April 2024

Proposed New Residential Development,

New Road, Donabate, Co. Dublin

Daylight and Sunlight Assessment Report

Applicant: Fingal County Council

"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design." - BR 209

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Report Contents

The following report has been prepared by 3D Design Bureau (3DDB). 3DDB have over 7 years experience in producing daylight and sunlight assessments for large scale planning applications and are recognised as experts in the field. This report has been reviewed and overseen by Nicholas Polley and Richard Dalton. Nicholas is CEO of 3D Design Bureau and is a qualified Building Services Engineer (B.Sc.(Eng) Dip Eng) with over 25 years experience in the industry. Richard is Associate Director of 3DDB and has a bachelors degree in Building Information Modelling (BIM) with over 20 years experience in the industry.

1.0 Executive Summary

1.1 Summary of Assessment

3D Design Bureau (3DDB) were commissioned to carry out a scheme performance assessment for daylight and sunlight for the apartment building within the proposed new residential development at New Road, Donabate, Co. Dublin. An accompanying shadow study has also been included in the appendix section of this report.

The subject site is bounded by the existing residential development of St. Patrick's Park to the west, the granted residential development at Ballymastone (ABP-315288-22) to the north, and the recently completed residential development at Lands at Ballymastone (ABP-311447-21, altered under F22A/0686) to the east. For the purpose of this study, the granted development to the north (ABP-315288-22) has been considered as built in the existing surrounding context, according to the information available from the planning authority.

It should be noted that following a high level evaluation of the neighbouring environment aforementioned, none of the existing and granted surrounding properties would fall within the 25 degree criterion as per the BRE Guidelines (under the reasonable assumption that windows on the gables in close proximity to the shared site boundary service non-habitable rooms). Therefore, no further impact assessment has been carried out.

Scheme Performance

Daylight access for the habitable rooms of the apartment building within the proposed development has been assessed through a Spatial Daylight Autonomy (SDA) study. Sunlight access for the same rooms has been quantified through a Sunlight Exposure (SE) assessment. A Sun On Ground (SOG) study has also been carried out to indicate the level of sunlight on March 21st in the proposed outdoor public amenity spaces. The results of these scheme performance assessments, which are in accordance with the BRE Guidelines, can be found in section A.0 on page 19. These results are summarised in section 1.2 and explained in section "5.0 Analysis of Results" on page 14.

Supplementary scheme performance studies have also been carried out. These include an SDA assessment under the I.S. EN 17037 criterion, and a No Sky Line (NSL) study within proposed habitable rooms. The results of the supplementary scheme performance assessments can be found in section B.0 on page 33.

Following completion of all assessments, as fully detailed in this report, it is the opinion of 3DDB that the provision for daylight and sunlight within the apartments is very favourable.

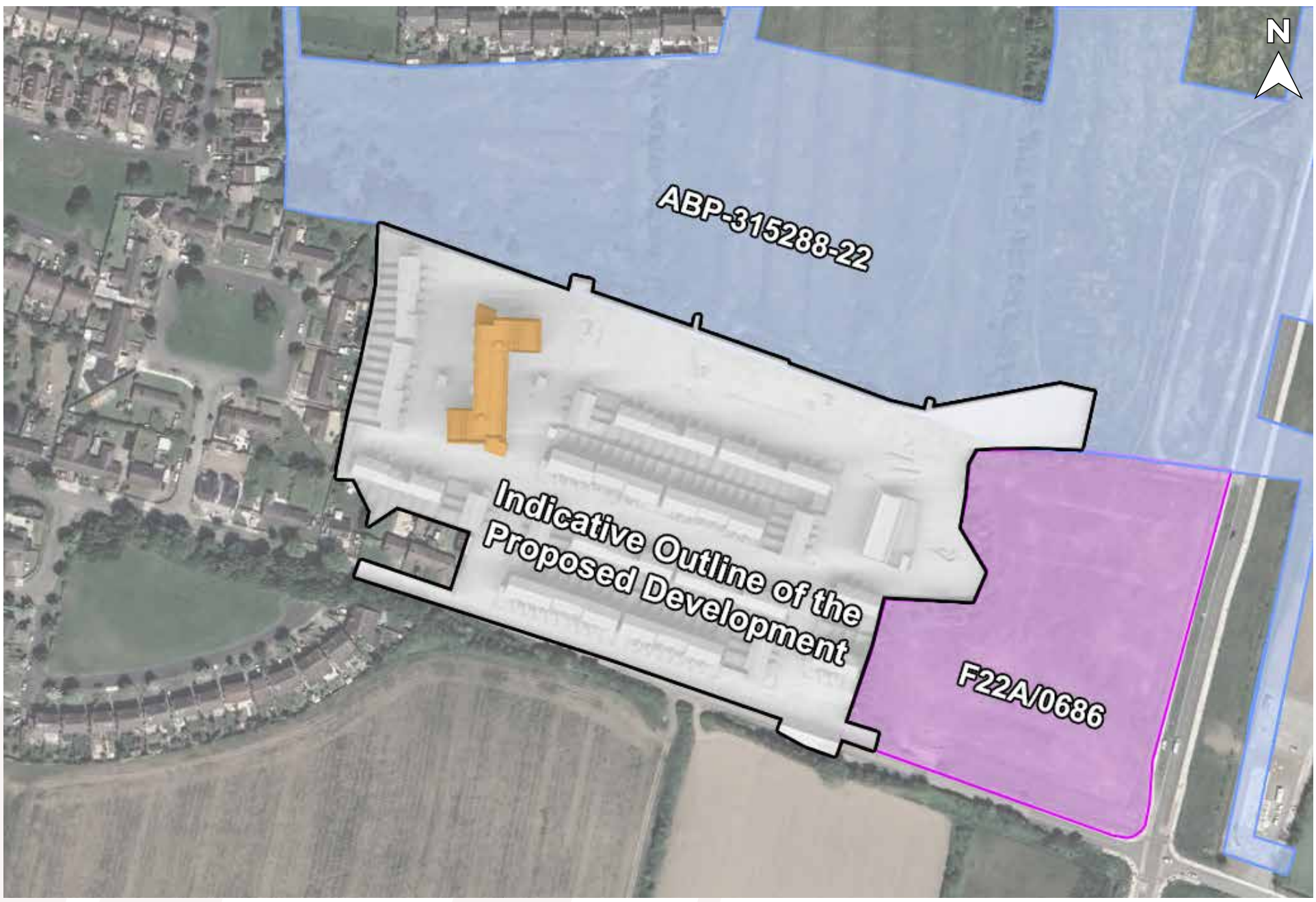

Figure 1.1: Indicative outline of proposed development and adjacent residential schemes (the assessed apartment building is marked in orange).

1.2 Scheme Performance Results Overview:

Spatial Daylight Autonomy (SDA):

Spatial Daylight Autonomy (SDA) BRE 209 Criteria	
Unit Count	52
Rooms Assessed	136
Without Trees	
Compliant	136
Non-compliant	0
Compliance Rate*	100%
Trees in Winter State (Proposed and Existing Trees)	
Compliant	136
Non-compliant	0
Compliance Rate*	100%
Trees in Summer State (Proposed and Existing Trees)	
Compliant	136
Non-compliant	0
Compliance Rate*	100%
Note: It is the expert opinion of 3DDB that the appropriate criteria for SDA assessments are that of the BRE Guidelines (BRE 209)	

Sunlight Exposure (SE):

Sunlight Exposure (SE)	
Units Assessed	52
SE with trees as opaque objects	
Non-Compliant	6
Minimum	4
Medium	11
High	31
Compliance Rate*	c. 88%
SE without deciduous trees	
Non-Compliant	3
Minimum	4
Medium	10
High	35
Compliance Rate*	c. 94%

Sun on Ground (SOG):

Sun On Ground (SOG) in proposed outdoor public amenity areas	
Areas Assessed	5
Areas meeting the guidelines	5
Areas not meeting the guidelines	0
Compliance Rate	100%

* Compliance rates stated are based on the units within the apartment building that have been assessed.

1.3 Supplementary Assessment Results Overview

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion:

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion	
Unit Count	52
Rooms Assessed	136
Without Trees	
Compliant	130
Non-compliant	6
Compliance Rate*	c. 96%
Trees in Winter State (Proposed and Existing Trees)	
Compliant	118
Non-compliant	18
Compliance Rate*	c. 87%
Trees in Summer State (Proposed and Existing Trees)	
Compliant	108
Non-compliant	28
Compliance Rate*	c. 79%
Note: The study under the I.S. EN 17037 criterion should be considered a supplementary assessment. It is the expert opinion of 3DDB that the appropriate criteria are that of the BRE Guidelines (BRE 209)	

No Sky Line (NSL):

No Sky Line (NSL):	
Unit Count	52
Rooms Assessed	136
Yes	136
No	0
Compliance Rate**	100%
** As the BRE Guidelines do not provide a recommended minimum for NSL in proposed developments, compliance rates for NSL are calculated using a criteria applied by 3DDB.	

* Compliance rates stated are based on the units within the apartment building that have been assessed.

2.0 Guidelines / Standards

Whilst the subject of this report is related to scheme performance only, this section refers to guidelines and standards for daylight and sunlight assessment for both impact assessment and scheme performance.

Summary

Neither the British Standard, European Standard, British Annex to the European Standard nor the BRE Guide set out rigid standards or limits. They are all considered advisory documents. The BRE Guide is preceded by the following very clear statement as to how the design advice contained therein should be used:

"*The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.*"

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts, is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (e.g. lands in close proximity or immediately to the south of residential lands). A compromise may have to be made concerning daylight and sunlight compliance to achieve national or local planning objectives.

It is the expert opinion of 3D Design Bureau, that the BRE Guidelines (*BR 209*) are the most appropriate guiding document for daylight and sunlight assessment. For daylight within proposed developments, a supplementary study has also been carried out under the criteria of *I.S. EN 17037*. The rationale for this opinion is outlined below.

Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities. (2023)

In July 2023, the Department of Housing, Planning and Local Government published a guidance document for new apartments, *Sustainable Urban Housing: Design Standards for New Apartments*. This document makes reference to, *EN 17037:2018: Daylight in Buildings* (the European Standard), *BS EN 17037:2018: Daylight in Buildings* (the UK National Annex to the European Standard) and to the 3rd edition of Building Research Establishment's *Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice* (BR 209 2022).

Paragraph 6.7 of the 2023 apartment guidelines states:

"*Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints [sic] associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.*"

As such, this report identifies where daylight and sunlight recommendations have and have not been achieved. Rationale and compensatory design solutions are the remits of the planning consultant and/or the project architect, these will also be included in this report when possible.

Note: Section 3.2 of the Urban Development and Building Height Guidelines 2018, provides similar guidance as above. However, it should be noted that at the time of publication of the *Urban Development and Building Height Guidelines (2018),* BR 209 was in the 2nd edition, first published in 2011. Since then, a 3rd edition of BR 209 has been published (June 2022) and the 2nd edition has been withdrawn. BR 209 no longer references *BS 8206-2:2008*, which has also been withdrawn. The standard used as reference in BR 209 edition 3 is *BS EN 17037*.

BRE - Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (2022)

This document will be referred to as *the BRE Guidelines* in this report.

At the time of writing this report, the BRE Guidelines are in the third edition (BR 209). The BRE Guidelines set out recommendations for appropriate levels of daylight and sunlight within a proposed development, as well as providing guidance on impacts arising from a proposed development to surrounding properties and amenity areas.

It is the expert opinion of 3D Design Bureau that the BRE Guidelines are the most appropriate guiding document for assessing daylight potential within a proposed development. The rationale for this opinion is outlined in the Dublin City Development Plan (2022-2028), which states:

"*Prior to 2018, Ireland had no standard for daylight. In 2018, the National Standards Authority of Ireland adopted EN 17037 to directly become IS EN 17037. It is important to note that no amendments were made to this document and unlike BS EN 317037, it does not contain a national annex. It offers only a single target for new buildings (there are no space by space targets – e.g. a kitchen would have the same target as a warehouse or office). It does not offer guidance on how new developments will impact on surrounding existing environments. These limitations make it unsuitable for use in planning policy or during planning applications. BR 209 must still be used for this purpose.*"

Whilst BRE Guidelines draws reference from BS EN 17037, there are some subtle differences between BR 209 and BS EN 17037. For the purposes of this report, the BRE Guidelines (BR 209) is considered the appropriate reference document.

A detailed description of the various recommendations for scheme performance is contained in section "4.2 Quantitative Scheme Performance Assessment Overview" on page 11 of this report.

EN 17037:2018: Daylight in Buildings (2018)

*EN 17037 i*s a European Standard that provides recommendations for daylight within spaces. (Emphasis added)

EN 17037:2018 recommends that 300 lux should be received across 50% of a hypothetical reference plane of any room for half of the daylight hours of the year, with no less than 100 lux received across 95% of the reference plane. No distinction is made for the function of the room for target lux levels within this standard.

It is the opinion of 3D Design Bureau that these target values are less appropriate for proposed residential developments than the recommendations made in the BRE Guidelines, which apply room-specific target values for appropriate LUX levels.

Recommendations made in EN 17037 regarding Sunlight Exposure for proposed developments have been incorporated into the BRE Guidelines. As such, Sunlight Exposure is deemed the appropriate assessment for sunlight within habitable rooms of the proposed development.

EN 17037 also makes recommendations related to glare and quality of view out. These aspects are not addressed in this report as these assessments have less relevance in a residential context where occupants have the freedom to move about in order to improve level of glare or alter the view out.

I.S. EN 17037:2018 Daylight in Buildings (2018)

*I.S. EN 17037 i*s a direct adoption of the European Standard *EN 17037:2018* that provides recommendations for daylight within spaces.

The target values given within *I.S. EN 17037* are directly adopted from *EN 17037*. As such, there are no room-specific recommendations for daylight. Because of these limitations, it is the expert opinion of 3D Design Bureau, that the recommendations made in the *BRE Guidelines* are more appropriate to use than those within *I.S. EN 17037*.

Regardless, a supplementary SDA study has been carried out on the proposed development using the criterion of *I.S. EN 17037*, with compliance rates stated. However, this should be considered a supplementary study.

BS EN 17037:2018: Daylight in Buildings (2018)

BS EN 17037 is the British Annex to the European Standard (see above). The British Annex acknowledges that a rigid application of the European Standard "may not be achievable". It states *"... it is the opinion of the UK committee that the recommendations for daylight provision in a space [...] may not be achievable for some buildings, particularly dwellings."*

In BS EN 17037, daylight recommendations differ depending on the function of a room. Target lux levels are applied across 50% of the reference plane of a room for half of the daylight hours. The target lux levels are:

• 200 Lux for kitchens • 150 Lux for living rooms • 100 Lux for bedrooms

No minimum is stated to be achieved across 95% of the working plane. If a space has dual purposes it is advised that the higher target value should be applied.

The Compact Growth Guidelines (2024)

The Compact Growth Guidelines offers guidance on compact growth principles as a means to promote sustainable development, efficient land use, and infrastructure while minimizing sprawl and environmental degradation, contributing to sustainable urban growth, enhance liveability and support broader planning objectives.

In regard to daylight, section 5.3.7 states:

"The provision of acceptable levels of daylight in new residential developments is an important planning consideration, in the interests of ensuring a high quality living environment for future residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties.

(...)

(b) In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context.

In drawing conclusions in relation to daylight performance, planning authorities must weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision, against the location of the site and the general presumption in favour of increased scales of urban residential development. Poor performance may arise due to design constraints associated with the site or location and there is a need to balance that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

The Compact Growth Guidelines should be applied within statutory development plans and during the consideration of individual planning applications. Flexibility in interpretation allows planning authorities to tailor recommendations to specific local contexts and planning objectives.

3.0 Glossary

3.1 Terms and Definitions

Below is a list of daylight and sunlight terminology that may be used in this report depending on the assessments carried out.

Skylight
Non directional ambient light cast from the sky and environment.

Sunlight
Direct parallel rays of light emitted from the sun.

Daylight
Combined skylight and sunlight.

Overcast sky model
A completely overcast sky model, used for daylight calculation.

Cloudless sky model
A completely cloudless sky model, used for sunlight exposure calculation.

Model State
The model state is a term used to describe the configuration of the digital model used to run analysis. Model states will typically reflect a baseline state and a proposed or cumulative state. For a definition of the model states used in the analysis carried out in this report, please refer to “Preparing the analytical model” on page 10.

Sunlight Exposure (SE)
The number of hours of direct sunlight a room can expect to receive on a given date between February 1st and March 21st at a determined point on the windows.

Spatial Daylight Autonomy (SDA)
Spatial Daylight Autonomy assesses whether a space receives sufficient daylight on a working plane during standard operating hours on an annual basis. For compliance, the target value is achieved across 50% of the working plane for half of the occupied period.

No Sky Line (NSL)
The no sky line divides points on the working plane which can and cannot see the sky.

Working plane
Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 850 mm above the floor in houses and factories, 700 mm above the floor in offices. The plane is offset 300mm from the room boundaries under BR 209 criteria, and 500mm from the room boundaries under I.S. EN 17037 criteria.

LKD
Living / Kitchen / Dining room.

BRE Target Value
When assessing the effect a proposed development would have on a neighbouring property, a target value will be applied. This applied target value is generated as per the criteria set out for each study in the BRE Guidelines.

Alternative Target Value
It could be appropriate to use alternative target values when conducting assessment of effect on existing properties. If such instances occur the rationale will be clearly explained and the instances where the alternative target values have been applied will be clearly identified.

Level of BRE Compliance
Each table in the study that has a column identified as “Level of BRE Compliance”, identifies how an assessed instance performs in relation to the appropriate target value. If the instance is in compliance with the recommendations as made in the BRE Guidelines the value will be expressed as “BRE Compliant”. If the instance does not meet the criteria as set out in the BRE Guidelines a percentage will be expressed to determine the level of compliance with the recommendation. This value determines the definition of effect.

LUX
Lux is a standardised unit of measurement of light level intensity. A measurement of 1 lux is equal to the illumination of a one metre square surface that is one metre away from a single candle.

3.2 Definition of Levels of Sunlight Exposure

For interiors, access to sunlight can be quantified. BR 209 recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used. The medium level of recommendation is three hours and the high level of recommendation four hours. For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion.

Level of Sunlight Exposure:

The level of sunlight exposure will be stated for each assessed room in the tables under section “A.3 Sunlight Exposure (SE) in Proposed Units” on page 26. Below is a list of the terms used to categorise the levels of sunlight exposure:

Below Minimum
Sunlight exposure will be categorised as ‘below minimum’ if the potential sunlight for the assessed room is less than 1.5 hours on March 21st. Note: the recommendation is that a room within a proposed unit is capable of receiving 1.5 hours of direct sunlight on March 21st. If an individual room does not achieve this recommendation, it does not mean that the unit is non compliant.

Minimum
A ‘minimum’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 1.5 hours and 3 hours on March 21st.

Medium
A ‘medium’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 3 hours and 4 hours on March 21st.

High
A ‘high’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is greater than 4 hours on March 21st.

Unit Compliance:

In addition to the level of sunlight exposure expressed for each room, compliance will be stated on a unit-by-unit basis. A proposed unit is considered to be compliant if any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on the assessment date.

Non-Compliant
If no habitable rooms within a proposed unit can receive 1.5 hours of sunlight on the assessment date, the unit will be categorised as ‘Non-Compliant’.

Compliant
If at least one habitable room within a proposed unit can receive 1.5 hours or more of sunlight on the assessment date, the unit will be categorised as ‘Compliant’.

Typically unit compliance will be stated for the best performing room per unit only, with lesser performing rooms indicated with a dash (-). However, if more than one room in a given unit is considered to be the best performing room (i.e. they have the same number of SE hours on March 21st), then the unit compliance column will be populated in the first instance only.

4.0 Methodology

4.1 Preparing the analytical model

4.1.1 Building the Model States

The architectural department of Fingal County Council supplied 3DDB with 3D models of the proposed apartment building and house types, from which a 3D analytical model was created. Landscape drawings were issued by Áit Urbanism + Landscape. A combination of survey information, aerial photography, available online photography and/or ordnance survey information were used to model the surrounding context and assessed buildings. **Note:** as the information gathered from online sources is not as accurate as surveyed information, a reasonable tolerance should be allowed to the modelling of the existing and granted houses, boundary treatments and the results generated.

Proposed model state

As illustrated in Figure 4.1, the proposed model state reflects the subject site if the development is built as proposed. This includes proposed landscaping on the subject site and the demolition of existing structures, etc. Proposed buildings have been positioned in their location on the subject site with relevant surrounding context, which includes the granted residential development at Ballymastone (ABP-315288-22) to the north, considered as built, and the recently completed residential development at Lands at Ballymastone (ABP-311447-21, altered under F22A/0686) to the east. Proposed trees have been included in the subject site according to the information provided by the landscape architect regarding size, location and species. It should be noted that, as no impact assessment was warranted on this project (see executive summary), no baseline model state was required.

All of the above information was subsequently used to prepare a digital analytical model in software specifically designed for daylight and sunlight analysis.

Relevant weather and climatic data has been obtained for this report using a localised EnergyPlus Weather File (IRL_Dublin.039690_IWEC.epw).

Figure 4.1: Model view of the proposed model state (proposed apartment building shown in red)

4.1.2 Trees

It is generally not possible to accurately represent trees in a digital 3D model as the size and shape will differ greatly from tree to tree. When modelling trees for this assessment assumptions have been made and tree geometry has been simplified.

For the purpose of the analysis carried out in this report, simplified models of proposed trees within the development have been included according to the information provided by the landscape architect.

BR 209 provides guidance on how trees should be treated depending on the study being carried out, as summarised below:

Sunlight Exposure (SE)

The BRE Guidelines state that as deciduous trees would not be in full leaf on the recommended assessment date (March 21st), sunlight would be expected to penetrate deciduous trees. However, as trees have so many variables, it is impossible to accurately represent how they would affect sunlight at a given time. The suggested methodology (BR 209) to allow for this is to run the sunlight exposure study in two states. Once with trees as opaque objects and secondly without deciduous trees in the assessment model. This gives a range of potential sunlight hours.

Spatial Daylight Autonomy (SDA)

BR 209 recommends when assessing daylight in a proposed building, it is appropriate to run the assessment with trees represented in both winter and summer conditions. Light transmittance values of 60% and 20% have been applied to deciduous tree canopies for winter and summer assessments respectively. A light transmittance value of 20% has been applied to evergreen trees throughout the year. Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

I.S. EN 17037 does not give any guidance on how trees should be represented. For the purpose of this report, the SDA calculation under the I.S. EN 17037 criteria has been carried out with trees represented in both winter and summer conditions. Light transmittance values of 60% and 20% have been applied to deciduous tree canopies for winter and summer assessments respectively. A light transmittance value of 20% has been applied to evergreen trees throughout the year. Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

No Sky Line (NSL)

Because some sky can usually be seen through a tree canopy, deciduous trees have not been included in the No Sky Line assessment model. Evergreen trees may be included in this assessment, particularly if there is a dense belt or group planned for windbreak or for privacy purposes.

Shadow Study

The hourly renderings of the shadow study have been generated with evergreen trees represented as opaque objects, where applicable, and without deciduous trees. This method best represents the methodology used for the impact assessment and allows for a better understanding of potential shadows cast by the proposed development through the tree canopy.

4.2 Quantitative Scheme Performance Assessment Overview

4.2.1 Spatial Daylight Autonomy in Proposed Habitable Rooms (SDA)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Spatial Daylight Autonomy (SDA) is the recommended metric for assessing daylight access within a proposed development. Spatial Daylight Autonomy replaces Average Daylight Factor (ADF) in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

Spatial Daylight Autonomy assesses whether a room receives sufficient daylight on a working plane during standard operating hours on an annual basis. A given target value should be achieved across 50% of the working plane for half of the daylight hours.

There are two methods for calculating SDA:

- **Calculation method using illuminance level:** This requires the use of a detailed daylight calculation method where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the site. This calculation method determines daylight provision directly from simulated illuminance values on the reference plane. The illuminance value of at least half the required area of the space should equal or exceed the target values.
- **Calculation method using daylight factor:** The daylight factor method assumes a constant ratio between internal and external illuminance. The daylight factors in the space shall be calculated by any reliable method that is based on the ISO 15469:2004 standard overcast sky (TYPE 1 or TYPE 16). Daylight factors are to be predicted across grid of points on a plane 0.85m above the floor of the space. The daylight factor of at least half the required area of the space should equal or exceed the target values.

It is the opinion of 3DDB that the calculation method using illuminance level better represents a real-world scenario as it accounts for the quality of daylight based on orientation. As such, the illuminance methodology has been adopted for all SDA assessments in this report using a localised EnergyPlus Weather File (IRL_Dublin.039690_IWEC.epw) to apply the relevant climate information.

In terms of housing, *BR 209* provides target SDA values to be received across at least 50% of the working plane for at least half the daylight hours. The target values differ based on the function of the room assessed:

· 200 Lux for kitchens · 150 Lux for living rooms · 100 Lux for bedrooms

Where rooms serve more than one function, the higher SDA target value should been taken.

Under I.S. EN 17037 at least 50% of the working plane should receive above 300 lux for at least half the daylight hours, with 95% of the working plane receiving above 100 Lux for all rooms. The target SDA values do not vary depending on the room function under this criteria.

This study has assessed the Spatial Daylight Autonomy (SDA) received in the habitable rooms of the proposed development under the BR 209 criterion. The SDA of the proposed development has been calculated under the I.S. EN 17037 criterion as part of a supplementary assessment.

Defining Rooms

Definition of rooms has been taken directly from the architectural drawings supplied by the project architect.

In accordance with the BRE Guidelines circulation spaces, corridors, bathrooms etc. have not been assessed.

Indication of the assessed space in each room is provided in the floor plans that correspond to the SDA results in the appendix section “Proposed Apartment Floor Plans” on page 19.

Working Plane

The calculation of SDA is carried out on a hypothetical working plane which lies 850 mm from the finished floor level in residential units and 700 mm in academic and office spaces.

In the BR 209 study the working plane is offset 300 mm from the room boundaries. Under the I.S. EN 17037 criteria the working plane is offset 500 mm from the room boundaries. The working plane has a grid density of c. 300 mm.

Material Palette

Following consultation with the design team, material values used for SDA calculations are as per the table below:

Table No. 4.2.1 - Material Palette for SDA Calculations

Object	Material	Reflectance	Object	Material	Reflectance / Transmittance
Exterior walls	Standard Brick	0.3	Interior Walls	Pastel paint	0.70
	Light Brick	0.4	Interior Ceiling	White paint	0.8
	Dark Brick	0.15	Interior Floor	Light timber	0.4
	Render	0.6	Miscellaneous	Miscellaneous	0.5
	Concrete	0.4	Glass	Double glazing	0.68
Ground cover	Paving	0.4		Maintenance factor	0.91
	Tarmac	0.2		Glass adjusted for maintenance	0.62
	Grass	0.2		Frosted glass	0.5

Project Assessment

The results for the study on SDA can be found in the appendix results section A.2 on page 21.

Analysis of the results can be found in section 5.1 on page 14.

The results of the supplementary SDA study under the I.S. EN 17037 criterion can be found in section B.0 on page 33.

4.2.2 Sunlight Exposure in Proposed Habitable Rooms (SE)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Sunlight Exposure (SE) is the recommended metric for assessing sunlight access within a proposed development. Sunlight Exposure replaces APSH/WPSH in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

Sunlight exposure (SE) is a measure of sunlight that a given window may expect to receive on a given date between the 1st of February and the 21st of March. The BRE guidelines suggest that March 21st (equinox) is used as the assessment date.

In the presence of trees, SE results have been generated, both with deciduous trees as opaque objects and without the inclusion of deciduous trees, in accordance with the BRE Guidelines. Evergreen trees have been included as opaque objects, where applicable, in both states.

The level of sunlight exposure is categorised as follows:

• 1.5 Hours - Minimum • 3 Hours - Medium • 4 Hours - High

The recommendation for dwellings is that at least one habitable room, preferably a main living room, should receive at least the minimum criterion. Should no room within a given unit meet the recommended minimum level of sunlight exposure, it will be stated as non-compliant.

Sunlight exposure is carried out on habitable rooms within a proposed development. The assessment point for windows is 1.2m above the finished floor level, or 0.3m above the sill level (which ever is higher). If a room has multiple windows, the amount of sunlight received by each can be added together provided they occur at different times and sunlight hours are not double counted.

The criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance, especially in developments that contain single aspect units.

Project Assessment

The results for the study on sunlight exposure can be found in the appendix results section A.3 on page 26, with analysis of the results in section 5.2 on page 15.

4.2.3 Sun On Ground in Proposed Outdoor Amenity Areas (SOG)

The BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of it should receive at least two hours of sunlight on March 21st.

March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

The analytical model for SOG assessment in proposed amenity areas includes evergreen trees, where applicable, as per the BRE Guidelines. Typically deciduous trees will not be included unless there is a particularly dense belt.

A quantitative SOG assessment has been carried out on the areas as indicated by the project architect. The shadow study and false colour plans allow for a qualitative assessment for all other areas.

The portion of each assessed space capable of receiving 2 hours of direct sunlight on March 21st has been calculated individually. These areas can be combined to give the development average where appropriate.

Project Assessment

The levels of sunlighting to proposed amenity areas, as indicated by the architect, have been assessed. However, it should be noted that the numbering of these spaces in the Daylight and Sunlight Assessment Report has been assigned by 3DDB specifically for the purposes of this report. If other consultants are referencing these spaces in their own reports, it is unlikely they will be numbered the same.

The results for the study on sun on ground in the proposed outdoor amenity areas (including a visual representation in the form of 2-hour false colour plans) can be found in the appendix results section A.4 on page 31, with analysis of the results in section 5.3 on page 15.

4.2.4 No Sky Line in Proposed Habitable Rooms (NSL)

The no sky line divides the areas of the working plane which can receive direct skylight, from those which cannot. It indicates the distribution of direct daylight within a room.

The BRE Guidelines recommend the No Sky Line study as an appropriate metric for an impact assessment to daylight, but only where room layouts are known.

"The calculation can only be carried out where room layouts are known. Using estimated room layouts is likely to give inaccurate results and is not recommended."

All advice given for NSL in the BRE Guidelines are in relation to impact assessments. NSL is not mentioned in the BRE section regarding daylight in new developments. Regardless, a NSL assessment was carried out on the proposed development as a supplementary study as it is requested in the DCC development plan 2022-2028. Although the proposed development is not located within Dublin City, the NSL study has been included to provide consistency across 3DDB daylight and sunlight assessments.

As the BRE Guidelines does not give advice on target NSL values for proposed rooms, no compliance rate has been stated. However a no skyline of 80% could be considered an appropriate figure given that the BRE Guidelines state that supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.

4.3 Qualitative Assessment - Shadow Study

A shadow study has been carried out to allow a qualitative comparison between the relevant model states, as outlined in section 4.1 on page 10. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in the appendix results section C.0 on page 43.

Hourly renderings have been shown from sunrise to sunset on the following dates:

- Spring equinox: March 21st Sunrise 6:32 | Sunset 18:32. (GMT)
- Summer solstice: June 21st. Sunrise 5:03 | Sunset 21:50. (BST)
- Winter solstice: December 21st Sunrise 8:46 | Sunset 15:59. (GMT)

The shadow study has been generated using the same model states as described in section 4.1.1. In certain cases, assumptions or estimations may have been made when modelling elements of the surrounding context and/or proposed site details when creating the various model states. Therefore, it is advisable for a reasonable tolerance to be applied when interpreting shadows in the qualitative assessment.

The hourly renderings of the shadow study will be generated without deciduous trees and with evergreen trees, where applicable, represented as opaque objects when present in the model states.

Note: The spring equinox (March 21st) and autumn equinox (21st September) yield similar shadows, albeit with a one hour difference as daylight saving time (BST) would be in effect. Only the spring equinox was included in the shadow study images in accordance with the BRE Guidelines.

5.0 Analysis of Results

5.1 Spatial Daylight Autonomy (SDA)

This study has assessed the Spatial Daylight Autonomy (SDA) received in all habitable rooms of the apartment building within the proposed development. This has ensured that a clear understanding has been obtained regarding the daylight performance of the proposed apartment building.

This proposed apartment building consists of 52 no. units, which makes up 136 no. habitable rooms.

Under the criteria as set out in the BR 209, the SDA value in all the habitable rooms meet or exceed their target values in both the summer and winter state calculations. This gives a compliance rate of 100% in both the assessments carried out with trees represented in summer and winter state.

The SDA study was initially tested without proposed trees, and all the rooms assessed achieved compliance with the BRE guidelines. The inclusion of the proposed trees, in the calculations, presented a reduction of the Lux levels recorded in some rooms. This can be expected but not to be considered a cause for concern. The reduction resulted in the non-compliance of some rooms at the ground floor level. 3DDB therefore worked very closely with the landscape architect to ensure that proposed trees would not adversely affect the compliance of any of the rooms. This was achieved through replacing and/or repositioning some of trees and species, while maintaining the desired design and levels of screening and privacy. Considering that trees form an integral part of any proposed development, reducing the risk of potential heat gain and providing a favourable outlook for occupants, the full compliance should be considered an excellent result and underpins the importance of collaborative design.

I.S. EN 17037 sets out more onerous recommendations for SDA. As such, the number of habitable rooms achieving compliance under this standard is 108 with summer trees and 118 with the trees represented in the winter state. This gives a reduced circa compliance rate of c. 79% & c. 87% in the summer and winter time calculations respectively. The additional SDA assessment, under this standard, that does not include trees has shown a compliance rate of c. 96%.

With regards to internal daylighting, Section 6.7 of the Sustainable Urban Housing: Design Standards for New Apartments July 2023, states the following:

"Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints [sic] associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

In cases where rooms comply with the criteria of BR 209 but do not meet the criteria of I.S. EN 17037, it is the recommendation of 3D Design Bureau that these rooms will appear adequately daylit. This recommendation is based on the fact that BR 209 provides room-specific criteria, unlike I.S. EN 17037. BR 209 considers the varying daylight requirements for different room types, which I.S. EN 17037 does not account for. However, compensatory design solutions have also been incorporated for units that do not meet the recommended daylight levels according to I.S. EN 17037.

The compensatory design solutions (CDSs) provided by the project architect are the following:

1. Floor areas are larger than the requirements in the Sustainable Urban Housing: Design Standards for New Apartments Appendix 1, and the Fingal Development Plan 2023-2029.
2. Private Open Space in the form of a balcony/terrace are larger than the area required in the Sustainable Urban Housing: Design Standards for New Apartments Appendix 1, and the Fingal Development Plan 2023-2029.
3. Dual Aspect provided to the open plan kitchen/dining/living room.
4. Favourable views of the high quality Communal Open Space or Public Open Space from the kitchen/dining/living rooms and bedrooms.
5. Floor to ceiling heights are more than that required in the Sustainable Urban Housing: Design Standards for New Apartments Appendix 1, and the Fingal Development Plan 2023-2029.
6. High quality Communal Open Space is provided for the use of the residents of all the apartments. At 680m², the Communal Open Space provided is more than double the size of the 318m² that is required in the Sustainable Urban Housing: Design Standards for New Apartments Appendix 1, and the Fingal Development Plan 2023-2029.

Table No. 5.3.4 - Compensatory Design Solutions (CDSs) for non-compliant units under SDA (I.S. EN 17037)

Unit Number	1. Floor Area above recommended minimum (%)	2. Private external amenity space (private Open Space) above recommended minimum (%)	3. Dual Aspect?	4. Favourable external views	5. Floor to ceiling height over minimum requirement	6. Communal Open Space over minimum required
B.00.01	7.10%	21.66%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.00.02	19.30%	52.00%	NO	-	2.7m	YES
B.00.03	5.30%	46.00%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.00.04	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.05	3.80%	4.28%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.06	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.07	8.50%	5.60%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.00.08	8.50%	5.60%	YES	Yes, overlooks Public Open Space	2.7m	YES
B.00.09	19.30%	52.00%	NO	Yes, overlooks Public Open Space	2.7m	YES

B.00.10	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.11	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.12	3.80%	4.28%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.13	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.14	7.10%	21.66%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.01.05	3.80%	4.28%	NO	Yes, overlooks Communal Open Space	2.55m	YES

The results for the study on SDA can be seen in section A.2 on page 21.

5.2 Sunlight Exposure (SE)

A sunlight exposure assessment has been carried out on all habitable rooms of the apartment building within the proposed development. The assessments have been carried out in two states:

- All trees represented as opaque objects.
- With the deciduous trees removed from the analytical model.

This approach is in accordance with the BRE Guidelines. Where a range of values is expressed in the following summary, this refers to the results generated with the deciduous trees included and with deciduous trees not included in the model. Evergreen trees where no light can penetrate all year round, are included in both studies, where applicable.

In total 52 no. units have been assessed. Using the rationale explained in section 3.2 on page 9, the level of sunlight exposure for 31-35 no. units is considered *high*, 11-10 no. *medium*, 4 no. have reached the *minimum* recommendation with 6-3 units below the *minimum* recommendation.

The SE assessment has shown that c. 88% - 94% of the proposed units meet the criteria for sunlight exposure as set out in the BRE Guidelines. **Note:** For a unit to be compliant under BR 209, only one habitable room within the unit needs to meet the guideline values.

Whilst the criterion applies to rooms of all orientations, it should be noted that if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance. In the case of the proposed apartment building, only 3 no. of the 52 no. units do not meet the minimum requirements when deciduous trees are removed from the model. These are all north-facing units located on subsequent floors from ground to second level. However, the overall design has shown to be sympathetic to the sunlight exposure, which is demonstrated by the very high compliance rates recorded. The inclusion of trees represented as opaque objects caused an additional 3 no. units to not achieve compliance for sunlight. However, the same considerations made for the daylight assessment in the previous paragraph, about the importance of trees in any balanced scheme, also applies.

No recommendation is made regarding the performance of a development as a whole for SE performance within the BRE Guidelines. However, it is the opinion of 3DDB that the proposed apartment building performs very favourably in this regard.

Compensatory design solutions have also been provided for the units that do not achieve the recommended level of sunlight under the sunlight exposure assessment:

Table No. 5.3.4 - Compensatory Design Solutions (CDSs) for non-compliant units under Sunlight Exposure

Unit Number	1. Floor Area above recommended minimum (%)	2. Private external amenity space (private Open Space) above recommended minimum (%)	3. Dual Aspect?	4. Favourable external views	5. Floor to ceiling height over minimum requirement	6. Communal Open Space over minimum required
B.00.03	5.30%	46.00%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.00.09	19.30%	52.00%	NO	Yes, overlooks Public Open Space	2.7m	YES
B.00.13	5.30%	46.00%	NO	Yes, overlooks Communal Open Space	2.7m	YES
B.00.14	7.10%	21.66%	YES	Yes, overlooks Communal Open Space	2.7m	YES
B.01.09	19.30%	52.00%	YES	Yes, overlooks Public Open Space	2.55m	YES
B.02.09	19.30%	52.00%	YES	Yes, overlooks Public Open Space	2.55m	YES

The results for the study on SE in the habitable rooms of the proposed units can be seen in section A.3 on page 26.

5.3 Sun On Ground in Proposed Outdoor Public Amenity Areas

This study has assessed the level of sunlight on March 21st within the proposed outdoor public amenity areas.

In total 5 no. spaces have been assessed, all of them meeting the criteria as set out in the BRE Guidelines.

The results for the study on sunlighting in the proposed outdoor amenity spaces can be found in section A.4 on page 31.

A visual representation of these readings can be seen in the false colour plan in section A.4 and in the hourly shadow diagrams for March 21st in section C.1 on page 43 of the appendix section of this report.

6.0 Conclusion

3D Design Bureau (3DDB) were commissioned to carry out a scheme performance assessment for daylight and sunlight for the apartment building within the proposed new residential development at New Road, Donabate, Co. Dublin. An accompanying shadow study has also been carried out.

Following a high level evaluation of the neighbouring environment, in which the granted residential development at Ballymastone (ABP-315288-22) to the north has been included as built for the purposes of this study, no further impact assessment was deemed necessary as per the criteria laid out in the BRE Guidelines (25 degrees rule).

The scheme performance assessments for daylight and sunlight carried out for the apartment building has yielded very favourable results. All the habitable rooms assessed would meet the daylight requirements set by the BRE Guidelines both in summer and winter state, resulting in full compliance. Moreover, the vast majority of these units will be able to access direct sunlight, as demonstrated by the very high compliance rates under the SE results.

Finally, the results for Sun on Ground (SOG) have demonstrated that the future occupants will have access to well-lit outdoor amenity spaces.

It is the opinion of 3DDB, that when considering the development, and whilst taking into account the daylight & sunlight provision, the results presented in this report should be seen as very favourable.

Appendix - Results

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Appendix Contents

Assessment criteria and detailed analysis of results can be found in the accompanying report.

A.0 Scheme Performance

A.1 Proposed Apartment Floor Plans

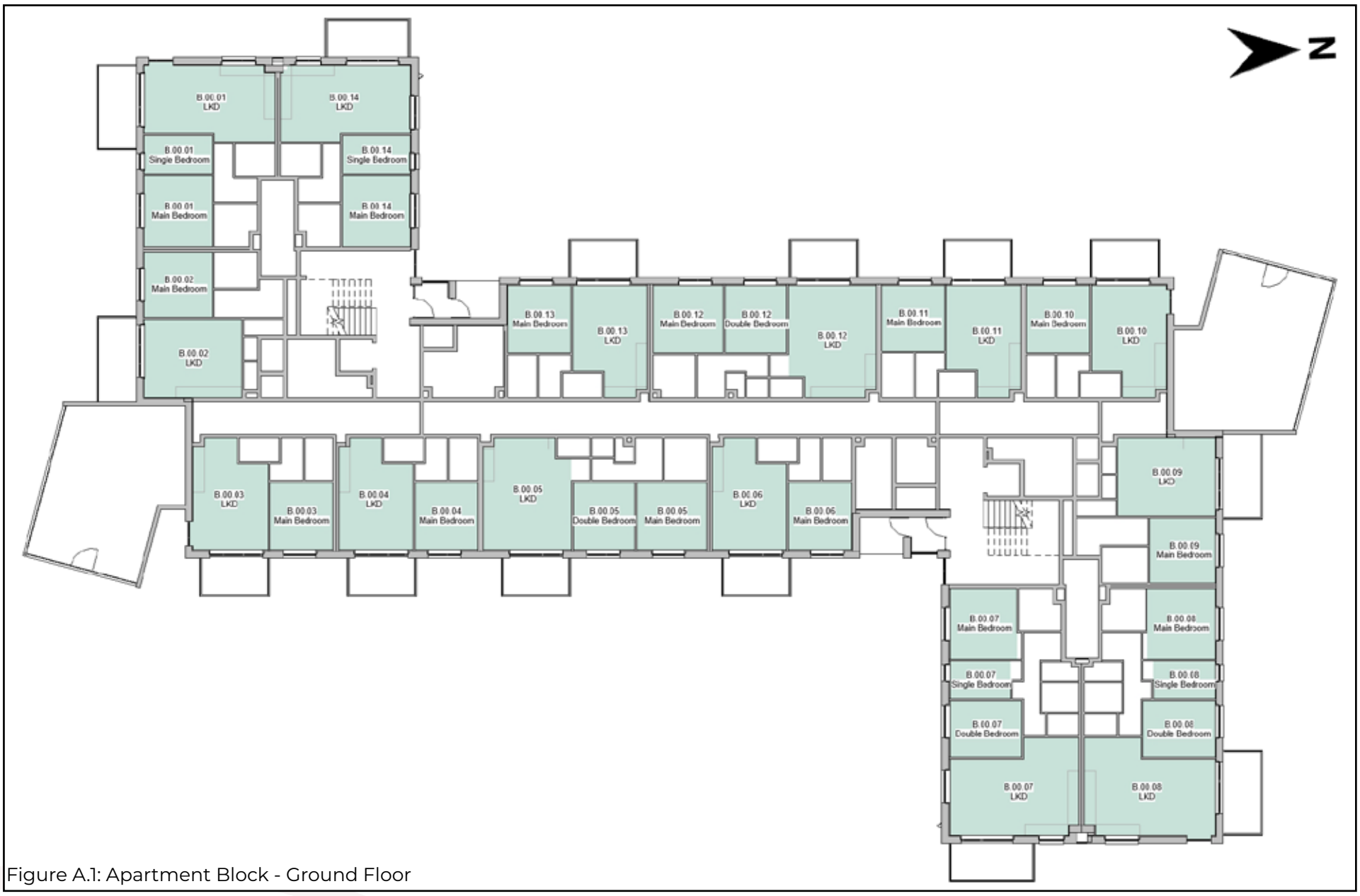


Figure A.1: Apartment Block - Ground Floor

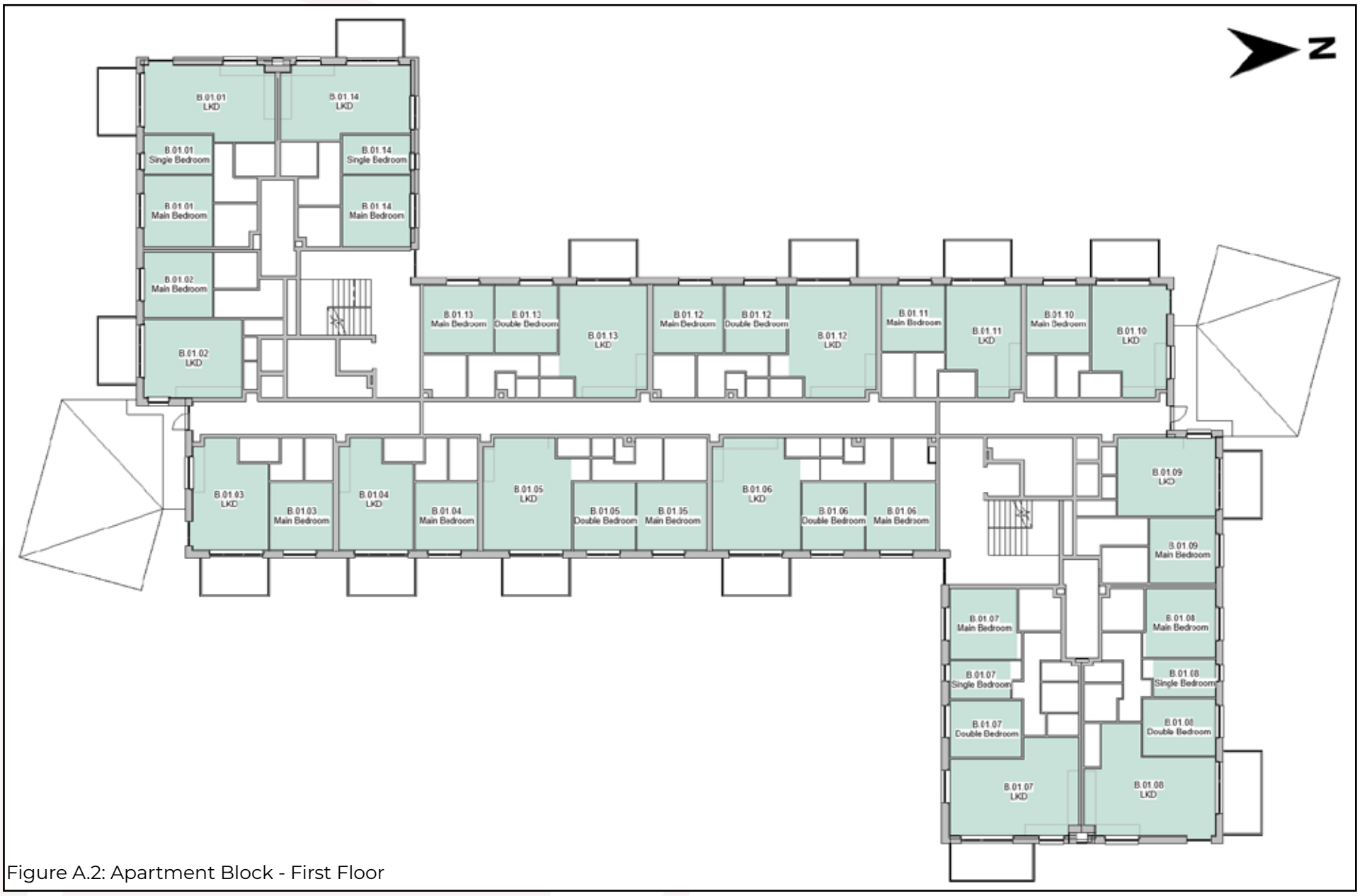


Figure A.2: Apartment Block - First Floor

Figure A.3: Apartment Block - Second Floor

Figure A.4: Apartment Block - Third Floor

A.2 Spatial Daylight Autonomy (SDA) in Proposed Units

Below is an example of the table used to describe the spatial daylight autonomy results in proposed units.

Table Example. A.2 - Scheme Performance SDA						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BR 209 Criteria
			Without Trees	Winter	Summer	
A	**B**	**C**	**D**	**E**	**F**	**G**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: Target Lux

Under BR 209 the appropriate target lux levels to be achieved across 50% of the working plane of a room differ depending on the room type. Kitchens have a target lux of 200, living rooms have a target lux of 150 and bedrooms have a target lux of 100. In a room providing more than one function, such as an LKD, the higher target value should be taken i.e. 200 Lux.

D: % of area above target Lux (Without Trees)

BR 209 recommends target lux levels to be achieved across at least 50% of the working plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with trees excluded from the analytical model. The figures shown in this column should be considered part of a supplementary study that helps identify if trees are having an effect on daylight within the proposed units.

E: % of area above target Lux (Winter)

BR 209 recommends target lux levels to be achieved across at least 50% of the working plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with deciduous trees in the winter state, i.e. bare branch.

F: % of area above target Lux (Summer)

BR 209 recommends target lux levels to be achieved across at least 50% of the working plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with deciduous trees in full foliage.

G: Compliance with BR 209 Criteria

This column states if the assessed room achieves the recommended level of daylight as per BR 209 with consideration to the various tree states.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the target lux level is not achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, without trees but is not achieved with trees, this column will state: *'Trees affecting compliance'*.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, with the trees in the winter state but is not achieved with trees in the summer state, this column will state: *'Trees affecting compliance (summer only)'*.

Compliance rates will be stated for SDA compliance with trees in all of the above states.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

A.2.1 SDA Results: Apartment Block/Ground Floor

Table No. A.2.1 - SDA Results: Apartment Block/Ground Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BR 209 Criteria*
			Without Trees***	Winter**	Summer**	
B.00.01	Kitchen, Dining & Living Room	200	100%	100%	80%	Compliant
B.00.01	Main Bedroom	100	100%	100%	100%	Compliant
B.00.01	Single Bedroom	100	100%	100%	100%	Compliant
B.00.02	Kitchen, Dining & Living Room	200	100%	81%	52%	Compliant
B.00.02	Main Bedroom	100	100%	100%	100%	Compliant
B.00.03	Kitchen, Dining & Living Room	200	97%	80%	59%	Compliant
B.00.03	Main Bedroom	100	100%	100%	100%	Compliant
B.00.04	Kitchen, Dining & Living Room	200	91%	83%	65%	Compliant
B.00.04	Main Bedroom	100	100%	100%	100%	Compliant
B.00.05	Double Bedroom	100	100%	100%	100%	Compliant
B.00.05	Kitchen, Dining & Living Room	200	78%	64%	53%	Compliant
B.00.05	Main Bedroom	100	100%	100%	100%	Compliant
B.00.06	Kitchen, Dining & Living Room	200	90%	78%	65%	Compliant
B.00.06	Main Bedroom	100	100%	100%	100%	Compliant
B.00.07	Double Bedroom	100	100%	100%	100%	Compliant
B.00.07	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.00.07	Main Bedroom	100	100%	100%	99%	Compliant
B.00.07	Single Bedroom	100	100%	100%	100%	Compliant
B.00.08	Double Bedroom	100	100%	100%	100%	Compliant
B.00.08	Kitchen, Dining & Living Room	200	100%	100%	92%	Compliant
B.00.08	Main Bedroom	100	100%	100%	87%	Compliant
B.00.08	Single Bedroom	100	100%	100%	98%	Compliant
B.00.09	Kitchen, Dining & Living Room	200	100%	60%	52%	Compliant
B.00.09	Main Bedroom	100	100%	100%	100%	Compliant
B.00.10	Kitchen, Dining & Living Room	200	98%	81%	61%	Compliant
B.00.10	Main Bedroom	100	100%	100%	100%	Compliant
B.00.11	Kitchen, Dining & Living Room	200	94%	78%	50%	Compliant
B.00.11	Main Bedroom	100	100%	100%	100%	Compliant
B.00.12	Double Bedroom	100	100%	100%	100%	Compliant
B.00.12	Kitchen, Dining & Living Room	200	81%	68%	59%	Compliant
B.00.12	Main Bedroom	100	100%	100%	100%	Compliant
B.00.13	Kitchen, Dining & Living Room	200	89%	75%	52%	Compliant
B.00.13	Main Bedroom	100	100%	100%	64%	Compliant
B.00.14	Kitchen, Dining & Living Room	200	100%	100%	97%	Compliant
B.00.14	Main Bedroom	100	100%	100%	69%	Compliant
B.00.14	Single Bedroom	100	100%	100%	90%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
** Under the BR 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1 on page 14.
For floor plans of the assessed units please refer to section A.1 on page 19.

A.2.2 SDA Results: Apartment Block/First Floor

Table No. A.2.2 - SDA Results: Apartment Block/First Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BR 209 Criteria*
			Without Trees***	Winter**	Summer**	
B.01.01	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.01	Main Bedroom	100	100%	100%	100%	Compliant
B.01.01	Single Bedroom	100	100%	100%	100%	Compliant
B.01.02	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.02	Main Bedroom	100	100%	100%	100%	Compliant
B.01.03	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.03	Main Bedroom	100	100%	100%	100%	Compliant
B.01.04	Kitchen, Dining & Living Room	200	100%	97%	93%	Compliant
B.01.04	Main Bedroom	100	100%	100%	100%	Compliant
B.01.05	Double Bedroom	100	100%	100%	100%	Compliant
B.01.05	Kitchen, Dining & Living Room	200	99%	91%	83%	Compliant
B.01.05	Main Bedroom	100	100%	100%	100%	Compliant
B.01.06	Double Bedroom	100	100%	100%	100%	Compliant
B.01.06	Kitchen, Dining & Living Room	200	99%	83%	80%	Compliant
B.01.06	Main Bedroom	100	100%	100%	100%	Compliant
B.01.07	Double Bedroom	100	100%	100%	100%	Compliant
B.01.07	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.07	Main Bedroom	100	100%	100%	100%	Compliant
B.01.07	Single Bedroom	100	100%	100%	100%	Compliant
B.01.08	Double Bedroom	100	100%	100%	100%	Compliant
B.01.08	Kitchen, Dining & Living Room	200	100%	98%	96%	Compliant
B.01.08	Main Bedroom	100	100%	100%	100%	Compliant
B.01.08	Single Bedroom	100	100%	100%	100%	Compliant
B.01.09	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.09	Main Bedroom	100	100%	100%	100%	Compliant
B.01.10	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.10	Main Bedroom	100	100%	100%	100%	Compliant
B.01.11	Kitchen, Dining & Living Room	200	100%	96%	94%	Compliant
B.01.11	Main Bedroom	100	100%	100%	100%	Compliant
B.01.12	Double Bedroom	100	100%	100%	100%	Compliant
B.01.12	Kitchen, Dining & Living Room	200	97%	94%	89%	Compliant
B.01.12	Main Bedroom	100	100%	100%	100%	Compliant
B.01.13	Double Bedroom	100	100%	100%	100%	Compliant
B.01.13	Kitchen, Dining & Living Room	200	86%	72%	65%	Compliant
B.01.13	Main Bedroom	100	100%	100%	100%	Compliant
B.01.14	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.01.14	Main Bedroom	100	100%	100%	100%	Compliant
B.01.14	Single Bedroom	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
** Under the BR 209 study the SDA has been calculated with trees represented with both winter and summer foliage.
*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 5.1 on page 14.
For floor plans of the assessed units please refer to section A.1 on page 19.

A.2.3 SDA Results: Apartment Block/Second Floor

Table No. A.2.3 - SDA Results: Apartment Block/Second Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BR 209 Criteria*
			Without Trees***	Winter**	Summer**	
B.02.01	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.01	Main Bedroom	100	100%	100%	100%	Compliant
B.02.01	Single Bedroom	100	100%	100%	100%	Compliant
B.02.02	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.02	Main Bedroom	100	100%	100%	100%	Compliant
B.02.03	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.03	Main Bedroom	100	100%	100%	100%	Compliant
B.02.04	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.04	Main Bedroom	100	100%	100%	100%	Compliant
B.02.05	Double Bedroom	100	100%	100%	100%	Compliant
B.02.05	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.05	Main Bedroom	100	100%	100%	100%	Compliant
B.02.06	Double Bedroom	100	100%	100%	100%	Compliant
B.02.06	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.06	Main Bedroom	100	100%	100%	100%	Compliant
B.02.07	Double Bedroom	100	100%	100%	100%	Compliant
B.02.07	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.07	Main Bedroom	100	100%	100%	100%	Compliant
B.02.07	Single Bedroom	100	100%	100%	100%	Compliant
B.02.08	Double Bedroom	100	100%	100%	100%	Compliant
B.02.08	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.08	Main Bedroom	100	100%	100%	100%	Compliant
B.02.08	Single Bedroom	100	100%	100%	100%	Compliant
B.02.09	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.09	Main Bedroom	100	100%	100%	100%	Compliant
B.02.10	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.10	Main Bedroom	100	100%	100%	100%	Compliant
B.02.11	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.11	Main Bedroom	100	100%	100%	100%	Compliant
B.02.12	Double Bedroom	100	100%	100%	100%	Compliant
B.02.12	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.12	Main Bedroom	100	100%	100%	100%	Compliant
B.02.13	Double Bedroom	100	100%	100%	100%	Compliant
B.02.13	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.13	Main Bedroom	100	100%	100%	100%	Compliant
B.02.14	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.02.14	Main Bedroom	100	100%	100%	100%	Compliant
B.02.14	Single Bedroom	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.

** Under the BR 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 5.1 on page 14.

For floor plans of the assessed units please refer to section A.1 on page 19.

A.2.4 SDA Results: Apartment Block/Third Floor

Table No. A.2.4 - SDA Results: Apartment Block/Third Floor						
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)			Compliance with BR 209 Criteria*
			Without Trees***	Winter**	Summer**	
B.03.01	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.01	Main Bedroom	100	100%	100%	100%	Compliant
B.03.02	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.02	Main Bedroom	100	100%	100%	100%	Compliant
B.03.03	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.03	Main Bedroom	100	100%	100%	100%	Compliant
B.03.04	Double Bedroom	100	100%	100%	100%	Compliant
B.03.04	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.04	Main Bedroom	100	100%	100%	100%	Compliant
B.03.05	Double Bedroom	100	100%	100%	100%	Compliant
B.03.05	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.05	Main Bedroom	100	100%	100%	100%	Compliant
B.03.06	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.06	Main Bedroom	100	100%	100%	100%	Compliant
B.03.07	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.07	Main Bedroom	100	100%	100%	100%	Compliant
B.03.08	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.08	Main Bedroom	100	100%	100%	100%	Compliant
B.03.09	Double Bedroom	100	100%	100%	100%	Compliant
B.03.09	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.09	Main Bedroom	100	100%	100%	100%	Compliant
B.03.10	Double Bedroom	100	100%	100%	100%	Compliant
B.03.10	Kitchen, Dining & Living Room	200	100%	100%	100%	Compliant
B.03.10	Main Bedroom	100	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.

** Under the BR 209 study the SDA has been calculated with trees represented with both winter and summer foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 5.1 on page 14.

For floor plans of the assessed units please refer to section A.1 on page 19.

A.3 Sunlight Exposure (SE) in Proposed Units

Below is an example of the table used to describe the SE performance of proposed habitable rooms.

Table Example. A.3 - Scheme Performance Sunlight Exposure							
Unit Number	Room Description	Deciduous Trees as Opaque Objects			Without Deciduous Trees		
		SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room	SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room of the unit has been assessed, e.g. bedroom, living room, etc.

C: SE Hours on March 21st (Deciduous Trees as Opaque Objects)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out with deciduous trees as opaque objects.

D: Level of SE on March 21st (Deciduous Trees as Opaque Objects)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure with deciduous trees as opaque objects based on the following:

- Less than 1.5 hours: *Below minimum,*
- Between 1.5 hours and 3 hours: *Minimum*
- Between 3 hours and 4 hours: *Medium*
- More than 4 hours: *High*

E: Unit compliance based on highest performing room (Deciduous Trees as Opaque Objects)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on the assessment date. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out with deciduous trees as opaque objects.

Typically unit compliance will be stated for the best performing room per unit only, with lesser performing rooms indicated with a dash (-).

F: SE Hours on March 21st (Without Deciduous Trees)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out without deciduous trees.

G: Level of SE on March 21st (Without Deciduous Trees)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure without deciduous trees using the same criteria as the study with deciduous trees as opaque objects.

H: Unit compliance based on highest performing room (Without Deciduous Trees)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on March 21st. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out without deciduous trees. Typically only one room per unit will be populated in this column, with lesser performing rooms indicated with a dash (-).

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

A.3.1 SE Results: Apartment Block/Ground Floor

Table No. A.3.1 - Sunlight Exposure Results: Apartment Block/Ground Floor

Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B.00.01	Kitchen, Dining & Living Room	3.00	Medium	-	6.30	High	-
B.00.01	Main Bedroom	2.50	Minimum	-	8.70	High	Compliant
B.00.01	Single Bedroom	3.50	Medium	Compliant	7.60	High	-
B.00.02	Kitchen, Dining & Living Room	2.30	Minimum	Compliant	4.00	High	-
B.00.02	Main Bedroom	1.70	Minimum	-	6.60	High	Compliant
B.00.03	Kitchen, Dining & Living Room	0.20	Below Minimum	Non-Compliant	4.30	High	Compliant
B.00.03	Main Bedroom	0.10	Below Minimum	-	0.10	Below Minimum	-
B.00.04	Kitchen, Dining & Living Room	0.90	Below Minimum	-	2.50	Minimum	Compliant
B.00.04	Main Bedroom	1.80	Minimum	Compliant	2.20	Minimum	-
B.00.05	Double Bedroom	1.70	Minimum	-	2.20	Minimum	-
B.00.05	Kitchen, Dining & Living Room	3.80	Medium	Compliant	3.80	Medium	Compliant
B.00.05	Main Bedroom	2.40	Minimum	-	3.80	Medium	-
B.00.06	Kitchen, Dining & Living Room	3.20	Medium	Compliant	3.20	Medium	Compliant
B.00.06	Main Bedroom	1.50	Minimum	-	2.20	Minimum	-
B.00.07	Double Bedroom	3.00	Medium	-	6.20	High	-
B.00.07	Kitchen, Dining & Living Room	4.30	High	-	6.80	High	Compliant
B.00.07	Main Bedroom	4.10	High	-	5.10	High	-
B.00.07	Single Bedroom	4.60	High	Compliant	4.80	High	-
B.00.08	Double Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.00.08	Kitchen, Dining & Living Room	3.60	Medium	Compliant	3.70	Medium	Compliant
B.00.08	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.00.08	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.00.09	Kitchen, Dining & Living Room	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
B.00.09	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.00.10	Kitchen, Dining & Living Room	2.40	Minimum	Compliant	2.50	Minimum	Compliant
B.00.10	Main Bedroom	1.20	Below Minimum	-	2.20	Minimum	-
B.00.11	Kitchen, Dining & Living Room	2.70	Minimum	Compliant	3.60	Medium	Compliant
B.00.11	Main Bedroom	1.90	Minimum	-	3.20	Medium	-
B.00.12	Double Bedroom	2.80	Minimum	-	3.50	Medium	-
B.00.12	Kitchen, Dining & Living Room	3.90	Medium	Compliant	3.90	Medium	Compliant
B.00.12	Main Bedroom	1.50	Minimum	-	3.20	Medium	-
B.00.13	Kitchen, Dining & Living Room	0.80	Below Minimum	Non-Compliant	1.60	Minimum	Compliant
B.00.13	Main Bedroom	0.00	Below Minimum	-	0.70	Below Minimum	-
B.00.14	Kitchen, Dining & Living Room	1.30	Below Minimum	Non-Compliant	2.90	Minimum	Compliant
B.00.14	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.00.14	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 5.2 on page 15.

*** For the interpretation of levels of Sunlight Exposure please refer to “3.2 Definition of Levels of Sunlight Exposure” on page 9.

For floor plans of the assessed units please refer to section A.1 on page 19.

A.3.2 SE Results: Apartment Block/First Floor

Table No. A.3.2 - Sunlight Exposure Results: Apartment Block/First Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B.01.01	Kitchen, Dining & Living Room	6.00	High	-	6.00	High	-
B.01.01	Main Bedroom	7.80	High	Compliant	7.80	High	Compliant
B.01.01	Single Bedroom	5.50	High	-	5.50	High	-
B.01.02	Kitchen, Dining & Living Room	5.70	High	-	5.70	High	-
B.01.02	Main Bedroom	6.80	High	Compliant	6.80	High	Compliant
B.01.03	Kitchen, Dining & Living Room	9.00	High	Compliant	9.00	High	Compliant
B.01.03	Main Bedroom	1.50	Minimum	-	1.50	Minimum	-
B.01.04	Kitchen, Dining & Living Room	3.70	Medium	Compliant	3.70	Medium	Compliant
B.01.04	Main Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.01.05	Double Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.01.05	Kitchen, Dining & Living Room	3.80	Medium	Compliant	3.80	Medium	Compliant
B.01.05	Main Bedroom	3.70	Medium	-	3.70	Medium	-
B.01.06	Double Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.01.06	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.01.06	Main Bedroom	3.70	Medium	-	3.70	Medium	-
B.01.07	Double Bedroom	6.70	High	-	6.70	High	-
B.01.07	Kitchen, Dining & Living Room	7.40	High	Compliant	7.40	High	Compliant
B.01.07	Main Bedroom	5.60	High	-	5.60	High	-
B.01.07	Single Bedroom	5.20	High	-	5.20	High	-
B.01.08	Double Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.08	Kitchen, Dining & Living Room	4.00	High	Compliant	4.00	High	Compliant
B.01.08	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.08	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.09	Kitchen, Dining & Living Room	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
B.01.09	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.10	Kitchen, Dining & Living Room	3.30	Medium	Compliant	3.30	Medium	Compliant
B.01.10	Main Bedroom	2.20	Minimum	-	2.20	Minimum	-
B.01.11	Kitchen, Dining & Living Room	3.60	Medium	Compliant	3.60	Medium	Compliant
B.01.11	Main Bedroom	3.20	Medium	-	3.20	Medium	-
B.01.12	Double Bedroom	3.60	Medium	-	3.60	Medium	-
B.01.12	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.01.12	Main Bedroom	3.20	Medium	-	3.20	Medium	-
B.01.13	Double Bedroom	0.80	Below Minimum	-	0.80	Below Minimum	-
B.01.13	Kitchen, Dining & Living Room	3.80	Medium	Compliant	4.00	High	Compliant
B.01.13	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.14	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.01.14	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.01.14	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 5.2 on page 15.

*** For the interpretation of levels of Sunlight Exposure please refer to “3.2 Definition of Levels of Sunlight Exposure” on page 9.

For floor plans of the assessed units please refer to section A.1 on page 19.

A.3.3 SE Results: Apartment Block/Second Floor

Table No. A.3.3 - Sunlight Exposure Results: Apartment Block/Second Floor

Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B.02.01	Kitchen, Dining & Living Room	9.40	High	Compliant	9.40	High	Compliant
B.02.01	Main Bedroom	8.70	High	-	8.70	High	-
B.02.01	Single Bedroom	7.60	High	-	7.60	High	-
B.02.02	Kitchen, Dining & Living Room	5.70	High	-	5.70	High	-
B.02.02	Main Bedroom	6.80	High	Compliant	6.80	High	Compliant
B.02.03	Kitchen, Dining & Living Room	9.00	High	Compliant	9.00	High	Compliant
B.02.03	Main Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.02.04	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.02.04	Main Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.02.05	Double Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.02.05	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.02.05	Main Bedroom	4.00	High	-	4.00	High	-
B.02.06	Double Bedroom	2.00	Minimum	-	2.00	Minimum	-
B.02.06	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.02.06	Main Bedroom	4.00	High	-	4.00	High	-
B.02.07	Double Bedroom	7.40	High	-	7.40	High	-
B.02.07	Kitchen, Dining & Living Room	8.20	High	Compliant	8.20	High	Compliant
B.02.07	Main Bedroom	6.00	High	-	6.00	High	-
B.02.07	Single Bedroom	5.80	High	-	5.80	High	-
B.02.08	Double Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.08	Kitchen, Dining & Living Room	4.00	High	Compliant	4.00	High	Compliant
B.02.08	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.08	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.09	Kitchen, Dining & Living Room	0.00	Below Minimum	Non-Compliant	0.00	Below Minimum	Non-Compliant
B.02.09	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.10	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.02.10	Main Bedroom	2.20	Minimum	-	2.20	Minimum	-
B.02.11	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.02.11	Main Bedroom	3.50	Medium	-	3.50	Medium	-
B.02.12	Double Bedroom	3.80	Medium	-	3.80	Medium	-
B.02.12	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.02.12	Main Bedroom	3.50	Medium	-	3.50	Medium	-
B.02.13	Double Bedroom	3.60	Medium	-	3.60	Medium	-
B.02.13	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.02.13	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.14	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.02.14	Main Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-
B.02.14	Single Bedroom	0.00	Below Minimum	-	0.00	Below Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 5.2 on page 15.

*** For the interpretation of levels of Sunlight Exposure please refer to “3.2 Definition of Levels of Sunlight Exposure” on page 9.

For floor plans of the assessed units please refer to section A.1 on page 19.

A.3.4 SE Results: Apartment Block/Third Floor

Table No. A.3.4 - Sunlight Exposure Results: Apartment Block/Third Floor							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B.03.01	Kitchen, Dining & Living Room	9.40	High	Compliant	9.40	High	Compliant
B.03.01	Main Bedroom	9.30	High	-	9.30	High	-
B.03.02	Kitchen, Dining & Living Room	9.00	High	Compliant	9.00	High	Compliant
B.03.02	Main Bedroom	4.00	High	-	4.00	High	-
B.03.03	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.03.03	Main Bedroom	4.00	High	-	4.00	High	-
B.03.04	Double Bedroom	4.00	High	-	4.00	High	-
B.03.04	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.03.04	Main Bedroom	4.00	High	-	4.00	High	-
B.03.05	Double Bedroom	4.00	High	-	4.00	High	-
B.03.05	Kitchen, Dining & Living Room	4.30	High	Compliant	4.30	High	Compliant
B.03.05	Main Bedroom	4.00	High	-	4.00	High	-
B.03.06	Kitchen, Dining & Living Room	0.00	Below Minimum	-	0.00	Below Minimum	-
B.03.06	Main Bedroom	3.40	Medium	Compliant	3.40	Medium	Compliant
B.03.07	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.03.07	Main Bedroom	3.80	Medium	-	3.80	Medium	-
B.03.08	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.03.08	Main Bedroom	3.80	Medium	-	3.80	Medium	-
B.03.09	Double Bedroom	3.80	Medium	-	3.80	Medium	-
B.03.09	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.03.09	Main Bedroom	3.80	Medium	-	3.80	Medium	-
B.03.10	Double Bedroom	3.80	Medium	-	3.80	Medium	-
B.03.10	Kitchen, Dining & Living Room	4.10	High	Compliant	4.10	High	Compliant
B.03.10	Main Bedroom	2.30	Minimum	-	2.30	Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** The BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 5.2 on page 15.
*** For the interpretation of levels of Sunlight Exposure please refer to “3.2 Definition of Levels of Sunlight Exposure” on page 9.
For floor plans of the assessed units please refer to section A.1 on page 19.

A.4 Sun On Ground (SOG) in Proposed Outdoor Public Amenity Areas

Below is an example of the table used to describe SOG in proposed outdoor public amenity spaces.

	Table Example. A.4 - Scheme Performance SOG				
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended Minimum	Level of Compliance with BRE Guidelines	Meets BR 209 Criteria
A	**B**	**C**	**D**	**E**	**F**

A: Assigned Area Number

This column indicates the number that 3DDB have assigned to the assessed areas, which is included for the sole purpose of aiding in the identification of the corresponding space shown in the corresponding figure.

B: Assessed Area

This column identifies the assessed garden/amenity area.

C: Area Capable of Receiving 2 Hours of Sunlight on March 21st

The percentage of the proposed area that can receive more than 2 hours of sunlight on March 21st.

D: Recommended Minimum

The BRE Guidelines state that the percentage of a garden/amenity area that can receive more than 2 hours of sunlight on March 21st should be 50%. The target value for all spaces is set to 50%.

E: Level of Compliance with BRE Guidelines

This column states the compliance of the assessed space with the *BRE Target Value*. If the assessed garden or amenity area complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the garden or amenity area does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

F: Meets BR 209 Criteria

This column states if the assessed area achieves the recommended level of sunlight on March 21st as per BR 209.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

A.4.1 Sun On Ground in Proposed Outdoor Public Amenity Areas

Table No. A.4.1 - SOG in Proposed Outdoor Public Amenity Areas Results:					
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended minimum	Level of Compliance with BRE Guidelines*	Meets BR 209 Criteria*
1	Open Space 1	73.03%	50.00%	BRE Compliant	Yes
2	Open Space 2	89.61%	50.00%	BRE Compliant	Yes
3	Open Space 3	99.87%	50.00%	BRE Compliant	Yes
4	Open Space 4	99.59%	50.00%	BRE Compliant	Yes
5	Open Space 5	81.52%	50.00%	BRE Compliant	Yes

* The BRE Guidelines recommend that for a garden or amenity 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 March 21st.

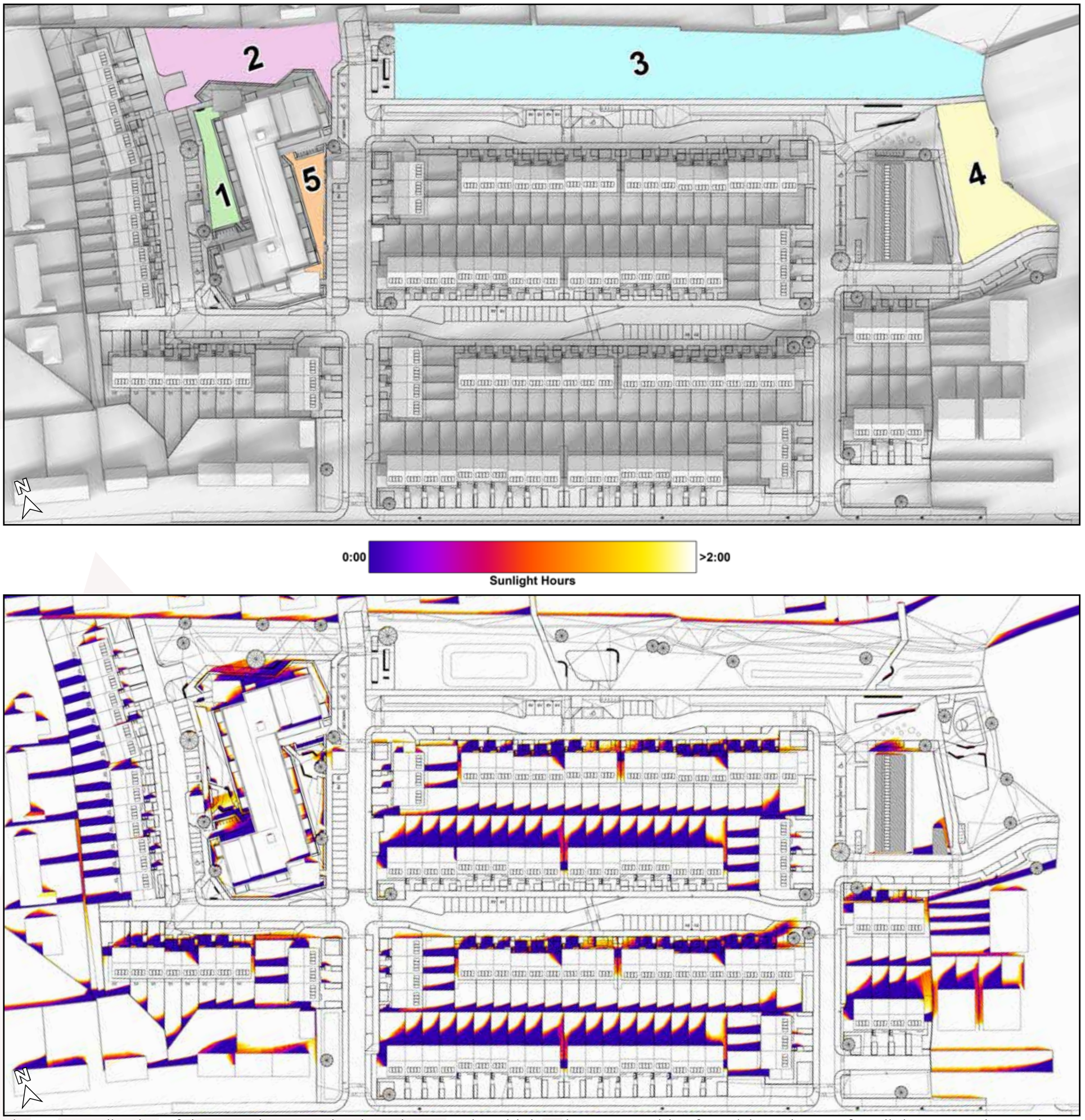


Figure A.5: Indication of the amenity areas that have been analysed (Above), Area capable of receiving 2 hours of sunlight on March 21st shown in white (Below)

B.0 Supplementary Study Results

B.1 SDA study, under the I.S. EN 17037 criteria

Below is an example of the table used to describe the supplementary study results for proposed units in the assessment of SDA under the I.S. EN 17037 criteria.

Table Example. B.1 - Supplementary SDA Results (I.S. EN 17037 criteria)

Unit Number	Room Description	No Trees		Winter Trees		Summer Trees		Compliance with I.S. EN 17037 Criteria
		Area above 300 Lux	Area above 100 Lux	Area above 300 Lux	Area above 100 Lux	Area above 300 Lux	Area above 100 Lux	
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % of area above 300 Lux (No Trees)

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours when the assessment is carried out without trees in the analytical model.

D: % of area above 100 Lux (No Trees)

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours when the assessment is carried out without trees in the analytical model.

E: % of area above 300 Lux (Winter Trees)

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours when the trees in the analytical model are configured in the winter state i.e. bare branch.

F: % of area above 100 Lux (Winter Trees)

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours when the trees in the analytical model are configured in the winter state i.e. bare branch.

G: % of area above 300 Lux (Summer Trees)

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours when the trees in the analytical model are configured in the summer state i.e. full leaf.

H: % of area above 100 Lux (Summer Trees)

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours when the trees in the analytical model are configured in the summer state i.e. full leaf.

I: Compliance with I.S. EN 17037 Criteria

This column states if the assessed room achieves the recommended level of daylight as per I.S. EN 17037 with consideration to the various tree states.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the recommended lux levels are not achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, without trees but are not achieved with trees, this column will state: *'Trees affecting compliance'*.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, with the trees in the winter state but are not achieved with trees in the summer state, this column will state: *'Trees affecting compliance (summer only)'*.

Compliance rates will be stated for SDA compliance with trees in all of the above states.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

B.1.1 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Ground Floor

Table No. B.1.1 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Ground Floor								
Unit Number	Room Description	No Trees		Winter Trees		Summer Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B.00.01	Kitchen, Dining & Living Room	100%	100%	88%	100%	56%	100%	Compliant
B.00.01	Main Bedroom	100%	100%	97%	100%	50%	100%	Compliant
B.00.01	Single Bedroom	75%	100%	50%	100%	25%	100%	Trees affecting compliance (summer only)
B.00.02	Kitchen, Dining & Living Room	82%	100%	48%	100%	28%	100%	Trees affecting compliance
B.00.02	Main Bedroom	100%	100%	90%	100%	44%	100%	Trees affecting compliance (summer only)
B.00.03	Kitchen, Dining & Living Room	80%	100%	53%	100%	37%	100%	Trees affecting compliance (summer only)
B.00.03	Main Bedroom	100%	100%	50%	100%	39%	100%	Trees affecting compliance (summer only)
B.00.04	Kitchen, Dining & Living Room	73%	100%	52%	100%	40%	100%	Trees affecting compliance (summer only)
B.00.04	Main Bedroom	100%	100%	100%	100%	94%	100%	Compliant
B.00.05	Double Bedroom	100%	100%	86%	100%	74%	100%	Compliant
B.00.05	Kitchen, Dining & Living Room	48%	100%	38%	100%	34%	100%	Non-compliant
B.00.05	Main Bedroom	100%	100%	81%	100%	71%	100%	Compliant
B.00.06	Kitchen, Dining & Living Room	65%	100%	46%	100%	38%	100%	Trees affecting compliance
B.00.06	Main Bedroom	85%	100%	56%	100%	38%	100%	Trees affecting compliance (summer only)
B.00.07	Double Bedroom	100%	100%	89%	100%	71%	100%	Compliant
B.00.07	Kitchen, Dining & Living Room	100%	100%	93%	100%	82%	100%	Compliant
B.00.07	Main Bedroom	76%	100%	52%	100%	33%	100%	Trees affecting compliance (summer only)
B.00.07	Single Bedroom	47%	100%	41%	100%	38%	100%	Non-compliant
B.00.08	Double Bedroom	100%	100%	51%	100%	30%	100%	Trees affecting compliance (summer only)
B.00.08	Kitchen, Dining & Living Room	97%	100%	85%	100%	69%	100%	Compliant
B.00.08	Main Bedroom	100%	100%	42%	100%	11%	87%	Trees affecting compliance
B.00.08	Single Bedroom	56%	100%	31%	100%	19%	100%	Trees affecting compliance
B.00.09	Kitchen, Dining & Living Room	55%	100%	31%	100%	26%	100%	Trees affecting compliance
B.00.09	Main Bedroom	100%	100%	60%	100%	53%	100%	Compliant
B.00.10	Kitchen, Dining & Living Room	83%	100%	59%	100%	40%	99%	Trees affecting compliance (summer only)
B.00.10	Main Bedroom	100%	100%	76%	100%	54%	100%	Compliant
B.00.11	Kitchen, Dining & Living Room	78%	100%	47%	100%	30%	99%	Trees affecting compliance
B.00.11	Main Bedroom	100%	100%	93%	100%	68%	100%	Compliant
B.00.12	Double Bedroom	100%	100%	94%	100%	76%	100%	Compliant
B.00.12	Kitchen, Dining & Living Room	53%	100%	42%	100%	34%	100%	Trees affecting compliance
B.00.12	Main Bedroom	97%	100%	76%	100%	59%	100%	Compliant
B.00.13	Kitchen, Dining & Living Room	62%	100%	40%	100%	27%	96%	Trees affecting compliance
B.00.13	Main Bedroom	97%	100%	40%	100%	10%	65%	Trees affecting compliance
B.00.14	Kitchen, Dining & Living Room	100%	100%	91%	100%	76%	100%	Compliant
B.00.14	Main Bedroom	53%	100%	26%	100%	6%	74%	Trees affecting compliance
B.00.14	Single Bedroom	25%	100%	19%	100%	19%	94%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
For floor plans of the assessed units please refer to section A.1 on page 19.

B.1.2 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/First Floor

Table No. B.1.2 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/First Floor								
Unit Number	Room Description	No Trees		Winter Trees		Summer Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B.01.01	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.01.01	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.01	Single Bedroom	78%	100%	72%	100%	64%	100%	Compliant
B.01.02	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.01.02	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.03	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.01.03	Main Bedroom	100%	100%	99%	100%	99%	100%	Compliant
B.01.04	Kitchen, Dining & Living Room	82%	100%	78%	100%	76%	100%	Compliant
B.01.04	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.05	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.05	Kitchen, Dining & Living Room	58%	100%	54%	100%	51%	100%	Compliant
B.01.05	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.06	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.06	Kitchen, Dining & Living Room	56%	100%	52%	100%	50%	100%	Compliant
B.01.06	Main Bedroom	93%	100%	88%	100%	81%	100%	Compliant
B.01.07	Double Bedroom	99%	100%	96%	100%	96%	100%	Compliant
B.01.07	Kitchen, Dining & Living Room	100%	100%	100%	100%	97%	100%	Compliant
B.01.07	Main Bedroom	79%	100%	78%	100%	73%	100%	Compliant
B.01.07	Single Bedroom	44%	100%	44%	100%	44%	100%	Non-compliant
B.01.08	Double Bedroom	100%	100%	97%	100%	84%	100%	Compliant
B.01.08	Kitchen, Dining & Living Room	95%	100%	95%	100%	94%	100%	Compliant
B.01.08	Main Bedroom	100%	100%	84%	100%	78%	100%	Compliant
B.01.08	Single Bedroom	56%	100%	47%	100%	47%	100%	Trees affecting compliance
B.01.09	Kitchen, Dining & Living Room	100%	100%	89%	100%	82%	100%	Compliant
B.01.09	Main Bedroom	100%	100%	85%	100%	79%	100%	Compliant
B.01.10	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.01.10	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.11	Kitchen, Dining & Living Room	82%	100%	76%	100%	73%	100%	Compliant
B.01.11	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.12	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.01.12	Kitchen, Dining & Living Room	60%	100%	56%	100%	53%	100%	Compliant
B.01.12	Main Bedroom	99%	100%	98%	100%	94%	100%	Compliant
B.01.13	Double Bedroom	97%	100%	89%	100%	72%	100%	Compliant
B.01.13	Kitchen, Dining & Living Room	54%	100%	46%	100%	39%	100%	Trees affecting compliance
B.01.13	Main Bedroom	84%	100%	72%	100%	64%	100%	Compliant
B.01.14	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.01.14	Main Bedroom	56%	100%	50%	100%	41%	100%	Trees affecting compliance (summer only)
B.01.14	Single Bedroom	25%	100%	25%	100%	22%	100%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
For floor plans of the assessed units please refer to section A.1 on page 19.

B.1.3 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Second Floor

Table No. B.1.3 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Second Floor								
Unit Number	Room Description	No Trees		Winter Trees		Summer Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B.02.01	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.01	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.01	Single Bedroom	92%	100%	92%	100%	89%	100%	Compliant
B.02.02	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.02	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.03	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.03	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.04	Kitchen, Dining & Living Room	87%	100%	85%	100%	85%	100%	Compliant
B.02.04	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.05	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.05	Kitchen, Dining & Living Room	67%	100%	66%	100%	64%	100%	Compliant
B.02.05	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.06	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.06	Kitchen, Dining & Living Room	67%	100%	65%	100%	63%	100%	Compliant
B.02.06	Main Bedroom	100%	100%	99%	100%	99%	100%	Compliant
B.02.07	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.07	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.07	Main Bedroom	92%	100%	89%	100%	89%	100%	Compliant
B.02.07	Single Bedroom	69%	100%	66%	100%	66%	100%	Compliant
B.02.08	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.08	Kitchen, Dining & Living Room	100%	100%	100%	100%	99%	100%	Compliant
B.02.08	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.08	Single Bedroom	63%	100%	56%	100%	56%	100%	Compliant
B.02.09	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.09	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.10	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.10	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.11	Kitchen, Dining & Living Room	89%	100%	88%	100%	88%	100%	Compliant
B.02.11	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.12	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.12	Kitchen, Dining & Living Room	71%	100%	69%	100%	68%	100%	Compliant
B.02.12	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.13	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.02.13	Kitchen, Dining & Living Room	67%	100%	64%	100%	61%	100%	Compliant
B.02.13	Main Bedroom	98%	100%	98%	100%	97%	100%	Compliant
B.02.14	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.02.14	Main Bedroom	80%	100%	74%	100%	66%	100%	Compliant
B.02.14	Single Bedroom	31%	100%	31%	100%	31%	100%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
For floor plans of the assessed units please refer to section A.1 on page 19.

B.1.4 Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Third Floor

Table No. B.1.4 - Supplementary SDA Results (I.S. EN 17037 criteria): Apartment Block/Third Floor

Unit Number	Room Description	No Trees		Winter Trees		Summer Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B.03.01	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.03.01	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.02	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.03.02	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.03	Kitchen, Dining & Living Room	97%	100%	97%	100%	97%	100%	Compliant
B.03.03	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.04	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.04	Kitchen, Dining & Living Room	87%	100%	87%	100%	85%	100%	Compliant
B.03.04	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.05	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.05	Kitchen, Dining & Living Room	89%	100%	88%	100%	86%	100%	Compliant
B.03.05	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.06	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.03.06	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.07	Kitchen, Dining & Living Room	100%	100%	100%	100%	100%	100%	Compliant
B.03.07	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.08	Kitchen, Dining & Living Room	99%	100%	98%	100%	98%	100%	Compliant
B.03.08	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.09	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.09	Kitchen, Dining & Living Room	93%	100%	92%	100%	90%	100%	Compliant
B.03.09	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.10	Double Bedroom	100%	100%	100%	100%	100%	100%	Compliant
B.03.10	Kitchen, Dining & Living Room	94%	100%	94%	100%	93%	100%	Compliant
B.03.10	Main Bedroom	100%	100%	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 4.2.1 on page 11.
For floor plans of the assessed units please refer to section A.1 on page 19.

B.2 Supplementary No Sky Line (NSL) assessment in proposed units.

Below is an example of the table used to describe the supplementary assessment results for 'No Sky Line' in proposed units.

Table Example. B.2 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%
A	**B**	**C**	**D**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % of room where the sky is visible from the working plane

This column states the percentage of the room from which there is a direct line of sight to the sky when assessed at the working plane height, which is 850mm above the finished floor level in residential rooms or 700mm above the finished floor level in offices or classrooms.

D: Above 80%

Whilst the BRE Guidelines only provide recommendations for NSL in the context of an impact analysis, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

If this column states: *'Yes'*, it signifies that the sky will be visible from more than 80% of the working plane.

If this column states: *'No'*, it signifies that the sky will be visible from less than 80% of the working plane and supplementary electric lighting may be required.

B.2.1 Supplementary NSL Results: Apartment Block/Ground Floor

Table No. B.2.1 - Supplementary NSL Results: Apartment Block/Ground Floor			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B.00.01	Kitchen, Dining & Living Room	100%	Yes
B.00.01	Main Bedroom	100%	Yes
B.00.01	Single Bedroom	100%	Yes
B.00.02	Kitchen, Dining & Living Room	100%	Yes
B.00.02	Main Bedroom	100%	Yes
B.00.03	Kitchen, Dining & Living Room	100%	Yes
B.00.03	Main Bedroom	99%	Yes
B.00.04	Kitchen, Dining & Living Room	100%	Yes
B.00.04	Main Bedroom	99%	Yes
B.00.05	Double Bedroom	99%	Yes
B.00.05	Kitchen, Dining & Living Room	99%	Yes
B.00.05	Main Bedroom	98%	Yes
B.00.06	Kitchen, Dining & Living Room	97%	Yes
B.00.06	Main Bedroom	92%	Yes
B.00.07	Double Bedroom	94%	Yes
B.00.07	Kitchen, Dining & Living Room	100%	Yes
B.00.07	Main Bedroom	82%	Yes
B.00.07	Single Bedroom	81%	Yes
B.00.08	Double Bedroom	99%	Yes
B.00.08	Kitchen, Dining & Living Room	100%	Yes
B.00.08	Main Bedroom	98%	Yes
B.00.08	Single Bedroom	97%	Yes
B.00.09	Kitchen, Dining & Living Room	100%	Yes
B.00.09	Main Bedroom	98%	Yes
B.00.10	Kitchen, Dining & Living Room	100%	Yes
B.00.10	Main Bedroom	99%	Yes
B.00.11	Kitchen, Dining & Living Room	100%	Yes
B.00.11	Main Bedroom	99%	Yes
B.00.12	Double Bedroom	99%	Yes
B.00.12	Kitchen, Dining & Living Room	99%	Yes
B.00.12	Main Bedroom	98%	Yes
B.00.13	Kitchen, Dining & Living Room	98%	Yes
B.00.13	Main Bedroom	96%	Yes
B.00.14	Kitchen, Dining & Living Room	99%	Yes
B.00.14	Main Bedroom	82%	Yes
B.00.14	Single Bedroom	80%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

For floor plans of the assessed units please refer to section A.1 on page 19.

B.2.2 Supplementary NSL Results: Apartment Block/First Floor

Table No. B.2.2 - Supplementary NSL Results: Apartment Block/First Floor			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B.01.01	Kitchen, Dining & Living Room	100%	Yes
B.01.01	Main Bedroom	98%	Yes
B.01.01	Single Bedroom	98%	Yes
B.01.02	Kitchen, Dining & Living Room	100%	Yes
B.01.02	Main Bedroom	99%	Yes
B.01.03	Kitchen, Dining & Living Room	100%	Yes
B.01.03	Main Bedroom	99%	Yes
B.01.04	Kitchen, Dining & Living Room	100%	Yes
B.01.04	Main Bedroom	99%	Yes
B.01.05	Double Bedroom	99%	Yes
B.01.05	Kitchen, Dining & Living Room	99%	Yes
B.01.05	Main Bedroom	98%	Yes
B.01.06	Double Bedroom	99%	Yes
B.01.06	Kitchen, Dining & Living Room	98%	Yes
B.01.06	Main Bedroom	93%	Yes
B.01.07	Double Bedroom	97%	Yes
B.01.07	Kitchen, Dining & Living Room	100%	Yes
B.01.07	Main Bedroom	84%	Yes
B.01.07	Single Bedroom	86%	Yes
B.01.08	Double Bedroom	99%	Yes
B.01.08	Kitchen, Dining & Living Room	100%	Yes
B.01.08	Main Bedroom	98%	Yes
B.01.08	Single Bedroom	97%	Yes
B.01.09	Kitchen, Dining & Living Room	100%	Yes
B.01.09	Main Bedroom	99%	Yes
B.01.10	Kitchen, Dining & Living Room	100%	Yes
B.01.10	Main Bedroom	99%	Yes
B.01.11	Kitchen, Dining & Living Room	100%	Yes
B.01.11	Main Bedroom	99%	Yes
B.01.12	Double Bedroom	99%	Yes
B.01.12	Kitchen, Dining & Living Room	99%	Yes
B.01.12	Main Bedroom	98%	Yes
B.01.13	Double Bedroom	98%	Yes
B.01.13	Kitchen, Dining & Living Room	96%	Yes
B.01.13	Main Bedroom	94%	Yes
B.01.14	Kitchen, Dining & Living Room	99%	Yes
B.01.14	Main Bedroom	85%	Yes
B.01.14	Single Bedroom	86%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

For floor plans of the assessed units please refer to section A.1 on page 19.

B.2.3 Supplementary NSL Results: Apartment Block/Second Floor

Table No. B.2.3 - Supplementary NSL Results: Apartment Block/Second Floor			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B.02.01	Kitchen, Dining & Living Room	100%	Yes
B.02.01	Main Bedroom	98%	Yes
B.02.01	Single Bedroom	97%	Yes
B.02.02	Kitchen, Dining & Living Room	100%	Yes
B.02.02	Main Bedroom	99%	Yes
B.02.03	Kitchen, Dining & Living Room	100%	Yes
B.02.03	Main Bedroom	99%	Yes
B.02.04	Kitchen, Dining & Living Room	100%	Yes
B.02.04	Main Bedroom	99%	Yes
B.02.05	Double Bedroom	99%	Yes
B.02.05	Kitchen, Dining & Living Room	99%	Yes
B.02.05	Main Bedroom	98%	Yes
B.02.06	Double Bedroom	99%	Yes
B.02.06	Kitchen, Dining & Living Room	100%	Yes
B.02.06	Main Bedroom	97%	Yes
B.02.07	Double Bedroom	98%	Yes
B.02.07	Kitchen, Dining & Living Room	100%	Yes
B.02.07	Main Bedroom	91%	Yes
B.02.07	Single Bedroom	96%	Yes
B.02.08	Double Bedroom	99%	Yes
B.02.08	Kitchen, Dining & Living Room	100%	Yes
B.02.08	Main Bedroom	98%	Yes
B.02.08	Single Bedroom	97%	Yes
B.02.09	Kitchen, Dining & Living Room	100%	Yes
B.02.09	Main Bedroom	99%	Yes
B.02.10	Kitchen, Dining & Living Room	100%	Yes
B.02.10	Main Bedroom	99%	Yes
B.02.11	Kitchen, Dining & Living Room	100%	Yes
B.02.11	Main Bedroom	99%	Yes
B.02.12	Double Bedroom	99%	Yes
B.02.12	Kitchen, Dining & Living Room	99%	Yes
B.02.12	Main Bedroom	98%	Yes
B.02.13	Double Bedroom	98%	Yes
B.02.13	Kitchen, Dining & Living Room	100%	Yes
B.02.13	Main Bedroom	97%	Yes
B.02.14	Kitchen, Dining & Living Room	100%	Yes
B.02.14	Main Bedroom	92%	Yes
B.02.14	Single Bedroom	96%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

For floor plans of the assessed units please refer to section A.1 on page 19.

B.2.4 Supplementary NSL Results: Apartment Block/Third Floor

Table No. B.2.4 - Supplementary NSL Results: Apartment Block/Third Floor			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B.03.01	Kitchen, Dining & Living Room	100%	Yes
B.03.01	Main Bedroom	100%	Yes
B.03.02	Kitchen, Dining & Living Room	100%	Yes
B.03.02	Main Bedroom	99%	Yes
B.03.03	Kitchen, Dining & Living Room	100%	Yes
B.03.03	Main Bedroom	99%	Yes
B.03.04	Double Bedroom	99%	Yes
B.03.04	Kitchen, Dining & Living Room	99%	Yes
B.03.04	Main Bedroom	98%	Yes
B.03.05	Double Bedroom	99%	Yes
B.03.05	Kitchen, Dining & Living Room	100%	Yes
B.03.05	Main Bedroom	97%	Yes
B.03.06	Kitchen, Dining & Living Room	100%	Yes
B.03.06	Main Bedroom	100%	Yes
B.03.07	Kitchen, Dining & Living Room	100%	Yes
B.03.07	Main Bedroom	99%	Yes
B.03.08	Kitchen, Dining & Living Room	100%	Yes
B.03.08	Main Bedroom	99%	Yes
B.03.09	Double Bedroom	99%	Yes
B.03.09	Kitchen, Dining & Living Room	99%	Yes
B.03.09	Main Bedroom	98%	Yes
B.03.10	Double Bedroom	98%	Yes
B.03.10	Kitchen, Dining & Living Room	100%	Yes
B.03.10	Main Bedroom	97%	Yes

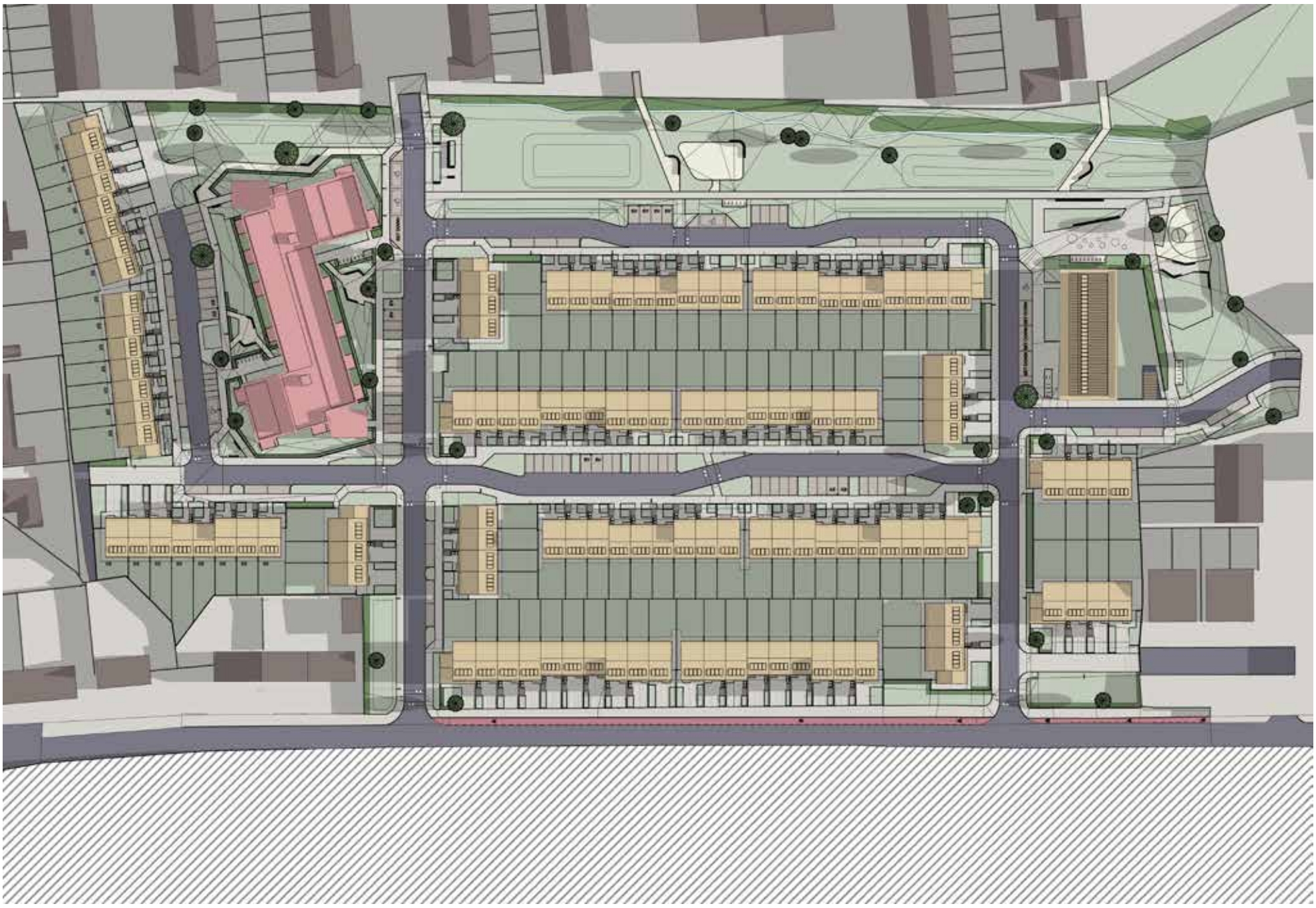
* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, it states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section A.1 on page 19.

N

March 21st 7:00

March 21st 8:00



C.0 C.1	Shadow Studies Shadow Study 21 March	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
	March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

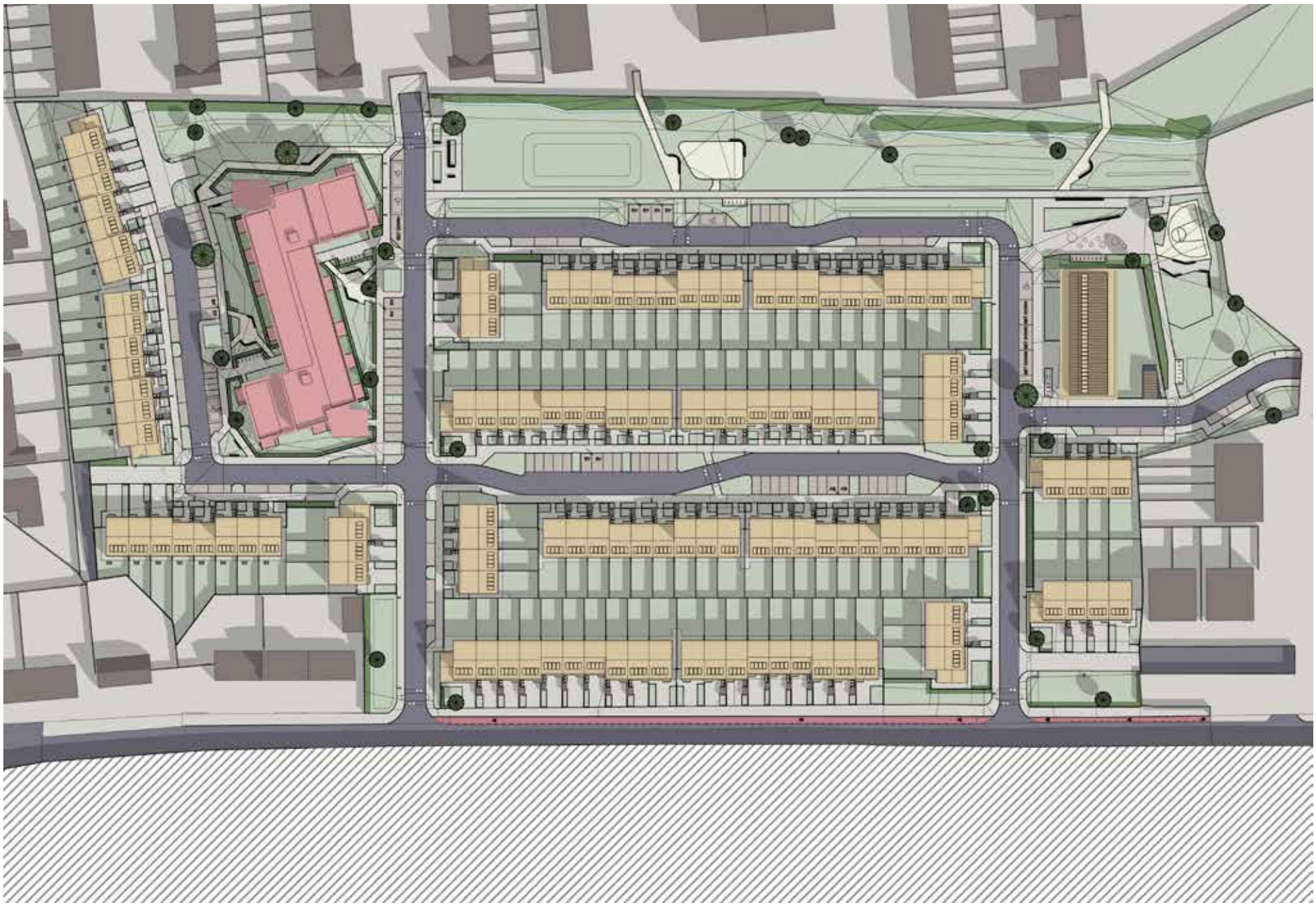
March 21st 9:00

March 21st 10:00

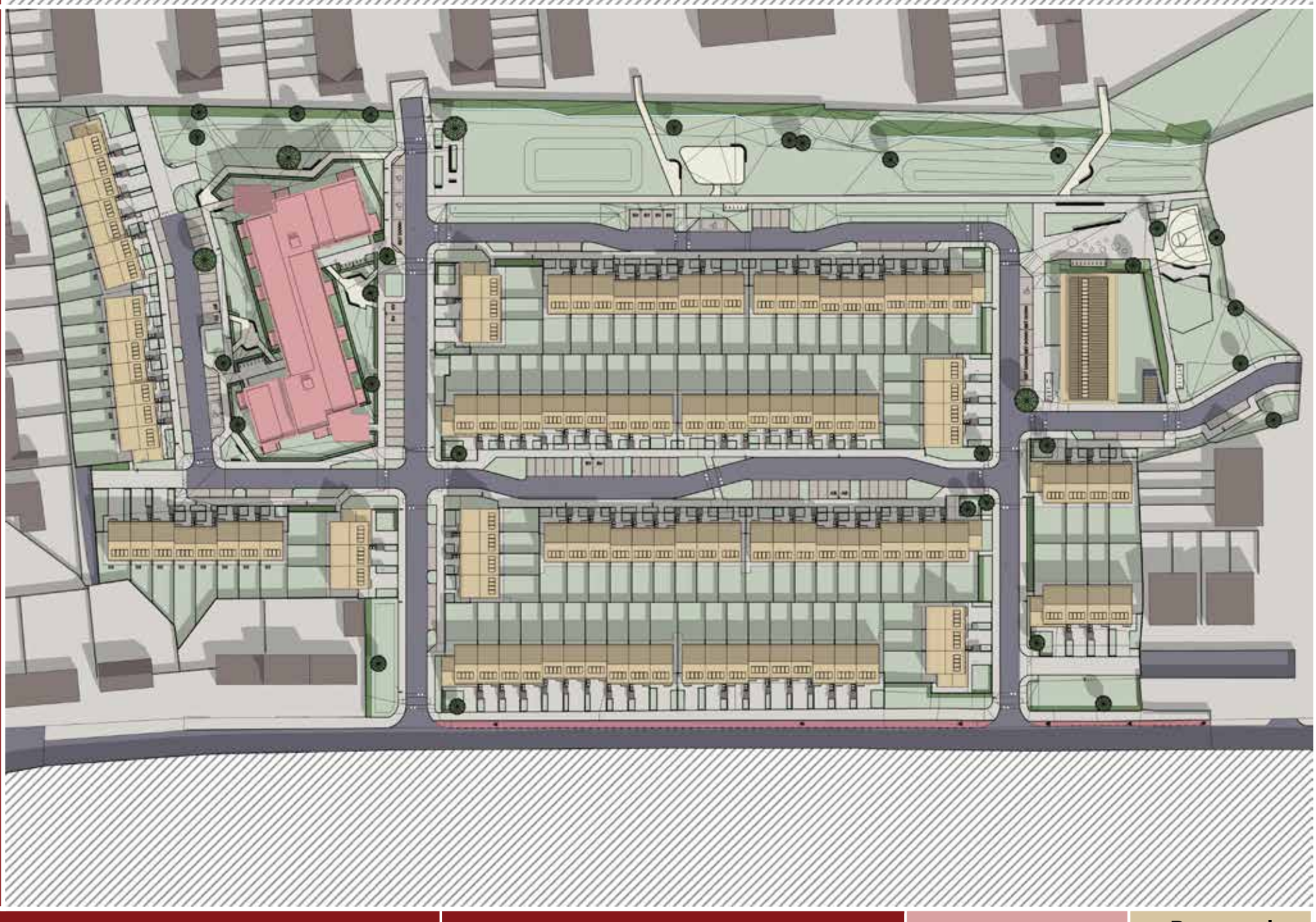
	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

March 21st 11:00



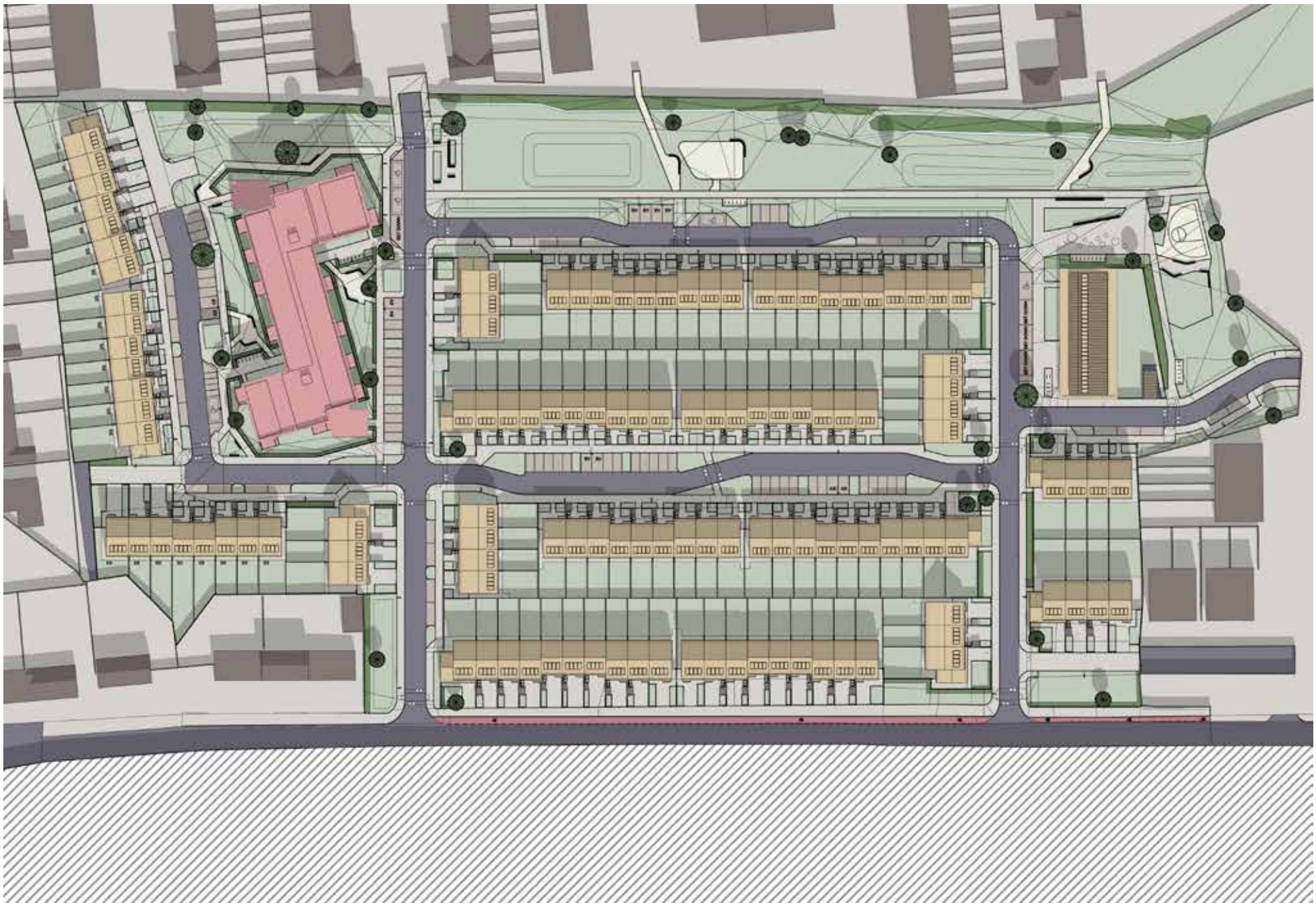
March 21st 12:00



	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

March 21st 13:00



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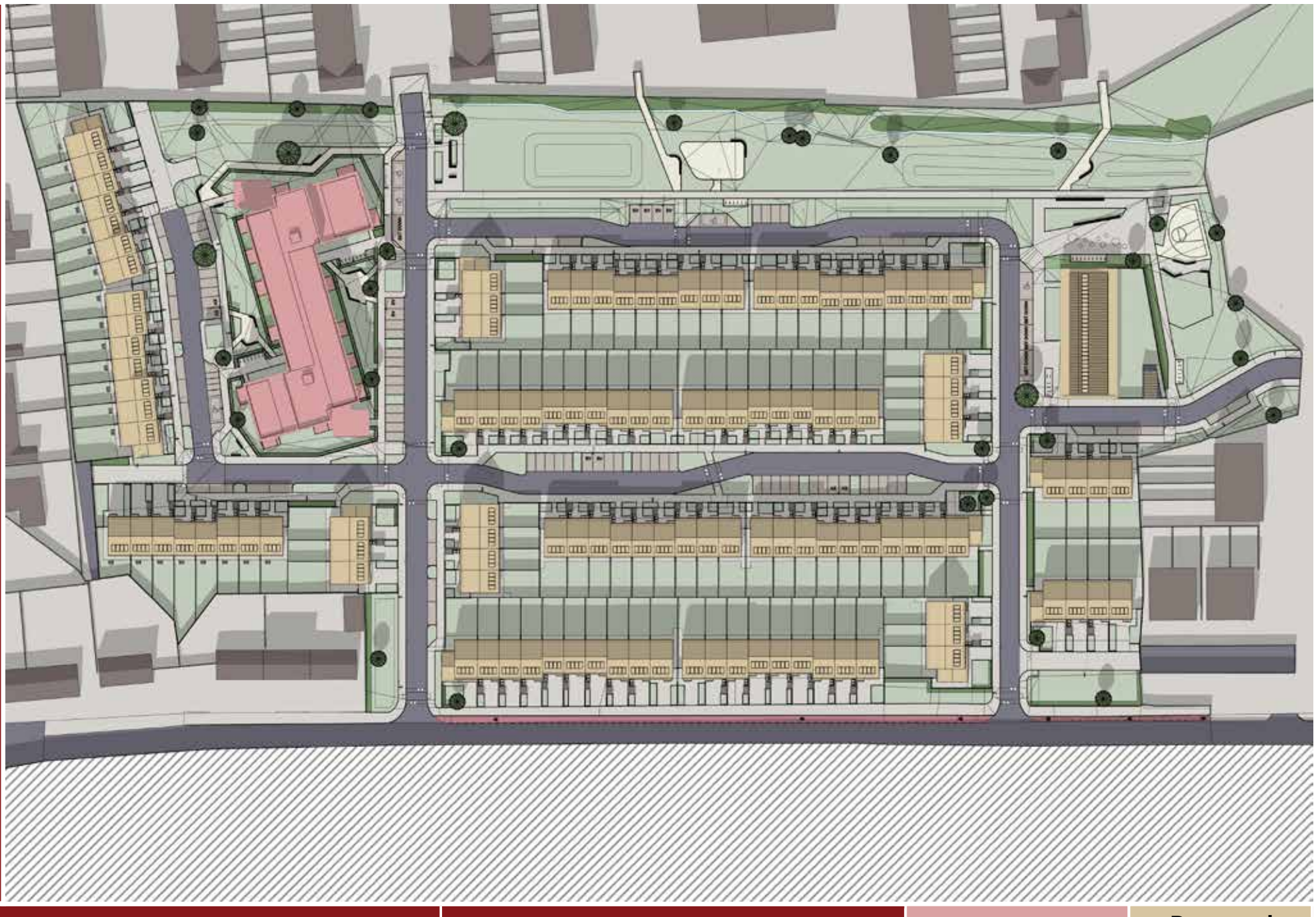
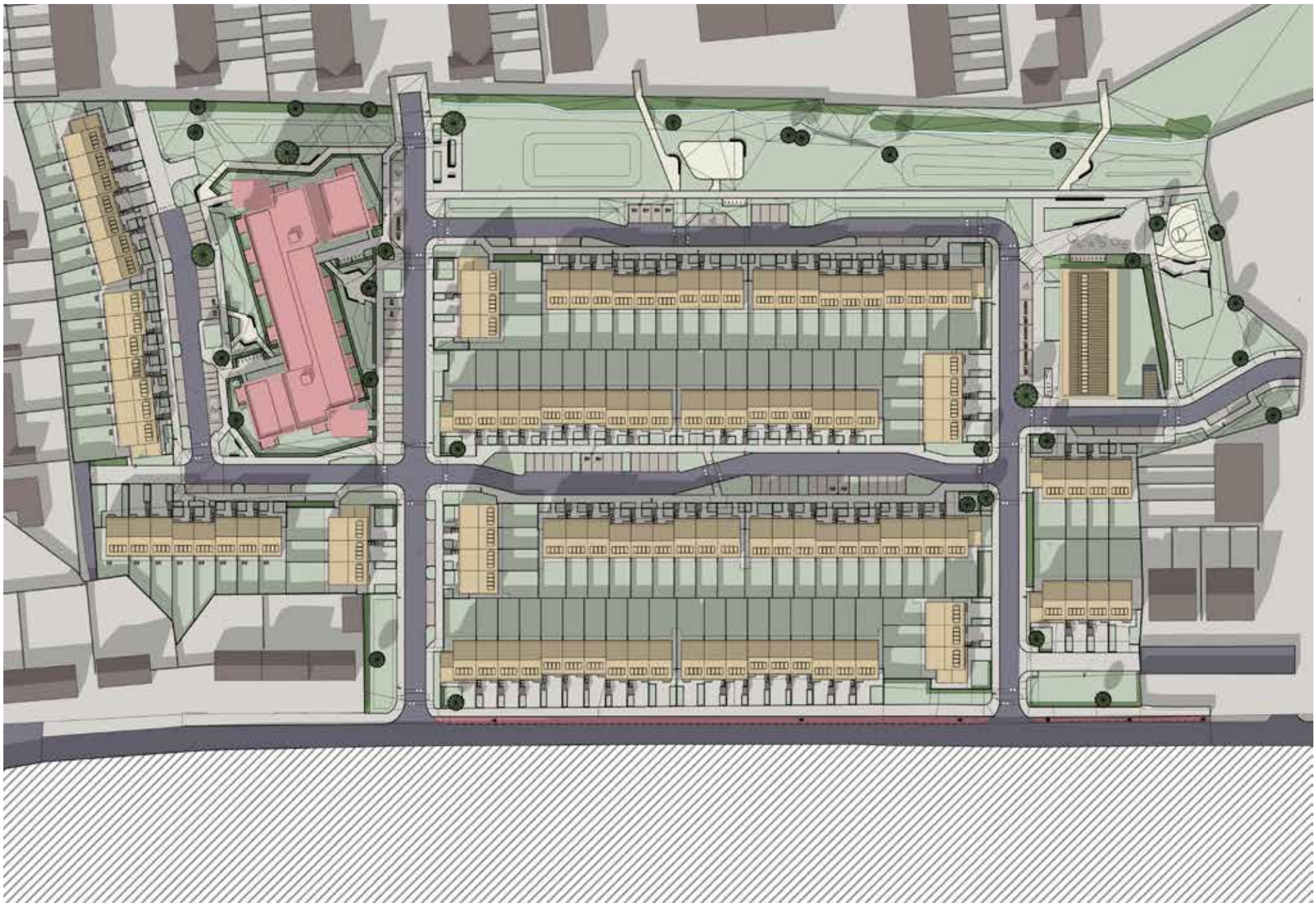


	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

March 21st 15:00



March 21st 16:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

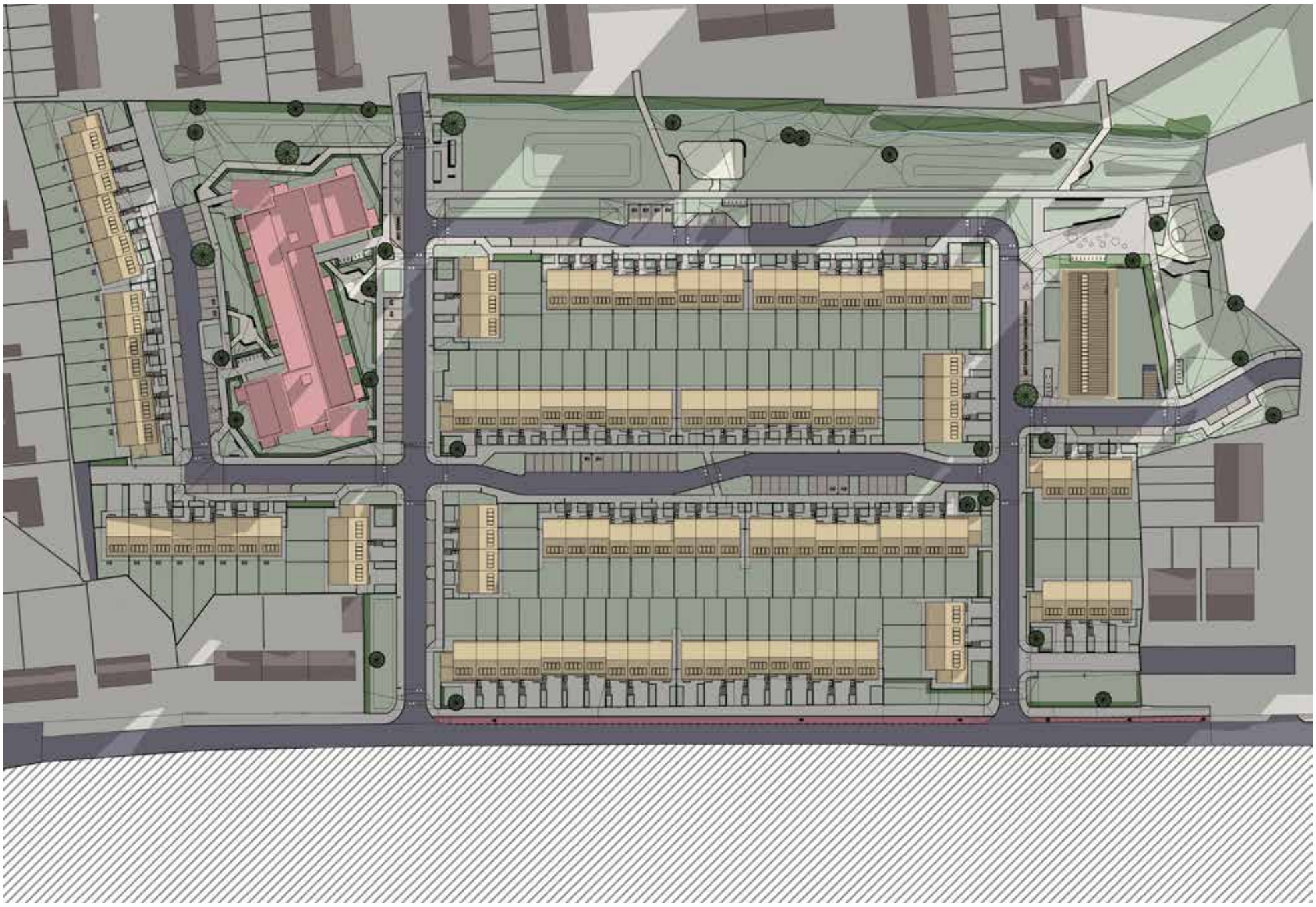
March 21st 17:00

March 21st 18:00

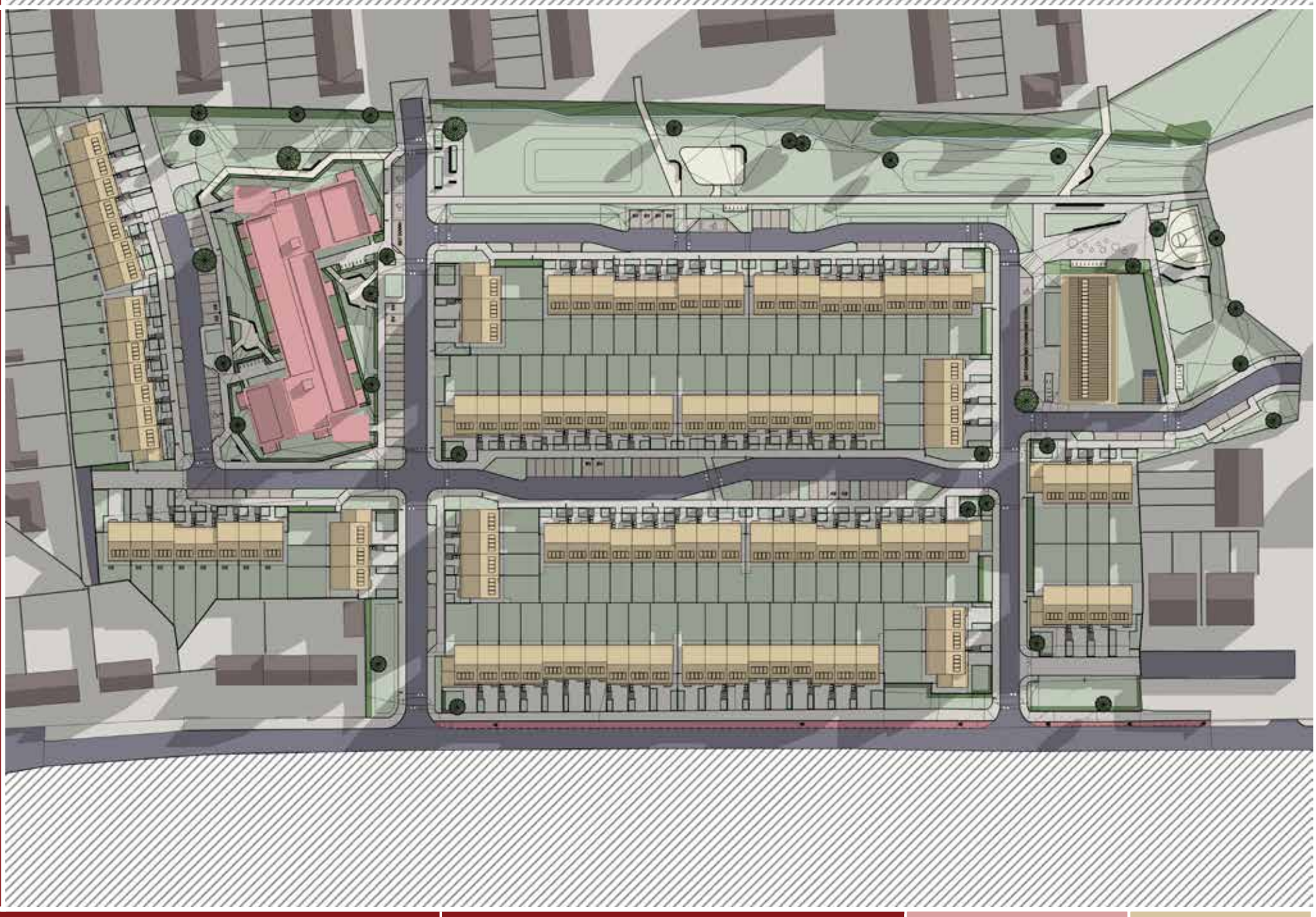
	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
March 21st Sunrise 6:32 | Sunset 18:32	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 6:00



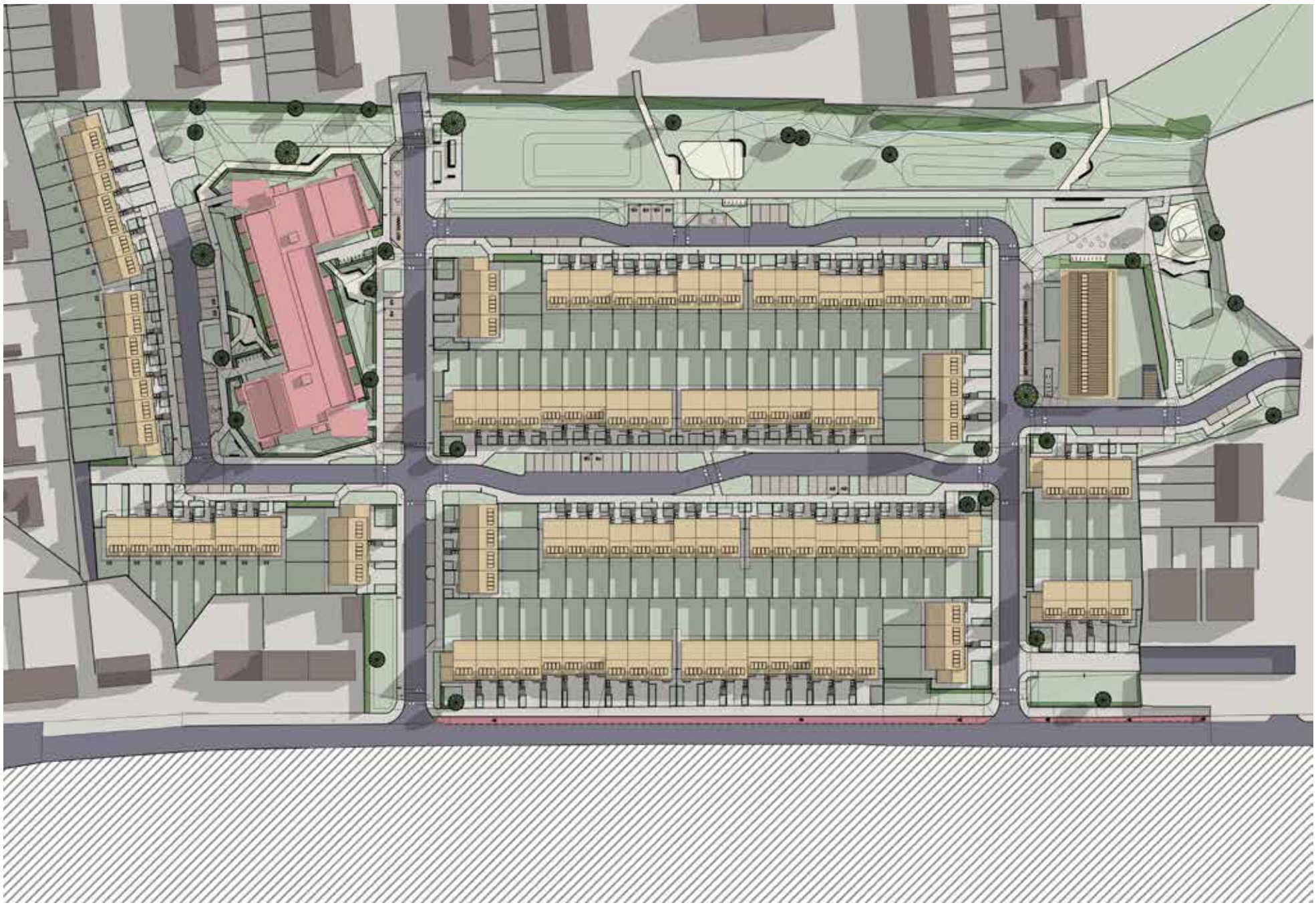
June 21st 7:00



C.2	Shadow Study 21 June	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
	June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 8:00

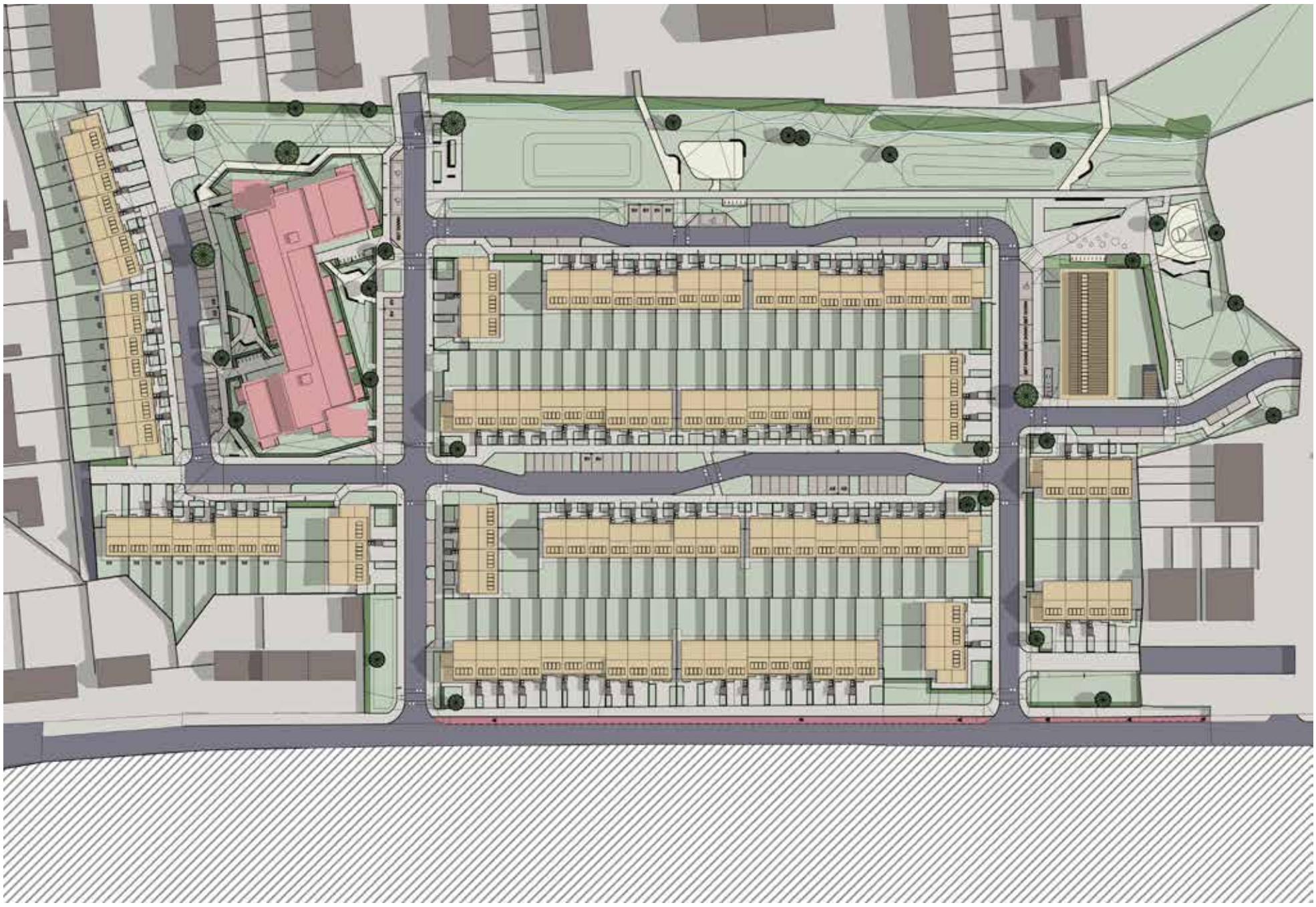


June 21st 9:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 10:00



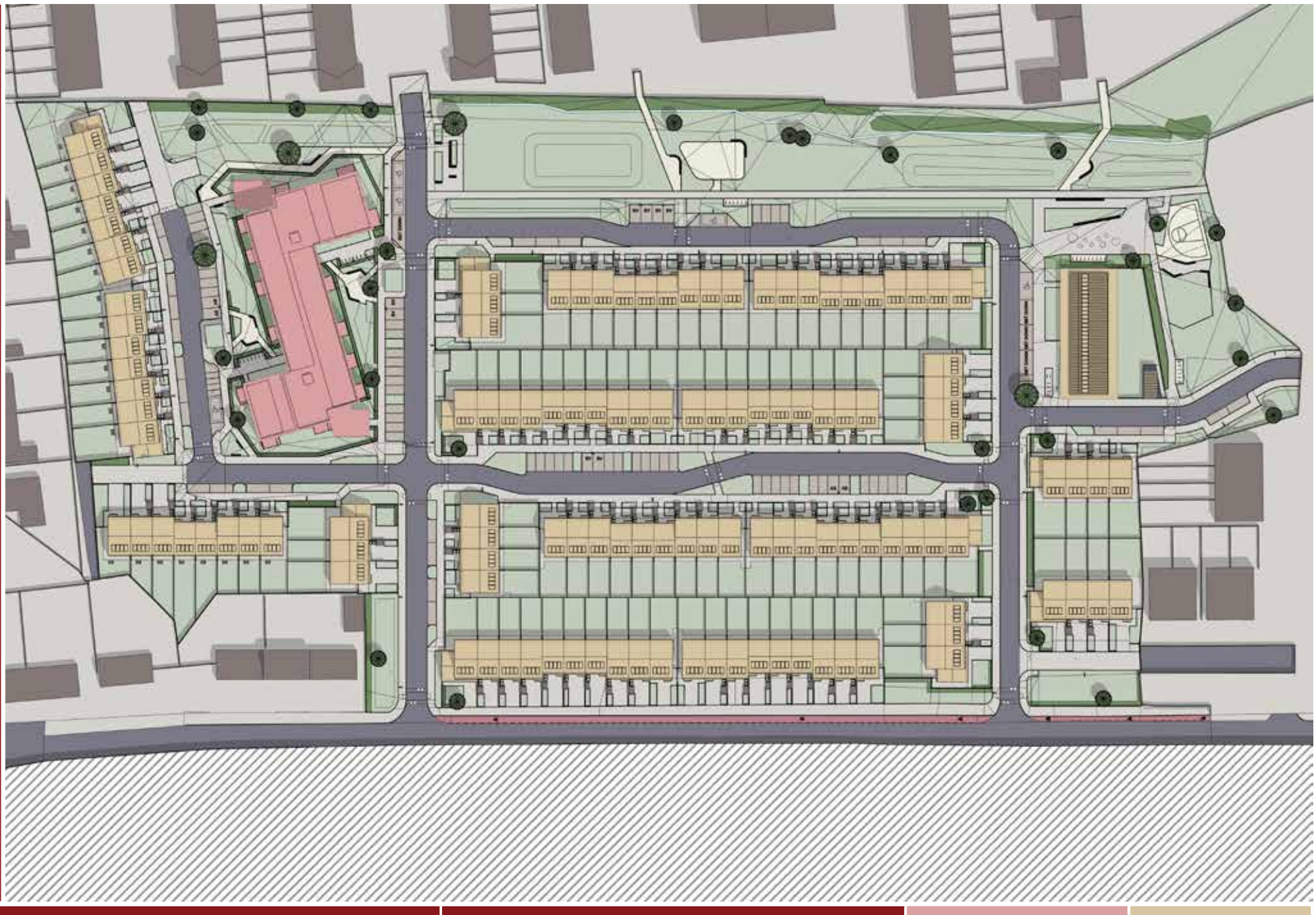
June 21st 11:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 12:00

June 21st 13:00



	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 14:00

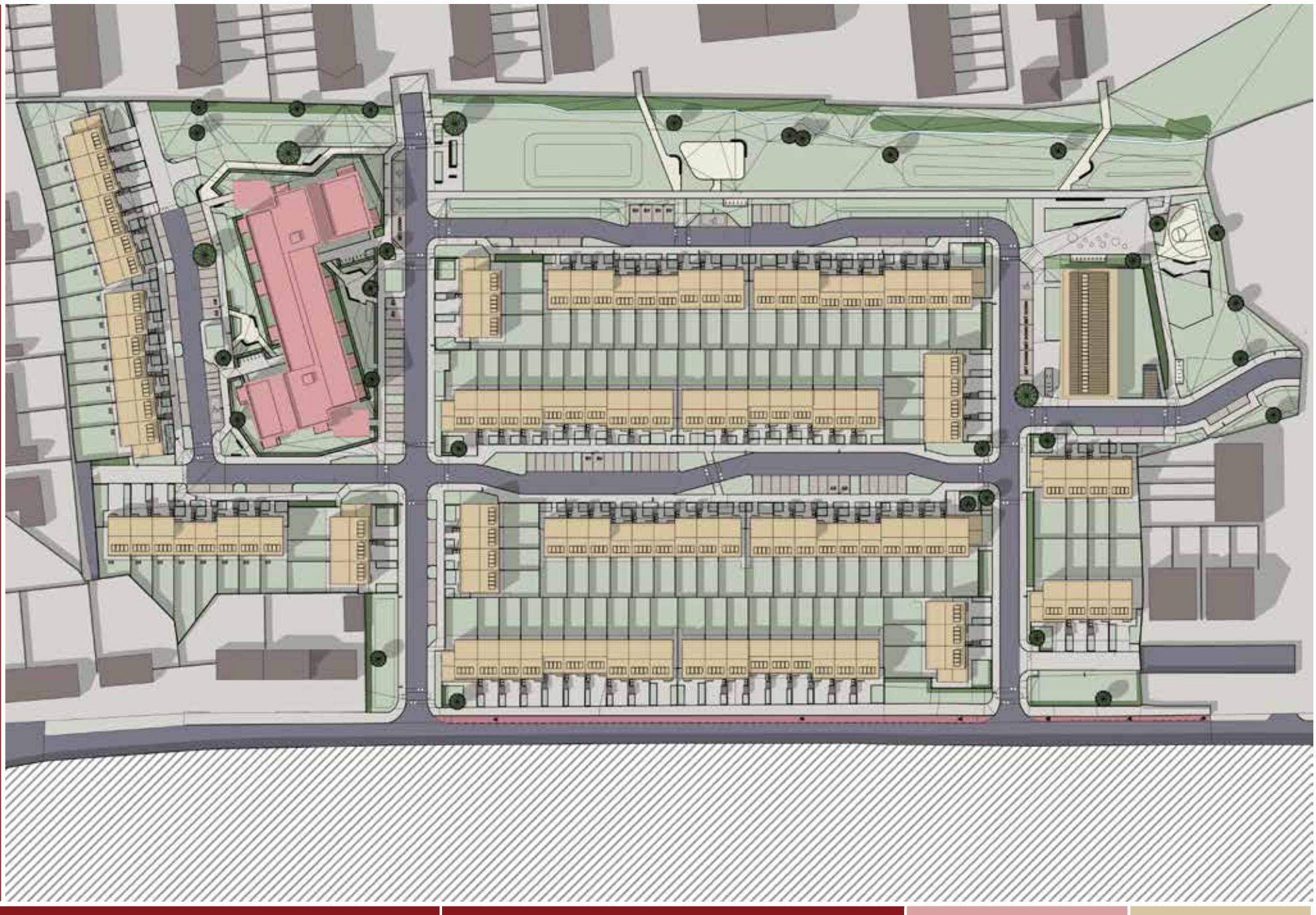
June 21st 15:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 16:00

June 21st 17:00



	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

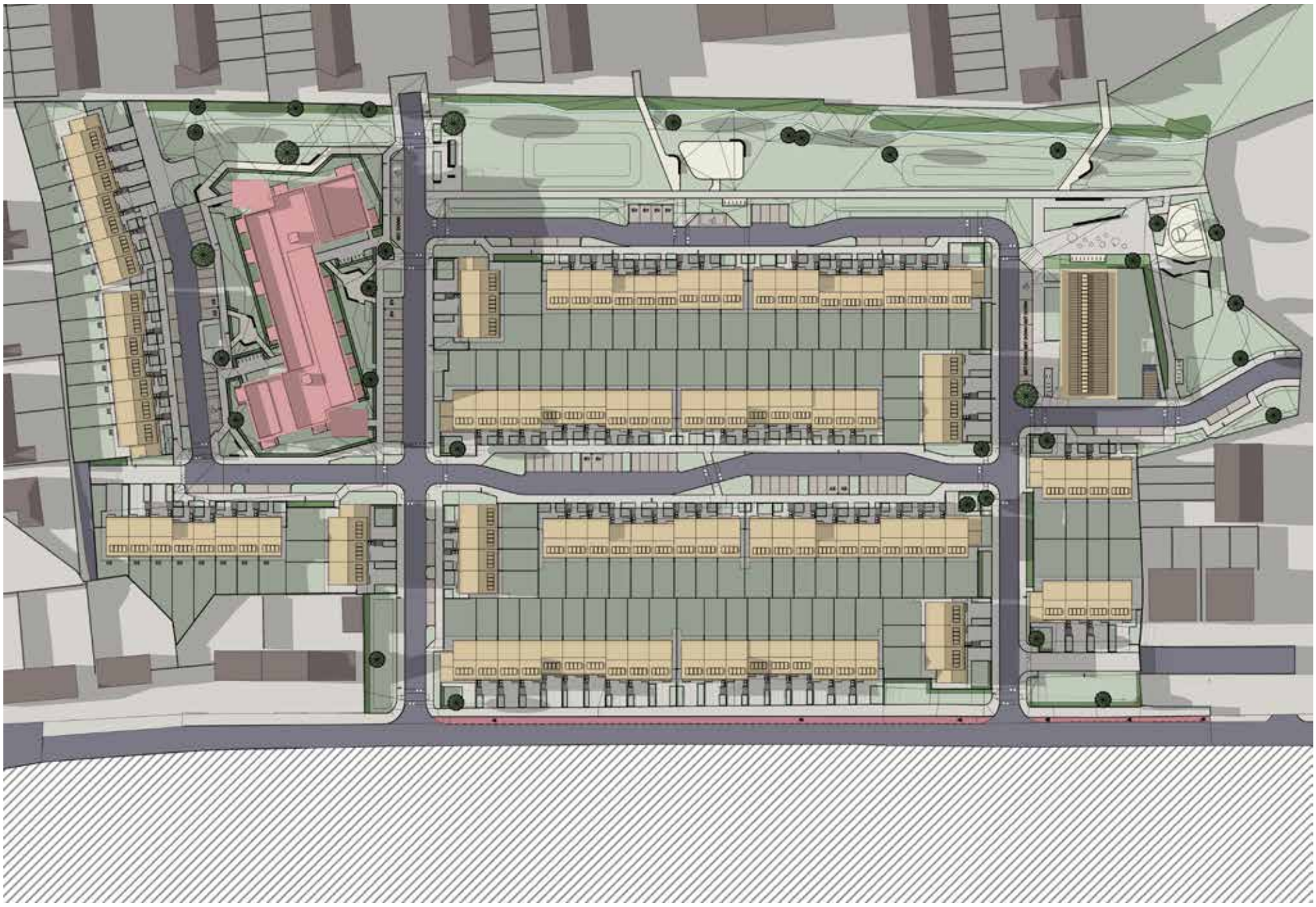
June 21st 18:00

June 21st 19:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

June 21st 20:00



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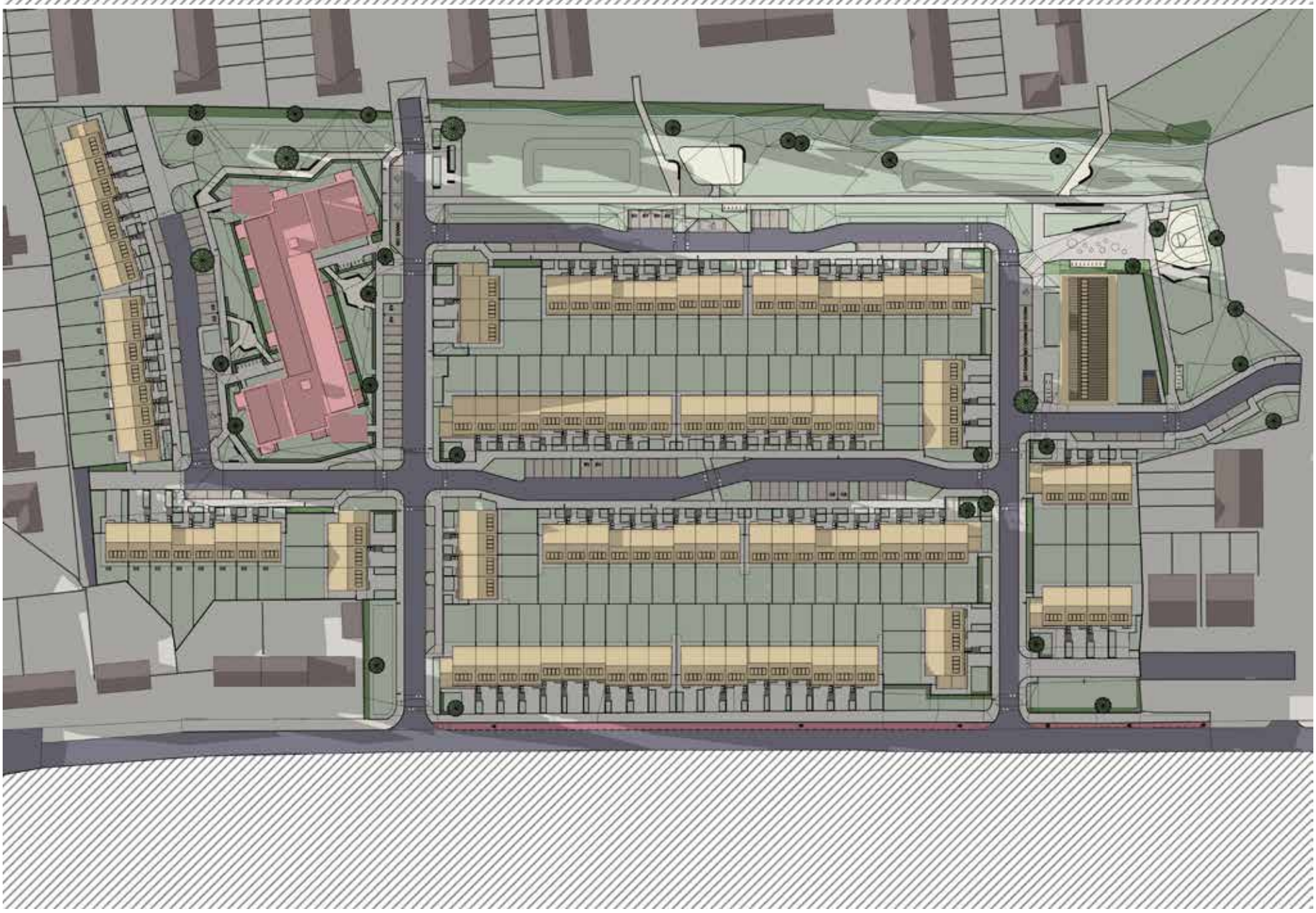
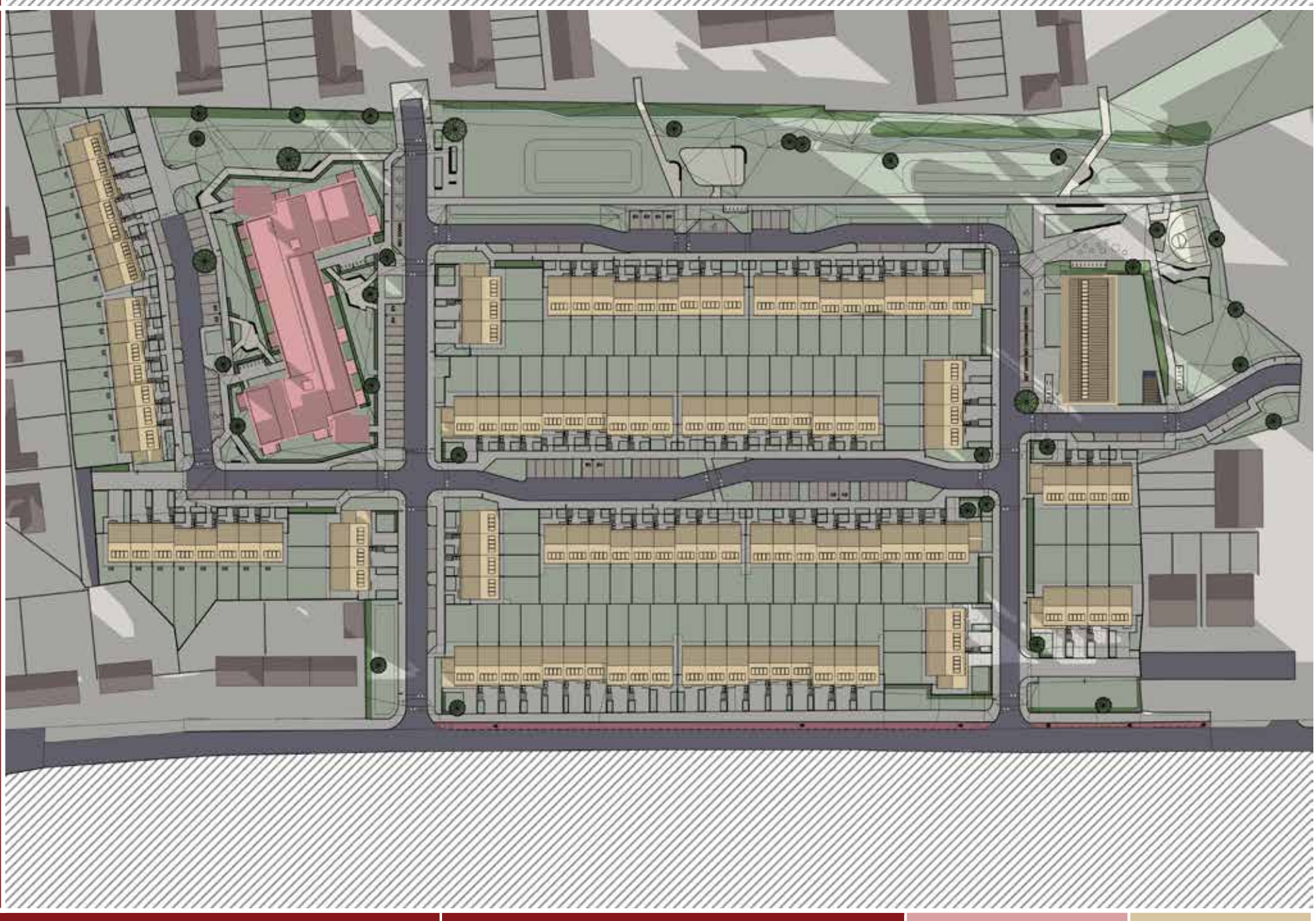


	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
June 21st Sunrise 5:03 | Sunset 21:50	Applicant: Fingal County Council		3D DESIGN BUREAU

N

December 21st 9:00

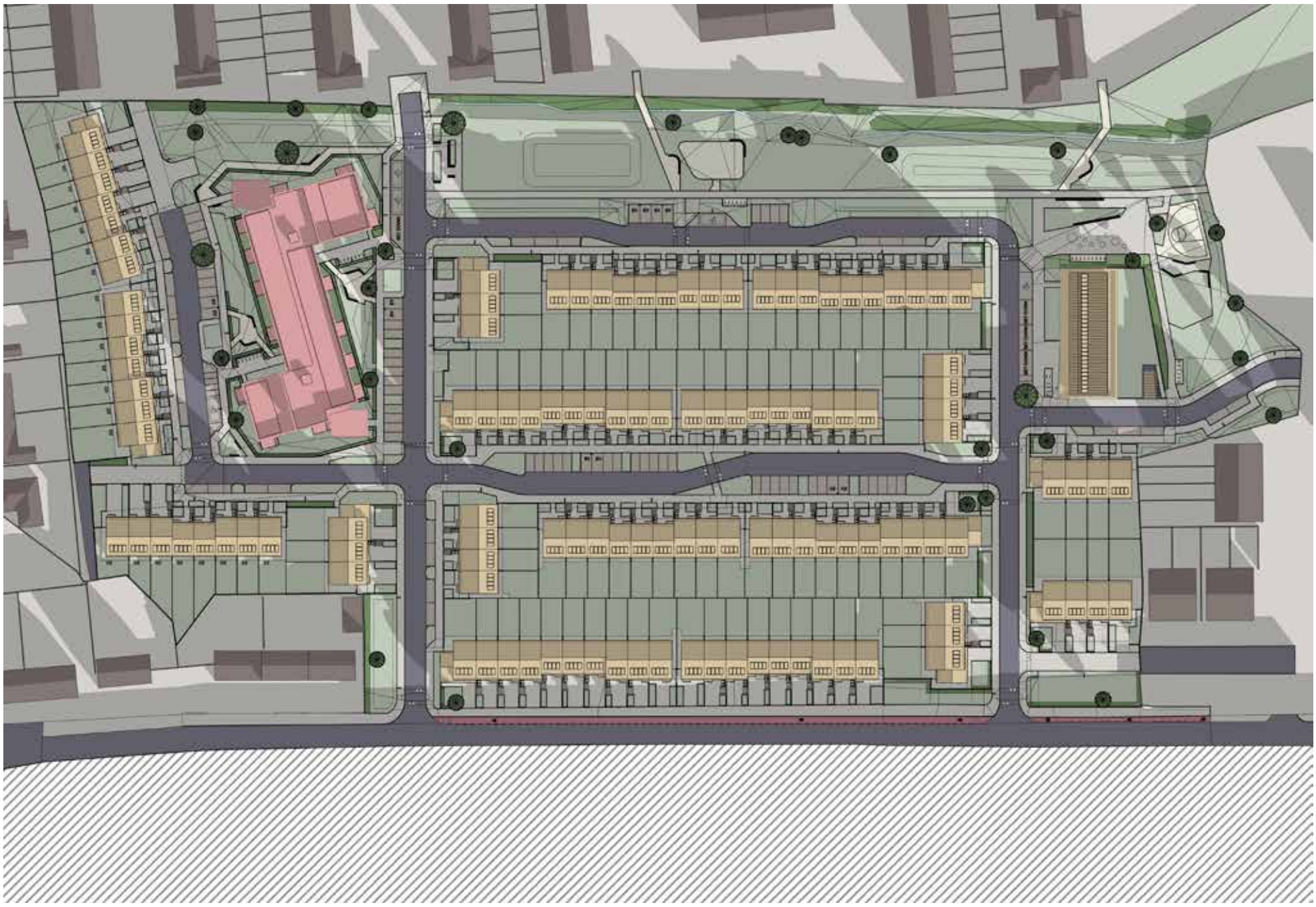
December 21st 10:00



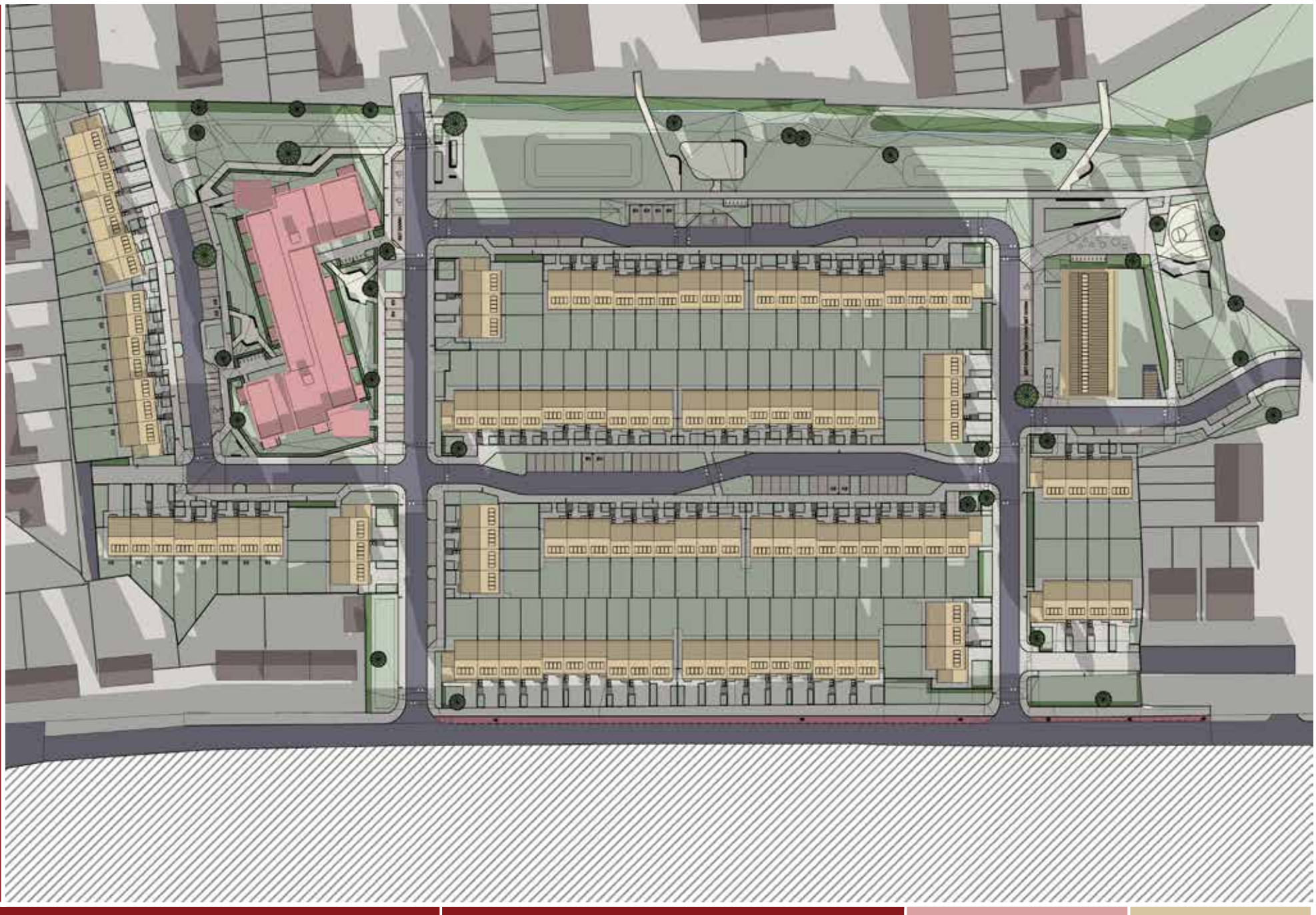
C.3 Shadow Study 21 December	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
December 21st Sunrise 8:46 | Sunset 15:59	Applicant: Fingal County Council		3D DESIGN BUREAU

N

December 21st 11:00



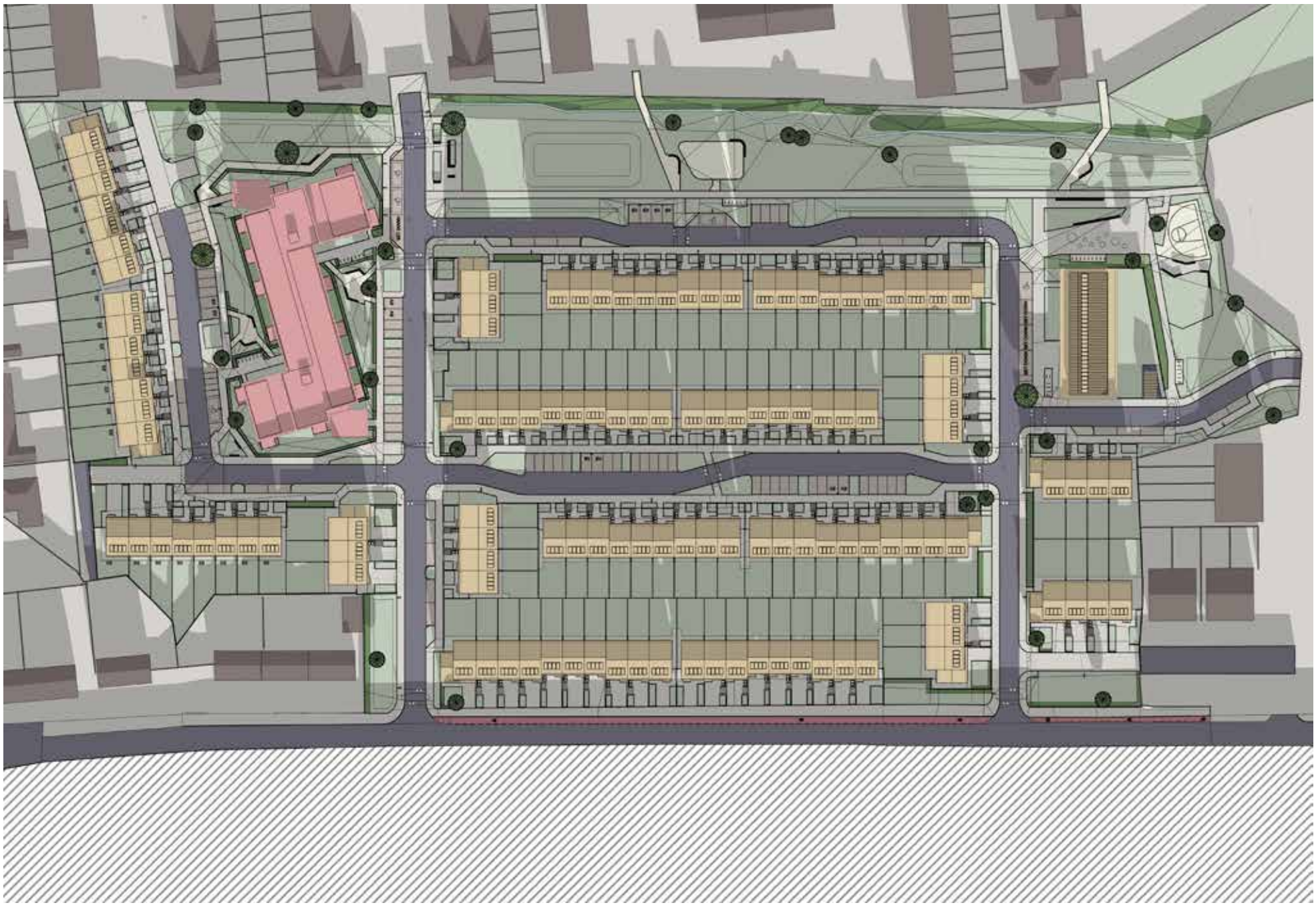
December 21st 12:00



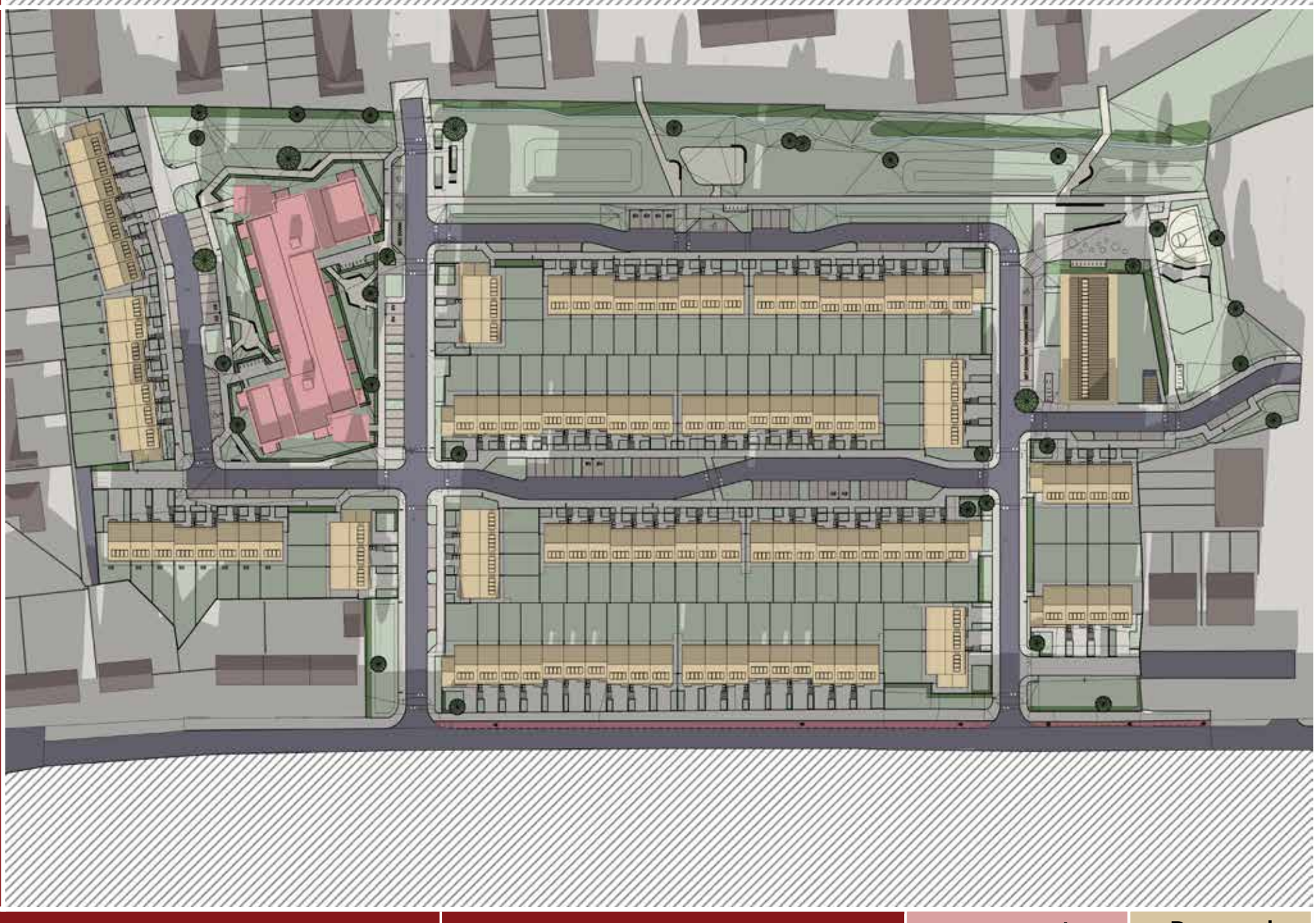
	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
December 21st Sunrise 8:46 | Sunset 15:59	Applicant: Fingal County Council		3D DESIGN BUREAU

N

December 21st 13:00



December 21st 14:00



	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
December 21st Sunrise 8:46 | Sunset 15:59	Applicant: Fingal County Council		3D DESIGN BUREAU

N

December 21st 15:00

December 21st 16:00

	Project: New Road, Donabate, Co. Dublin	Proposed Apartment Building	Proposed Houses
December 21st Sunrise 8:46 | Sunset 15:59	Applicant: Fingal County Council	3D DESIGN BUREAU	