CANARY WHARF
GROUP PLC

NQ.PA.20

North Quay
Internal Daylight, Sunlight and Overshadowing Report

GIA
July 2020

Contents

1. Introduction

1.1 Overview

Canary Wharf (North Quay) Ltd ("the Applicant") are submitting applications for Outline Planning Permission ("OPP") and Listed Building Consent ("LBC") to enable the redevelopment of the North Quay site, Aspen Way, London ("the Site").

Two separate applications are being submitted for the works as follows:

- Application NQ.1: Outline Planning Application (all matters reserved) ("OPA") - Application for the mixed-use redevelopment of the Site comprising demolition of existing buildings and structures and the erection of buildings comprising business floorspace, hotel/serviced apartments, residential, co-living, student housing, retail, community and leisure and sui generis uses with associated infrastructure, parking and servicing space, public realm, highways and access works; and
- Application NQ.2: Listed Building Consent - Application ("LBCA") to stabilise listed quay wall and any associated/necessary remedial works as well as demolition of the false quay in connection with Application NQ.1.

Together the development proposed under Applications NQ.1 and NQ.2 are referred to as the "Proposed Development".

At the time of making the OPA, the Applicant is unable to determine exactly how much of the Proposed Development is likely to come forward in which land use. For this reason, the description of development provides the Applicant with flexibility as to the uses that could be undertaken on the Site.

However, in order to ensure that the level of flexibility is appropriately restricted, the OPA seeks approval for three Control Documents which describe the principal components of the Proposed Development, define the parameters for the Proposed Development (the "Specified Parameters") and control how the Proposed Development will come forward in future. They provide the parameters, design principles and controls that will guide future reserved matters applications ("RMAs"). These Control Documents are – (1) the Development Specification; (2) the Parameter Plans; and (3) the Design Guidelines:

- The Development Specification sets out the type and quantity of development that could be provided across the Site (including setting a maximum floorspace across the Site);
- The Parameter Plans set the parameters associated with the scale, layout, access and circulation and distribution of uses classes and public space for the Proposed Development. They also establish the Development Zones and Development Plots across the Site; and
- The Design Guidelines set the design principles and controls for future development.

Together, these documents set out the information required to allow the impacts of the Proposed Development to be identified with sufficient certainty as future RMAs will be required to demonstrate compliance with the Specified Parameters and controls in these Control Documents.

1.2 Site Description

The North Quay site ("the Site") is located in the north of the Isle of Dogs, within the administrative boundary of the London Borough of Tower Hamlets (the "LBTH"), at Canary Wharf. It is bounded by Canary Wharf Crossrail Station to the south, Aspen Way (A1261) to the north, Hertsmere Road to the west and Billingsgate Market to the east. The West India Quay Docklands Light Railway (DLR) station and Delta Junction are located on the western side of the Site and the Site also incorporates parts of North Dock, Upper Bank Street and Aspen Way.

The Site is 3.28 hectares (ha) in area. Currently the Site comprises mostly cleared land, being previously used as a construction laydown site for the Canary Wharf Crossrail Station. There are some temporary uses currently on site, including the LBTH Employment and Training Services, WorkPath and advertising structures.

A Grade I Listed brick dock wall (Banana Wall) exists below the surface of part of the Site, which originally formed the dockside until it was extended over to the south.

Existing access to the Site for vehicles is from Upper Bank Street to the east and Hertsmere Road to the west, which both link to Aspen Way. The Site is not currently accessible to the public, however pedestrian routes are located on each side of the Site (Aspen Way, Hertsmere Road, Upper Bank Street, and the western part of the dockside to the

south). The Aspen Way Footbridge which leads to Poplar also lands on the southern side of Aspen Way.

The Site is highly accessible by public transport. The West India Quay DLR station is located on the Site, the Poplar DLR station is accessed directly from the Aspen Way Footbridge, the Canary Wharf Crossrail Station is located immediately to the south of the Site, beyond which are the Canary Wharf underground and DLR stations. The Site's PTAL varies from 5 ('very good') to 6a ('excellent'), with improved PTAL closer to Upper Bank Street. The score is expected to improve to 6a across the entire Site by 2021 owing to the planned opening of the Crossrail Station.

Beyond the Site, 1 West India Quay (the Marriot Hotel (107m AOD) and residential building (41m AOD)) are located to the west, adjacent to the DLR tracks. Beyond these, along Hertsmere Road is a cinema, museum, shops, restaurants and other leisure facilities, forming part of the West India Quay Centre.

Billingsgate Market is located to the east of the Site, on the opposite side of Upper Bank Street. Billingsgate Market is identified as a Site Allocation (4.2: Billingsgate Market) for redevelopment in LB Tower Hamlet's Local Plan.

To the north of the Site on the other side of Aspen Way are the Tower Hamlets College and The Workhouse leisure facility. They comprise part of a Site Allocation (4.1: Aspen Way) for redevelopment in LB Tower Hamlet's Local Plan. In close proximity to these there are lower rise residential properties (some with shops beneath them) as well as the Poplar Recreation Ground.

Beyond the Crossrail station and Crossrail Place to the south of the Site is the Canary Wharf commercial area, with the buildings closest to the Proposed Development including the HSBC (200 m AOD), Bank of America and One Canada Square buildings (235m AOD).

1.3 Listed Building Works

Towards the south of the Site, the edge of the dock is defined by a quay wall known as the Banana Wall. The brickwork has a profile and counterfort buttresses, on a gravel bed. The Banana Wall was constructed between 1800-1802 and was Listed Grade I in 1983.

The Proposed Development will span over the Banana Wall with piles on either side of the wall providing support to the new structures. The new structures will leave a void or compressible material above to avoid permanent loading of the wall. The adjacent existing false quay deck will be removed. The excavation of the basement may require stabilisation works to be undertaken to ensure there are no impacts to the Banana Wall. Remedial works to the Banana Wall will also be undertaken if required.

2. Objective

The purpose of this report is twofold: firstly, it aims to ascertain the potential of the Proposed Development to offer acceptable internal daylight and sunlight amenity for the enjoyment of future occupants; secondly, it provides guidance to be used by the design team at the detailed design and Reserved Matters Application stage to ensure that the design makes the most of the daylight and sunlight available on Site.

In accordance with the Building Research Establishment handbook 'Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2011)' (the "BRE Guidance"), GIA has undertaken following:

- Carried out a daylight potential assessment using the methodology set out in the BRE Guidance for Vertical Sky Component (VSC);
- Carried out a sunlight assessment using the methodology set out in the BRE Guidance for Annual Probable Sunlight Hours (APSH);
- Carried out an overshadowing assessment using the methodology set out in BRE Guidance for Sun Hours On Ground (SHOG); and
- Prepared a report setting out the analysis alongside our findings and recommendations.

3. Executive Summary

To ascertain the potential of the Proposed Development to provide good internal daylight and sunlight amenity, daylight and sunlight assessments have been undertaken on the residential buildings' elevations and overshadowing assessments have been carried out for the public realm. So as to portray a realistic scenario in terms of massing, the assessments have been undertaken considering the Indicative Scheme, further details of which can be found in the Methodology section of this report.

The results of the façade assessments have shown that the daylight potential is generally good, with lower levels of light found only on the lowest floors and where buildings are in close proximity to each other. The results are typical of high-density urban developments and the daylight ingress into the rooms can be optimised through a number of measures to be implemented at detailed design stage. Further details of these can be found in Section 6 of this report.

The levels of sunlight reaching the buildings' façades throughout the year are generally excellent, with the majority of the facade area assessed seeing overall levels of sunlight in line with or greater than the BRE's recommendations. As would be expected, lower levels of sunlight can be found predominantly where tall buildings face one another. Levels of winter sunlight are also good, overall, with areas of lower availability located predominantly on the lowest storeys, where low-angle winter sunlight is easily intercepted by tall buildings within and around the Site.

A variety of spaces are suggested within the Indicative Scheme, some of which are very well sunlit whilst other smaller areas provide more shade but overall, 50% of all the public realm will enjoy at least two hours of sunlight on the 27th March, just six days after the recommendation of the 21st. Very high levels of sunlight will be available in summer months, when outdoor areas are more likely to be utilised for longer periods of time. Given the variety of spaces on offer, future occupants and visitors will be able to enjoy either a sunlit or more shaded space depending on their requirements. The main unified amenity space provided across Quay Square and The Quayside will meet the recommended levels of sunlight just one day after the equinox (21st March), and will therefore perform well. Overall, the performance is not considered uncommon for high-density locations such as this and can be considered good considering the context of the wider Canary Wharf Estate.

In conclusion, the Proposed Development has the potential to provide residential accommodation and outdoor areas of amenity considered acceptable in terms of daylight, sunlight and overshadowing and the assessment and suggestions within this report can be used to aid future designers of Development Zones and Plots in bringing forward building and public realm designs with optimised levels of natural light.

4. The BRE Guidance

The BRE Guidance provides guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

The guidance also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

It is important to note, however, that this guidance is a guide and states that its aim "*is to help rather than constrain the designer*" (Para. 1.6).

The guidance provides advice, but also clearly states that it "*is not mandatory and this document should not be seen as an instrument of planning policy.*" (Para. 1.6) The guidance also acknowledges in its introduction that "*in special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings.*" (Para. 1.6)

It is an inevitable consequence of the built up urban environment that daylight and sunlight will be more limited in these areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just the provision of ideal levels of daylight and sunlight.

4.1 Daylight

The BRE set out various methods for assessing the daylight within a proposed building within section 2.1 and Appendix C of the guidance. These are summarised below.

Vertical Sky Component (VSC)

This method of assessment can be undertaken using a skylight indicator or a Waldram diagram. It measures from a single point, at the centre of the window (if known at the early design stage), the quantum of sky visible taking into account all external obstructions. Whilst these obstructions can be either other buildings or the general landscape, trees are usually ignored unless they form a continuous or dense belt of obstruction.

The VSC method is a useful 'rule of thumb' but has some significant limitations in determining the true quality of daylight within a proposed building. It does not take into account the size of the window, any reflected light off external obstructions, any reflected light within the room, or the use to which that room is put. Appendix C of the guidance goes into more detail on these matters and sets forward alternative methods for assessment to overcome these limitations.

Appendix C of the BRE Guidance: Interior Daylighting Recommendations, states:

"The British Standard Code of practice for daylighting (BS 8206-2) and the CIBSE Lighting Guide LG 10 Daylighting and window design contain advice and guidance on interior daylighting. The guidance contained in this publication (BR 209) is intended to be used with BS 8206-2 and LG 10. Both these publications refer to BR 209.

For skylight BS 8206-2 and LG 10 put forward three main criteria, based on average daylight factor (ADF); room depth; and the position of the no sky line."

These assessments are set out below.

Average Daylight Factor (ADF)

Paragraph C4 of the BRE Guidance states, "*If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if*

supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of ADF which should be attained even if a predominantly daylit appearance is not achievable."

This method of assessment takes into account the total glazed area to the room, the transmittance quality of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the VSC and the quantum of reflected light off external surfaces.

This is, therefore, a significantly more detailed method of assessment than the VSC method set out above.

Room Depth Criterion (RDC)

Where it has access to daylight from windows in one wall only, the depth of a room can become a factor in determining the quantity of light within it. The BRE Guidance provides a simple method for examining the ratio of room depth to window area. However, whilst it does take into account internal surface reflections, this method also has significant limitations in that it does not take into account any obstructions outside the window and therefore draws no input from the quantity of light entering the room.

No Sky Line (NSL)

This third method of assessment is a simple test to establish where within the proposed room the sky will be visible through the windows, taking into account external obstructions. The assessment is undertaken at working plane height (850mm above floor level) and the method of calculation is set out in Appendix D of the BRE Guidance.

Appendix C of the BRE Guidance states "If a significant area of the working plane (normally more than 20%) lies beyond the no sky line (ie it receives no direct skylight) then the distribution of daylight in the room will look poor and supplementary electric lighting will be required." To guarantee a satisfactory daylight uniformity, the area which does not receive direct skylight should not exceed 20% of the floor area, as quantified in the BS 8206 Part2 2008.

Summary

The ADF gives a more detailed assessment of the daylight within a room and takes into account the highest number of factors in establishing a quantitative output.

However, the conclusion of Appendix C of the BRE Guidance states:

"[All three of] *the criteria need to be satisfied if the whole of the room is to look adequately daylit. Even if the amount of daylight in a room (given by the Average Daylight Factor) is sufficient, the overall daylight appearance will be impaired if its distribution is poor*."

In most urban areas it is important to recognise that the distribution of daylight within a room may be difficult to achieve, given the built up nature of the environment. Consequently, most local authorities seek to ensure that there is sufficient daylight within the room as determined by the ADF calculation. However, the additional recommendations of the BRE and British Standard for residential accommodation, set out above, ought not to be overlooked.

4.2 Sunlight

Section 3.1 of the BRE Guidance discusses sunlight quality within new developments. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial properties, and this is reflected in the BRE Guidance.

Paragraph 3.1.2 states, "*in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens where people prefer it in the morning rather than the afternoon*."

The BRE Guidance considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guidance proposes minimizing the number of dwellings whose living room face solely north unless there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Further more, it discusses massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time it acknowledges that the Site's existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

To quantify sunlight access for interiors where sunlight is expected, it refers to the BS 82606-2 criterion of Annual Probable Sunlight Hours (APSH). APSH is defined in Paragraph 3.1.10 as "*the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness at the location in question*." In line with the recommendation, APSH is measured from a point on the inside face of the window, should the locations have been decided. If these are unknown, sunlight availability is checked at points 1.6m above the ground or the lowest storey level on each main window wall, and no more than 5m apart. If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken into account. If a room has two windows on opposite walls, the APSH for each can be added together.

The summary of section 3.1 of the BRE Guidance states as follows:

"*In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that:*

- *At least one main window faces within 90 degrees of due south, and*
- *The centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March."*

In paragraph 3.1.11, the BRE Guidance suggests that if a room faces significantly North of due East or West it is unlikely to meet the recommended levels proposed by the BS 8206-2. As such, it is clear that only windows facing within 90 degrees of due South can be assessed using this methodology.

It is also worth noting how paragraph 5.3 of the BS 8206-2 suggests that with regards to sunlight duration "the degree of satisfaction is related to the expectation of sunlight. If a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary".

4.3 Overshadowing

The BRE Guidance in respect of overshadowing of amenity spaces is set out in section 3.3 of the guidance. Here it states as follows:

"Sunlight in the spaces between buildings has an important impact on the overall appearance and ambiance of a development. It is valuable for a number of reasons, to:

- provide attractive sunlit views (all year)
- make outdoor activities, like sitting out and children's play more pleasant (mainly warmer months)
- encourage plant growth (mainly spring and summer)
- dry out the ground, reducing moss and slime (mainly in colder months)
- melt frost, ice and snow (in winter)
- dry clothes (all year)"

Again, it must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

The summary of section 3.3 of the guide states as follows:

"*It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.*" (Para. 3.3.17)

4.4 Further relevant information

Further information can be found in The Daylight in Urban Areas Design Guide (Energy Saving Trust CE257, 2007) which provides the following recommendation with regards to VSC levels in urban areas:

"If 'theta' (Visible sky angle) is greater than 65° (obstruction angle less than 25° or VSC at least 27 percent) conventional window design will usually give reasonable results.

If 'theta' is between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15 and 27 percent), special measures such as larger windows and changes to room layout are usually needed to provide adequate daylight.

If 'theta' is between 25° and 45° (obstruction angle between 45° and 65°, VSC from 5 to 15 percent), it is very difficult to provide adequate daylight unless very large windows are used.

If 'theta' is less than 25° (obstruction angle more than 65°, VSC less than 5 percent) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."

Additional information on relevant legislation and planning policy can be found in the Environmental Statement (Volume 3, Appendix DSOSGLP - Annex 1: Legislation, Planning Policy and Other Relevant Standards and Guidance).

5. Methodology

The Parameter Plans submitted with the OPA set out the potential boundaries for a building with a certain quantum of area and have been designed to allow a degree of flexibility. This requested area and the resulting massing are also bound by the Design Guidelines and so testing the daylight availability to the maximum building of the envelope defined by the Parameter Plans would provide an unrealistic assessment as the volume would be far larger than the quantum of area the Applicant is seeking permission for.

In addition, the assessed façades would be within a few metres of one another which would be contrary to the Design Guidelines accompanying the OPA and therefore not acceptable.

An Indicative Scheme has been produced that demonstrates a realistic interpretation of a scheme that could be brought forward within the Parameters and in accordance within the Development Specification and Design Guidelines. Given the unrealistic nature of testi ng the Parameters, this Indicative Scheme is considered the only representative way to gauge the potential for daylight and sunlight within a scheme of this nature. Further details on the Indicative Scheme can be found within ES Volume 1, Chapter 4: Proposed Development.

Therefore, the daylight potential and overshadowing assessments illustrated within this report have been undertaken for the Indicative Scheme.

Whilst the detailed design may vary from the Indicative Scheme, this would be later covered within the Reserved Matters Application when full detailed daylight assessments would be undertaken.

5.1 3D Model

To undertake the daylight and sunlight assessments set out in the previous pages, we have prepared a three dimensional computer model and used specialist lighting simulation software. The three dimensional representation of the Indicative Scheme has been provided by the masterplan architects, Allies and Morrison. This has been placed in the context of its surrounding buildings which have been modelled from photogrammetry and Ordnance Survey. This allows for a precise model, which in turn ensures that the analyses accurately represents the amount of daylight and sunlight available to the building façades, internal and external spaces considering all of the surrounding obstructions and orientation.

5.2 Assessments

Owing to the outline nature of this OPA, the room layouts, façade and window details are not known at this stage. Therefore, façade assessments have been undertaken to establish how to optimise the daylight and sunlight amenity within the residential elements of the Indicative Scheme. These are described in detail below.

Daylight

In order to understand the levels of daylight potential within the proposed massing, VSC facade assessments have been undertaken on each residential facade whithin the Indicative Scheme. This produced a number of VSC façade maps showing the VSC value that a window in that location would enjoy. The façades are split into squares approximately one metre wide and one storey high, the colour of which represents the VSC value achieved at that location.

The VSC assessments are described statistically into the brackets outlined in the BRE Guidance, which states in Paragraph 2.1.6 that:

- *"with VSC levels above 27% conventional window design will usually give reasonable results,*
- *with VSC levels from 15-27%, special measures are required,*
- *with VSC levels from 5-15%, adequate daylight can only be provided with very large windows, and*
- *with VSC levels below 5%, it is often impossible to achieve reasonable levels of daylight.*"

However, the VSC studies' principal use should be as a starting point for establishing the potential for ADF compliance. The VSC is a very simple test and good levels of daylight can still be found in rooms with low levels of VSC provided the future designs are brought forward with daylight in mind and any areas with lower daylight potential are mitigated successfully. Any future RMAs submitted for a residential building will be accompanied by a report setting out how the design has been brought

forward to enhance natural light and the final levels of daylight achieved (as determined by the ADF).

SUNLIGHT

Annual Probable Sunlight Hours (APSH) assessments have been undertaken on the façades of the residential elements facing within degrees of due south. These are presented through false-coloured facade maps similar to those used for the VSC assessments.

These show the APSH value that a window in that location would enjoy. Two maps are produced from each viewpoint, one showing the levels of annual sunlight and one showing the levels of winter sunlight.

Overshadowing

To illustrate the sunlight availability within the proposed areas of outdoor public and communal amenity throughout the year, assessments of Sun Hours on Ground and Sun Exposure assessments have been undertaken.

The results of the Sun Hours on Ground assessment are presented showing the areas which receive direct sunlight for two hours or more on the equinox. The BRE recommends that at least 50% of each area should receive such levels of sunlight.

The Sun Exposure assessments are presented showing the gradient levels of sunlight in all the areas within the Indicative Scheme both on the equinox and summer solstice.

Again, it is noted that these consider the Indicative Scheme and so, should a detailed design emerge which could alter the findings of these assessments significantly, the relevant RMA would be supported by an updated overshadowing assessment.

6. Conclusions

The results show that the Indicative Scheme can deliver residential accommodation with good levels of daylight and sunlight amenity. As expected for schemes of this size and density, the levels of direct sunlight reaching some of the smaller open spaces suggested by the Indicative Scheme will be lower than those recommended in March but much higher levels will be seen in summer when the outside spaces are more likely to be utilised.

The assessments results are presented in Sections 8 (Daylight), 9 (Sunlight) and 10 (Overshadowing) and discussed in detail below.

5.3 Conclusions on daylight

Daylight to NQ.A1 and NQ.A4

To understand the potential daylight levels within the Indicative Scheme, VSC facade assessments have been undertaken on each residential facade. The buildings shown as residential in use, NQ.A1 and NQ.A4, are identified in page 20 of this report and the assessment results are presented in Section 8 of this report.

A breakdown of the VSC results on the residential façades is provided below.

VSC (%) LEVELS	FACADE AREA (%)
0 ≤ VSC < 5	0%
5 ≤ VSC < 15	17.5%
15 ≤ VSC < 27	21.4%
VSC ≥ 27	61.1%

The results of the assessments show that good levels of daylight potential are generally seen, with 61% of the facade area seeing VSC levels in excess of 27%. In these areas, as stated in the BRE Guidance, conventional window design will generally lead to good levels of daylight.

An additional 21% of the facade area sees at least 15% VSC, which is considered good for dense urban locations and means that good levels of daylight are still achievable provided larger windows are specified. It follows that the vast majority of the façades (>80%) performs well and so, overall, good levels of light can be expected at detailed design stage.

The remaining 18% of the façade area sees levels of VSC lower that 15% but greater or equal to 5%, behind which rooms will achieve acceptable levels of daylight provided very large glazing areas are specified and the room depths are kept to a minimum. These areas of lower potential are located on façades positioned between adjacent neighbouring buildings, especially on the lowest floors. Acceptably daylit rooms behind these areas of lower potential can be designed and it should be noted that lower levels of VSC are to be expected in certain areas of any high-density development.

The outer frontages (northern, southern and western) enjoy a mostly unobstructed outlook and therefore the majority of façades achieve good daylight potential (shown in yellow in the diagrams). In these areas, as discussed, a conventional design of the elevations and layouts is likely to lead to good levels of daylight within the rooms.

As is typical of any dense scheme, where two parallel façades are in close proximity of one another, their access to daylight can inevitably be more restricted. An example of this can be seen in the east and south elevations of NQ.A1 and on the lower floors of the east and north elevations of NQ.A4.

In the areas shown as red in the daylight potential diagrams (~10-15% VSC), care would need to be taken at detailed design stage to ensure that the daylight ingress is maximised, especially into living areas. Room depths should be kept to a minimum and the fenestration to living areas may need to be more generous than in less obstructed locations.

It can be more challenging for living areas to achieve the recommended daylight levels, owing to their higher daylight requirement, deeper layouts and generally provision of a balcony. These should therefore be designed as dual-aspect where possible and the location of balconies should be carefully considered. Bedrooms, on the other hand, have the potential to achieve acceptable daylighting even in areas of more restricted daylight availability, owing to their lower daylight requirement and generally shallower layouts.

As a general rule, it is recommended that bedrooms are positioned in the most constrained areas and provided with generous fenestration, whilst

living areas should be located where the daylight availability is greatest and, if possible, in the corners where they can be dual aspect.

Balconies, whilst providing private external amenity space, restrict the access to daylight and sunlight to the windows below them (if projecting) or behind them (if recessed). With living areas having both a higher daylight requirement than bedrooms and generally a greater expectation of sunlight, a balcony strategy should be devised so as not to cause further obstruction to this room type. This can be achieved through a number of different strategies, for instance by providing living areas with additional windows free of obstructions, by staggering the balconies or internal layouts so the windows serving living areas are not overhung or even by providing oversized units without balconies.

Inset balconies cause a more substantial obstruction than pop-out ones, as they also block peripheral light. Therefore, should recessed balconies be provided in areas where the daylight and sunlight availability is limited, it is recommended that either they are located in front of bedrooms, with a side access from the living areas, or that the living areas are generously glazed, shallow, and if possible, also served by secondary windows.

Indicative Layout

Considering all the above, an example of how the Indicative Scheme could make the most of the available daylight within NQ.A1 at detailed design stage is provided on page 26. In this design, the cruciform shape of the building allows to maximise the number of dual aspect rooms/unit. The example only provides one potential configuration, but it should be noted that there are a number of alternative strategies that would be available within the parameters, including rotating the building or providing angled façades that could benefit from light coming from either side of NQ.B1.

In the example provided, therefore, bedrooms, have been located in the façades opposite NQ.B1 and NQ.A4, where the daylight potential is lower. As discussed above, bedrooms typically have a shallower layout than living areas and a lower expectation for daylight, so, as long as they generously glazed, they can achieve good levels of light in relatively obstructed areas. Combined living/kitchen/dining rooms have been located in the corners, so as to offer a dual aspect. This also means that the balcony provided in front of these rooms will only reduce the daylight ingress to one of the windows provided and light can still enter through the other. The same principles are followed to the west facade, and north facade, where daylight levels are expected to be excellent.

Conclusion on Daylight

Overall, the Indicative Scheme has optimised daylight access by locating the residential buildings so as to allow good daylight potential to the majority of elevations.

The more obstructed areas, which are typical of high-density urban developments, can be addressed at detailed design stage and the measures described above provide an example of how the daylight amenity within the rooms could be optimised. To conclude, the Proposed Development is considered to have the potential to deliver good-quality homes with adequate daylight amenity.

Daylight to NQ.D4

NQ.D4 comprises serviced apartments and as such is not technically relevant for assessment. Given its tenure, however, it has been designed with a more slender massing than the adjacent office plots, and as such it would constitute a preferential location to provide additional residential floorspace, if this was proposed at RMA stage, in accordance with the Development Specification.

The building is also shown on page 20 of this report and the assessment results are presented in Section 8, alongside those of plots NQ.A1 and NQ.A4 discussed above.

A breakdown of the VSC results is provided below.

VSC (%) LEVELS	FACADE AREA (%)
0 ≤ VSC < 5	3.9%
5 ≤ VSC < 15	12.3%
15 ≤ VSC < 27	22.6%
VSC ≥ 27	61.1%

The results are largely aligned to those already discussed for the residential plots, with the vast majority (>80%) of the facade area performing well

and expected to result in a good performance at detailed design stage.

The remaining facade area, seeing lower levels of daylight, is located at the lowest part of the building, towards its north-west corner, owing to the relationship with NQ.D1 and NQ.D3. The majority of this area, 12% of the total, sees VSC levels between 5% and 15%. As previously discussed, this allows to achieve acceptable daylight levels indoors, provided the rooms are adequately proportioned and the glazing maximised. The remaining area (4%) sees levels of daylight potential lower than 5% VSC, behind which rooms will be more difficult to light to levels recommended by BRE. Should habitable rooms be placed behind these areas, acceptable levels of daylight are still achievable in bedrooms provided that the design carefully considers this aspect.

However, as the area of reduced daylight potential spans across several storeys towards the north west corner of NQ.D4, this portion of the building would be best suited to accommodate non-residential uses, if possible.

Should residential accommodation be wished for this small corner of NQ.D4 the massing may need to be amended or other factors such as bay windows be provided so as to allow for maximised daylight levels to the lowest part of the building.

To conclude, the NQ.D4 is considered to have the potential to deliver residential accommodation with adequate daylight amenity. The more obstructed areas, which are typical of high-density urban developments, can be addressed at detailed design stage.

5.4 Conclusions on Sunlight

Sunlight to NQ.A1 and NQ.A4

To understand the potential sunlight levels within the Indicative Scheme, APSH facade assessments have been undertaken on residential façades within 90 degrees of due south.

The assessment results are presented in Section 9 of this report and show that the levels of APSH seen are generally very good, with the majority of the facade area assessed complying with the BRE Guidance's recommendations both throughout the year and during the winter months, and often seeing levels well above the minimum recommended of 25% APSH.

Lower levels than recommended can be seen on the lower floors, as is typical of dense urban environments, as well as on the east elevation of NQ.A1 owing to the morning sun being intercepted by NQ.B1.

Winter sunlight is also good, overall, with areas seeing lower levels predominantly located on the lowest storeys. This is again a typical feature of dense urban areas in central London, where low-angle sunlight is more easily intercepted by the urban fabric.

Whilst there is some flexibility in massing available to increase the sunlight availability to the façades in a detailed design, the design can also locate as many living rooms as possible in the areas of greatest sunlight potential. Should living rooms be located in some of the areas of lower sunlight potential listed above, making them dual aspect would allow for greater access to sunlight.

Furthermore, balconies reduce the sunlight ingress to the rooms below (if projecting) or behind them (if recessed). Therefore, should balconies provided in the areas where the access to sunlight is more limited, it is recommended that their positioning is carefully designed so as to allow for maximum sunlight ingress into living areas. These can be achieved by staggering the balconies and internal layouts or ensuring that living areas are provided with at least one window free of obstructions.

The illustrative example of NQ.A1, already discussed for daylight in the previous section, also provides an example of how the strategies just discussed to optimise sunlight could be incorporated at detailed design stage. All living areas provided are dual aspect and they will all have windows free from the obstruction caused by the balconies, so that the amount of sunlight entering each of the rooms throughout the year can be maximised. Overall, the Proposed Development is considered to have the potential to deliver good-quality homes with adequate sunlight amenity.

Sunlight to NQ.D4

As for daylight, NQ.D4 is not technically relevant for assessment but it has been assessed to consider a case whereby a residential building comes forward at RMA stage.

The results are also presented in Section 9 of this report, alongside those of NQ.A1 and NQ.A4. As for the residential plots just discussed, levels are generally excellent both throughout the year and during the winter months, well above the minima recommended. Lower levels of sunlight than recommended can be see on the lowest floors, predominantly towards west, as sunlight is intercepted by NQ.D5.

Overall, the NQ.D4 is considered to have the potential to deliver residential accommodation with adequate sunlight amenity.

5.5 Conclusions on Overshadowing

As suggested in the BRE Guidance, Sun Hours on Ground assessments have been undertaken on the proposed open spaces and areas of public or communal amenity within the Site. Moreover, in order to better understand the levels of sunlight seen, additional assessments of sunlight exposure on 21st March and 21st June have been undertaken. The assessment results are presented in Section 10 of this report.

The open space provided connects the building plots as a spine through the Indicative Scheme creating a variety of ground and upper ground floor uses.

Several public squares and terraces are provided in the Indicative Scheme, including Garden Square, Quay Square, Dock Square and the terrace next to NQ.A1. Quayside is the public pedestrian space along the North Dock waterway and Poplar Plaza provides a connection between Poplar and the North Dock. Each of these spaces will provide different degrees of sunshine and shade, which will inform the landscape design.

The greatest levels of sunlight will be available to the Quayside, Quay Square, Garden Square and Poplar Plaza. These spaces are interconnected and will create a wider area where good levels of sunlight can be enjoyed.

Quay Square is the main public outdoor space, being the largest area and centrally located within the Site. This area will receive direct sunlight for approximately two to three hours on 21st March, and much greater levels of sunlight in the summer, with its southern portion seeing in excess of six hours of sunlight on the summer solstice.

Quayside is also expected to be highly utilised for outdoor activities along the waterway. The western portion of this space receives very good levels of sunlight, whilst the eastern part is more overshadowed as the Crossrail Place roof garden intercepts low-angle sunlight. In the summer, when Quayside is most likely to be in use, the entirety of its area will be excellently sunlit, receiving more than six hours of direct sunlight on 21st June.

The southern part of Garden Square, adjacent to Quayside, will receive good levels of sunlight throughout the year. The sunlight availability will gradually decrease further north, in the area in between tall buildings.

Poplar Plaza will also see the greatest levels of sunlight in its southern part, adjacent to Quay Plaza. As this space is designed as a connection between Poplar, the Quay Plaza and North Dock, the distances between buildings are wider and as a result levels of summer sunlight are good.

The smaller pocket gardens will inevitably receive less direct sunlight at ground level, as their location in between buildings leads to more sunlight being intercepted by the built fabric. However, it should be noted that these spaces need not be dark when not directly sunlit as light will be reflected off the buildings' facades to create a light atmosphere. This is actively encouraged and supported by the design guidelines submitted.

Overall, considering all outdoor area within the Indicative Scheme, 31% of the public realm assessed will receive direct sunlight for two hours or more on 21st March but the 50% threshold recommended for the equinox will be met just six days later on the 27th March. The levels of sunlight will further improve in summer, as demonstrated by the sun exposure diagram generated for June, where it can be seen that the majority of the space will receive well in excess of two hours of sunlight, with Quayside and Quay Square in particular seeing

over six hours of sunlight.

Given the variety of spaces on offer, future occupants will be able to enjoy either a sunlit or more shaded space depending on their requirements.

Owing to the illustrative nature of the Indicative scheme, the whole public realm has been assessed, however some areas will mainly serve as circulation corridors connecting the main areas of amenity provided.

In order to meet the requirements of the key open space provision in the North Quay Site Allocation in the LB Tower Hamlets Local Plan 2031: Managing growth and sharing the benefits (Adopted January 2020), an area of no less than 0.4 hectares of open public space will be provided across Quay Square and The Quayside. This will serve as the heart of the Proposed Development and will be designed to encourage the use of outdoor seating provision and to host outdoor activities and events.

In order to understand what the levels of sunlight would be for this area, where sunlight is most likely to be enjoyed, specific overshadowing assessments have been undertaken, which are presented on pages 36-39.

The results demonstrate that the main amenity area has been located where the best levels of sunlight are available and will receive at least two hours of direct sunlight on 46% of its area, on 21st March. This is just marginally short of the 50% recommended, which, however, will be met the following day and as such unlikely to materially affect the quality of the space. The space is therefore considered to offer good sunlight levels. In June, the whole area will see more than two hours of direct sunlight, with the majority of the space seeing more than six hours and being therefore excellently sunlit.

We can therefore conclude that when counting all the open space provided in the Indicative Scheme, whilst just below recommendation for the 21st of March, the two-hour criterion will me met just a few days later and the public realm as a whole will be well sunlit in summer. The main open public space has been located where most sunlight will be available, reaching the recommended levels just one day after the equinox and is therefore considered to perform well.

Overall, the performance is not considered uncommon for high-density locations such as this and can be considered good considering the context of the wider Canary Wharf Estate.

7. Indicative Scheme Overview

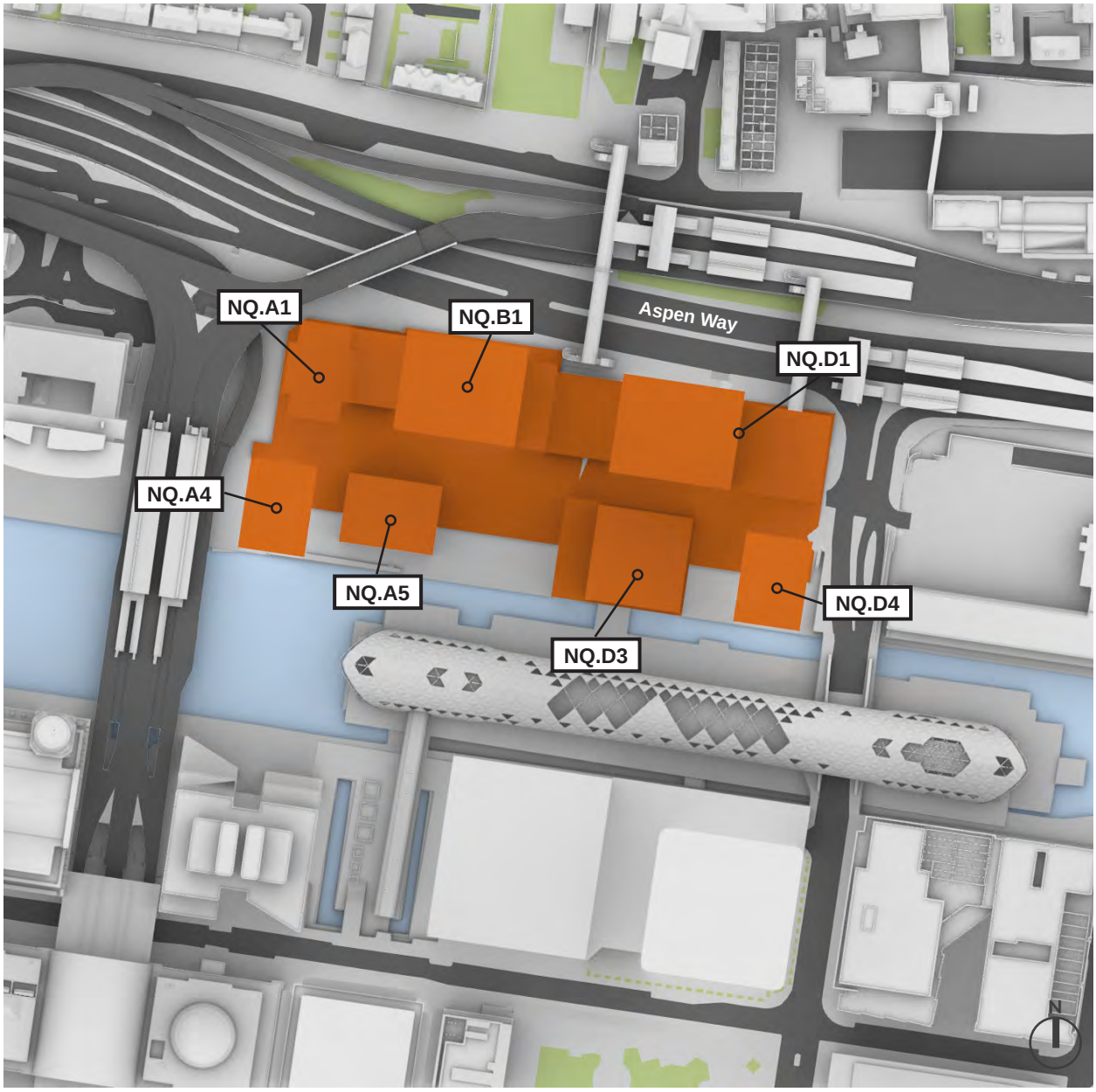


Fig. 01: Top view - Proposed (Indicative Scheme)

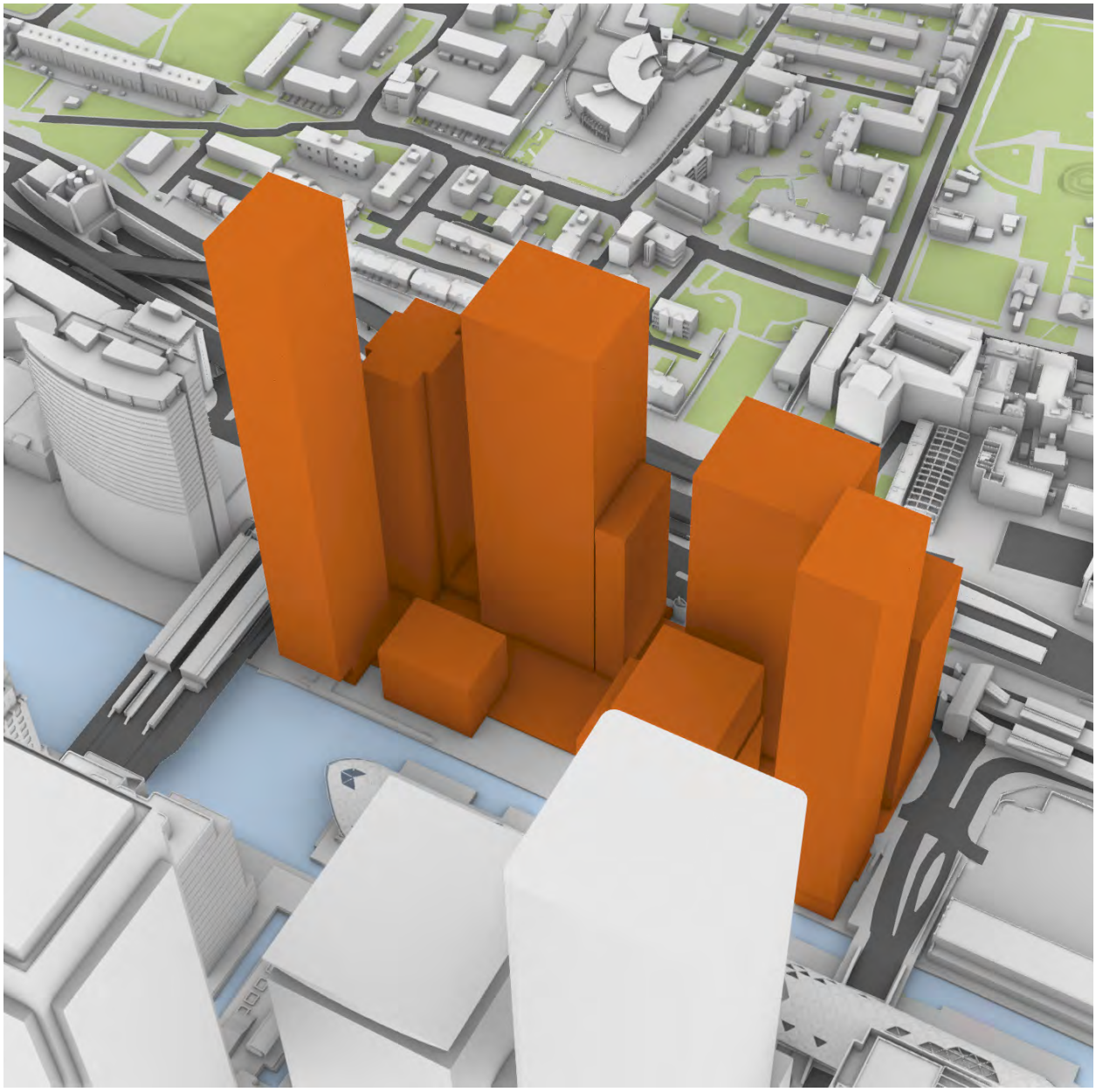
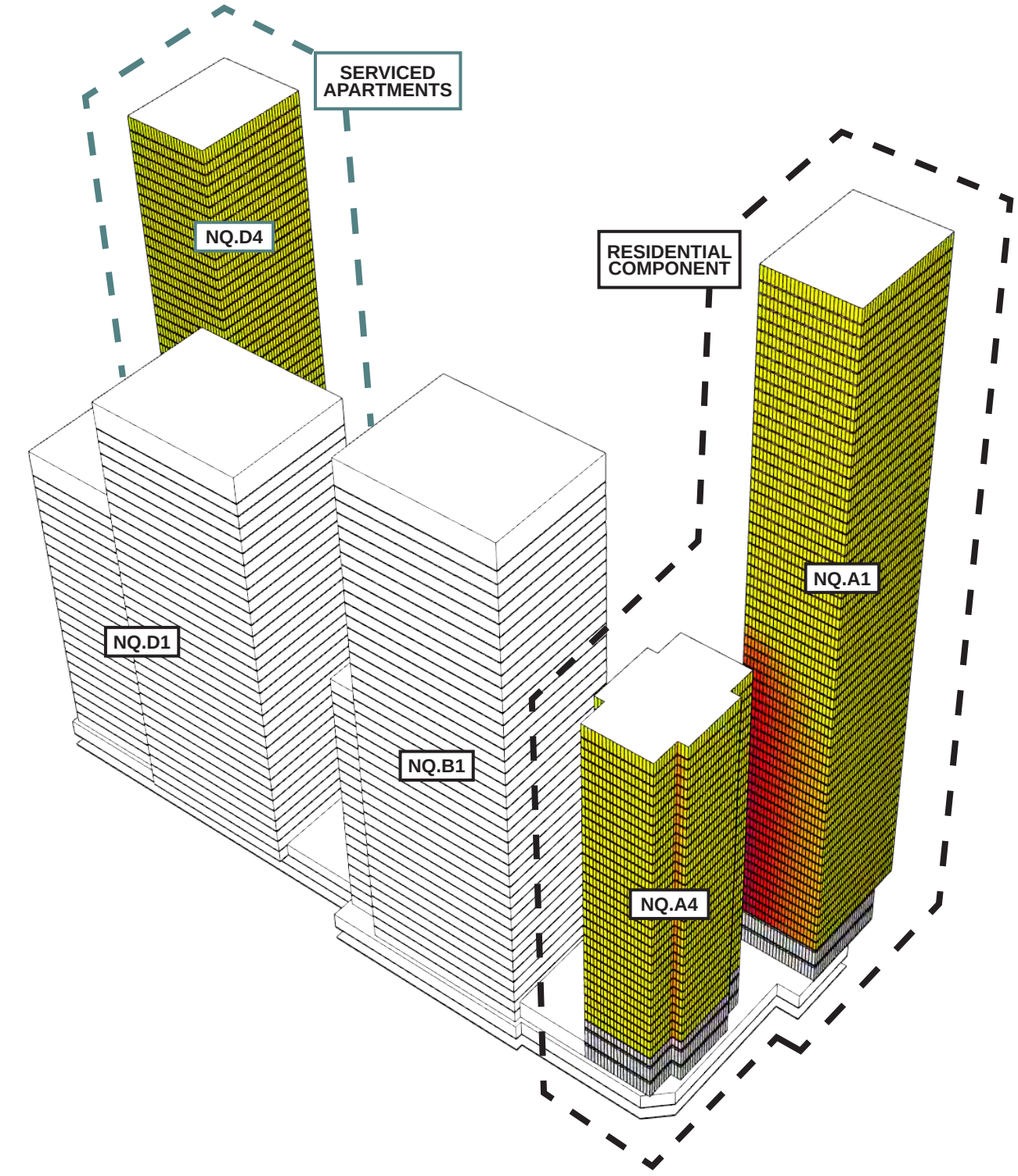
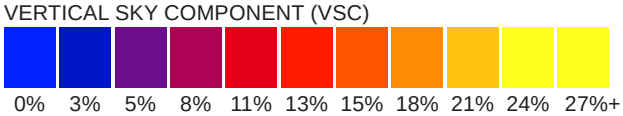


Fig. 02: Perspective view - Proposed (Indicative Scheme)

8. Daylight Potential Assessments



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



DAYLIGHT POTENTIAL - VSC FACADE ASSESSMENT
VIEW 1

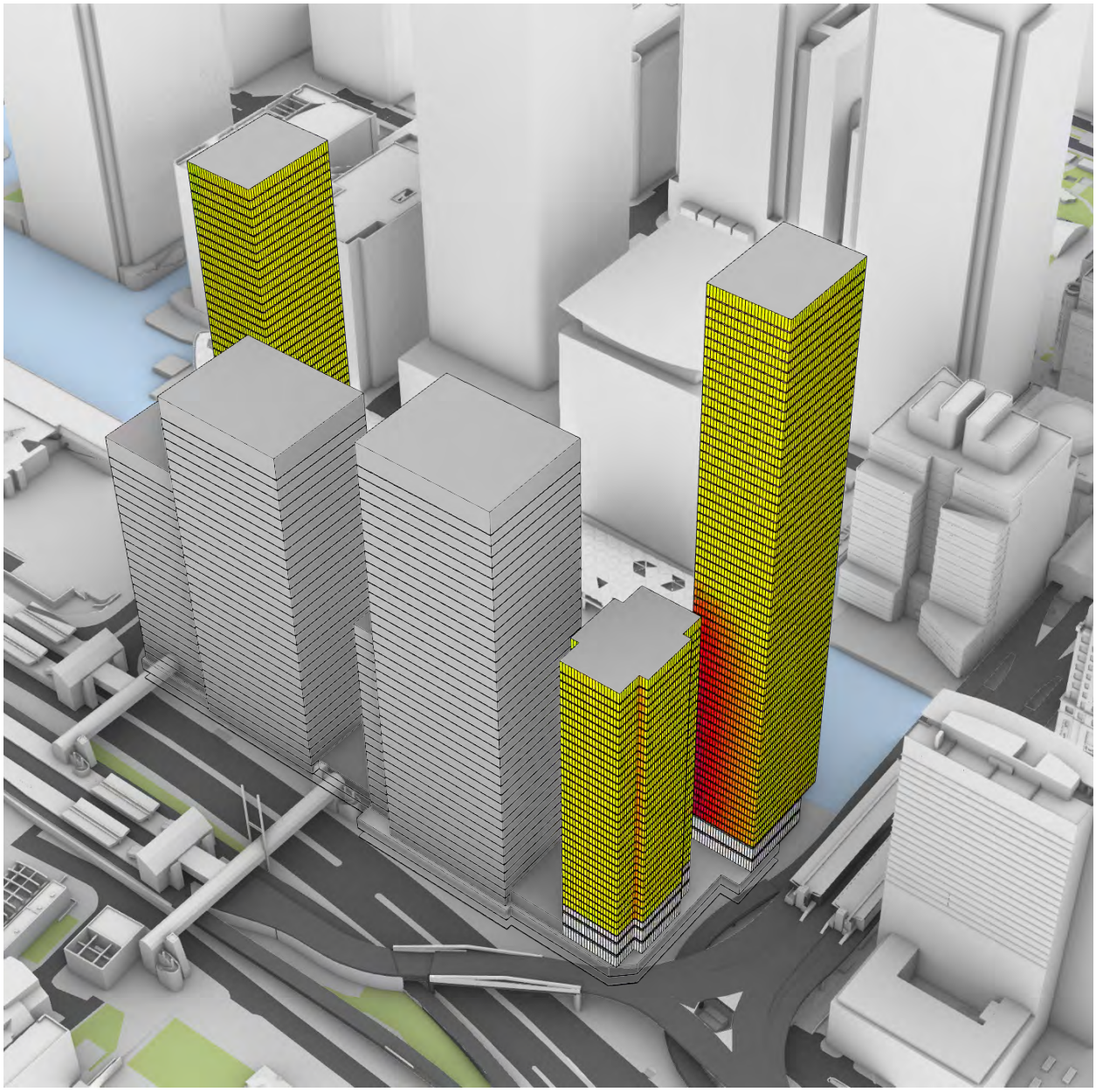
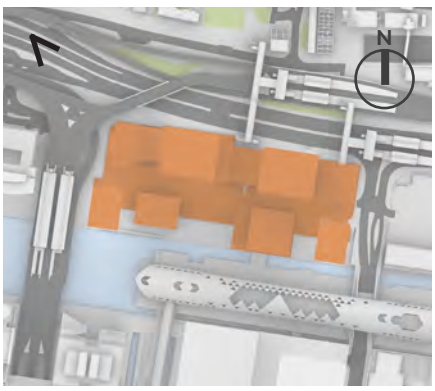


Fig. 03: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

DAYLIGHT POTENTIAL - VSC FACADE ASSESSMENT
VIEW 2

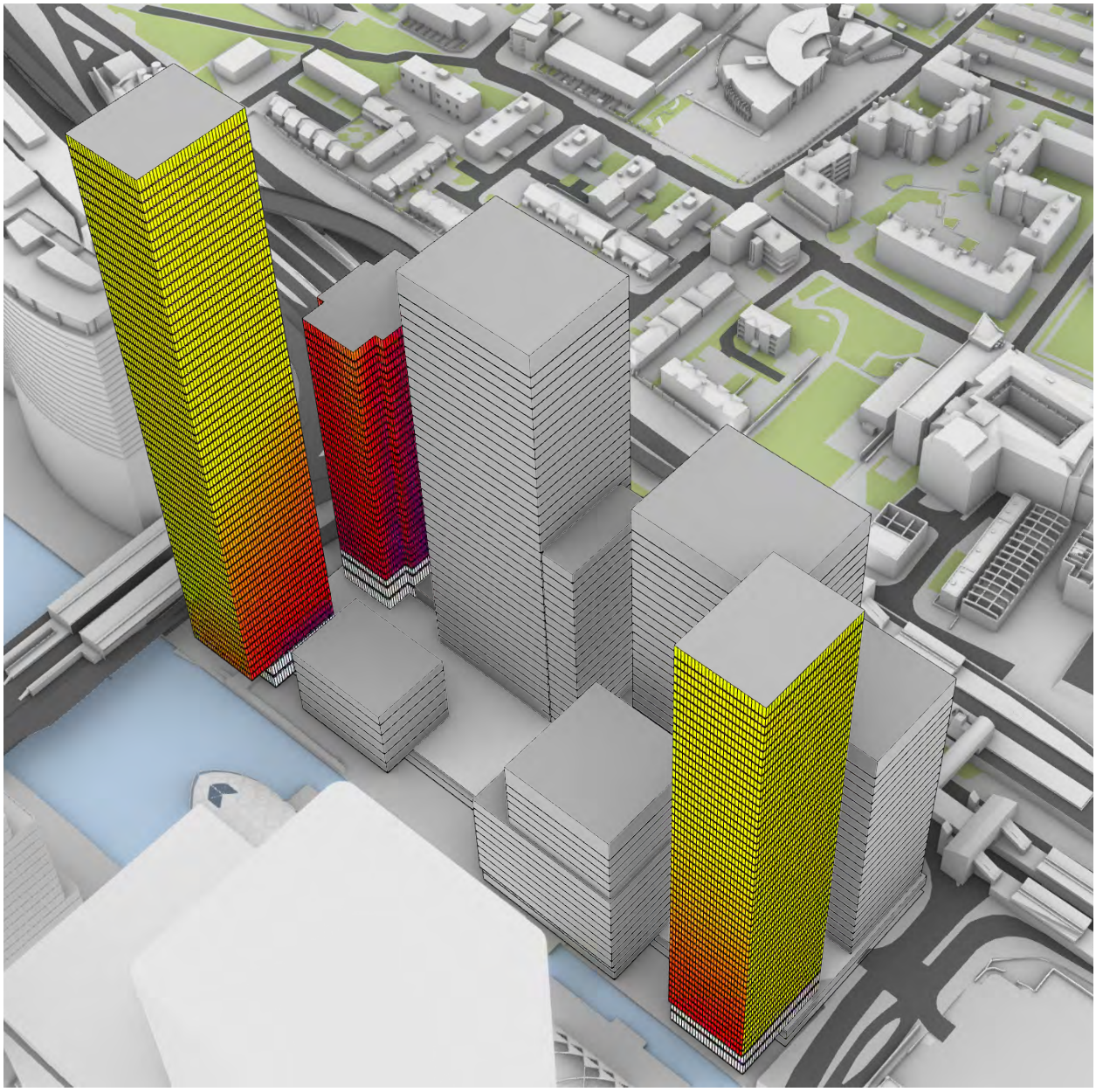
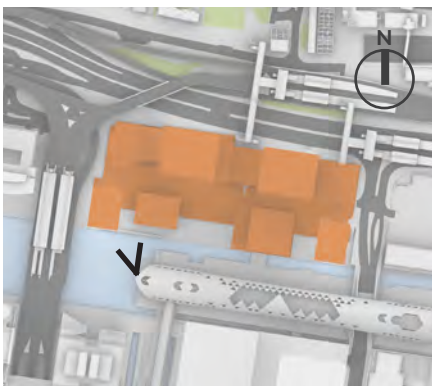


Fig. 04: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

DAYLIGHT POTENTIAL - VSC FACADE ASSESSMENT
VIEW 3

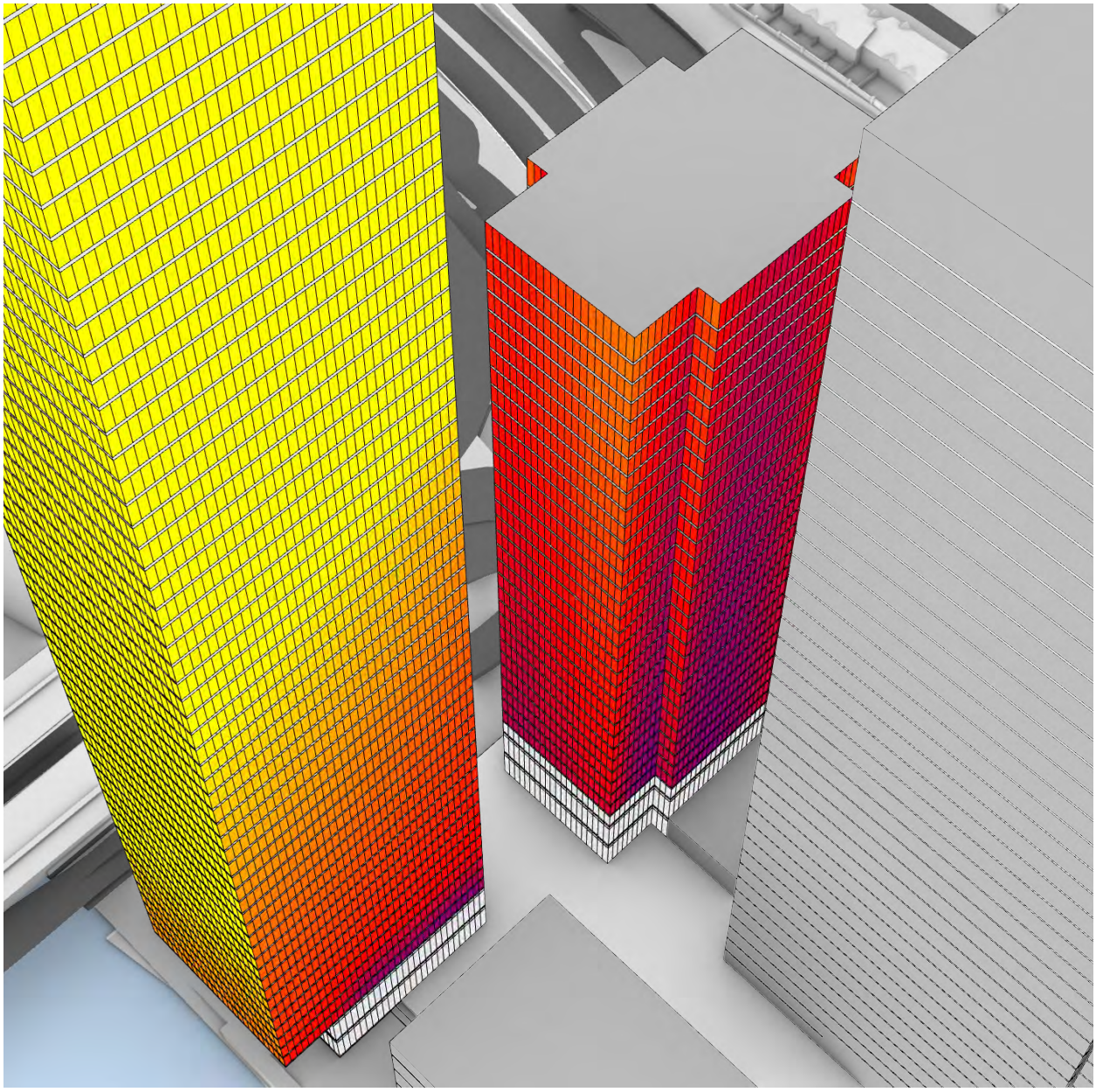
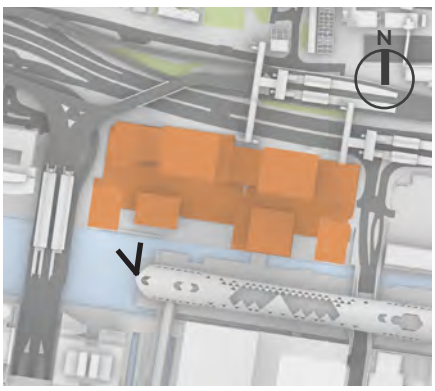
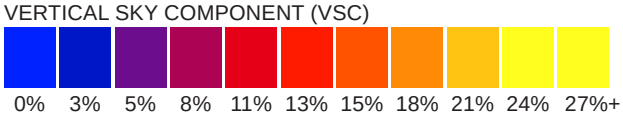


Fig. 05: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



DAYLIGHT POTENTIAL - VSC FACADE ASSESSMENT
VIEW 4

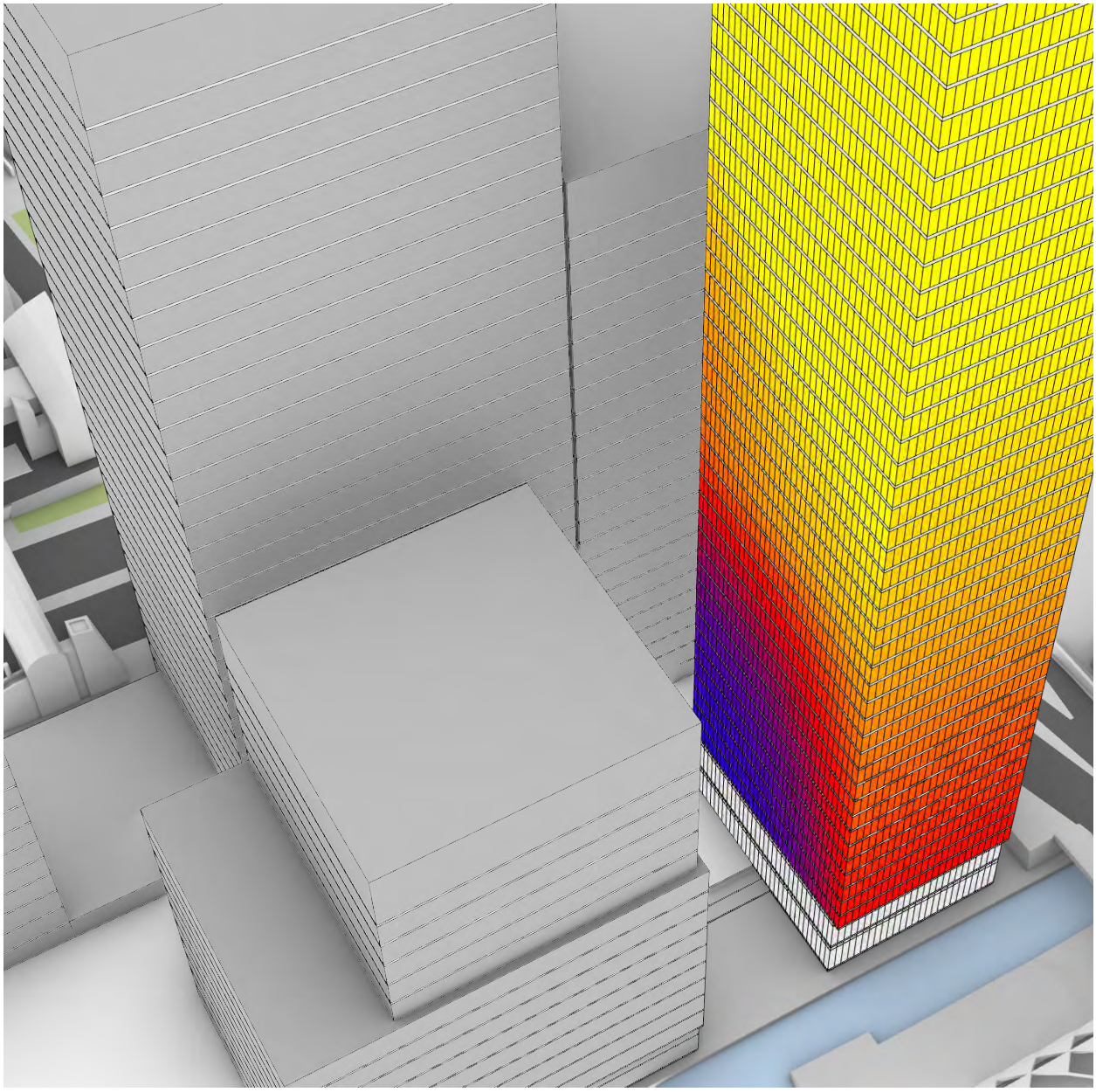
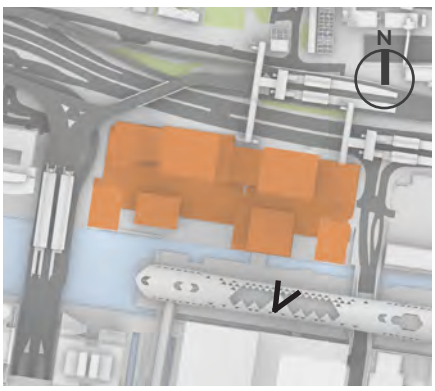
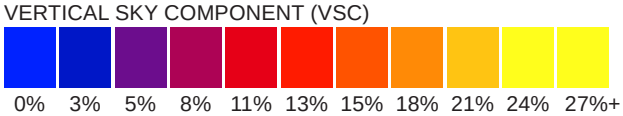


Fig. 06: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



DAYLIGHT POTENTIAL - VSC FACADE ASSESSMENT
VIEW 5

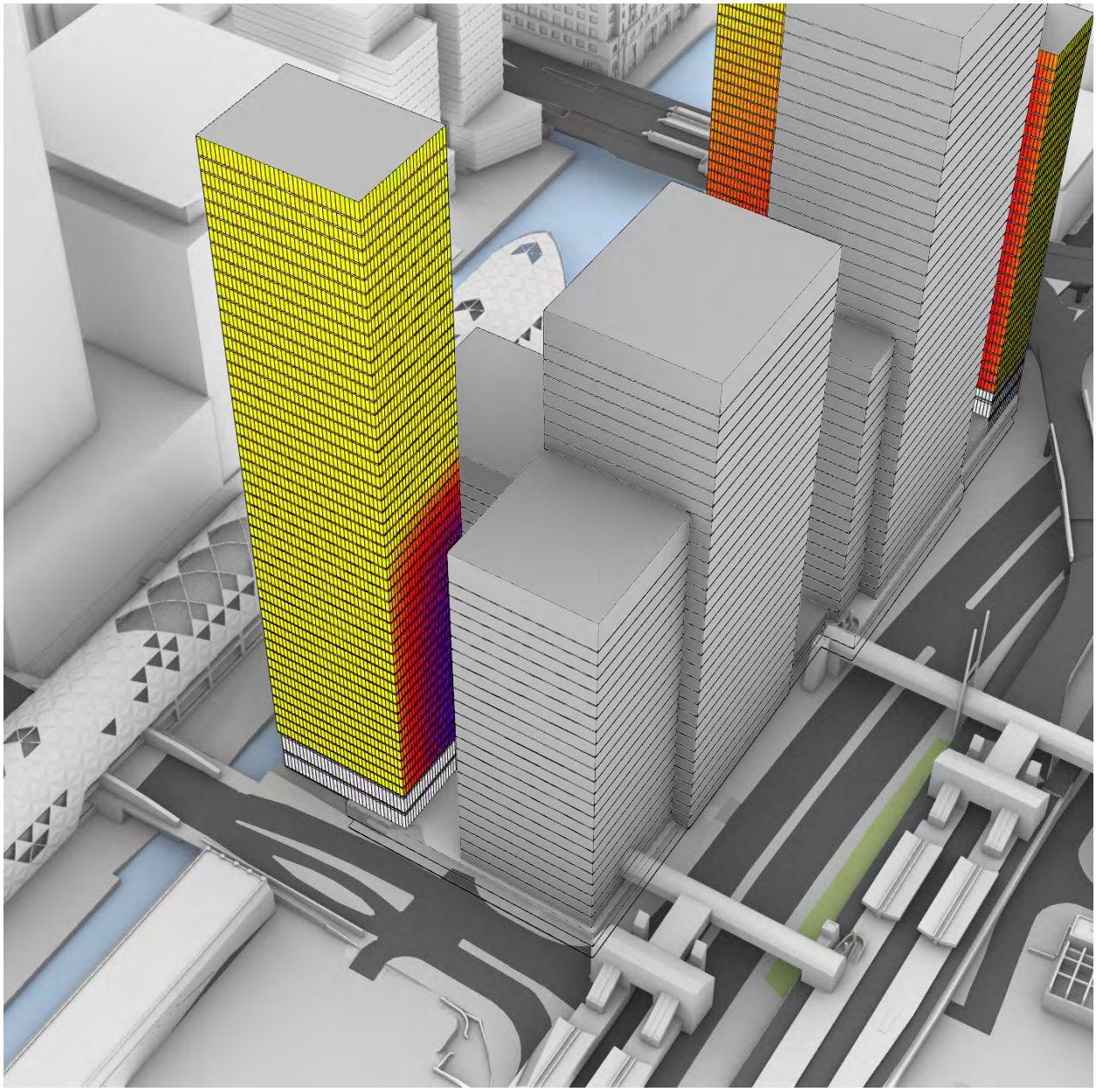
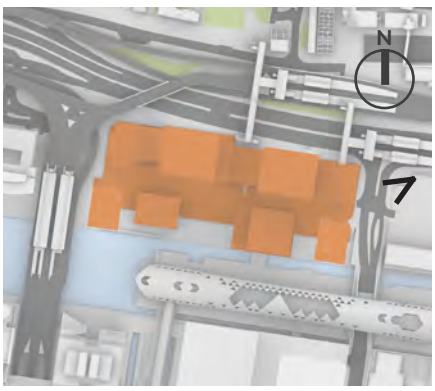
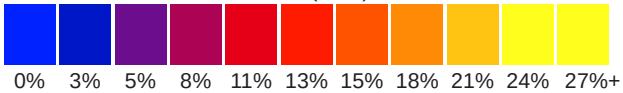


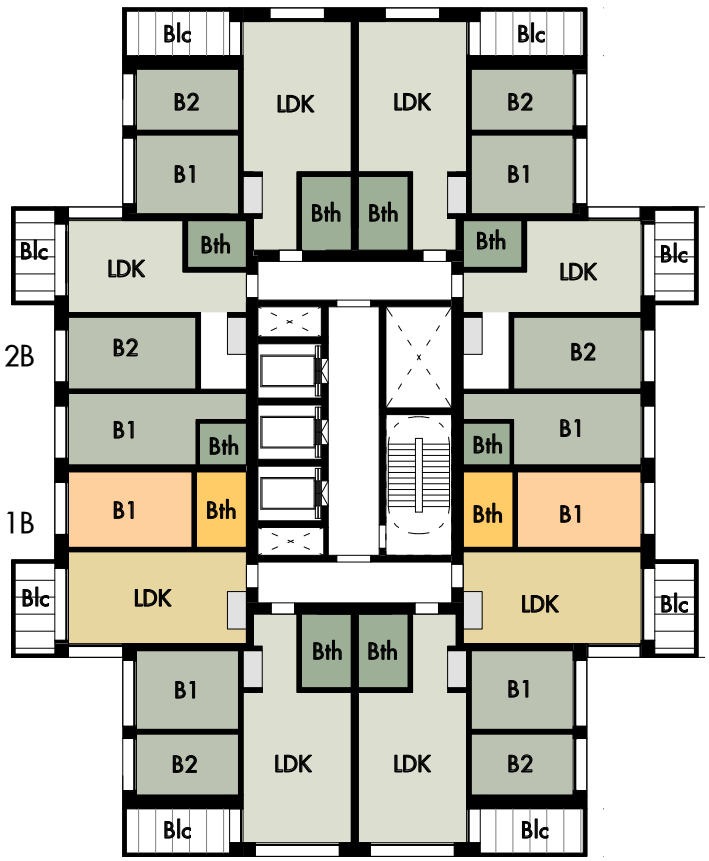
Fig. 07: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

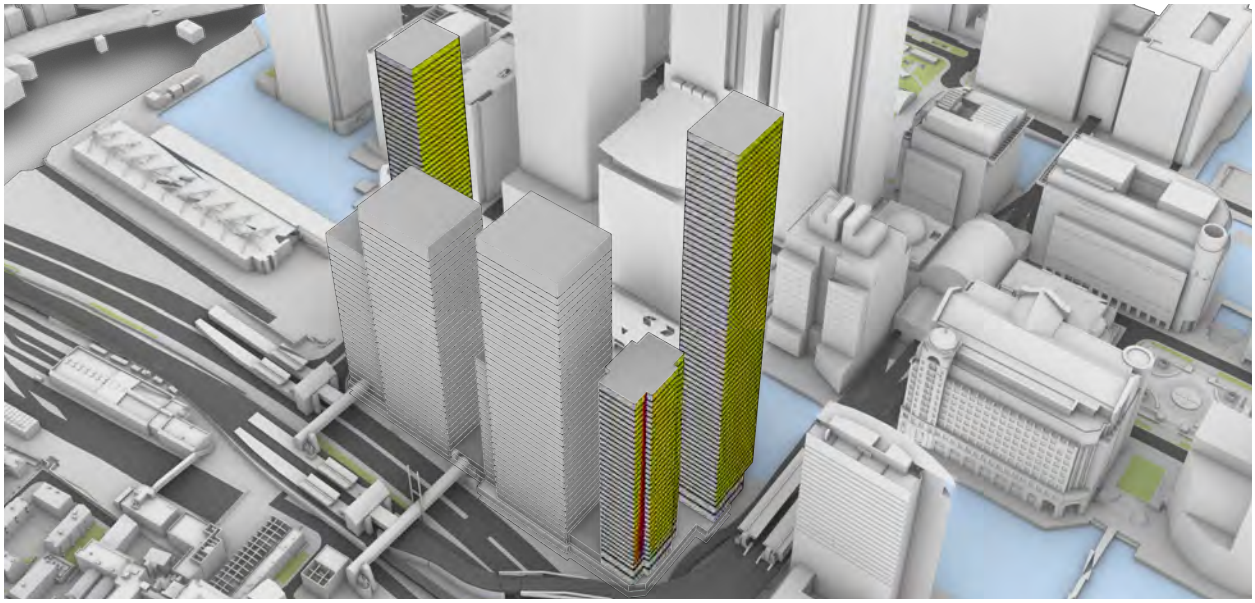


TYPICAL FLOORPLAN INDICATIVE ARRANGEMENT
NQ.A1

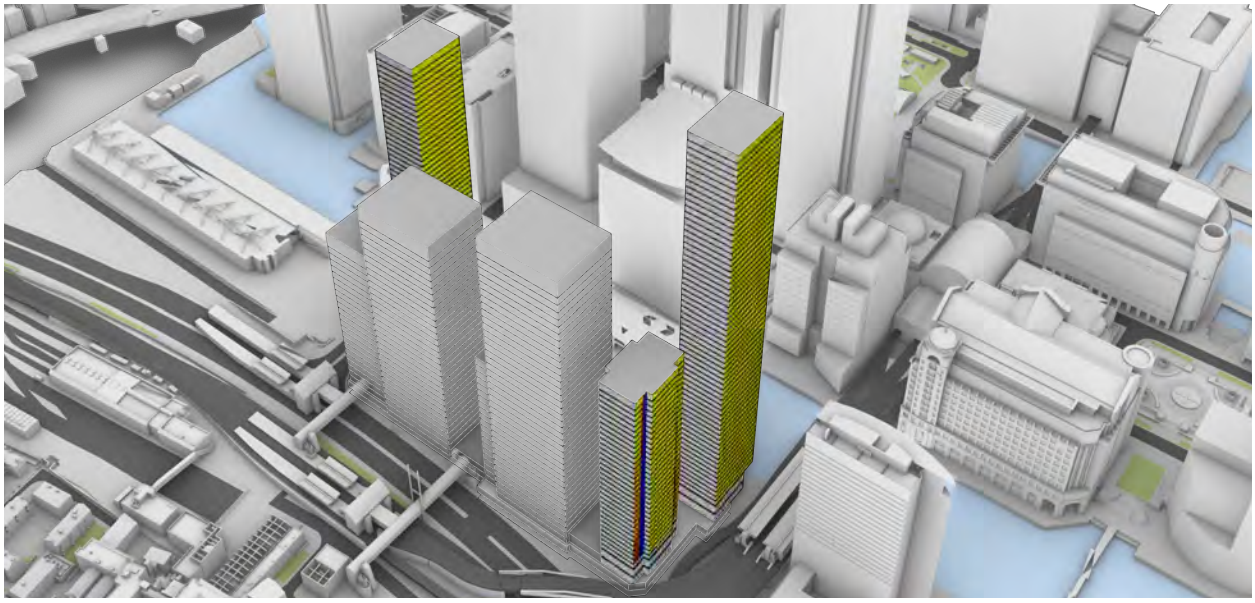


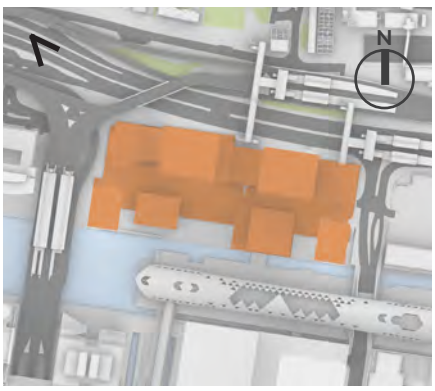
9. Sunlight Potential Assessments

SUNLIGHT POTENTIAL - ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL

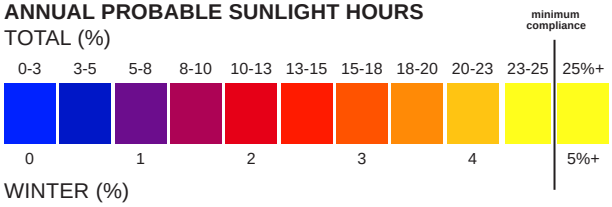


WINTER



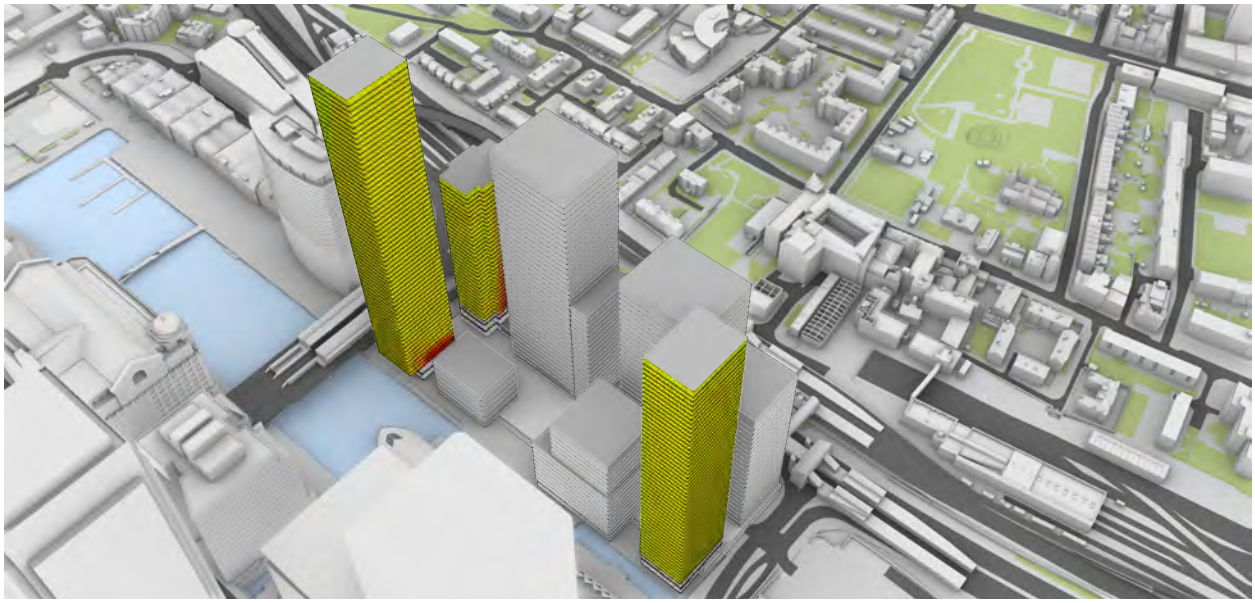


ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL (%)

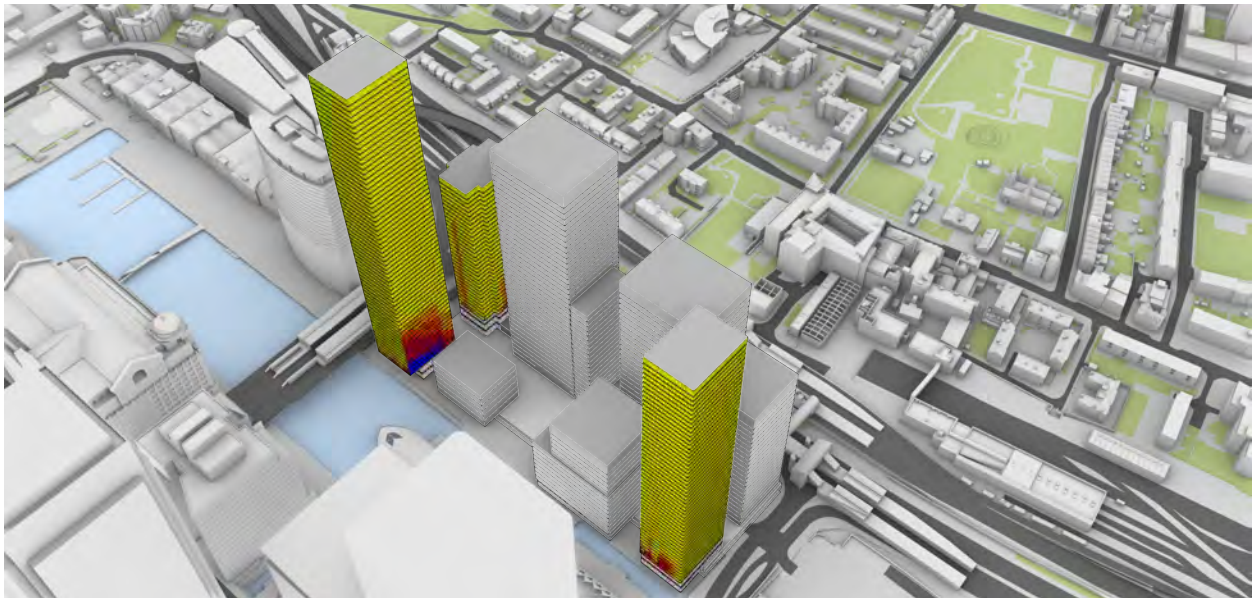


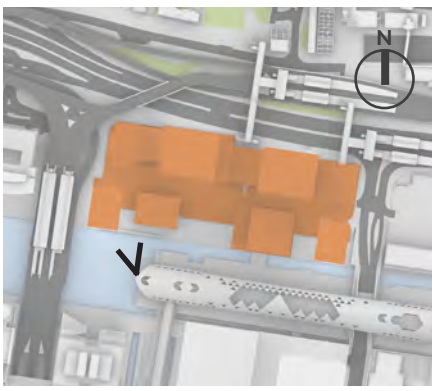
WINTER (%)

SUNLIGHT POTENTIAL - ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL

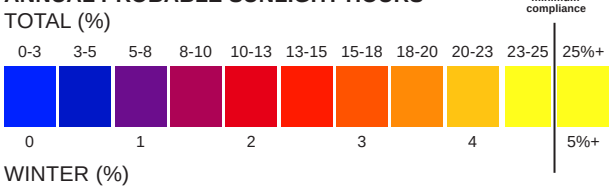


WINTER



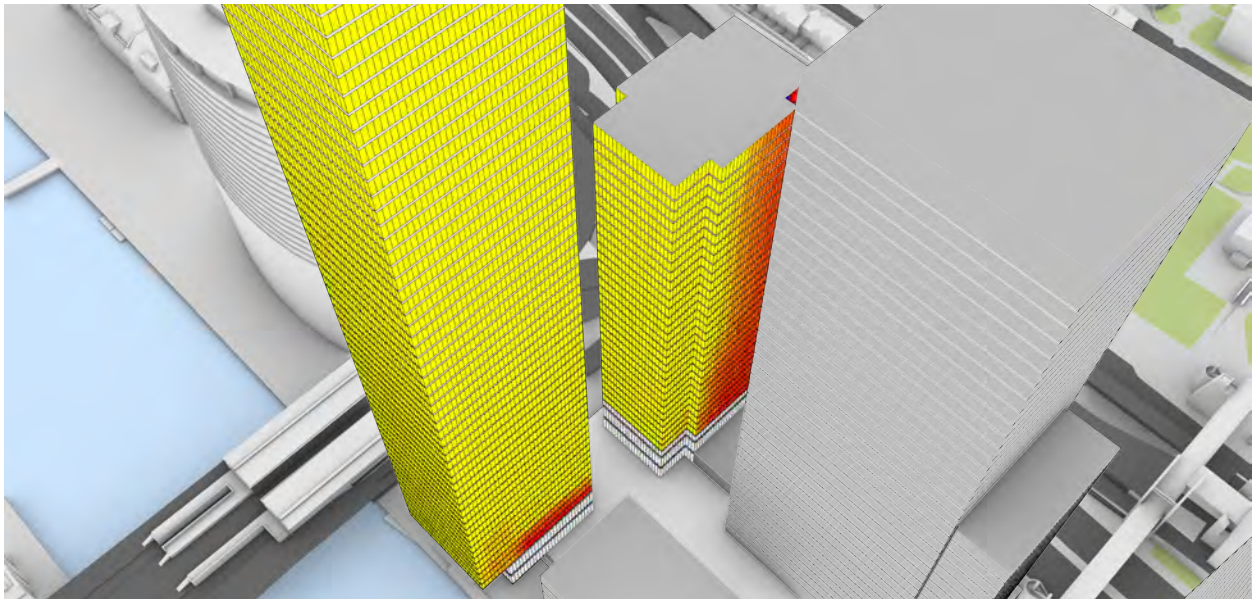


ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL (%)

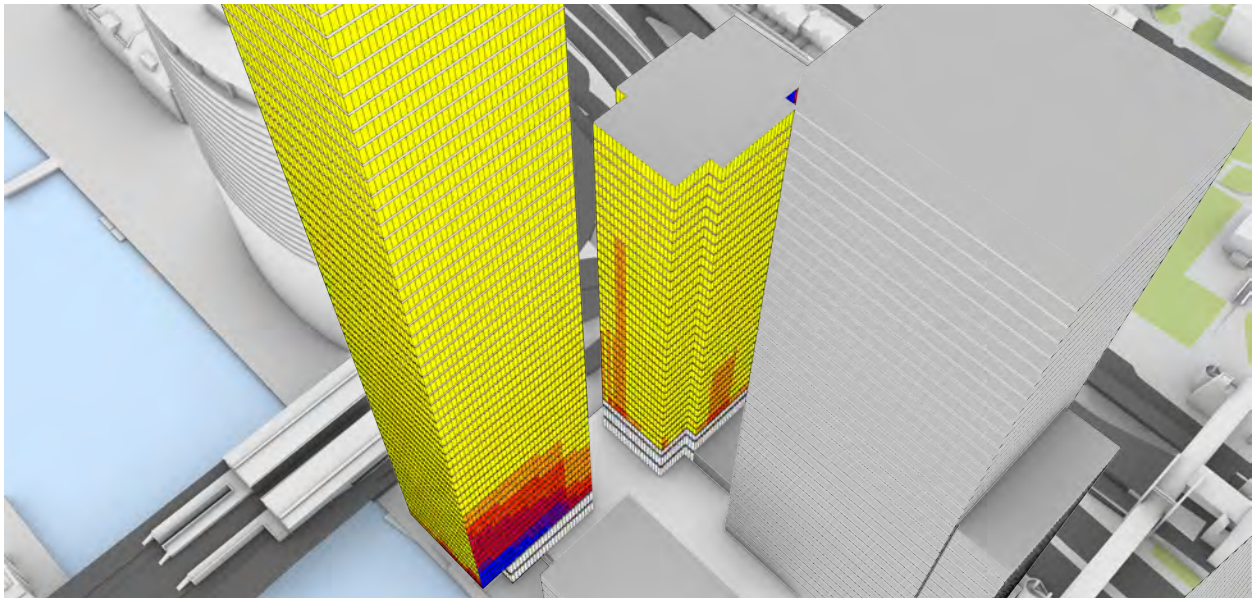


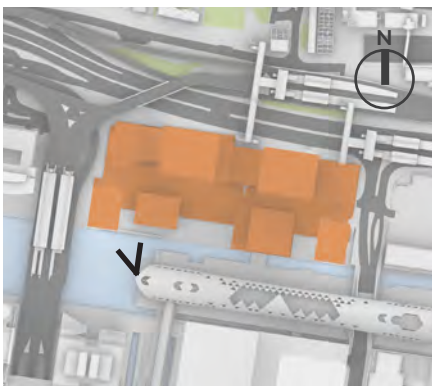
WINTER (%)

SUNLIGHT POTENTIAL - ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL



WINTER





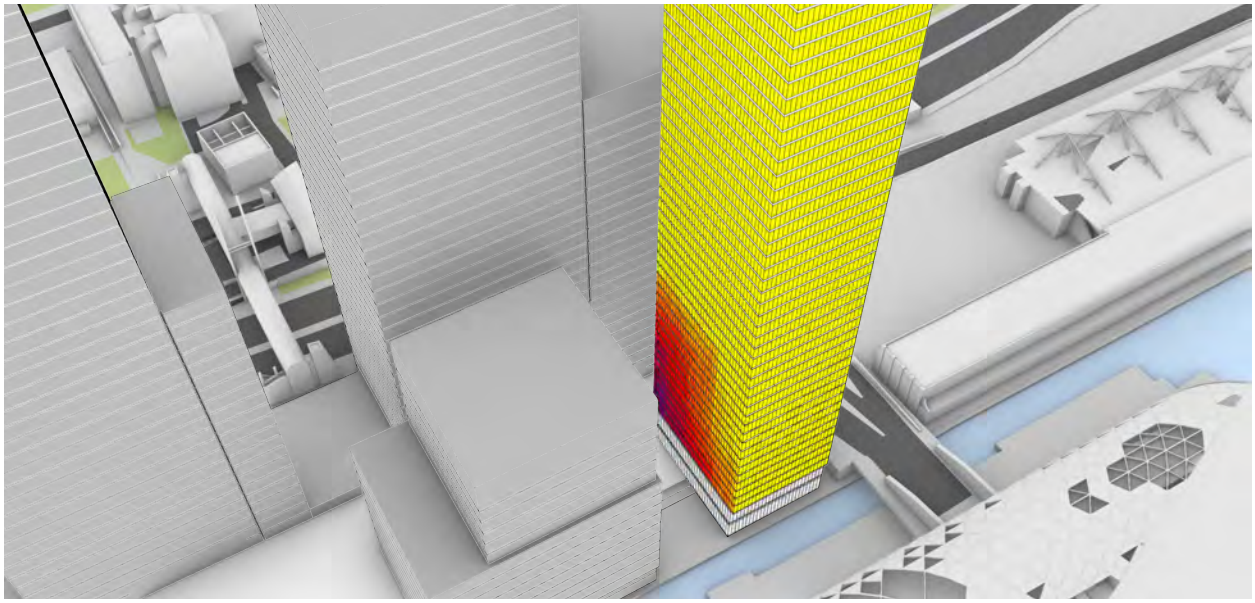
ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL (%)

0-3	3-5	5-8	8-10	10-13	13-15	15-18	18-20	20-23	23-25	25%+
0		1		2		3		4		5%+

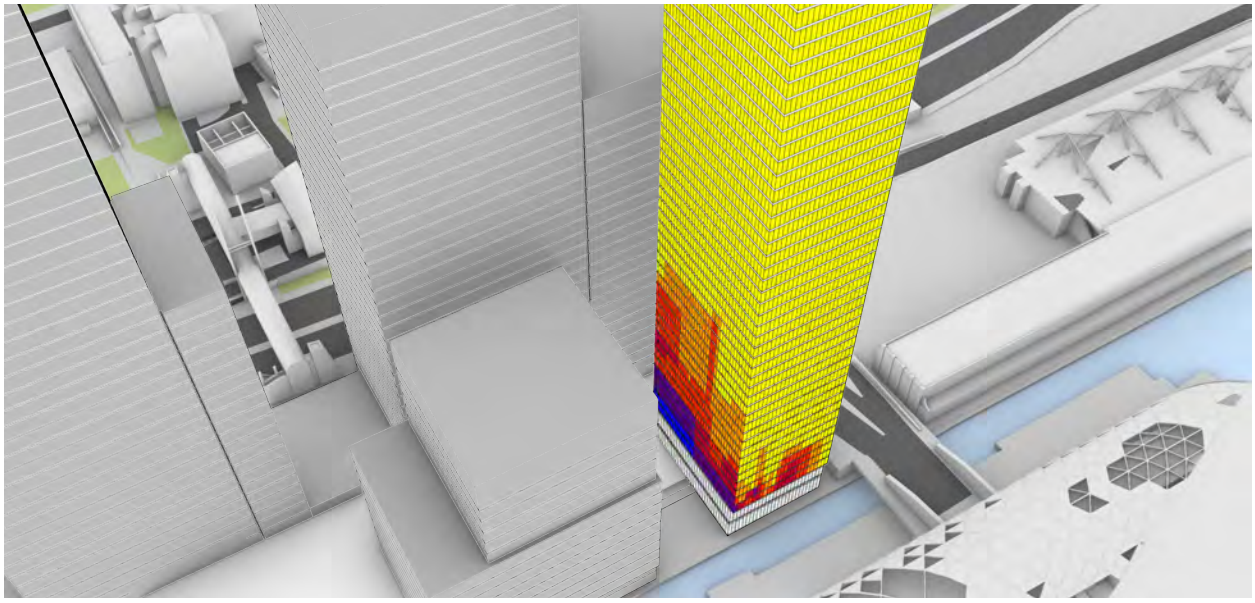
minimum compliance

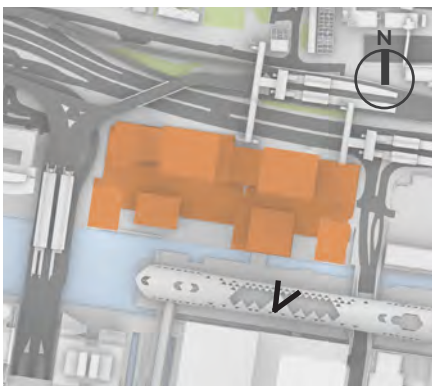
WINTER (%)

SUNLIGHT POTENTIAL - ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL



WINTER





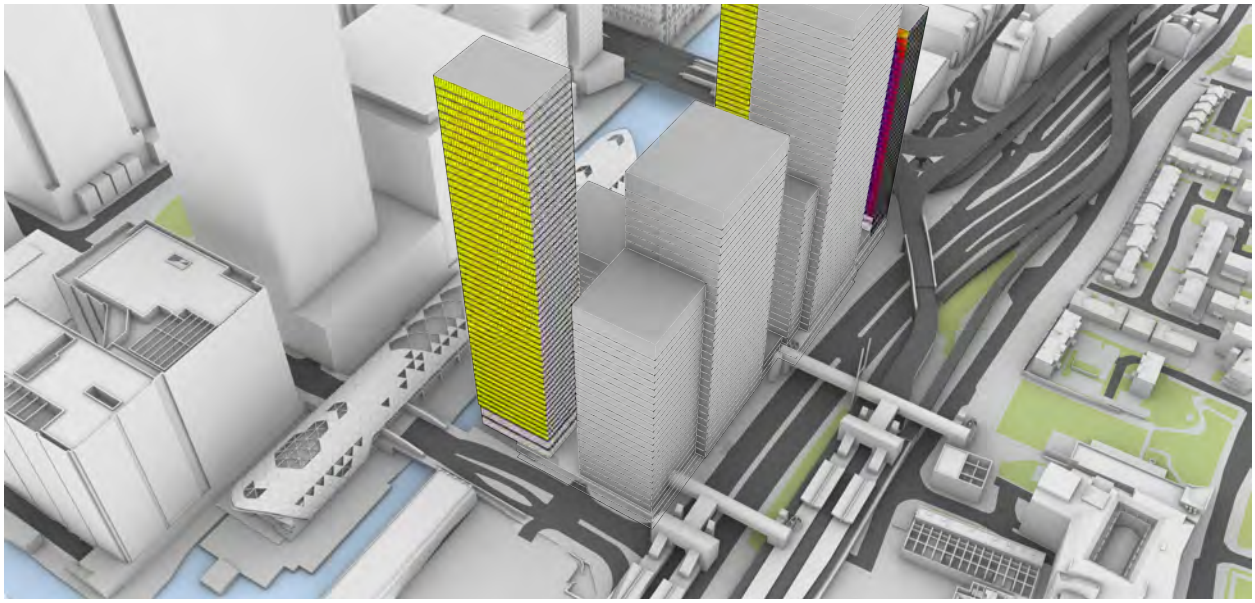
ANNUAL PROBABLE SUNLIGHT HOURS

TOTAL (%)

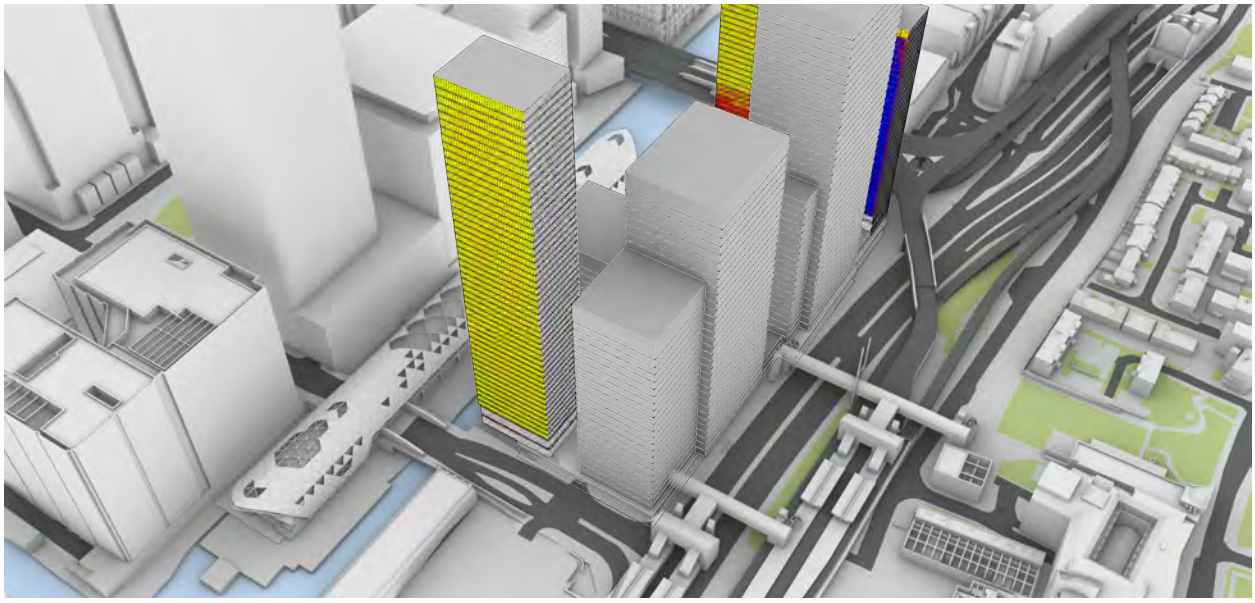
0-3	3-5	5-8	8-10	10-13	13-15	15-18	18-20	20-23	23-25	25%+
									minimum compliance	
0		1		2		3		4		5%+

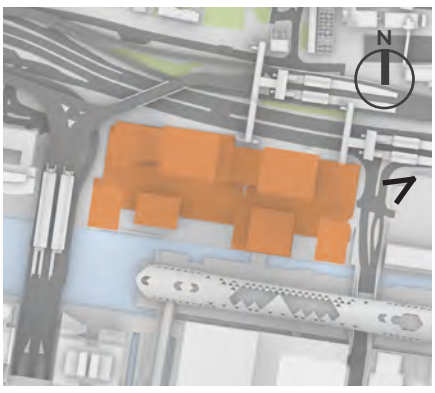
WINTER (%)

SUNLIGHT POTENTIAL - ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL



WINTER





ANNUAL PROBABLE SUNLIGHT HOURS
TOTAL (%)

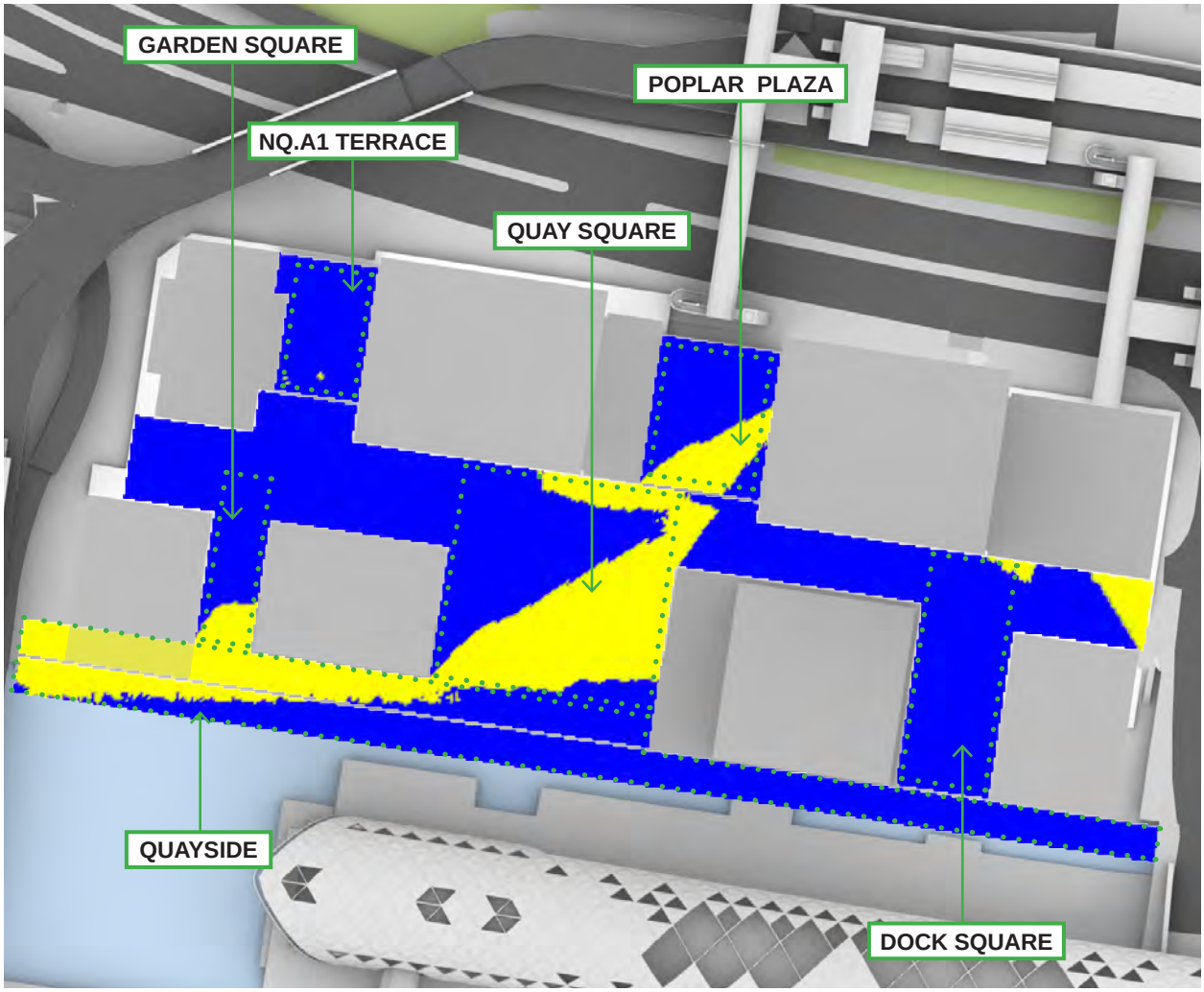
0-3	3-5	5-8	8-10	10-13	13-15	15-18	18-20	20-23	23-25	25%+
0		1		2		3		4		5%+

minimum compliance

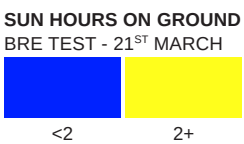
WINTER (%)

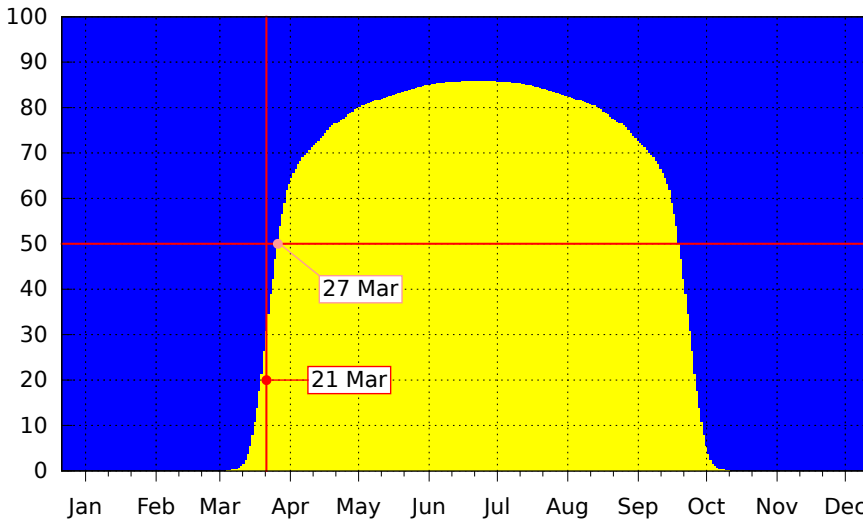
10. Overshadowing Assessments

OPEN SPACE - OVERSHADOWING ASSESSMENT
SUN HOURS ON GROUND - 21ST MARCH - BRE TEST CONTOUR LINES

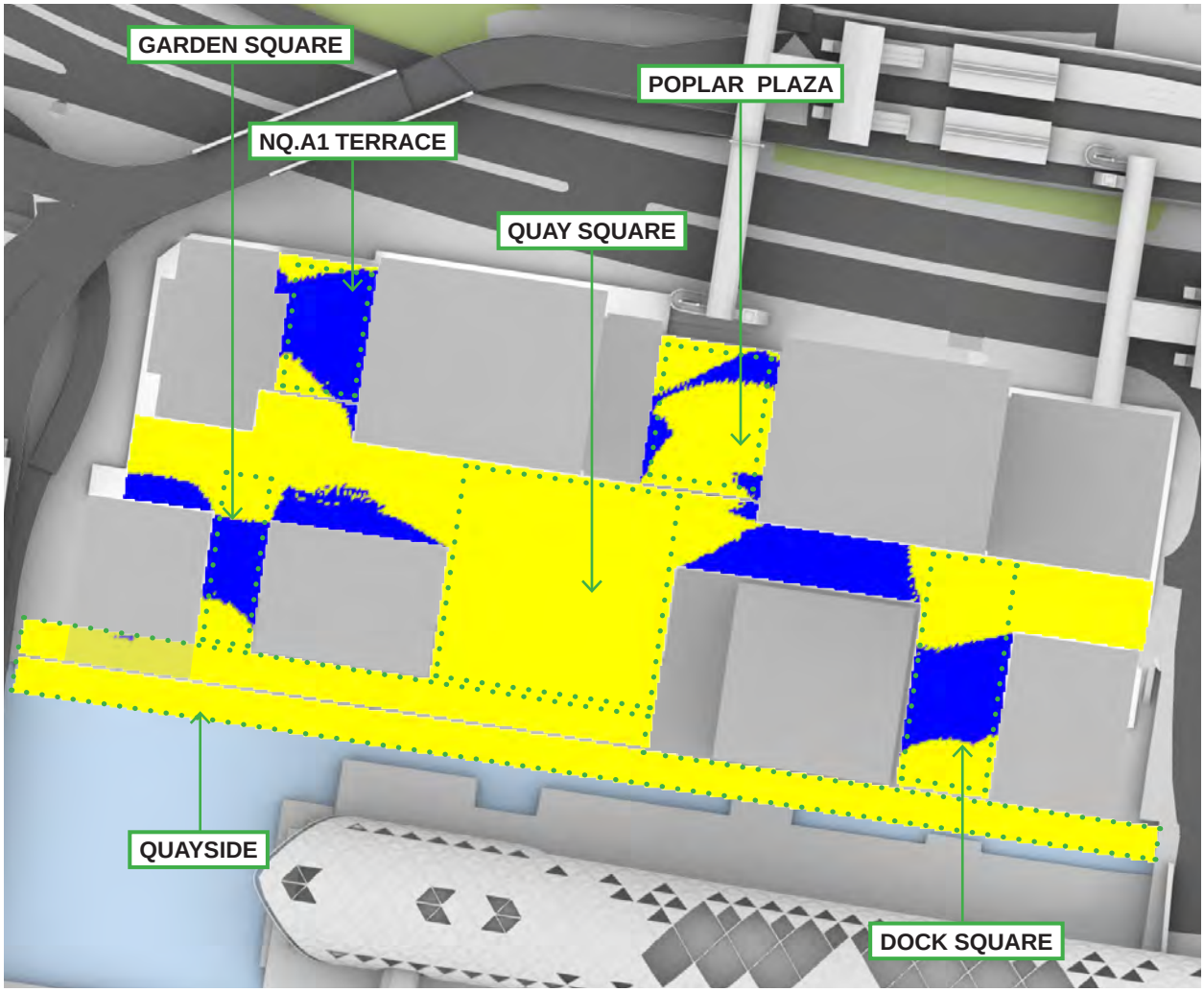


(BRE RECOMMENDS 2+ HOURS OF SUNLIGHT ON 21ST MARCH FOR AT LEAST 50% OF THE OPEN SPACE)
OVERALL PERCENTAGE AREA SEEING 2+ HOURS: 31%





OPEN SPACE - OVERSHADOWING ASSESSMENT
SUN HOURS ON GROUND - 21ST JUNE - 2 HOURS TEST CONTOUR LINES

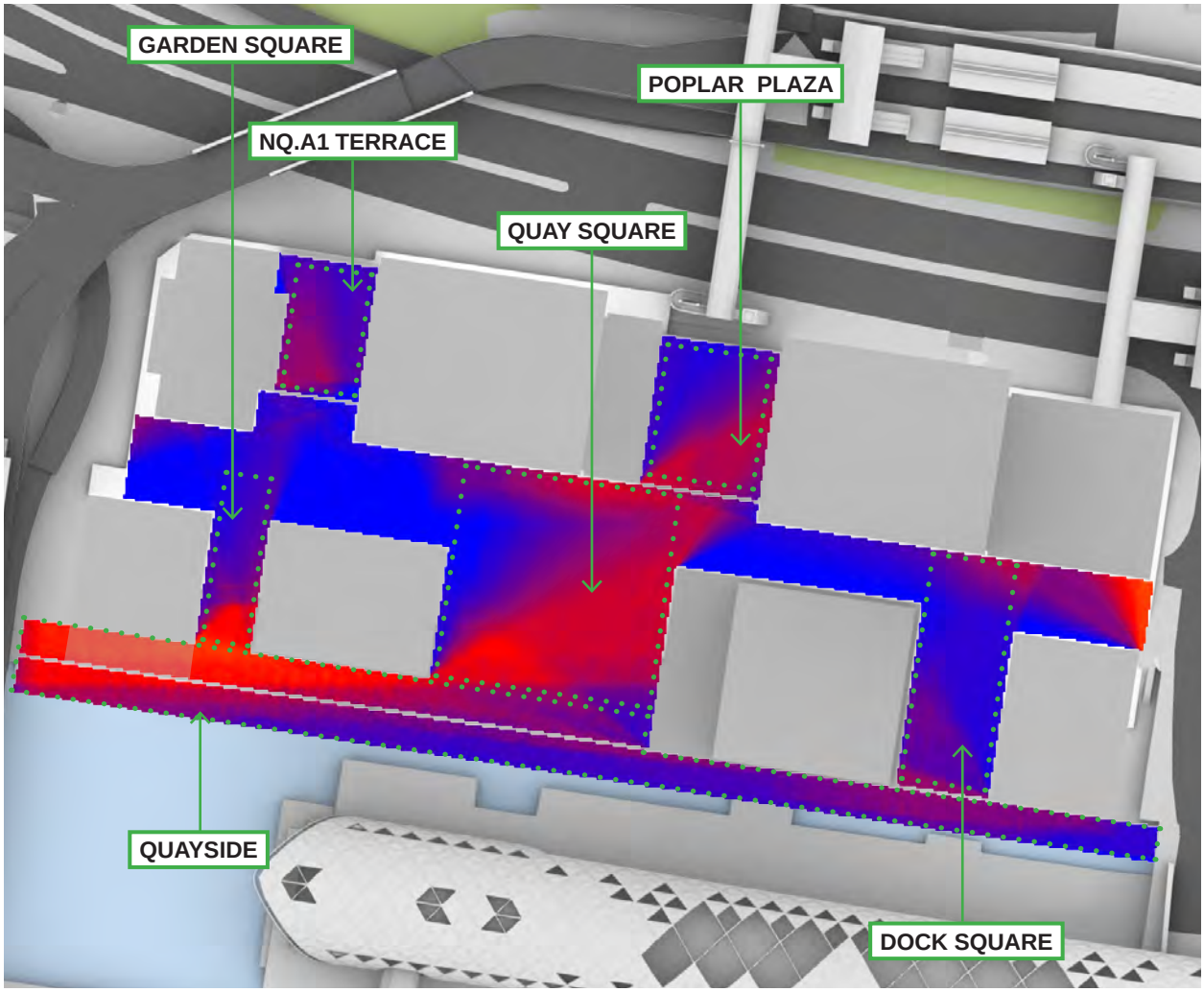


OVERALL PERCENTAGE AREA SEEING 2+ HOURS: 81%

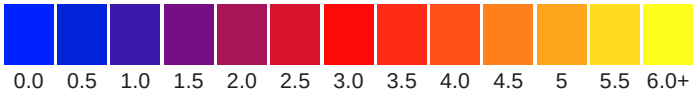
SUN HOURS ON GROUND
21ST JUNE

<2 2+

OPEN SPACE - OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST MARCH



SUN EXPOSURE
TOTAL HOURS



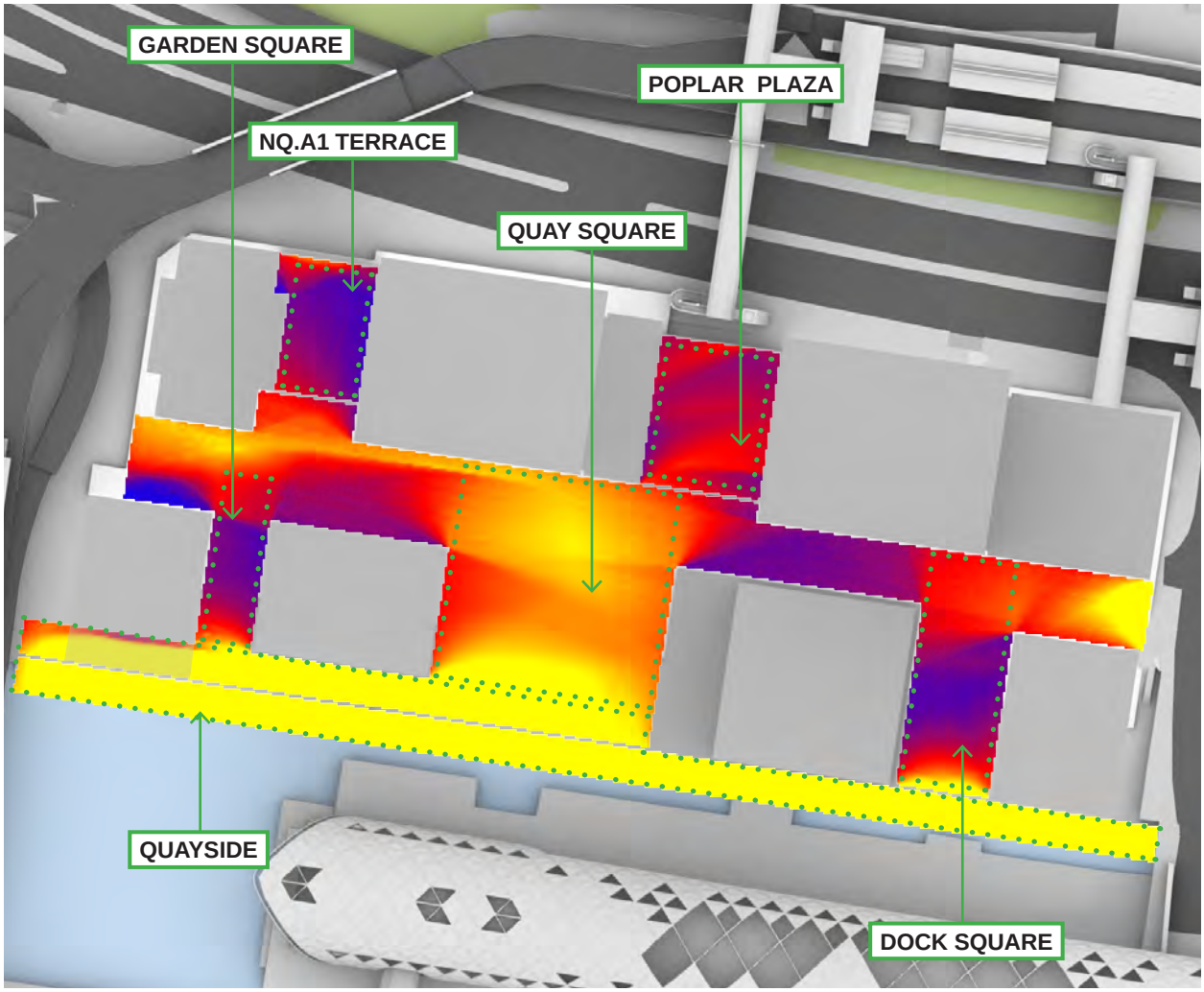
21st MARCH
(SPRING EQUINOX)

LONDON

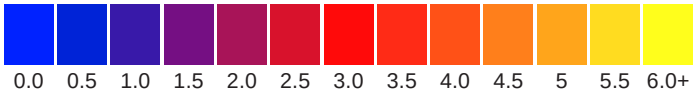
Latitude:	51.4
Longitude:	0.0
Sunrise:	06:02 GMT
Sunset:	18:14 GMT

Total Available Sunlight:
12hrs 12mins

OPEN SPACE - OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST JUNE



SUN EXPOSURE
TOTAL HOURS



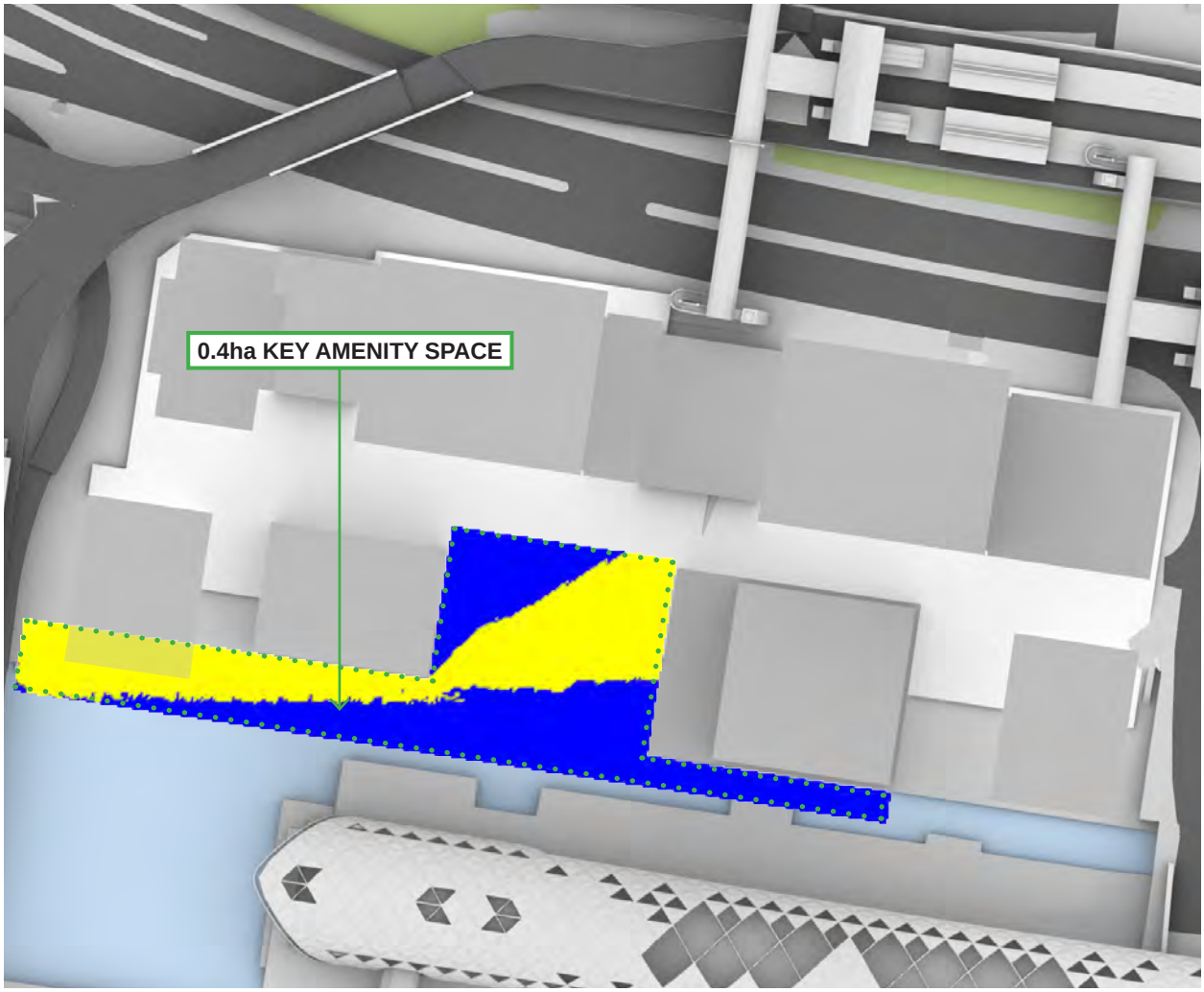
21st JUNE
(SUMMER SOLSTICE)

LONDON

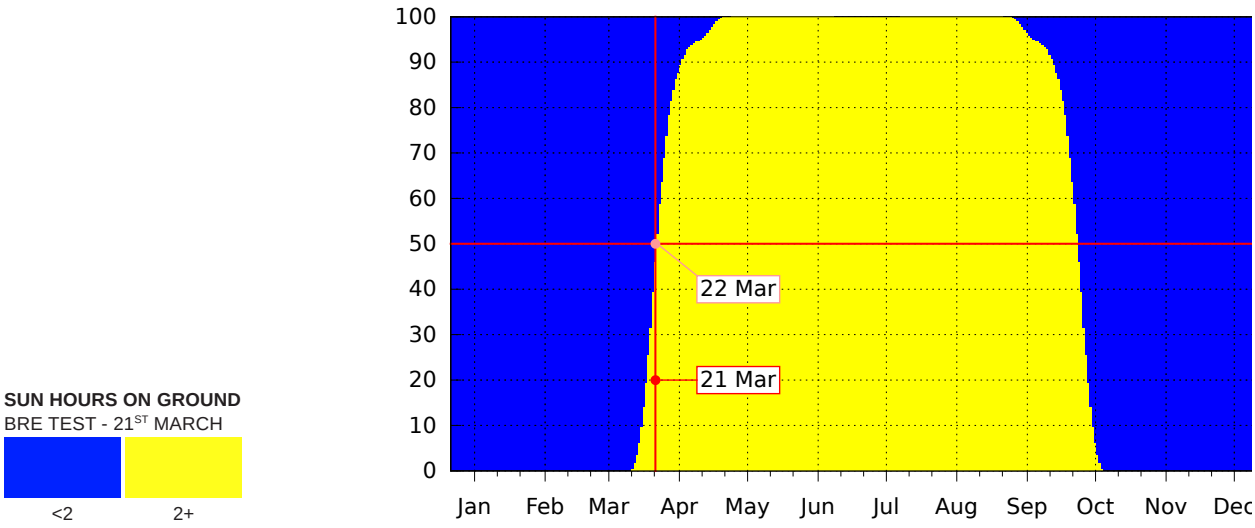
Latitude:	51.4
Longitude:	0.0
Sunrise:	04:43 BST
Sunset:	21:21 BST

Total Available Sunlight:
16hrs 38mins

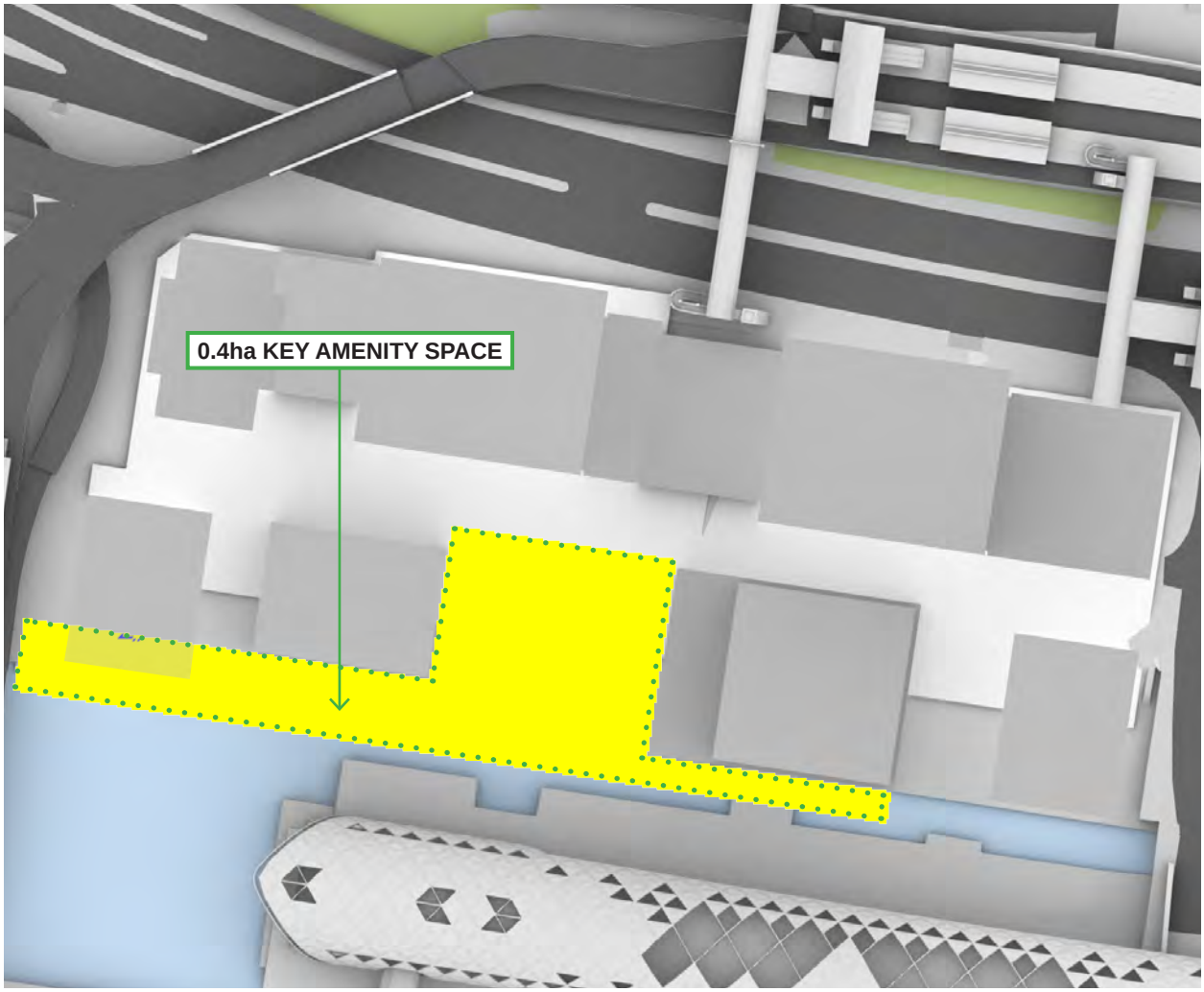
AMENITY SPACE - OVERSHADOWING ASSESSMENT
SUN HOURS ON GROUND - 21ST MARCH - BRE TEST CONTOUR LINES



(BRE RECOMMENDS 2+ HOURS OF SUNLIGHT ON 21ST MARCH FOR AT LEAST 50% OF THE OPEN SPACE)
OVERALL PERCENTAGE AREA SEEING 2+ HOURS: 46%



AMENITY SPACE - OVERSHADOWING ASSESSMENT
SUN HOURS ON GROUND - 21ST JUNE - 2 HOURS TEST CONTOUR LINES

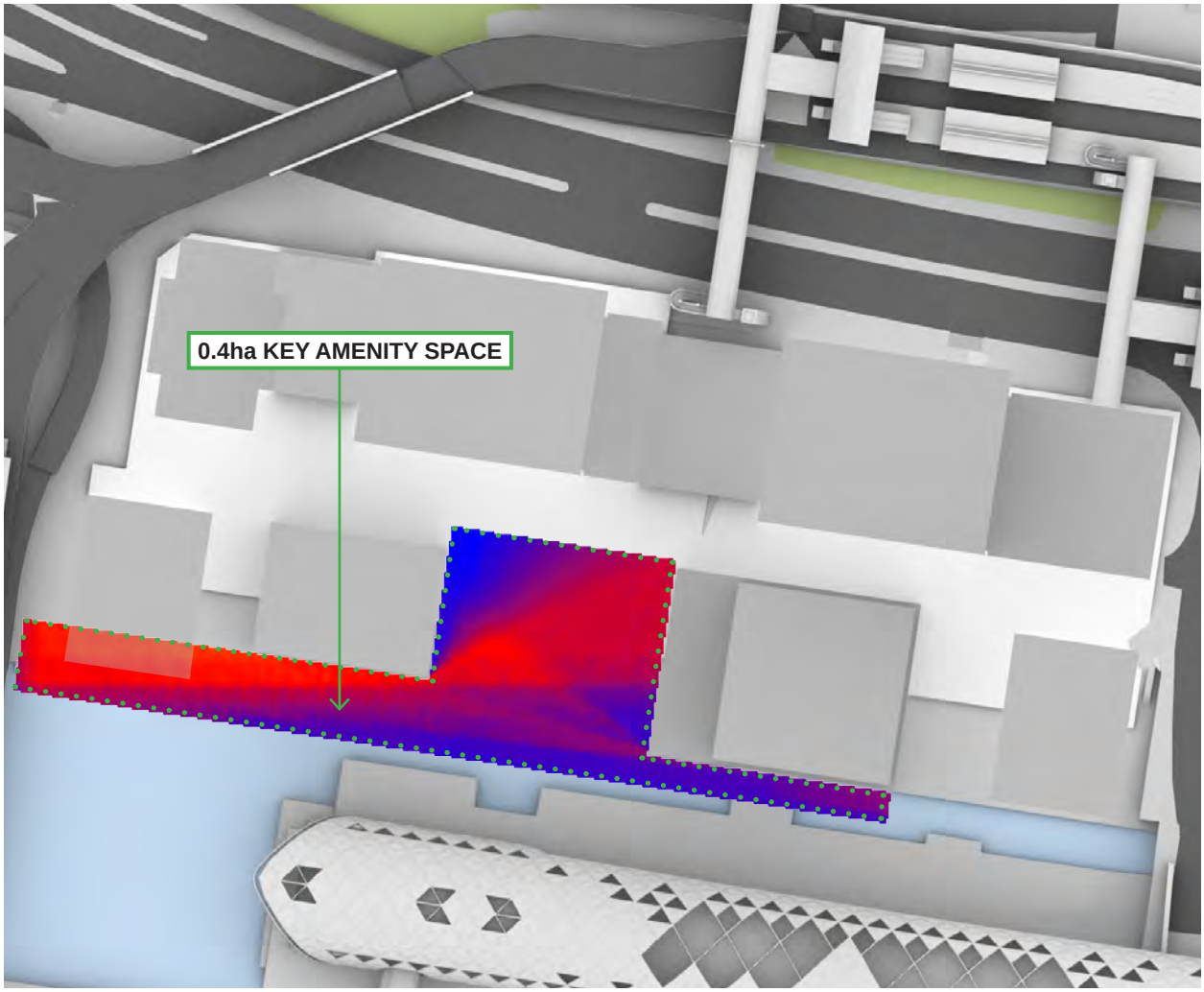


OVERALL PERCENTAGE AREA SEEING 2+ HOURS: 100%

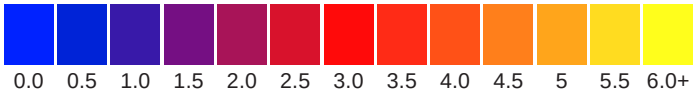
SUN HOURS ON GROUND
21ST JUNE

<2 2+

AMENITY SPACE - OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST MARCH



SUN EXPOSURE
TOTAL HOURS



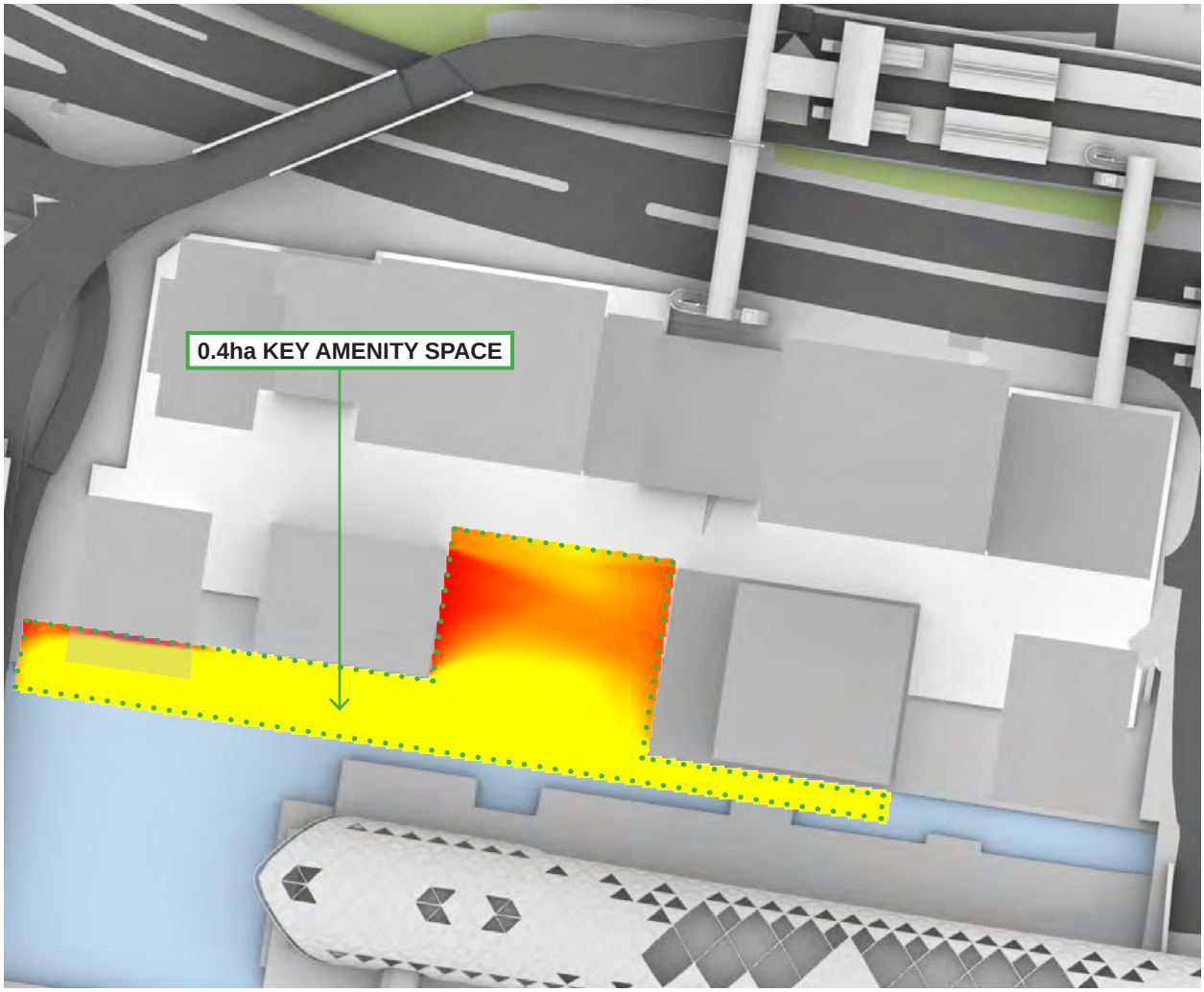
21st MARCH
(SPRING EQUINOX)

LONDON

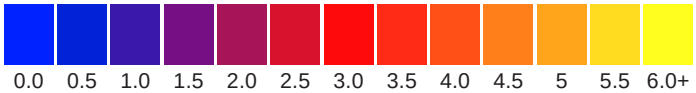
Latitude:	51.4
Longitude:	0.0
Sunrise:	06:02 GMT
Sunset:	18:14 GMT

Total Available Sunlight:
12hrs 12mins

AMENITY SPACE - OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST JUNE



SUN EXPOSURE
TOTAL HOURS



21st JUNE
(SUMMER SOLSTICE)

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	04:43 BST
Sunset:	21:21 BST

Total Available Sunlight:
16hrs 38mins

Appendix 1 - Abbreviations

OPP	Outline Planning Permission
LBC	Listed Building Consent
OPA	Outline Planning Application
LBTH	London Borough of Tower Hamlets
DLR	Docklands Light Railway
PTAL	Public transport accessibility level
AOD	Above Ordnance Datum
BRE	Building Research Establishment
VSC	Vertical Sky Component
APSH	Annual Probable Sunlight Hour
SHOG	Sun Hours on Ground
CIBSE	Chartered Institution of Building Services Engineers
RMA	Reserved Matters Application

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