BR209: Site layout planning for daylight and sunlight: A guide to good practice, third edition 2022 — a review

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Lucy Taggart *is an Associate in the Neighbourly Matters team at Hollis. Lucy specialises in rights of light and daylight, sunlight and overshadowing services, with additional wider experience in party wall and other neighbourly matters services. Her work predominantly involves assisting developers and design teams during the planning stages of development projects and advising on the impacts that developments will have on daylight and sunlight amenity, as well as private rights of light. This includes communicating the effects on neighbouring daylight and sunlight amenity to planning officers and committee members and negotiating with affected parties to avoid potential rights of light disputes and to mitigate risk. Recent sustainability-led changes in European Standards in relation to daylight and sunlight amenity and the subsequent alignment of British Standards has necessitated a revised edition of the BRE publication 'Site layout planning for daylight and sunlight: A guide to good practice', which is considered the leading authority on daylight and sunlight matters by practitioners and planning officials alike. Taking part in the pre-publication peer review and consultation process, Lucy and the wider specialist team at Hollis have the expertise to provide good-quality and timely advice to the industry.*

Abstract

Following the UK implementation of European Standard EN 17037:2018 'Daylight in Buildings' in May 2019, and the subsequent withdrawal of British Standard BS 8206–2:2008, the BRE's 2011 publication 'Site layout planning for daylight and sunlight: A guide to good practice, second edition (BR209), which is widely regarded as the leading authority on all matters relating to daylight and sunlight at design and planning stage, suddenly became outdated. The industry has since been left in a state of uncertainty when tasked with evaluating the amenity provision of daylight and sunlight within new developments, torn between the tried-and-tested BR209 methodology from the now withdrawn BS 8206 and the newer but more complex British Standard methodology — until now. The eagerly anticipated revised addition of BR209 has now been published, but will it provide clarity on common issues relating to current daylight and sunlight analysis and evaluation methods that are prohibitive to achieving planning permission for higher-density development delivering much-needed housing, or will it only prove to compound these issues? This paper explores the new guidance and reviews the recommended methodology to understand what the changes will mean for developers and neighbours alike.

Keywords: daylight, sunlight, overshadowing, planning, BS EN 17037, amenity, development

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INTRODUCTION

The Building Research Establishment's (BRE) highly regarded publication 'Site layout planning for daylight and sunlight:

A guide to good practice, second edition 2011' (BR209)[1] is widely considered the leading authority for guiding developers, local authorities, light practitioners and planning consultants alike through the complex topic of daylight and sunlight as an amenity consideration for planning applications. Widely referred to in local planning policy, the BR209 gives advice for site layout and design to ensure both the provision of daylight and sunlight within new development and the protection of the same in neighbouring existing buildings, open spaces and future development sites, drawing reference from British Standard BS 8206–2:2008 'Lighting for buildings. Code of practice for daylighting' (BS 8206),[2] which has now been withdrawn and replaced by BS EN 17037:2018 'Daylight in Buildings' (BS EN 17037)[3] in May 2019.

In recent years, the provision and protection of daylight and sunlight in new and existing buildings has become an increasingly prominent issue, with the rise in popularity of 'well-being' building certification standards such as WELL and Fitwel driving further scientific research on the effects of natural light in buildings, leading to a shift in focus away from 'visual comfort' and towards the undoubtedly more vital considerations of physical and mental health. This shift in focus places further pressures on local authorities to refuse applications for new developments on daylight and sunlight grounds, where recommended target values (which were never intended to be utilised as planning policy) are not fully met. With a planning system that is already considered 'a blocker to housing delivery',[4] and with availability and cost of developable land (particularly in urban areas) already a major hindrance to development, developers are faced with risk and uncertainty as to the extent of any planning permission they may or may not be able to secure.

With demand for housing ever increasing due to 'a growing population, rising immigration and rising incomes',[5] it has long been considered necessary for national, region and local planning policy to adopt a more flexible approach towards daylight and sunlight guidance if government housing targets are to be met, or better still, for daylight and sunlight guidance itself to adopt a more definitive stance towards relaxing unrealistic target values in urban areas.

THE DAYLIGHT AND SUNLIGHT DILEMMA

The amenity consideration of daylight and sunlight at planning has long been considered at odds with other material planning considerations; private outdoor amenity space requirements under the London Plan, Housing Supplementary Planning Guidance (SPG)[6] often give rise to deep recessed or projecting balconies that severely limit availability of daylight and sunlight to the rooms they serve, trading one amenity for another. Building regulations that require management and mitigation of overheating under Approved Document O[7] often result in restricted glazing-to-floor-area ratios and/or the specification of glazing with a lower diffuse transmittance value, thus limiting daylight and sunlight potential to the rooms within. These conflicting requirements can often leave the planning process feeling like a gamble, particularly for larger developments in built-up areas, where full compliance with daylight and sunlight numerical targets is rarely achievable.

This looked set to change with London First commissioning the report 'Guiding Light: Unlocking London's Residential Density'[8] in 2017 to determine whether a more suitable set of daylight and sunlight targets specifically for built-up/city centre locations could be established and adopted. Drawing on extensive research of the typical daylight and sunlight conditions in urban locations, the report highlighted that daylight and sunlight is generally not

a primary consideration for city dwellers when deciding where to live, with other amenities such as transport, green spaces, proximity to shops, etc. being considered before access to daylight and sunlight. The report expressed the need for any new guidance in relation to daylight and sunlight to move away from applying numerical targets that can hinder more than help local authorities and limit their ability to grant permission for much-needed new developments in higher-density areas. 'The intention is not to repeat the opportunity to be linear or formulaic about daylight/sunlight.'[9] The report called for any such new guidance to be supported by national and regional planning policy, specifically guiding local authorities to take a flexible approach in regard to numerical targets when assessing amenity impact of new developments in higher-density areas.

The trend towards relaxing daylight and sunlight requirements looked set to continue, with the July 2018 revision of the National Planning Policy Framework (NPPF)[10] calling for a flexible approach in applying policies and guidance in relation to daylight and sunlight to enable appropriate densities to be achieved on development sites, should strict application of the guidance otherwise inhibit making efficient use of the site. This, along with the Housing SPG published in March 2016, which highlighted the need to apply daylight and sunlight guidelines 'sensitively' to higher-density development, assisted local planning authorities towards providing the justification needed to support schemes that do not fully accord with the BR209 guidance.

More recently, the coming into force of the Statutory Instrument n.907 for New Permitted Development Rights[11] in May 2019 again hinted at change in favour of developers, by making permanent the right for residential owners to extend upwards by up to 8m without the need to obtain planning permissions (albeit with prior approval required and the potential effect on neighbouring amenity to be considered, if raised during the required 'Neighbour Consultation Scheme' process).

Expectations were therefore high for a revised edition of BR209 to continue this trajectory, but will the updates prove to be more of a hindrance than help?

UPDATED BR209: LEAVING DEVELOPERS IN THE DARK?

The highly anticipated revised edition of BR209 is upon us; while there is little change in the way the effect of new development on neighbouring daylight and sunlight is assessed, entirely new calculation methods have been adopted for assessing the daylight and sunlight provisions within proposed accommodation, with the methods considered even more stringent and complex than those preceding.

This is not entirely unexpected, with the revised BR209 adopting methodology from British Standard BS EN 17037; the UK's answer to European Standard EN 17037 'Daylight in Buildings', published in 2018.[12] Nonetheless, the complete withdrawal of former methods to make way for BS EN 17037 is likely to draw criticism from the industry (British Standards are neither compulsory nor legislation but are regarded as 'examples of good practice' said to 'support and promote innovation' and 'create a common framework that encourages the sharing of knowledge'). Indeed, an article by Peter Dafoe and Andrew D. Thompson[13] published in *Daylighting* magazine in late 2020 critiquing BS EN 17037 methods[14] suggested that the justification exists to 'allow BRE to publish an updated 3rd Edition of BR209 simply via the removal of any reference to the British Standard. This would for planning and environmental purposes be the simplest BRE solution.' The BRE does not appear to have taken these comments on board.

The first warning of the changes to come could be traced to a seminar held in London in early 2019, with the then new European Standard EN 17037 presented by CEN members and Paul Littlefair of the BRE. While highly informative, the question and answer (Q&A) session revealed some concerns felt among attendees — namely that the complex calculations may not only take considerably longer to complete, but the targets may be even harder to meet than those already deemed unachievable in higher-density areas. It was hardly surprising then, that, when put to the vote as to how the new standards should be addressed by updated BRE guidance, the majority of attendees opted for a 'hybrid' adoption of the new methodology, with the option to revert to previous methods if needed.

Now, three years later, it appears the unofficial 'grace period' is over, with tried and tested BS 8206 methods replaced entirely by new BS EN 17037 methodology. It remains to be seen how well the industry will adapt to the new methods, and in particular, how local authorities will react to the unfamiliar methods when faced with determining the outcome of much-needed new development in application sites where the new targets are inherently unachievable.

NEW DEVELOPMENTS: A CHANGE FOR THE BETTER?

The 2011 edition of the BR209 followed BS 8206 methodology for assessing the provision of daylight and sunlight within proposed buildings, including the average daylight factor (ADF) test, which measured the average indoor illuminance on the working plane within a room, expressed as a percentage of the outdoor illuminance on a horizontal plane; the daylight distribution (DD) test or 'no sky-line', which measures the area of the working plane with access to visible sky; the room depth test, which determines the maximum depth of a room lit by one window wall which should not be exceeded if the room is to maintain a predominately daylit appearance; and the annual probable sunlight hours (APSH) test, which determines the maximum amount of direct sunlight hours available to a window across the year, expressed as a percentage of the total sunlight hours available to that window without obstructions.

In accordance with RICS guidance note 'Daylighting and Sunlighting',[15] most practitioners typically used complex 3D computer modelling techniques and specialist analysis software to undertake these tests, but for those without access to costly computer software, there remained the option to perform the calculations on paper using skylight indicators/sunlight availability indicators (and a lot of patience). This allowed for greater transparency in the verification process (for planning officers and interested members of the public, for example) and also gave greater control during the design process, as relatively simple formulas such as for the ADF and room depth tests could be reverse-engineered to provide designers with the parameters needed to achieve the desired target values from the outset, thereby removing the need for multiple 'trial and error' cycles of redesign and reassess, saving time and money for developers.

Not one of these tests (in the context of new development, at least) has survived the BRE's update. BS EN 17037 methodology is adopted in full, with the ADF, DD and room depth tests replaced by the spatial daylight autonomy (sDA) test (whereby a particular lux level is to be achieved across at least 50 per cent of the room area for least half of all daylight hours across the year, and a minimum value is to be achieved across the remainder of the space), or the median daylight factor (MDF) test (where a daylight factor [DF] equivalent to the given lux values is to be achieved across at least 50 per cent of the room area). BS EN 17037 gives target lux values for 'minimum', 'medium'

and 'high' levels of compliance, taking into account geographically specific climate data (sun and sky conditions that are derived from standard meteorological datasets). The UK Annex of the BS EN 17037 provides equivalent DF targets for specific room types (albeit DF does not take climate data into account). The assessments continue to use the CIE Standard Overcast Sky, as per BS 8206; however, externally and internally reflected light must now also be taken into account under BS EN 17037 guidelines, significantly adding to the assessment preparation time.

Interestingly, with new daylight methods now introducing an annual 'time' factor, the reverse applies for sunlight amenity, with the previous annual metric now replaced by target sunlight hours to be achieved by a habitable room on a single day (the BRE adopts 21st March, the spring equinox, for consistency). As with daylight, a range of target values is given to represent 'minimum', 'medium' and 'high' compliance. Notably, under 2011 guidelines, the previous targets applied predominantly to the main living spaces within a dwelling, whereas BS EN 17037 allows for the target values to be achieved by at least one habitable room in each dwelling, regardless of use (albeit it is considered preferable for the compliant room to be the main living space). Somewhat of a double-edged sword, this change may allow greater flexibility in allowing new developments to comply with guidance now that a non-compliant main living room will no longer render a dwelling 'inadequate' (so long as at least one other habitable room meets the guidance); however, a greater level of technical input will likely be required — particularly in large multi-unit developments — to assess not just every habitable room in a dwelling (seeing as it may not be obvious which of the habitable rooms, if any, will achieve compliance prior to analysis), but to configure the computer analysis on a 'per dwelling' basis to enable results to be interpreted accordingly (previous practice would see all main living rooms assessed collectively, and compliance figures could simply be provided on a 'per dwelling basis' on the reasonable assumption that there would be just one main living room per dwelling).

In addition to daylight and sunlight, additional considerations such as 'view out', loss of radiation to solar panels and solar convergence have also been introduced in the revised BR209. 'View out' is a test to ensure that building occupants (particularly those required to be indoors for long periods, and at fixed locations, such as office workers) can feel more connected to the outside world. The 'view out' test comprises three components: width of view, distance to view and layers of view. Again, a range of targets is provided for the three components, allowing for a classification of 'minimum', 'medium' and 'high' level of compliance. While 3D computer modelling and complex computer analysis using specialist software would be preferable for these tests, the option remains for manual (albeit labour-intensive) on-site measurements and calculations to be used.

It is widely considered that the 'view out' test is not likely to be required for residential buildings (with the potential exception of sheltered accommodation, where residents may be less mobile), but could this now mean that commercial buildings can no longer reasonably be excluded from amenity considerations for new development applications?

NEIGHBOURING AMENITY: A LIGHTER TOUCH?

As may come as somewhat of a relief to some (but perhaps to the disappointment of those hoping for a more progressive approach to the limitations of previous BR209 guidance), assessment methodology in the revised BR209 guidance remains largely unchanged for the effect of new development on daylight and sunlight levels to existing surrounding buildings, as well

as adjoining development land. The preliminary '3x distance to height' ratio and '25-degree line' screening tests still apply, and where potential adverse impacts are suspected, the vertical sky component (VSC), DD and APSH tests remain in use.

The revised edition does, however, appear to have presented the opportunity for the BRE to offer clarity on some of the more common 'misinterpretations' of the guidance, and, presumably, put an end to selective application of the methodology. (The BRE are regularly appointed by local authorities to peer-review applicants' daylight and sunlight reports, and such 'tricks of the trade' applied on occasion by practitioners to support some of the more 'ambitious' schemes clearly have not gone unnoticed.)

For example, VSC guidance now elaborates on the appropriate approach for rooms with multiple windows, specifically where a 'main window' would experience a significant loss of daylight. This addition is likely to be well received in practice, given that previous guidance focused heavily on the 'main window', leading to the assumption that a room would remain compliant so long as the 'main window' does not fall below numerical targets, regardless as to loss suffered by other windows serving the same room which could be obstructed without consequence, and vice-versa, penalising rooms with a main window affected that would otherwise remail well-daylight via unaffected secondary windows. Further, as the BRE provided no definition of a 'main window', this was often assumed to be the window with the largest glazed area, albeit this may not always be the main source of daylight into the room (particularly in the case of glazed balcony access doors, which despite often having the largest glazed area often contribute very little in terms of daylight to the room due to the restriction of balconies in front/overhead). In such cases, the main source of daylight into the room may be a smaller, unobstructed window that, under the old guidance, is vulnerable to significant adverse effects that have an impact on the overall amenity of the room, but may go unreported due to the 'main window' remaining unaffected (particularly where the 'main window' is not site-facing, and in such cases is often not even assessed). Revised guidance partly addresses this issue by specifying that windows further than 5m apart in a through-lit room cannot be considered to mitigate loss to one another.

New guidance is also given for calculating the 'proportional' VSC according to glazing area for windows of different sizes serving the same room, ensuring the effect on each window is judged according to the relative contribution of daylight to the room. New guidance also addresses horizontal or sloping rooflights (which were previously often assessed using VSC), stating the need for alternative sky components to be calculated using specialist software.

For sunlight amenity, guidance now clearly specifies that kitchens and bedrooms need not be assessed (except for specific circumstances where the bedrooms also comprise living space, ie in studio apartments or bedrooms in a retirement home), which will be a welcome clarification for many. That said, this may be considered a contradiction of new guidance in relation to new developments, which now considers all habitable rooms in a dwelling rather than just the main living space (albeit on the basis that only one of the habitable rooms in a dwelling, regardless of the room type, need comply, and the main living space is 'preferred' in any event). As with VSC, further guidance is given on applying the calculations within rooms served by multiple windows.

Guidance now also specifies how the assessment data should be presented: ratios of VSC, DD and APSH results are to be given to at least two decimal places (or as a percentage), presumably to prevent any favourable 'rounding up' (or down) of figures

when comparing against the benchmark of 0.8 times the former value.

CHANGE AT WHAT COST?

In each case, the new assessments for new development (and it could also be said, the revisions for existing building assessments) require significantly more time and equipment investment than their predecessors; users will need access to (and proficiency in) costly 3D computer modelling software and specialist analysis plug-in software to be able to undertake the assessments. It appears to no longer be possible for planning officers or local residents affected by developments to undertake their own quick-check calculations or verify analysis submitted in support of a planning application without employing the services of a specialist themselves.

The 3D computer model environment will need to be built to a higher level of detail (much of which will require manual input), and the outputs following assessment will contain significantly more data (again, much of which will require manual interpretation). That is all before considering the computer processing power and hardware needed to handle the data-intensive computer models and calculations.

A seminar held earlier in the year by a leading software provider confirmed that, using a central processing unit (CPU), an sDA analysis for a new development containing c.600 habitable rooms would take approximately 6.5 hours to complete (for comparison, the ADF and DD assessment methods for the same number of rooms under the former guidance would take a matter of minutes to complete). This is not surprising, given the sDA method requires assessment of the lux levels at hourly intervals for all daylight hours in a year, to be undertaken at every 'grid point' on a working plane spaced approximately 0.3m apart. For a single room of modest proportions of say 12m^2, this would presumably require over 500,000 calculations to be processed. The additional energy consumption cost of the new methods should therefore not be overlooked, albeit it could be argued that this is far outweighed by the environmental benefits of future development becoming considerably less dependent on electric lighting, if the new standards are to be successfully achieved.

Far greater cost implications, however, may arise through the inability of developments to obtain planning permission at the appropriate density for the site, if the new targets cannot be achieved yet are strictly enforced. While it remains to be seen how local authorities will approach the guidance (particularly in urban areas, where previous, less stringent targets were already difficult to achieve), it would appear that the revised targets are less attainable than those they replace.

A comparison study undertaken by the technical team at Hollis using both BS 8206 and BS EN 17037 daylight and sunlight methodologies for a residential development in an urban area confirms as such, with a proposed development of 39 habitable rooms achieving an ADF compliance rate of 95 per cent when assessed in accordance with BS 8206 methodology. This same development, when assessed in accordance with BS EN 17037 methodology for the DF test, resulted in a significantly reduced compliance rate of 56 per cent.

While it could be argued that the lower reflectance values applied in BS EN 17037 methodology are to blame for such reduced daylight performance, a further DF test undertaken for the same development applying reflectance values to match that of the ADF test resulted in a DF compliance rate of 82 per cent, demonstrating in this case that the new targets are harder to achieve (albeit this is likely to vary on a case-by-case basis, with alternative design or more forgiving site conditions potentially

showing less disparity between compliance rates under the old and new guidance).

SOLAR ENERGY: A TIMELY GESTURE?

Perhaps the most opportune addition in the revised BR209 is the guidance on calculating loss of radiation to solar panels. The effect of new development on solar panels was thrust into the spotlight with the High Court ruling in *William Ellis McLennan vs Medway Council and Ken Kennedy* (2019), where the claimant sought to overturn planning permission granted to his neighbour on the basis that his neighbour's proposed extension would overshadow, and therefore interfere with the electricity production of the photovoltaic panels installed on his property. Prior to the court action, the claimant's objections raised at planning were dismissed by the council on the basis that such issues are not a material planning consideration due to being private interests. Nevertheless, the judge considered that the contribution (however small) that private solar panels make towards tackling climate change is in fact in the public interest (as supported by regional and national planning policy, he argued) and therefore the impact of new developments on the ability of solar panels to produce heat/electricity is indeed a material planning consideration. The planning permission for the defendant's proposed extension was subsequently overturned.

In light of this case, it can be reasonably assumed that planning authorities will increasingly seek to understand the impact of new development on nearby solar panels, and revised BRE guidance now provides an initial check to establish whether loss of radiation is likely to be significant, and therefore whether expert advice will need to be sought. The guidance recommends the APSH test to be undertaken at the centre of each panel in the first instance, and provides recommended minimum ratios for the radiation received before and after the development (assuming that the cells are not wired in series, so that the module can withstand a degree of overshadowing without impairing the function of the entire array), which vary depending on the incline angle of the panel from the horizontal. Reductions beyond these minimum ratios are deemed 'significant', warranting specialist analysis and advice beyond the scope of the BR209.

Conversely, the addition of guidance on solar convergence in the revised BR209 highlights the perils of too much solar irradiance in the built environment. Solar convergence issues became a 'hot topic' (quite literally) in 2014, when the concave glazed façade of 20 Fenchurch Street, London (better known as the 'Walkie Talkie') gave rise to 'hot spots' of concentrated reflected sunlight, causing damage to parked vehicles and stationary objects in its path. The new guidance recommends a maximum level of solar irradiance of 10 kW/m^2 that should not be exceeded at any point and provides lower maximum levels for occupied spaces and street level. Assessment methodologies are not provided (with users urged to seek assessment and advice from a specialist, if required), and only descriptive guidance is given to assist with avoiding solar convergence through design, and how to recognise where solar convergence may occur.

Furthermore, revised BR209 does not appear to have adopted daylight glare probability (DGP) methodology and guidance provided in BS EN 17037 (a test to ensure that spaces are not overexposed to direct or reflected sunlight during the expected time of occupation), which again requires specialist software to perform the complex calculations (albeit non-compliance with the targets in BS EN 17037 appears easily rectified, with manually or automated shading devices able to effectively mitigate the problem).

CONCLUSION

It can be reasonably concluded that the revised BR209 will present challenges ahead in terms of both assessing daylight and sunlight in accordance with new methodology and achieving the new targets within proposed developments.

While the BRE should be applauded for advocating for better-quality homes and encouraging energy efficiency by utilising natural light in buildings without caving in to the pressures of an industry seeking relaxed targets to assist with tackling a chronic housing shortage, many may consider the revised guidance a missed opportunity to unshackle local authorities from restrictive targets that inhibit their ability to approve new developments providing much-needed housing, particularly in city centre locations where, next to amenities such as public parks, transport and proximity to leisure, work and retail facilities, the provision of daylight and sunlight typically registers fairly low on the list of priorities for city dwellers.

Ultimately, while targets designed to improve living conditions and steer the built environment towards a more sustainable future should be welcomed, there remains the need to address the challenges faced not only by developers in tacking the uncertainty of the planning process when embarking on development projects in higher-density areas, but also by local authorities in supporting such schemes (with the threat of judicial review behind every discretionary decision to accept 'sub-standard' daylight and sunlight on balance with wider benefits provided by new development). With the revised targets, this fine balancing act only looks set to continue, and those who may be disappointed at the lack of 'olive branch' offered by the revised BR209 can at least take relative comfort in the fact that, by and large, it appears to be 'business as usual'.

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