



OUR SERVICES

To help potential clients understand the journey to a Passivhaus or low energy building with Ecospheric, we have outlined our services below and divided them into five stages with additional optional services. You may wish to engage our services for the first stage initially to explore whether a Passivhaus or EnerPHit approach is the right fit for your project. After that, it is recommended to engage our services to the end of stage two in order to complete an initial energy model to determine the potential for carbon savings and provide a roadmap for your project team to follow. For those seeking maximum carbon savings, we can support you through the full Passivhaus design and certification process, delivering a quality assured and certified building. Each project and building is unique and we would be happy to provide a bespoke service offering which achieves your intentions and aspirations.

STAGE ONE - PROJECT INITIATION

Project familiarisation

This item covers project onboarding, offering an opportunity to familiarise relevant internal parties with the current proposal at depth and time to introduce ourselves to the design team and clarify how the working relationship will function.

- Review of documentation associated with project
- Initial feedback, noting points for clarification, answer questions and discuss the philosophy of approach, timeline/staging, lifestyle requirements, suitability of key technologies etc.
- Project team introductions, to establish preferred methods of communication, clarify expectations and understand dependencies

Passive design review & initial ideas

Holistic design describes a key principle necessary to the success of decarbonisation within the built environment. Holistic design highlights the interconnectivity between proposed interventions; how the effectiveness of one measure is dependent on another. Piecemeal interventions typically have little real world effect, making the first step in any project the development of a long term plan.

As well as interconnectivity, Passive Design relates to a general design philosophy. Ecospheric has a three tier approach to design, firstly passive design, then fabric selection and upgrade and finally active technologies. For existing buildings passive design typically involves reviewing the design proposal to deliver a better performing building via design optimisation (site position, scale, massing, orientation/aspect, form factor, glazing ratios and free heat options, shading etc.). For newbuilds Ecospheric typically works with architects within the constraints applied by planning, client and the site to present a number of design options. Each of these options may focus on separate considerations. The following lenses may apply: 1) Cost to build; 2) Operational or embodied carbon; 3) Architectural purity; 4) Ease of ride through planning. This item can provide significant performance enhancement and cost reduction through design adjustments on plan. Improvements made at this stage offer the best value upgrade to both existing buildings as well as newbuilds.



STAGE TWO - DEFINING THE SUSTAINABILITY APPROACH

Initial PHPP Modelling (Required for both PassivHaus certification and low energy building design)

Passivhaus is in practice the world's highest performing building standard. Production of a comprehensive thermal analysis using the Passivhaus Planning Package (PHPP) will ensure that the proposed design and fabric specification is properly considered and the resulting performance specification can be trusted. Modelling a building in PHPP should be the first step with every building project, at any scale, to get a solid foundation for all future decisions. It accurately predicts the energy use and can help inform design.

This element of the process includes the following:

- Creation of an outline specification for all aspects of the building fabric and technology selection. The specific selection of required products and build ups will be derived from either the preliminary design work in stage two or Ecospheric's go to option for each missing item.
- Creation of an options table, populated with results produced using the draft PHPP model showing the exact effect of each individual possibility and some combinations in order to achieve the most cost effective solution to achieve the desired
- Production of a summary output presentation
- Allows for 2 hours of telephone/email correspondence with the design team. Assumes plans have been provided in .dwg (please note accurate plans are required if Passivhaus certification is to be sought).
- Also allows for a single PHPP model update to reflect revised proposal

STAGE TWO - OPTIONAL SERVICES

Comparison Studies

This item explores the relevant fabric selection and technology options available for the project, to facilitate the project team in choosing the most sustainable approach possible given the project constraints. This item also greatly strengthens any sustainability statement. It involves the creation of a series of comparison studies to clarify for the design team which options are suited specifically to the project being considered. In each case the options are broken down with associated pros and cons, costings (where available) and associated recommendations.

- **Fabric** - Researching suitable fabric options, calculating U-values and associated wall build-ups with wall thicknesses calculated
- **Foundations Review** - Comparison of floor and foundation options (suspended and solid) including an embodied carbon assessment and compatibility assessment
- **Glazing Approach** - Consideration given to passive lighting and shading solutions
- **Building Services Review and Technology Selection** - Outline specification and feasibility for DHW and cold water, space heating, ventilation, heat pump and PV array (rough generation calculation)
- **Renewable Energy Generation** - Research into suitable forms of energy generation, energy management options, PV panel and mounting types, and accurate calculation of generation potential accounting for shading effects

Sustainability statement in support of planning

- Creation of a supporting sustainability statement which, whilst not going into the precise details of mechanical engineering and calculations on energy performance, sets out the strategy for the development, what technologies, heat networks, energy generation and energy saving mechanisms will be implemented with clear evidence of innovation, broken down into the following sections:
 - High level project claims and certifications
 - Innovative technologies, methodologies and strategies
 - Operational and Embodied Carbon/Energy pledges
 - Energy conservation and fabric first approach (U-values)
 - Technology selection, heat networks and renewables
 - Site Biodiversity
 - Transportation
 - Occupancy and Building related Health
 - Water Saving technologies
 - Foul waste solutions
 - Waste minimisation strategy
 - Where applicable, local and national planning policy support



Site or online meeting attendance with Planners

Pre-planning and planning meetings often require attendance by the sustainability consultant in order to deliver a clear and infallible message around sustainability professionally answering any questions the local authority may have about the proposed scheme.

Embodied carbon analysis

PHribbon calculates Embodied CO₂ from Cradle to Grave, covering stages A-C (and D where information is available) and is suitable for initial estimates for the RIBA 2030 Challenge. This therefore includes :

- Stage A, A1-A3 Manufacture including A4 Transport to site and A5 Construction
- Stage B, Use of the building (including B4 Replacement)
- Stage C, Demolition and Disposal of the building
- And quoted separately Stage D, Reuse, Recycling potential (outside the usual scope of the main calculation)

This exercise can provide essential data for planning applications which are proposing a replacement dwelling

Extended Comparison Studies

Each of the comparison studies can be further extended looking at the following:

- *PHPP variants modelling* - This would allow us to use the official PassivHaus software to model a range of insulants or other technologies and compare the resultant performance in order to optimise selection. We can also apply a cost overlay that can look at cost benefit ratios.
- *Purchase and Supply* - With our very own in house CIPS chartered professionals and a background in running our own multi-million pound developments across a wide range of construction sectors we can happily help identify suitable product alternatives or suppliers occasionally with direct costings.
- *Research* - Our typical comparison studies work on the premise of commercially available solutions; however with our national network of universities and manufacturers, Ecospheric can identify novel solutions often suited to paragraph 80 projects.

M&E integration

Consideration of the integration of renewable energy and M&E elements for shared infrastructure, reduced operating costs, and increased efficiency

- Hot water sterilisation
- Underfloor (/inwall/ceiling) heating control profile (slab temp control for low energy applications)
- Space heating design for low temperature distribution and low demand spaces using comfort or performance design focus
- Feasibility review of materials and technologies submitted at pre-planning designs covering energy management and renewable energy generation, in order to maximise generation potential and self consumption
- Review of other energy opportunities or custom research projects, go on, challenge us!

Estate integration

This allows for a scoping exercise in order to consider the wider benefits of the proposals for a whole estate integration plan, where applicable. Integration of:

- Energy generation
- Energy management
- Infrastructure
- Landscape features
- Continuous cover deciduous planting schemes and other shading solutions
- Biodiversity net gain enhancements (note we do not offer certified net gain calculations)
- Walled garden/greenhouse technologies/methodologies and other food production aspects such as agronomy



STAGE THREE - DETAILED DESIGN

Building detailing support

- Support design team in creating specialist construction details required for submission to Passivhaus Institute using Ecospheric's 13 hat optimisation analysis which considers the following lenses:
 - Airtightness
 - Vapour control and moisture - Breathability (vapour diffusivity gradients), capillary activity, drying rate
 - Ease of Installation Weather tightness
 - Thermal conductivity
 - Thermal bridging
 - Durability
 - Aesthetics
 - Acoustics
 - Life cycle carbon - Sourcing, manufacturing and delivery of materials. Construction, operational use and replacement/maintenance. Finally end of life.
 - Structural
 - Building/product warranty
 - Maintenance - Ease, Cost and frequency
 - Fire

Model finalisation and certifier documentation (for Passivhaus certified buildings only)

Finalise PHPP model ready for submission to the PassivHaus Institut incorporating any site adjustments due to Architectural Instructions. Includes discussions with PassivHaus certifier in order to satisfy requirements (making any necessary amends) and coordination of upload of PHPP model to PassivHaus Institut with supporting documentation to obtain Design certificate from PassivHaus Institut.

Passivhaus Design Stage Certification (for Passivhaus certified buildings only)

At this stage a certificate will be issued that provisionally guarantees the granting of PassivHaus certification so long as the construction follows the plans. This element also includes the certifier fees associated with the final certification, listing on the international and national PH databases and an official PassivHaus Institut certification wall plaque.

STAGE THREE - OPTIONAL SERVICES

Thermal bridge modelling & Hygroscopic Modelling

- Thermal bridge modelling in THERM - if required by PassivHaus Institut to calculate Psi values of thermal bridges for entering into the PHPP software.
- Hygroscopic modelling in WUFI - Based on internal construction details.

Airtightness Strategy

- The strategy work associated with airtightness includes the following:
 - Construction strategy - Project phasing associated with the construction plan in order to create the necessary pause and test points to ensure an air tight construction.
 - Testing strategy - Whole building or compartmentalised approach to air tightness testing. Allows for design and location of test perimeters if compartmentalisation is necessary.

Building Services - *Note: We can also provide a review and integration service for building services designs provided by others*

● Hot water and cold water design and layout

- Use a PHPP module to estimate the DHW consumption based upon a nominal or pre agreed occupancy
- Carry out water efficiency calculations suitable for Part G of building regulations
- Size a system based upon the technology selection coming out of the technology review
- Produce an outline CAD layout for hot and cold water systems
- Create an outline specification and add into an M&E pack presentation

● Space heating design and layout

- Use PHPP space heating demand figures to calculate a rough whole house space heating energy demand and add contingency
- Modify PHPP space heating demand figures to size room specific heat emitters and associated network
- Size a system based upon the technology selection coming out of the technology review



- Allow for 30 minutes online meeting to understand clients expectations for control and preferred method of heat distribution
- Produce an outline CAD layout for distribution and heat emitters
- Create an outline specification and add into an M&E pack presentation
- **Ventilation design and layout**
 - Use the ventilation module within PHPP to estimate the air change rate for the dwelling
 - Produce an outline 3D CAD layout for distribution, identifying risers, inlets and extract points
 - Create an outline specification with associated air flow calculations and add into an M&E pack presentation
- **Electrical design and layout**
 - Online meeting to understand client's expectations for AV, smart house tech, ancillary appliances, internet connectivity (both wired and wireless) and other energy demands such as EV and water treatment
 - Use a PHPP module to estimate the electrical consumption
 - Size the development electrical demand ready for a connection application
 - Sketch a rough layout for fuse spurs covering appliances, EV, water treatment and plant equipment. Additionally mark on initial proposed positions for power sockets, ethernet and AV
- **Lighting design and layout**
 - Sketch a rough reflected ceiling layout for luminaires and associated switching logic (assuming a manual system, not smart lighting controls)
 - Create an outline lighting specification for the purposes of planning
- **Utility and road connections**
 - Planning requires confirmation from Highways, water utility providers and the DNO (Electricity provider) that the proposed developments can proceed as designed. Ecospheric can assist in running these processes:
 - Using the sizing exercise results, identify the correct DNO application process whether this is for supply only or to include generation
 - Process the DNO application to the point where initial enquiries have been satisfied and any connection costs and requirements determined
- **Specification of PV array and energy management review**
 - Array design aiming for maximum distributed energy generation for self consumption, or for export centric and energy managed systems the design will aim for maximum generation potential
 - Creation of specification for a suitable system
 - Review and recommendation of a suitable PV energy divert technologies (thermal solution, no battery)
 - Review and recommendation of a suitable battery based energy management system with separate electric car charging facility
 - Review and recommendation of a suitable Vehicle to Building (V2B) technology (integrated car charging solution)
- **Rainwater goods and drainage layout**
 - Optimisation of proposed rainwater goods and tie in with proposed ground drainage leading to a rainwater harvesting tank. Assumes CCTV drainage survey results are made available and contain identification and location of any public sewer on the site, a clearly marked site plan with surface water runs and gullies and also foul runs, rodding and access points with depth of run, gradient of run and condition for all underground drainage routes.
- **Rainwater collection and surface water discharge calculation**
 - Rainwater goods specification and design
 - Roof rainwater collection calculation
 - Storm water calculation
- **Rainwater harvesting sizing and calculations for the express purpose of greywater use**
 - Tank sizing calculation
 - Underground pipe layout
 - Typical design accounts for the flushing of toilets and outdoor taps, although can allow for other specific design requirements as necessary
- **Potable rainwater harvesting and treatment**
 - In order to progress off grid water, calculations associated with rainwater collection and storage are required and will conform to sizing for all bar 1 in 100 year drought situations



STAGE FOUR - CONSTRUCTION - ALL OPTIONAL SERVICES

Onsite Support - Toolbox Talks and Quality Control Visits

Training workshops designed to familiarise subcontractors with airtightness principles, building materials, and installation design:

- 1) Airtightness application workshop, appointment and training for the onsite airtightness champion. Covers membrane and tape use.
- 2) Thermal envelope toolbox
- 3) Air pressure testing, leak testing
- 4) Window and door installation and commissioning
- 5) MVHR ducting routing and commissioning

Quality control visits with photos taken for PHPP certification purposes. Please note additional photos will need to be taken during works and saved to a central location ready for submission. Contractors will also need to provide support in documenting the necessary proof of build process (Assume 5 x 1hr visits plus 3hr telephone discussion/photo review with contractors).

Support architect in producing Architectural Instructions

Technical advice based on site visits and feedback from building contractor to optimise construction detailing and build in order to achieve prescribed performance requirements

STAGE FIVE - POST-COMPLETION - ALL OPTIONAL SERVICES

Final Submission for Passivhaus Certification

- Final submission for PassivHaus certification including air pressure test result, upload material and installation photos and clarification around detail changes.
- Upload and distribution of key documentation and discussions with PassivHaus certifier as necessary.
- Please note additional photos will need to be taken during the construction period and saved to a central location ready for submission. With direction the contractor is often capable of providing the necessary proof.

Soft landings guide for occupants

- A document explaining how to live in a passive house or low energy building, technologies included, and basic maintenance of components

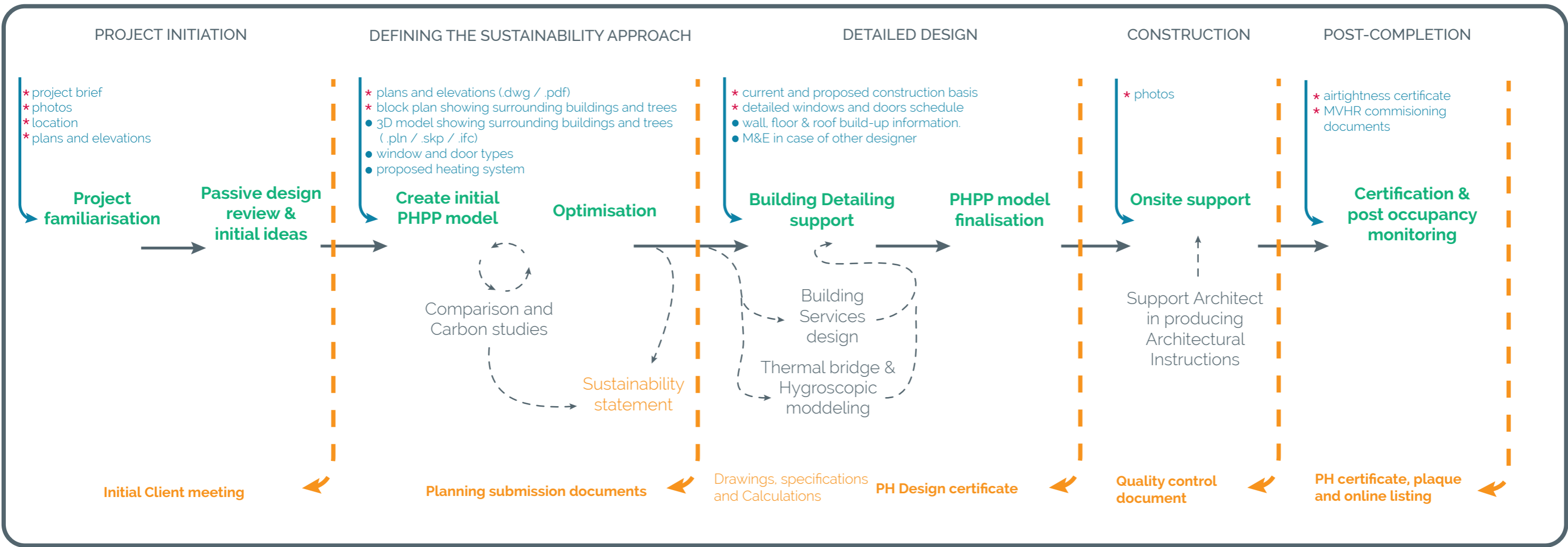
Post-completion analysis

- Calculate final building efficiency
- Air quality, wall moisture, and building fabric measurements

Post-occupancy analysis and support

- Energy use analysis
- Air quality and heating analysis





→ **Standard Services / process** - - - -> **Optional services** - - - -> **Output to client and request approval to continue** optional output → **Client input information** * **Essential Input** • **Nice to have**