

BUILDING CONDITION & RETROFITTING SURVEY REPORT

Property Address: 113 Priory Road
Milford Haven
Pembrokeshire
United Kingdom
SA75 1TU

Client: Ian Brown

Prepared By: Manta Ray Surveying & Solutions Ltd

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1.0 Executive Summary

This report is solely designed to accurately depict the current condition of the property in question and to propose up to date retrofitting solutions of which are up to par with the most recent UK legislation. This property is a 3-bed semi-detached brick and block cavity construction likely from the 1960's. Following the 2035 PAS framework for retrofitting existing homes to improve energy efficiency, ensuring a "whole house" approach that considers the building, its local environment and the potential occupants based on room sizes to prevent any potential issues such as mould, water ingress, radon and more. This survey utilizes modern surveying techniques to identify any existing performance gaps. Moving forward from what is considered "shallow" retrofitting to proposing a deeper retrofitting which will include amending the buildings fabric, ventilation and energy generation.

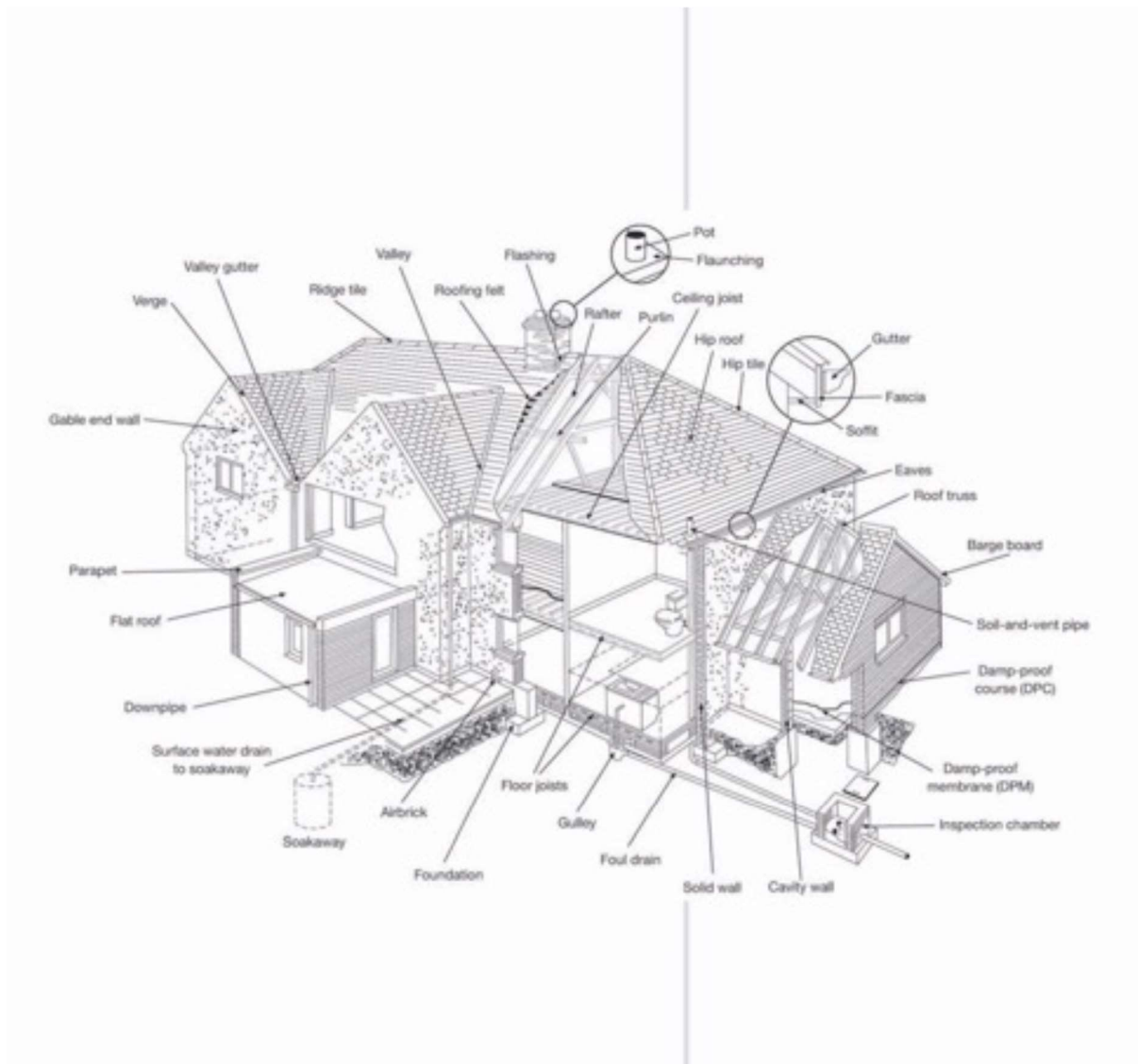
2.0 Scope and limitations of survey

This survey was "non-destructive" and limited by carpets, furniture, and personal belongings.

Also, no services were tested by MantaRay Surveying. The wiring and gas appliances will be checked by qualified engineers prior to the retrofit planned work.

3.0 Annotated diagram of a typical 1960's domestic 3 bed building

Please use this diagram taken from “Walker Dunn Surveyors” to reference against when reading this report.



Walker Dunn (2024)

4.0 Condition Survey and Property Information

Weather conditions at time of inspection	Dry & overcast. 10mph wind speed.	External temperature	13°
Internal temperature	At time of inspection, the meter read 10°, heating not on, when on, system runs between 15 & 20°.	Orientation to report	From the entrance point to each room, W1 represents the left facing wall, with W2 representing the Forward-facing wall. W3 representing the right facing wall and W4 representing the rear facing wall.
Central heating usage	Informed by tenant that in the winter, on from 6:30am to 9:00am, followed by 16:30pm to 22:30pm. Totalling circa 9 hours over a 24-hour period.	Restrictions during survey	The property was occupied with fixtures and fittings restricting access for inspection. Furthermore, a large volume of stored items was noted throughout the home again restricting access within rooms for inspection. Therefore, areas were not fully investigated.

4.1 Property Characteristics

As aforementioned, the subject property is a two-story semi-detached cavity build constructed circa 1960's. At the time of its construction, this build will have met the current building regulations regarding thermal performance. These, however, were rudimentary in comparison to modern regulations in the UK.

Traditional brick-and-block cavity construction. The external leaf is a standard 102.5mm clay facing brick, with a 50mm bead insulated cavity and a 100mm lightweight aerated concrete block internal leaf.

A dual-pitch timber rafter roof with slate interlocking tiles. The loft hatch is unsealed, and the current insulation consists of 50mm of degraded glass wool between joists.

The existing floor detail is a solid concrete over earth. This will have to be retrofitted with something both more substantial in terms of thermal efficiency and structural. Initial proposal due to time constraints is a suspended timber floor detail due to drying times with a new ground bearing slab.

Windows & Doors, the original timber windows were replaced in the 90s with uPVC double-glazed units.

4.2 Damp Readings

Damp readings throughout the area were measured.

Floor: Readings ranged from 0 to 9

Walls: Readings reached a high of 15.

Damp readings, where all within acceptable limits under BS 5250:2021 (Management of Moisture in Buildings). *BMI (2021)*

4.3 Survey Methods

A comprehensive audit was conducted using number of different surveying methods to move behind solely carrying out a visual inspection.

Even though the difference in temperature was 3 degrees, the thermographic imaging camera was very useful. Focussing on junctions, wall-to-floor, wall-to-wall, windows & doors and steel lintels. Another useful tool was the moisture meter, using the prongs to be able to distinguish between moisture penetration and surface condensation. As this property is a cavity build, a borescope is very useful to check for any debris within the cavity and at the DPC level, any debris in this area could be catastrophic for moisture/thermal bridging.

4.4 Identified Issues and Building Defects (Main Points)

This survey highlights a number of different issues with the integrity of the building, of which will contribute to the thermal efficiency and overall structural integrity.

Due to the age of the building, the floor detail is an uninsulated example, a layer of 70-100mm (depending on area) concrete on top of existing compacted earth. The floor height was not below the DPC line and was allowing moisture penetration and due to it being not insulated in the slightest, this will have to be hacked up and retrofitted with a more suitable solution.

The existing cavity wall insulation is very damp, likely to the floor detail allowing rising moisture. This will likely have to be extracted and a different solution to wall insulated will need to be proposed.

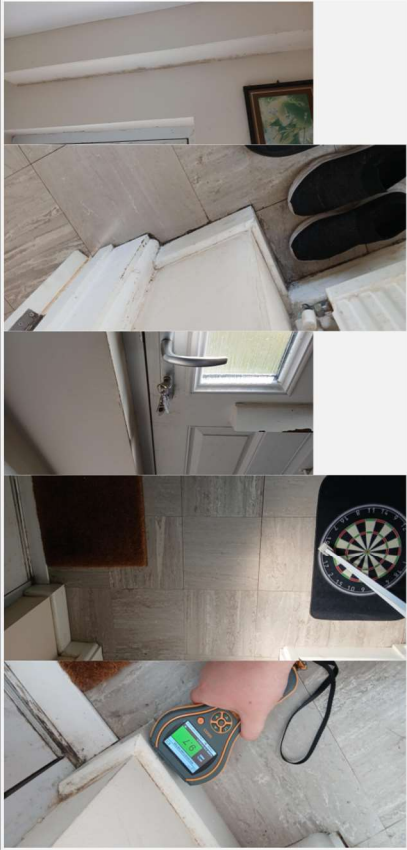
The current lintels above the windows are all the original timber, however not in disrepair, they will likely have to be upgraded to precast concrete lintels due to the current planned workload.

Kitchen and bathroom are both in disrepair and would benefit from either an overhaul or renewal.

The relative humidity (RH) was noted down at 72% in the bedrooms, this is relatively a high moisture level and will need a more adequate form of extracted ventilation. *Ltd, E. (2023)*

4.5 Interior Condition

4.5.1 Entrance Hall

	Inspection	Photos
Entrance Hall		
Notes:	The primary UPVC/composite door on W4 provides the main access from the front to the home. Wall 1: Timber door with timber surround provides access to the boiler room/cloaks facility. Constructed with brick or block, finished with plaster. No immediate signs of mould or damp penetration was seen at the time of the inspection. Surface-mounted electrics and thermostats reading 10C. Wall 2: Timber door with timber surround provides access to the kitchen. Timber staircase leading to the first floor. Wall 3: Brick or block construction with a plaster finish. Timber door with timber surround provides access to the main lounge. Wall 4: Composite door provides access to the front elevation. Brick or block construction with a plaster finish. Signs of mould above the door on timber boxing. Radiator not properly sealed, with some damp below the radiator. Floor covering is a thermoplastic floor tile. Ceiling is plaster finished and in good order.	

4.5.2 Downstairs Toilet

Downstairs Toilet	
Notes:	
	Wall 1 (Left-facing wall adjacent to the WC): Evidence of mould growth was observed on the lower right section of this wall, extending up to approximately 800 mm above floor level. Wall 2 (Low-level WC wall with plastic cistern): Signs of dampness were noted beneath the cistern area, though the extent was limited. Wall 3 (External wall with uPVC window and porcelain sink): Mould growth was present up to the height of the window sill, approximately 1.2 metres above floor level. Additionally, significant mould was observed descending from the ceiling perimeter, particularly concentrated above the window header. Flooring: Thermoplastic floor tiles were present. No visible issues or signs of moisture ingress were noted at floor level. Ceiling: The ceiling has a plaster finish with surface-mounted electrical fittings. No mould was observed on the ceiling surface.

4.5.3 Kitchen

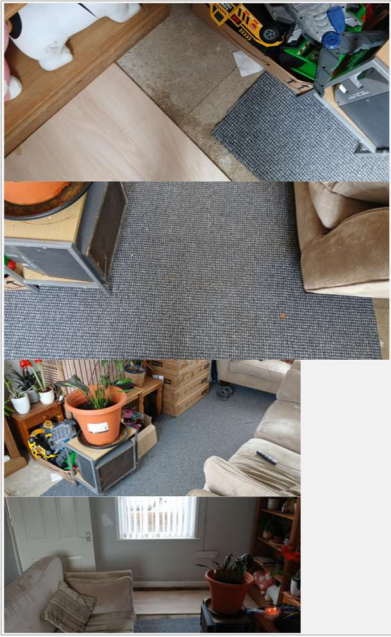
Kitchen	
Notes:	Kitchen units are outdated and in disrepair due to damp at plinth height
Wall 1:	Timber door with timber surround provides access to the parlour room. Constructed with brick or block, finished with plaster.
Wall 2:	Timber door with timber surround provides access to the kitchen. Timber staircase leading to the first floor.
Wall 3:	Brick or block construction with a plaster finish. Timber door with timber surround provides access to the main lounge.
Wall 4:	Composite door provides access to the front elevation.
	Brick or block construction with a plaster finish. Signs of mould above the door on timber boxing.
	Floor covering is a thermoplastic floor tile.
	Ceiling is plaster finished



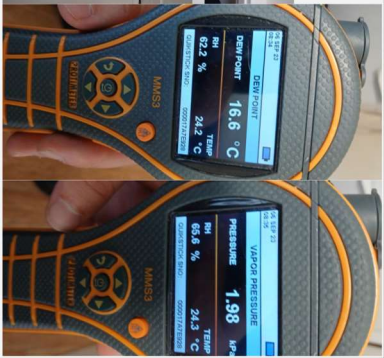
4.5.4 Parlour Room

Parlour Room	
Notes: Access Limitations: Access to lower wall areas was restricted due to stored items, limiting full inspection. Wall 1: Brick and block construction with a plaster finish. No visible issues observed. Wall 2 (Rear-facing wall): Contains a uPVC window; rear view access was restricted. Cracking observed in the plaster at the top left-hand corner (as shown in the photograph). Wall extends beyond a small storage area with no access, but signs of mould were noted on the ceiling in that section. Remainder of the wall is brick or block with plaster finish Ceiling: Plaster finish with some staining or variation in paint finish. This appears to be cosmetic rather than due to water ingress. Heating and Flooring: No heating present in the room. Floor is carpeted.	
	

4.5.5 Living Room

Living Room	
Notes:	Works in place to replace the flooring as needed. See notes above for new insulated detail. Wall 1: Timber door with timber surround provides access to the kitchen. Wall 2: Timber door with timber surround provides access to the Entrance hall. Constructed with brick or block, finished with plaster. Timber staircase leading to the first floor. Wall 3: Brick or block construction with a plaster finish. Timber door with timber surround provides access to the main lounge. Wall 4: Composite door provides access to the front elevation. Brick or block construction with a plaster finish. Signs of mould above the door on timber boxing. Floor covering is weyrco and off cuts of bedroom carpet. Ceiling is plaster finished
	

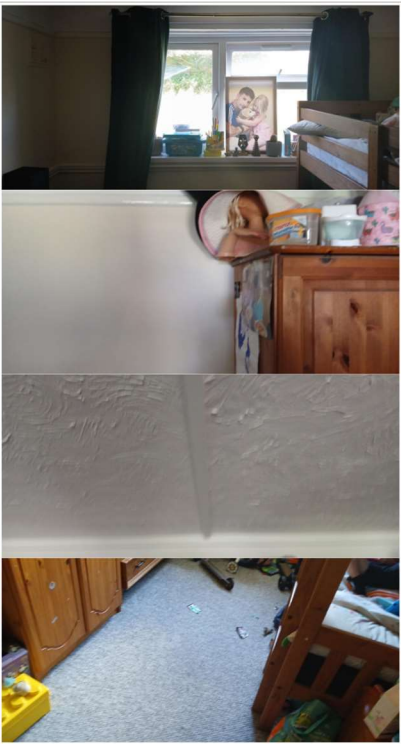
4.5.6 First Floor Bathroom

FF Bathroom	
Notes:	W1 - Brick and block wall with a plaster finish, PWHB W2 - Bath with ceramic tile surround, extraction fan humidity type, UPVC window internal beaded, Trickle vents closed at the time of the inspection. W3 - Ceramic tiles over bath with electric shower Over, remaining wall has plaster finish over a brick and block construction, riser to the corner where it meets W3 Wall 4 - WC with timber door and surround presenting access to the hallway, skirting is an ornate torus style looks like a 4 to 6 inches. Ceramic tiles over bath where seen to have blown in sections of the wall. Ceiling areas and wall to higher levels above the bath and shower visible mould was seen in sections 

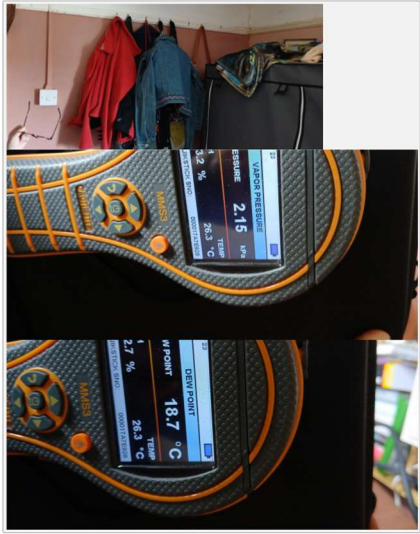
4.5.7 Bedroom 1

Bedroom 1	
Notes:	Wall 1 - Brick or Block construction with dado rail Taurus skirting 6 inches, picture rail over and frieze over. Electrics seen was surface mounted, mould seen in the bottom right hand corner where it meets W2. Wall 2 - Formed the same as W1 with UPVC window to the front elevation central flag opening and two casements casement openings, some signs of mould to surfaces, residue only. Wall 3 - Same as W1 and W2, electrics surface mounted and air vent. At the time of the inspection the extraction vent was sealed with tape, residual mould seen in this location Ceiling where it meets W3 & W4 some historic mould seen where the tenant has clean the surface. Wall 4 - same as the rest, radiator, timber and surround presenting access to the room. ceiling texture coatings floor carpeted
	

4.5.8 Bedroom 2

Bedroom 2	
Notes:	W1 - party wall between bedroom 1 and bedroom 2 is brick and block timber skirt, dado and picture rail to match other rooms. Bedroom 1 wall 2 is the same structure as wall 2 in bedroom 2. I which houses a vent to the far right corner, just below the picture rail. W3 - radiator change in skirting to bull nose from Taurus U PVC window overlooking the rear elevation. W4 - Brick or Block construction with timber door and surround presenting access from the hallway 

4.5.9 Bedroom 3

Bedroom 3	Notes: W1 - Block timber skirt, dado and picture rail to match other rooms. W2 - Same wall type as Bed 2. Picture rail and skirting in good condition. W3 - radiator change in skirting to bull nose from Taurus U PVC window overlooking the rear elevation. W4 - Brick or Block construction with timber door and surround presenting access from the hallway	
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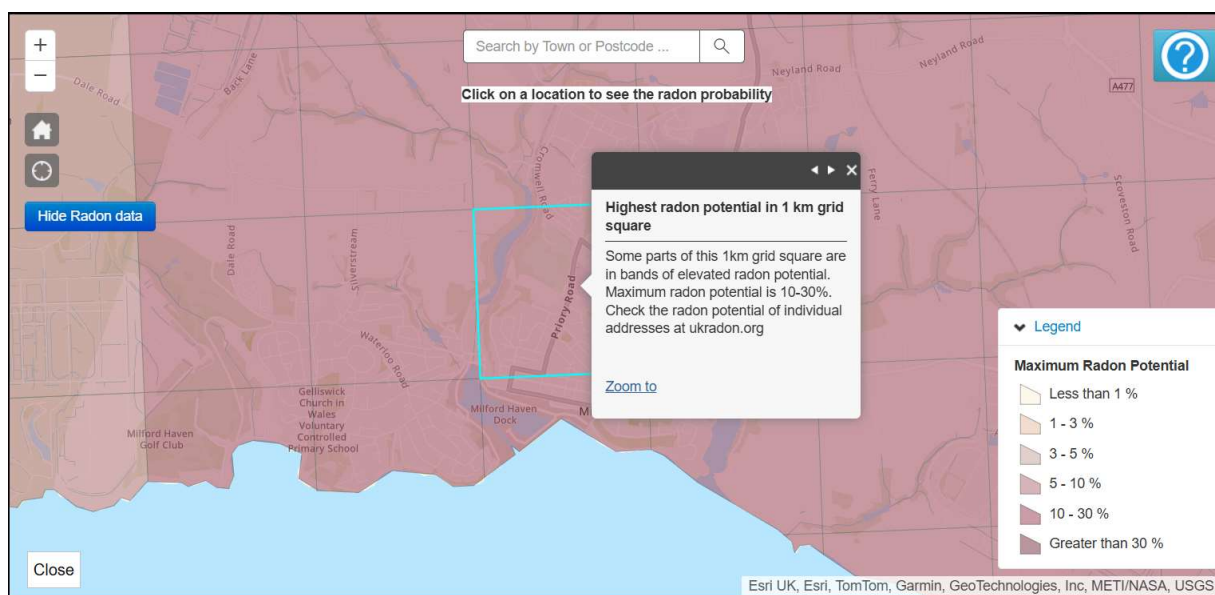
4.6 Exterior Condition

Bedroom 3		
Notes:	Front Elevation The front elevation is finished in a roughcast render with UPVC windows, two composite doors. Front elevation presents access into the property via two composite doors. The RHS door present access into the "parlour room". Along the party line to the RHS an approximately 1m high boundary wall adjoins to the property. During the inspection, it was observed that the external concrete paths are above the 150mm threshold and will need to be dropped to accomodate the air vents. Currently this is now causing moisture to bridge past the DPC. Rear Elevation Grass is overgrown (Above 300mm), there is a brick wall at waist height (1.2m), there is also an old metal pole and a few timber garden ornaments. The path at the rear will also have to be dropped due to the same bridging issue. Roof covering This roof covering looks new with white felt and an already dropped stack. there are no leaks and will not to be amended in any way.	



4.7 Environmental Risk (RADON)

Radon is a very high risk in Pembrokeshire, as per the data map below, this property located in Milford Haven as at the maximum percentage. Over 30%, the highest potential of radon gas seeping through the ground. This will have to be included in the proposed works to fit a radon barrier and a suitable escape for radon gases before they become dangerous to the tenants. The new floor detail as detailed below will allow a “void” and vents to allow for any dangerous radon gases to escape externally. The vents enter the cavity, gooseneck upwards and out the external leaf above the external path levels which will have to be dropped 150mm below the DPC line.



UKradon - UK maps of radon (no date)

5.0 Retrofitting Proposals

The proposals below are solely to improve the buildings thermal efficiency and eliminate its reliance on fuels, some of these proposals will also benefit the buildings condition.

5.1 Building thermal efficiency details

DETAIL		SPECIFICATION		NOTES
Internal Wall insulation		Battens and counter battens to accommodate 50mm Celotex PIR IWI. No service void due to size constraints and lack of need as all services will be surface mounted.		Total thickness of the wall will be 362.5mm with the additional IWI. The overall U-value calculation will come to 0.24W/(m2k)

Floor insulation		Due to the existing floor detail having no insulation or DPM. Proposal is too retrofit a new suspended timber floor with 150mm PIR between joists.		The new joists will be 170mm deep, this will accommodate the 150mm insulation level. This will bring the U value for the floor detail to 0.16W/(m2k)
Loft insulation		Remove the old mineral wool insulation which is strewn about and not substantially covering the loft floor space. The minimum amount is 400mm of new loft insulation with adequate coverage.		Will also upgrade the loft hatch to a proprietary one with a certain amount of insulation-built in.
High performing windows		Removal of the outdated double-glazed windows and retrofit new triple glazed UPVC framed windows throughout		UPVS as the frame is an excellent insulator on its own and is very budget friendly compared to aluminium or timber.

U-value calculations (no date)

5.2 Heating and Electricity

For a standard semi-detached 3 bed domestic property a Vaillant AroTherm Plus is generally considered the best air source heat pump (ASHP). This is due to the use of propane which is classed as a natural refrigerant and has a very low global warming potential that allows the unit to reach high flow temperatures of up to 75 degrees. This makes it ideal for a retrofit application as it can often work efficiently with the existing rads that were originally used by the gas boiler, in this case we will upgrade the radiators to suite the upgraded system. Online reviews claim it is very quiet when running, this alone makes this system a good choice, a lot of the internal walls will be stud partition with only circa 100mm sound insulation between rooms. Ultimately, the system will have to be between 5kw & 7kw for this three-bedroom home, to ensure a high seasonal coefficient of performance (SCOP), which can maximise the potential energy savings and can allow for a much longer lifespan.

Installing a 4.5kw solar panel system (Solar photovoltaic PV) array consists of 10-12 monocrystalline panels on the roof covering. These are capable of generating 4k to 4.5k kwh of clean electricity annually. This is dependent on the roof's orientation & shading; in this case the mono pitched roof is facing east & west which is ideal for sun coverage. For the standard three bed house this will be more than enough and will potentially generate more electricity than needed which can then be sold to the government through certain schemes.

With both of these systems paired together (ASHP & PV array), they offset the increased electrical demand for heating significantly. This provides a style of self-consumption and shields the tenants from rising utility costs. The excess electricity can be stored in a battery (commonly tesla batteries, typically a 10kWh lithium-ion), this will allow daytime appliances to

be ran such as the washing machine to be ran and significantly lower the properties carbon footprint.

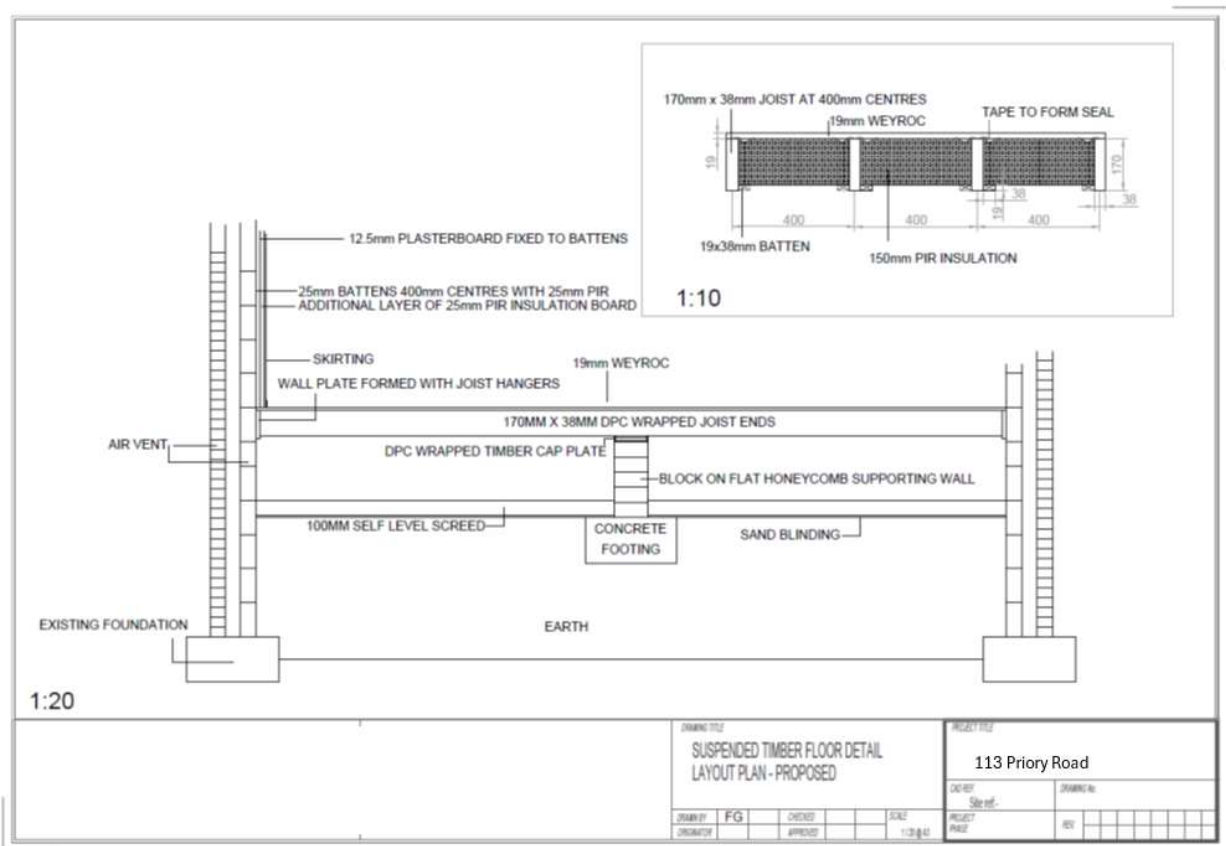
4.0 Proposal Strategy

To carry out a successful retrofit survey / proposal for a domestic building it is not solely a list of products.

5.3 Building Fabric

The first stage is prioritising the building fabric; all of the main elements should be insulated. The walls, floors & loft should be adequately insulated to reduce the peak heat load of the building and allowing for a smaller output air source heat pump to heat the property.

This is an auto CAD drawing outlining what the proposal will be to ensure that the thermal heat loss is minimized compared to the current details. This shows the proposed floor and wall detail.



Drawn by our surveyor using AutoCad.

5.4 Whole house approach

When the walls are internally insulated, there is an increased risk of condensation on the old window reveals. The new triple-glazed windows are installed with thermal bridge cavity closer; this ensures there is no cold spots for the heat to be attracted to.

5.5 Purposeful ventilation and air tightness

To address moisture, build up and any health issues for tenants, we propose the installation of a 'Zehnder ComfoAir Q350' mechanical ventilation system with heat recovery (MVHR). For this 3-bed domestic property, this system will transform the home with purposeful ventilation by recovering up to 96% of the heat from the stale air that would otherwise be lost through more traditional extraction fans.

This unit utilizes special clinically graded filters which protect against pollutants which will directly support the respiratory health of the asthmatic tenant. The use of an MVHR will continuously exchange the air in all habitable rooms while maintaining RH (relative Humidity) below the 60% mould-growth threshold. This system will also eliminate the condensation issue found at thermal bridge areas previously mentioned such as junctions, cold spots, lintels etc.

Moving on from the radon barrier previously mentioned, this system ensures the air pressure is perfectly balanced which intervenes and keeps radon gas levels internally at a safe 3-5% risk threshold.

For this property, we should aim for air permeability of $3.0 \text{ m}^3/\text{h.m}^2 @ 50\text{Pa}$. A MVHR recovery system generally becomes effective once the air permeability drops below $3.0 \text{ m}^3/\text{h.m}^2 @ 50\text{Pa}$.

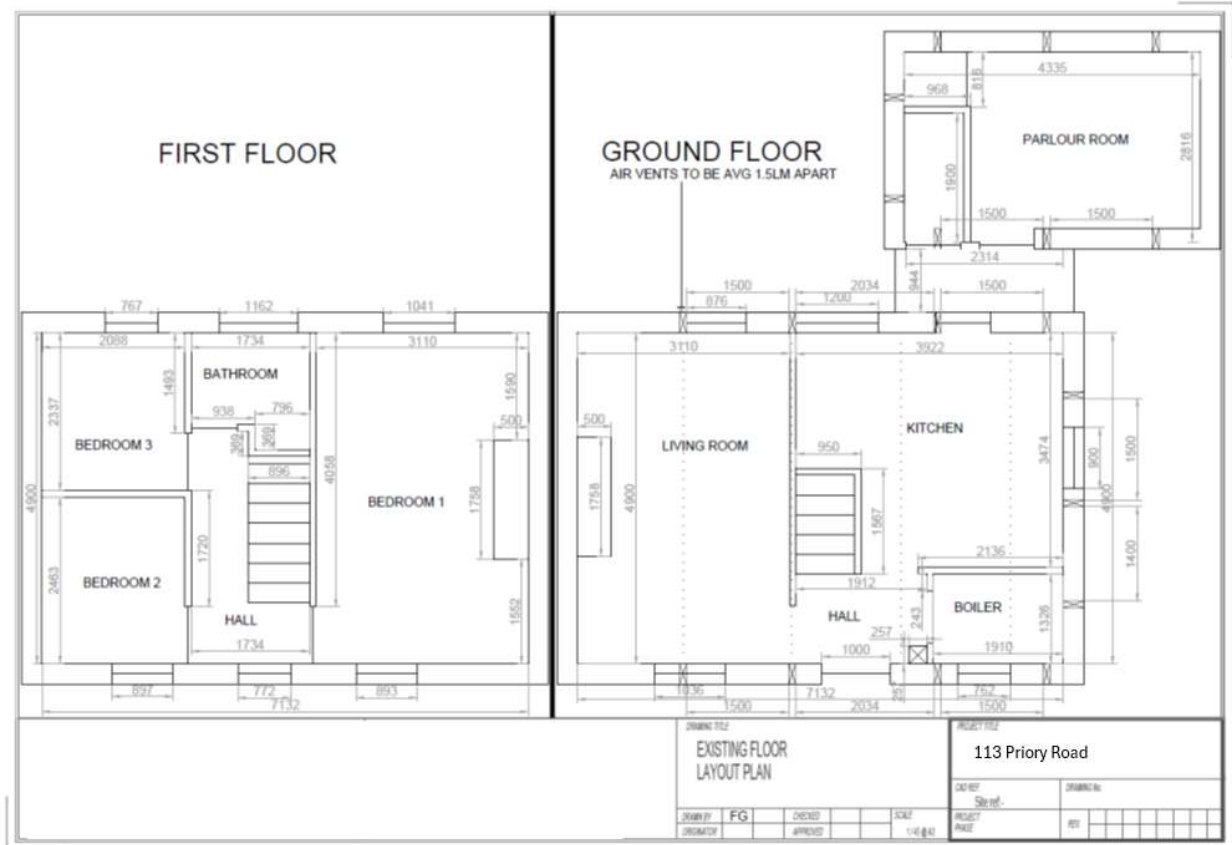
5.6 Quality Assurance

We follow the PAS 2035 standard. A Retrofit Coordinator within our company will oversee the project to ensure that any performance gaps are bridged. This involves checking quality of workmanship, there are no air gaps on the taped sections over the joists/insulation, loft insulation is spread evenly to ensure no clumps which could in turn invite mould due to cold spots, no thermal bridging in the cavity et cetera.

6.0 Conclusion

This retrofit strategy transforms this draughty, carbon intensive 1960's brick and block cavity constructed domestic property. The proposals of adding 150% more insulation to the floor, IWI with vents to allow air flow into the cavity, laying new cavity insulation, proprietary loft hatch and more. These raise the surface temperature to eliminate the conditions for mould growth and any cold spots. The new suspended timber floor with added PIR to block cold air flow from the new service void. These building fabric solutions paired with the MVHR system and an airtightness of $3.0 \text{ m}^3/\text{h.m}^2 @ 50\text{Pa}$ to provide a barrier against pollutants while warming incoming fresh air. As a total result, this building will hopefully provide a substantial 85% reduction in operational carbon dioxide emissions and an energy saving annually of £1,500. This property will be mould free, safe from radon gas and keep a stable temperature in all seasons all the while saving the tenant money and upkeeping their health.

7.0 Appendix



Drawn by our surveyor using AutoCad.





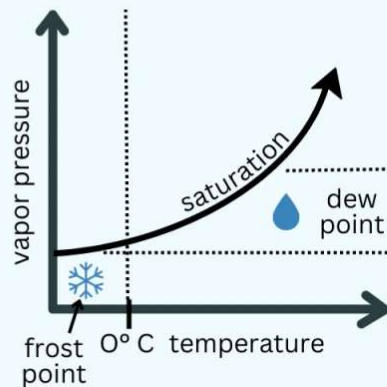
7.1 Technical information

Dew Point

The dew point is the temperature that air is cooled to where it becomes saturated with water vapor.

Dew or frost starts forming below this temperature.

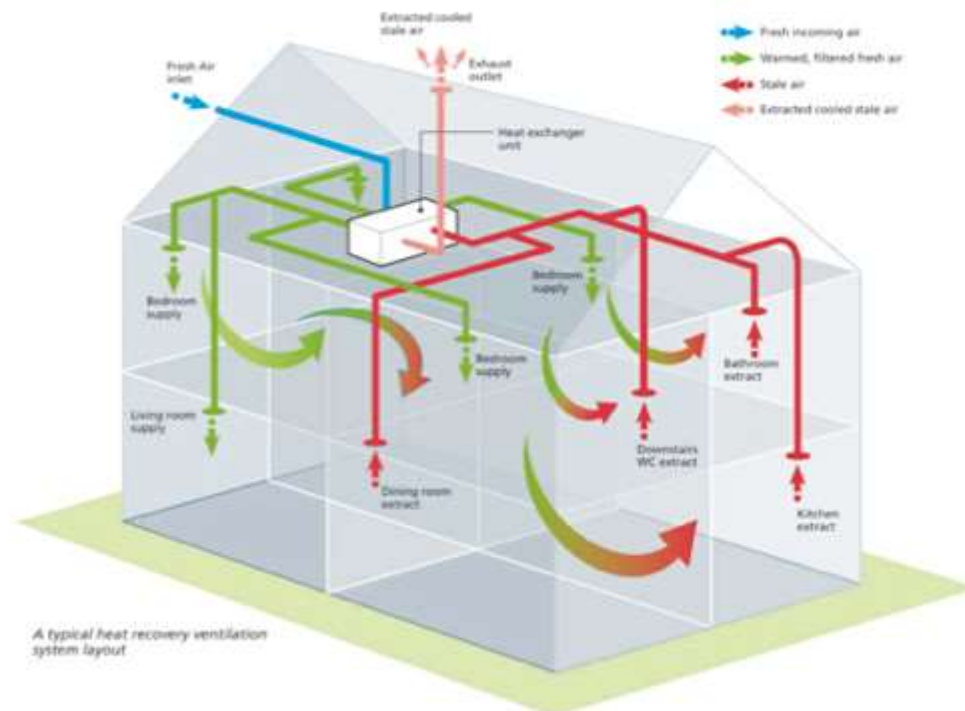
The higher the humidity or atmospheric pressure, the higher the dew point temperature.



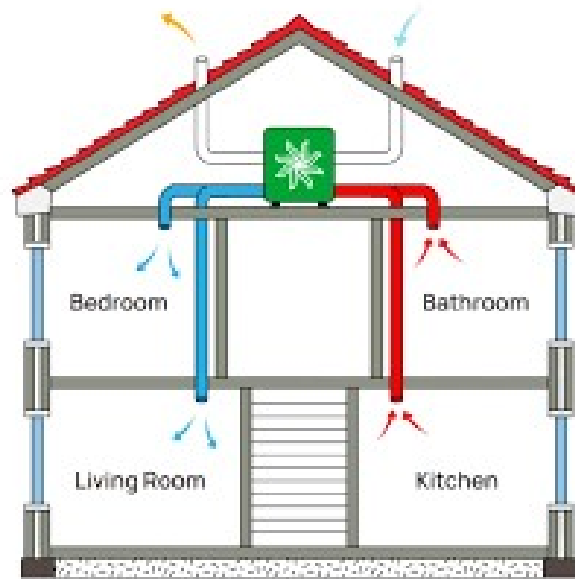
Dewpoint	How it feels	Emoji
50-60° F	comfortable	😊
60-65° F	sticky	😓
65-70° F	unpleasant	😞
70°F+	gross	🤢

sciencenotes.org

Chen, P. and Chen, P. (2025)



MVHR system eliminates condensation issues - ADM Systems (2019)



bjorn@orisel.co.uk (2024)

8.0 References

Walker Dunn (2024) Typical House diagram. <https://walkerdunn.co.uk/typical-house-diagram/>. Accessed on 20/12/2025

Chen, P. and Chen, P. (2025) 'Understanding comfort dew point and measuring it - Best weather station manufacturer | CODA Sensors,' Best Weather Station Manufacturer | Coda Sensors, 9 October. <https://www.codasensor.com/understanding-dew-point.html>. Accessed on 21/12/2025

MVHR system eliminates condensation issues - ADM Systems (2019). <https://admsystems.co.uk/casestudy/mvhr-system-eliminates-condensation-issues/>. Accessed on 01/01/2026

bjorn@orisel.co.uk (2024) 'What is MVHR?' Ventilation Megastore, 15 May. <https://ventilationmegastore.co.uk/mvhr-blog/what-is-mvhr/?srltid=AfmBOoqD4Tf1EhnWGDAsB2McjPULhZTaFosW52q9fq6dHHiTh7ze-LWo>. Accessed on 01/01/2026

Kingspan (2025). https://u-valuecalculator.com/gb/calculation/W1_1?results Accessed on 05/01/2026

U-value calculations (no date). <https://www.kingspan.com/gb/en/campaigns/u-value-calculations/>. Accessed on 05/01/2026

UKradon - UK maps of radon (no date). <https://www.ukradon.org/information/ukmaps>. Accessed on 05/01/2026

BMI (2021) *A guide to the updated British Standard and the changes to pitched and flat roofing*. https://assets.ctfassets.net/cd81nrotvav2/ujVUWjeQFoihtJkYoWsxY/878731b5e0c188d85afad93ba1dac78b/BMI-BS5250-Pitchedand_flatroofingguidanceAugust2021.pdf. Accessed on 05.01.2026

Ltd, E. (2023) *The maximum humidity under indoor air quality standard*.
<https://www.envirovent.com/blog/understanding-maximum-humidity-volume-under-the-new-indoor-air-quality-standard/>. Accessed on 06.01.2026