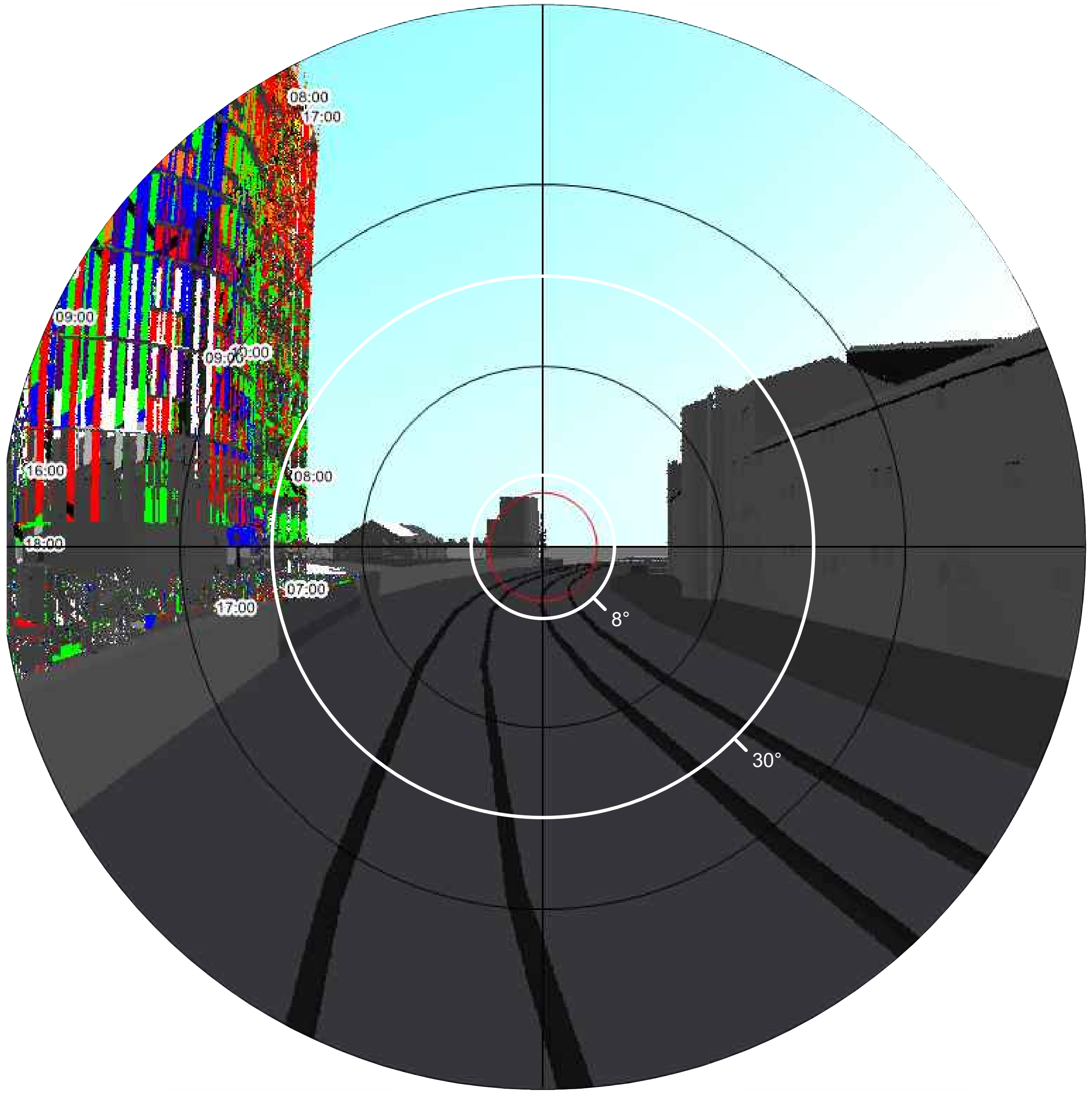
SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW

DWG No. D+S /6/ 902	REV.

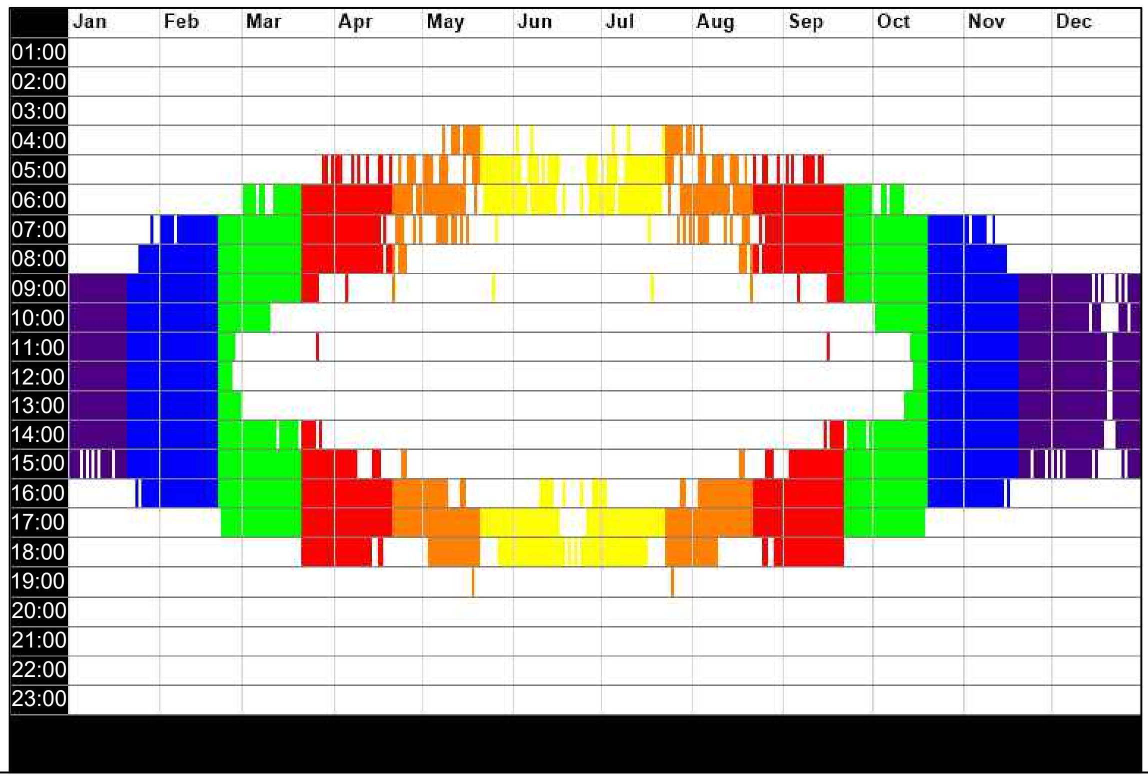
CONSIL

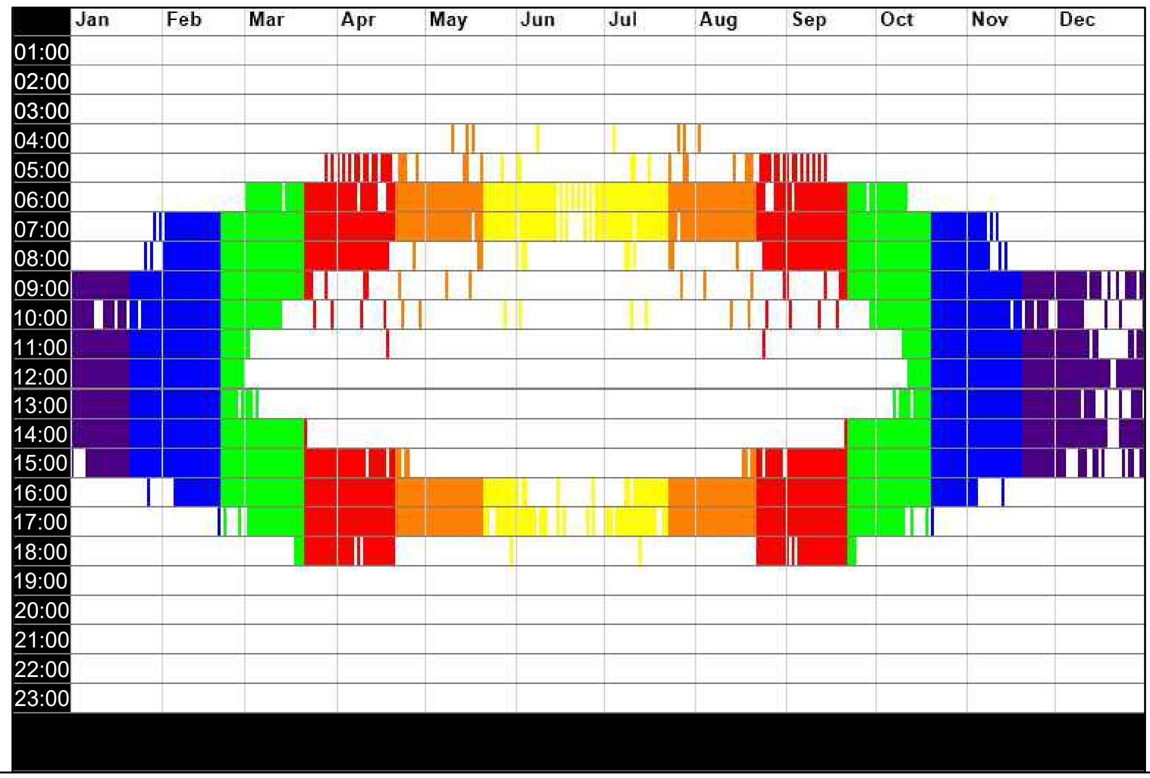


KP03



KP04





DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

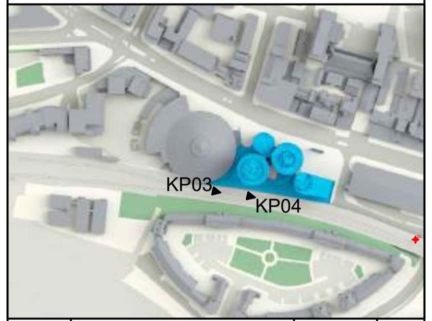
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	Yellow	Jun to Jul	
Apr to May	Orange	Jul to Aug	
Mar to Apr	Red	Aug to Sep	
Feb to Mar	Green	Sep to Oct	
Jan to Feb	Blue	Oct to Nov	
Dec to Jan	Purple	Nov to Dec	

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

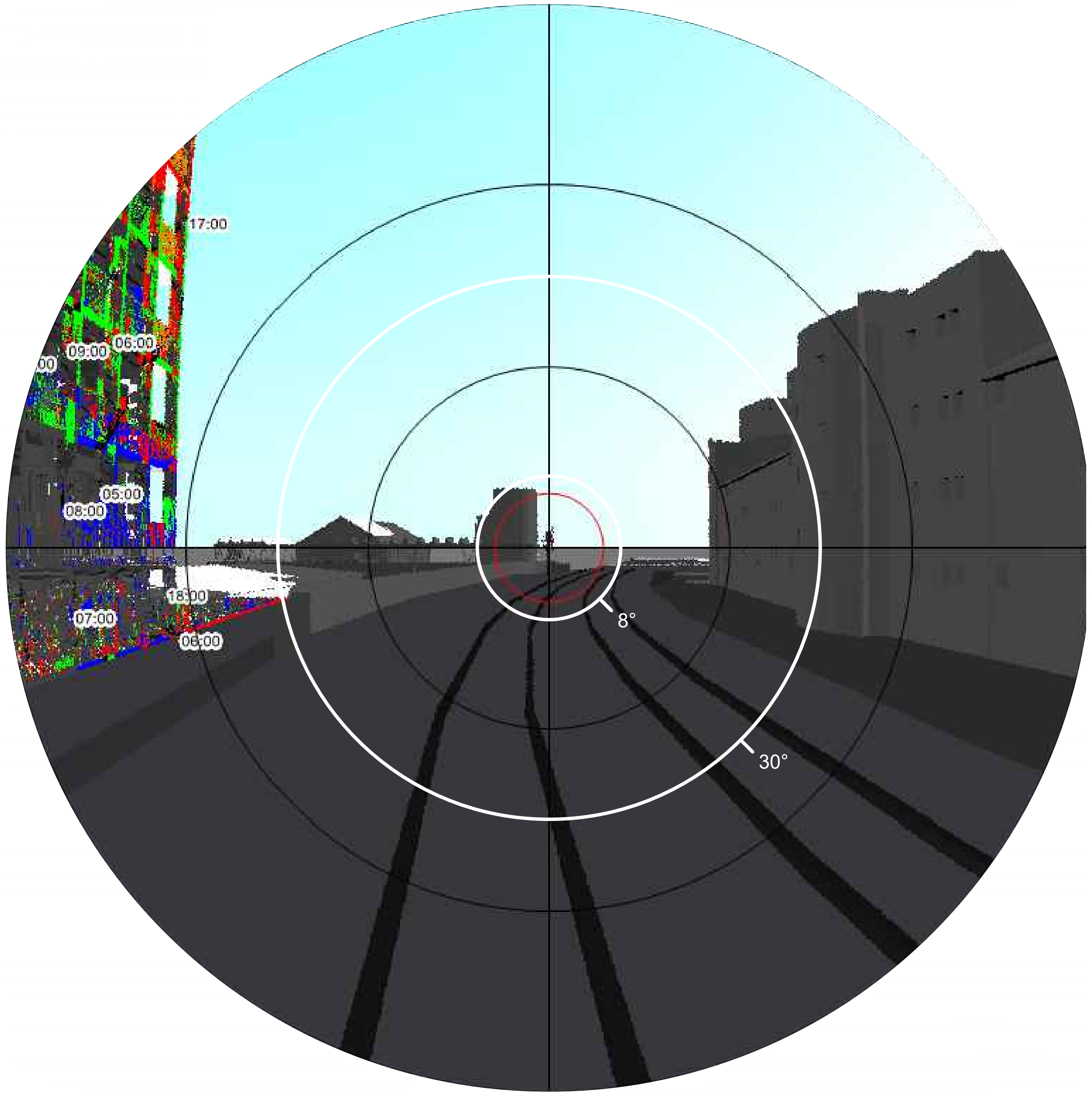
CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

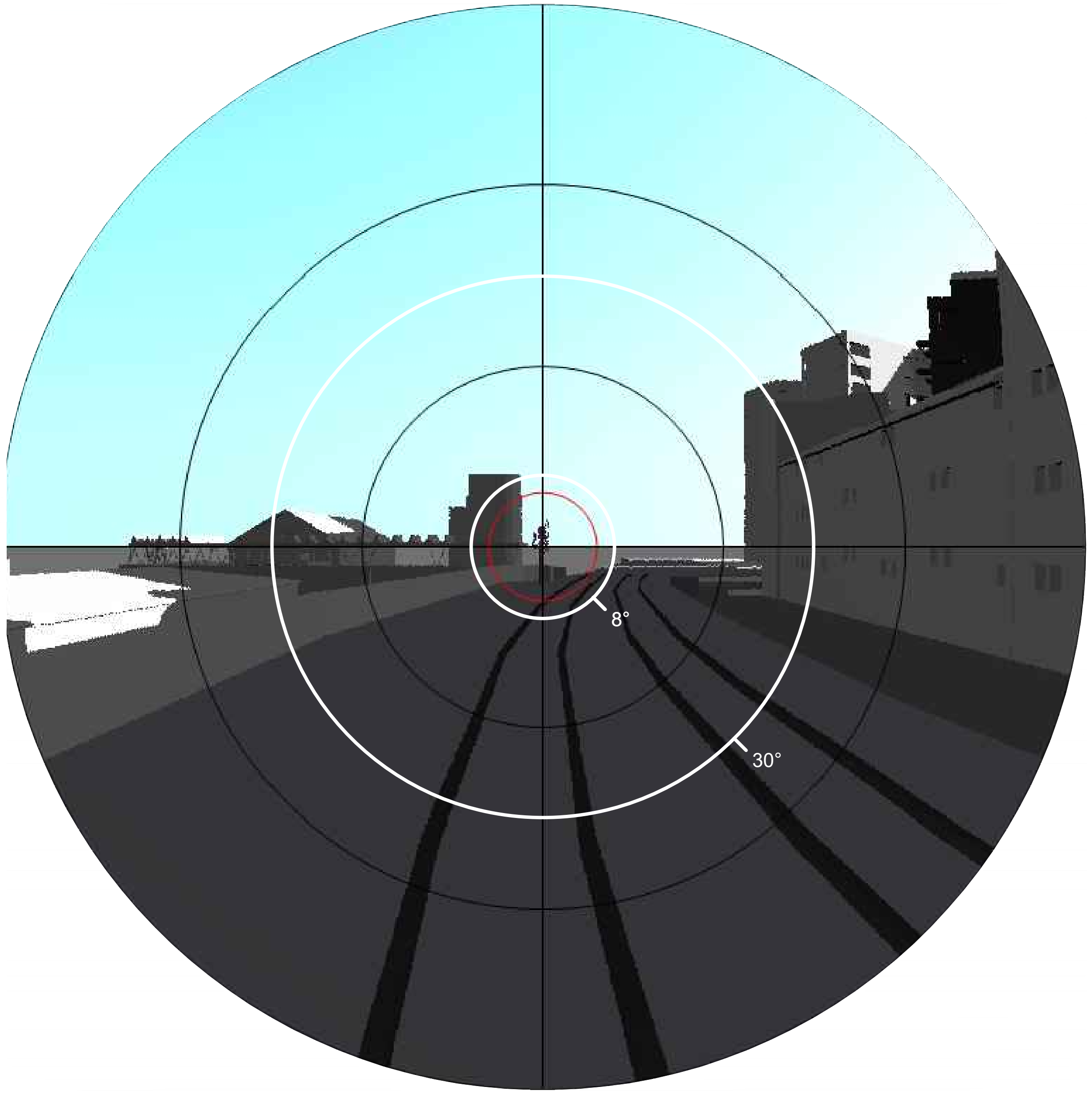
DRAWING TITLE
Potential Glare
60 degree view
KP03 & KP04

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 903	REV.

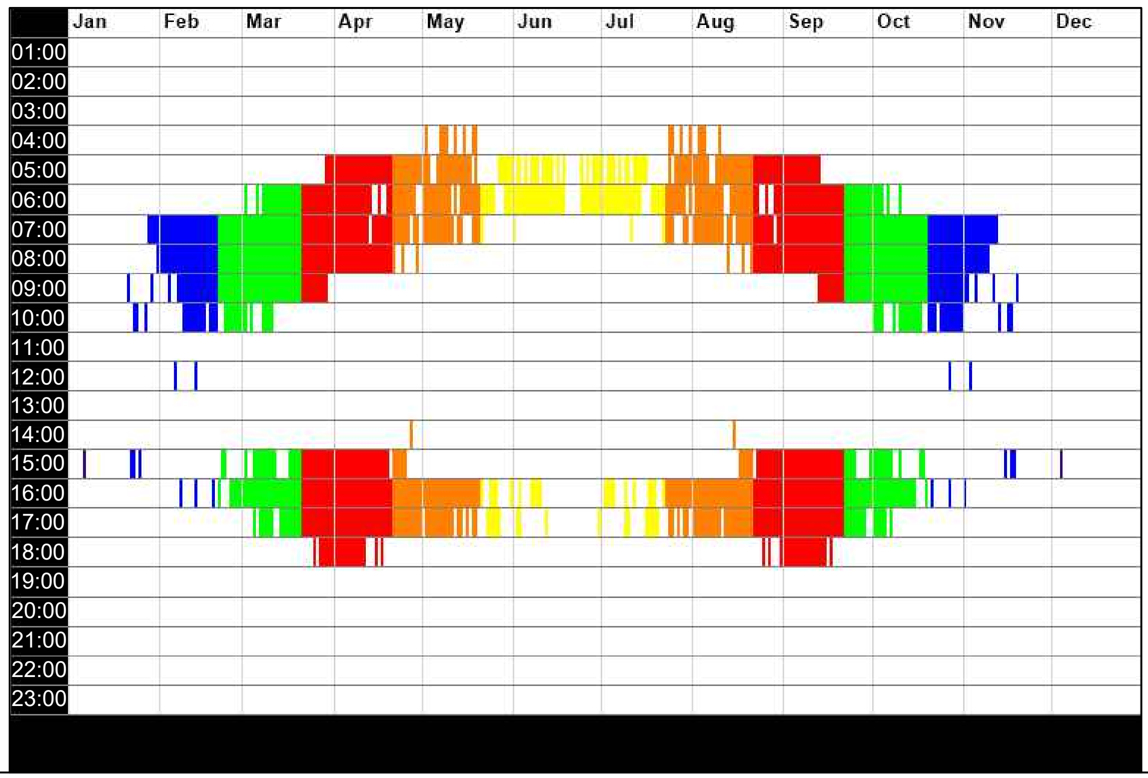
CONSIL

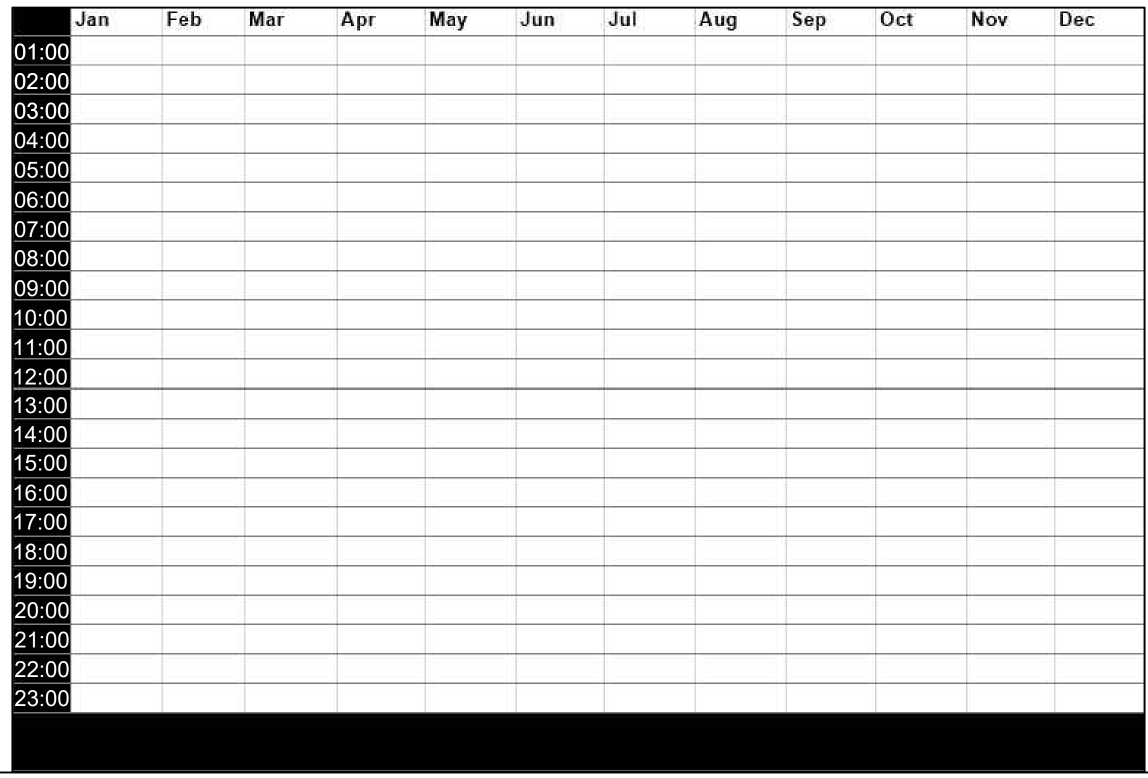


KP05



KP06





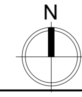
DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

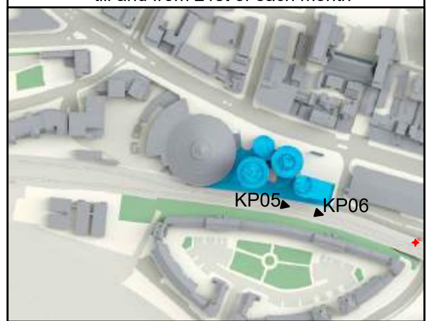
Consil site photography taken on 26/09/2022 and 20/06/2023



KEY

May to Jun	Jun to Jul
Apr to May	Jul to Aug
Mar to Apr	Aug to Sep
Feb to Mar	Sep to Oct
Jan to Feb	Oct to Nov
Dec to Jan	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

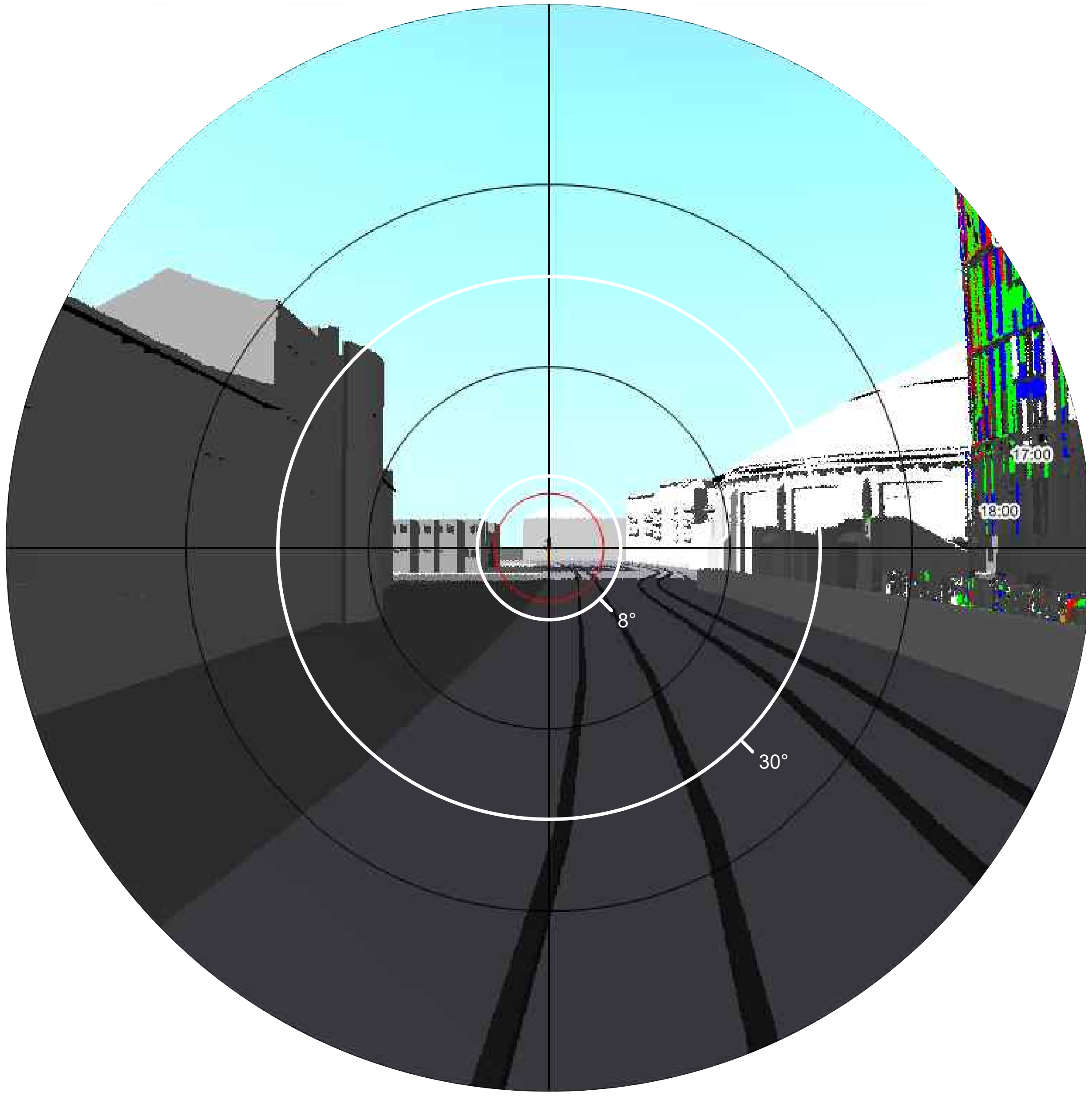
CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

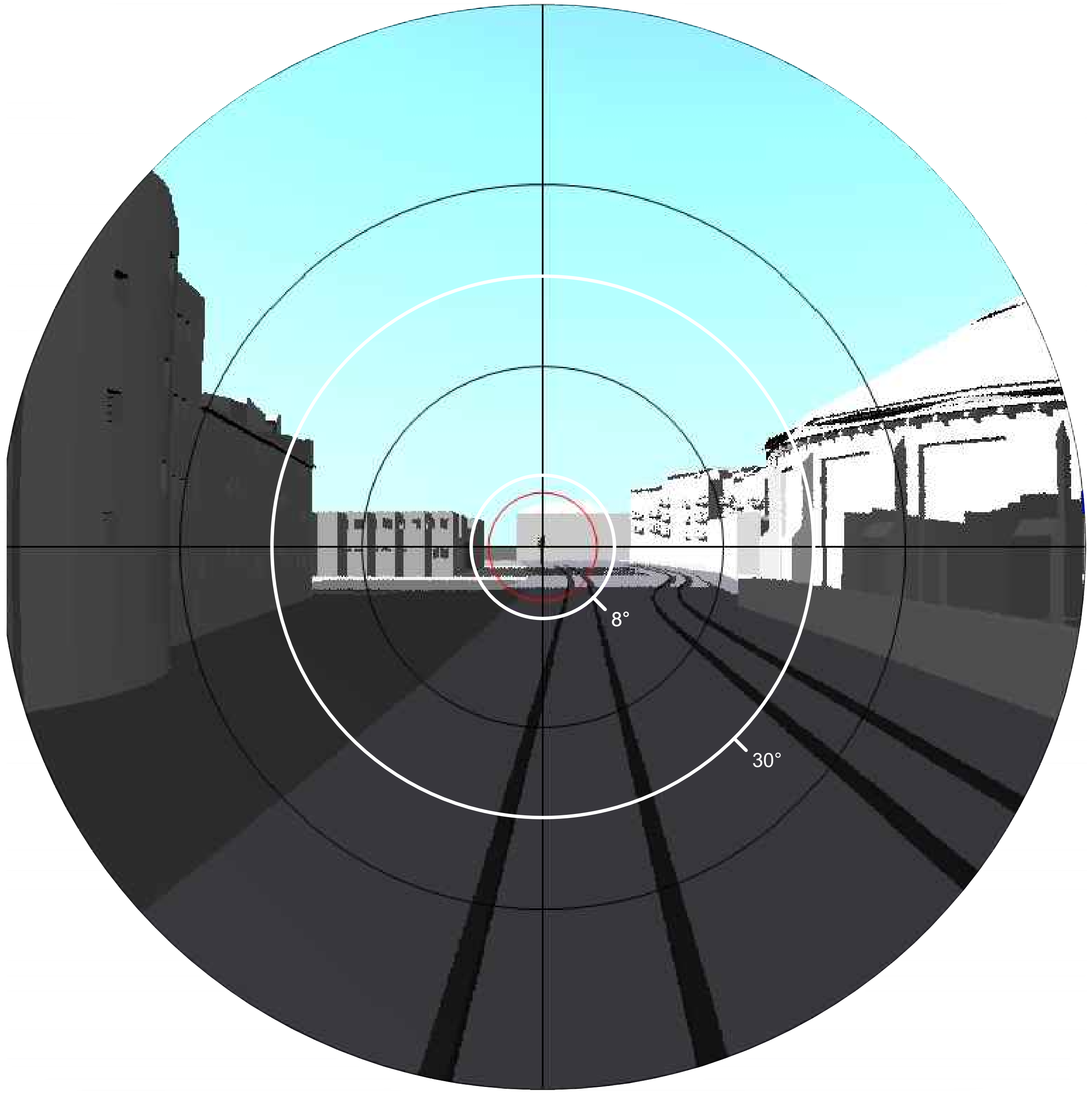
DRAWING TITLE
Potential Glare
60 degree view
KP05 & KP06

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 904	REV.

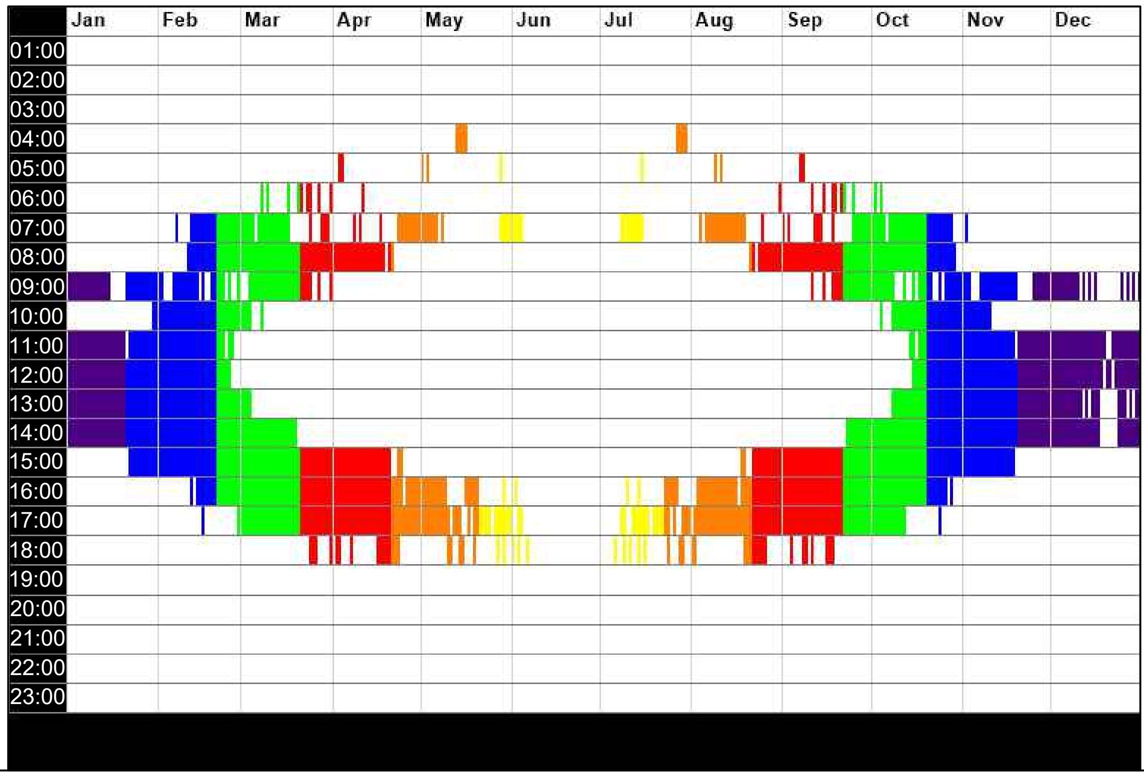
CONSIL

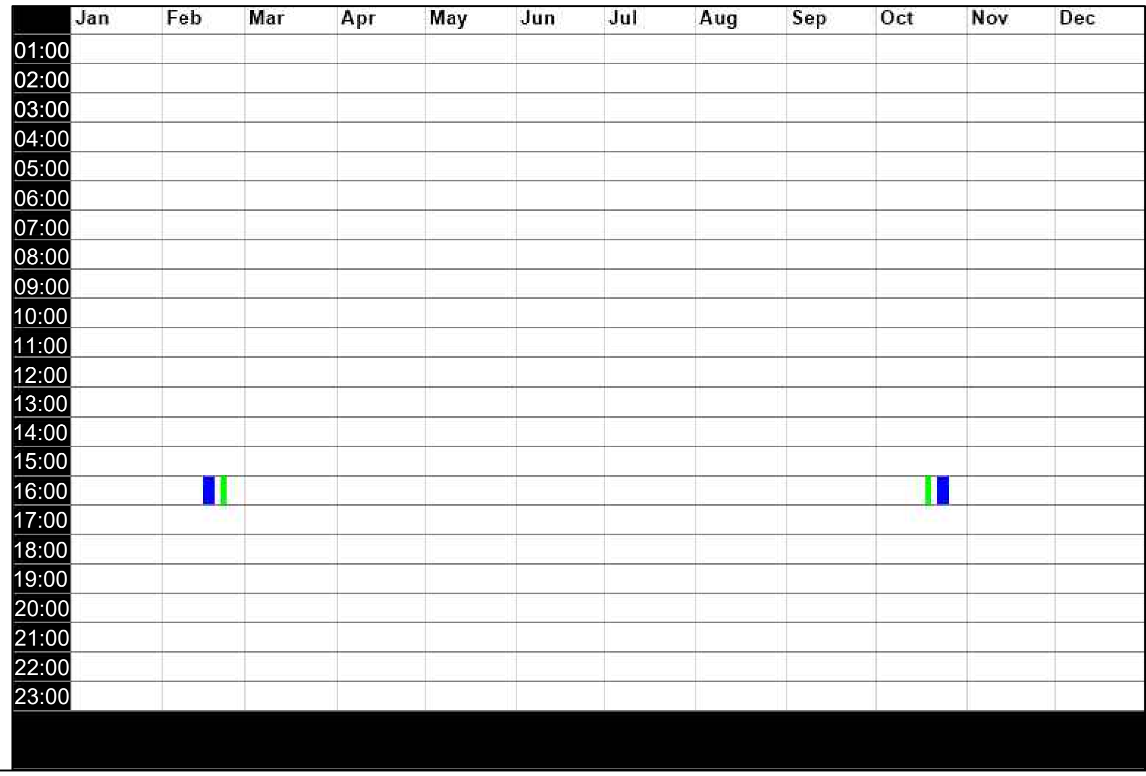


KP07



KP08





DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

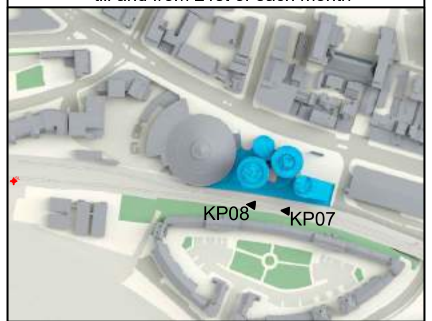
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	(yellow)	Jun to Jul
Apr to May	(orange)	Jul to Aug
Mar to Apr	(red)	Aug to Sep
Feb to Mar	(green)	Sep to Oct
Jan to Feb	(blue)	Oct to Nov
Dec to Jan	(purple)	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

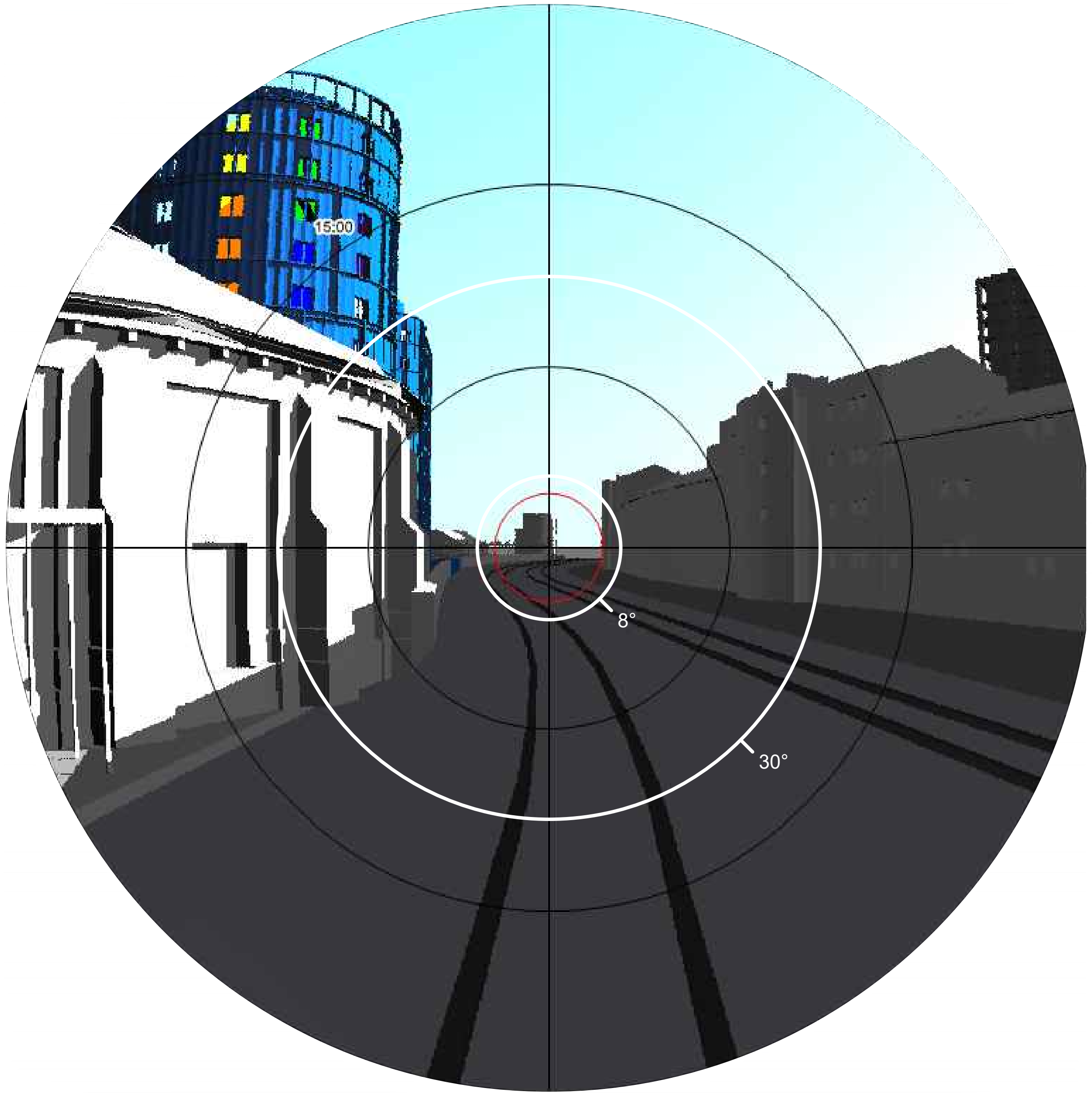
DRAWING TITLE
Potential Glare
60 degree view
KP07 & KP08

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 905	REV.

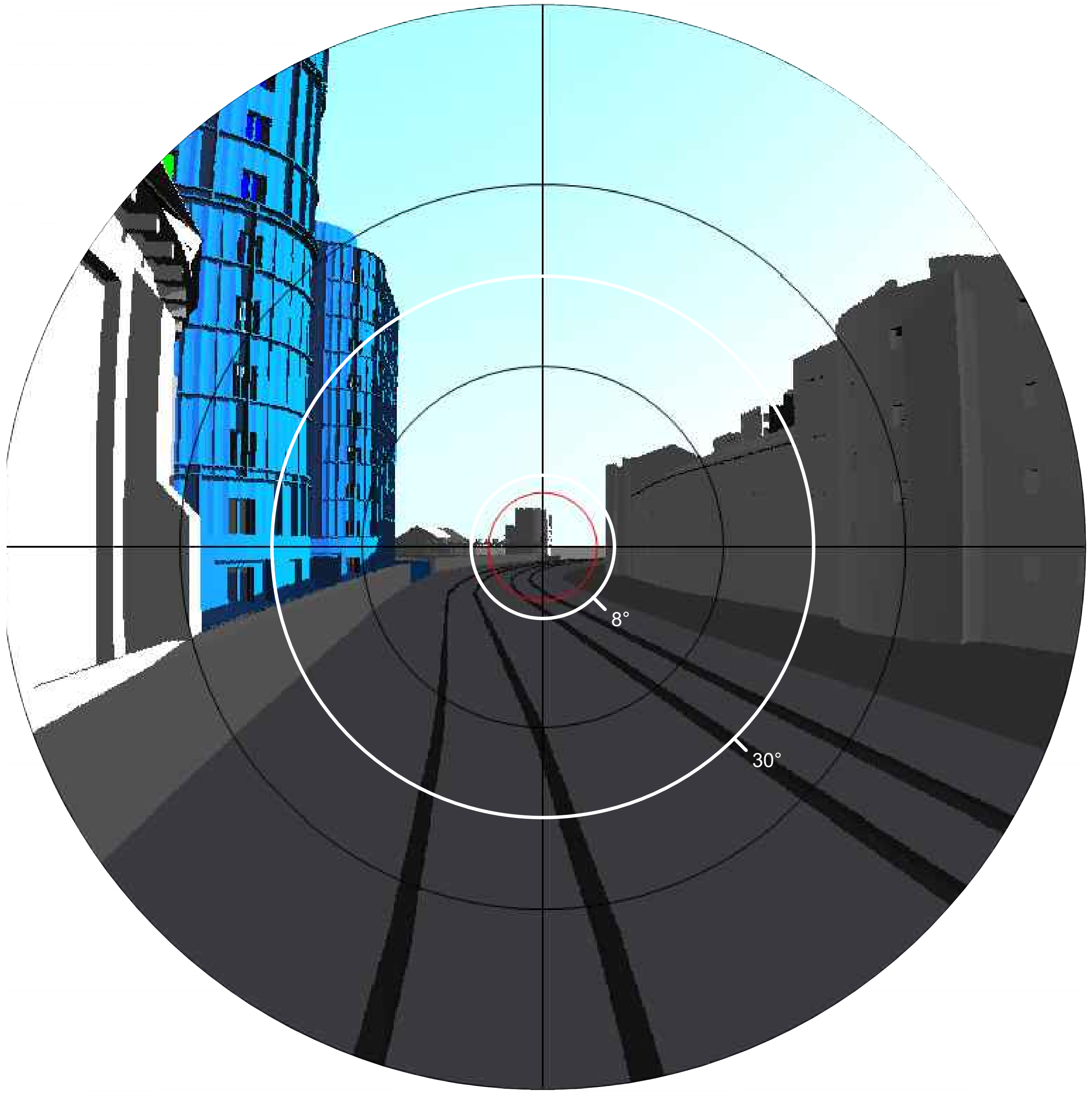
CONSIL

APPENDIX B

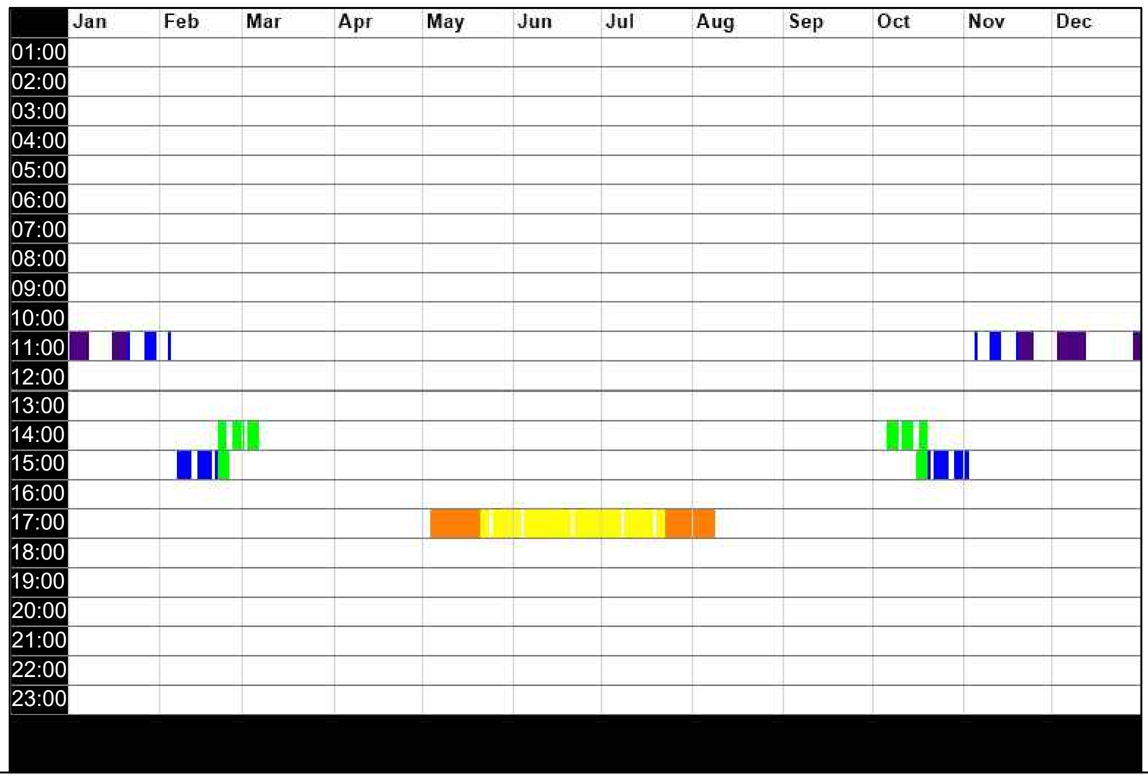
DRAWINGS (SCENARIO 2: NON-REFLECTIVE CLADDING)

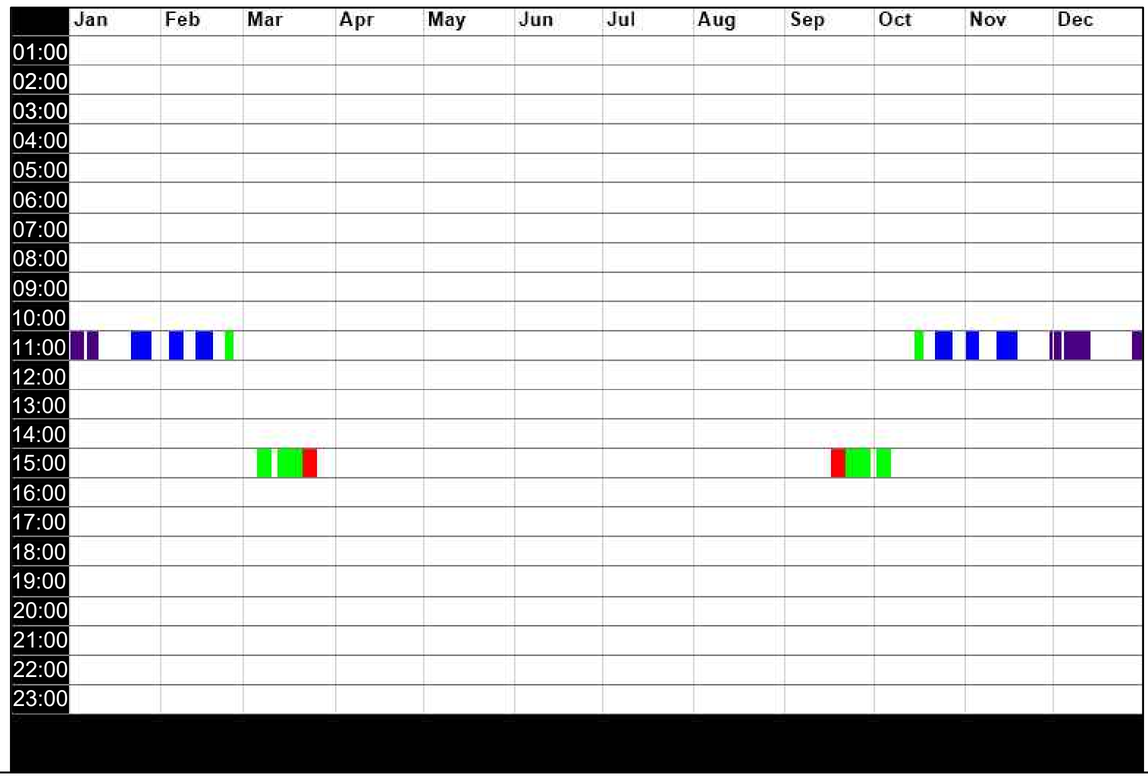


KP01



KP02





DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

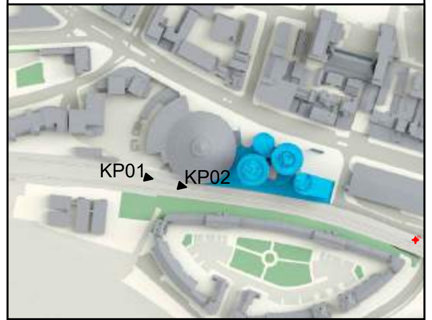
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	Jun to Jul
Apr to May	Jul to Aug
Mar to Apr	Aug to Sep
Feb to Mar	Sep to Oct
Jan to Feb	Oct to Nov
Dec to Jan	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

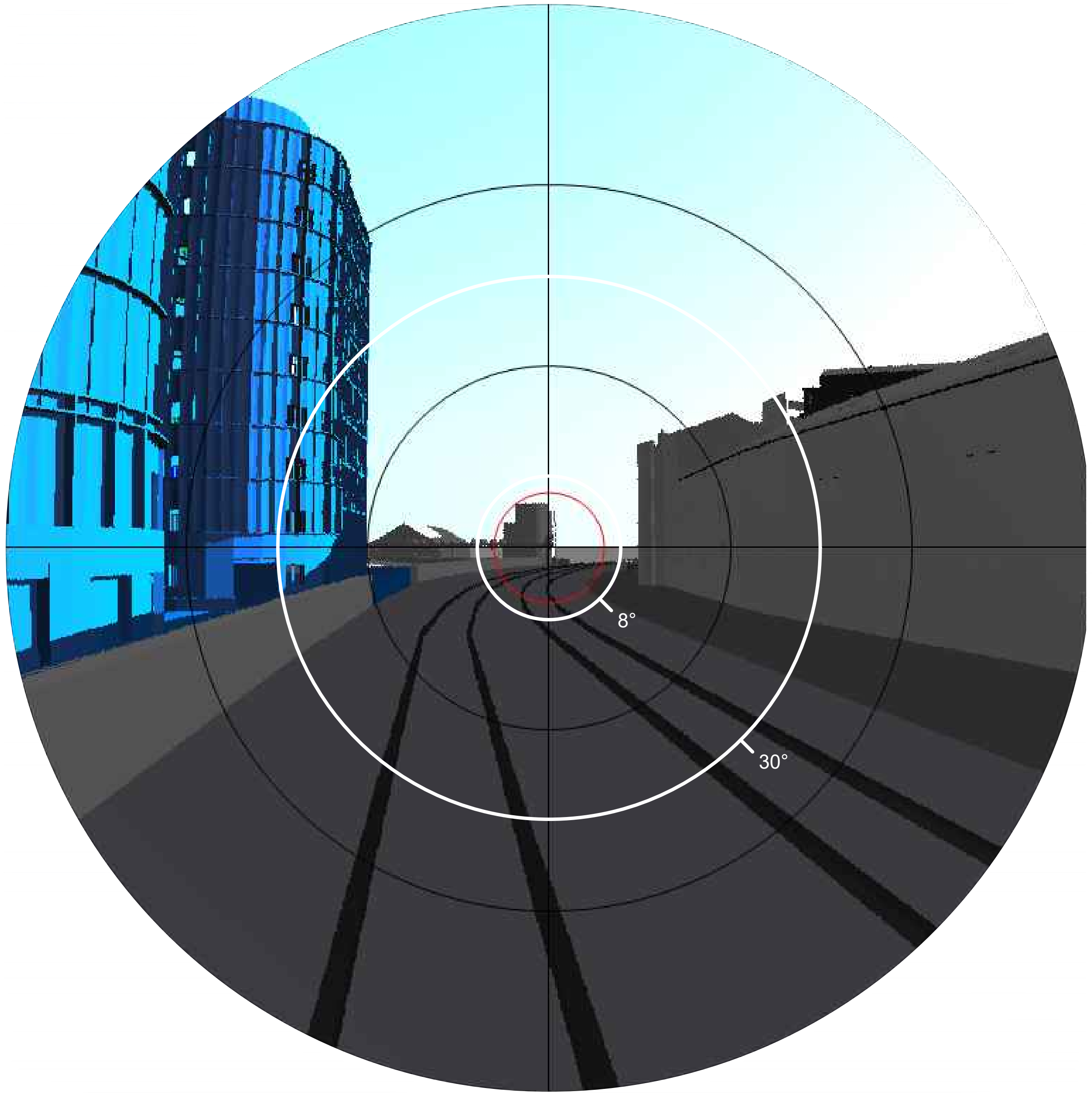
CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

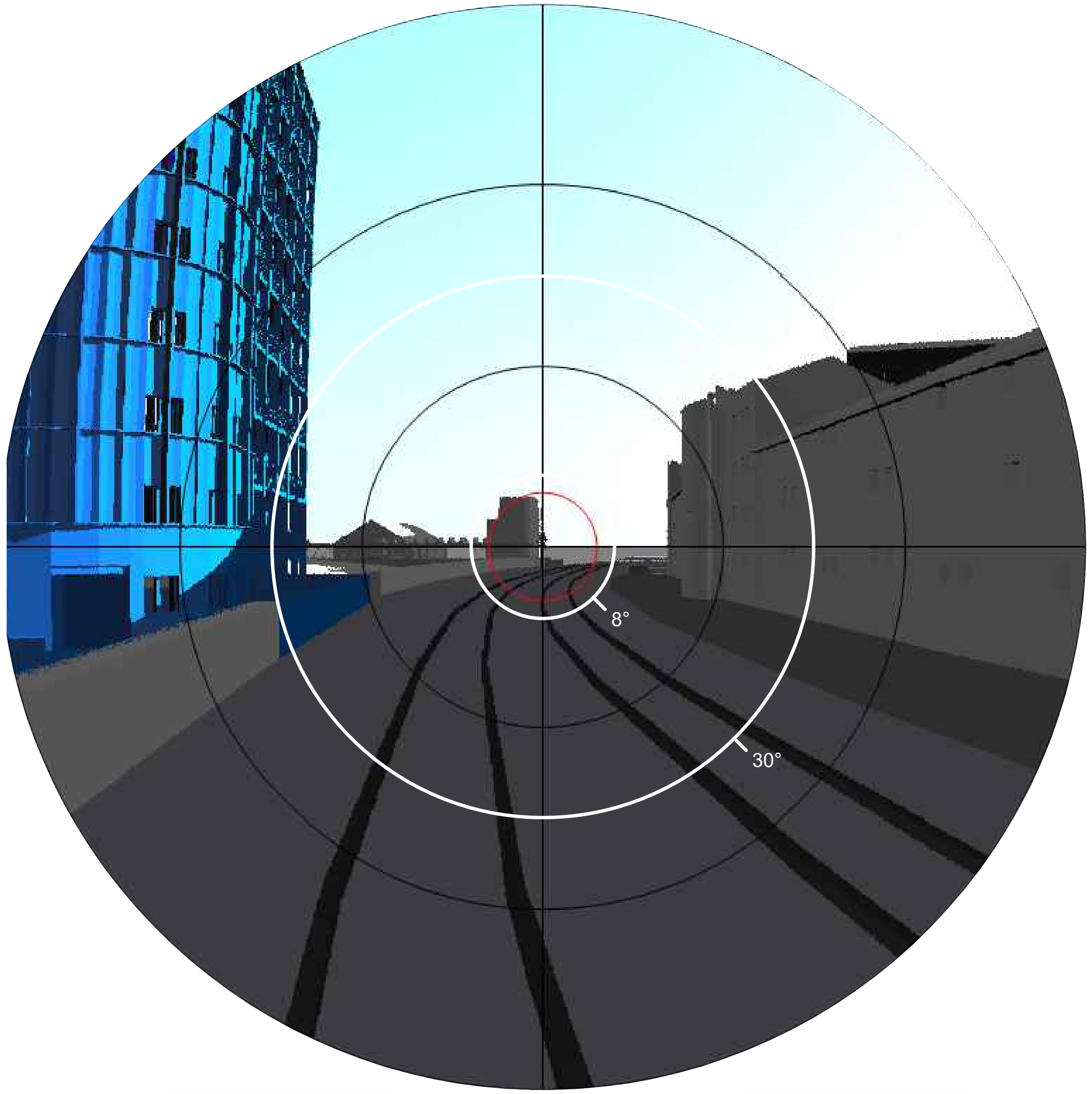
DRAWING TITLE
Potential Glare
60 degree view
KP01 & KP02

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 911	REV.

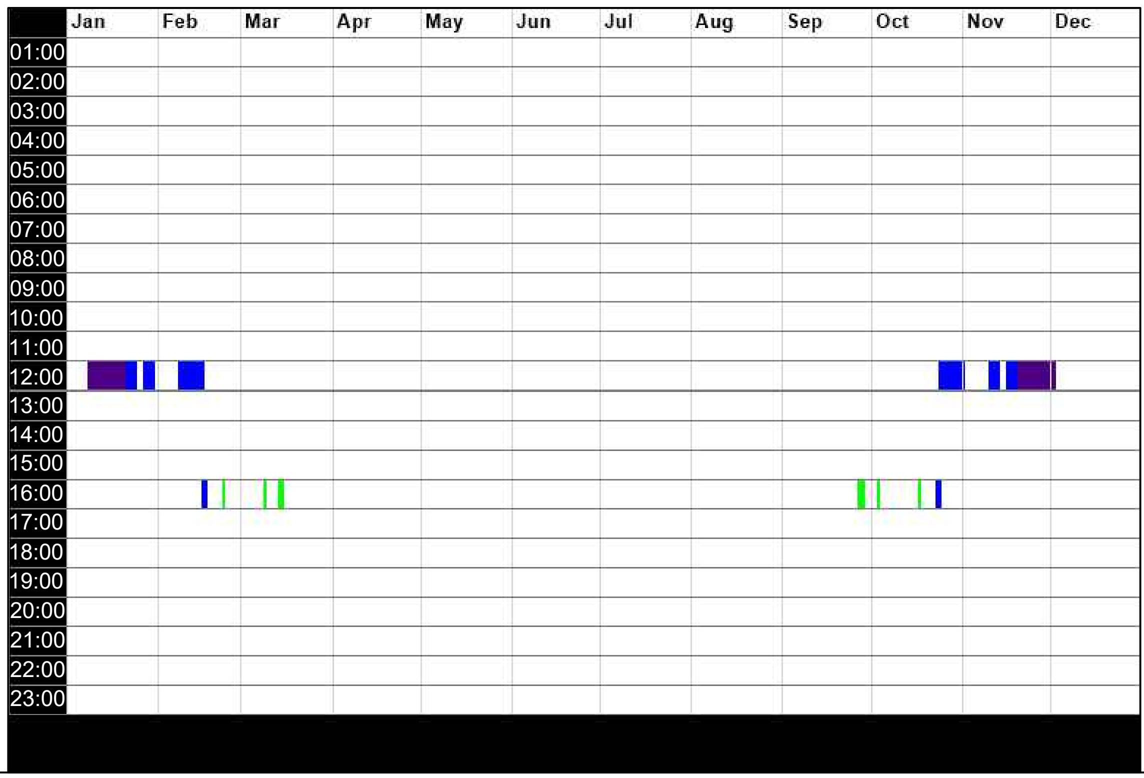
CONSIL

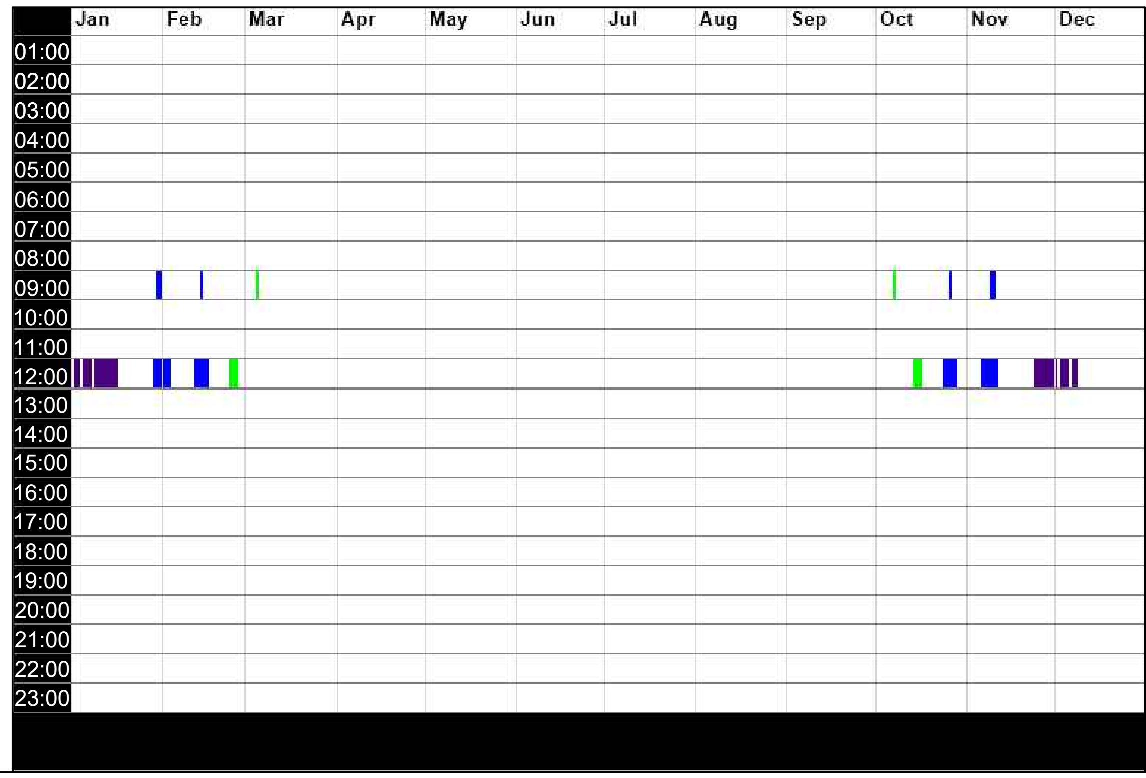


KP03



KP04





DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

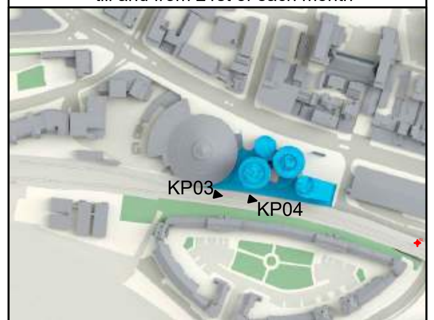
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	Yellow	Jun to Jul	
Apr to May	Orange	Jul to Aug	
Mar to Apr	Red	Aug to Sep	
Feb to Mar	Green	Sep to Oct	
Jan to Feb	Blue	Oct to Nov	
Dec to Jan	Purple	Nov to Dec	

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

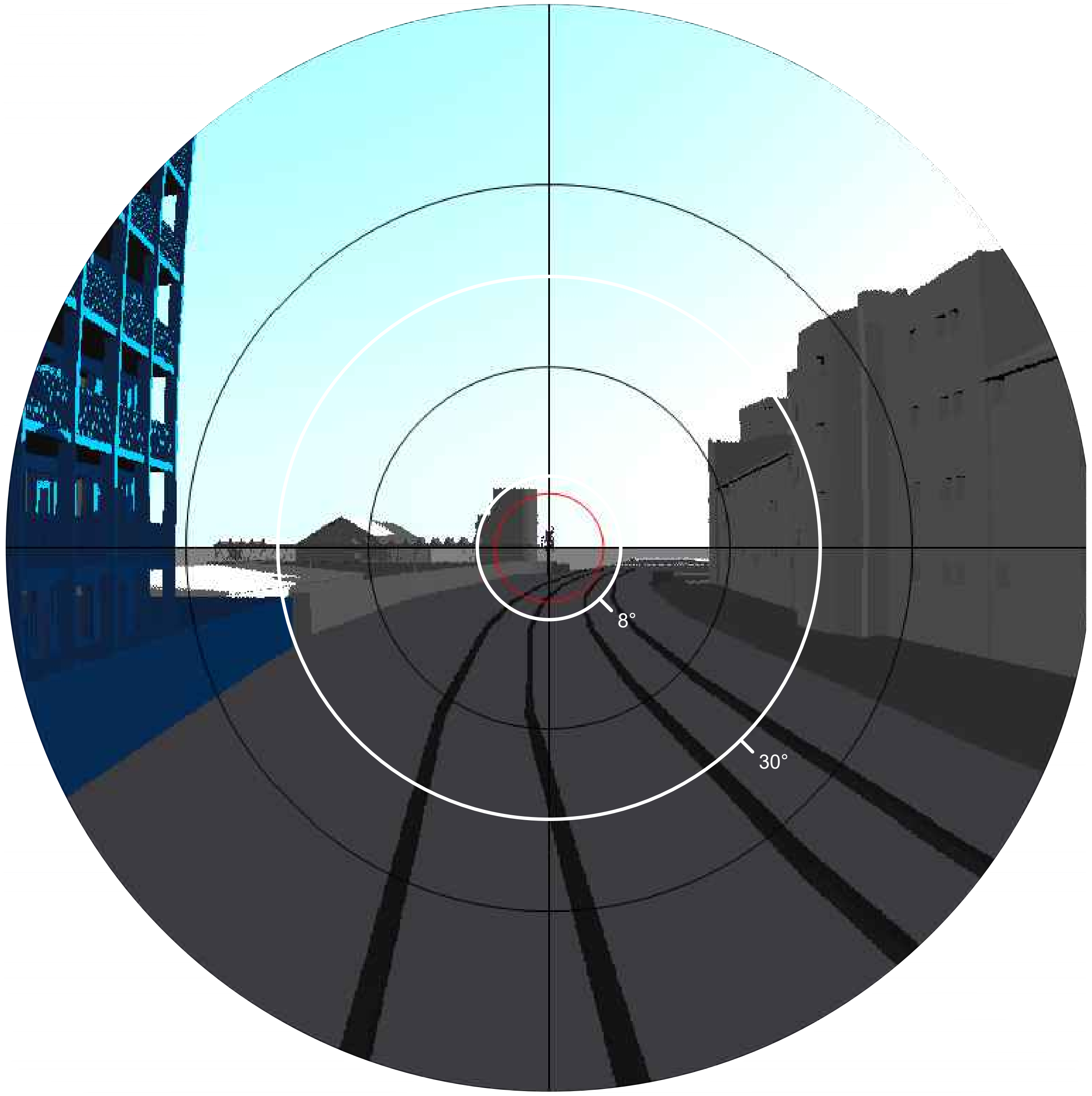
CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

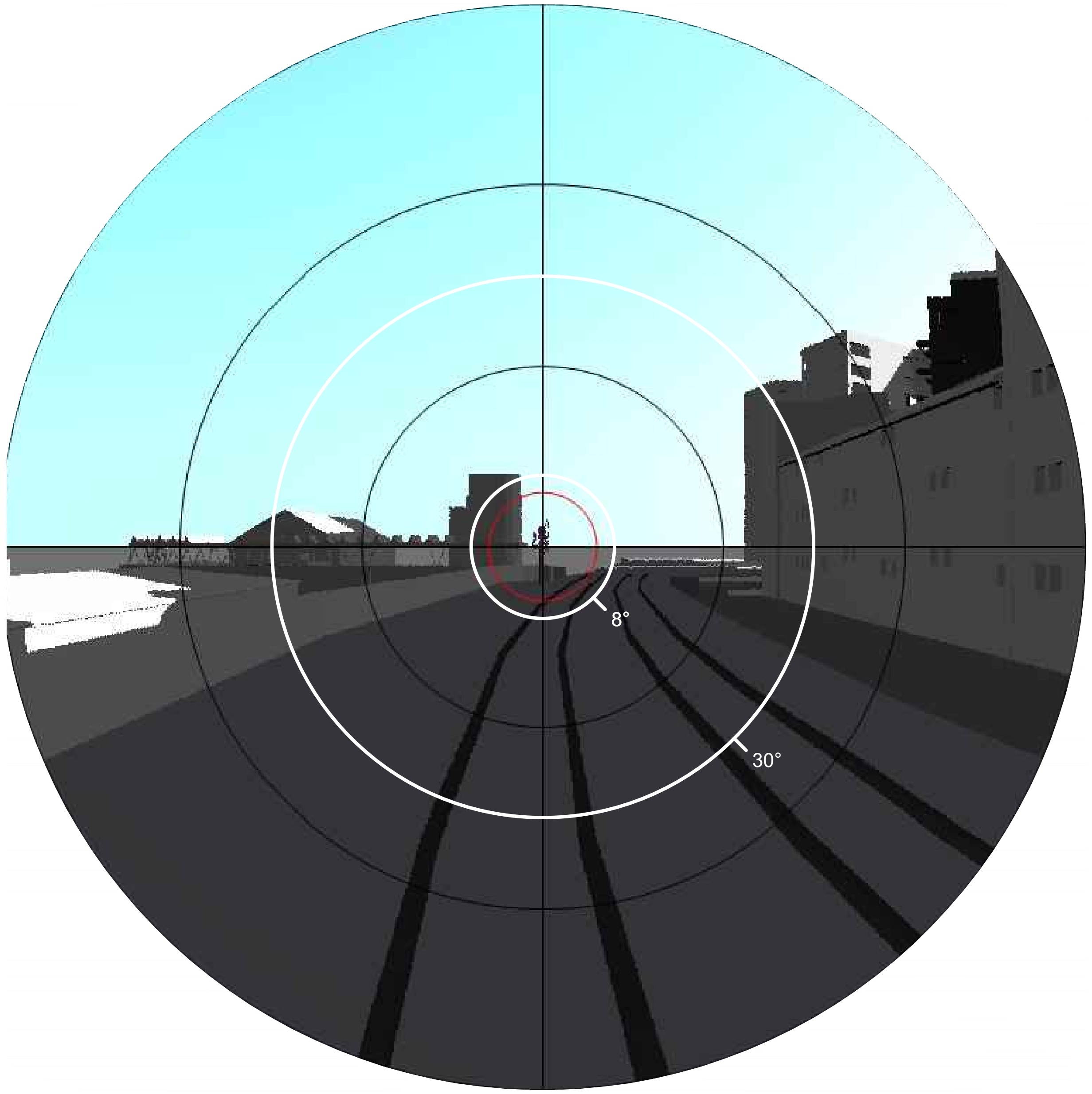
DRAWING TITLE
Potential Glare
60 degree view
KP03 & KP04

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 912	REV.

CONSIL



KP05



KP06

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

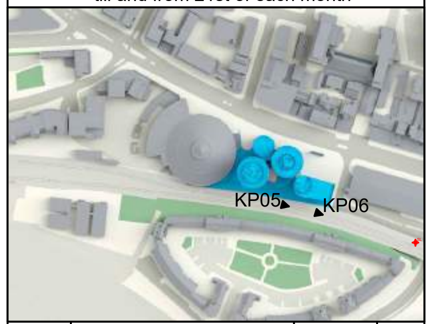
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	Jun to Jul
Apr to May	Jul to Aug
Mar to Apr	Aug to Sep
Feb to Mar	Sep to Oct
Jan to Feb	Oct to Nov
Dec to Jan	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

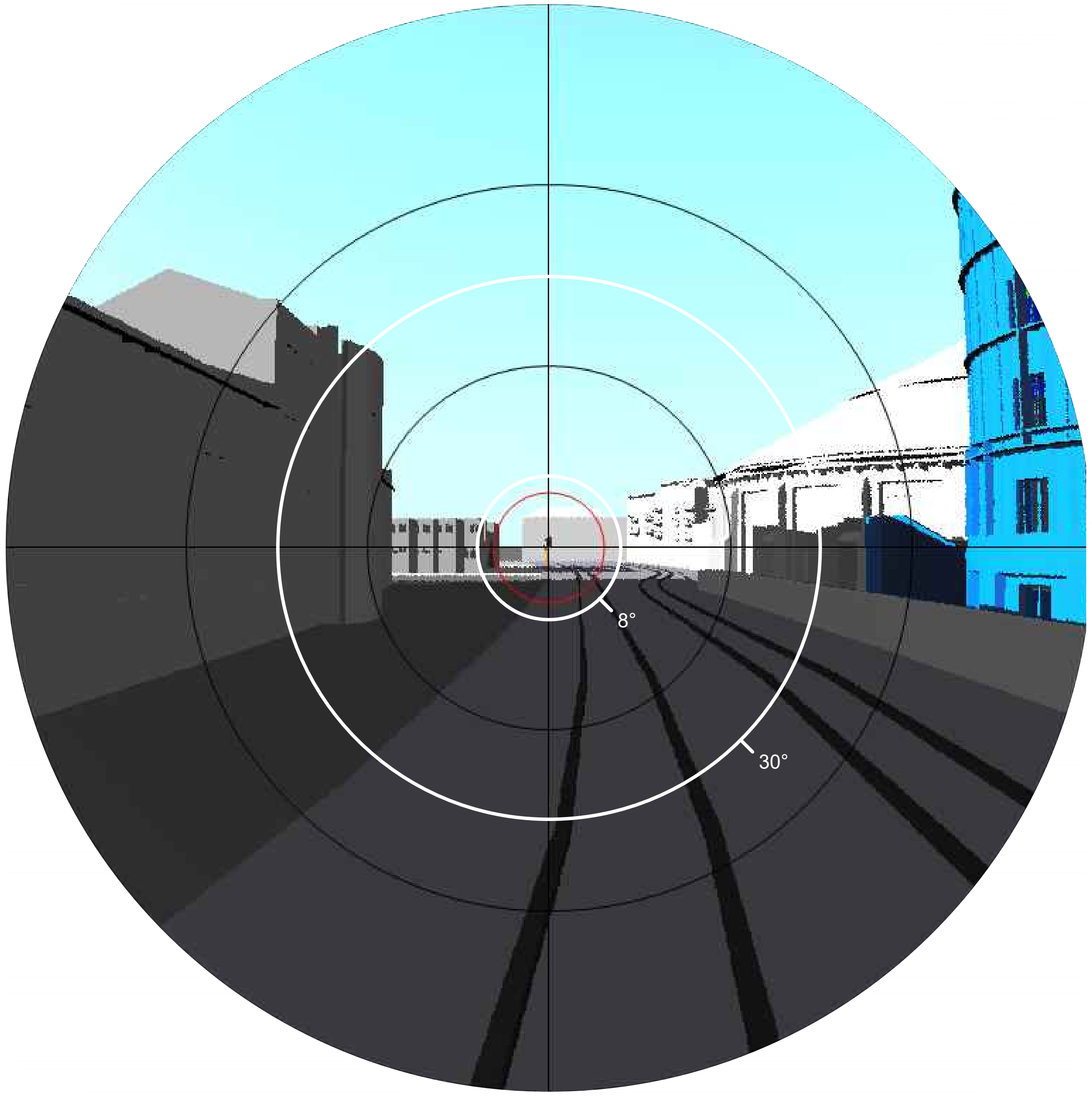
CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

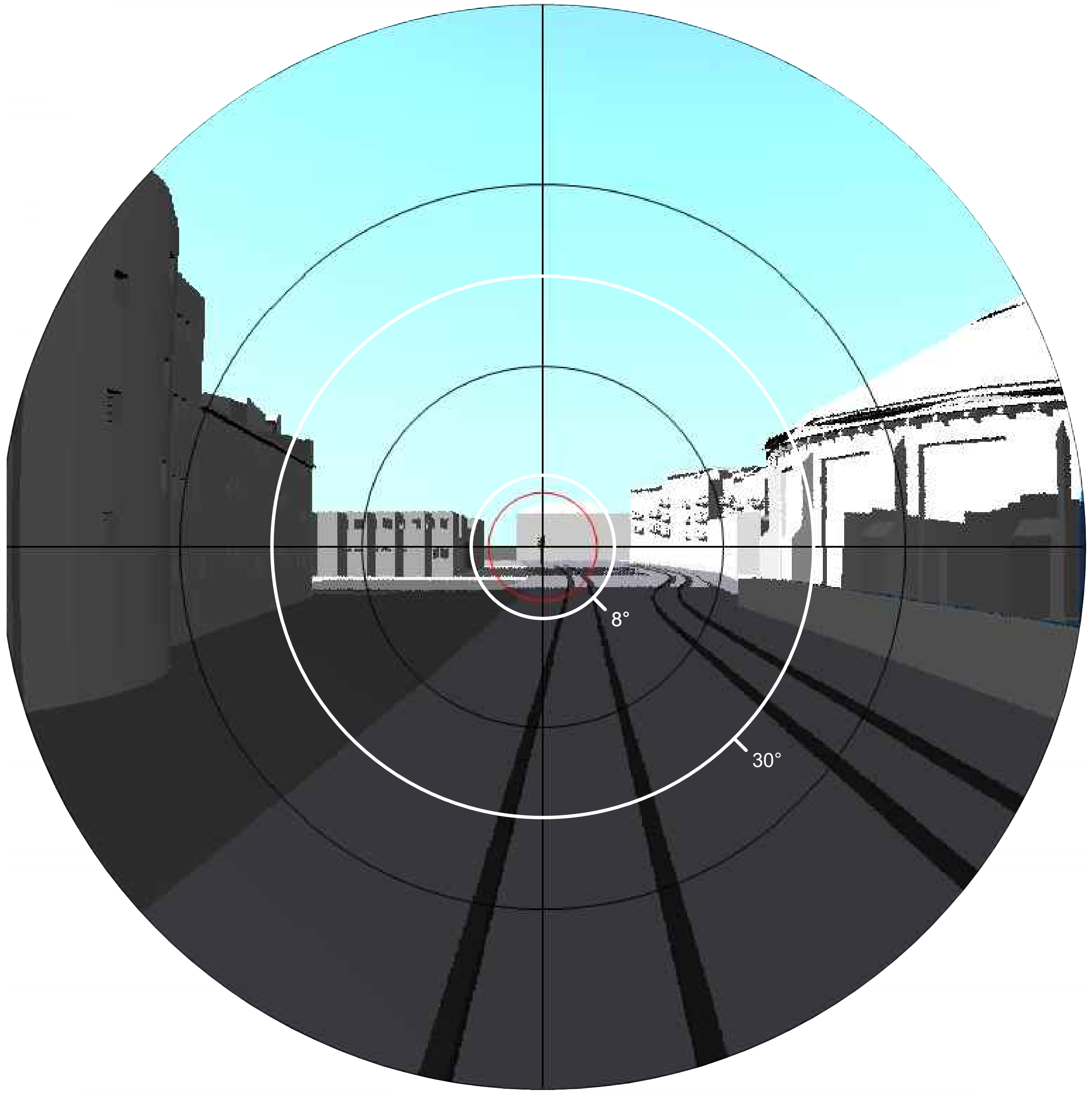
DRAWING TITLE
Potential Glare
60 degree view
KP05 & KP06

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW
DWG No. D+S /6/ 913	REV.

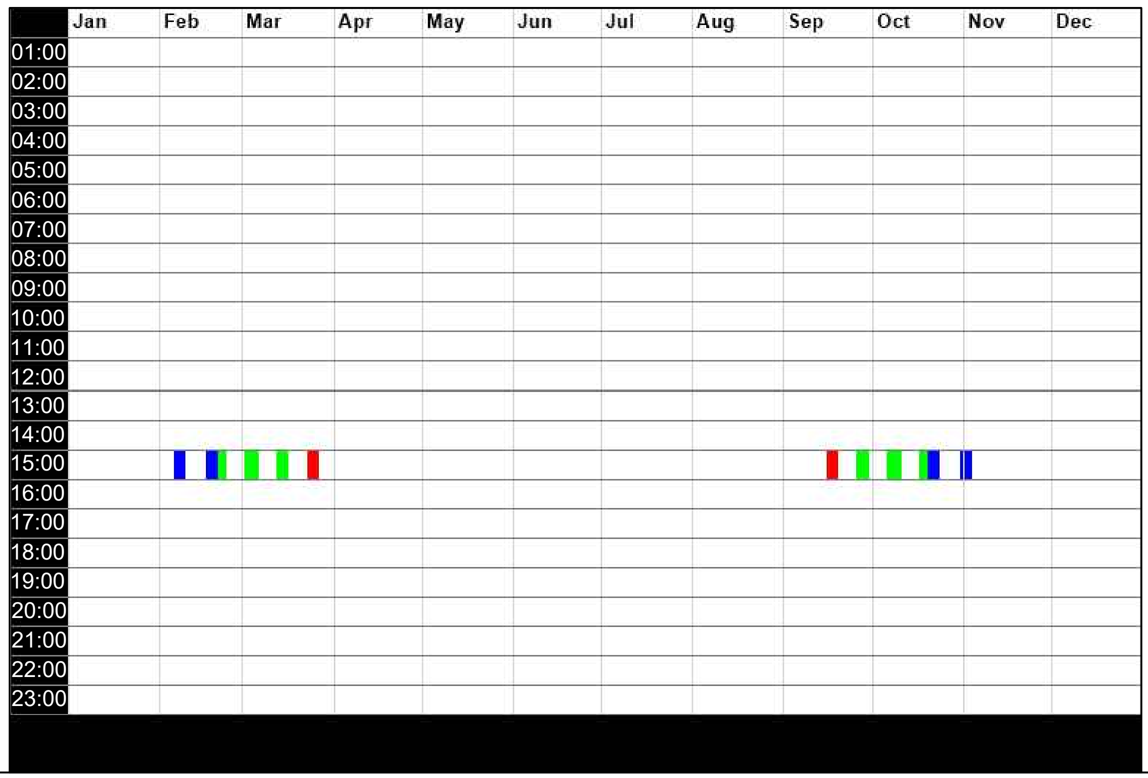
CONSIL



KP07



KP08



DO NOT SCALE

SOURCES OF INFORMATION:

DSDHA proposed scheme received on 16/01/2024

Cloud10 model and pointcloud received on 11/10/2022

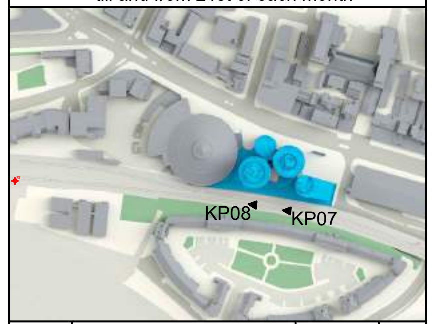
Consil site photography taken on 26/09/2022 and 20/06/2023

N

KEY

May to Jun	(yellow)	Jun to Jul
Apr to May	(orange)	Jul to Aug
Mar to Apr	(red)	Aug to Sep
Feb to Mar	(green)	Sep to Oct
Jan to Feb	(blue)	Oct to Nov
Dec to Jan	(purple)	Nov to Dec

*till and from 21st of each month



REV	DETAILS	DATE	BY
A	*	*	*

CLIENT
Regal Chalk Farm Limited

PROJECT
100 Chalk Farm Road, NW1 8EH
London

DRAWING TITLE
Potential Glare
60 degree view
KP07 & KP08

SCALE [Not to Scale]	DATE 19/01/2024
DRAWN BY BG	CHECKED BY JW

DWG No. D+S /6/ 914	REV.

CONSIL