

OPDC
OLD OAK AND
PARK ROYAL
DEVELOPMENT
CORPORATION

Post Occupancy Evaluation Study

LOCAL PLAN SUPPORTING STUDY

June 2018



MAYOR OF LONDON

39. Post Occupancy Evaluation Study

Document Title	Post Occupancy Evaluation Study
Lead Author	Buro Happold
Purpose of the Study	<ul style="list-style-type: none"> • To develop evidence to support the post occupancy evaluations as required in Local Plan Policy D13 and inform production of a Supplementary Planning Document (SPD) • To set out guidance and templates for post occupancy evaluations for OPDC • To provide recommendations for data collection and sharing of findings from the evaluation with stakeholders.
Key outputs	<ul style="list-style-type: none"> • Guidance on best practice in post occupancy evaluation and soft-landing approaches to monitoring and performance management • Policy recommendations for post occupancy evaluations • A scope and specification for an online data capture tool • Detailed reporting formats including a comprehensive suite of data to be captured for energy and water use and detailed questionnaires for occupant surveys in residential and non-residential development.
Key recommendations	<ul style="list-style-type: none"> • Post occupancy evaluations should be undertaken on all major developments. This will provide valuable insight into performance and community attitudes to the emerging development and inform subsequent phases of developments. • Post occupancy evaluations should form part of a wider soft-landing approach to development, which promotes project learning and a focus on meeting policy and design objectives. • A systematic, consistent and standardised approach to post occupancy evaluation should be adopted so that information can be shared across developments and over the long term to encourage industry wide learning. • A metering and energy and water data capture strategy will need to be planned early on and integrated into design proposals. • Evaluations should be undertaken over a 3-5 year period to understand how development is performing over time. • Information captured must comply with new general data protection regulations (GDPR). • AN on-line portal should be provided to share information in an anonymised format that helps developers, facility managers, residents, businesses and others know how their buildings are performing and how they can enhance performance.
Key changes made since Reg 19 (1)	New study
Relations to other studies	Outputs cross-relate to the Environmental Standards Study, Quantitative Tracking Survey and the Public Realm, Walking and Cycling Strategy

Relevant Local Plan
Policies and Chapters

- Policy SP2 (Good Growth),
- Design Policies D1 (Securing High Quality Design), D2 (Public Realm), D3 (Accessible and Inclusive Design), D4 (Well Design Buildings); D5 (Tall Buildings) D6 (Amenity), D8 (Heritage), D9 (Play Space),
- Environment and Utility Policies EU1 (Open Space), EU2 (Urban Greening and Biodiversity); EU3 (Water), EU4 (Air Quality), EU5 (Noise and Vibration), EU6 (Waste), EU9 (Minimising carbon emissions and overheating) and EU10 (Energy systems)

OPDC Post Occupancy Evaluation

Draft Planning Policy & Data Collection Platform Specification

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22 May 2018

Revision 04

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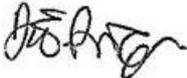
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1 Executive Summary

Introduction

This report provides the evidence base for Old Oak and Park Royal Development Corporation (OPDC) to develop a Post Occupancy Evaluation guidance for new development.

Post occupancy evaluation (POE) is a way of providing feedback about a building or project after occupancy. Initiatives to support POE can include the collection of energy and water performance data in-use, as well as undertaking surveys of building users to establish what is working well and what can be improved.

It is preferable that the POE evaluations take place more than once over the lifetime of a development, to establish how performance changes with time. Typically, POE activities are conducted by a third party to provide an independent and unbiased view of performance.

To help ensure a successful outcome to POE, well tried and tested approaches should be adopted. An example is the BSRIA 'Soft Landings' framework which promotes an early adoption and whole project approach to evaluation from initial project conception through design and construction to handover and occupation. Experience suggests this ensures buildings are ready to occupy and tend to perform better than projects that don't consider evaluation. The BSRIA Soft Landings approach is designed around the RIBA Plan of Work, so that it facilitates dialogue between the client, design team, contractor, building users and building management staff at each stage in the project life cycle.

Policy Background

Industry bodies and authorities including Innovate UK, Zero Carbon Hub, UKGBC and others are increasingly recognising that the performance of new build is not matching the design aspirations. As a result, the draft London Plan Policy SI2 requires that major developments monitor and report on energy performance for at least five years via an online portal. This will enable the GLA to identify good practice and report on the operational performance of new development in London. The GLA have not yet developed guidance on monitoring and reporting.

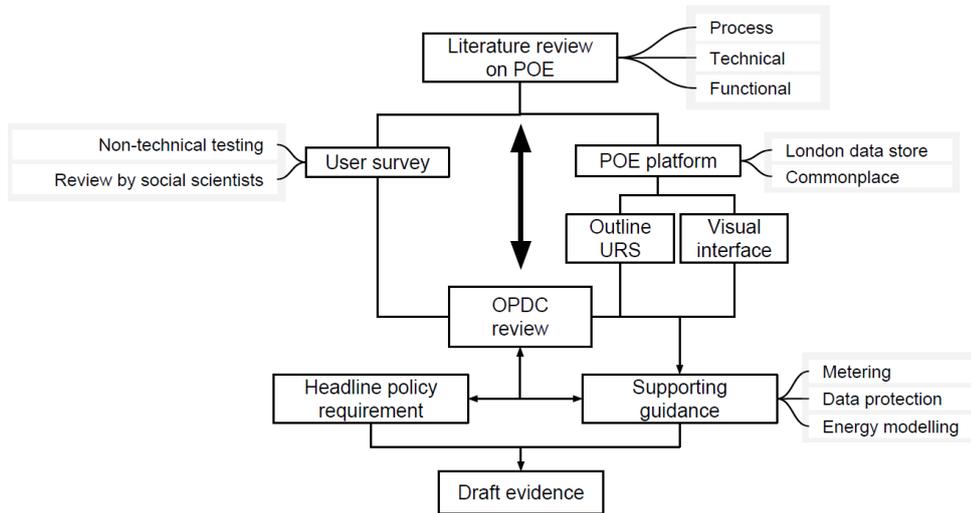
Old Oak will undergo major development over the next few decades, which will fundamentally change the character and nature of the development. The character of the proposed regeneration is very different from most of London. The density and typical heights of development, the mix of uses and the number of people living and working in the area will be much greater than in other parts of the city.

As this new district takes shape it will be important to ensure it is meeting the Mayor's long-term aspirations for environmental performance, wellbeing and social integration and is delivering a place that functions well and fosters strong communities. Currently there is little active long-term monitoring, feedback and learning in the development sector. OPDC want to address this by working with developers to monitor and evaluate the emerging development both through quantitative performance assessments and through qualitative surveys of new residents and workers as well as local communities.

Understanding how the emerging built environment in Old Oak and Park Royal is performing is important as it will provide feedback to inform learning on future development projects and to help developers/management companies respond to issues as they arise.

Report overview

This report includes a literature review, development of the draft POE policy, production of supporting templates and checklists, and the functional requirements for a new online POE data collection platform. The overall methodology bringing all elements together is illustrated below:



OPDC have developed two user survey templates one for residential and one for non-residential developments. Each template addresses a range of policy objectives set out in the OPDC local plan, including:

- Temperature – thermal comfort, impact on health, communal areas
- Controls – ease of use, response
- Lighting – daylighting, electric lighting
- Energy – utility bills, energy awareness
- Water – water pressure, drinking water, recycled systems
- Design – external design of building, views, layout, storage
- Air quality – internal conditions, external conditions
- Noise - internal noise, external noise
- Safety and security – safety during day/night, home security
- Waste – storage, recycling, refuge areas
- Transport – cycling, frequency of services, traffic
- Public areas and open space – size and quality of spaces
- Public amenities – education, health, community, retail, food
- Identity and community – image, community spirit, affordability

The monitoring and evaluation programme is designed to support:

- Better engagement with and feedback from building users;
- A learning culture based on evidence and good quality data;
- An understanding of what works well and what could be improved in buildings;
- An understanding about how well the public realm and open space work for different people in the area;
- An understanding about how well local amenities, services and transport links are serving the local community;

- An understanding of the differences between regulated CO₂ at the planning stage and as-built stages, as well as the in-use performance of completed developments;
- Benchmarking of in-use building performance to drive good practice throughout Old Oak and Park Royal and the rest of London.

Permission to capture data from homes and commercial buildings will have to be agreed with residents and businesses and will be subject to data protection regulations, which includes; informing that their personal data is being processed, clearly stating the purpose of using this data and their personal information, and an instruction on how they can subsequently opt-out. The intention is that this data will be used to support continual improvement and ensure buildings are complying with requirements. Personal data must be safeguarded by developers and only shared with the resident or tenant who generated the data unless agreement to share data more widely is explicitly given by the resident.

OPDC will store anonymised data from different developments across the OPDC area so that feedback and performance can be shared across the area to promote the widest learning possible. The data will be used to benchmark and compare performance across different developments. Where appropriate anonymised benchmarked data will also be shared more widely with policy makers and industry to support wider industry learning.

The proposed headline planning policy for major development are as follows:

Residential development proposals should:

- i). Submit energy and CO₂ calculation outputs at the detailed planning and at the as-built stage, to demonstrate (at RIBA Stage 6), that carbon reduction measures have been implemented.
- ii). Submit overheating and daylighting calculation outputs at the detailed planning to enable comparison to user survey data collected in operation.
- iii). Provide metering in residential buildings to allow the total energy and water consumption of individual dwellings to be reported annually in the first 5 years after handover, provided that the appropriate level of consent is in place.
- iv). Provide energy and water metering, including renewable generation, to all common parts of the building, so that in use energy and water consumption can be reported annually in the first 5 years after handover, with the appropriate level of consent in place.
- v). Formally report on the annual energy and water consumption for a target of 20% of dwellings and at least 90% of common parts through an online OPDC data collection tool, or other preferred means.
- vi). Appoint an independent POE consultant to carry out anonymised user surveys for a target of 20% of dwellings, using the OPDC residential survey template. The first user survey shall take place within 1-1.5 years after practical completion. The second user survey shall take place between 2-2.5 years after practical completion. The third user survey shall take place between 3-3.5 years after practical completion.

Non-residential development proposals should:

- i). Submit energy and CO₂ calculation outputs at the detailed planning and at the as-built stage, to demonstrate (at RIBA Stage 6), that carbon reduction measures have been implemented.
- ii). Submit the results of operational energy predictions at the detailed planning stage for all non-residential buildings above 1,000m², following the CIBSE TM54 methodology, or equivalent.
- iii). Submit overheating and daylighting results at the detailed planning for all non-residential buildings above 1,000m², to enable comparison to user survey data collected in operation.
- iv). Provide metering in non-residential buildings to allow the total energy and water consumption and renewable generation to be reported annually in the first 5 years after handover. Where this is not practical, then the landlord areas and a number of tenanted spaces (as agreed with OPDC), should be separately metered.

- v). For each of the agreed metered areas, at least 90% of the energy for all fuels and water usage should be reported on annually through an online OPDC data collection tool, or other preferred means, provided that the appropriate level of consent is in place.
- vi). Appoint an independent POE consultant to carry out anonymised user surveys on a representative sample (e.g. 20%) of users in the building using the OPDC non-residential survey template. The first user survey shall take place within 1-1.5 years after practical completion. The second user survey shall take place between 2-2.5 years after practical completion. The third user survey shall take place between 3-3.5 years after practical completion.

In addition to the requirements above, OPDC also encourage developers to adopt a full BSRIA Soft Landings process as this will support more effective post occupancy monitoring and evaluation. Furthermore, developers are encouraged to undertake more detailed metering, post occupancy monitoring and increase sample sizes and ensure a good cross section of the population is surveyed to improve statistical validity of surveys. Supporting guidance for all core and encouraged activities has been prepared.

For the online POE data collection platform, a visual overview of the user interface and user experience has been produced together with a detailed User Requirements Specification (URS) to develop the tool. The primary function of the online platform is to capture and disseminate data, as well as translate data into accessible formats that provide useful insights for residents, developers, OPDC and others. A secondary function and key driver of success as a data collection platform is to support engagement between developers, planners and the community.

Defining the standards for the online data capture tool (ODCT) follows the initial steps of a typical software development process. The structure and interface for the ODCT have been developed iteratively through close collaboration with OPDC.

Example interfaces for all the main tabs within the ODCT have been developed, covering essential POE aspects such as user satisfaction surveys and environmental performance data, and encouraged activities such as a news and updates 'portal' and community platform.

2 Proposed planning guidance

2.1 Introduction

This chapter contains the proposed policy guidance, setting out what developers should do and could do to ensure adequate Post Occupancy Evaluation (POE) and Soft Landings approaches are adopted on major projects.

OPDC is committed to ensuring that developers adopt a culture of continual improvement so that lessons learned can be used to help improve future phases of the masterplan and revisions to the Local Plan. To support this ambition, OPDC require that all developers of major developments undertake a POE.

The POE shall review both:

- i). Measurable performance metrics including energy and water use to understand how the development is performing against compliance calculations and in operation.
- ii). Qualitative reporting on user perceptions of the development and local environment to understand how well the emerging development is serving resident and business needs and expectations.

The outcomes that the POE policy is intended to support include:

- Better engagement with and feedback from building users;
- A learning culture based on evidence and good quality data;
- An understanding of what works well and what could be improved in buildings;
- An understanding about how well the public realm and open space work for different people in the area;
- An understanding about how well local amenities, services and transport links are serving the local community;
- An understanding of the differences between regulated CO₂ at the planning stage and as-built stages, as well as the in-use performance of completed developments;
- Benchmarking of in-use building performance to drive good practice throughout Old Oak and Park Royal and the rest of London.

It is intended that data collected as part of these exercises will be uploaded onto a new online OPDC POE data collection tool, or other preferred means.

On major developments, developers are encouraged to adopt a full soft-landings approach using an industry accredited and recognised standard, for example the BSRIA Soft Landings process. This will support more effective post occupancy monitoring and evaluation. In addition, attention should be paid to the design of energy and water metering to support data collection.

Permission to capture data from homes and commercial buildings will have to be agreed with residents and businesses and will be subject to data protection regulations. Personal data must only be shared with the resident or tenant who generated the data.

OPDC will store data for all developments across the OPDC area and share this information with individual developers. This will enable performance on individual developments to be benchmarked.

2.2 Core requirements

Residential development proposals should:

- i). Submit energy and CO₂ calculation outputs at the detailed planning and at the as-built stage, to demonstrate (at RIBA Stage 6), that carbon reduction measures have been implemented.
- ii). Submit overheating and daylighting calculation outputs at the detailed planning to enable comparison to user survey data collected in operation.
- iii). Provide metering in residential buildings to allow the total energy and water consumption of individual dwellings to be reported annually in the first 5 years after handover, provided that the appropriate level of consent is in place.
- iv). Provide energy and water metering, including renewable generation, to all common parts of the building, so that in use energy and water consumption can be reported annually in the first 5 years after handover, with the appropriate level of consent in place.
- v). Formally report on the annual energy and water consumption for a target of 20% of dwellings and at least 90% of common parts through an online OPDC data collection tool, or other preferred means.
- vi). Appoint an independent POE consultant to carry out anonymised user surveys for a target of 20% of dwellings, using the OPDC residential survey template. The first user survey shall take place within 1-1.5 years after practical completion. The second user survey shall take place between 2-2.5 years after practical completion. The third user survey shall take place between 3-3.5 years after practical completion.

Non-residential development proposals should:

- i). Submit energy and CO₂ calculation outputs at the detailed planning and at the as-built stage, to demonstrate (at RIBA Stage 6), that carbon reduction measures have been implemented.
- ii). Submit the results of operational energy predictions at the detailed planning stage for all non-residential buildings above 1,000m², following the CIBSE TM54 methodology, or equivalent.
- iii). Submit overheating and daylighting results at the detailed planning for all non-residential buildings above 1,000m², to enable comparison to user survey data collected in operation.
- iv). Provide metering in non-residential buildings to allow the total energy and water consumption and renewable generation to be reported annually in the first 5 years after handover. Where this is not practical, then the landlord areas and a number of tenanted spaces (as agreed with OPDC), should be separately metered.
- v). For each of the agreed metered areas, at least 90% of the energy for all fuels and water usage should be reported on annually through an online OPDC data collection tool, or other preferred means, provided that the appropriate level of consent is in place.
- vi). Appoint an independent POE consultant to carry out anonymised user surveys on a representative sample (e.g. 20%) of users in the building using the OPDC non-residential survey template. The first user survey shall take place within 1-1.5 years after practical completion. The second user survey shall take place between 2-2.5 years after practical completion. The third user survey shall take place between 3-3.5 years after practical completion.

2.3 Activities OPDC will encourage developers to adopt to help achieve agreed performance standards in operation

Residential development proposals are encouraged to:

- i). Adopt the full BSRIA Soft Landings process from conception to handover, appointing a Soft Landings Champion at RIBA Stages 1, or equivalent to assist in target setting for the project.
- ii). Undertake commissioning and seasonal commissioning of all dwellings and common areas to ensure that systems are operating as per the design intent. Re-commission the building systems annually.

- iii). Undertake thermal imaging of the building and air tightness testing of all dwellings to gain an improved understanding of build quality and identify any remedial works required.
- iv). Provide all residential dwellings with smart meters as well as home energy and water monitors to enable residents to enter their own data onto an online OPDC data collection tool, or other preferred means.
- v). Implement smart metering technology for energy and water meters to assist in data collection, analysis and diagnostics.
- vi). Implement energy metering by end-use in common areas and implement a building management system (BMS) to undertake more detailed analysis of energy usage in operation.
- vii). Use the BMS and/or install environmental logging equipment to undertake more detailed analysis of indoor environmental conditions (e.g. thermal comfort, daylighting, air quality etc.).
- viii). Carry out the energy and water POE reporting and user surveys on a representative sample of dwellings to achieve a confidence level of 90% or above. This will ensure a more robust representation of all dwellings, and a good representative section of residents are surveyed.
- ix). Undertake energy and water data reporting in a more frequent format (e.g. weekly, monthly, quarterly).
- x). Undertake lessons learned workshop with the consultant team within 3 months of practical completion to ensure a continual improvement approach is adopted.
- xi). Commission a POE summary report and arrange a meeting with OPDC (e.g. after the second user survey) to discuss what has worked well, what could be improved and what recommendations should be taken forward for future phases of the masterplan.

Non-Residential development proposals are encouraged to:

- i). Adopt the full BSRIA Soft Landings process from conception to handover, appointing a Soft Landings Champion at RIBA Stages 1, or equivalent to assist in target setting for the project.
- ii). Provide 'high', 'medium' and 'low' energy use estimations for all end uses when undertaking the operational energy performance calculations.
- iii). Undertake commissioning and seasonal commissioning of all areas to ensure that systems are operating as per the design intent. Re-commission the building systems annually.
- iv). Undertake thermal imaging of the building and air tightness testing to gain an improved understanding of build quality and identify any remedial works required.
- v). Implement smart metering or automatic meter reading (AMR) technology for energy and water meters to assist in data collection, analysis and diagnostics.
- vi). Implement energy metering by end-use and/or floor and implement a building management system (BMS) to undertake more detailed analysis of energy usage in operation.
- vii). Use the BMS and/or install environmental logging equipment to undertake more detailed analysis of indoor environmental conditions (e.g. thermal comfort, daylighting, air quality etc.).
- viii). Undertake energy and water data reporting in a more frequent format (e.g. weekly, monthly, quarterly).
- ix). Carry out the user surveys on a representative sample of employees to achieve a confidence level of 90% or above to achieve a more robust representation of the population.
- x). Undertake lessons learned workshop with the consultant team within 3 months of practical completion to ensure a continual improvement approach is adopted.
- xi). Commission a POE summary report and arrange a meeting with OPDC (e.g. after the second user survey) to discuss what has worked well, what could be improved and what recommendations should be taken forward for future phases of the masterplan.
- xii). Increase awareness of energy efficiency in the building by producing a Display Energy Certificate (DEC) after the building has been occupied for at least 12 months. The DEC should be updated annually for buildings with a total useful floor area more than 1,000m².

2.4 Evidence base and policy links

1. Post occupancy evaluation (POE) is a way of providing feedback about a building or project after occupancy. A number of guidance documents^{1,2} suggest that POE should include a review of the process of delivering a project, in addition to evaluations of the physical performance and user experience as this provides useful insight into why a building is performing in the way it is.
2. According to BSRIA and researchers who have looked into POE, it is preferable that the POE evaluations take place more than once over the lifetime of a building, to establish how performance changes with time. POE activities should be conducted by a third party to provide an independent and unbiased view of performance.
3. Building Performance Evaluation (BPE)³ and Zero Carbon Hub⁴ research has demonstrated that the link between regulated performance (assessed using Building Regulation approved methodologies) and measured performance is very weak. For example, within the BPE programme funded by Innovate UK, it was found that that in-use CO₂ emissions were on average 2.6 times higher than the design estimates.
4. In a recent publication, the UKGBC summarised findings of interviews with construction industry professionals, which highlighted that assessments of compliance calculations vs. in-use performance are not a fair comparison⁵. This is because the regulated calculations do not include ‘unregulated’ CO₂ emissions (e.g. plug loads), nor does the calculation methodology take into account realistic occupancy profiles, or special uses and functions that would be required to produce an accurate ‘operational prediction’.

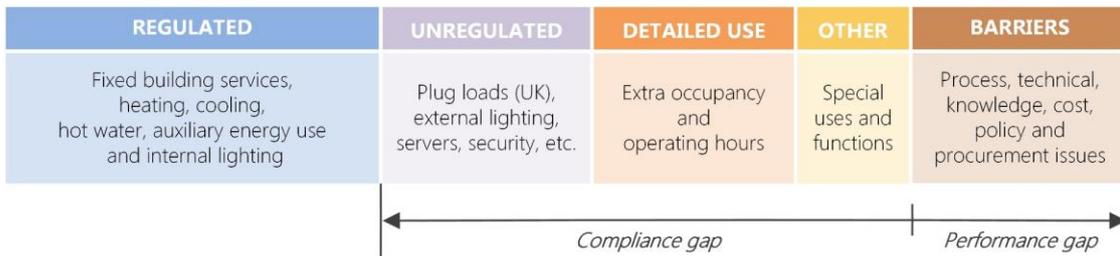


Illustration of the difference between the ‘compliance gap’ and ‘performance gap’ (UKGBC).

5. It is possible to bridge the gap between the compliance model and the in-use performance through use of extended calculation methods such as those described in CIBSE TM54⁶. Whilst this may close the ‘compliance gap’, as illustrated in the diagram above, it does not address the full ‘performance gap’ between predictions and reality, as there are limitations to all predictive calculations undertaken at the design stages of a project.
6. From a planning perspective, draft London Plan Policy SI2 states that the move towards zero-carbon development requires comprehensive monitoring of energy demand and carbon emissions to ensure that planning commitments are being delivered⁷. Requirements relating to POE are as follows:
 - a. Major developments are required to monitor and report on energy performance, such as by displaying a Display Energy Certificate (DEC) and reporting to the Mayor for at least five years via an online portal to enable the GLA to identify good practice and report on the operational performance of new development in London.

¹ HEFCE, AUDE, University of Westminster (2006), Guide to Post Occupancy Evaluation
² BRE (2003), DIG 478 Building performance feedback: getting started
³ Innovate UK (2016), Building performance evaluation programme: findings from non-domestic projects
⁴ ZCH (2014), Closing the gap between design and as-built performance: end of term report
⁵ UKGBC (2016), Delivering building performance
⁶ CIBSE (2014), CIBSE TM54: Evaluating operational performance of building at the design stage
⁷ GLA (2017), The London Plan, the spatial development strategy for Greater London

- b. As a minimum, energy strategies should contain proposals for how energy demand and carbon dioxide emissions post-construction will be monitored annually (for at least five years).
- 7. OPDC welcomes this commitment and believes it will support better development, a focus on commissioning and handover, designing of metering strategies and performance monitoring.
- 8. As a mayoral development corporation, the largest opportunity area in London and a project that will be delivered over many decades, Old Oak and Park Royal will seek to set exemplary standards for developments. Understanding how the emerging built environment in Old Oak and Park Royal is performing is important as it will provide feedback to inform learning on future development projects and to help developers/ management companies respond to issues as they arise.
- 9. Currently there is very little feedback in the development industry between the user (tenant, occupier, resident, and/or owner) and the development team including their consultants. As such, the best way to monitor and audit performance is to actively engage with the resident and worker community as they move into the area. OPDC with support from the GLA wants to be a responsive body that can use evidence to help shape the way the developments evolve over time.

EVIDENCE BASE LINKS

- UKGBC Delivering building performance
- BSRIA Soft Landings (BG 38/2014 and BG 54/2014)
- BCO guide to post occupancy evaluation
- BRE building performance feedback: getting started
- Innovate UK - BPE programme: non-domestic findings
- Zero Carbon Hub - Closing the gap between design and as-built performance: end of term
- CIBSE TM54: Evaluating operational energy performance of buildings at the design stage

POLICY LINKS

- Delivery and Implementation Policies D13
- Design Policies D11, D16
- Environment and Utilities (All)

2.5 Guidance to support core requirements at detailed planning stage (residential)

- 10. For the detailed planning submission developers shall submit information on energy use and CO₂ emissions, overheating and daylighting for a representative sample of properties (e.g. 10-15% dwellings). Details of the metering strategy and POE resources shall also be confirmed.
- 11. For residential buildings, steps to be undertaken at the detailed planning stage are set out below:

Planning checklist (residential)	<i>Complete?</i>
Step 1a: Submit schedule of energy and CO ₂ calculation outputs	<input type="checkbox"/>
Step 2a: Submit schedule of overheating and daylighting results	<input type="checkbox"/>
Step 3a: Provide details of the metering strategy to enable energy and water data collection	<input type="checkbox"/>
Step 4a: Confirm appropriate POE resources are in place and that data protection regulations will be met	<input type="checkbox"/>

Step 1a: Submit schedule of energy and CO₂ calculation outputs

- 12. To capture information on the energy use and CO₂ emissions at the detailed planning stage for residential dwellings, the following information shall be captured in the OPDC carbon compliance template, or through other approved means:

- a. Address data and/or unique property reference
 - b. Property type (ground/mid/top floor flat, mid/end terrace, semi-detached, detached, other)
 - c. Orientation
 - d. Floor area (m²), in line with SAP measurement conventions
 - e. Air permeability (m³/(m².hr)@50Pa)
 - f. Regulated heat (kWh/m²/year)
 - g. Regulated power (kWh/m²/year)
 - h. Unregulated power (kWh/m²/year)
 - i. Dwelling Emission Rate (kgCO₂/m²/year)
 - j. Target Emission Rate (kgCO₂/m²/year)
 - k. Dwelling Fabric Energy Efficiency (kWh/m²/year)
 - l. Target Fabric Energy Efficiency (kWh/m²/year)
13. For individual residential dwellings, a sampling approach in alignment with the energy modelling strategy agreed for the overall detailed planning submission can be used.
14. For residential dwellings, unregulated power shall refer to cooking and plug load energy use, outputted from the standard SAP calculations based on floor area.
15. For the residential common areas, the non-residential guidance shall be followed.

Step 2a: Submit schedule of overheating and daylighting results

16. For residential buildings, design stage overheating assessments shall be conducted following the TM59 guidance and TM52 methodology, based on 2020 DSY weather files or latest methodology where these have been updated. The following information, where applicable, shall be captured in an OPDC template, or other approved means:
- a. Bedrooms (night) - % of hours above 26 degrees Celsius (worst case bedroom)
 - b. Bedrooms and living area (daytime) – overall "pass" or "fail" of TM52 criterion 1
17. Results for the above overheating assessment should be reported with and without blinds, as per TM59.
18. Design stage daylight assessments shall be carried out to report on average daylight factors in bedrooms, kitchen and living spaces. Calculation procedures shall be in accordance with BS 8206 Part 28 and the BRE 'Site layout planning for daylight and sunlight: a guide to good practice'⁹. The following information, where applicable, shall be captured in an OPDC template, or other approved means:
- a. Average daylight factor (bedrooms)
 - b. Average daylight factor (kitchen/living spaces)

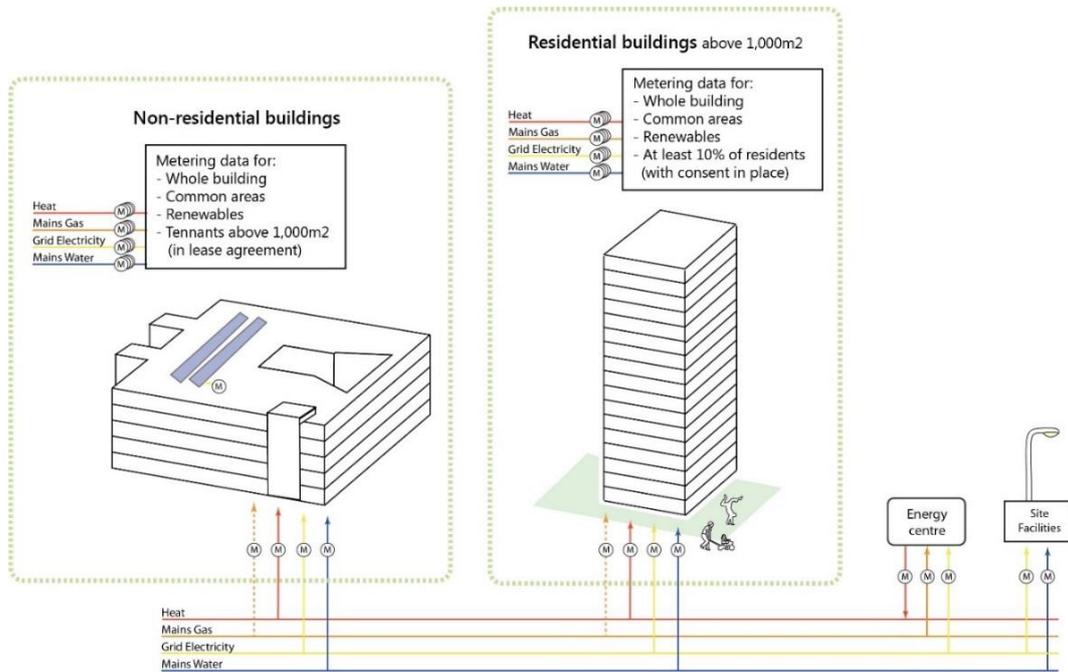
Step 3a: Provide details of the metering strategy to enable energy and water data collection

19. Developers shall provide a metering strategy for the development and supporting narrative confirming to what extent it enables post occupancy reporting in line with the OPDC core requirements.
20. A metering strategy shall be developed that enables total electricity, heat, gas and water usage in individual dwellings to be captured for annual reporting, as applicable. The metering strategy should also enable the total electricity, heat, gas, water and renewable energy of common parts to be captured for annual reporting, as applicable.

⁸ BSI 2008 BS 8206-Part 2. Lighting for buildings. Code of practice for daylighting 2008

⁹ BRE Trust. Site layout planning for daylight and sunlight: a guide to good practice, 2nd edition 2011

21. The term common areas refer to all common parts of the building, including all landlord services, integral building functions and external lighting for the building. For common parts the metering shall enable at least 90% of the estimated annual consumption to be captured.
22. Water reporting in residential buildings should cover total water usage, net of any recycled usage. Individual dwellings and common areas including landlord services should be separately reported.



Step 5a: Confirm appropriate POE resources are in place and that data protection regulations will be met

23. The developer shall confirm that an appropriate budget has been put in place for an independent party to undertake the POE reporting over the 5-year period.
24. The POE reporting shall cover annual energy and water data collection, together with undertaking three user surveys at 1-1.5, 2-2.5 and 3-3.5 years after practical completion
25. The POE shall aim to collect data for a target of 20% of dwellings and at least 90% of common parts.
26. The independent party that conducts the POE shall be a third-party, person or body who shall not have any conflicts of interests resulting from their position. Where the organisation has been involved in some capacity with the design of the building, e.g. the project architect, sustainability engineer, then a credible level of independence should be demonstrated to the developer.
27. The developer shall provide written confirmation that all POE data collected will comply with data protection regulations. See the POE guidance section for further details.

2.6 Guidance to support core requirements at detailed planning stage (non-residential)

- 28. For the detailed planning submission developers shall submit information on energy use and CO₂ emissions for all buildings. For buildings above 1,000m² outputs from operational energy predictions, overheating and daylighting assessment shall also be provided. Details of the metering strategy and POE resources shall also be confirmed.
- 29. For non-residential buildings, steps to be undertaken at the detailed planning stage are set out below:

Planning checklist (non-residential)	Complete?
Step 1b: Submit schedule of carbon compliance results	<input type="checkbox"/>
Step 2b: Submit operational energy prediction results (buildings above 1,000m ²)	<input type="checkbox"/>
Step 3b: Submit schedule of overheating and lighting results at (buildings above 1,000m ²)	<input type="checkbox"/>
Step 4b: Provide details of the metering strategy to enable energy and water data collection for the POE	<input type="checkbox"/>
Step 5b: Confirm appropriate POE resources are in place and that data protection regulations will be met	<input type="checkbox"/>

Step 1b: Submit schedule of carbon compliance results

- 30. To capture information on the regulated CO₂ emissions at the detailed planning stage for non-residential dwellings (and residential communal areas), the following information shall be captured in an OPDC template, or other approved means:
 - a. Address data and/or unique property reference
 - b. Property type
 - c. Floor area (m²), in line with SBEM measurement conventions
 - d. Air permeability (m³/(m².hr)@50Pa)
 - e. Energy consumption by end use (kWh/m²/year)
 - i). Heating
 - ii). Cooling
 - iii). Auxiliary
 - iv). Lighting
 - v). Hot water
 - vi). Equipment
 - f. Energy production by technology (kWh/m²/year)
 - i). Photovoltaic systems
 - ii). Wind turbines
 - iii). CHP generators
 - iv). Solar thermal systems
 - g. Regulated Emissions, Notional (kgCO₂/m²/year)
 - h. Regulated Emissions, Actual (kgCO₂/m²/year)
- 31. Energy used by equipment does not count towards the total energy use when calculating carbon dioxide emissions. The total energy use to determine regulated CO₂ emissions is net of any electrical energy displaced by CHP generators, if applicable.
- 32. For individual non-residential uses, a sampling approach in alignment with the energy modelling strategy agreed at the detailed planning stage can be used.

Step 2b: Submit operational energy prediction results (buildings above 1,000m²)

33. A prediction of operational energy use and CO₂ emissions shall be made at the detailed planning stage, following the CIBSE TM54 calculation method or equivalent.
34. For the operational prediction, the following information where reasonable and applicable, shall be captured in an OPDC template, or other approved means:
- a. *Total energy consumption, thermal (kWh/m²/year)*
 - b. *Total energy consumption, electricity (kWh/m²/year)*
 - c. *Energy consumption by end use (kWh/m²/year)*
 - i). *Lighting*
 - ii). *Small power*
 - iii). *Lifts and escalators*
 - iv). *Catering*
 - v). *Server Rooms*
 - vi). *Other equipment*
 - vii). *Domestic hot water, thermal*
 - viii). *Domestic hot water, electricity*
 - ix). *Heating, thermal*
 - x). *Heating, electricity*
 - xi). *Cooling*
 - xii). *Fans/AHU*
 - xiii). *Pumps/controls/heat rejection*
 - xiv). *Renewable generation, thermal*
 - xv). *Renewable generation, electric*
35. When presenting the operational energy calculation results, provide 'high', 'medium' and 'low' energy use estimations for all applicable end uses, where reasonable.
36. It is intended that the operational energy predictions will enable a greater understanding of the gap between design stage energy consumption (regulated and unregulated) and in-use performance.

Step 3b: Submit schedule of overheating and lighting results at (buildings above 1,000m²)

37. For non-residential buildings, design stage overheating assessments shall be conducted following CIBSE TM52 criteria (if naturally ventilated) or following CIBSE Guide A criteria (where mechanically cooled), based on 2020 DSY weather files or the latest methodology where these have been updated. The following information, where applicable, shall be captured in an OPDC template, or other approved means:
- a. *Occupied spaces (daytime) – percentage of spaces passing TM52 criteria*
38. Design stage daylight assessments shall be carried out to report on average daylight factors for occupied spaces. Calculation procedures shall be in accordance with BS 8206 Part 2. The average daylight factor is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE Standard Overcast Sky. The following information, where applicable, shall be captured in an OPDC template, or other approved means:
- a. *Percentage occupied spaces achieving average daylight factor of 2%*

Step 4b: Provide details of the metering strategy to enable energy and water data collection for the POE

39. For the energy and water POE data collection, metering should be provided to allow the total energy and water consumption and renewable generation to be reported annually.

40. The term common areas refer to all common parts of the building, including all landlord services, integral building functions and external lighting for the building.
41. The metering strategy and level of sub-metering should be appropriate to the building. Energy reporting should cover all energy fuel sources (e.g. heat, mains gas, grid electricity, renewable heat and renewable electricity).
42. Energy metering shall enable at least 90% of the estimated annual consumption for each reportable area to be captured. Where 'whole building' energy consumption is being reported on, as per the DEC calculation methodology, the reported energy consumption should cover more than 95% of all energy used by the building.
43. Where energy use for tenant and landlord areas are to be separately reported, OPDC will expect reasonable endeavours to be made as part of the metering strategy to report on tenant energy consumption with floor area above 1,000m².
44. Water reporting in non-residential buildings should cover total water usage, net of any recycled usage. Metering data submitted for water consumption can be sub-divided differently to the energy data provided.

Step 5b: Confirm appropriate POE resources are in place and that data protection regulations will be met

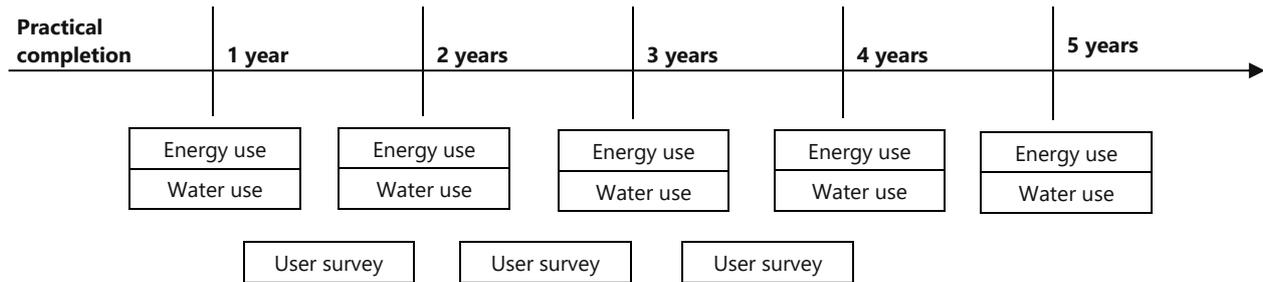
45. The developer shall confirm that an appropriate budget has been put in place for an independent party to undertake the POE reporting over the 5-year period.
46. The POE reporting shall cover annual energy and water data collection, together with undertaking three user surveys at 1-1.5, 2-2.5 and 3-3.5 years after practical completion
47. The POE shall aim to collect data for a target of 20% of building users and at least 90% of common parts.
48. The independent party that conducts the POE shall be a third-party, person or body who shall not have any conflicts of interests resulting from their position. Where the organisation has been involved in some capacity with the design of the building, e.g. the project architect, sustainability engineer, then a credible level of independence should be demonstrated to the developer.
49. The developer shall provide written confirmation that all POE data collected will comply with data protection regulations. See the POE guidance section for further details.

2.7 Guidance to support core requirements at hand-over stage

50. For both residential and non-residential development, updated energy and CO₂ calculation outputs shall be provided at the as-built stage (RIBA Stage 6). The data to be captured is the same as at the detailed planning stage, except that figures should now be provided for all dwellings and buildings. The data shall be captured in an OPDC template, or other approved means.
51. It is intended that the carbon compliance data will enable an improved understanding of the differences between regulated CO₂ at the planning stage and as-built stages, as well as provide a mechanism to demonstrate that carbon reduction measures have been implemented and are performing as intended.
52. It is not required for the POE planning requirements to update daylighting and overheating calculations at the as-built stage, as the intention is that these elements will be evaluated based upon user survey data.

2.8 Guidance to support core requirements at the post occupancy evaluation stage

- 53. The developer is required to begin the POE reporting for the development from the point of handover for each individual building within a development, where reasonable.
- 54. A timeline for the POE reporting activities for residential and non-residential major developments is set out below:



- 55. Collected POE data shall be submitted onto the OPDC online data collection platform, or other approved means on an annual basis over the 5-year period.
- 56. It is intended that the on-going annual reporting of energy and water usage over the 5-year period will enable better visibility of in-use performance to ensure that building operation does not become inefficient after the initial evaluation period has passed, e.g. due to changes in control strategies or in-use changes.

Energy and water POE data collection

- 57. To assist with POE data collection, the metering strategy, full meter schedule and schematic drawings with meters labelled to match up the meter schedule should be made available to the independent POE consultant.
- 58. For all energy and water data collection, formal consent must be granted before any data (either manually or automatically collected) is gathered as part of the POE reporting.
- 59. It is the developer’s duty to obtain consent, secure data and comply with data protection regulations.
- 60. By 2020, all premises are required to take all reasonable steps to ensure that smart energy meters or ‘advanced’ meters are installed. The Data Communications Company (DCC) provides the communications infrastructure that handles this (anonymised) smart meter data.
- 61. When consent is obtained from users, the DCC can allow third parties the use of consumer metering data or consumers themselves can access their own metering data and share this with third parties. In either case, the transfer and storage of data must adhere to the General Data Protection Regulation (GDPR), or its UK equivalent. In addition, any use of the data must abide by the Smart Energy Code.
- 62. For multi tenanted non-domestic buildings, a mechanism to support consented POE data collection could be an inclusion within a lease agreement.
- 63. An address is a piece of personal data, as such the GDPR requires that: (i) participants are informed on how their data is being processed; (ii) why data is being collected and used (including personal information), and; (iii) an instruction on how they can subsequently opt-out of sharing their data is provided.

User surveys

64. Two user survey templates (one residential and one non-residential) have been developed to cover a range of important performance measures including:
- a. *Temperature* – thermal comfort, impact on health, communal areas
 - b. *Controls* – ease of use, response
 - c. *Lighting* – daylighting, electric lighting
 - d. *Energy* – utility bills, energy awareness
 - e. *Water* – water pressure, drinking water, recycled systems
 - f. *Design* – external design of building, views, layout, storage
 - g. *Air quality* – internal conditions, external conditions
 - h. *Noise* - internal noise, external noise
 - i. *Safety and security* – safety during day/night, home security
 - j. *Waste* – storage, recycling, refuse areas
 - k. *Transport* – cycling, frequency of services, traffic
 - l. *Public areas and green space* – size and quality of spaces
 - m. *Public amenities* – education, health, community, retail, food
 - n. *Identity and community* – image, community spirit, affordability
65. The residential survey aims to establish how satisfied residents are in their homes, the building they live in and the local area. Similarly, the non-residential survey aims to establish how satisfied employees are with the building and the area around the development they work in.
66. Multiple choice questions have been used to enable a statistical comparison to other buildings. Non-emotive language e.g. satisfied / unsatisfied, rather than happy / unhappy has been used.
67. Surveyors must ensure the General Data Protection Regulation (GDPR), or its UK equivalent is adhered to.
68. As a minimum, the survey should aim to capture feedback from at least 20% of dwellings and/or 20% of building users in. This sample size has been selected to provide qualitative insights of performance. For a greater statistical representation, see the formulae in section 2.9.
69. The survey sample size should aim to cover the demographics of people within a development (i.e. people of different ages, gender and backgrounds).
70. Survey findings should be captured on an online OPDC data collection tool, or other preferred means. This will enable developers to carry out detailed analysis of occupant satisfaction and the potential to compare different development sites.

2.9 Guidance to support activities beyond core requirementsPost Occupancy Evaluation

71. POE can be categorised into three types of evaluations¹:
- a. *Process evaluation* – the delivery of the project from inception to handover, how was the project delivered and how decisions were arrived at;
 - b. *Functional evaluation* - how well the building supports the organisational, as well as its goals and aspirations and how well the user needs are supported;
 - c. *Technical evaluation* - measuring how the physical systems perform, for example in relation to energy use, lighting, ventilation, air quality and acoustics.

72. These three types of evaluations involve using different assessment techniques, but generally involve an analysis of building performance data, occupant satisfaction surveys and interviews, as well as on-site inspections of the building's engineering system and architecture.

Soft Landings

73. Soft Landings provides a framework for a clearer dialogue between the client, design team, contractor and building users to improve the operational readiness of buildings. It is a way of systematically ensuring that feedback is applied throughout a building's lifetime from initial concept through to operation and occupation.
74. Implementation of Soft Landings is encouraged as it can significantly support the building design, procurement, construction, commissioning and handover process to ensure that performance is being met in-use. The Soft Landings process describes five stages:
- a. Stage 1: Inception and briefing - focuses on clarifying the roles and responsibilities of the client, design and building teams during critical stages, and help set and manage expectations for performance in use.
 - b. Stage 2: Design and construction - focuses on keeping Soft Landings issues on the agenda throughout the project, by placing emphasis on having regular (e.g. quarterly) review workshops, as well as reviewing design specification and construction information.
 - c. Stage 3: Pre-handover - aims to ensure that risks associated with handover are effectively managed. Work includes greater involvement of designers, builders, operators to ensure the operational readiness of the building from day one. This is a critical step in all Soft Landings processes and one that requires commitment from the client and contractor.
 - d. Stage 4: Initial aftercare - takes place during the first 12 months of occupation. This is the time when the users settle into the building, and may require advice on how best to operate the building. A Soft Landing's representative or team member will be available on site to help pass on knowledge, respond to queries, and assist with problems.
 - e. Stage 5: Extended aftercare - ensures that in years 2 and 3, the Soft Landings team is still engaged with the project supporting in structured POE activities such as user surveys and energy audits. This will enable periodic monitoring and reviews of building performance to ensure the design aspirations have been met.
75. Soft Landings requirements are set out in the Soft Landings guidance documents, see BSRIA BG 54/2014 (framework), BG 38/2014 (core principles) and BG 45/2014 (how to procure Soft Landings).

Good practice user surveys

76. It is encouraged that surveyors be accredited by the Market Research Society (MRS).
77. For greater statistical significance in the user survey it is encouraged to increase the sample size to achieve a 90% confidence level using Yamane's formula¹⁰. For a development with 25 dwellings and a confidence level of 90%, the sample size would be 20 dwellings. For a development with 100 dwellings the sample size would be 50. For 500 dwellings the sample size would be 83.
78. Recurring user surveys are recommended every 3-5 years, after the planning commitment has been fulfilled, to provide OPDC with long term data for improving and learning from the development.

Good practice energy and water metering

¹⁰ Yamane, Taro (1967), Statistics, an introductory analysis (2nd Edition)

79. Good practice guidance relating to metering in buildings include CIBSE TM39¹¹ and Better Buildings Partnership Better Metering Toolkit¹². Further guidance can also be found in Building Regulations Part L.
80. It is good practice to label all energy consuming systems, meters and distribution boards so they are identifiable by end-use.
81. In BREEAM New Construction 2018 (draft), it is a minimum requirement for any rating above 'Very Good' to provide energy sub-metering that enables at least 90% of the estimated annual energy consumption of each fuel to be assigned to different end-use categories and by high energy load and functional areas.
82. Sub-metering water consumption means that water consumption can be better accounted for. Sub-metering of rainwater recycling and greywater management systems is also recommended where installed.
83. In BREEAM, it is a minimum requirement for any rating above 'Good' to provide a water meter on the mains water supply to each non-residential building, including instances where water is supplied via a borehole or other private source.
84. BREEAM also includes requirements that water consuming plant or building areas consuming 10% or more of the building's total water demand are either fitted with accessible sub-meters or have integral monitoring equipment, as well as being BMS connected or enabled.
85. In buildings with swimming pools, BREEAM requires that separate sub-meters are fitted on the water supply of the swimming pool and its associated changing facilities (toilets, showers etc.) irrespective of their water consumption levels. Laboratories are also required to have plumbed-in laboratory equipment sub-metered.

Good practice overheating and daylight modelling

86. In order to minimise overheating risk in residential buildings, developers are encouraged to consider an adaptation strategy for future compliance with CIBSE TM59 or CIBSE Guide A criteria (if mechanically cooled), using 2050 weather files. Developers are also encouraged to show that the present-day design complies with CIBSE TM59 criteria (if naturally ventilated) or CIBSE Guide A criteria (if mechanically cooled), based on 2050 DSY weather files.
87. For non-residential buildings, developers are encouraged to consider an adaptation strategy for future compliance with CIBSE TM52 or CIBSE Guide A criteria (if mechanically cooled), using 2050 weather files. Developers are also encouraged to show that the present-day design complies with CIBSE TM52 criteria (if naturally ventilated) or CIBSE Guide A criteria (if mechanically cooled), based on 2050 DSY weather files.
88. In order to deliver good daylight in residential buildings, developers are encouraged to maximise daylighting in shaded locations, aiming to achieve an average daylight factor of 1.5% in living spaces whilst mitigating overheating.
89. For non-residential buildings, developers are encouraged to achieve an average daylight factor of 2% in all occupied spaces where technically feasible.
90. For both residential and non-residential development, developers are encouraged to use climate-based daylight simulation, aiming to maximise Useful Daylight Illuminance (UDI).

Use of the operational energy predictions

¹¹ CIBSE (2009), CIBSE TM39: Building energy metering

¹² BBP (2011), Better metering toolkit: A guide to improved energy management through better energy metering

91. When conducting the operational energy modelling, it is encouraged that a structured interview with the intended occupiers takes place to establish more accurate operating hours, occupancy factors and management factors.
92. A high and low-end scenario should be generated by changing key variables considered to be the least certain. The sensitivity of some variables can also be tested to determine which are likely to impact on the results the most.
93. Achieving in-use performance within the calculated range will not be enforceable by OPDC, as it is intended as a learning exercise to assist the POE, It is however encouraged that developers provide kWh/m² target(s) to the independent POE consultant and building occupants, where appropriate, to help drive down energy performance in use.
94. It is encouraged to update the operational energy modelling at the as-built stage of a development. The carbon compliance template includes an allowance for this optional information to be entered.
95. It is encouraged to calibrate the operational energy model in use, so that this model can be used to help drive behaviour change strategies and inform energy saving opportunities.

Lessons learned workshop

96. It is encouraged that developers adopt their own process evaluation as part of POE. This can be facilitated through a lessons learned workshop at key milestones (e.g. 3-6 months after practical completion) and is about understanding how the project was delivered from inception to handover/occupation.
97. The lessons learned workshop would ideally cover the following building delivery aspects;
 - a. Brief - how the brief was developed, on which design it was based including financial management aspects;
 - b. Procurement - how team selection, contractual and technical processes were undertaken including time and value aspects;
 - c. Design - how the project team developed and refined the design including space planning, engineering and financial management aspects;
 - d. Construction - how the construction phase until handover was managed, including financial and change management processes;
 - e. Commissioning - how commissioning of the building was managed, including adjustments and provision of documentation; and
 - f. Handover - how the handover process was managed including rectification of last-minute snags and if applicable the removal/relocation process.
98. A review of the delivery process can be helpful in determining how the building brief was developed to understand if the process can be improved upon by subsequent projects. It aims to provide lessons to all members of the project team, to improve these processes for future developments.

Commissioning and recommissioning

99. If the POE finds that building performance has diminished, recurrent commissioning and facilities management can make the necessary adjustments to the controls, equipment and operation of the building. Interviews with facilities management and representative building users, before or during a walkthrough audit can assist with understanding changes to HVAC strategies.

- 100. It is encouraged that attention is paid to commissioning, in order to verify systems are operating correctly and that metering systems are accurately recording the flows of gas, heat, electricity and water. This ensures that environmental performance objectives can be verified in-use.
- 101. An appropriately commissioned building will reduce maintenance costs as equipment won't fail as quickly, and it will reduce energy use through efficient use of M&E systems. Typical test that need to be carried out include ensuring:
 - a. Current and voltage transformers are of the correct ratio, polarity and are correctly located to record the required power flow;
 - b. Meters are set to the same voltage and current transformer as the installed measurement transformers and have the correct compensation for errors;
 - c. Metering equipment detects phase failure and operates the required alarms;
 - d. Reconciliation of sub-meter readings with the mains meter and any recording through the building; and management system.
- 102. Developers are encouraged to ensure adequate time is allowed within the project delivery programme for commissioning of systems in general, with metering and BMS systems treated as a specialist items. Commissioning of the metering system is emphasised here, but is part of the broader commissioning process, which includes commissioning of any installed system (e.g. HVAC, lighting, controls, renewable energy systems etc.).

Indoor environmental quality assessment

- 103. Developers/owners are encouraged to assess the indoor environmental performance of their developments, particularly when issues are identified through the user satisfaction surveys. The evaluation of the indoor environmental quality is encouraged, with the assessment of several aspects described in the following table:

Activity	Standards and guides
Undertake co-heating test and/or locate areas of heat loss with a thermal imaging camera (for BREEAM use a UKTA level 2 certificate holder).	BS EN 13187:1999, BS EN ISO 6781-3, ISO 9869-1:2014
Analyse daylight and artificial lighting levels including glare.	BS 8206-2:2008, BS EN 12464-1:2011, BS EN 15193:2007
Measure aspects that impact thermal comfort, dry-bulb and we-bulb and radiant air temperature, air velocity and humidity.	CIBSE Guide A, CIBSE TM52, BB101, EN 15251, ASHRAE Standard 55 (2013)
Measure potential aspects that impact indoor air quality, such as CO ₂ , volatile organic compounds (VOCs), particulates (PM2.5 and PM10), NO ₂ , allergens, and O ₃ .	EN ISO 16000-1:2004 and ISO 16000 series, ASHRAE Standard 62 1&2 (2013) CIBSE KS17, Directive 2008/50/EC/2008
Identify the ventilation control strategies and establish the path of the air. Identify the main heat generators, controls and zones. Identify how systems are managed to prevent opposing actions, identify where the sensors are and how they fit into the control strategy.	CIBSE Guide B, CIBSE TM26, BS 8206-2:2008, CIBSE SLL Lighting Guides, CIBSE Commissioning Code A, CIBSE Guide H, CIBSE KS04
Observe how occupants understand systems and how, why and when they change their environment. Check how spaces are used and if there are improvised alterations.	NHBC NF 35
Measure the ambient noise, impact noise and reverberation	BS EN ISO 16283-1:2014

Alignment of RIBA stages to Soft Landings

RIBA Stage 1	RIBA Stage 2	RIBA Stage 3	RIBA Stage 4	RIBA Stage 5	RIBA Stage 6	RIBA Stage 7	
Inception and briefing	Design and construction			Operational readiness		Initial aftercare	Extended aftercare and POE
<ul style="list-style-type: none"> • Agree the Soft Landings champion; • Define roles and responsibilities; • Review past experience; • Plan for intermediate reviews and reality checks; • Set environmental and other performance targets; • Agree sign-off gateways and reality checks; • Agree how to measure performance in use, and what action is appropriate if anything falls short. 	<ul style="list-style-type: none"> • Refine design in light of information from feedback of other relevant project/developments; • Revisit and update early performance targets reporting on both regulated and un-regulated energy use, predicted water use etc.; • Undertake stakeholder engagement with users to understand what really matters to them; • Choose a reality-checking process which gives the project team additional focus on specific elements during design, construction and installation; • Include facilities management (FM) staff and/or contractors in design reviews; • Review usability and manageability of the building and systems; • Identify how systems will be managed to prevent opposing actions; • Review design for buildability, ease of commissioning and maintainability; • Incorporate performance targets and Soft Landings requirement in tender documents and evaluate tender responses and results from interviews; • Create contract documents, review and sign-off in accordance with design review and reality-checking findings. Review tender responses against requirements. 			<ul style="list-style-type: none"> • Undertake pre-handover reality-checks with FM staff and contractor(s); • Confirm maintenance strategy and agreements are in place; • Ensure all outstanding reality-checked items are complete and system is signed off and operational; • Agree format and content for Building Logbook, Building User Guide and metering pack; • Ensure that commissioning of all metering, BMS and MEP systems infrastructure is properly planned in; • Ensure adequately trained personnel are in place; agree criteria for sign-offs. • Ensure adequately trained personnel are in place, agree criteria for sign-offs. 		<ul style="list-style-type: none"> • Have a member of the design and/or construction team on-site to spot, respond to, and help deal with emerging issues; • Ensure that all key personnel have been adequately trained on building performance issues; • Review technical guidance with FM, explaining systems and rational for control set-points; • Introduce the building user guide to wide audience of building users and discuss views and queries in focus groups; • Roam building on a regular basis, with additional spot checks if necessary (combine with other visits as appropriate); • Establish a means of communication with building users, e.g. a simple bulletin board for email dialogue and posting of information updates. Ensure a representative provides update fortnightly and moderate comments; • Record changes to systems in building logbook and add to operational & maintenance (O&M) manuals to help progressive changes. 	<ul style="list-style-type: none"> • Appoint an independent POE consultant and/or body; • Determine if the strategic brief including the client’s vision and primary aims of the project were achieved in the delivery of the project; • Determine if the client’s business needs, risks and opportunities, and social, environmental and economic benefits as defined in the business case were achieved; • Check energy use against design prediction(s); • Understand relative building performance by checking how well other comparable buildings have performed; • Provide a written review of overall energy and systems performance at six monthly intervals; • Measure performance to agreed programme to inform six monthly review meetings to compare against forecasted targets; • Sharing results whenever possible to help designers understand how their buildings perform and help them work towards closing their performance gap.

Operational benefits of an integrated Soft Landings and POE approach

Benefits to	First few years	Long term
Project team	<ul style="list-style-type: none"> • Provides immediate feedback and opportunity to resolve problems jointly in mutually supportive atmosphere • Learning experience for staff within the organisations • Building performs as intended through fine-tuning • Commissioning and aftercare services have been adequately planned and integrated, supported through the Soft landings process 	<ul style="list-style-type: none"> • Maintenance for ongoing customer relations • A learning culture based on evidence and good data • Mitigating differences between predictions and measurements • Better informed design decision-making and understanding of the consequences of design • Testing of new concepts to determine how well they work in occupied buildings.
Client (owner)	<ul style="list-style-type: none"> • Ensures building matches design brief • Facilities joint problem solving while project team is still on board • Ensures that the building operates optimally from the outset • Ensures impact on organisation performance is as intended • Measuring project success, ensure quality and value achieved are in line with investments • Highlighting strengths and weaknesses of the building/project • Commissioning and aftercare services have been adequately planned and integrated, supported through the Soft landings process 	<ul style="list-style-type: none"> • Increased staff productivity by improving environment • Long term improvement and maintenance of building performance • Benchmark building performance • Incorporates lessons learned into new developments. • Adapt to changing organisational needs and inform future decisions and expenditures
End users (occupants)	<ul style="list-style-type: none"> • Ensures quality of working environment is satisfactory • Ensures end users are able to control their environment as intended • Ensures facilities provision is suitable • Building users have a better understanding of how to operate the building thanks to the Soft Landings process 	<ul style="list-style-type: none"> • Ensures continuing satisfaction with internal environment and facilities • Demonstrates commitment of organisation to providing comfortable environment • Proactive facility management responsive to user values • Improved attitude of building occupants through active involvement in the evaluation process
Facilities manager	<ul style="list-style-type: none"> • Enables good understanding of building operation • Better awareness of problem areas for subsequent monitoring • Ensures they are able to discuss problem with the design team • Early warning and avoidance of potentially serious problems • Improved space utilisation and feedback on building performance 	<ul style="list-style-type: none"> • Allows more positive interactions with end users • Allows prioritisation of funding • Allows the value of good performance to be measurably demonstrated • Improves effectiveness of facilities managers
Social, environmental and economic aspects	<ul style="list-style-type: none"> • Improved services resulting in energy savings • Improved resource efficiency • Increased energy security • Lower carbon emissions • Improved health, wellbeing and productivity 	<ul style="list-style-type: none"> • Enhanced asset value • Significant cost savings in the building process • Improvements in building performance • Improved measurement of building performance through quantification • Support of policy development as reflect in design and planning guides, validity of underlying premises can be tested and improved.

3 Online Data Capture Tool – Visual overview

3.1 Overview

As part of the process of ‘closing the loop’ between Post Occupancy Evaluation and creating healthier, high quality future living and working environments in buildings and neighbourhoods, OPDC wish to collect rich data sets of performance information via an online data capture tool (ODCT).

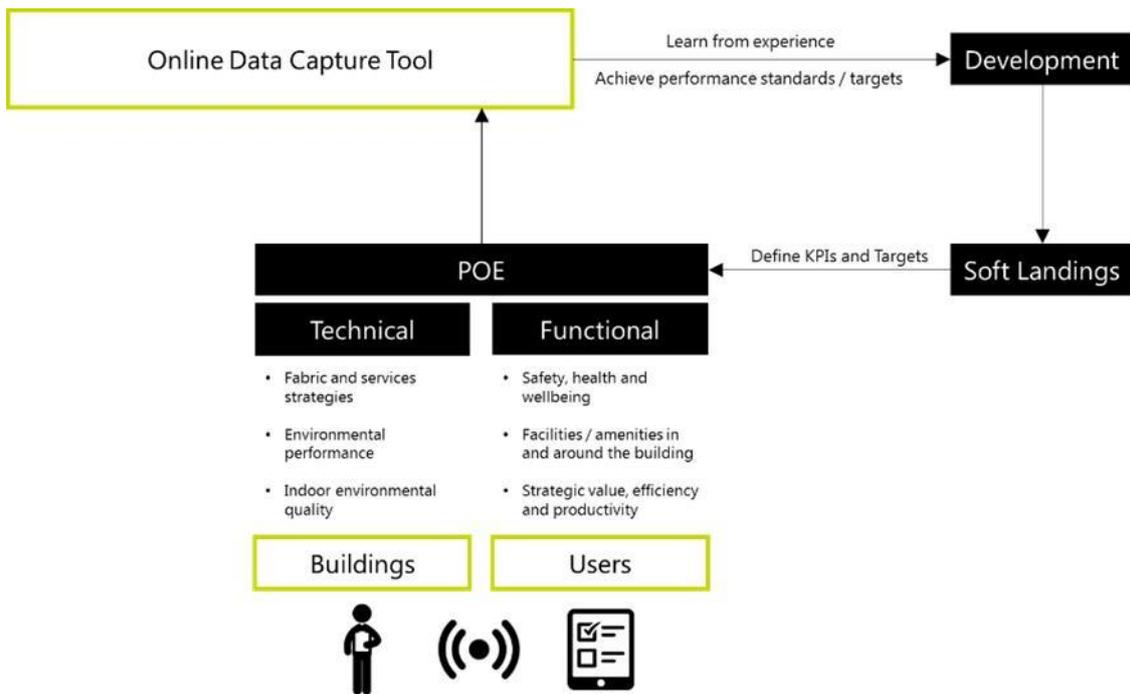


Figure 4.1: ‘Closing the loop’ - Iterative process to achieve performance objectives

The primary function of the ODCT would be for providing data from development to measure performance, enabling OPDC to derive insights and lessons learned for future sites. A secondary function and key driver of success as a data collection platform is to support engagement.

The ODCT offers a means to convey the results of the POE to occupants and to engage the community.

Further considerations

- User satisfaction – Expectations of occupants will develop in the future. The process (and tool) must be future-proof, flexible and scalable to changing trends;
- Environmental performance – Reviewed against benchmarks and targets. Performance must be conveyed to occupants in a meaningful way, illustrated in relation to cost, carbon, or relative to other units/developments;
- Community feedback – To encourage recurring visits to the ODCT, it must be relatable, informative (news and updates) and reactive (data-drive actions and insights), and should incorporate a community platform, discussed later in this section.

Defining the standards for the ODCT follows the initial steps of a typical software development process, as outlined in Figure 4.2. The following sections detail the requirements, user experience and user interface developed to meet the objectives for Post Occupancy Evaluation.

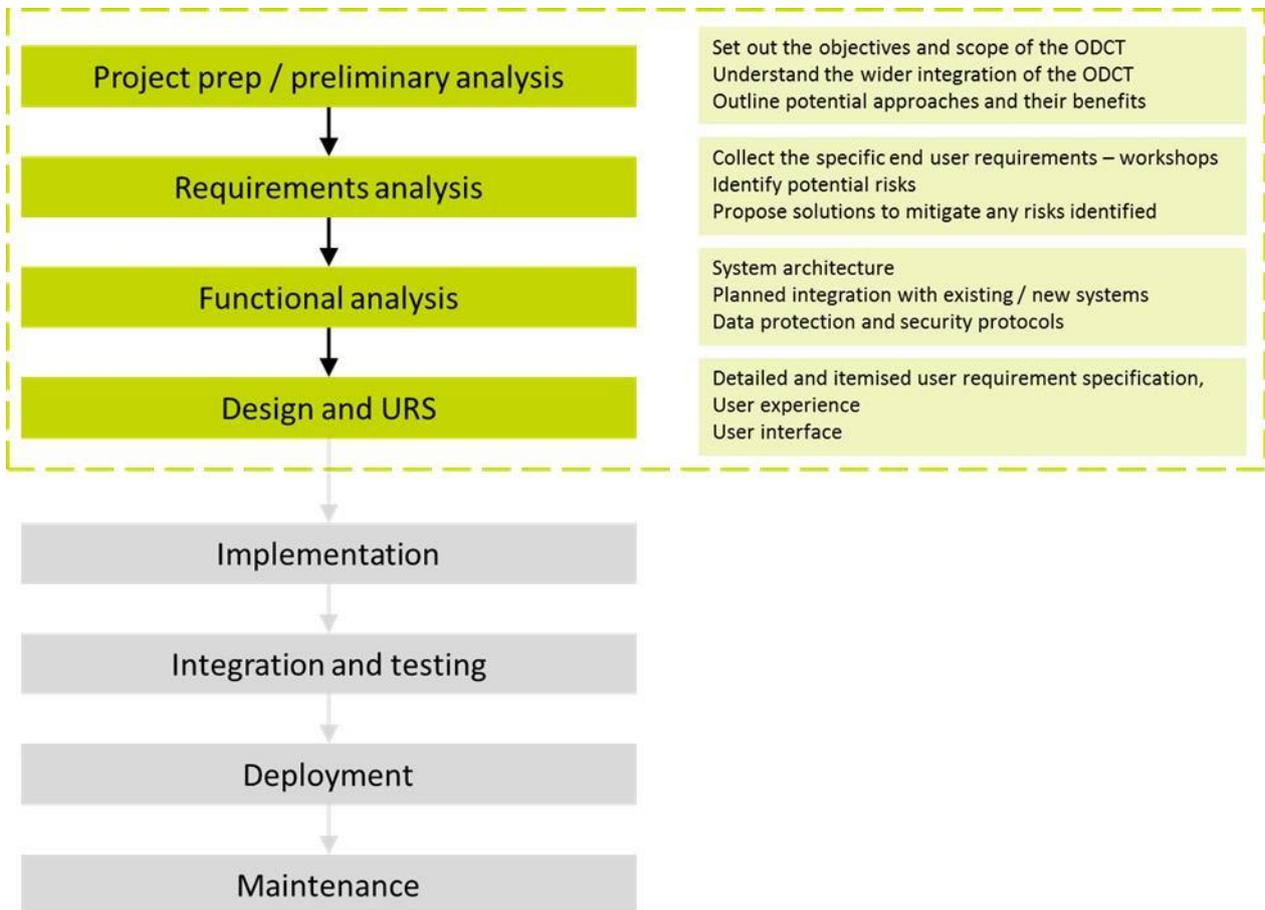


Figure 4.2: Typical software development process

3.2 Proposed ‘look and feel’ of the tool and user experience

Accounts and login

As a multi-user platform (occupants, developers, project team, OPDC), the ODCT must cater for the different requirements of each group and allow varied levels of access such that each user can benefit from and have access to relevant types of data and reporting.

To achieve this and to satisfy data protection regulations, it would be necessary to:

- Issue each user with an account login and password;
- Include a landing page with login functionality and introductory ‘About us’ and ‘Contact’ details (see Fig. 4.3);
- Restrict access to all other areas of the ODCT behind the password ‘wall’;
- Control access to different components of the ODCT based on the type of user account. For example, building occupants will be able to see their own data, plus aggregated results for whole buildings and whole neighbourhood. Developers will have access to the data for each individual unit.

There is an opportunity to add to the depth of data available to ‘trusted partners’ by incorporating additional datasets as part of the London DataStore and City DataStore, discussed further at the end of this section. Access to the more sensitive data will need to be controlled by appropriate account access. Other data protection regulations may apply and should be kept under constant review, especially as new regulations are introduced or existing ones are updated.

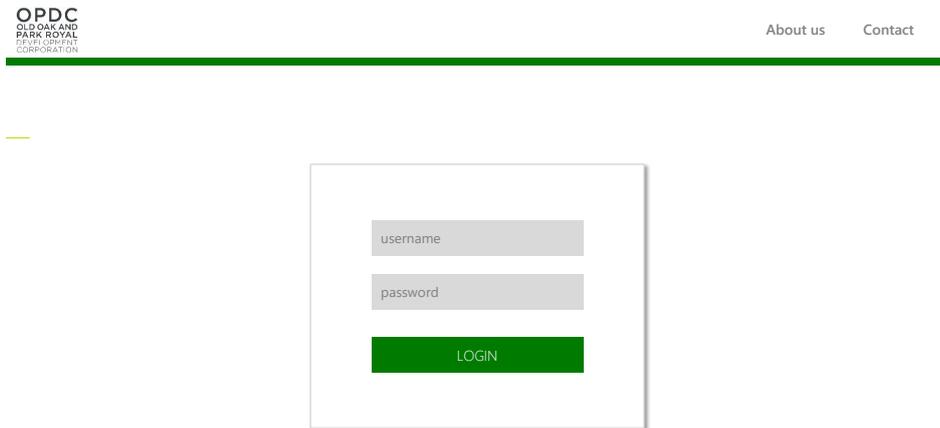


Figure 4.3: Common login portal for all users

The collection of large quantities of personal data requires ensuring data integrity and compliance with data protection regulations. In addition to the way in which accounts are used to restrict presentation of data, security and appropriate storage of data is critical.

Building occupants and organisations must have the choice to ‘opt in’ to sharing of data. Success in this area requires users to receive the appropriate reassurances in the ways in which their data will be used and shared, and be given a clear understanding of the benefits and specific outcomes arising from their decision to share their personal data.

It is envisaged that a common data standard can be developed with the support and engagement of GLA.

Considerations

- What data needs to be secured?
 - Personal demographic data – age group, gender, etc. will not be shared at a personal level;
 - Survey responses – will only be shared as part of an aggregated / anonymised data set;
 - Environmental performance – will not pass to future occupants of the same dwelling, i.e. data belongs to a user account and not a dwelling account;
 - Community discussions – are openly accessible to those with an account.

My Data (see Figure 4.4)

The content landing page provides an overview of the most relevant data, personal to the user, and presented with simplicity and clarity. For example, for a building occupant, this includes a choice of metrics, explored at different scales and for different groups. The page would contain the following components:

Introduction (Tell a story)

- Introductory text explains the vision for the development, and outlines the goal and benefits of the data collection process;
- It is also an opportunity to outline incentives and prize draws as a means of improving the response rate. Further detail of incentivising surveys can be found in the following report:
www.ipsos.com/ipsos-mori/en-uk/new-research-ipsos-mori-and-office-national-statistics-ons
- It sets the scene for the benefits of Post Occupancy Evaluation in jargon-free language.

3D viewport (Make it relatable)

- An interactive 3D viewport adds context and familiarity for users;
- By default, occupants see their building highlighted, with contextual information provided in tooltips;
- The viewport can be panned and zoomed to explore the development further;
- Each building can be clicked to reveal the relevant contextual information;
- Developers can select individual units and see relevant information.

Clear presentation of performance (Make it informative)

- Three dials beneath the viewport present relevant metrics at a personal level (My Place), at a block level (My Building), and at a community level (My Neighbourhood);
- For each dial, a dropdown menu allows selection of any accessible datasets made available to users;
- My Place – provides information for the user's specific unit;
 - Default metric is Energy Usage, but can be changed via the dropdown menu
 - Performance is presented relative to target values, i.e. how am I performing?
- My Building – shows aggregated data for the user's building
 - Data on other individual units within the building are not available to occupants;
 - Default metric is Overall Satisfaction, but can be changed via the dropdown menu;
 - Performance is presented relative to target values, i.e. how is my building performing?
- My Neighbourhood - shows aggregated data for the user's neighbourhood, including public realm
 - Default metric is Sense of Safety, but can be changed via the dropdown menu;
 - Performance is presented relative to other neighbourhoods in the same development, i.e. how does my neighbourhood rank in the wider development?

Filter by demographics (Make it reactive)

- Occupants can filter the dataset to be more relevant to their own demographic;
- Filtering by age, gender or number of bedrooms reduces the dataset to occupants meeting the filtered criteria, updating the performance values displayed for My Building and My Neighbourhood;
- To maintain anonymity of data, there will be a limit when filtering data to a minimum of five individual units. This is to ensure that data for individual units cannot be exposed by filtering the dataset to specific criteria.

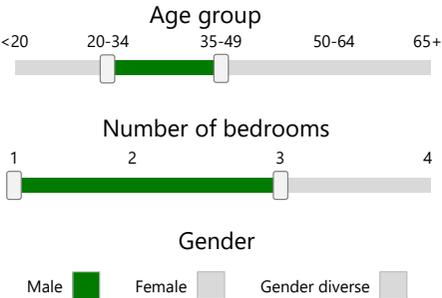
The proposed styling of the landing page aims to make the data-driven message immediately clear and obvious to users. Rather than relying on an understanding of the meaning of specific performance values, results are presented relative to clear targets on a sliding scale from 'good' to 'bad'.

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Text explaining the vision and benefits of the data collection



How are you performing?



My Place



My Building



My Neighbourhood



Figure 4.4: My Data summary. Example visualisation.

News (see Figure 4.5)

A key driver of continued engagement with the ODCT will be to provide relevant information to users, reflecting the position of occupants as an important part of the development process. There is a challenge in presenting and phrasing the data collection surveys in a meaningful way to building occupants. Incorporating a News section contextualises this data collection process. This can be achieved by tapping into existing resources such as the OPDC website, social media platforms and GLA communications.

The page would contain the following components:

News and updates

- News articles and community updates are directly related to the datasets being collected as part of the Post Occupancy Evaluation, and should be housed alongside the data collection and data sharing of the ODCT;
- Cross-platform integration with OPDC website, for example, ties the latest actions and improvements with the source of data driving those outcomes;
- Users can comment and share news articles.

Member statistics

- It is important to reflect to occupants that they are a part of a community, concerned with improving and maintaining their living environment;
- The News platform highlights the number of active members, comments and discussions, to reinforce the aspiration of a vibrant communication platform.

Newsletter subscription

- Subscription to a newsletter of the latest news and events should be encouraged;
- This serves the dual purpose of further spreading communication about the community, and as a reminder to occupants that they can visit the ODCT for further details and discussion;
- The idea of expanding the newsletter communication to include wider GLA scope should be explored further.

Social media feeds

- Increasingly, people expect to interact with services and systems in much the same way that they do with an app on their mobile phone. Social media integration offers a route to familiarity for users;
- Incorporating embedded Twitter feeds (or other existing resources) should be considered as a quick-win to improved engagement.

Have your say on the latest OPDC activities, events and blogs

41,761
Members



10,667
Comments



495
Discussions



Keep informed of OPDC news and events by receiving our newsletter



The Power of Partnership Working



Read our guest blog from Lisa Sharp, one of our partner organisations that we worked closely with as part of our activities at MIPIM 2018, where we promoted investment and opportunities in west London, with West London Business (WLB), AECOM, Fairview New Homes, L&Q, Kier Group, SEGRO Plc, CoStar Group and Sharp Business Insights.

Read more...

My experience as an Apprentice at OPDC



Over the last few years, OPDC has taken part in the GLA Apprenticeship programme. Our most recent Apprentice, Iqra, is now almost at the end of the year with us and has shared her thoughts and experiences of the scheme and working here.

Read more...

Great Place Scheme Community Briefing and Brainstorming event



On 6 March 2018, local residents, businesses and artists came together to share ideas at our first Great Place Scheme event. The three-year project is an ambitious and community-focused project funded by the Heritage Lottery Fund and Arts Council England.

Read more...

Park Royal's hidden gems



As part of OPDC's ongoing activity and engagement with businesses in Park Royal, a number of the team went on a tour arranged by SEGRO to meet a number of the diverse and interesting businesses that are located within London's largest industrial area

Read more...

Draft Local Heritage Consultation Event



On 21 February 2018, we held an event in Harlesden, just north of our boundary area, to inform the community on our draft Local Heritage Listings Consultation. The purpose of this consultation is to give the local community the opportunity to shape the Local Heritage Listings for this part of west London. The consultation closed on 22 March 2018.

Read more...

Our Second Community Forum Event



Our second Forum event was held at the end of 2017 and enabled the OPDC team to meet with, update and chat to local residents, charities, and businesses about proposed developments, progress and activities in the Old Oak and Park Royal area.

Read more...

Follow us on Twitter
@oldoakparkroyal



Figure 4.5: News, updates, and social media engagement. Example visualisation.

Survey (Figure 4.6)

A minimum requirement of the process outlined in this document is to conduct user satisfaction surveys. These surveys should be completed at intervals of 1-2 years, starting 1-1.5 years after occupation. Recurring assessments are recommended every 3-5 years, thereafter, highlighting the importance of community engagement and repeat visits to the ODCT.

Responses to questions and analysis of the answers are based on a multiple-choice structure, with some opportunities for occupants to word additional answers as they see appropriate.

The page would contain the following components:

Introduction

- Introductory text makes the purpose of the survey clear and transparent for the user;
- It offers reassurance of what is to be done with the data provided, how it will be shared, and the benefits of completing the satisfaction survey.

User satisfaction survey

- Templates for residential and non-residential satisfaction surveys have been prepared as part of this commission. They have been designed for clarity and simplicity, avoiding technical jargon and tailored for building occupants;
- The Survey section of the ODCT would be structured as written in the template documents, potentially split into the following categories of multiple choice questions, including:
 1. Background;
 2. Temperature;
 3. Air quality;
 4. Lighting;
 5. Noise;
 6. System controls;
 7. Safety and accessibility;
 8. Facilities and amenities;
 9. General (not covered by other categories).
- Occupants can return to an incomplete survey to add further responses;
- For each round of surveying, survey questions are pre-populated with the responses previously provided. It is recommended where possible that an electronic survey format be used to facilitate this process;
- If a unit has changed occupier between surveys, previous responses will not be provided

Acceptance of data sharing

- On completion of all questions, users will be given the opportunity to 'opt in' for their data to be shared;
- Survey responses from those who decline to 'opt in' will not be included in the aggregated data displayed in the My Data section of the ODCT;
- The surveys and data collection should be conducted to comply with Market Research Society code of conduct.

Environmental Performance (Figure 4.7)

As discussed, energy and water reporting need to be completed by the following groups:

- Building managers/owners are responsible for obtaining energy and water data for common parts including landlord services. Data for individual dwellings will need to be collected separately, for a target of 20% of all dwellings within a building. All data will require the appropriate consent to be obtained;
- Building managers/owners and/or tenants of non-residential buildings will provide their readings, in addition to any communal use and/or central systems, to either be included within a contractual lease agreement and/or incentivised through provision of access to view and compare data on the ODCT.

Online data capture for energy performance covers each of these three areas through a single portal, linked to the user's account to ensure it is building or unit specific.

The page would contain the following components:

Introduction

- Introductory text highlights the vision and targets for energy and water performance;
- Targets would be developed based upon the collected good practice data within the development and/or the previous year's performance for the building to incentivise direct improvement.
- It offers reassurance of what is to be done with the data provided, and how it will allow users to track their own historic energy use.

Energy performance readings

- The interface must be simple and familiar;
- Previous readings will be displayed to show the historic trend and improvement / worsening in energy usage;
- This portal only shows personal data, specific to the user. Energy performance of other units is not shared at a personal level, and is only shown as part of aggregated data in the My Data tab.

Considerations

- Greater granularity of data could be provided by integrating with Smart meters for automatic data collection;
- This will require an 'opt In' agreement from occupants to share their data in this way;

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Text explaining energy performance and what is to be done with the data

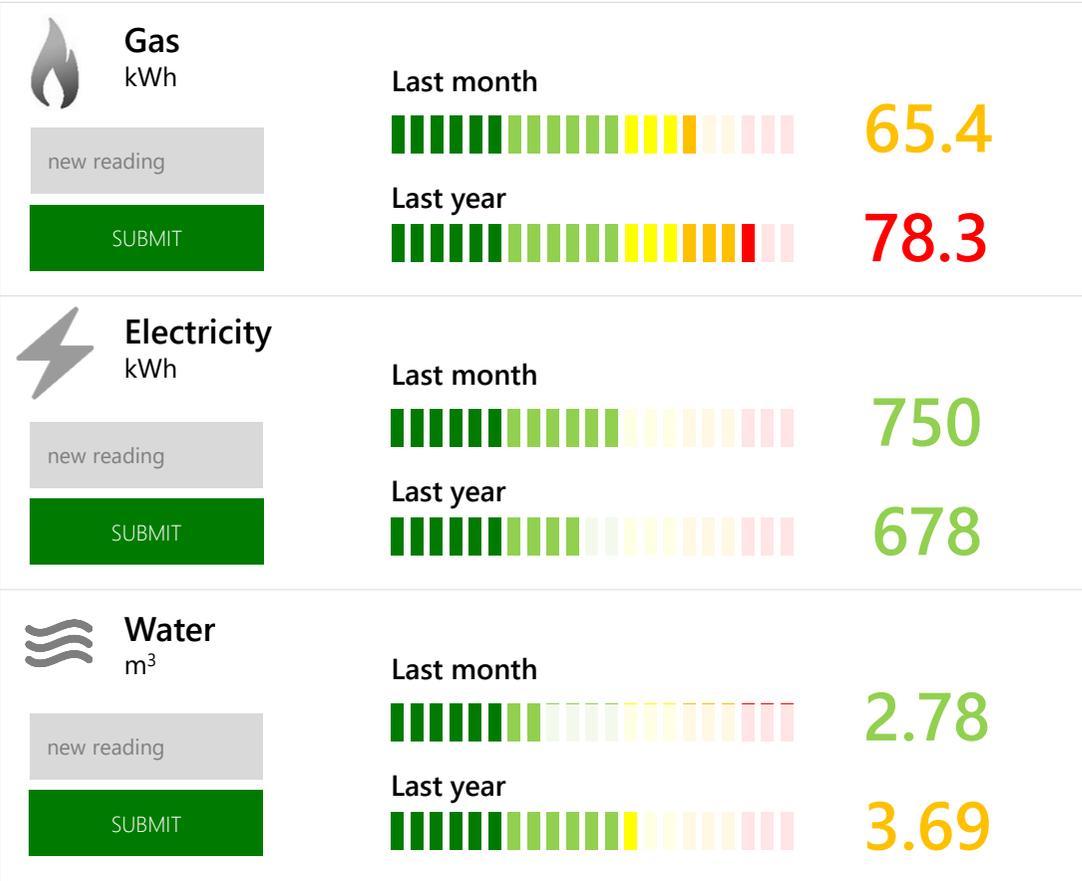


Figure 4.7: Environmental performance monitoring. Example visualisation.

Community

Improving engagement and increasing response rates to surveys is achieved by making participation easy and quick. By accelerating the feedback process with a dynamic, web-based toolset, the ODCT offers potential to improve developments even as they are being constructed by better understanding the needs and perceptions of the occupants.

It is about building a level of trust and ‘buy-in’ from the community to expand the depth of understanding. User satisfaction surveys and energy performance monitoring are prescriptive, both in terms of their content and, to some extent, the timing of responses. There is an opportunity to reach much further by incorporating a free-form feedback and discussion platform. This either can be a bespoke component of the ODCT developed specifically for this purpose, or achieved through cross-platform integration with existing technologies, such as Commonplace.is (see Figure 4.8)

Considerations

- A web platform such as Commonplace.is could be embedded within the Community tab of the ODCT, creating a single home for all aspects of online data capture;
- Such a tool would allow for specific placement of ‘pins’ in locations where occupants have concerns or feedback, viewable by other occupants who may share the same sentiment and wish to comment further;
- This approach also offers the opportunity for developers to respond directly to comments and provide evidence of the way in which concerns are being addressed.

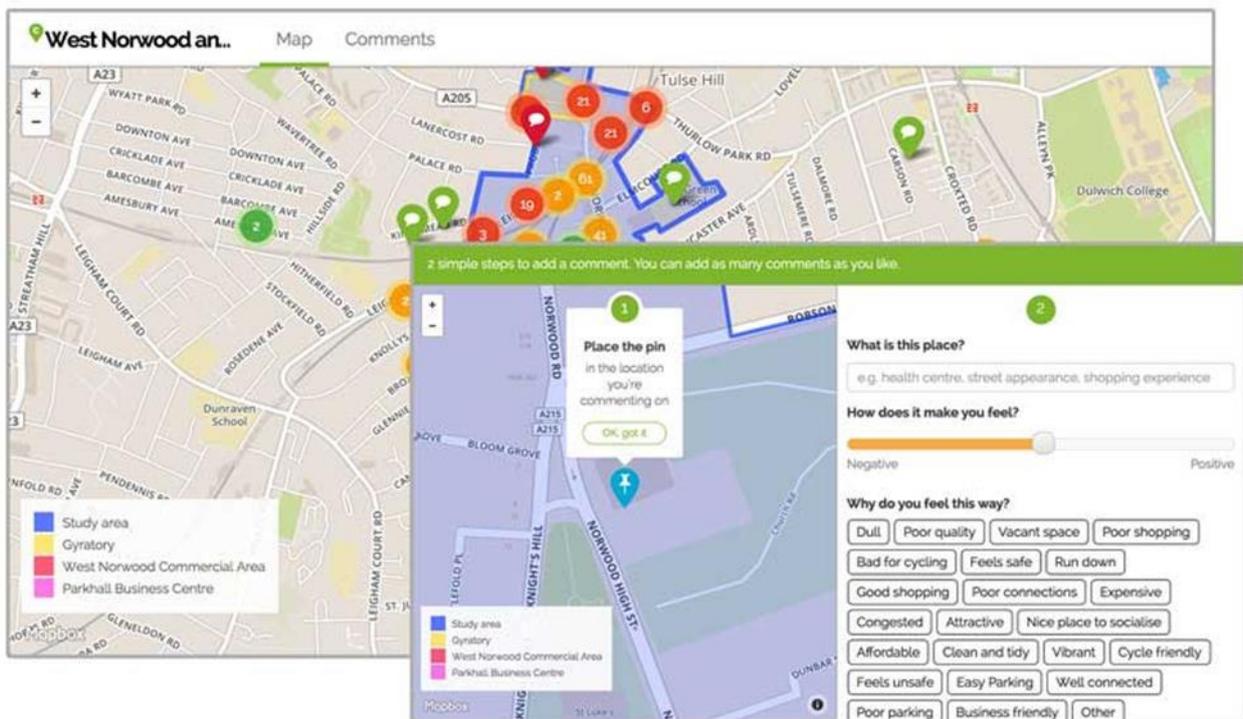


Figure 4.8: Commonplace – an example of a community discussion and feedback portal

3.3 Implementation with London DataStore

Data supplied directly through the ODCT has been considered as a driver of insights as part of the Post Occupancy Evaluation process. However, there is an opportunity to expand the scope by incorporating additional relevant data sets in the following three categories:

- Survey responses, occupant supplied energy and water performance, (Current scope);
- Expansion of the above to include community discussions and greater flexibility to support more granular datasets, end-use breakdowns and reporting frequencies;
- Additional, readily available data such as air quality, noise pollution and transport patterns (London DataStore);
- Sensor data, exploiting the rapid growth in Smart technologies and Smart sensors at a city scale (GLA target).

Incorporating these additional sources can lead to the following benefits:

- A better understanding of context and quantitative site performance;
- Deeper understanding of correlations between site performance and people's perceptions of performance;
- A holistic view of a 'day in life' of each development;
- New insights to develop city-wide, outcome-based decision making, working with GLA.

To this end, it is recommended to further explore collaboration with the London DataStore and twinned City DataStore to tap into new resources and future technologies. Additionally, storing of survey responses and environmental performance data as a part of the London DataStore should be discussed further as a means of ensuring consistent data protection.

3.4 User requirements specification

The next section of the report contains the user requirements specification for the OPDC data platform. This outlines all of the functional requirements for the tool including technical descriptions, as well as an indication of which functions are core to the planning requirements.

3.5 Next steps

The next steps to develop the data platform include:

- Further conversations should take place with London DataStore and City DataStore. Discussions during the scope of this work have highlighted the potential for integrating the ODCT with existing additional datasets, held as part of the London DataStore. These extra data sources, including transport, environment, crime and community safety, can help to provide occupants with a more engaging and holistic view of their development;
- Commonplace provide a well-established platform for local community engagement during planning stages. As part of this phase of work, discussions with Commonplace have explored the opportunity to embed Commonplace within the ODCT as a means of providing residents with a purpose-built community platform for discussion. A decision between integrating with an existing tool and building a bespoke platform should be considered;
- Prior to development and implementation of the ODCT and conducting surveys, plans should be discussed further with GLA Opinion Research team in the context of Market Research Society code of conduct and GDPR compliance.

4 POE ODCT Platform - User Requirements Specification

A: General requirements								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
A1.1	Web hosting	-	The tool will be accessible through a web browser via a unique address (URL to be confirmed)	The tool will be optimised for Google Chrome but will operate fully on all web browsers	During development, a temporary web link will be created to share work in progress	Must	✓	-
A1.2	Web access	-	The tool, and all data, will not be available to users in offline mode, i.e. an internet connection is required for access	-	-	Should	✓	-
A1.3	Tool lifecycle	-	Data will be added to the tool for a duration of at least 5 years	Tool maintenance will be required for this period as a minimum	-	Must	✓	-
A1.4	Concurrent users	-	The tool must have sufficient capacity to function for a peak number of users (to be determined) without any appreciable change in performance	-	-	Must	✓	-
A1.5	Unique settings	-	As a user, when I return to the online data capture tool, my previous settings (see filtering etc.) should be saved from my previous session	-	This is considered most important for building managers who will expect to return to the tool frequently. Building occupants will have only occasional use.	Could	-	✓
A1.6	Log in / Log out	-	As a user, I log in and out of the tool, with no access to any level of data outside of this process	-	The design of the login portal should be restricted to information about the tool, it's purpose, and log in fields	Must	✓	-
A1.7	Change password	-	As a user, I can change my password from within the tool	-	-	Should	-	✓
A1.8	Functional evaluation	-	Conduct user satisfaction surveys. Surveys focus on understanding comfort within the spaces they use, the safety, accessibility, facilities and amenities the development and its surroundings provide	-	-	Must	✓	-

B: Data entry								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
B1.1	Survey data	Introduction questions	<p>A set of introduction questions is to be completed by all survey respondents. All subsequent questions are optional (but encouraged), with a clear statement of the likely time needed to complete the full survey.</p> <p>The survey should be possible to complete comfortably within the target maximum length of 16 minutes</p> <p>I can quit and return to the survey at any time</p> <p>The tool will facilitate manual entry of the following via multiple choice and text entry questions</p>		Occupants should be encouraged / incentivised to complete the full survey	Must	✓	-
B1.2	Survey data	Background	<p>Non-residential</p> <ul style="list-style-type: none"> - Gender - Age - Years worked in the building - Distance from workstation to the closest window - Working habits - Department and location of workstation <p>Residential</p> <ul style="list-style-type: none"> - Gender - Age - Type of building - Household composition - Size and location of home 	<p>When returning to the survey, my previous responses should not be made visible to me until I have completed the survey.</p> <p>Once the survey is completed, a summary of my answers and how they have changed since the last time I responded, will be presented</p>	All multiple choice questions have the option to respond 'don't know' or 'not applicable'	Must	✓	-
B1.3	Survey data	Temperature	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to temperature and satisfaction with temperature during summer and winter			Must	✓	-
B1.4	Survey data	Controls	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to satisfaction with system controls (e.g. heating)			Must	✓	-

B1.5	Survey data	Lighting	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to satisfaction with artificial and natural light
B1.6	Survey data	Design, space and layout	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to satisfaction with appearance, size, layout and cleanliness
B1.7	Survey data	Air Quality	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to satisfaction with air quality
B1.8	Survey data	Noise	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to noise levels inside and outside the building. Additionally, space to enter a freeform text response to questions regarding the specific sources of noise related dissatisfaction
B1.9	Survey data	Safety and security	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to sense of safety in the home and public realm spaces, during the day and night
B1.10	Survey data	Water	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to the quality of water service provided to the home
B1.11	Survey data	Waste	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to storage, recycling, guidance and waste collections
B1.12	Survey data	Cycling	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to cycle storage, and safety when cycling or leaving a bike unattended
B1.13	Survey data	Public transport and traffic	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to public transport and volume of traffic on the nearby roads

Must	✓	-

B1.14	Survey data	Public areas and green space	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to maintenance and provision of landscaping and green public realm spaces			Must	✓	-
B1.15	Survey data	Identity and community	The tool will facilitate manual response to a set of multiple choice questions, on a sliding score scale, related to sense of community and services and communication from the local council			Must	✓	-
B1.16	Energy monitoring	Gas and electricity	The tool will facilitate manual entry of meter readings for energy usage	Energy use to be reported in kWh (to produce kWh/m ² data)		Must	✓	-
B1.17	Water monitoring	Water and waste	The tool will facilitate manual entry of meter readings for water usage	Water usage to be reported against a GLA target of 105 litres/person/day in dwellings	-	Must	✓	-
B1.16	Manual energy monitoring	Reminders	Occupants who have provided an email address will have the option to 'Opt In' to receive an email reminder when their latest meter readings are due to be supplied	-	-	Could	-	✓
B1.17	Automated energy monitoring	-	Automated data collection for energy and water usage is outside the scope of the proposed online data capture tool. Integration with established energy management platforms (e.g. Energy Deck, Demand Logic etc.) could be considered in the future	-	-	Could	-	✓

C: Design, data visualisation, and exploration								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
C1.1	Header bar	-	All sections of the tool have a common header bar containing the OPDC logo as a clickable 'Home' button, tabs for each section of the tool (see C1.2), and a 'Log out' button	-	-	Should	-	✓
C1.2	Tab selection	-	The header bar contains clickable tabs for 'My Data', 'News', 'Survey', 'Environmental performance', 'Community', and 'Help'. Each tab takes me to that section of the tool and remains highlighted while I am viewing that section	-	-	Should	-	✓
C1.3	My Data tab	Introduction	Introductory text explains the vision and benefits of the data collection process	-	-	Should	-	✓
C1.4	My Data tab	Site wide model	An interactive 3D viewport allows me to pan, zoom and rotate a model of the site, with my own building highlighted. I can click on a building to see its name	-	This is considered important to add context for users of the tool	Should	-	✓
C1.5	My Data tab	Dials	<p>Three dials are located beneath the 3D viewport, showing the following information at different scales:</p> <p>My Place – I can select from a list of metrics to show how my own unit is performing relative to target values</p> <p>My Building – I can select from a list of metrics to show how my building is performing relative to target values</p> <p>My Neighbourhood – I can select from a list of metrics to show how my neighbourhood is performing relative to other neighbourhoods in the same development</p>	It must not be possible to see data of any single unit other than my own dwelling	This comparison will show the % shortfall or surplus in performance for my unit / building and for the development as a whole	Should	-	✓
C1.6	My Data tab	Filtering	A selection of sliders allow me to filter the full data set to a smaller subset, more relevant to my own demographic. The displays on the three dials (see C1.5) update to reflect the reduced data set	-	This information, combined with community forums could provide occupants with information to determine the site wide ranking of	Should	-	✓

					performance of all buildings in Old Oak. Confidentiality of this information should be considered further, specifically in relation to the impact on marketability of units in underperforming buildings.			
C1.7	News	Articles	News articles and community updates related to the development are accessible to me through the tool. Users can comment and share news articles	Cross-platform integration with OPDC website, for example, ties the latest actions and improvements with the source of data driving those outcomes	-	Should	-	✓
C1.8	News	Stats and subscription	The News platform highlights the number of active members, comments and discussions, to reinforce the aspiration of a vibrant communication platform.	-	It is important to reflect to occupants that they are a part of a community, concerned with improving and maintaining their living environment	Should	-	✓
C1.9	News	Newsletter subscription	I can subscribe to an email newsletter to receive the latest updates from OPDC	-	Subscription to a newsletter of the latest news and events should be encouraged. This serves the dual purpose of further spreading communication about the community, and as a reminder to occupants that they can visit the tool for further details and discussion. The idea of expanding the newsletter communication to include wider GLA scope should be further explored	Should	-	✓

C1.9	News	Social media integration	Open source social media content, such as Twitter, can be incorporated within the online data capture tool to provide qualitative responses regarding the performance of the development.	-	Confidentiality and the possibility for unstructured and critical responses must be considered. It is suggested that occupants must 'Opt in' to have their messages published in the online data capture tool, and filtered to only include messages containing an Old Oak specific hashtag. Review and management of the content would be necessary	Should	-	✓
C1.10	Survey	Introduction	Introductory text explains the survey and what is to be done with my data	-	-	Should	✓	-
C1.11	Survey	Survey responses	I can complete the user satisfaction survey, as defined in items B1.1-B1.17 and I complete the survey one section at a time, such that only a small subset of questions is visible at any one time	-	-	Must	✓	-
C1.12	Environmental performance	Introduction	Introductory text explains the energy performance and what is to be done with my data	-	-	Should	✓	-
C1.13	Environmental performance	Meter readings	I can submit my meter readings for gas, electricity, water & waste, by entering values in text boxes. My previous readings are shown to me as a simple comparison of how my usage has changed	-	-	Must	✓	-
C1.14	Community	Integration	Community forums such as Google Groups will naturally exist for occupants of Old Oak. Incorporating a community platform within the online data capture tool would serve to improve user engagement, increase the user response rate, and tie qualitative discussions of the site wide performance to the database of information collected through user surveys and energy monitoring	Discussions with Commonplace should be further explored	Review and management of the content would be necessary	Could	-	✓

D: Data storage and protection								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
D1.1	User accounts	-	Each building manager, building occupant and developer will be issued with a username and password for unique access to the tool	Accounts will be user specific rather than unit specific, i.e. a new occupant will start a new account and not have access to previous data for that unit. Building managers will have access to all historic data from multiple occupants related to each unit.	User account information will be held by OPDC	Must	✓	-
D1.2	Terms and conditions	-	When users log in to the tool for the first time, they will be presented with terms and conditions related to the storage and protection of their data. As a user, I must tick a checkbox to acknowledge the terms and conditions before I can proceed further with the tool	Any changes to the terms and conditions during the lifespan of the tool will require a new prompt for users to accept the changes related to how their data will be stored and protected.	-	Must	✓	-
D1.3	Pre-populated data	-	When residents first access the online data capture tool, they will find certain data related to their dwelling pre-populated - Dwelling floor area - Number of bedrooms - Build date - Regulated energy These entries are editable by the resident, but will be used to inform benchmarking of the dwelling against similar dwellings within the development	It is the developers responsibility to pre-populate this information, prior to issuing account details to residents	-	Should	-	✓
D1.4	Revoked access	-	OPDC retain the right to revoke access to the tool for any user	-	Occupants who leave the development will have their account closed. A new account will be started for the new occupant of the dwelling	Must	✓	-

D1.5	Anonymised data	-	It must not be possible for any occupant to access data specific to any other occupant. All data shared for other units and buildings must be anonymised and aggregated	-	-	Must	✓	-
D1.6	Data collection	-	The survey and data collection must comply with the Market Research Society Code of Conduct and all relevant data protection regulations	-	-	Must	✓	-

E: User feedback and engagement								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
E1.1	User surveys	Mobile app	The process of completing the user surveys could be made more user friendly through the development of an accompanying mobile app. This app would improve user engagement and uptake of responses by presenting questions in a more familiar, accessible and manageable format.	-	A mobile app does not replace the functionality of data entry in the online data capture tool. Rather, it provides an alternative, to be highlighted to each building occupant as a means of improving the feedback rate.	Could	-	✓
E1.4	Feedback of actions	-	As an occupant (residential and non-residential), my engagement with the online data capture tool, and the building management, will be improved by the feedback of specific actions related to patterns revealed in the data collection. For example, the online data capture tool could highlight planned changes to the site to improve the feeling of safety in areas where occupants have raised concerns	-	-	Could	-	✓

F: Help								
ID	Category	Sub-category	Description	Technical	Other comments	Priority	Supports core POE planning targets	Supports additional engagement
F1.1	Documentation	-	Supporting text to explain the purpose of the tool and the reasons why it is important to capture relevant data should be made available to occupants. The need for written documentation explaining the functionality of the online data capture tool should be avoided through correct user interface and user experience of the design tool.	-	-	Must	✓	-
F1.2	On-board support	-	A brief Help section will provide basic detail of what each section of the tool is to be used for, plus contact information for any further concerns or questions. Tooltips will be used through the tool to provide one-line description of each piece of functionality	-	-	Must	✓	-

[End of user requirements specification]

RESIDENTIAL USER SURVEY

INTRODUCTION QUESTIONS

The following survey has been developed by Old Oak and Park Royal Development Corporation (OPDC) to gather feedback on what residents like the most and the least in their homes, the building they live in and the immediate neighbourhood. The results of the survey will be used to support the development of future buildings and public facilities in the area, as well as identifying any issues that require attention. All questions are optional and we would be very grateful if you could take the time to complete as much as you can. The data from the survey will be collected by OPDC and will be processed and anonymised. Anonymised findings may be communicated publicly.

<NAME OF CONSULTANT/COMPANY> is carrying out this survey on behalf of OPDC. Please email <EMAIL ADDRESS>, if you have any questions or comments about the survey.

Thank you for your time. We really value your feedback.

		-3	-2	-1	0	+1	+2	+3	n/a	?
How satisfied are you with your...	home?	Dissatisfied		<input type="checkbox"/>	Satisfied					
	building?	Dissatisfied		<input type="checkbox"/>	Satisfied					
	immediate neighbourhood?	Dissatisfied		<input type="checkbox"/>	Satisfied					

We would really appreciate it if you could answer additional questions about your home and immediate neighbourhood. These questions will take around 15 minutes to answer.

ADDITIONAL QUESTIONS

How do you identify your gender? <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Other <input type="checkbox"/> Prefer not to say	What type of residential building do you live in? <input type="checkbox"/> Flat <input type="checkbox"/> Terraced <input type="checkbox"/> Semi-detached <input type="checkbox"/> Detached <input type="checkbox"/> Other ___	Does your home have openable windows on two or more external walls? <input type="checkbox"/> Yes <input type="checkbox"/> No Do you live with children? <input type="checkbox"/> Yes <input type="checkbox"/> No
What is your age? <input style="width: 50px; height: 20px;" type="text"/>	How many bedrooms are there in your home? <input style="width: 50px; height: 20px;" type="text"/>	How many people including yourself live in your household? <input style="width: 50px; height: 20px;" type="text"/>
How many years have you lived in this building? <input style="width: 50px; height: 20px;" type="text"/>	On which floor(s) is your home? <input style="width: 50px; height: 20px;" type="text"/>	How many hours are you at home (including sleeping) during a typical... weekday? hours <input type="checkbox"/> <8 <input type="checkbox"/> 8-12 <input type="checkbox"/> 12-16 <input type="checkbox"/> 16-20 <input type="checkbox"/> 20+ weekend? hours <input type="checkbox"/> <8 <input type="checkbox"/> 8-12 <input type="checkbox"/> 12-16 <input type="checkbox"/> 16-20 <input type="checkbox"/> 20+

		-3	-2	-1	0	+1	+2	+3	n/a	?
How would you describe temperatures in your home during...	winter?	Too hot		<input type="checkbox"/>	Too cold					
	summer?	Too hot		<input type="checkbox"/>	Too cold					
How would you describe temperatures in communal corridors during...	winter?	Too hot		<input type="checkbox"/>	Too cold					
	summer?	Too hot		<input type="checkbox"/>	Too cold					
Is your home slow or quick to heat up during winter?	Slow	<input type="checkbox"/>	Quick	<input type="checkbox"/>						
Is your home slow or quick to cool down during summer?	Slow	<input type="checkbox"/>	Quick	<input type="checkbox"/>						

Lighting

-3 -2 -1 0 +1 +2 +3 n/a ?

How satisfied are you with the...	amount of electric lighting?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	brightness of electric lighting?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	amount of daylight?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
Are blinds/shutters effective or not effective in blocking out glare (direct daylight)?		Not effective	<input type="checkbox"/>	Effective	<input type="checkbox"/>	<input type="checkbox"/>						

Air quality

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the air quality...	in your home?	<input type="checkbox"/>									
	in your local area?	<input type="checkbox"/>									
How satisfied are you with air movement within your home during...	winter?	<input type="checkbox"/>									
	summer?	<input type="checkbox"/>									
How satisfied are you with odours within your home during...	winter?	<input type="checkbox"/>									
	summer?	<input type="checkbox"/>									

Controls

-3 -2 -1 0 +1 +2 +3 n/a ?

How satisfied are you with the user guidance provided for your home?		Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How easy is it to use your controls for...	lighting?	Difficult	<input type="checkbox"/>	Easy	<input type="checkbox"/>	<input type="checkbox"/>						
	hot water?	Difficult	<input type="checkbox"/>	Easy	<input type="checkbox"/>	<input type="checkbox"/>						
	heating?	Difficult	<input type="checkbox"/>	Easy	<input type="checkbox"/>	<input type="checkbox"/>						
	cooling?	Difficult	<input type="checkbox"/>	Easy	<input type="checkbox"/>	<input type="checkbox"/>						

Design, space and layout

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the...	appearance of the building?	<input type="checkbox"/>									
	the view to the outside?	<input type="checkbox"/>									
	cleanliness of common areas?	<input type="checkbox"/>									
	size of your home?	<input type="checkbox"/>									
	internal layout of your home?	<input type="checkbox"/>									
	amount of storage in your home?	<input type="checkbox"/>									
	size of private spaces (e.g. balcony)?	<input type="checkbox"/>									

Noise

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the noise...	levels in your home?	<input type="checkbox"/>									
	from other rooms?	<input type="checkbox"/>									
	from your neighbours?	<input type="checkbox"/>									
	from traffic?	<input type="checkbox"/>									
	from people outside?	<input type="checkbox"/>									
	from ventilation system?	<input type="checkbox"/>									
	from other sources?	<input type="checkbox"/>									

Safety and security			-3	-2	-1	0	+1	+2	+3		n/a	?
How satisfied are you with...	how secure your windows & doors are?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	the level of security in your building?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How safe do you feel in your home during...	the day?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	the night?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
How safe do you feel walking in the local area during...	the day?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	the night?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						

Water		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with the...	water pressure in your home?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	taste of drinking water?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	size of your bath/shower?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	recycled water system?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Waste		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with...	the amount of waste storage at home?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	how much you currently recycle?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	cleanliness of communal waste areas?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	access to communal waste areas?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	provided guidance on what can be recycled?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Energy and water use		Worry	-3	-2	-1	0	+1	+2	+3	Do not worry	n/a	?
Do you worry about your...	electricity bills?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	heating / hot water bills?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	water bills		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Cycling			-3	-2	-1	0	+1	+2	+3		n/a	?
How satisfied are you with the...	number of cycle spaces in the building?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	location and access to cycle spaces?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	number of public bicycles available?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
Do you feel safe when...	your bike is left unattended?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	cycling on the roads in the local area?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						

Public transport and traffic		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with...	the frequency of buses in the local area?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the walking distance to public transport?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the amount of car parking spaces?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the amount of motorbike parking?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the amount of traffic on the roads?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	car sharing schemes in the area?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Public areas and green space

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with...	the size and quality of parks/open space?	<input type="checkbox"/>								
	the walking distance to parks/open space?	<input type="checkbox"/>								
	how well landscapes are maintained?	<input type="checkbox"/>								
	number of water features?	<input type="checkbox"/>								
	cleanliness of local area?	<input type="checkbox"/>								
	variety of outdoor play areas?	<input type="checkbox"/>								

Public amenities

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the...	educational facilities in the area?	<input type="checkbox"/>								
	exercise facilities in the area?	<input type="checkbox"/>								
	health facilities (e.g. GP, dentist, hospital)?	<input type="checkbox"/>								
	community facilities in the area?	<input type="checkbox"/>								
	variety of leisure facilities in the area?	<input type="checkbox"/>								
	postal services in the area?	<input type="checkbox"/>								
	variety of shops in the area?	<input type="checkbox"/>								
	variety of healthy food outlets?	<input type="checkbox"/>								
	variety of restaurants in the area?	<input type="checkbox"/>								

Identity and community

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

Do you feel a weak or strong community spirit...	in your building?	Weak	<input type="checkbox"/>	Strong	<input type="checkbox"/>	<input type="checkbox"/>						
	in your local area?	Weak	<input type="checkbox"/>	Strong	<input type="checkbox"/>	<input type="checkbox"/>						
Do you think this area of London is affordable or unaffordable?		Unaffordable	<input type="checkbox"/>	Affordable	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the overall services of the local council?		Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the communication you receive from the local council?		Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						

Thank you for your time. Please use the space below to explain any **health, safety or financial concerns** you would like to raise that have been prompted by any questions in this survey. If you would like to be contacted by a member of OPDC regarding these comments, please leave your name, email address and/or telephone number. Your personal details will not be disclosed to any third party or processed as part of the survey findings.

Name _____ Email _____ Telephone _____

NON-RESIDENTIAL USER SURVEY

INTRODUCTION QUESTIONS

The following survey has been developed by Old Oak and Park Royal Development Corporation (OPDC) to gather feedback on what employees in the area like the most and the least in the building they work in and outdoor spaces. The results of the survey will be used to support the development of future buildings and public facilities in the area, as well as identifying any particular issues that require attention. All questions are optional and we would be very grateful if you could take the time to complete as much as you can. The data from the survey is collected by OPDC, processed and anonymised. The anonymised findings may be communicated publicly.

<NAME OF CONSULTANT/COMPANY> is carrying out this survey on behalf of OPDC. Please email <EMAIL ADDRESS>, if you have any questions or comments about the survey.

Thank you for your time. We really value your feedback.

		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a
How satisfied are you with your...	workplace?		<input type="checkbox"/>		<input type="checkbox"/>						
	the building you work in?		<input type="checkbox"/>		<input type="checkbox"/>						
	immediate outdoor surroundings by your place of work		<input type="checkbox"/>		<input type="checkbox"/>						

We would really appreciate it if you could answer additional questions about your workplace and immediate outdoor surroundings. These questions will take around 10 minutes to answer.

ADDITIONAL QUESTIONS

How do you identify your gender?	Yes	No						n/a	
<input type="checkbox"/> Male	Do you typically work at a desk?	<input type="checkbox"/>	<input type="checkbox"/>	What is your age?					<input type="checkbox"/>
<input type="checkbox"/> Female	If yes, do you hot-desk?	<input type="checkbox"/>	<input type="checkbox"/>	On which floor(s) do you work?					<input type="checkbox"/>
<input type="checkbox"/> Other	Does your workplace have air conditioning?	<input type="checkbox"/>	<input type="checkbox"/>	<1	1-3	3-7	7-15	15+	n/a
<input type="checkbox"/> Prefer not to say									
How many years have you worked in this building?	years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What is the distance from your place of work to the closest outside window?	meters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How many hours do you work in this building in a typical week?	hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approximately how many people work in the same room you work in?	no. of people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		-3	-2	-1	0	+1	+2	+3	n/a	?	
How would you describe the internal temperature at your workplace in...	winter?	Too hot	<input type="checkbox"/>	Too cold	<input type="checkbox"/>	<input type="checkbox"/>					
	summer?	Too hot	<input type="checkbox"/>	Too cold	<input type="checkbox"/>	<input type="checkbox"/>					
How would you describe temperatures in communal areas during...	winter?	Too hot	<input type="checkbox"/>	Too cold	<input type="checkbox"/>	<input type="checkbox"/>					
	summer?	Too hot	<input type="checkbox"/>	Too cold	<input type="checkbox"/>	<input type="checkbox"/>					
How much personal control do you have over the room temperature?	No control	<input type="checkbox"/>	Full control	<input type="checkbox"/>	<input type="checkbox"/>						
How does the temperature affect your productivity at work?	Negatively	<input type="checkbox"/>	Positively	<input type="checkbox"/>	<input type="checkbox"/>						

Air quality

-3 -2 -1 0 +1 +2 +3 n/a ?

Does the air at workplace feel stuffy or draughty?	Stuffy	<input type="checkbox"/>	Draughty	<input type="checkbox"/>	<input type="checkbox"/>						
Does the air at workplace feel damp or dry?	Damp	<input type="checkbox"/>	Dry	<input type="checkbox"/>	<input type="checkbox"/>						
<p style="text-align: center;">-3 -2 -1 0 +1 +2 +3 n/a ?</p>											
How satisfied are you with the air quality... at your workplace?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the air quality... in the local area?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How much personal control do you have over ventilation (e.g. opening windows)?	No control	<input type="checkbox"/>	Full control	<input type="checkbox"/>	<input type="checkbox"/>						
Does the air quality affect your productivity at work?	Negatively	<input type="checkbox"/>	Positively	<input type="checkbox"/>	<input type="checkbox"/>						

Lighting

-3 -2 -1 0 +1 +2 +3 n/a ?

How satisfied are you with the... amount of electric lighting?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the... brightness of electric lighting?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the... amount of daylight?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
Are blinds/shutters effective or not effective in blocking out glare (i.e. direct daylight)?	Not effective	<input type="checkbox"/>	Effective	<input type="checkbox"/>	<input type="checkbox"/>						
How much personal control do you have over light levels?	No control	<input type="checkbox"/>	Full control	<input type="checkbox"/>	<input type="checkbox"/>						
How does the light level affect your productivity at work?	Negatively	<input type="checkbox"/>	Positively	<input type="checkbox"/>	<input type="checkbox"/>						

Noise

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the... noise levels where you work?	<input type="checkbox"/>										
How satisfied are you with the... sound privacy where you work?	<input type="checkbox"/>										
How satisfied are you with the... noise from traffic?	<input type="checkbox"/>										
How satisfied are you with the... noise from people on the street?	<input type="checkbox"/>										
How satisfied are you with the... noise from nearby rooms?	<input type="checkbox"/>										
How satisfied are you with the... noise from ventilation systems?	<input type="checkbox"/>										
How satisfied are you with the... noise from other sources?	<input type="checkbox"/>										
How do noise levels affect your productivity at work?	Negatively	<input type="checkbox"/>	Positively	<input type="checkbox"/>	<input type="checkbox"/>						

Waste and recycling

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with... the facilities for waste and recycling?	<input type="checkbox"/>									
How satisfied are you with... how much waste you recycle?	<input type="checkbox"/>									
How satisfied are you with... cleanliness of external waste areas and bins?	<input type="checkbox"/>									
How satisfied are you with... provided guidance on what can be recycled?	<input type="checkbox"/>									

Water

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with the... taste of drinking water?	<input type="checkbox"/>									
How satisfied are you with the... overall plumbing in the building?	<input type="checkbox"/>									
How satisfied are you with the... recycled water system (e.g. toilet flushing)?	<input type="checkbox"/>									

Energy and water use

Dissatisfied -3 -2 -1 0 +1 +2 +3 Satisfied n/a ?

How satisfied are you with... how you are informed about energy use?	<input type="checkbox"/>									
How satisfied are you with... how your workplace reduces energy use?	<input type="checkbox"/>									
How satisfied are you with... how you are informed about water use?	<input type="checkbox"/>									
How satisfied are you with... how your workplace reduces water use?	<input type="checkbox"/>									

Safety and security			-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with...	the level of security inside the building?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	the level of security outside the building?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
How safe do you feel leaving the building during..	the day?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	the night?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
How safe do you feel walking in the local area during...	the day?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	the night?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						

Design, space and layout		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with the...	external appearance of the building?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	view to the outside from your workplace?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	cleanliness of common areas?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	size of your workplace?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	internal layout of your workplace?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	quality and comfort of office furnishings?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	amount of personal storage?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Cycling			-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with the...	number of cycle spaces for the building?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	location and access to cycle spaces?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	number of public bicycles available?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
Do you feel safe when...	showering and changing facilities?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						
	your bike is left unattended?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						
	cycling on the roads in the local area?	Unsafe	<input type="checkbox"/>	Safe	<input type="checkbox"/>	<input type="checkbox"/>						

Public transport and traffic		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with...	the frequency of buses in the local area?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	your journey to/from work?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the distance to the nearest tube station?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the amount of traffic on the roads?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	car sharing schemes in the area?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Public areas and green space		Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
How satisfied are you with...	the size and quality of parks/open space?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	the walking distance to parks/open space?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	how well landscapes are maintained?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	number of water features?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	cleanliness of local area?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	variety of places to eat lunch outside?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
	variety of places to think and relax?		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						

Public amenities

	Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
exercise facilities in the area?	<input type="checkbox"/>										
health facilities (e.g. GP, dentist, hospital)?	<input type="checkbox"/>										
variety of leisure facilities in the area?	<input type="checkbox"/>										
variety of spaces to meet with other people?	<input type="checkbox"/>										
variety of shops in the area?	<input type="checkbox"/>										
variety of healthy food outlets?	<input type="checkbox"/>										
variety of restaurants in the area?	<input type="checkbox"/>										

How satisfied are you with the...

Identity and community

	Dissatisfied	-3	-2	-1	0	+1	+2	+3	Satisfied	n/a	?
Do you feel a weak or strong community spirit... in the local area?	Weak	<input type="checkbox"/>	Strong	<input type="checkbox"/>	<input type="checkbox"/>						
in your workplace?	Weak	<input type="checkbox"/>	Strong	<input type="checkbox"/>	<input type="checkbox"/>						
Does working in this area have a positive or negative impact on your job satisfaction?	Negative	<input type="checkbox"/>	Positive	<input type="checkbox"/>	<input type="checkbox"/>						
Do you think this area has a positive image to visitors?	Negative	<input type="checkbox"/>	Positive	<input type="checkbox"/>	<input type="checkbox"/>						
Do you think this area of London is affordable?	Unaffordable	<input type="checkbox"/>	Affordable	<input type="checkbox"/>	<input type="checkbox"/>						
How satisfied are you with the overall services of the local council?	Dissatisfied	<input type="checkbox"/>	Satisfied	<input type="checkbox"/>	<input type="checkbox"/>						

Thank you for your time. Please use the space below to explain any **health or safety concerns** you would like to raise that have been prompted by any questions in this survey. If you would like to be contacted by a member of OPDC regarding these comments, please leave your name, email address and/or telephone number. Your personal details will not be disclosed to any third party or processed as part of the survey findings.

Name _____ Email _____ Telephone _____

NON-RESIDENTIAL CARBON COMPLIANCE TEMPLATE

DETAILED PLANNING STAGE

OPDC - POE carbon compliance evaluation

Detailed planning stage template - Non residential

Development:	
Author:	
Organisation:	
Date:	
Revision:	

Note 1: Energy used by equipment does not count towards the total energy use when calculating carbon dioxide emissions
 Note 2: The total energy use to determine regulated CO2 is net of any electrical energy displaced by CHP generators, if applicable.

Regulated figures

Ref	Property Type (e.g. Office, retail)	Address1	Address2	Address3	City	Postcode	Total Floor Area m ²	Air permeability m ³ /(m ² hr)@50Pa	Regulated energy consumption by end use					Energy production by technology				See Note 1&2		Overheating	Daylighting				
									Heating kWh/m ² /year	Cooling kWh/m ² /year	Auxiliary kWh/m ² /year	Lighting kWh/m ² /year	Hot water kWh/m ² /year	Equipment kWh/m ² /year	Photovoltaic kWh/m ² /year	Wind kWh/m ² /year	CHP kWh/m ² /year	Solar thermal kWh/m ² /year	Regulated emissions, Notional kgCO ₂ /m ² /year	Regulated emissions, Actual kgCO ₂ /m ² /year	Occupied spaces (daytime) – % passing TM52	% occupied spaces achieving av. DF of 2%			
-		-	-	-	-	-																			

Extend rows as necessary

Operational calculations (Floor area above 1,000m²)

Ref (as listed above)	Primary energy source (e.g. electricity)	Operational energy estimate (kWh/m ² /year)		
		Low-end	Mid-range	High-end
Operational energy by end use	Lighting			
	Lifts & Escalators			
	Small Power			
	Catering			
	Server Rooms			
	Other Equipment			
	Domestic Hot Water (fossil)			
	Domestic Hot Water (elec)			
	Heating			
	Cooling			
	Fans/AHUs			
	Pumps/controls/heat rejection			
	Humidification			
	Renewables (electric)			
Renewables (thermal)				
Total kWh/m ² /year	Total electric energy (kWh/m ² /year)			
	Total thermal energy (kWh/m ² /year)			
Total MWh/year	Total electric energy (MWh/year)			
	Total thermal energy (MWh/year)			

Copy and paste table below as necessary

NON-RESIDENTIAL CARBON COMPLIANCE TOOL

AS-BUILT (RIBA STAGE 6)

OPDC - POE carbon compliance evaluation

As built template (RIBA Stage 6) - Non residential

Development:	
Author:	
Organisation:	
Date:	
Revision:	

Note 1: Energy used by equipment does not count towards the total energy use when calculating carbon dioxide emissions
Note 2: The total energy use to determine regulated CO2 is net of any electrical energy displaced by CHP generators, if applicable.

Regulated figures

Ref	Property Type <small>(e.g. Office, retail)</small>	Address1	Address2	Address3	City	Postcode	Total Floor Area m ²	Air permeability m ³ /(m ² ·hr)@50Pa	Regulated energy consumption by end use					Energy production by technology				Regulated emissions, Notional kgCO ₂ /m ² /year	Regulated emissions, Actual kgCO ₂ /m ² /year				
									Heating kWh/m ² /year	Cooling kWh/m ² /year	Auxiliary kWh/m ² /year	Lighting kWh/m ² /year	Hot water kWh/m ² /year	Equipment kWh/m ² /year	Photovoltaic kWh/m ² /year	Wind kWh/m ² /year	CHP kWh/m ² /year			Solar thermal kWh/m ² /year			

Extend rows as necessary

Operational calculations (Optional)

Ref (as listed above)		Primary energy source <small>(e.g. electricity)</small>	Operational energy estimate (kWh/m ² /year)		
			Low-end	Mid-range	High-end
Operational energy by end use	Lighting				
	Lifts & Escalators				
	Small Power				
	Catering				
	Server Rooms				
	Other Equipment				
	Domestic Hot Water (fossil)				
	Domestic Hot Water (elec)				
	Heating				
	Cooling				
	Fans/AHUs				
	Pumps/controls/heat rejection				
	Humidification				
	Renewables (electric)				
Renewables (thermal)					
Total kWh/m ² /year		Total electric energy (kWh/m ² /year)			
		Total thermal energy (kWh/m ² /year)			
Total MWh/year		Total electric energy (MWh/year)			
		Total thermal energy (MWh/year)			

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