



G2

CONSTRUCTION
& CONSULTANCY

Case Study



St Albans, Hertfordshire – Low Energy Residential Retrofit, with additions and alterations case study

G2 Construction and Consultancy Intellectual Property
Document



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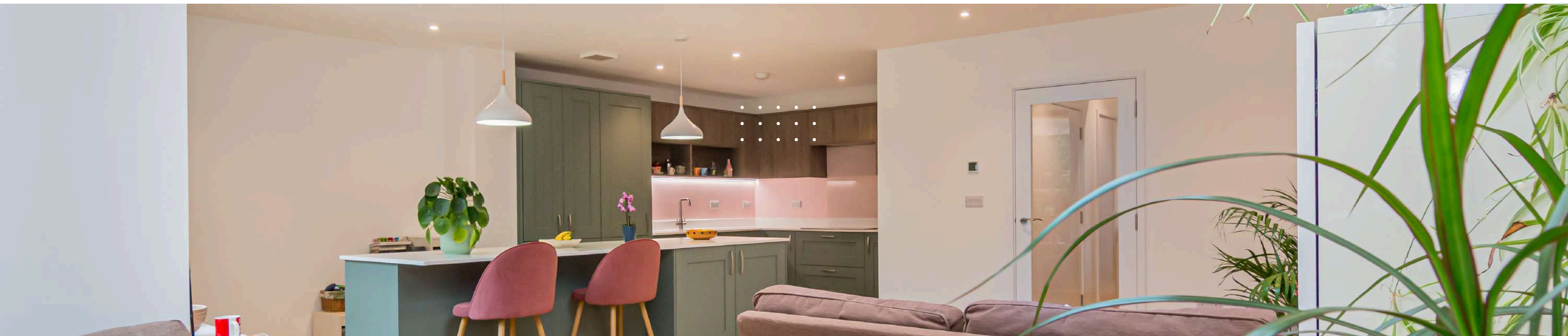


Executive Summary:

This project demonstrates the complete transformation of a 1940s semi-detached home from a cold, damp, and dysfunctional property with high running costs into a high-performance, low-energy dwelling.

Through our comprehensive LETI-focused renovation approach, we addressed fundamental issues including poor thermal performance, moisture problems, spatial inefficiencies, and an unusable conservatory, while dramatically improving internal layout and flow.

The renovation achieved exceptional energy performance reductions, eliminated damp issues, and created a comfortable, healthy living environment that showcases how post-war housing stock can be successfully upgraded to meet contemporary sustainability standards.





Project Background

This renovation project centered on revitalizing a typical 1940s semi-detached property that exemplified the common challenges facing Britain's post-war housing stock. The property presented multiple interconnected problems that had rendered it uncomfortable, inefficient, and costly to operate, requiring a holistic approach to achieve meaningful transformation.

Building Envelope Issues:

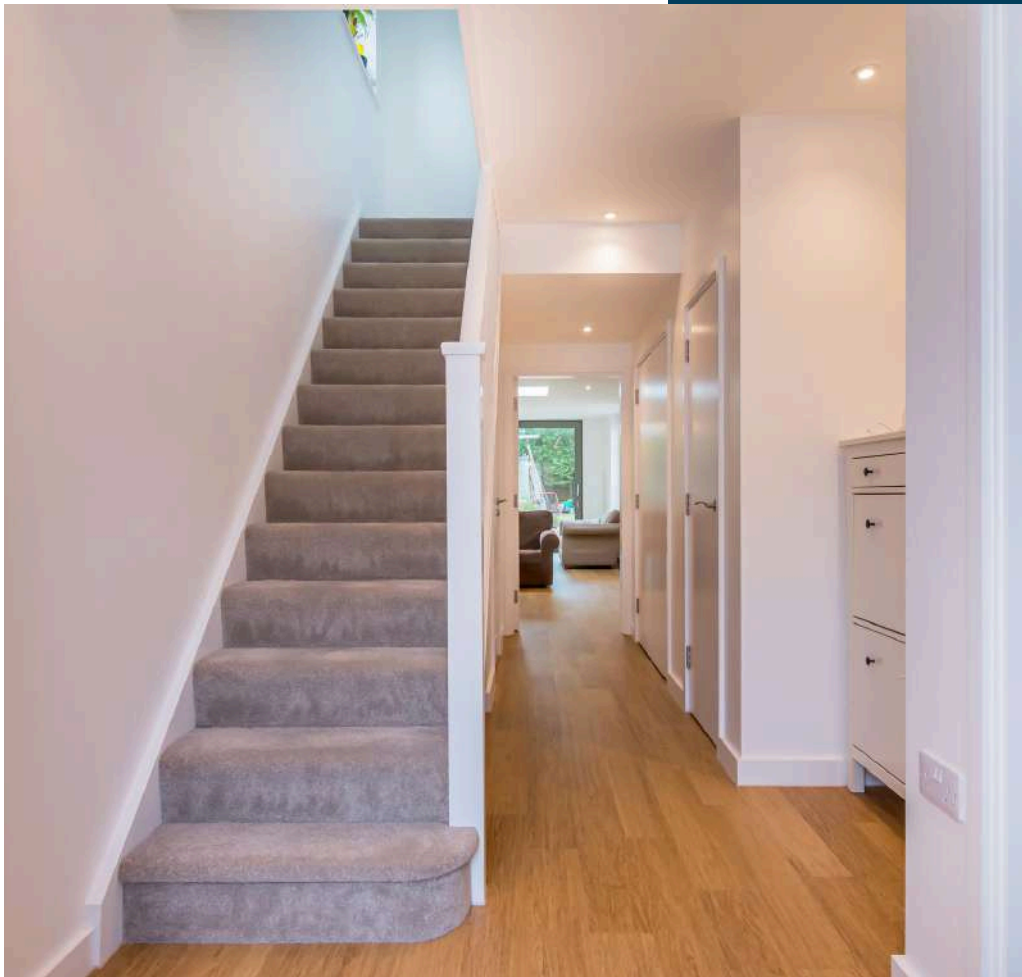
- Solid brick walls with no insulation, resulting in significant thermal bridging and heat loss
- Original single-glazed metal windows providing poor thermal performance and contributing to condensation issues
- Uninsulated roof structure with basic felt covering
- Ground bearing slab throughout with compacted soil only with no damp proof layer

Moisture and Damp Problems

- Persistent damp issues in multiple rooms, particularly ground floor areas
- Poor ventilation leading to condensation and potential mould growth
- Rising damp in some wall areas due to compromised damp-proof course
- Water ingress around poorly sealed windows and door frames
- Basic double glazing condensating

Spatial and Functional Deficiencies

- Undersized kitchen with inadequate storage and workspace
- Unusable conservatory that had become thermally uncomfortable and structurally compromised
- Inefficient use of available floor area due to poor spatial planning



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Low Levels of Wellbeing

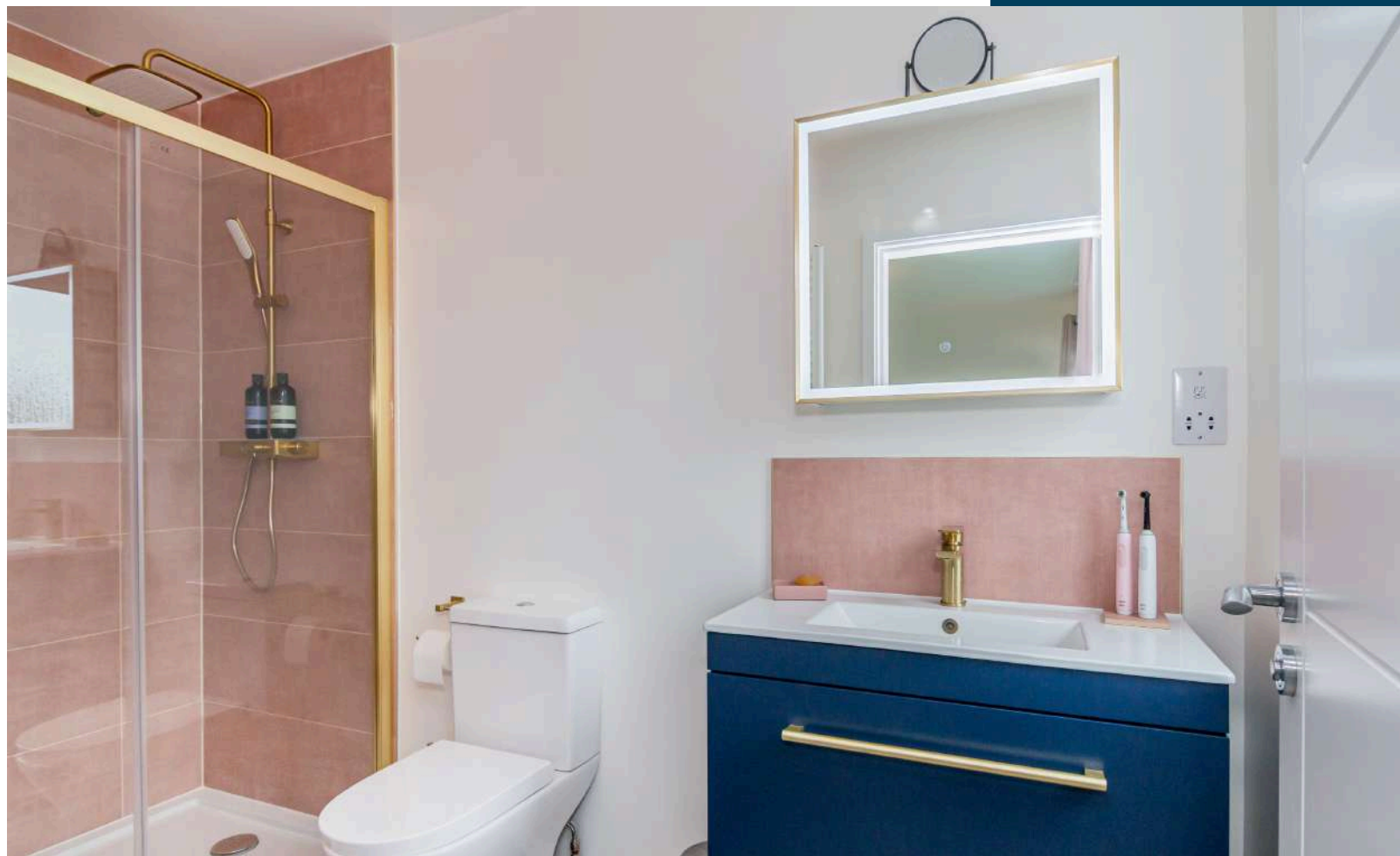
- Dark interior spaces with limited natural light penetration
- Stress from high energy bills impacting household financial wellbeing
- Low levels of motivation from being within the property, leading to stress and poor mental health

Energy Performance

- Extremely high heating bills due to heat loss through uninsulated building fabric
- Inefficient central heating system with poor controls
- Previous EPC rating of e
- Significant operational carbon emissions
- Poor thermal comfort with large temperature variations throughout the property

Mechanical Systems

- Aging boiler with poor efficiency ratings
- Inadequate heating distribution failing to provide consistent comfort
- No mechanical ventilation system, relying solely on natural ventilation and air leakage
- Outdated electrical systems requiring complete renewal



Project Objectives

The renovation aimed to address these fundamental issues while creating a exemplar low-energy home that would serve as a demonstration of best practice for similar propertie

- Achieve LETI (Best Practice Retrofit Unconstrained) or equivalent low-energy performance standards
- Eliminate damp and moisture issues through comprehensive building envelope improvements and proper ventilation
- Reduce operational energy consumption by minimum 80% compared to pre-renovation levels
- Transform spatial layout to create better flow, increased natural light, and improved functionality
- Create a healthy indoor environment with excellent air quality and thermal comfort
- Integrate renewable energy systems to further reduce carbon footprint
- Demonstrate cost-effective solutions that could be replicated in similar housing stock
- Achieve significant carbon reduction in both operational and embodied carbon terms

Innovative Solutions Implemented



ASHP

Transferring heat from the outside air to the inside of a building, providing heating.



MVHR

Providing fresh, filtered air while recovering heat from exhaust air, reducing energy consumption and improving indoor air quality



AIRTIGHTNESS

SIGA Membranes to help achieve 1.13m³/h/m² (ACH)

Innovative Solutions Implemented



TRIPLE GLAZED UNITS

Triple glazed units meeting
U-Values of 0.88 W/m²K



HIGH PERFORMANCE INSULATION

High-quality insulation with levels
above building regulation
compliance



SUSTAINABLE MATERIALS

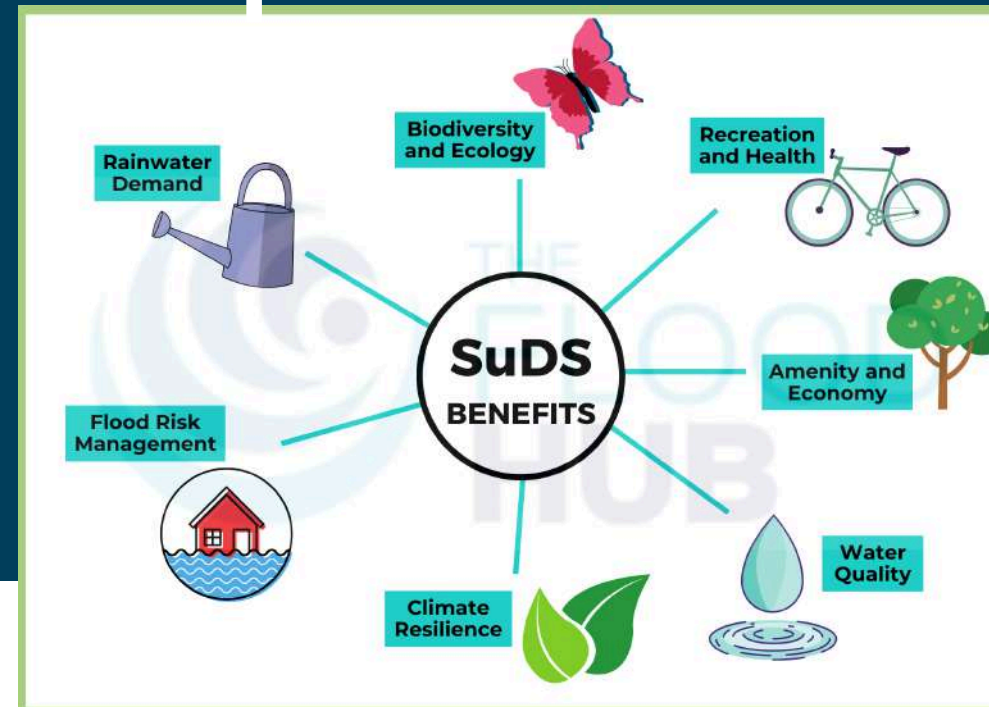
Locally sourced materials
including British Larch Cladding
Timber Framing
All with lower carbon than
brick/block/concrete

Innovative Solutions Implemented



EV CHARGER

Convenience of overnight charging, and reduce excessive costs for charge time at public EV points



SUDS DRAINAGE

Sustainable Urban Drainage System – to the perimeter of the property to mitigate damp, and surface water flooding



THIN COAT RENDER

Dramatically lower maintenance costs and less prone to cracking and mould build-up

Performance Metrics

Some basic indicative costs within the first two months of occupancy

Pre-Renovation
Energy Costs

Post-Renovation
Energy Useage

Energy
Reduction
Achieved

£2,393.88 combined
Gas and Electric

£748.80
Electric only

£1,645.08
A reduction of approximately
68.8% per year.
Over 30 Years that's
£49,352.40 at energy costs in
2025. This will increase over the
years as energy rises



Before vs After

FRONT ELEVATION

- Removal of the existing bay structure and external finishes
- Installation of a new timber framed porch, with a new timber framed bay window, complemented by new insulated silicone render





Before vs After



REAR ELEVATION

- Removal of the rear single storey extension and side garage
- Installation of a 2nd floor dormer, rear ground floor timber framed extension, with insulated render to the existing facade



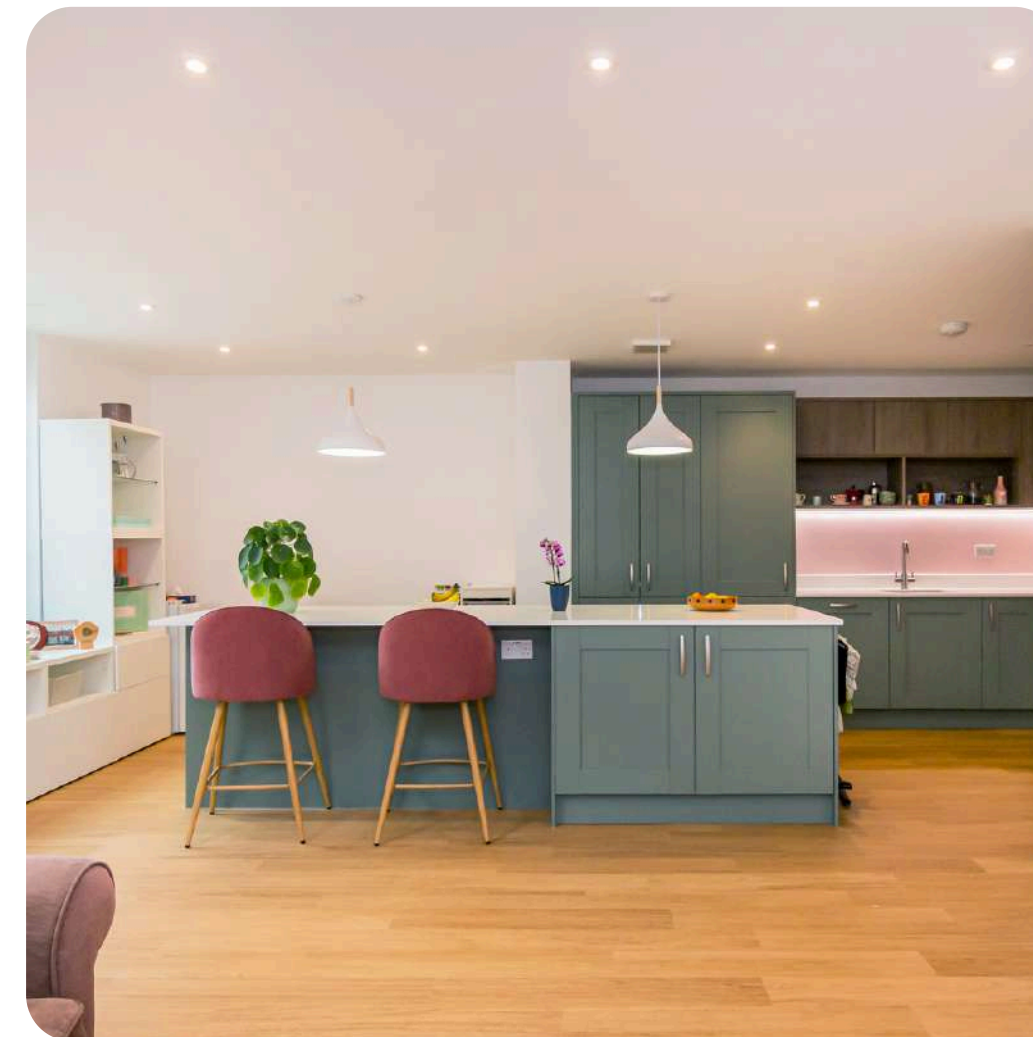
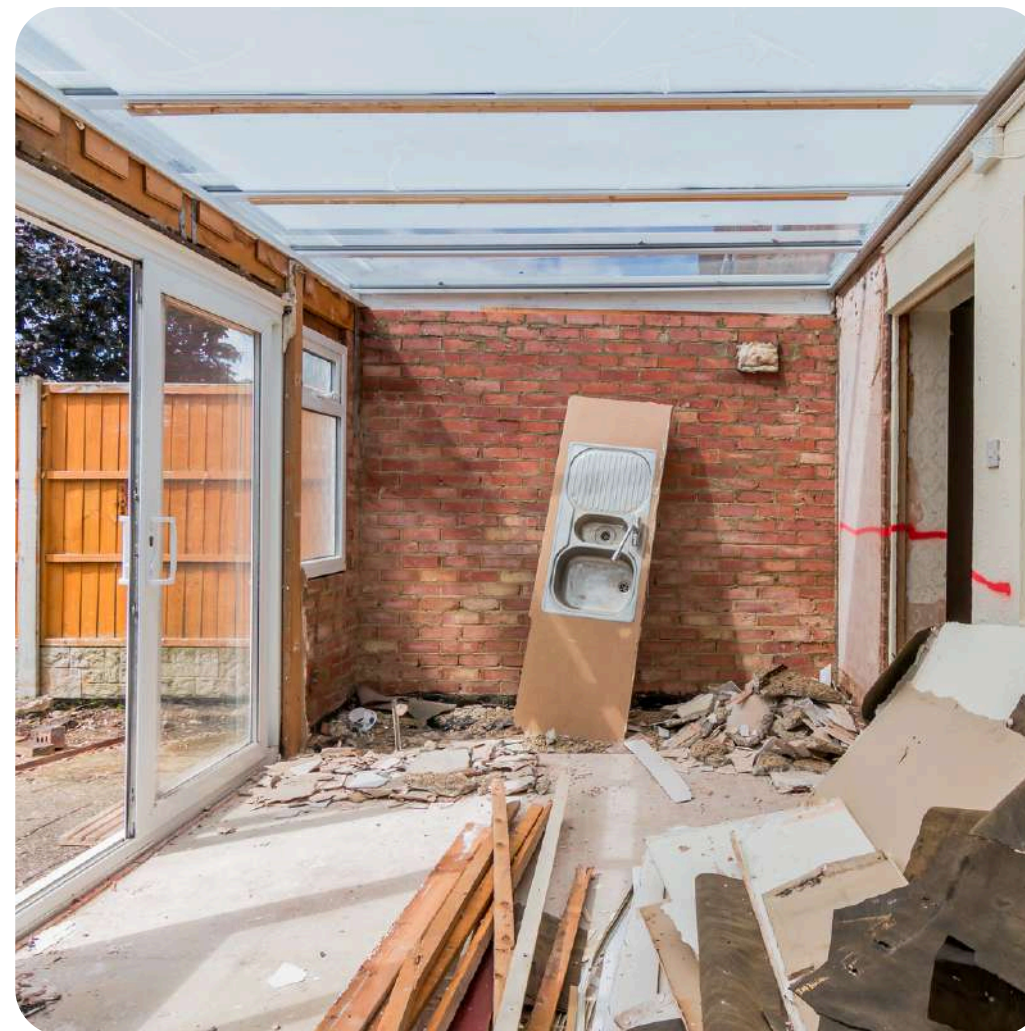


Before vs After



REAR CONSERVATORY

- Removal of the rear single storey conservatory
- Installation of a ground floor timber framed extension, with open plan living, and new bespoke kitchen with complementary Quartz worktops



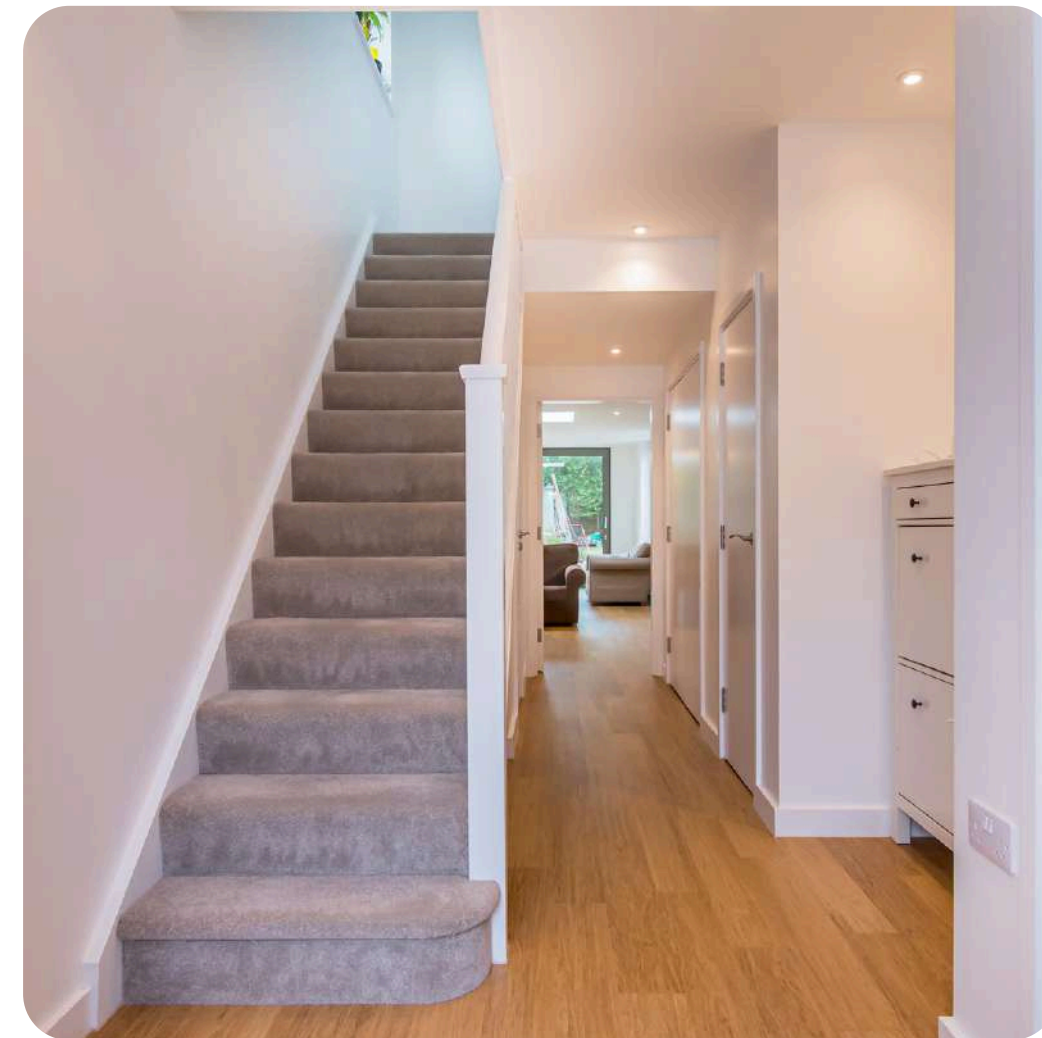
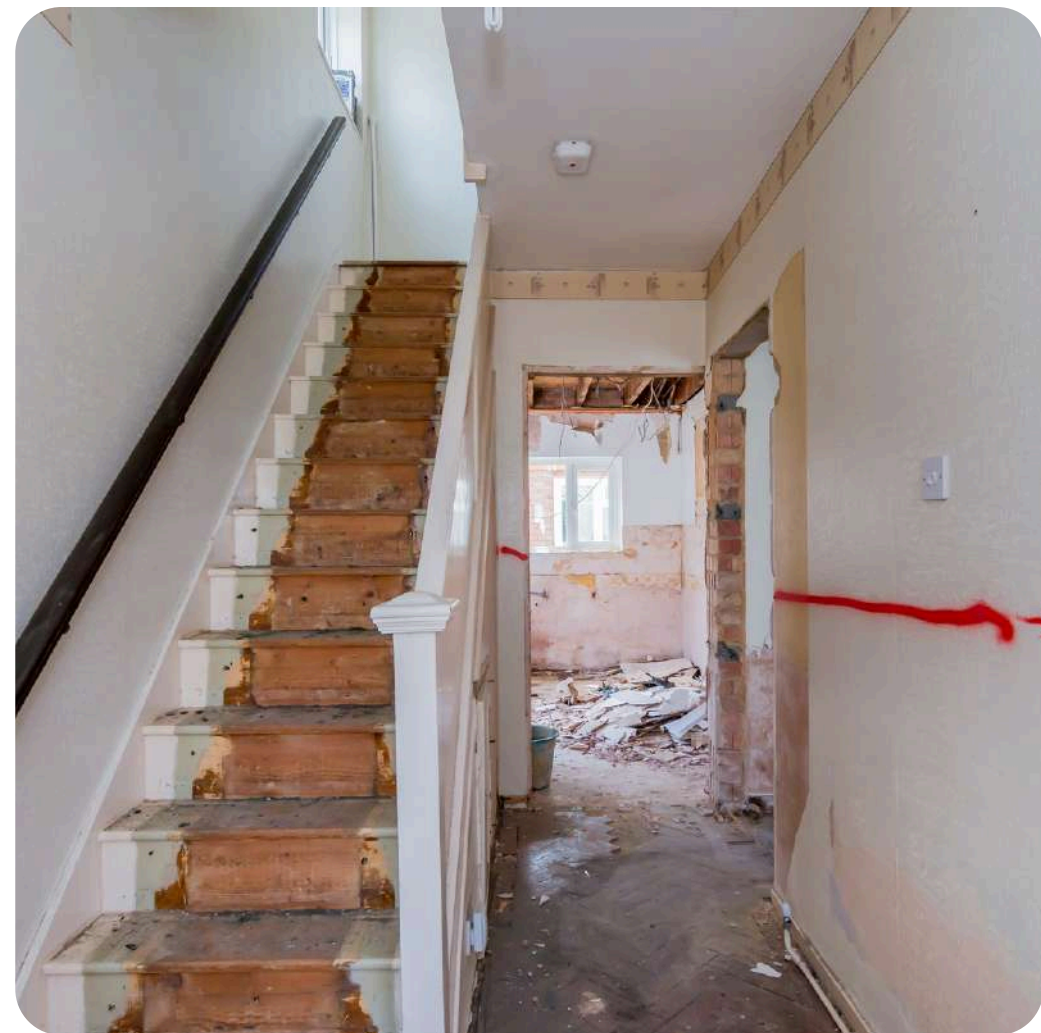


Before vs After



ENTRANCE HALLWAY

- Removal of the porch and dividing hall/living room wall
- Installation of a new timber framed porch, with new dividing wall to the entrance providing new storage for coats, boots and shoes

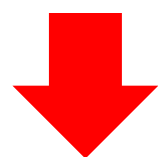




Client Testimonial

Mr Richard Davidson
Property Owner

PRESS THIS LINK HERE:



<https://www.youtube.com/watch?v=NeJkj5n7Fml>

“When I met with Carl, I was confident he understood my drive. What was really remarkable was he wanted to know everything I wanted, and it gave me hope, that they would deliver. Both Carl and Aaron really understood everything, and bought into my vision”.

Three vertical oval-shaped portraits of men, likely staff members of G2 Construction & Consultancy. The man on the left is wearing a dark blue hoodie with the G2 logo. The man in the middle is wearing a bright yellow high-visibility hoodie with the G2 logo. The man on the right is wearing a dark blue high-visibility jacket with a yellow hood and the G2 logo. All three are smiling and standing in front of a wooden structure.

THERMAL BRIDGE DETAILING TO TIMBER STRUCTURE

[illegible]

Regular coordination meetings were implemented to systematically review thermal bridge design development and ensure seamless integration throughout construction.

**Simon Knight
Architects**



**Three.
Six.
Design.**



**Project
Team**





Contact Us



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Legal Disclaimers

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Performance metrics are based on early results over a small period of time and actual results may vary based on occupancy patterns, weather conditions, and maintenance practices.

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