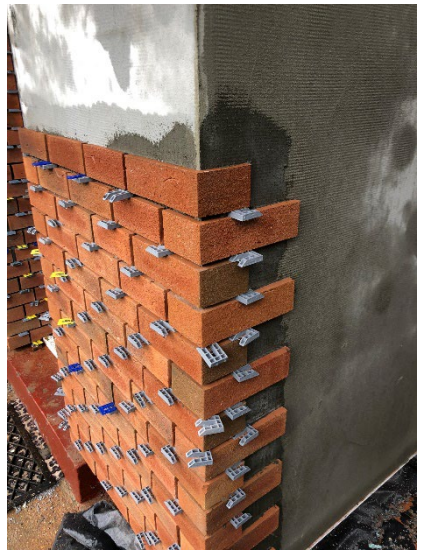
Masterclass: Building Monitoring for Healthier, More Efficient Homes – Lessons from Havering's Retrofit Success







20/05/25

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Setting the Havering Scene

- Where are we and what are we looking at?

Our knowledge

- Just when you think you know your stock…

Our Objectives

- What's in it for us?

Why Monitor?

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MONITORING IS NOT THE SAME AS MEASUREMENT!

Measurement = monitoring data + test process
Means you can compare performance – before and after
Not all monitoring data can give valid measurement

PLANNING FOR MONITORING AND MEASUREMENT

Start early: part of funding application
What to test and when? Universal or sample?
Short and long term goals

WHAT MAKES A HELPFUL BENCHMARK?

How much is it influenced by tenant behaviour?
How hard / costly is it to measure?
Who is using this benchmark?

MONITORING AND MEASUREMENT. WHERE AND WHEN?

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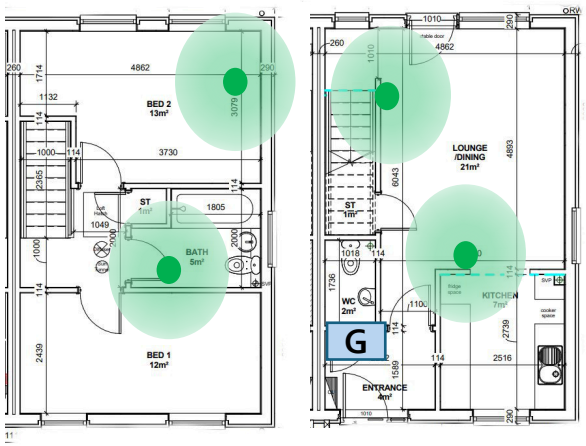
SENSORS IN BUILDING



Deploy inconspicuous sensors in less than 30 minutes. Provides uniquely granular data for high quality analytics. No pairing or hardware configuration. Battery life more than four years.

GSM TO CLOUD

No need for tenant wifi
Network agnostic – extensive coverage.
No SIM/contract hassle:
one contract covers all sites.

DATA HELD IN WEB ACCOUNT

Calculate heat loss, ventilation rate and condensation risk. Analyse full data set for troubleshooting. Dashboard all sites for benchmarking. Build full reports for customers

DATA COLLECTION AND TEST

Test in each house for 3 – 4 weeks, then move kit to next house

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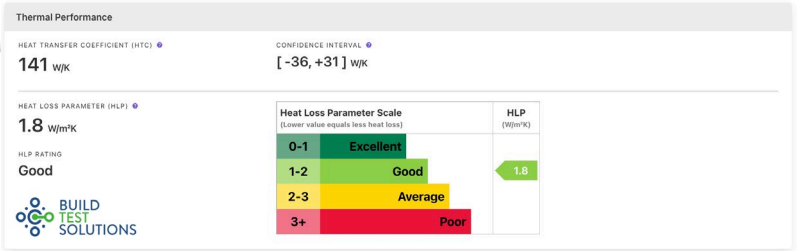
HEAT LOSS TESTING PROVIDES A CLEAR MEASUREMENT OF A HOMES INSULATION.

IT IS OFTEN USED TO IDENTIFY STOCK SUITABLE FOR RETROFIT INVESTMENT AND TO HELP SIZE HEATING SYSTEMS, ESPECIALLY HEAT PUMPS

PROVIDES TWO MEASURES:

- HEAT TRANSFER COEFFICIENT (W/K)
- HEAT LOSS PARAMETER (W/M²K)

MEASURE OF RATE OF HEAT LOSS, ADD HEATING DEMAND (+ GAINS) FOR kWh/M²/A



REQUIRES DATA ON HEATING ENERGY SO TESTING IS IN HEATING SEASON

ALSO IMPORTANT FOR SIZING HEAT PUMPS

TESTS AND REPORTING – HEAT LOSS

** SMARTHTC provided by our partners* BUILD TEST SOLUTIONS

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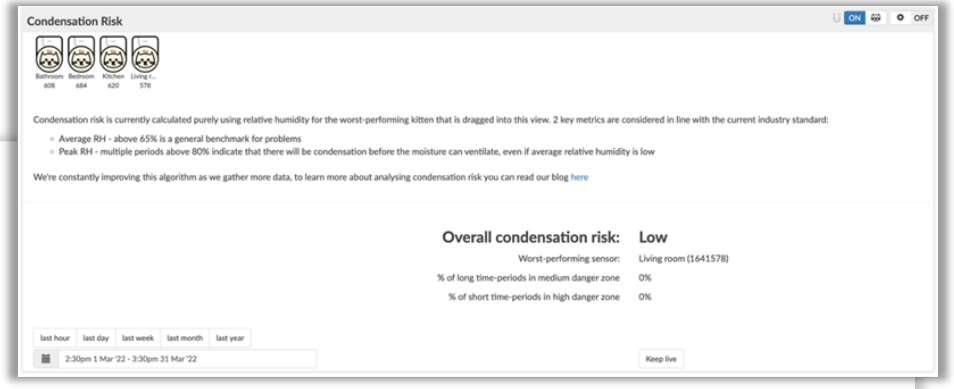
RUNNING A HEALTHY HOME MEANS UNDERSTANDING CONDENSATION, MOULD AND VENTILATION .

PURRMETRIX TESTS HELP QUANTIFY AND LOCATE PROBLEMS

USES HUMIDITY DATA TO IDENTIFY MOISTURE RISKS INSIDE HOMES



BASED ON A RISK MODEL WITH TWO MAJOR FACTORS:

- AVERAGE RH IN THE TEST PERIOD
- DURATION AND PEAK OF RH EVENTS

IDENTIFIES ROOMS AND PERIODS MOST EXPOSED TO DAMP, LEADING TO INCREASED MOULD RISK

TESTS AND REPORTING – CONDENSATION / MOULD

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VENTILATION AFFECTS HEALTH, COMFORT AND ENERGY EFFICIENCY IN A HOME.

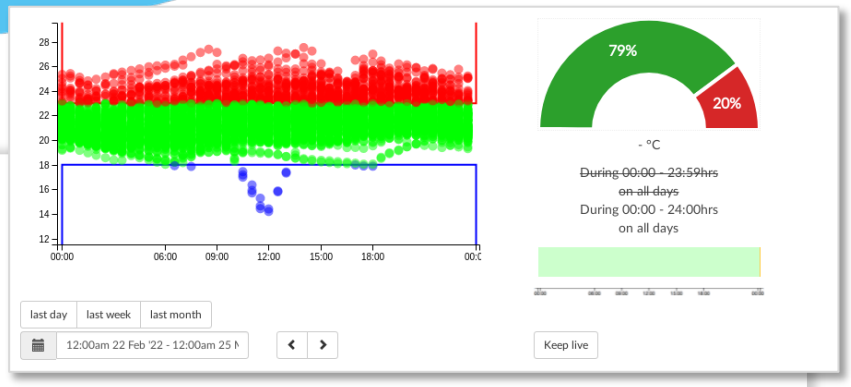
PURRMETRIX TESTS HELP QUANTIFY AND LOCATE PROBLEMS

DATA CAN ALSO SHOW HOW MUCH REAL WARMTH IS BEING DELIVERED BY A HOME

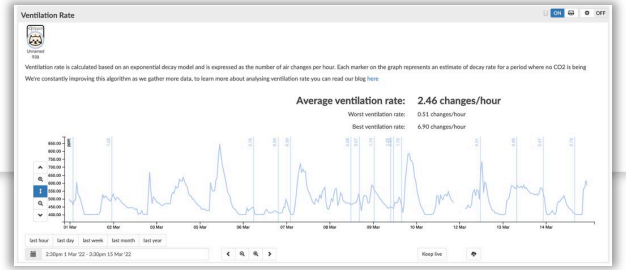
VENTILATION TESTS USE CO_2 DATA TO MEASURE HOW QUICKLY AIR IS REPLACED IN A SPACE

WORKS ALONGSIDE ABSOLUTE CO_2 LEVELS TO PROVIDE MEASURES OF HEALTH AND FABRIC EFFICIENCY

NOT THE SAME AS AIR TIGHTNESS!



COMFORT MEASUREMENT SHOWS HOW MANY HOURS OF WARMTH A HOME PROVIDES. USEFUL ALONGSIDE ENERGY BILLS. INFLUENCED BY TENANT BEHAVIOUR.



TESTS AND REPORTING – VENTILATION AND COMFORT

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IN NUMBERS:

		PRE WORKS				POST WORKS			
Property Name	Archetype	HTC	HLP	Condensation risk	Ventilation rate	HTC	HLP	Condensation risk	Ventilation rate
	B	209	2.9	Low	2.47	124	1.4	Low	0.66
	B	201	2.9	Low	1.77	159	2.3	Low	-
	B	199	3	Low	2.13	134	2	Low	0.88
	D	119	1.9	Low	3.3	89	1.4	Low	0.47
	D	135	2	Low	1.57	101	1.5	Low	1.05
	D	167	2.7	Low	0.79	104	1.4	Low	0.66

ALL HOMES ARE NOW AT AN EPC C

AVERAGE REDUCTIONS IN HEAT LOSS OF 24% (FOR ARCHETYPE B) AND 29% (FOR ARCHETYPE D)
AVERAGE REDUCTIONS IN VENTILATION RATES OF 66% (FOR ARCHETYPE B) AND 45% (FOR ARCHETYPE D)
IN OTHER ARCHETYPES, REDUCTIONS IN VENTILATION RATES OF 63% (FOR ARCHETYPE A) AND 66% (FOR ARCHETYPE C).
HOWEVER CONDENSATION RISKS REMAIN LOW IN ALL HOMES MEASURED.

LBH RESULTS SO FAR – IN NUMBERS

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D	No Fines		South End Road - RM12 5NA Charlbury Crescent - RM3 8YR
E	1970's Houses		Elmhurst Drive & Grosvenor Drive - RM11 1PF
F	1970's Houses and Bungalows		Neave Crescent and adjoining roads - RM3 8HN

- Different archetypes within the project
- A large variability between archetypes
- Fewer archetypes representing a larger proportion of properties is probably better.

Planning and Monitoring

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- Resident Reservations about data collection
- The role of the RLO
- It’s a people thing

Data Collection Challenges

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Data Collection Challenges

- Collecting Energy Data
- The impact of losing data
- Mitigation of data loss

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Type of home	Pre works SAP model	Pre works testing	Post works SAP model	Post works testing
Semi detached	265 W/K	209 W/K	117 W/K	124 W/K
Semi detached	234 W/K	97 W/K	183 W/K	--
Semi detached	266 W/K	167 W/K	103 W/K	104 W/K

Table 1: Comparison between HTC from SAP modelling and measurement, pre and post works

- A small sample but interesting
- Pre works a wide variance similar to modelling for heat pumps using BS EN 12831
- A close correlation of post works results
- Why might this be?
- Limitations of SAP when taking investments decisions

Testing Vs SAP Modelling

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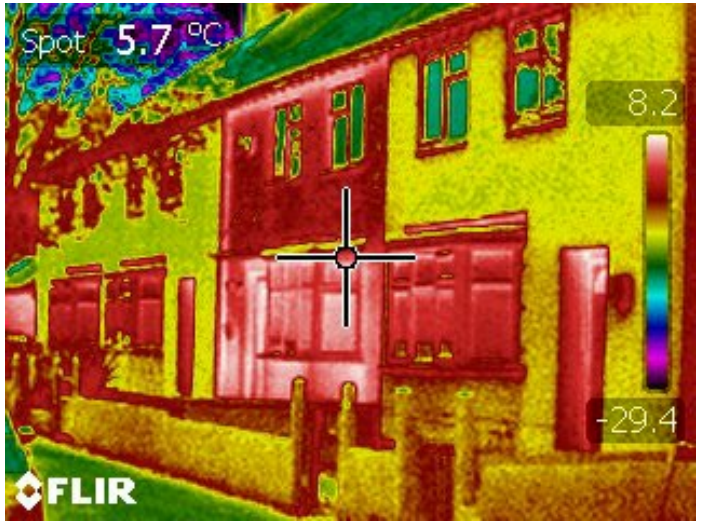
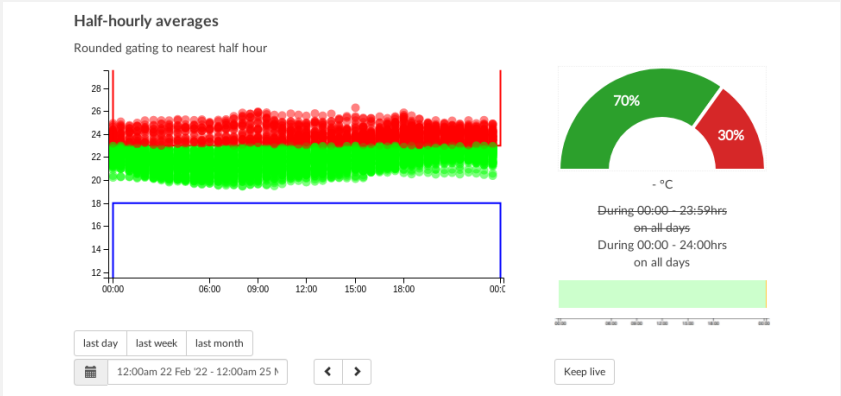


Case Studies-Longfield Avenue

LBH RESULTS SO FAR – IN STORIES

HOUSE A

Feb 2022



Gas used:
7M3

Mean outside temp:
9.4°C

Jan 2023

Gas used:
4.5 M3

Mean outside temp:
5.4°C

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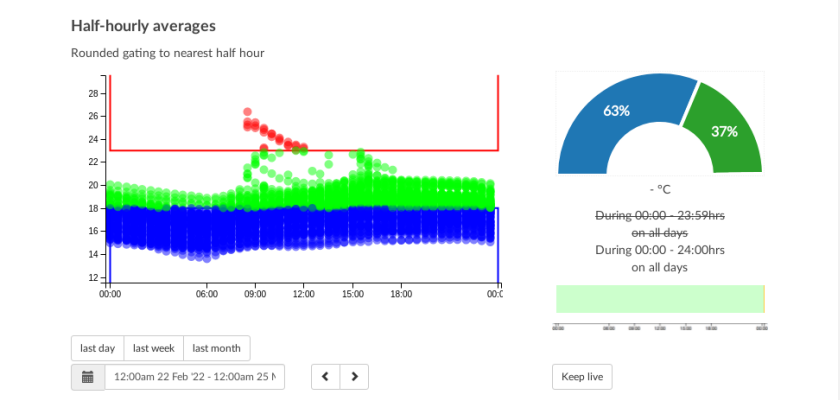
LBH RESULTS SO FAR – IN STORIES

HOUSE B

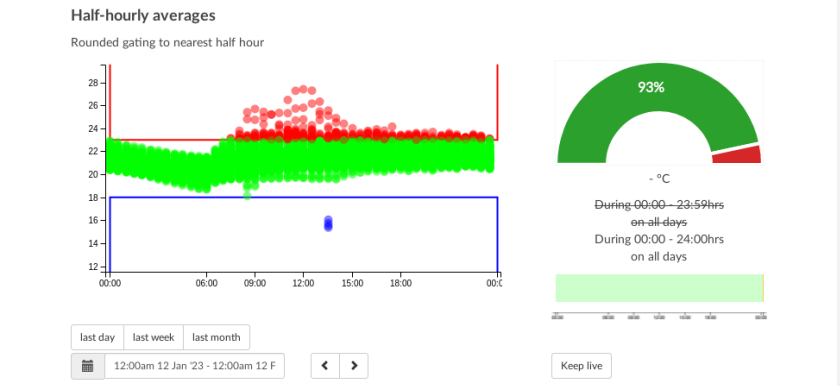
Feb 2022



Gas used:
4.2M3

Mean outside temp:
9.4°C

Jan 2023



Gas used:
5.4M3

Mean outside temp:
5.4°C

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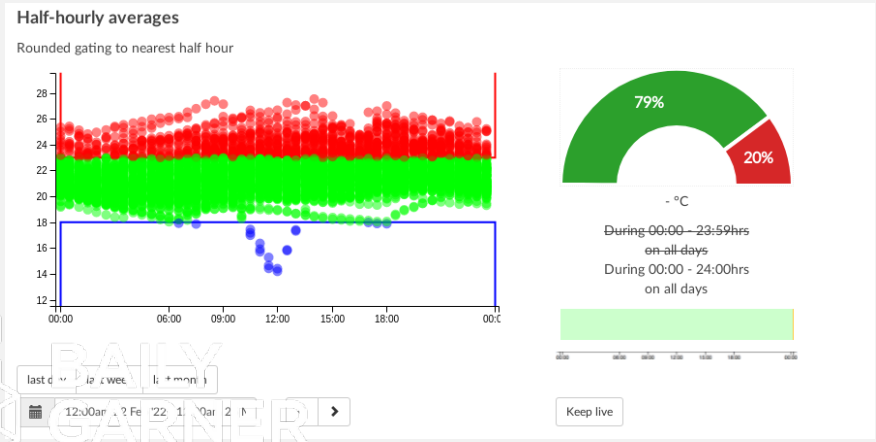
Case Study – Clydesdale Road

LBH RESULTS SO FAR – IN STORIES

HOUSE C

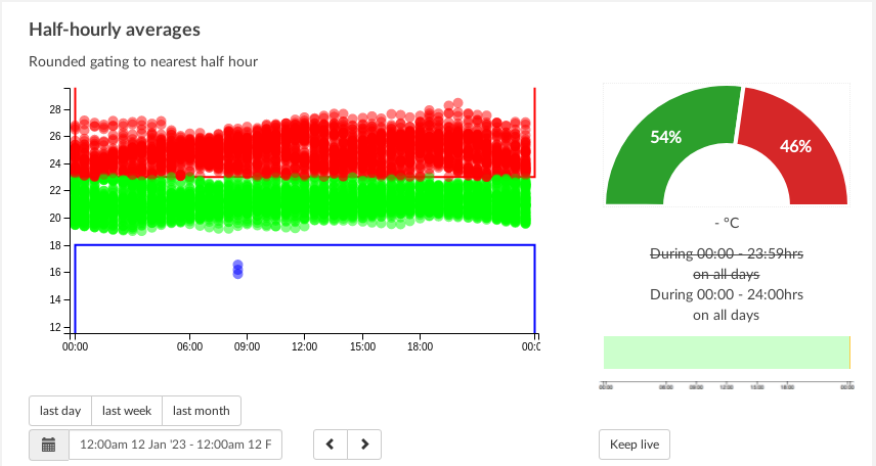
Feb 2022



Gas used:
7.0 M3

Mean outside temp:
9.4°C

Jan 2023



Gas used:
4.1 M3

Mean outside temp:
5.4°C

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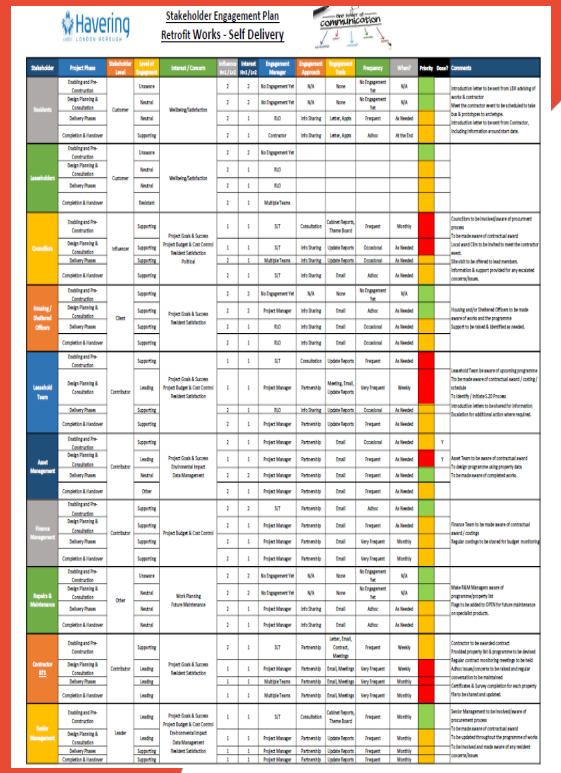
Havering

Stakeholder Engagement Plan
Retrofit Works - Self Delivery

Stakeholder	Project Phase	Stakeholder Level	Level of Engagement	Interest / Concern	Interest Ext / Int	Interest Ext / Int	Engagement Manager	Engagement Approach	Engagement Tools	Frequency	Whom	Priority	Done?	Comments
Residents	Enabling and Pre-Construction	Customer	Unaware	Wellbeing/Satisfaction	2	2	No Engagement Yet	N/A	None	No Engagement Yet	N/A			Introduction letter to be sent from LBH advising of works & contractor
	Design Planning & Consultation		Neutral		2	2	No Engagement Yet	N/A	None	No Engagement Yet	N/A			Meet the contractor event to be scheduled to take
	Delivery Phase		Neutral		2	1	RLO	Info Sharing	Letter, Appts	Frequent	As Needed			Introduction letter to be sent from Contractor,
	Completion & Handover		Supporting		2	1	Contractor	Info Sharing	Letter, Appts	Adhoc	At the End			including information around client data.
Leaseholders	Enabling and Pre-Construction	Customer	Unaware	Wellbeing/Satisfaction	2	2	No Engagement Yet							
	Design Planning & Consultation		Neutral		2	1	RLO							
	Delivery Phase		Neutral		2	1	RLO							
	Completion & Handover		Resistant		2	1	Multiple Teams							
Councillors	Enabling and Pre-Construction	Influencer	Supporting	Project Goals & Succes Project Budget & Cost Control Resident Satisfaction Political	1	1	SLT	Consultation	Cabinet Reports, Theme Board	Frequent	Monthly			Councillors to be involved/aware of procurement process To be made aware of contractual award
	Design Planning & Consultation		Supporting		1	1	SLT	Info Sharing	Update Reports	Occasional	As Needed			Local and Cllrs to be invited to meet the contractor event.
	Delivery Phase		Supporting		2	1	Multiple Teams	Info Sharing	Update Reports	Occasional	As Needed			Site visit to be offered to lead members.
	Completion & Handover		Supporting		2	1	SLT	Info Sharing	Email	Adhoc	As Needed			Information & support provided for any escalated concerns/issues.
Housing / Sheltered Officers	Enabling and Pre-Construction	Client	Supporting	Project Goals & Succes Resident Satisfaction	2	2	No Engagement Yet	N/A	None	No Engagement Yet	N/A			
	Design Planning & Consultation		Supporting		2	2	Project Manager	Info Sharing	Email	Adhoc	As Needed			Housing and/or Sheltered Officers to be made
	Delivery Phase		Supporting		2	1	RLO	Info Sharing	Email	Occasional	As Needed			aware of works and the programme
	Completion & Handover		Supporting		2	1	RLO	Info Sharing	Email	Occasional	As Needed			Support to be raised & identified as needed.
Leasehold Team	Enabling and Pre-Construction	Contributor	Supporting	Project Goals & Succes Project Budget & Cost Control Resident Satisfaction	1	1	SLT	Consultation	Update Reports	Frequent	As Needed			
	Design Planning & Consultation		Leading		1	1	Project Manager	Partnership	Meeting, Email, Update Reports	Very Frequent	Weekly			Leasehold Team be aware of upcoming programme To be made aware of contractual award / costing / schedule
	Delivery Phase		Supporting		2	1	RLO	Info Sharing	Update Reports	Occasional	As Needed			To Identify / Initiate C.S.D Proces
	Completion & Handover		Supporting		2	1	Project Manager	Partnership	Update Reports	Frequent	As Needed			Introduction letters to be shared for information Escalation for additional action where required.
Asset Management	Enabling and Pre-Construction	Contributor	Supporting	Project Goals & Succes Environmental Impact Data Management	2	1	Project Manager	Partnership	Email	Occasional	As Needed		Y	
	Design Planning & Consultation		Leading		1	1	Project Manager	Partnership	Email	Frequent	As Needed		Y	Asset Team to be aware of contractual award
	Delivery Phase		Neutral		2	2	Project Manager	Partnership	Email	Frequent	As Needed			To design programme using property data
	Completion & Handover		Other		2	1	Project Manager	Partnership	Email	Frequent	As Needed			To be made aware of completed works.
Finance Management	Enabling and Pre-Construction	Contributor	Supporting	Project Budget & Cost Control	2	2	SLT	Partnership	Email	Adhoc	As Needed			
	Design Planning & Consultation		Supporting		2	1	Project Manager	Partnership	Email	Frequent	As Needed			Finance Team to be made aware of contractual
	Delivery Phase		Supporting		2	1	Project Manager	Partnership	Email	Very Frequent	Monthly			award / costings
	Completion & Handover		Supporting		2	1	Project Manager	Partnership	Email	Very Frequent	Monthly			Regular costings to be shared for budget monitoring
Repairs & Maintenance	Enabling and Pre-Construction	Other	Unaware	Work Planning Future Maintenance	2	2	No Engagement Yet	N/A	None	No Engagement Yet	N/A			
	Design Planning & Consultation		Neutral		2	2	No Engagement Yet	N/A	None	No Engagement Yet	N/A			Make R&M Managers aware of
	Delivery Phase		Neutral		2	1	Project Manager	Info Sharing	Email	Adhoc	As Needed			programme/property list
	Completion & Handover		Neutral		2	1	Project Manager	Info Sharing	Email	Adhoc	As Needed			Flags to be added to CRMs for future maintenance on specialist products.
Contractor etc	Enabling and Pre-Construction	Contributor	Supporting	Project Goals & Succes Resident Satisfaction	2	1	SLT	Partnership	Letter, Email, Contract, Meetings	Frequent	Weekly			Contractor to be awarded contract
	Design Planning & Consultation		Leading		1	1	Project Manager	Partnership	Email, Meetings	Very Frequent	Weekly			Provided property list & programme to be devised
	Delivery Phase		Leading		1	1	Multiple Teams	Partnership	Email, Meetings	Very Frequent	Monthly			Regular contract monitoring meetings to be held
	Completion & Handover		Leading		1	1	Multiple Teams	Partnership	Email, Meetings	Very Frequent	Monthly			Adhoc issues/concerns to be raised and regular conversation to be maintained
Senior Management	Enabling and Pre-Construction	Leader	Leading	Project Goals & Succes Project Budget & Cost Control Environmental Impact Data Management Resident Satisfaction	1	1	SLT	Consultation	Cabinet Reports, Theme Board	Frequent	Monthly			Certificates & Survey completion for each property Works be chartered and updated.
	Design Planning & Consultation		Leading		1	1	Project Manager	Partnership	Update Reports	Frequent	Monthly			Senior Management to be involved/aware of procurement process
	Delivery Phase		Supporting		1	1	Project Manager	Partnership	Update Reports	Frequent	Monthly			To be made aware of contractual award
	Completion & Handover		Supporting		1	1	Project Manager	Partnership	Update Reports	Frequent	Monthly			To be updated throughout the programme of works
														To be invited and made aware of any resident concerns/issues

“What is Havering’s approach to Resident Engagement?” I hear you ask

Resident Engagement


This is to certify that

Nicola Rivers

has achieved the following Qualification

NOCN_Cskills Awards Level 2 Award in Understanding Domestic Retrofit

Qualification Approval No: 603/7123/7
Learner ID: 32157920
Award Date: 20/03/2023
Certificate No: 48016056

Graham Hasting-Evans
Chief Executive
NOCN Group

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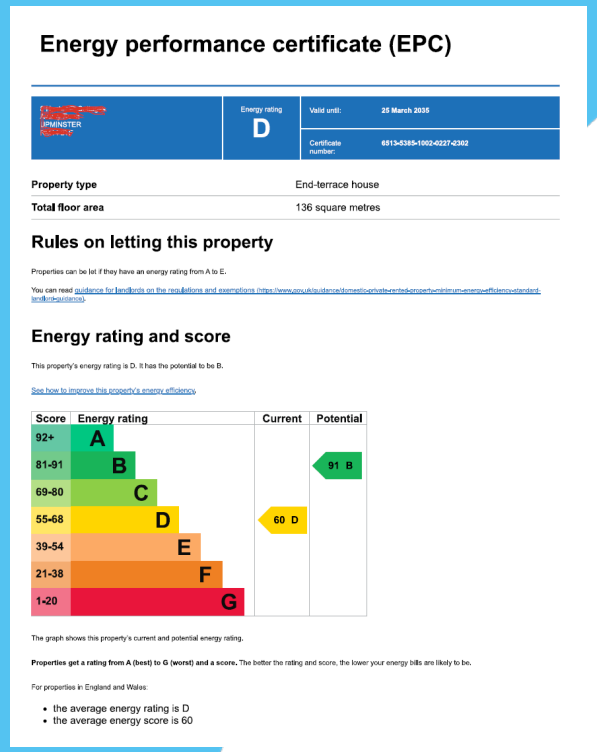


Energy performance certificate (EPC)

	Energy rating	Valid until:	25 March 2035
UPMINSTER RM14 2QP	D	Certificate number:	6913-6385-1002-0227-2302

Property type	End-terrace house
Total floor area	136 square metres

Rules on letting this property

Properties can be let if they have an energy rating from A to E.

You can read guidance for landlords on the regulations and exemptions (https://www.gov.uk/guidance/domestic-private-rented-property-minimum-energy-efficiency-standard-landlord-guidance).

Energy rating and score

This property's energy rating is D. It has the potential to be B.

See how to improve this property's energy efficiency.

Score	Energy rating	Current	Potential
92+	A		
81-91	B		91 B
69-80	C		
55-68	D	60 D	
39-54	E		
21-38	F		
1-20	G		

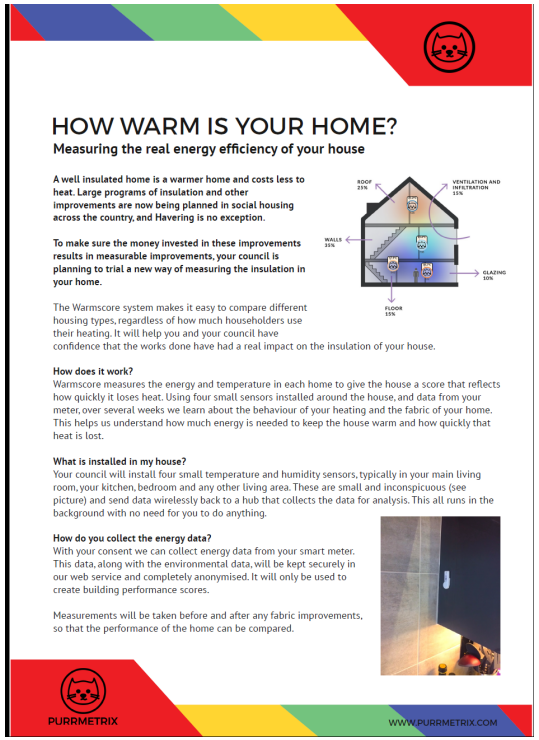
The graph shows this property's current and potential energy rating.

Properties get a rating from A (best) to G (worst) and a score. The better the rating and score, the lower your energy bills are likely to be.

For properties in England and Wales:

- the average energy rating is D
- the average energy score is 60

- Data Collection and Data Sharing
- Anyone want to buy some retrofit?



HOW WARM IS YOUR HOME?

Measuring the real energy efficiency of your house

A well insulated home is a warmer home and costs less to heat. Large programs of insulation and other improvements are now being planned in social housing across the country, and Havering is no exception.

To make sure the money invested in these improvements results in measurable improvements, your council is planning to trial a new way of measuring the insulation in your home.

The Warmscore system makes it easy to compare different housing types, regardless of how much householders use their heating. It will help you and your council have confidence that the works done have had a real impact on the insulation of your house.

How does it work?
Warmscore measures the energy and temperature in each home to give the house a score that reflects how quickly it loses heat. Using four small sensors installed around the house, and data from your meter, over several weeks we learn about the behaviour of your heating and the fabric of your home. This helps us understand how much energy is needed to keep the house warm and how quickly that heat is lost.

What is installed in my house?
Your council will install four small temperature and humidity sensors, typically in your main living room, your kitchen, bedroom and any other living area. These are small and inconspicuous (see picture) and send data wirelessly back to a hub that collects the data for analysis. This all runs in the background with no need for you to do anything.

How do you collect the energy data?
With your consent we can collect energy data from your smart meter. This data, along with the environmental data, will be kept securely in our web service and completely anonymised. It will only be used to create building performance scores.

Measurements will be taken before and after any fabric improvements, so that the performance of the home can be compared.

PURRMETRIX

WWW.PURRMETRIX.COM

Data and Persuasion

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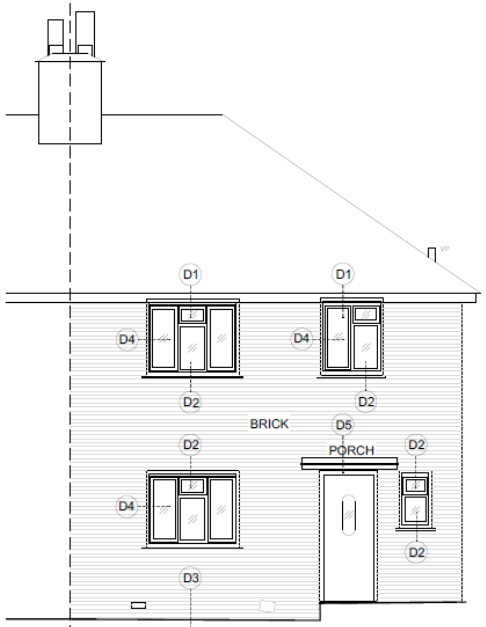

Front Elevation (Brick Slip)

So, does it work?

Comfort and Energy Savings

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Lessons Learned and the Future

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PURRMETRIX

Havering LONDON BOROUGH

ANY QUESTIONS?