Red & Yellow
Specialist Extra Care

Melliss Avenue – Kew

Daylight, Sunlight & Overshadowing Report

October 2018

Justin Bolton • Barry Hood
• Andrew Cartmell • Chris Skelt •
Nick Lane • Liam Dunford

Point 2 Surveyors Ltd
17 Slingsby Place, London WC2E 9AB

tel: 0207 836 5828

Former Kew Biothane site,

Melliss Avenue, Kew

Daylight, Sunlight and Overshadowing

Overshadowing

• *Daylight & Sunlight* • *Light Pollution* •

Solar Glare • *Daylight Design*

Director:	Nick Lane
Client:	Melliss Av Devco Ltd
Date:	October 2018
Version:	Planning
Project:	P1572

Contents

Appendices

1 Introduction

1.1 Melliss Ave Devco Limited ('the Applicant') have instructed Point 2 Surveyors to undertake a detailed daylight and sunlight assessment of the Red & Yellow Specialist Extra Care development on the Former Biothane Site, Melliss Avenue, Kew TW9 in the London Borough of Richmond ('LBR').

1.2 The proposals includes the demolition of existing buildings and structures and redevelopment of the site to provide a specialist extra care facility (C2 Use Class) for the elderly with existing health conditions. Comprising, 89 units, with extensive private and communal healthcare, therapy, leisure and social facilities set within a building of ground plus 3 to 5 storeys including setbacks. Provision of car and cycle parking, associated landscaping and publicly accessible amenity spaces including a children's play area ('Proposed Development').

1.3 This report assesses the potential daylight and sunlight effects of the Proposed Development on the surrounding residential properties in accordance with the advice and recommendation set out in the BRE guidelines 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' (2011).

1.4 The calculations within this report have been based upon a 3D contextual model created from measured point cloud survey data, alongside the submitted 3D model of the Proposed Development that has been prepared by Marchese Partners.

Sources of Information

1.5 In the process of compiling this report the following sources of information have been used:

Point 2 Surveyors
Point Cloud Survey
Site Photography

Marchese Partners
Proposed Info – '180731 KEW_revised model.rvt'

MJ Rees and Company
3D Laser Scan Tree Survey – '8850.dwg' (Undertaken in March 2018)

SJA Trees
Tree Species Survey

London Borough of Richmond Upon Thames
Layout Plans

Estate Agent Details
Layout Plans

Valuation Office Agency
Property Uses

2 Methodology

2.1 It is usual to assess daylight and sunlight in relation to the guidelines set out in the 2011 Building Research Establishment (BRE) Report 'Site layout planning for daylight and sunlight - A guide to good practice' by Paul Littlefair. This document is most widely accepted by planning authorities as the means by which to judge the acceptability of a scheme. One of the primary sources for the BRE Report is the more detailed guidance contained within 'British Standard 8206 Part 2:2008'.

2.2 The BRE guidelines are not mandatory, and they explicitly state that the numerical target values should be interpreted flexibly. While local planning authorities will consider the acceptability of a proposed scheme in relation to BRE guidance, consideration will be given to the context within which a scheme is located, and daylight and sunlight will be one of a number of planning considerations.

2.3 In relation to the properties surrounding a site, usually the local planning authority will only be concerned with the impact to main habitable accommodation (i.e. living rooms, bedrooms and kitchens) within residential properties.

2.4 To determine whether a neighbouring existing building may be adversely affected, the initial test provided by the BRE is to establish if any part of the proposal subtends an angle of more than 25˚ from the lowest window serving the existing building. If this is the case then there may be an adverse effect, and more detailed calculations are required to quantify the extent of any impact.

2.5 The BRE guidelines provide two principal measures of daylight for assessing the impact on properties neighbouring a site, namely Vertical Sky Component (VSC) and No-Sky Line (NSL).

2.6 In terms of sunlight we examine the BRE Annual Probable Sunlight Hours (APSH); and in relation to sunlight amenity to gardens and amenity spaces, we apply the quantitative BRE overshadowing guidance.

2.7 These measures of daylight and sunlight are discussed in the following paragraphs -

Diffuse Daylight

2.8 **Vertical Sky Component (VSC)** – VSC is a measure of the direct skylight reaching a point from an overcast sky. It is the ratio of the illuminance at a point on a given vertical plane to the illuminance at a point on a horizontal plane due to an unobstructed sky.

2.9 For existing buildings, the BRE guideline is based on the loss of VSC at a point at the centre of a window, on the outer plane of the wall.

2.10 The BRE guidelines state that if the VSC at the centre of a window is less than 27%, and it is less than 0.8 times its former value (i.e. the proportional reduction is greater than 20%), then the reduction in skylight will be noticeable, and the existing building may be adversely affected.

2.11 **No-Sky Line (NSL) -** NSL is a measure of the distribution of daylight within a room. It maps out the region within a room where light can penetrate directly from the sky, and therefore accounts for the size of and number of windows by simple geometry.

2.12 The BRE suggest that the area of the working plane within a room that can receive direct skylight should not be reduced to less than 0.8 times its former value (i.e. the proportional reduction in area should not be greater than 20%).

2.13 The BRE recommend that the NSL assessment should be undertaken "*where room layouts are known*". Therefore, where room layouts are not known, the VSC has been adopted as the principal form of daylight assessment.

Sunlight

2.14 **Annual Probable Sunlight Hours (APSH)** - In relation to sunlight, the BRE recommends that the APSH received at a given window in the proposed case should be at least 25% of the total available, including at least 5% in winter.

2.15 Where the proposed values fall short of these, and the absolute loss is greater than 4%, then the proposed values should not be less than 0.8 times their previous value in each period (i.e. the proportional reductions should not be greater than 20%).

2.16 The BRE guidelines state that '*...all main living rooms of dwellings, and conservatories, should be checked if they have a window facing within 90 degrees of due south. Kitchens and bedrooms are less important, although care should be taken not to block out too much sun'*.

2.17 The APSH figures are calculated for each window, and where a room is served by more than one window the contribution of each is accounted for in the overall figures for the room. The acceptability criteria are applied to overall room based figures.

Sun Hours on Ground

2.18 The methodology for the assessment of sun hours on ground for external amenity areas is set out in the 2011 BRE Guidance and is summarised below. The 2011 BRE Guidelines acknowledges that:

"Good Site layout planning for daylight and sunlight should not limit itself to providing good natural light inside buildings. Sunlight in the space between buildings has an important effect on the overall appearance and ambience of a Development."

2.19 The method for assessing sun hours on ground is the sun-on-ground indicator. The sun hours on ground assessment applies both to new gardens and amenity areas, and to existing ones, which are affected by new Developments.

2.20 The 2011 BRE Guidelines suggests that the Spring Equinox (21st March) is a good date for assessment as the sun is at its midpoint in the sky. Using specialist software, the path of the sun is tracked which maps obstructions and compares them to the known sun paths to determine where the sun would reach the ground and where it would not.

2.21 The BRE suggests that for a garden or amenity area to appear adequately sunlit throughout the year, no more than half (50%) of the area should be prevented by buildings from receiving two hours of sunlight on the 21st March. The 2011 BRE Guidelines then go on to suggest that if, as a result of new Development, an existing garden or amenity area (external receptor) does not meet the Guidance, or the area which can receive some sun on the 21st March is less than 0.8 times its former value then the loss of sunlight is likely to be noticeable. The results of each assessment are analysed against these criteria.

Trees and Hedges

2.22 In general, deciduous trees and hedges are omitted from daylight and sunlight technical assessments. Appendix H of the BRE guidelines sets out their recommendations for the assessment of trees. Paragraph H1.2 states the following:

> *"It is generally more difficult to calculate the effects of trees on daylight because of their irregular shapes and because some light will generally penetrate through the tree crown. Where the effect of a new building on existing buildings nearby is being analysed, it is usual to ignore the effect of existing trees."*

2.23 However, whilst this is the usual and more practical approach for developers, the BRE recommends that each site is considered on a case by case basis so there are times when the effect of trees cannot be ignored and should be taken into account.

2.24 The BRE guide goes on to state that:

> *"Trees and hedges vary in their effects on skylight and sunlight. Most tree species will cast a partial shade; for deciduous trees will vary with time of year. However, very little light can penetrate dense belts of evergreen trees, and the shade they cause will be more like that of a building or wall."*

2.25 The same could arguably be said for a belt of densely planted deciduous trees, where in the summer months (around half of the year) the trees will be in full leaf and could also cast shadow similar to that of a building. The BRE does not rule out the assessment of deciduous trees, however where this is required the BRE acknowledges that:

> *"This needs to be done using the exact shape of the trees; often trees are irregularly shaped and simple modelling, using height and spread data and assuming a circular tree, will give inaccurate results. A special survey on site is generally required to produce the required data on the tree height."*

2.26 Furthermore, where deciduous trees are to be analysed, the BRE also advocates that daylight and sunlight assessments be undertaken in both the summer (full leaf) and winter (no leaf).

3 Planning Overview and Site Context

3.1 This assessment has been informed by the BRE document entitled '*Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' 2011* (the BRE Guidelines), which is the principal guidance on daylight, sunlight and overshadowing.

3.2 The BRE guidelines are predicated upon a low-scale suburban environment, and it is therefore inevitable that if those recommendations are applied to more urban locations, or those where larger scale buildings are envisaged, then there will be greater reductions in daylight and sunlight amenity if developments are to match the height and proportions of the neighbouring buildings.

3.3 It is evident that the wider context within which the development site is located has undergone some significant regeneration over the past 18 years or so, with the former Kew Biothane Plant having been surrounded by a mixture of 3-5 storey residential buildings as part of the Berkeley Homes development. As a result, the development site with its relatively low-scale obstructions represents an under-developed parcel of land at the heart of what is now an established urban residential neighbourhood.

EXISTING SITE LOCATION (BING MAPS)

3.4 Consideration should therefore be given to the urban context within which the site is located, as daylight and sunlight is one of a many planning considerations which the local authority will review as part of the planning process. This is because there are many factors that influence site layout, and the BRE Guidelines expressly recognise in its introduction that "*the advice given 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."*

3.5 In addition, the recently updated National Planning Policy Framework 2018 ('NPPF') makes reference to the need for local authorities to adopt a flexible approach when considering daylight and sunlight impacts, stating in its 'Achieving Appropriate Densities' section:

3.6 "123:

c) *local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing,* ***authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight****, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."*

3.7 One of the key characteristics of this particular site is that when the Berkeley Homes residential development was constructed in the early 2000s, the Kew Biothane Plant was retained and as a result a conscious decision was made to plant a large number of trees close together along the boundary of the site with the specific aim of masking the view of the Biothane Plant from the neighbouring residential dwellings. A consequence of this is that these trees have now been established for over 15 years and now present a noticeable obstruction to the daylight and sunlight experienced by those residential dwellings, particularly along Melliss Avenue. These trees are shown below in full leaf (representative of the summer months) and also in the process of losing leaf during autumn:

TREES ALONG MELLISS AVENUE IN SUMMER (FULL LEAF)

TREES ALONG MELLISS AVENUE IN AUTUMN (LOSING LEAF)

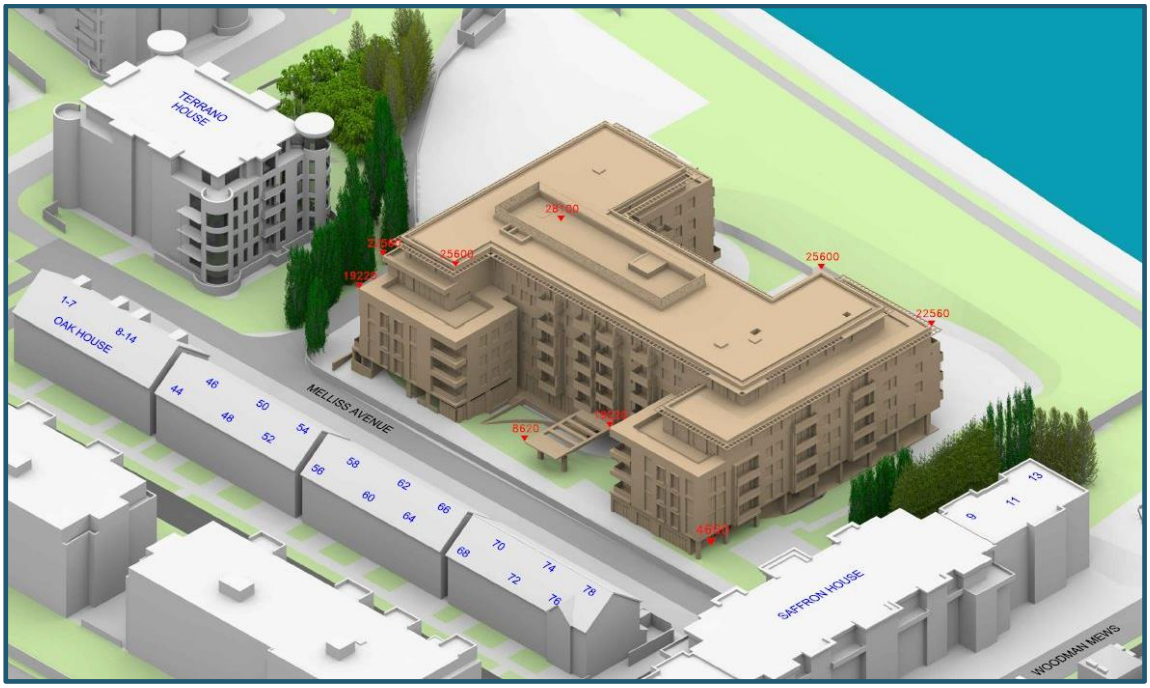
3.8 A dense belt of trees such as this, be they deciduous or evergreen, has been created that causes an obstruction that is not dissimilar to that of a building so will have a material impact on the amount of daylight and sunlight received by the neighbouring properties. Therefore, in our opinion, the trees must be taken into consideration as part of any detailed technical assessment in order to provide a true reflection of the real-life conditions.

3.9 Whilst the significance of the trees cannot be ignored, we have also considered the impact to the neighbouring properties without trees so that the reader is made aware of the full effects caused by the proposals.

3.10 The existing site is the former Biothane Site and is made up of low rise buildings and structures. The proposed development includes the demolition of existing buildings and structures and redevelopment of the site to provide a specialist extra care facility (C2 Use Class) for the elderly with existing health conditions. Comprising, 89 units, with extensive private and communal healthcare, therapy, leisure and social facilities set within a building of ground plus 3 to 5 storeys including setbacks. Provision of car and cycle parking, associated landscaping and publicly accessible amenity spaces including a children's play area.

3.11 The design has been developed with daylight and sunlight in mind and includes setbacks in plan and section on the upper storeys to minimise the effects caused.

3.12 Our understanding of the Proposed Development is shown below:



PROPOSED DEVELOPMENT LOOKING NORTH EAST

4 Scope of Technical Assessment

4.1 The BRE Guidelines recommend that daylight and sunlight assessments should be undertaken in relation to any properties which might be considered to have a reasonable expectation for natural light.

4.2 In our experience, local authorities tend to focus on residential dwellings and non-domestic buildings such as churches, schools and some workshops that have a greater expectation for daylight and sunlight, as referenced in the BRE guidelines. As such, commercial properties such as office buildings, hotels etc. ordinarily need not be analysed and are therefore excluded from the assessment.

4.3 Given that each of the existing surrounding properties are in permanent residential occupation, these have all been included within our detailed technical assessments. These are listed as follows:

- 9-13 Woodman Mews (odds)
- Saffron House
- 44-78 Melliss Avenue (evens)
- 1-14 Oak House
- Terrano House

4.4 The location of each of these properties relative to the site is shown on the drawings attached at Appendix 1 of this report, as well as on the existing site plan below:

EXISTING SITE LOCATION PLAN

4.5 As explained earlier in this report, we have undertaken a series of detailed technical assessments with the existing trees in place. Given the deciduous nature of the trees, we have assessed the trees in two scenarios:

- Full leaf (representative of the summer months, i.e. circa 7-9 months of the year); and
- Without leaf (representative of the winter months, i.e. circa 3-5 months of the year).

4.6 As set out at paragraphs 2.22 to 2.26, the BRE recommends the exact shape of the trees are used as part of any technical assessment, so the Applicant instructed MJ Rees and Company to undertake a 3D Laser Scan Survey of the neighbouring trees, which has been used in the construction of our 3D computer model. This was undertaken in mid-March 2018 when the trees are starting to leaf.

4.7 The existing and proposed site conditions with the trees in full leaf are shown on the drawings at Appendix 1 of this report. The corresponding daylight and sunlight results are confirmed on the tables at Appendix 2, with the Sun on Ground overshadowing studies shown on the drawings at Appendix 3.

4.8 The existing and proposed site conditions with the trees without leaf are shown on the drawings at Appendix 4 of this report. The corresponding daylight and sunlight results are confirmed on the tables at Appendix 5, with the Sun on Ground overshadowing studies shown on the drawings at Appendix 6.

4.9 The existing and proposed site conditions without the trees included as part of the assessment are shown on the drawings at Appendix 7 of this report. The corresponding daylight and sunlight results are confirmed on the tables at Appendix 8, with the Sun Hours on Ground overshadowing studies shown on the drawings at Appendix 9.

5 Daylight and Sunlight to Existing Neighbouring Properties

5.1 Detailed daylight and sunlight analysis has been undertaken in accordance with the BRE Guidelines. Full detailed results of the daylight and sunlight assessments to existing neighbouring properties are included within Appendix 2 (trees in full leaf), Appendix 5 (trees without leaf) and Appendix 8 (no trees).

5.2 Sun Hours on Ground overshadowing assessment results are confirmed on the drawings attached at Appendix 3 (trees in full leaf), Appendix 6 (trees without leaf) and Appendix 9 (no trees).

5.3 Window maps are included in Appendix 10 that identify the separate windows which have been analysed in correspondence with the technical results.

5.4 The technical analyses are based upon a 3D computer model constructed using measured survey undertaken by Point 2 Surveyors and the MJ Rees and 3D Laser Scan Tree Survey. This has been supplemented by a site inspection, photographs and research from publicly available records.

5.5 To improve the accuracy of the analysis, where available we have obtained floorplans for the surrounding properties through our own further research and incorporated them into our 3D digital context model of the site and surroundings. Suitable layouts were only obtained for 9-13 Woodman Mews and Terrano House. For all other properties where we have been unable obtain floorplans we have used VSC as the main indicator of the daylight impacts, which is the recommended approach within the BRE guidelines.

5.6 To the best of our knowledge, all windows and rooms that could be of habitable use have been assessed to determine the effect of the Proposed Development. However, where rooms can clearly be identified as non-habitable space - such as corridors, bathrooms or plant space – they have been excluded from the assessment.

Daylight and Sunlight Amenity

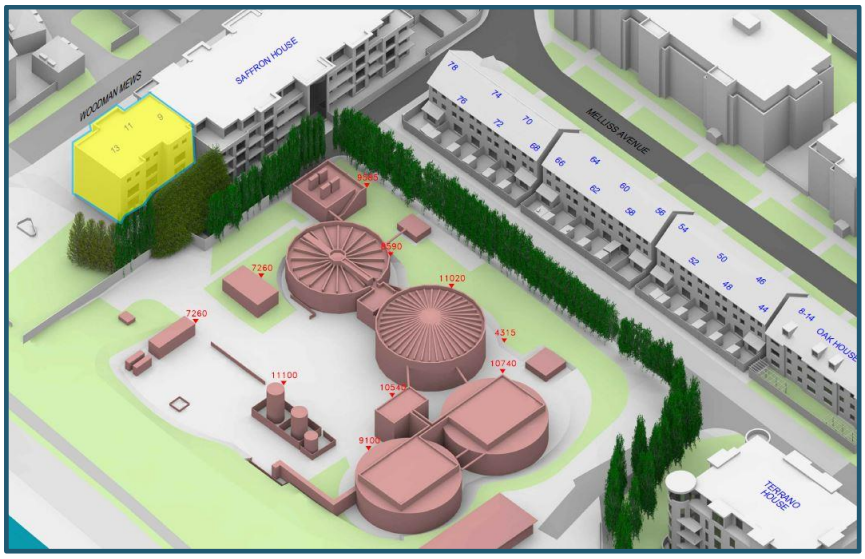
5.7 Our detailed technical assessments have confirmed that the following properties will comfortably satisfy the BRE Guideline recommendations in all three assessment scenarios:

- 1-7 Oak House
- 8-14 Oak House

5.8 It can therefore be concluded that the above properties will experience no noticeable change in their daylight and sunlight amenity as a result of the implementation of the Proposed Development.

5.9 Below we discuss the effects to the remaining properties that do not fully meet the BRE criteria.

9-13 Woodman Mews



LOCATION OF 9-13 WOODMAN MEWS

5.10 These three residential properties are located to the south of the site. We were able to obtain partial floorplans for 9 and 11 Woodman Mews which have been used to model the layouts within these buildings and also used to inform the layouts within 13 Woodman Mews.

5.11 The daylight analysis demonstrates that all of the windows tested will satisfy the BRE guidelines in terms of the VSC form of assessment, in both of the tree scenarios. It is also worth noting that there are a number of windows that would experience some notable improvements in VSC as a result of the removal of some of the trees in the proposed scenario, and the setting back of the Proposed Development away from the site boundary.

5.12 For NSL, when the trees are in full leaf, each of the habitable rooms tested will satisfy the BRE guideline targets, again with three rooms also experiencing an increased level of daylight distribution. When the trees are without leaf, the vast majority of rooms will satisfy the BRE guidelines, however there would be two ground floor kitchen/dining rooms that would experience a deviation from the numerical targets during the winter months.

5.13 In terms of sunlight, the windows overlooking the site are north facing and therefore do not qualify for assessment in accordance with the BRE guideline recommendations.

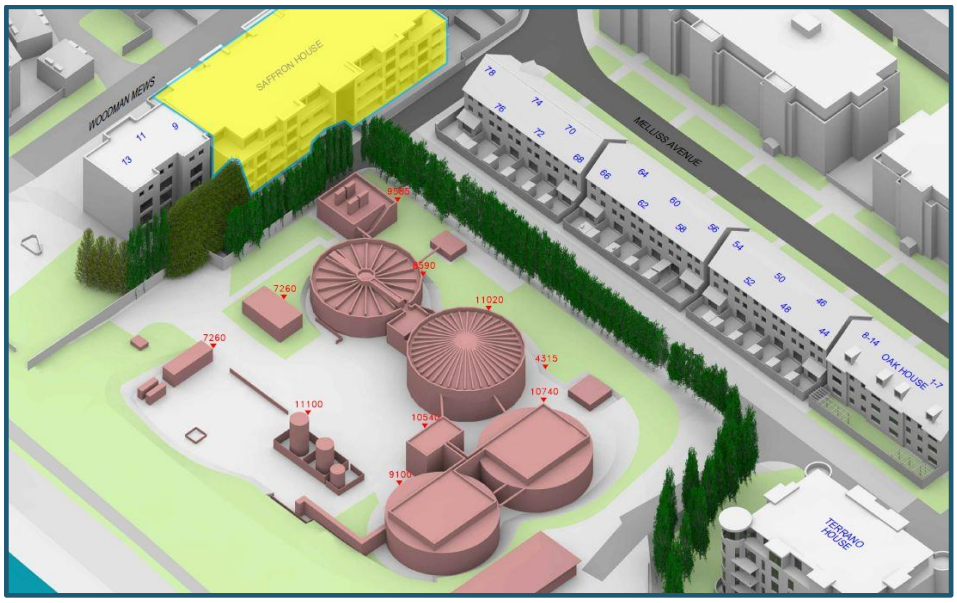
5.14 Similarly, the gardens serving these three properties are located to the south of the Proposed Development and therefore do not require assessment of Sun on Ground (overshadowing).

5.15 Whilst not a true representation of the site conditions, a daylight assessment has been undertaken without the trees in place. The results demonstrate that 10 of the 15 windows would satisfy the VSC numerical target criteria, with relative reductions for the remaining 5 windows ranging from 24-32%.

5.16 In terms of the NSL assessment, 14 of the 15 rooms tested would satisfy the BRE guideline targets, with the remaining room experiencing a relative reduction of 25.5%.

5.17 Overall, it is considered that the Proposed Development will not give rise to a noticeable reduction in the daylight and sunlight amenity to these properties when the existing trees are taken into account.

Saffron House



LOCATION OF SAFFRON HOUSE

5.18 This property is a 4-storey residential apartment block located to the south of the site. There were no available floor plans for this property so room uses have been assumed and therefore as discussed above, VSC has been used as the main daylight indicator, in accordance with the BRE guidance.

5.19 By virtue of the design of Saffron House, the majority of windows overlooking the site are set back into the building façade and overhung by private amenity balconies. The combined effect of the balcony above and the inset nature of the windows in effect 'self-obstructs' the access to direct skylight, such that even modest alterations in the skyline opposite can often give rise to disproportionately larger relative reductions in daylight. This therefore places an unfair burden over the development site and should be taken into consideration when reviewing the technical results for this property, as acknowledged in the BRE guide.

5.20 The technical results confirm that in both assessment scenarios (trees in full leaf and without leaf) the overwhelming majority of windows will satisfy the VSC guideline criteria, with every window meeting the BRE numerical targets when the trees are in full leaf (i.e. representative of around half the year). In the winter, when the trees are predominantly without leaf, virtually all of the windows meet the VSC recommendations with the exception of three windows (W1/21, W1/22 and W2/23). These windows are all located beneath private amenity balconies/roof overhangs and would record relative reductions of 27.9%, 30.7% and 20.3% respectively. The absolute reductions in VSC however are 3.61%, 6.14% and 6.52%.

5.21 It is evident when reviewing the level of absolute VSC recorded in both the existing and proposed site conditions, that there will be some noticeable improvements in some areas as a result of the removal of some of the existing trees on the site and the fact that the Proposed Development is set back away from the site boundary adjacent to Saffron Court.

5.22 The summary tables below show the level of retained absolute VSC at each floor level in the three assessment scenarios; trees in full leaf, trees without leaf and no trees included. The summary tables show that the level of existing VSC with the trees in place (i.e. the actual site conditions) are far lower than if the trees were excluded from the assessment altogether. This shows that an assessment without the trees in place would not be representative of the actual effect of the Proposed Development on the daylight to Saffron Court, as in reality the alteration in VSC to the residential dwellings within Saffron Court would be far less noticeable.

5.23 The tables also show that in each scenario, there would be some improvements in VSC to a number of windows, demonstrating the effect the existing trees have on the skylight availability.

Floor Level	Range of Existing Absolute VSC levels (*Average VSC*)		
	Trees in Full Leaf	Trees Without Leaf	No Trees Included
Ground	2.06%-24.9% (*11.22%*)	6.36%-26.33% (*14.13%*)	14.75%-28.99% (*20.2%*)
First	6.44%-29.63% (*15.39%*)	12.51%-31.07% (*19.15%*)	17.24%-36.33% (*24.81%*)
Second	14.03%-33.66% (*22.66%*)	19.99%-34.87% (*26.04%*)	22.11%-38.32% (*29.16%*)
Third	18.51%-35.66% (*26.94%*)	18.84%-36.46% (*28.42%*)	18.91%-37.33% (*28.99%*)
Overall	**2.06%-35.66% (*19.21%*)**	**6.36%-36.46% (*22.07%*)**	**14.75%-38.32% (*25.84%*)**

TABLE 1: SUMMARY OF EXISTING ABSOLUTE VSC LEVELS

5.24 The existing VSC levels summarised in Table 1 above indicate that the level of existing sky visibility with the trees in place is lower than if the trees were to be excluded from the technical assessment. The results also show how there is very little difference between the summer and winter conditions of the trees, with only a very slight improvement in winter when the trees are without leaf.

Floor Level	Range of Proposed Absolute VSC levels (*Average VSC*)		
	Trees in Full Leaf	Trees Without Leaf	No Trees Included
Ground	5.14%-25.72% (*14.23%*)	6.33%-25.76% (*14.54%*)	9.55%-25.82% (*15.09%*)
First	8.07%-29.82% (*17.62%*)	9.33%-29.86% (*17.91%*)	12.08%-29.91% (*18.39%*)
Second	12.93%-33.16% (*23.07%*)	13.85%-33.19% (*23.22%*)	16.88%-33.21% (*23.59%*)

Third	17.21%-34.48% (*23.07%*)	17.91%-34.49% (*25.57%*)	18.79%-34.5% (*25.72%*)
Overall	**5.14%-34.48% (*25.46%*)**	**6.33%-34.49% (*20.41%*)**	**9.55%-34.5% (*20.8%*)**

TABLE 2: SUMMARY OF PROPOSED ABSOLUTE VSC LEVELS

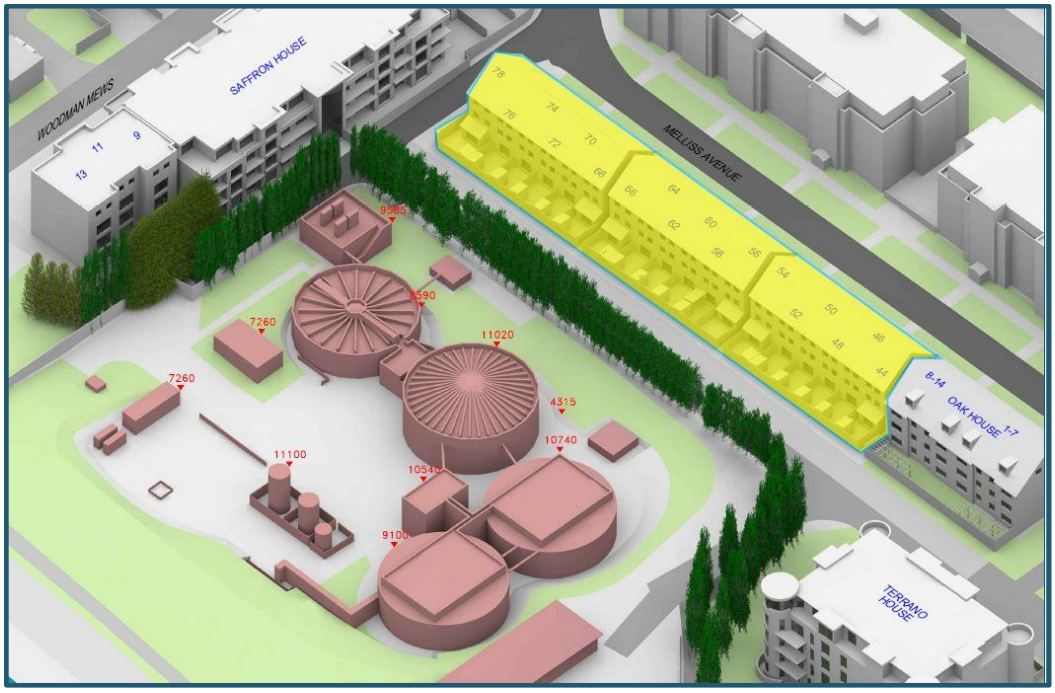
5.25 The proposed VSC levels summarised in Table 2 above show that when the trees are in full leaf, the effect of the Proposed Development is far less noticeable, and in fact there will be improvements in the level of sky visibility at ground and first floor level. Overall there is an increased level of average VSC across the building with the Proposed Development. Whilst there would be some minor reductions in the level of absolute VSC in the winter tree condition (i.e. without leaf), the difference between the existing and proposed levels are fractional and unlikely to be noticeable to the occupants.

5.26 From a sunlight perspective, the windows overlooking the site are north facing and therefore do not qualify for assessment in accordance with the BRE guideline recommendations.

5.27 Overall, it is clear from the technical results undertaken that if the existing trees were to be excluded from the assessment, then there would be some noticeable reductions in daylight to Saffron House following the implementation of the Proposed Development. It is however considered that the correct form of assessment is one which includes the trees as that is representative of the actual site conditions and would be a true indication of the level of perceived alteration in daylight to the Saffron Court residents.

5.28 By looking at the effect of the Proposed Development on the basis of the existing trees being in full leaf and without leaf (i.e. summer and winter conditions) it is demonstrably the case that virtually all of the windows would comfortably satisfy the BRE guideline targets for VSC, and furthermore there would be a number of windows that would experience improvements in the their skylight availability. As such, the overall effect of the Proposed Development on the daylight to Saffron Court is likely to be minor and barely noticeable to the occupants.

44-78 Melliss Avenue



LOCATION OF 44-78 MELLISS AVENUE

5.29 These are the residential townhouses located to the west of the site, with the rear of the properties having windows overlooking the site at ground to second floor level. There were no available floor plans for these properties so room uses have been assumed based upon external inspection and therefore, as discussed above, VSC has been used as the main daylight indicator, in accordance with the BRE guidance.

5.30 The technical results confirm that when the existing trees are in full leaf (i.e. the summer months) then the overwhelming majority of windows will satisfy the BRE guideline recommendations in terms of the VSC form of assessment. There would only be four windows at second floor level that experience a fractional deviation from the numerical targets (relative reductions between 20.04% and 20.85%).

5.31 In winter, when the trees are without leaf, the results confirm that again the majority of windows would satisfy the VSC numerical targets. Where windows do not meet the criteria, the relative reductions in VSC are close to the BRE target, ranging from 20.17% to 28.71%. Furthermore, the level of retained absolute VSC for those windows ranges from 18.40% to 26.88%, which is a commensurate level for an urban location.

5.32 The one window that records an absolute VSC lower than this is a ground floor window (W1/140) which is partially obstructed by a ‘lean-to’ structure in the rear garden and records a VSC of 13.11%. The existing level however is also lower than those of the adjacent unencumbered windows (17.89%) and as such the actual loss in VSC would be just below 5%, which is unlikely to be noticeable, particularly given that in summer this window would satisfy guidance.

5.33 To further demonstrate the effect of the Proposed Development, the summary tables below show the level of retained absolute VSC at each floor level in the three assessment scenarios; trees in full leaf, trees without leaf and no trees included. The tables also show the average absolute VSC recorded at each floor, as well as across the whole building.

Floor Level	Range of Existing Absolute VSC levels (*Average VSC*)		
	Trees in Full Leaf	Trees Without Leaf	No Trees Included
Ground	15.36%-26.97% (*22.76%*)	17.89%-29.82% (*26.35%*)	20.17%-32.36% (*29.78%*)
First	26.68%-31.85% (*29.39%*)	29.95%-34.67% (*33.15%*)	33.87%-37.41% (*36.74%*)
Second	26.85%-32.63% (*30.18%*)	29.48%-34.67% (*33%*)	31.88%-36.12% (*35.01%*)
Overall	**15.36%-32.63% (27.44%)**	**17.89%-34.67% (30.83%)**	**20.17%-36.12% (33.84%)**

TABLE 3: SUMMARY OF EXISTING ABSOLUTE VSC LEVELS

5.34 The existing VSC levels summarised in Table 3 above indicate that the level of existing sky visibility with the trees in place is lower than if the trees were to be excluded from the technical assessment altogether.

Floor Level	Range of Proposed Absolute VSC levels (*Average VSC*)		
	Trees in Full Leaf	Trees Without Leaf	No Trees Included
Ground	13.11%-24.98% (*21.52%*)	13.11%-25.40% (*21.68%*)	13.11%-26.31% (*21.84%*)
First	25.23%-28.65% (*26.58%*)	25.25%-29.34% (*26.75%*)	25.26%-30.39% (*27.05%*)
Second	24.26%-28.63% (*26.10%*)	24.26%-29.24% (*26.22%*)	24.26%-29.80% (*26.39%*)
Overall	**13.11%-28.65% (24.73%)**	**13.11%-29.34% (24.88%)**	**13.11%-30.39% (*25.09%*)**

TABLE 4: SUMMARY OF PROPOSED ABSOLUTE VSC LEVELS

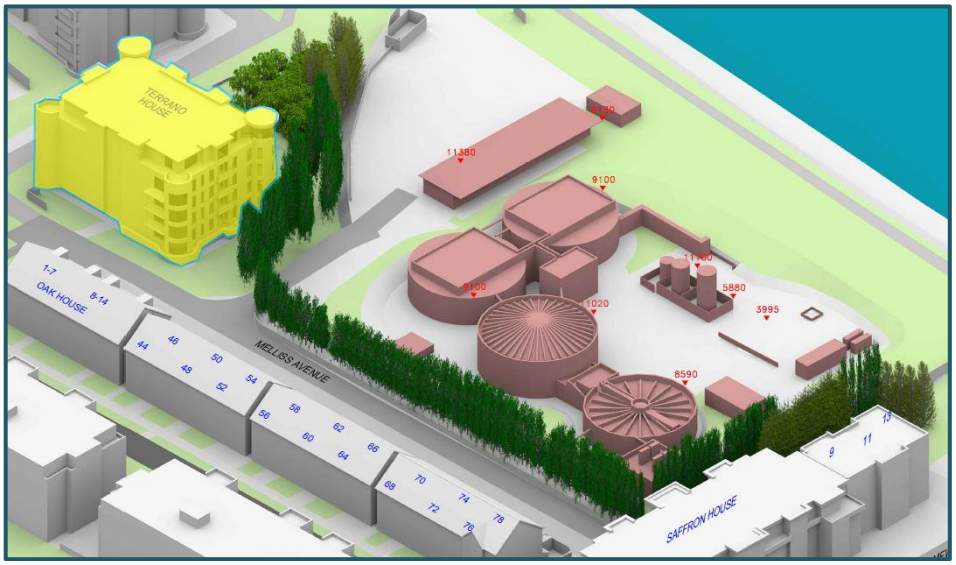
5.35 The proposed absolute VSC levels summarised in Table 4 above demonstrate that there would generally be some good levels of retained VSC within the Melliss Avenue properties for an urban location following the implementation of the Proposed Development. The average levels of retained VSC are also close to the BRE target of 27% which is predicated upon a low-scale suburban environment.

5.36 From a sunlight perspective, the windows within these properties that overlook the site do not face within 90 degrees of due south and therefore do not qualify for assessment.

5.37 Overall, it is clear from the detailed technical results that if the existing trees were to be excluded from the assessment, then there would be some noticeable reductions in daylight to the Melliss Avenue properties following the implementation of the Proposed Development. It is however considered that the correct form of assessment is one which includes the trees as that is representative of the actual site conditions and would be a true indication of the level of perceived alteration in daylight to the Melliss Avenue residents.

5.38 By looking at the effect of the Proposed Development on the basis of the existing trees being in full leaf and without leaf (i.e. summer and winter conditions) it is demonstrably the case that virtually all of the windows would comfortably satisfy the BRE guideline targets for VSC in summer, and in the winter months, whilst there would be some windows that experience minor deviations from the BRE numerical targets, the level of retained absolute VSC is generally commensurate for an urban location, and in many instances close to the BRE target of 27% which is predicated upon a low-scale suburban context. As such, the overall effect of the Proposed Development on the daylight to 44-78 Melliss Avenue is likely to be minor and in some instances there will in fact be improvements in skylight availability as a result of the removal of the trees along the site boundary.

Terrano House



LOCATION OF TERRANO HOUSE

5.39 This property is a 5-storey residential apartment block located to the north of the site. We have obtained partial floorplans for a number of the apartments within the block which have been used to inform the room layouts for the entire property.

5.40 It is evident that there are a number of windows that have been assessed that are set back into the building and overhung by projecting balconies, which has an effect on the amount of direct skylight they can receive, thus placing a material burden over the development site. This burden is increased by the fact that these windows are also inset which causes a blinkering effect so the view of sky from the centre of the windows is further limited. This must be taken into consideration when reviewing the technical results.

5.41 The VSC results confirm that when the existing trees are included within the baseline condition, then when the trees are in full leaf a total of 150 of the 156 windows tested would satisfy the BRE guideline recommendations. The remaining 6 windows are all recessed into the building façade and self-obstructed, and as such whilst there are some relative reductions beyond the BRE guideline recommendations, the absolute VSC reductions are fractional (0.58% - 3.9%).

5.42 When the trees are without leaf in winter, a total of 145 of the 156 windows tested would satisfy the BRE guidelines. Again, each of the 11 windows that do not meet the criteria are those self-obstructed and recessed into the building, with relatively minor absolute reductions of between 1.23% and 5.28%.

5.43 As room layouts are known, the NSL form of daylight assessment has also been undertaken, which confirms that when the trees are in full leaf, 24 of the 27 rooms tested would satisfy the BRE guideline recommendations. The three rooms that do not meet the targets include two deep LKDs (R3/260 and R3/261) that extend to nearly 8m in depth. Paragraph 2.2.10 of the BRE guide states that *"if an existing building contains rooms lit from one side only and greater than 5 m deep, then a greater movement of the no sky line may be unavoidable".* As a result, these rooms experience relative reductions of 34.8% and 39.7% respectively whereas the adjacent 4.2m deep rooms immediately next to these rooms comfortably meet the BRE guidance. The remaining room (R2/260) is a bedroom and would experience a reduction in NSL of 26.9%. The BRE guidelines do however acknowledge that bedrooms are less important than main living rooms.

5.44 When considering the effect of the Proposed Development against the baseline scenario of the trees without leaf in winter, a total of 25 of the 27 rooms tested would meet the NSL criteria. The two remaining rooms are again the deeper LKDs (R3/260 and R3/261) and therefore it is inevitable that these rooms would experience a greater movement of the no sky line by virtue of their single-aspect, deep open plan configuration.

5.45 In terms of the sunlight position, the technical results indicate that in each of the assessment scenarios, be that when the trees are in full leaf, without leaf or if they are excluded from the assessment altogether, each of the southerly orientated rooms within Terrano House would meet the BRE guideline recommendations for both annual and winter APSH.

5.46 It is therefore demonstrably the case that the Proposed Development will have no noticeable effect upon the sunlight availability to Terrano House.

Overshadowing to Neighbouring Gardens (Sun on Ground)

5.47 The results of the Sun on Ground assessment can be seen by reference to the drawings attached within Appendix 3 (trees in full leaf), Appendix 6 (trees without leaf) and Appendix 9 (no trees).

5.48 On each of the drawings there are two viewports; one showing the existing level of Sun on Ground on March 21st, and the other showing the level of Sun on Ground in the proposed site conditions. The individual private gardens analysed are denoted by the green outline, with the area of amenity space receiving at least 2 hours of direct sunlight on March 21st being indicated by the highlighted yellow area, and the area receiving less than 2 hours shown by the grey shaded area. The corresponding proportion of the area receiving at least 2 hours of direct sunlight is shown annotated as a percentage next to each of the amenity spaces assessed.

5.49 It is important to note that the assessment has taken into account any boundary walls/fences and garden structures that were highlighted in the measured survey.

5.50 The BRE guidelines recommend that for an external amenity space to feel sufficiently sun lit, at least 50% of the area should receive at least 2 hours of direct sunlight on March 21st. For there to be no noticeable effect upon the sunlight availability then the garden should continue to receive at least 2 hours of direct sunlight to over 50% of its area with the Proposed Development in place, or experience no more than a 20% reduction (or retain at least 0.8 times its former value) when compared to the existing level of Sun on Ground.

5.51 We have assessed a total of 18 separate private rear gardens to 44-78 Melliss Avenue (evens). All of these gardens have a north easterly orientation and therefore are all below the BRE recommendations in terms of Sun on Ground in the existing conditions. In fact, the area receiving 2 hours of direct sunlight to these properties on March 21st ranges from 0-32% which is well below the recommended 50%.

5.52 The results demonstrate that on March 21st in all three assessment scenarios, there is virtually no change in Sun on Ground availability to any of the Melliss Avenue gardens, such that they would meet the BRE recommended criteria as the relative reductions are all comfortably less than 20%. When the trees are in full leaf during the summer months, the comparative assessment also indicates that some of the rear gardens would experience some fractional increases in Sun on Ground availability as a result of the central section of the Proposed Development setting back away from Melliss Avenue.

5.53 Overall, the Sun on Ground analysis confirms that there will be a negligible effect upon the sunlight availability to the rear gardens of 44-78 Melliss Avenue on March 21st, following implementation of the Proposed Development.

6 Summary and Conclusions

6.1 Point 2 Surveyors have assessed the Marchese Partners' Proposed Development for the former Kew Biothane site on Melliss Avenue, insofar as it affects the daylight and sunlight amenity to the existing surrounding residential properties. The assessments have been informed by the advice and recommendations provided by the BRE guidelines.

6.2 As explained earlier in this report, the BRE guidelines are predicated upon a low-scale suburban environment, and it is therefore inevitable that if those recommendations are applied to more urban locations, then there will be larger reductions if developments are to match the height and proportions of neighbouring buildings, particularly where the existing site buildings present very limited existing obstruction to sky visibility. Similarly, the recently adopted NPPF 2018 stipulates that local authorities should adopt a flexible approach to daylight and sunlight effects where they would otherwise inhibit making efficient use of a site.

6.3 One of the key characteristics of this site is the presence of a series of tall deciduous trees that were planted close together along the site boundary to deliberately mask the view of the former Biothane plant from the occupants within the surrounding Berkeley Homes residential development. These trees have been in place for an extended period of time and have grown to provide a natural obstruction to the light currently enjoyed by the surrounding properties, such that that they should be material consideration when establishing the baseline levels of daylight and sunlight availability currently being enjoyed by the neighbouring residents.

6.4 The BRE guidelines acknowledge that where trees present a noticeable obstruction similar to that of a building or wall, then they should be considered as part of any daylight/sunlight studies. They also advise that assessments for deciduous trees should be undertaken in summer and winter as the extent of obstruction will alter throughout the year as the trees gain and lose their leaves. A special survey of the trees is advised by the BRE, and as such the applicant commissioned an Arboriculture Report to be undertaken, which has been used to construct our detailed computer analysis model.

6.5 Detailed technical assessments have therefore been undertaken in three scenarios; with the existing trees in place and in full leaf (representative of the summer months); with the existing trees in place without leaf (representative of the winter months); and also with the trees excluded from the baseline condition altogether.

6.6 The technical assessments demonstrate that there would be no effect upon the daylight and sunlight amenity to Oak House located to the west of the site. Whilst there would be some noticeable reductions in the daylight amenity to the remaining neighbouring properties if the existing trees were to be excluded from the assessment, it is our view that this is not the appropriate form of assessment as it does not reflect the true existing site conditions.

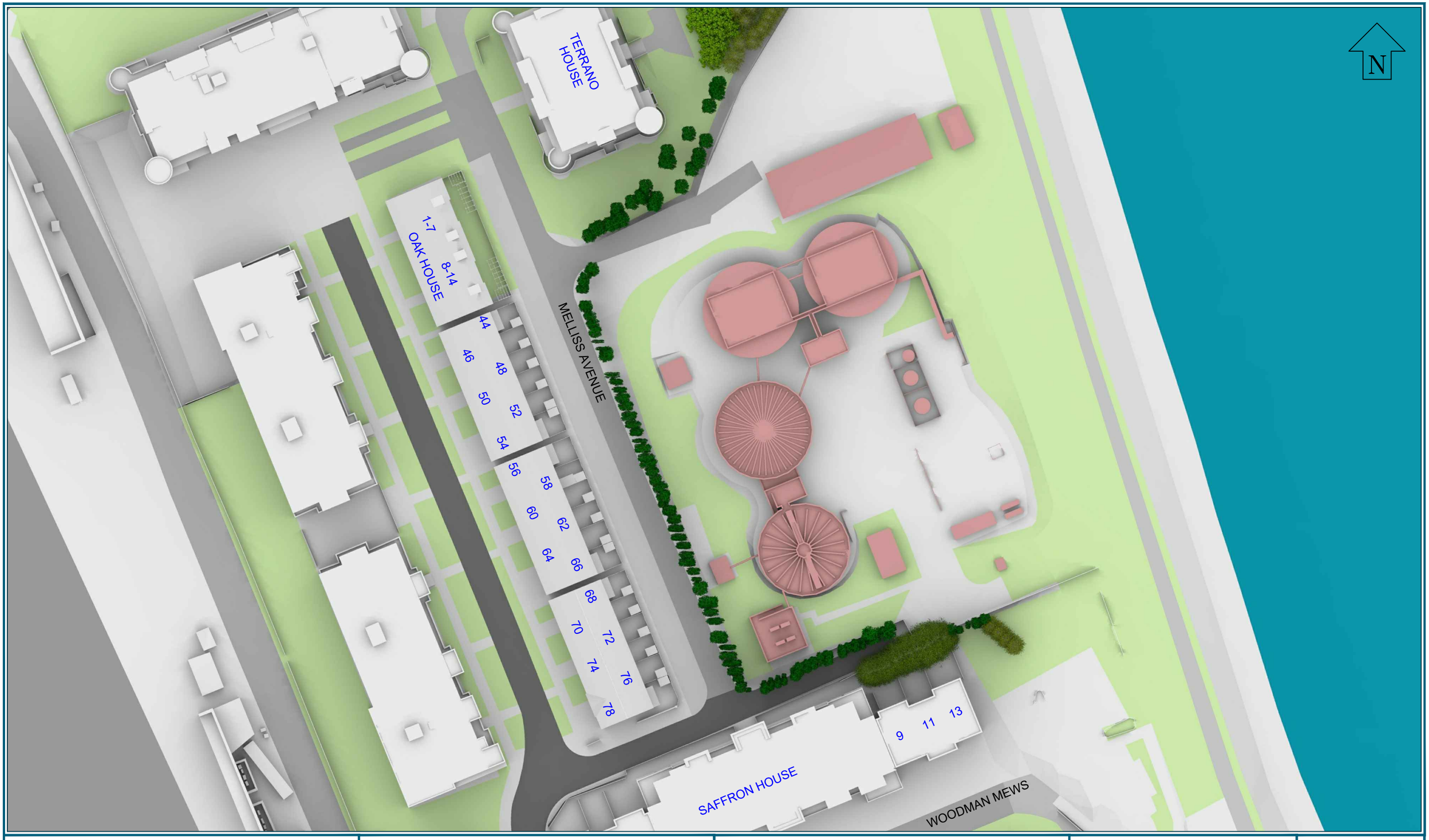
6.7 When considering the presence of the existing trees, whether in full leaf or without leaf, the vast majority of neighbouring properties will satisfy the BRE guideline recommendations, and retain good levels of daylight and sunlight availability. There are also a number of windows that would experience some improvements in daylight and sunlight availability as a result of the removal of some of the trees as part of the Proposed Development.

6.8 Where there are some deviations from the BRE numerical targets, these either occur to windows that are 'self-obstructed' by projecting/inset balconies or external structures which naturally limit the view of sky, or alternatively the deviations are minor relative reductions where the level of retained absolute VSC remain good for a location such as this.

6.9 In terms of the Sun on Ground availability to the surrounding residential gardens, the assessments confirm that in each scenario the BRE guideline recommendations are satisfied with the Proposed Development in place. Furthermore, again due to some of the trees being removed as part of the proposals and the central section of the scheme being set back away from Melliss Avenue, there would also be some marginal improvements in Sun on Ground availability to a handful of gardens.

6.10 Overall, it is our view that the existing trees located along the site boundary should be a material consideration when reviewing the potential effect of the Proposed Development upon the daylight and sunlight amenity to the existing neighbouring properties. The Proposed Development has also been designed with the neighbouring properties in mind, setting back away from the site boundary in certain areas to provide adequate separation between buildings. In that context, and adopting a flexible and pragmatic approach, in the vast majority of instances the BRE guidelines would be satisfied, and where deviations do occur, these are generally minor and the level of retained daylight and sunlight would be commensurate for a site of the nature.

Appendix 1 – Existing and Proposed Drawings (Trees in Full Leaf)



Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 31/10/17)
File Name: 171031 KEW model.rvt

MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme

Project: Former Kew Biothane Plant

Title: Plan View
Existing Buildings
Scenario with Trees

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

Scheme Confirmed: - Date : -

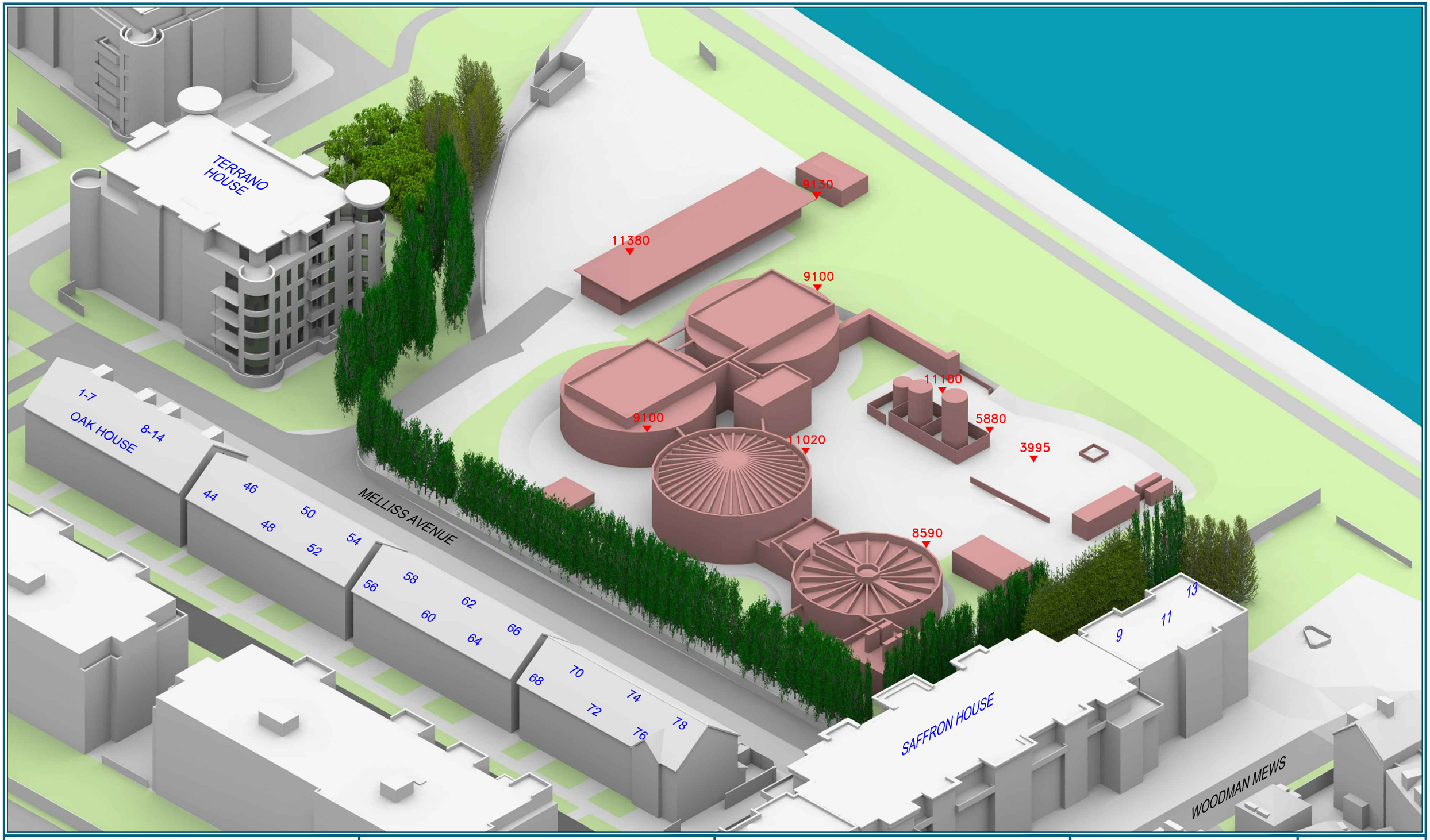
Drawn By: FV

Scale: 1:700 @ A3

Date: APR 18

Dwg No: **P1572_13**

Rel: 03



Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 31/10/17)
File Name: 171031 KEW model.rvt

MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme
All Heights in mm AOD

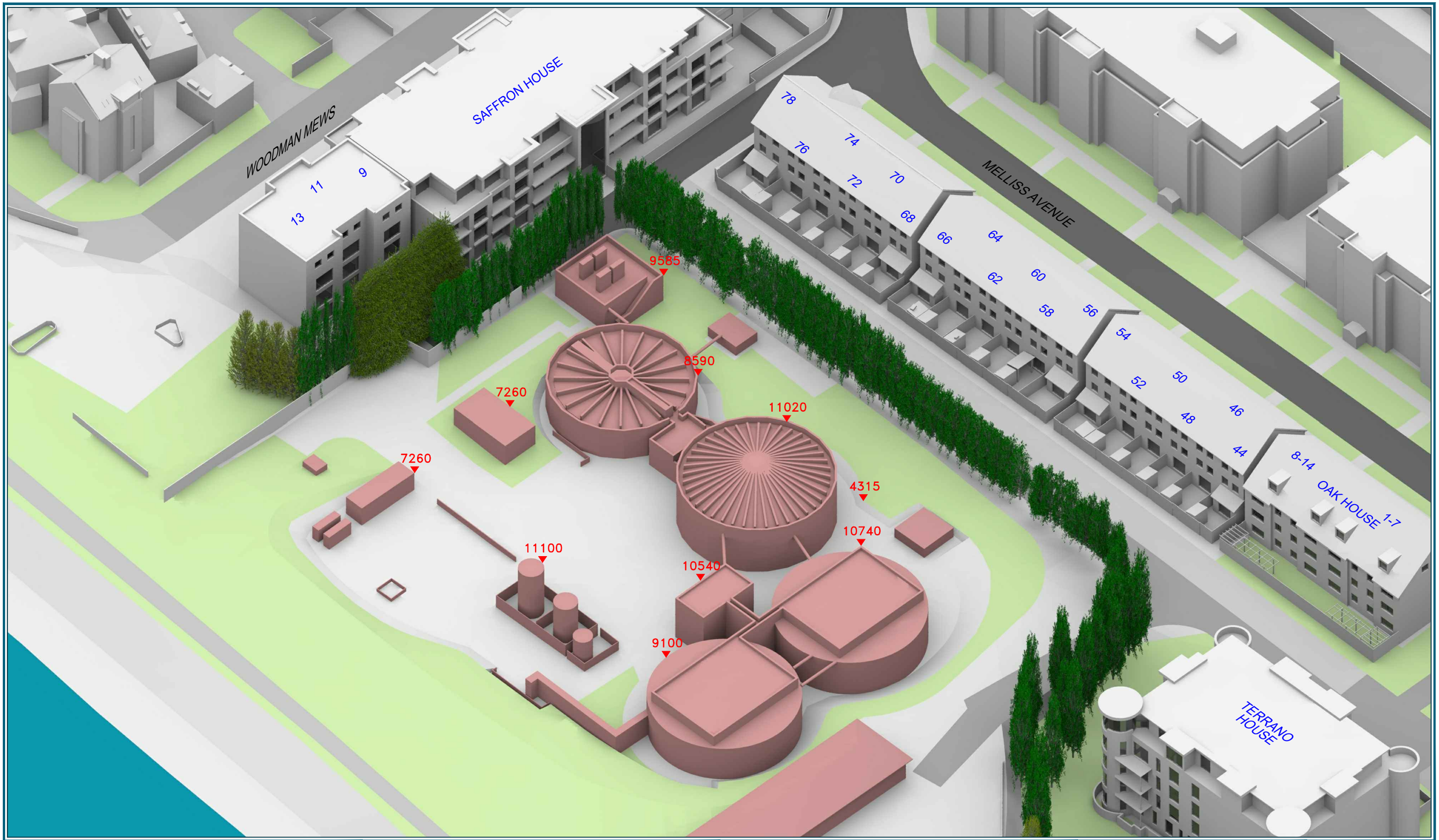
Project: Former Kew Biothane Plant

Title: 3D View
Existing Buildings
Scenario with Trees

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

Scheme Confirmed: - Date : -

Drawn By: FV | Scale: NTS | Date: APR 18 | Dwg No: **P1572_14** | Rel: 03



Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 31/10/17)
File Name: 171031 KEW model.rvt

MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme
All Heights in mm AOD

Project: Former Kew Biothane Plant

Title: 3D View
Existing Buildings
Scenario with Trees

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

Scheme Confirmed: - Date : -

Drawn By: FV | Scale: NTS | Date: APR 18 | Dwg No: **P1572_15** | Rel: 03

Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 01/08/18)
File Name: 180731 KEW□revised model.rvt
MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme

Project: Former Kew Biothane Plant

Title: Plan View
Proposed Scheme 01/08/18
Trees in Leaf Scenario

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

Scheme Confirmed: -

Date : -

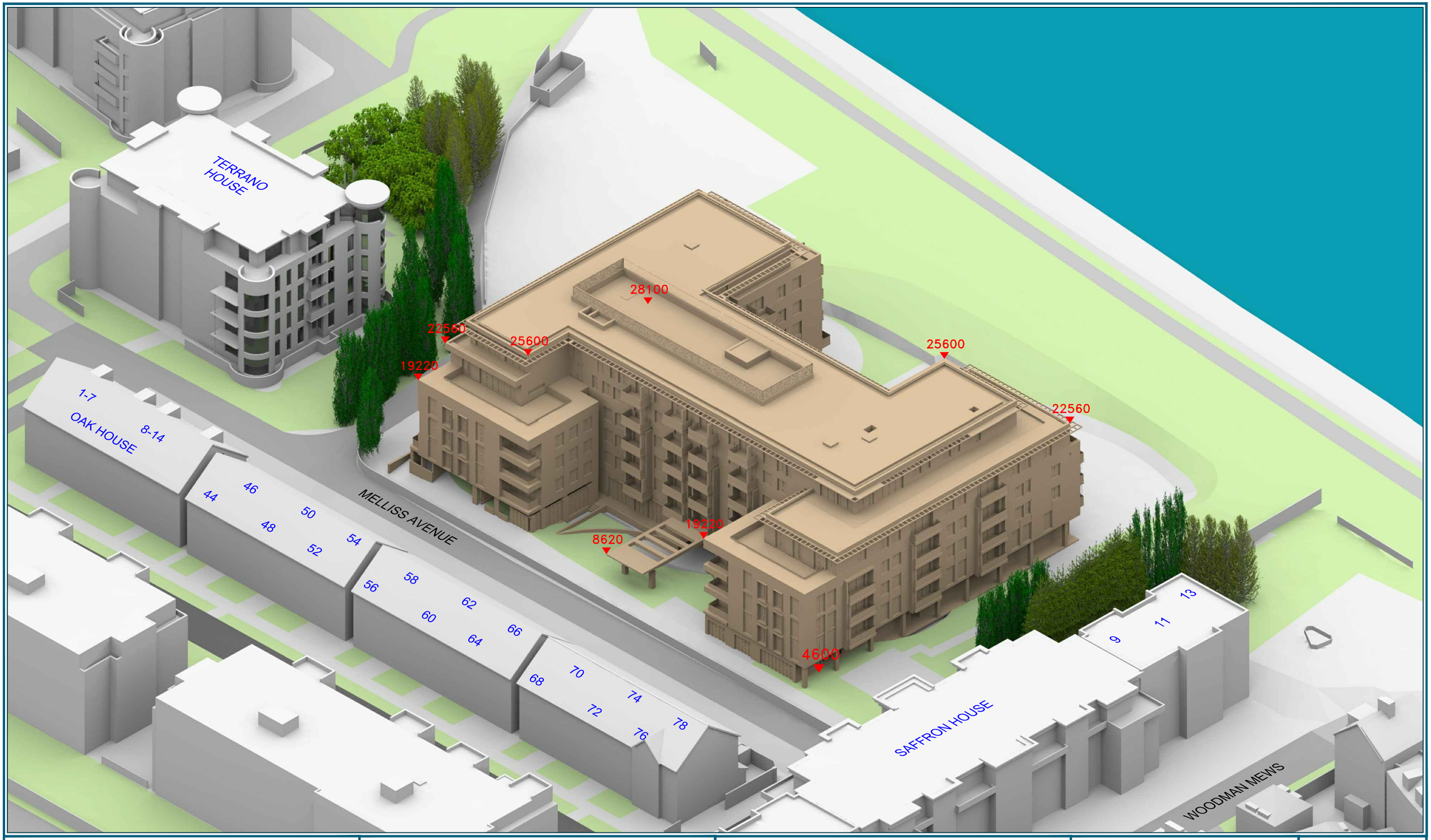
Drawn By: JF

Scale: 1:700 @ A3

Date: AUG 18

Dwg No: **P1572_37**

Rel: 06



Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 01/08/18)
File Name: 180731 KEW□revised model.rvt
MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme
All Heights in mm AOD

Indicative heights agreed with Marchese Partners 14/11/2017

Scheme Confirmed: - Date : -

Project: Former Kew Biothane Plant

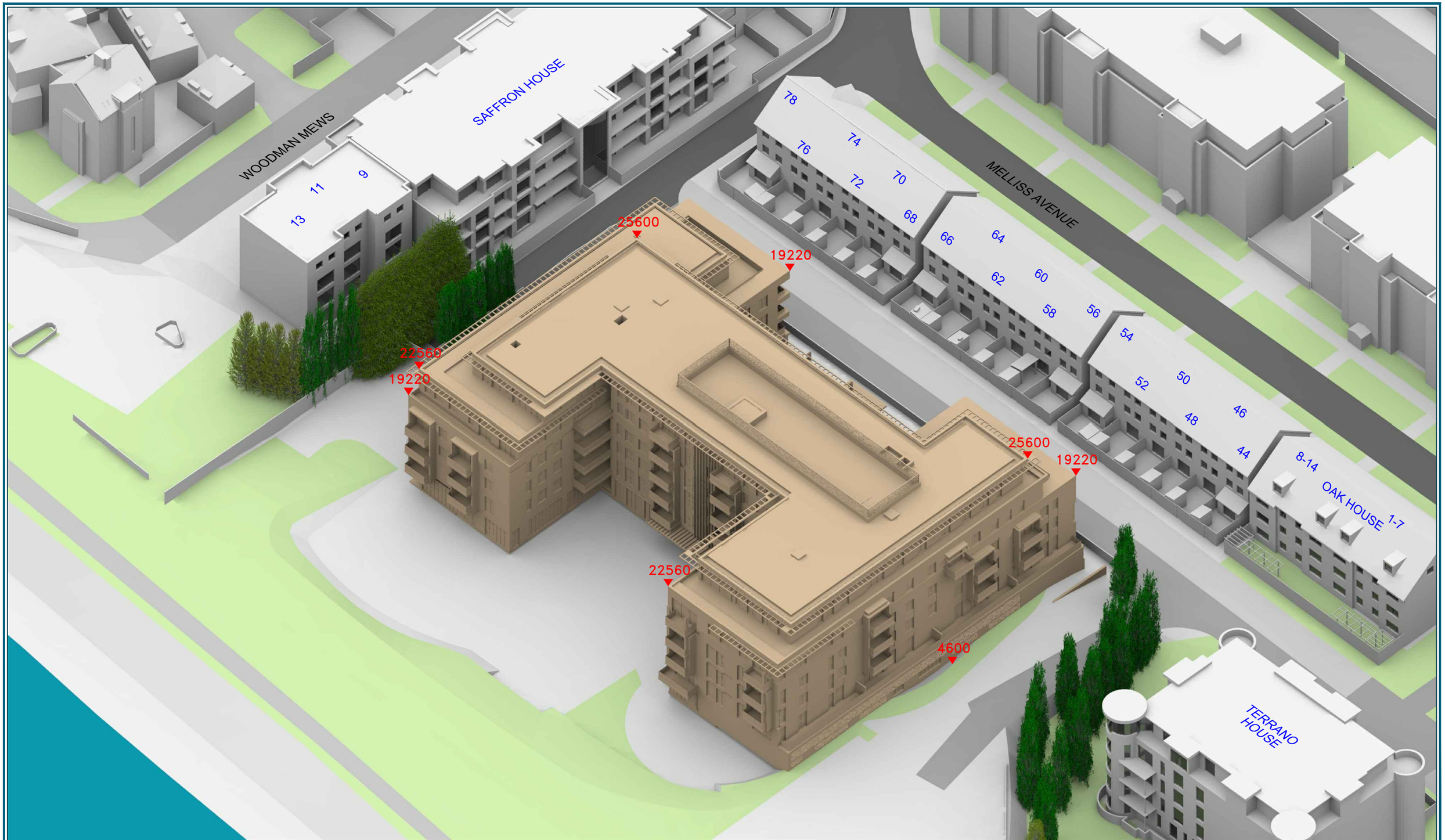
Drawn By: JF | Scale: NTS | Date: AUG 18

Title: 3DView
Proposed Scheme 01/08/18
Trees in Leaf Scenario

Dwg No: **P1572_38** | Rel: 06

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

POINT 2 surveyors



Sources: Point 2 Surveyors
Point Cloud Data
Site Photos

Marchese Partners
Proposed Info (received 01/08/18)
File Name: 180731 KEW□revised model.rvt
MJ Rees and Company
Tree Survey (received 26/03/18)
File Name: 8850.dwg

Key: Existing Buildings
Proposed Scheme
All Heights in mm AOD

Indicative heights agreed with Marchese Partners 14/11/2017

Project: Former Kew Biothane Plant

Title: 3D View
Proposed Scheme 01/08/18
Trees in Leaf Scenario

Point 2 Surveyors Ltd,
3rd Floor,
17 Slingsby Place,
London WC2E 9AB
0207 836 5828
www.point2surveyors.com

Scheme Confirmed: - Date : -

Drawn By: JF | Scale: NTS | Date: AUG 18 | Dwg No: **P1572_39** | Rel: 06

Appendix 2 – Daylight and Sunlight Results (Trees in Full Leaf)

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
13 WOODMAN MEWS						
R1/10	ASSUMED_KD	W1/10	8.58	8.60	-0.02	-0.23
R1/11	ASSUMED_DINING	W1/11	12.68	12.73	-0.05	-0.39
R1/12	ASSUMED_BEDROOM	W1/12	19.00	19.05	-0.05	-0.26
R1/13	ASSUMED_BEDROOM	W1/13	29.06	28.76	0.30	1.03
R2/13	ASSUMED_BEDROOM	W2/13	28.88	28.60	0.28	0.97
11 WOODMAN MEWS						
R2/10	KD	W2/10	8.42	8.82	-0.40	-4.75
R2/11	DINING	W2/11	12.39	12.81	-0.42	-3.39
R2/12	BEDROOM	W2/12	18.35	18.62	-0.27	-1.47
R3/13	BEDROOM	W3/13	27.28	26.75	0.53	1.94
R4/13	BEDROOM	W4/13	27.05	26.37	0.68	2.51
9 WOODMAN MEWS						
R3/10	ASSUMED_KD	W3/10	7.64	7.98	-0.34	-4.45
R3/11	ASSUMED_DINING	W3/11	12.11	12.14	-0.03	-0.25
R3/12	ASSUMED_BEDROOM	W3/12	19.63	19.16	0.47	2.39
R5/13	ASSUMED_BEDROOM	W5/13	30.01	29.29	0.72	2.40
R6/13	ASSUMED_BEDROOM	W6/13	30.96	29.56	1.40	4.52
1-43 SAFFRON HOUSE						
R1/20	ASSUMED	W1/20	2.06	5.14	-3.08	-149.51
R2/20	ASSUMED	W2/20	11.23	16.88	-5.65	-50.31
R3/20	ASSUMED	W3/20	2.51	8.88	-6.37	-253.78
R4/20	ASSUMED	W4/20	12.54	20.77	-8.23	-65.63
R5/20	ASSUMED	W5/20	3.59	9.67	-6.08	-169.36
R6/20	ASSUMED	W6/20	5.43	9.30	-3.87	-71.27
R7/20	ASSUMED	W7/20	10.38	11.61	-1.23	-11.85
R8/20	ASSUMED	W8/20	11.38	12.17	-0.79	-6.94

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R9/20	ASSUMED	W9/20	24.90	25.72	-0.82	-3.29
R10/20	ASSUMED	W10/20	13.35	13.47	-0.12	-0.90
R11/20	ASSUMED	W11/20	23.70	23.77	-0.07	-0.30
R12/20	ASSUMED	W12/20	13.57	13.37	0.20	1.47
R1/21	ASSUMED	W1/21	6.44	8.07	-1.63	-25.31
R2/21	ASSUMED	W2/21	17.18	21.20	-4.02	-23.40
R3/21	ASSUMED	W3/21	6.81	11.95	-5.14	-75.48
R4/21	ASSUMED	W4/21	17.73	24.74	-7.01	-39.54
R5/21	ASSUMED	W5/21	7.06	12.40	-5.34	-75.64
R6/21	ASSUMED	W6/21	8.41	11.72	-3.31	-39.36
R7/21	ASSUMED	W7/21	13.58	14.30	-0.72	-5.30
R8/21	ASSUMED	W8/21	15.03	15.35	-0.32	-2.13
R9/21	ASSUMED	W9/21	29.63	29.82	-0.19	-0.64
R10/21	ASSUMED	W10/21	17.08	16.82	0.26	1.52
R11/21	ASSUMED	W11/21	28.21	27.92	0.29	1.03
R12/21	ASSUMED	W12/21	17.48	17.11	0.37	2.12
R1/22	ASSUMED	W1/22	14.03	12.93	1.10	7.84
R2/22	ASSUMED	W2/22	25.21	26.06	-0.85	-3.37
R3/22	ASSUMED	W3/22	17.85	19.53	-1.68	-9.41
R4/22	ASSUMED	W4/22	24.99	28.59	-3.60	-14.41
R5/22	ASSUMED	W5/22	16.62	18.77	-2.15	-12.94
R6/22	ASSUMED	W6/22	16.44	17.24	-0.80	-4.87
R7/22	ASSUMED	W7/22	19.77	19.76	0.01	0.05
R8/22	ASSUMED	W8/22	22.00	21.46	0.54	2.45
R9/22	ASSUMED	W9/22	33.66	33.16	0.50	1.49
R10/22	ASSUMED	W10/22	25.33	24.64	0.69	2.72

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R11/22	ASSUMED	W11/22	33.43	32.72	0.71	2.12
R12/22	ASSUMED	W12/22	22.62	21.96	0.66	2.92
R1/23	ASSUMED	W1/23	20.23	17.21	3.02	14.93
R2/23	ASSUMED	W2/23	29.39	25.17	4.22	14.36
R3/23	ASSUMED	W3/23	28.50	25.48	3.02	10.60
R4/23	ASSUMED	W4/23	31.94	30.71	1.23	3.85
R4/23	ASSUMED	W5/23	18.51	18.83	-0.32	-1.73
R5/23	ASSUMED	W6/23	24.81	23.64	1.17	4.72
R6/23	ASSUMED	W7/23	23.18	21.23	1.95	8.41
R8/23	ASSUMED	W9/23	24.16	23.80	0.36	1.49
R9/23	ASSUMED	W10/23	26.60	25.29	1.31	4.92
R10/23	ASSUMED	W11/23	35.66	34.48	1.18	3.31
R11/23	ASSUMED	W12/23	31.82	30.77	1.05	3.30
R12/23	ASSUMED	W13/23	32.29	31.23	1.06	3.28
R13/23	ASSUMED	W14/23	23.18	23.17	0.01	0.04
78 MELLISS AVENUE						
R1/40	ASSUMED	W1/40	18.08	21.11	-3.03	-16.76
R1/41	ASSUMED_PCD	W1/41	26.68	28.06	-1.38	-5.17
R1/41	ASSUMED_PCD	W2/41	27.12	28.36	-1.24	-4.57
R1/42	ASSUMED	W1/42	26.85	26.78	0.07	0.26
R1/42	ASSUMED	W2/42	27.20	26.93	0.27	0.99
76 MELLISS AVENUE						
R1/50	ASSUMED	W1/50	23.11	24.98	-1.87	-8.09
R1/51	ASSUMED_PCD	W1/51	27.53	28.48	-0.95	-3.45
R1/51	ASSUMED_PCD	W2/51	27.85	28.40	-0.55	-1.97
R1/52	ASSUMED	W1/52	27.51	26.93	0.58	2.11
R1/52	ASSUMED	W2/52	27.79	26.81	0.98	3.53
74 MELLISS AVENUE						
R1/60	ASSUMED	W1/60	23.58	24.20	-0.62	-2.63

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R1/61	ASSUMED_PCD	W1/61	28.19	28.01	0.18	0.64
R1/61	ASSUMED_PCD	W2/61	28.23	27.51	0.72	2.55
R1/62	ASSUMED	W1/62	28.01	26.42	1.59	5.68
R1/62	ASSUMED	W2/62	27.99	25.96	2.03	7.25
72 MELLISS AVENUE						
R1/70	ASSUMED	W1/70	23.65	23.59	0.06	0.25
R1/71	ASSUMED_PCD	W1/71	28.37	26.82	1.55	5.46
R1/71	ASSUMED_PCD	W2/71	28.25	26.55	1.70	6.02
R1/72	ASSUMED	W1/72	28.16	25.35	2.81	9.98
R1/72	ASSUMED	W2/72	28.02	25.09	2.93	10.46
70 MELLISS AVENUE						
R1/80	ASSUMED	W1/80	22.86	22.55	0.31	1.36
R1/81	ASSUMED_PCD	W1/81	28.10	26.22	1.88	6.69
R1/81	ASSUMED_PCD	W2/81	28.06	26.02	2.04	7.27
R1/82	ASSUMED	W1/82	27.90	24.74	3.16	11.33
R1/82	ASSUMED	W2/82	27.86	24.53	3.33	11.95
68 MELLISS AVENUE						
R1/90	ASSUMED	W1/90	18.94	18.40	0.54	2.85
R1/91	ASSUMED_PCD	W1/91	28.06	25.83	2.23	7.95
R1/91	ASSUMED_PCD	W2/91	28.06	25.78	2.28	8.13
R1/92	ASSUMED	W1/92	27.88	24.31	3.57	12.80
R1/92	ASSUMED	W2/92	27.94	24.26	3.68	13.17
66 MELLISS AVENUE						
R1/100	ASSUMED	W1/100	19.52	18.74	0.78	4.00
R1/101	ASSUMED_PCD	W1/101	28.17	25.54	2.63	9.34
R1/101	ASSUMED_PCD	W2/101	28.17	25.53	2.64	9.37
R1/102	ASSUMED_PCD	W1/102	29.72	25.65	4.07	13.69
R1/102	ASSUMED_PCD	W2/102	29.73	25.58	4.15	13.96
64 MELLISS AVENUE						
R1/110	ASSUMED	W1/110	23.04	21.88	1.16	5.03
R1/111	ASSUMED_PCD	W1/111	28.26	25.48	2.78	9.84
R1/111	ASSUMED_PCD	W2/111	28.37	25.44	2.93	10.33

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R1/112	ASSUMED_PCD	W1/112	29.78	25.49	4.29	14.41
R1/112	ASSUMED_PCD	W2/112	29.93	25.42	4.51	15.07
62 MELLISS AVENUE						
R1/120	ASSUMED	W1/120	23.34	22.09	1.25	5.36
R1/121	ASSUMED_PCD	W1/121	28.36	25.42	2.94	10.37
R1/121	ASSUMED_PCD	W2/121	28.36	25.38	2.98	10.51
R1/122	ASSUMED_PCD	W1/122	29.98	25.37	4.61	15.38
R1/122	ASSUMED_PCD	W2/122	29.99	25.35	4.64	15.47
60 MELLISS AVENUE						
R1/130	ASSUMED	W1/130	23.29	21.71	1.58	6.78
R1/131	ASSUMED_PCD	W1/131	28.60	25.35	3.25	11.36
R1/131	ASSUMED_PCD	W2/131	28.95	25.34	3.61	12.47
R1/132	ASSUMED_PCD	W1/132	30.24	25.31	4.93	16.30
R1/132	ASSUMED_PCD	W2/132	30.57	25.29	5.28	17.27
58 MELLISS AVENUE						
R1/140	ASSUMED	W1/140	15.36	13.11	2.25	14.65
R1/141	ASSUMED_PCD	W1/141	29.29	25.27	4.02	13.72
R1/141	ASSUMED_PCD	W2/141	29.54	25.25	4.29	14.52
R1/142	ASSUMED_PCD	W1/142	30.85	25.24	5.61	18.18
R1/142	ASSUMED_PCD	W2/142	31.08	25.24	5.84	18.79
56 MELLISS AVENUE						
R1/150	ASSUMED	W1/150	21.52	18.45	3.07	14.27
R1/151	ASSUMED_PCD	W1/151	29.97	25.23	4.74	15.82
R1/151	ASSUMED_PCD	W2/151	30.31	25.24	5.07	16.73
R1/152	ASSUMED_PCD	W1/152	31.44	25.24	6.20	19.72
R1/152	ASSUMED_PCD	W2/152	31.72	25.30	6.42	20.24
54 MELLISS AVENUE						
R1/160	ASSUMED	W1/160	22.38	18.59	3.79	16.93
R1/161	ASSUMED	W1/161	30.81	25.39	5.42	17.59
R1/161	ASSUMED	W2/161	31.10	25.52	5.58	17.94
R1/162	ASSUMED	W1/162	32.07	25.41	6.66	20.77
R1/162	ASSUMED	W2/162	32.28	25.55	6.73	20.85

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
52 MELLISS AVENUE						
R1/170	ASSUMED	W1/170	26.38	22.53	3.85	14.59
R1/171	ASSUMED	W1/171	31.31	25.87	5.44	17.37
R1/171	ASSUMED	W2/171	31.49	26.19	5.30	16.83
R1/172	ASSUMED	W1/172	32.39	25.90	6.49	20.04
R1/172	ASSUMED	W2/172	32.54	26.20	6.34	19.48
50 MELLISS AVENUE						
R1/180	ASSUMED	W1/180	26.80	23.68	3.12	11.64
R1/181	ASSUMED	W1/181	31.65	26.80	4.85	15.32
R1/181	ASSUMED	W2/181	31.71	27.28	4.43	13.97
R1/182	ASSUMED	W1/182	32.57	26.74	5.83	17.90
R1/182	ASSUMED	W2/182	32.57	27.18	5.39	16.55
48 MELLISS AVENUE						
R1/190	ASSUMED	W1/190	26.97	24.76	2.21	8.19
R1/191	ASSUMED	W1/191	31.74	27.94	3.80	11.97
R1/191	ASSUMED	W2/191	31.85	28.31	3.54	11.11
R1/192	ASSUMED_PCD	W1/192	32.55	27.79	4.76	14.62
R1/192	ASSUMED_PCD	W2/192	32.63	28.16	4.47	13.70
46 MELLISS AVENUE						
R1/200	ASSUMED	W1/200	26.66	24.69	1.97	7.39
R1/201	ASSUMED	W1/201	31.72	28.65	3.07	9.68
R1/201	ASSUMED	W2/201	31.68	28.65	3.03	9.56
R1/202	ASSUMED	W1/202	32.48	28.53	3.95	12.16
R1/202	ASSUMED	W2/202	32.42	28.63	3.79	11.69
44 MELLISS AVENUE						
R1/210	ASSUMED_PCD	W1/210	24.15	22.30	1.85	7.66
R1/211	ASSUMED_PCD	W1/211	31.46	28.36	3.10	9.85
R1/211	ASSUMED_PCD	W2/211	30.66	27.53	3.13	10.21
R1/212	ASSUMED_PCD	W1/212	32.23	28.61	3.62	11.23
R1/212	ASSUMED_PCD	W2/212	31.76	28.22	3.54	11.15
8-14 OAK HOUSE						
R1/220	ASSUMED	W1/220	26.46	25.18	1.28	4.84

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R2/220	ASSUMED	W2/220	27.52	26.01	1.51	5.49
R1/221	ASSUMED_PCD	W1/221	31.75	29.40	2.35	7.40
R2/221	ASSUMED	W2/221	31.06	29.05	2.01	6.47
R1/222	ASSUMED_PCD	W1/222	30.13	27.29	2.84	9.43
R2/222	ASSUMED	W2/222	31.18	28.72	2.46	7.89
R1/223	ASSUMED	W1/223	37.33	34.46	2.87	7.69
R1/223	ASSUMED	W2/223	20.86	19.28	1.58	7.57
R1/230	ASSUMED	W1/230	27.67	26.19	1.48	5.35
R2/230	ASSUMED	W2/230	28.71	26.97	1.74	6.06
R1/231	ASSUMED	W1/231	30.90	28.84	2.06	6.67
R2/231	ASSUMED	W2/231	31.43	29.34	2.09	6.65
R1/232	ASSUMED_PCD	W1/232	30.97	28.59	2.38	7.68
R2/232	ASSUMED	W2/232	29.60	27.30	2.30	7.77
R1/233		W1/233	36.78	34.53	2.25	6.12
1-7 OAK HOUSE						
R1/240	ASSUMED	W1/240	28.31	26.78	1.53	5.40
R2/240	ASSUMED	W2/240	27.17	25.88	1.29	4.75
R1/241	ASSUMED	W1/241	31.00	29.28	1.72	5.55
R2/241	ASSUMED	W2/241	29.88	28.44	1.44	4.82
R1/242	ASSUMED_PCD	W1/242	29.18	27.31	1.87	6.41
R2/242	ASSUMED	W2/242	30.05	28.45	1.60	5.32
R1/243		W1/243	36.46	34.54	1.92	5.27
R1/250	ASSUMED	W1/250	26.38	25.41	0.97	3.68
R2/250	ASSUMED	W2/250	26.11	25.38	0.73	2.80
R1/251	ASSUMED_PCD	W1/251	29.46	28.24	1.22	4.14
R2/251	ASSUMED	W2/251	29.46	28.41	1.05	3.56
R1/252	ASSUMED	W1/252	29.45	28.07	1.38	4.69

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R2/252	ASSUMED	W2/252	26.98	25.75	1.23	4.56
R1/253		W1/253	35.69	34.29	1.40	3.92
R1/253		W2/253	33.40	33.40	0.00	0.00
TERRANO HOUSE						
R1/260	ASSUMED_LKD_PCD	W1/260	13.91	13.91	0.00	0.00
R1/260	ASSUMED_LKD_PCD	W2/260	15.47	15.47	0.00	0.00
R1/260	ASSUMED_LKD_PCD	W3/260	28.62	28.62	0.00	0.00
R1/260	ASSUMED_LKD_PCD	W4/260	28.28	28.22	0.06	0.21
R1/260	ASSUMED_LKD_PCD	W5/260	27.31	27.17	0.14	0.51
R1/260	ASSUMED_LKD_PCD	W6/260	25.74	25.50	0.24	0.93
R1/260	ASSUMED_LKD_PCD	W7/260	24.16	23.87	0.29	1.20
R1/260	ASSUMED_LKD_PCD	W8/260	16.90	16.45	0.45	2.66
R1/260	ASSUMED_LKD_PCD	W9/260	20.39	19.70	0.69	3.38
R1/260	ASSUMED_LKD_PCD	W10/260	21.96	21.04	0.92	4.19
R2/260	BEDROOM	W11/260	20.94	19.66	1.28	6.11
R2/260	BEDROOM	W12/260	2.19	1.61	0.58	26.48
R2/260	BEDROOM	W13/260	4.59	3.14	1.45	31.59
R3/260	LKD	W14/260	5.72	4.88	0.84	14.69
R3/260	LKD	W15/260	4.71	4.67	0.04	0.85
R3/260	LKD	W16/260	18.60	17.10	1.50	8.06
R4/260	LKD	W17/260	16.36	14.74	1.62	9.90
R4/260	LKD	W18/260	18.04	17.13	0.91	5.04
R4/260	LKD	W19/260	10.88	10.69	0.19	1.75
R4/260	LKD	W20/260	10.19	10.10	0.09	0.88
R4/260	LKD	W21/260	12.30	12.12	0.18	1.46
R4/260	LKD	W22/260	15.93	15.72	0.21	1.32
R4/260	LKD	W23/260	19.58	19.49	0.09	0.46
R4/260	LKD	W24/260	13.45	13.45	0.00	0.00
R4/260	LKD	W25/260	9.45	9.63	-0.18	-1.90
R4/260	LKD	W26/260	19.46	19.63	-0.17	-0.87
R5/260	BEDROOM	W27/260	25.39	25.43	-0.04	-0.16
R6/260	BEDROOM	W28/260	26.02	25.95	0.07	0.27
R6/260	BEDROOM	W29/260	22.85	22.72	0.13	0.57
R1/261	ASSUMED_LKD_PCD	W1/261	16.69	16.69	0.00	0.00
R1/261	ASSUMED_LKD_PCD	W2/261	17.43	17.43	0.00	0.00
R1/261	ASSUMED_LKD_PCD	W3/261	31.69	31.67	0.02	0.06
R1/261	ASSUMED_LKD_PCD	W4/261	31.57	31.40	0.17	0.54
R1/261	ASSUMED_LKD_PCD	W5/261	30.92	30.54	0.38	1.23
R1/261	ASSUMED_LKD_PCD	W6/261	29.77	29.22	0.55	1.85
R1/261	ASSUMED_LKD_PCD	W7/261	28.64	27.95	0.69	2.41
R1/261	ASSUMED_LKD_PCD	W8/261	21.53	20.67	0.86	3.99
R1/261	ASSUMED_LKD_PCD	W9/261	24.90	23.66	1.24	4.98
R1/261	ASSUMED_LKD_PCD	W10/261	26.69	25.25	1.44	5.40

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R2/261	BEDROOM	W11/261	25.85	24.03	1.82	7.04
R2/261	BEDROOM	W12/261	3.59	2.87	0.72	20.06
R2/261	BEDROOM	W13/261	7.73	5.68	2.05	26.52
R3/261	LKD	W14/261	8.40	7.26	1.14	13.57
R3/261	LKD	W15/261	5.85	5.77	0.08	1.37
R3/261	LKD	W16/261	23.84	21.76	2.08	8.72
R4/261	LKD	W17/261	20.94	19.02	1.92	9.17
R4/261	LKD	W18/261	21.90	20.81	1.09	4.98
R4/261	LKD	W19/261	16.26	15.77	0.49	3.01
R4/261	LKD	W20/261	15.64	15.36	0.28	1.79
R4/261	LKD	W21/261	17.82	17.37	0.45	2.53
R4/261	LKD	W22/261	21.33	21.00	0.33	1.55
R4/261	LKD	W23/261	24.52	24.59	-0.07	-0.29
R4/261	LKD	W24/261	16.32	16.34	-0.02	-0.12
R4/261	LKD	W25/261	13.53	13.81	-0.28	-2.07
R4/261	LKD	W26/261	25.80	25.95	-0.15	-0.58
R5/261	BEDROOM	W27/261	30.28	30.28	0.00	0.00
R6/261	BEDROOM	W28/261	31.60	31.44	0.16	0.51
R1/262	ASSUMED_LKD_PCD	W1/262	19.27	19.27	0.00	0.00
R1/262	ASSUMED_LKD_PCD	W2/262	19.51	19.51	0.00	0.00
R1/262	ASSUMED_LKD_PCD	W3/262	34.70	34.66	0.04	0.12
R1/262	ASSUMED_LKD_PCD	W4/262	34.83	34.47	0.36	1.03
R1/262	ASSUMED_LKD_PCD	W5/262	34.60	33.73	0.87	2.51
R1/262	ASSUMED_LKD_PCD	W6/262	34.05	32.62	1.43	4.20
R1/262	ASSUMED_LKD_PCD	W7/262	33.49	31.63	1.86	5.55
R1/262	ASSUMED_LKD_PCD	W8/262	26.61	24.69	1.92	7.22
R1/262	ASSUMED_LKD_PCD	W9/262	29.56	27.14	2.42	8.19
R1/262	ASSUMED_LKD_PCD	W10/262	31.79	29.21	2.58	8.12
R2/262	BEDROOM	W11/262	31.20	28.31	2.89	9.26
R2/262	BEDROOM	W12/262	5.65	4.69	0.96	16.99
R2/262	BEDROOM	W13/262	11.40	8.34	3.06	26.84
R3/262	LKD	W14/262	12.05	9.91	2.14	17.76
R3/262	LKD	W15/262	7.09	6.94	0.15	2.12
R3/262	LKD	W16/262	29.71	26.54	3.17	10.67
R4/262	LKD	W17/262	26.32	23.84	2.48	9.42
R4/262	LKD	W18/262	26.51	25.18	1.33	5.02
R4/262	LKD	W19/262	23.62	22.32	1.30	5.50
R4/262	LKD	W20/262	23.20	22.27	0.93	4.01
R4/262	LKD	W21/262	25.01	23.95	1.06	4.24
R4/262	LKD	W22/262	27.80	27.02	0.78	2.81
R4/262	LKD	W23/262	30.36	29.98	0.38	1.25
R4/262	LKD	W24/262	19.12	19.13	-0.01	-0.05
R4/262	LKD	W25/262	17.39	17.41	-0.02	-0.12
R4/262	LKD	W26/262	30.39	30.30	0.09	0.30

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R5/262	BEDROOM	W27/262	34.33	34.16	0.17	0.50
R6/262	BEDROOM	W28/262	35.21	34.95	0.26	0.74
R1/263	ASSUMED_LKD_PCD	W1/263	34.73	34.73	0.00	0.00
R1/263	ASSUMED_LKD_PCD	W2/263	32.13	32.13	0.00	0.00
R1/263	ASSUMED_LKD_PCD	W3/263	37.39	37.34	0.05	0.13
R1/263	ASSUMED_LKD_PCD	W4/263	37.65	37.17	0.48	1.27
R1/263	ASSUMED_LKD_PCD	W5/263	37.77	36.51	1.26	3.34
R1/263	ASSUMED_LKD_PCD	W6/263	37.72	35.49	2.23	5.91
R1/263	ASSUMED_LKD_PCD	W7/263	37.64	34.61	3.03	8.05
R1/263	ASSUMED_LKD_PCD	W8/263	31.83	28.76	3.07	9.64
R1/263	ASSUMED_LKD_PCD	W9/263	33.57	30.07	3.50	10.43
R1/263	ASSUMED_LKD_PCD	W10/263	36.39	32.72	3.67	10.09
R2/263	BEDROOM	W11/263	36.76	32.86	3.90	10.61
R2/263	BEDROOM	W12/263	9.18	8.03	1.15	12.53
R2/263	BEDROOM	W13/263	16.24	12.34	3.90	24.01
R3/263	LKD	W14/263	16.39	13.51	2.88	17.57
R3/263	LKD	W15/263	9.56	9.34	0.22	2.30
R3/263	LKD	W16/263	35.91	31.70	4.21	11.72
R4/263	LKD	W17/263	31.66	27.87	3.79	11.97
R4/263	LKD	W18/263	31.57	29.54	2.03	6.43
R4/263	LKD	W19/263	32.65	29.40	3.25	9.95
R4/263	LKD	W20/263	32.73	29.82	2.91	8.89
R4/263	LKD	W21/263	33.77	31.17	2.60	7.70
R4/263	LKD	W22/263	35.15	33.20	1.95	5.55
R4/263	LKD	W23/263	36.16	35.16	1.00	2.77
R4/263	LKD	W24/263	32.03	32.03	0.00	0.00
R4/263	LKD	W25/263	34.51	34.50	0.01	0.03
R4/263	LKD	W26/263	36.75	36.50	0.25	0.68
R5/263	BEDROOM	W27/263	37.30	36.96	0.34	0.91
R6/263	BEDROOM	W28/263	37.68	37.35	0.33	0.88
R1/264	BEDROOM	W1/264	33.76	33.75	0.01	0.03
R1/264	BEDROOM	W2/264	33.24	30.31	2.93	8.81
R2/264	LKD	W3/264	37.93	34.33	3.60	9.49
R2/264	LKD	W4/264	28.39	24.93	3.46	12.19
R2/264	LKD	W5/264	22.38	19.55	2.83	12.65
R2/264	LKD	W6/264	24.83	22.92	1.91	7.69
R2/264	LKD	W7/264	16.20	16.12	0.08	0.49
R2/264	LKD	W8/264	31.12	30.31	0.81	2.60
R2/264	LKD	W9/264	36.37	34.38	1.99	5.47
R2/264	LKD	W10/264	38.02	34.83	3.19	8.39
R2/264	LKD	W11/264	38.40	34.46	3.94	10.26
R2/264	LKD	W12/264	38.60	34.41	4.19	10.85
R2/264	LKD	W13/264	38.63	34.83	3.80	9.84

Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC
R2/264	LKD	W14/264	38.68	35.61	3.07	7.94
R2/264	LKD	W15/264	38.69	36.65	2.04	5.27
R2/264	LKD	W16/264	38.61	37.55	1.06	2.75
R2/264	LKD	W17/264	37.94	37.66	0.28	0.74
R2/264	LKD	W18/264	37.21	37.20	0.01	0.03
R2/264	LKD	W19/264	35.45	35.45	0.00	0.00
R2/264	LKD	W20/264	30.45	30.45	0.00	0.00
R2/264	LKD	W21/264	16.59	16.59	0.00	0.00
R2/264	LKD	W22/264	24.53	24.53	0.00	0.00
R2/264	LKD	W23/264	22.61	22.61	0.00	0.00
R2/264	LKD	W24/264	28.24	28.21	0.03	0.11
R2/264	LKD	W25/264	12.61	11.73	0.88	6.98
R2/264	LKD	W26/264	17.98	17.92	0.06	0.33
R2/264	LKD	W27/264	30.16	29.48	0.68	2.25
R2/264	LKD	W28/264	32.67	30.95	1.72	5.26
R2/264	LKD	W29/264	33.30	30.49	2.81	8.44
R2/264	LKD	W30/264	33.28	29.75	3.53	10.61
R2/264	LKD	W31/264	33.16	29.51	3.65	11.01
R2/264	LKD	W32/264	32.68	29.37	3.31	10.13
R2/264	LKD	W33/264	32.13	29.50	2.63	8.19
R2/264	LKD	W34/264	31.57	29.86	1.71	5.42
R2/264	LKD	W35/264	31.03	30.15	0.88	2.84
R2/264	LKD	W36/264	30.08	29.83	0.25	0.83
R2/264	LKD	W37/264	29.44	29.44	0.00	0.00
R2/264	LKD	W38/264	28.91	28.91	0.00	0.00
R2/264	LKD	W39/264	26.87	26.87	0.00	0.00
R2/264	LKD	W40/264	16.93	16.93	0.00	0.00
R2/264	LKD	W41/264	12.62	12.62	0.00	0.00
R3/264	ASSUMED_PCD	W42/264	37.94	37.61	0.33	0.87
R3/264	ASSUMED_PCD	W43/264	31.23	31.23	0.00	0.00