

Conservation & Adaptation: Analysis of Responses to the City of Edinburgh Council Public Consultation

Report prepared for the Short-Term Working Group

21 August 2023

Dr W. Victoria Lee

Lecturer in Architecture and Environment

Edinburgh School of Architecture and Landscape Architecture



THE UNIVERSITY *of* EDINBURGH

Please cite this report as: Lee, W.V. (2023). *Conservation & Adaptation: Analysis of Responses to the City of Edinburgh Council Public Consultation*. Report prepared for the Short-Term Working Group, The City of Edinburgh Council. Edinburgh, UK.

This work was produced under a Collaboration Agreement between the City of Edinburgh Council and the University of Edinburgh, and is released under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>

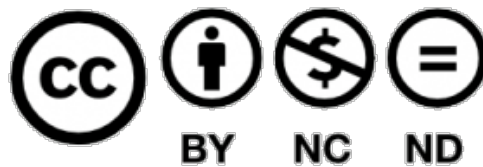


Table of Contents

0	Executive Summary	5
1	Introduction	8
2	Research Method	9
3	Profile of respondents and their properties	11
3.1	Respondent characteristics	11
3.2	Property Characteristics	13
4	Issues experienced in historic properties	16
5	Status quo of retrofit and adaptation works in historic properties.....	18
6	Current barriers to retrofit and maintenance works experienced by historic property owners	19
6.1	Difference in barriers experienced between flat and detached/terraced house property owners	19
6.2	Difference in barriers experienced between vulnerable and non-vulnerable respondents.....	20
6.3	Difference in barriers faced by respondents experiencing different changes in financial situation	20
6.4	Free text comments about barriers to retrofit and maintenance	21
7	Feedback on the CEC Listed Building and Conservation Areas Guidance.....	29
7.1	Free text comments about the CEC Listed Building and Conservation Areas Guidance.....	29
8	Feedback on the planning application process.....	33
8.1	Free text comments about the application process	33
9	Views on climate change, adaptation, comfort, and heritage conservation	35
10	Feedback on this consultation exercise.....	37
11	Conclusions	39
12	References and Resources	40

List of Figures

Figure 1 Number of respondents by age groups and change in personal financial situation in the past 12 months (based on 431 unique respondents)	12
Figure 2 Number of respondents by age groups and property types (based on 431 unique respondents)	12
Figure 3 Number of properties in the response sample by conservation area (only 33 out of 50 Conservation Areas are represented)	14
Figure 4 Number of properties by type and ownership length (based on 434 unique properties).....	15
Figure 5 Number of properties by type and potentially vulnerable status (based on 434 unique properties)...	15
Figure 6 Issues experienced in historic properties by property type; expressed as proportion (percentage %) of each property type	17
Figure 7 Retrofit/adaptation works by status (expressed as proportions of 434 unique properties)	18
Figure 8 Barriers to retrofit/maintenance works by property type; expressed as proportion (percentage %) of each property type	19
Figure 9 Barriers to retrofit/maintenance works by change in financial situation in the past 12 months; expressed as proportion (percentage %) of those answered 'no change', 'better', or 'much better', and those answered 'worse' or 'much worse'	20
Figure 10 Distribution of the degree agreement with each statement regarding the CEC guidelines. Only respondents who have read the guidelines are represented in this figure (n=289).....	29
Figure 11 Proportion of total respondents (431) by views about climate change.....	35
Figure 12 Proportion of total respondents (431) by views about adaptation, comfort, and heritage conservation.....	36
Figure 13 Proportion of total respondents (431) by views about this consultation	37

List of Tables

Table 1 Characteristics of respondents represented in the consultation survey responses (based on 431 unique respondents).....	11
Table 2 Characteristics of properties represented in the consultation survey responses (based on 434 unique properties).....	14
Table 3 Number of respondents who have applied in the past year by property type	33

0 Executive Summary

A consultation targeted towards owners of listed properties and properties in the conservation areas was carried out by the City of Edinburgh Council (CEC) from 31 March – 11 Jun 2023. The purpose of the consultation, which was conducted in the form of an online questionnaire survey, was to learn about owners' experience of maintaining, repairing, and adapting their historic properties. A total of 434 unique properties and 431 unique respondents were represented in the sample.

Overall, 33 out of 50 conservation areas were represented in the sample. The sample also has more flat properties (62%) than detached/terraced properties (33%). The vast majority of the properties dated pre-1900 and only 42% of the properties have known Energy Performance Certificate (EPC) ratings, with three-quarters in the D to G band. Half of the respondents have owned their properties for ten years or more. The sample is comprised of slightly more male-identified respondents (51%), with more than half of all respondents aged 55 or older.

Responses to the multiple-choice questions with pre-determined categories were analysed quantitatively; whereas responses to the free-text questions were qualitatively analysed and coded into themes and sub-themes. The key takeaways are as followed:

- On issues experienced in historic properties:
 - On average, flat properties have more *types* of issue than detached/terraced house properties.
 - Cold/draughts is the issue most experienced by all owners; followed by roof repairs. Whilst condensation is the third most experienced issue in flat properties, for house properties the third most experienced issue is with stonework/masonry.
 - Significantly higher proportions of flat properties have experienced the following issues: condensation, failed gutters and downpipes.
- On status quo of retrofit and adaption works in historic properties:
 - Not all works are relevant for all property types. Among the different works, 'window improvement' and 'alternative energy source' have the highest proportions of properties where the owners wish to carry out the work but face barriers.
 - 'Window improvement' and 'more efficient heating system' also have the highest proportions of properties where the owners have already carried out the work or are in the progress of doing so.
 - 'Alternative energy source' and 'flood prevention measures' have the least number of properties having had the work done.
 - Significantly higher proportion of house properties than flat properties have had 'window improvements' and 'wall or loft insulation' carried out. In contrast, significantly higher proportion of flat properties have owners that *wish* to carry out window improvements and guttering or downpipe improvements but are facing barriers.
- On current barriers to retrofit and maintenance works:
 - Financial cost is overwhelmingly the biggest barrier, selected by 70% of all respondents; followed by the process of applying for permission (55%), impact on special architectural character (49%), availability of tradespeople (35%), and seeking agreement with neighbours (32%).

- Many of the barriers in turn contribute to the overall financial cost of undertaking the retrofit or maintenance work and to the time required to carry out the work.
- Even for those who reported no change or better in their financial situation in the past year, 66% still indicated financial cost as a barrier.
- 70% of all respondents wrote in comments to elaborate on the barriers they face when maintaining or adapting their properties.
 - The cost barrier has multiple sources: upfront cost, maintenance cost, and application cost.
 - The upfront cost is exacerbated by the requirement for period-appropriate materials in the conservation areas. Most prominently, respondents found that timber frame windows to be much more expensive than uPVC frame windows. As a result, many respondents see the conservation area designation or listing status, and by extension the CEC, as a barrier itself.
 - Current available financial support has a number of limitations.
 - Additional barriers include lack of non-financial resources such as skilled and trustworthy tradespeople, as well as clear, centralised, and neutral advice on selecting and proceeding with the most cost-effective works.
- Feedback on the CEC Listed Building and Conservation Areas Guidance
 - The majority of the respondents agreed that the guidelines are clear and easy to understand. However, free-text comments suggest a more nuanced view on the current guidance.
 - There is a desire for greater clarity in terms of technical jargon (e.g. 'sightline') and certain guideline phrasings such as 'like for like', 'disrepair', or 'significant proportion'.
 - There is a desire for guidance on long term decarbonisation plan as well as community-wide approaches (especially for flat owners).
 - Comments from the respondents overwhelmingly reflected that it is possible to strike a balance between adapting to climate change and conserving historic properties if only some rules can be relaxed. Specifically, several respondents felt that permission should be allowed (or not even required) for works done on the rear façades. One respondent noted the importance of not letting 'the perfect be the enemy of the good'.
 - Owners felt that the authorities prioritise appearance over more urgent issues, such as cost-of-living crisis and the climate emergency; and that the current regulation is not in step with the time.
 - Whilst there is 'no precedent in planning', comments from many respondents clearly reflected a desire for consistency as they see many (apparent) violations around them where the rules are not reinforced.
- Feedback on the planning application process:
 - Only 28% of all respondents have applied for some form of consent in the past year.
 - A small proportion of respondents have had a positive experience. More respondents commented that the process was difficult and slow.
 - Many respondents expressed their wish for better communication from the Council in assisting with the application process and fielding queries.

- Respondent views on climate change, adaptation, comfort, and heritage conservation:
 - The respondents overwhelmingly (88%) view climate change as ‘an immediate and urgent problem’.
 - 64% of the respondents considered the preservation of architecture character and historical interest of properties to be ‘very or extremely important’. However, this is lower than the percentages of respondents who considered achieving energy efficiency, fabric adaptation, and making sustainable choices to be ‘very or extremely important’ (85%, 75%, 80%, respectively). Only a few respondents expressed in the free-text comment that conservation should be valued above all else.

- Feedback on this consultation exercise:
 - The vast majority of the respondents considered that they have been given all the information they needed (60%) and the opportunity to have their say (73%). They also agreed that the consultation was easy and clear to understand (72%).
 - Respondents expressed a clear desire to be kept informed of the outcome and to see swift actions from the Council.
 - Several respondents felt that the consultation was not sufficiently well publicised.
 - A few respondents also expressed the desire to discuss the issues in more depth (rather than via a survey) and be given the opportunity to provide suggestions directly to the authorities.

1 Introduction

This report presents the analysis of responses to the City of Edinburgh Council’s Conservation & Adaptation public consultation.¹ The consultation exercise is the first of three stages of the ‘Conservation & Adaptation’ motion agreed by the Planning Committee of the City of Edinburgh Council on 2 November 2022. The purpose of the public consultation is to understand the challenges faced by residents who own and live in listed buildings and/or conservation areas in adapting and maintaining their properties in response to the climate emergency and cost-of-living crisis.

Results of the consultation exercise serve to inform the discussions of a short-term working group (STWG) established as the second stage of the motion. The STWG is comprised of the City of Edinburgh Council’s Planning Officers and Councillors, Scottish Government Policy Officers, heritage bodies (Historic Environment Scotland, Cockburn Association, Scottish Historic Buildings Trust, Architectural Heritage Society of Scotland, and Edinburgh World Heritage), organisations addressing energy saving and fuel poverty (Changeworks, Energy Saving Trust, Edinburgh Climate Change Institute), and representatives from Edinburgh community councils and resident associations.

Discussions of the STWG, informed by the consultation responses, aim to address the following:

1. The barriers residents faced when adapting or maintaining their historic properties
2. What can currently be done to help lower the barriers;
3. What needs to be done in the longer term; and
4. Associated cost to Edinburgh’s built heritage from these changes

The City of Edinburgh Council (CEC) declared a climate emergency in 2019 and published its 2030 Climate Strategy in December 2021.² The strategy sets out the ambition for the city to become net zero by 2030, which requires a radical reduction of CO₂ emission across all sectors, including a 25% reduction in average household electricity and gas use for at least 50,000 homes across the city. It is no surprise then that Priority 1 of the Climate Strategy is to accelerate energy efficiency in homes and buildings.

In Scotland, Pre-1919 buildings make up 19% of the existing housing stock.³ The percentage is likely higher in Edinburgh as the city has one of the highest concentrations of listed buildings in the UK outside of London. Out of almost 68,000 listed buildings in Scotland, more than 10,000 are located in Edinburgh.⁴ As the Council has double statutory duty to achieve the carbon reduction target and to protect the city’s historic buildings, measured considerations are required in balancing heritage conservation and energy efficiency adaptations.

¹ The original consultation call can be found at: <https://consultationhub.edinburgh.gov.uk/sfc/conservation-adaptation2023/>

² The strategy is available at: <https://www.edinburgh.gov.uk/climate-2/climate-target-net-zero-2030>

³ Scottish House Condition Survey 2021. Available at: <https://www.gov.scot/collections/scottish-house-condition-survey/#technicalreports>

⁴ Based on Historic Environment Scotland’s 2020 Listed Building database, available at: <https://portal.historicenvironment.scot/downloads/listedbuildings>

2 Research Method

This consultation was carried out as a questionnaire survey developed by the City of Edinburgh Council (CEC) Planning – Built Heritage Team and hosted online at the CEC's *Consultation and Engagement Hub* (<https://consultationhub.edinburgh.gov.uk/>). The consultation was open from 31 March – 11 Jun 2023 and targeted towards residents who own and live in listed buildings and/or conservation areas.

In addition to the usual promotion carried out by the Consultation and Engagement Hub via its website and mailing lists, the consultation was promoted via the following channels:

- CEC's corporate communication channels including the main page of the CEC website;
- The CEC planning blog website (<https://planningedinburgh.com/>);
- Relevant social media channels such as 'My Neighbourhood' where they are covered by conservation area designations and/or have a high concentration of listed buildings;
- Planning Committee members' Community Councils and Resident Associations;
- CEC Planning's partner organisations: Historic Environment Scotland (HES) and Edinburgh World Heritage (EWH)
- Other organisations of interest such as Home Energy Scotland, Changeworks, and the Cockburn Association

Paper copies of the questionnaire survey were made available at all Edinburgh public libraries. The hard copy was created as a bespoke form that can be filled in by hand and submitted at the libraries. All library staff were briefed on the consultation and were available to facilitate the public in filling in the consultation through the libraries' computers. Service was also offered at the libraries to translate the survey into different languages or Braille. However, at the end of the consultation period, no paper copies have been completed. This analysis report therefore focuses entirely on the online survey responses.

This analysis report is based on the de-identified version of the data where each respondent's name, email, and organisation represented (if provided) were removed. The data were validated to remove duplicate responses, spams, tenants, and those whose properties are neither listed nor located within a conservation area. In total, there were **448 validated submitted responses**; nine of which are on behalf of organisations. Responses representing an entire organisation (n = 9) are omitted from descriptive and statistical analysis (e.g. split of building type, respondent age group) in this report.

Several respondents own more than one property and completed the survey once for each property. On the other hand, several properties have co-owners and each owner submitted separate responses. To avoid double counting, wherever the survey question pertains to the property (e.g. building type), percentages are calculated based on the number of **unique properties (n = 434)**; whenever the question pertains to individual opinions (e.g. views on climate change), percentages are calculated based on the number of **unique respondents (n = 431)**.

The questionnaire survey was set up such that respondents can skip questions they do not wish to answer or select 'prefer not to say', leading to missing data in certain questions. A technical error with the survey platform also resulted in a small proportion of the respondents not shown four questions pertaining to their properties. In this report, 'NA' or 'not available' is used to indicate these missing responses.

The questionnaire survey contains 26 questions, of which four were free-text and three had both a multiple-choice and free-text (e.g. 'other') component. Responses to the multiple-choice questions with pre-determined categories were analysed quantitatively; whereas responses to the free-text questions were qualitatively analysed and coded into themes and sub-themes. Both quantitative and qualitative analyses are presented in this report.

There were four free-text comment sections where respondents can elaborate on the barriers they face and comment on the existing guidelines, application process, and this consultation exercise. Analysis of the free-text comments includes all unique respondents as well respondents representing organisations ($n = 431 + 9 = 440$). However, not all respondents made comments in all sections. Out of 440 responses, 70% ($n = 299$) commented on the barriers they face when maintaining or adapting their properties; 33% ($n = 146$) provided comments and/or suggestions about the guidelines; 26% ($n = 112$) commented on their application experiences; and 32% ($n = 140$) made comments on this consultation. There was no word limit to any of the comment sections. Altogether, free-text comments amount to around 38,000 words. As part of data protection best practice, if the respondents included personal information (e.g. address or application number) in their comments, these were redacted before their quotations are used in this report. All capital emphasis in quotations are the respondents' own.

3 Profile of respondents and their properties

This section provides an overview of the respondents (n=431) and their properties (n=434).

3.1 Respondent characteristics

A breakdown of respondent characteristics (that were asked in the questionnaire survey) is summarised in Table 1. There are slightly more respondents who identified as male. Just over 50% of all respondents (222 out of 431) are 55 or older. The majority of the respondents (72%) reported no health conditions but around 16% of the respondents (n = 70) indicated that their day-to-day activities are at least a little reduced due to their health condition. Just over 27% of the respondents (n = 118) noted having caring responsibilities; most of which (n = 79) is for the caring of children under 18.

Just under half (47%) of all respondents indicated that their personal financial situation has worsen over the past year. Over one third (37%) of the respondents reported no change whereas 11% indicated that their situation has improved. Figure 1 illustrates the breakdown of the respondents by age group and change in personal financial situation. The proportion of respondents reporting faring worse is slightly higher among the younger age groups; whereas the proportion reporting no change is higher among the older age groups (65+).

Sex	
Female	190 (44.1%)
Male	221 (51.3%)
Other/Prefer not to say	20 (4.6%)
Age Group	
16-24	4 (0.9%)
25-34	38 (8.8%)
35-44	73 (16.9%)
45-54	83 (19.3%)
55-64	98 (22.7%)
65-74	84 (19.5%)
75+	40 (9.3%)
NA/Prefer not to say	11 (2.6%)
Physical/mental health conditions lasting/expected to last 12 months+?	
No	311 (72.2%)
Yes	78 (18.1%)
NA/Prefer not to say	42 (9.7%)
Condition/illness reduce ability to carry out day-to-day activity?	
Not at all	235 (54.5%)
Yes, a little	58 (13.5%)
Yes, a lot	12 (2.8%)
NA/Prefer not to say	126 (29.2%)
Caring responsibility?	
No	283 (65.7%)
Yes	118 (27.4%)
NA/Prefer not to say	30 (7.0%)
Change of personal financial situation over the past 12 months	
Much better	4 (0.9%)
Better	45 (10.4%)
No change	160 (37.1%)
Worse	167 (38.7%)
Much Worse	36 (8.4%)
NA/Prefer not to say	19 (4.4%)

Table 1
Characteristics of respondents represented in the consultation survey responses (based on 431 unique respondents)

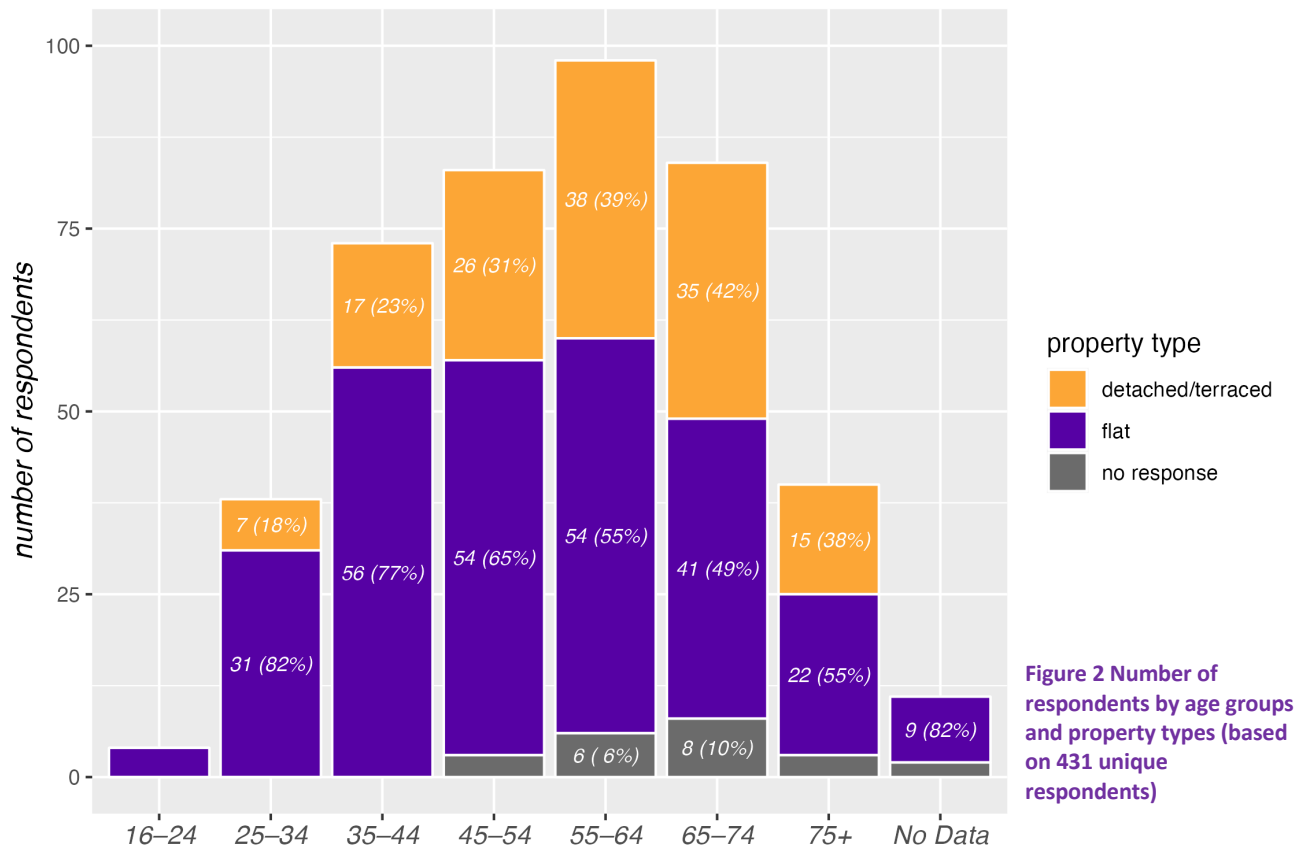
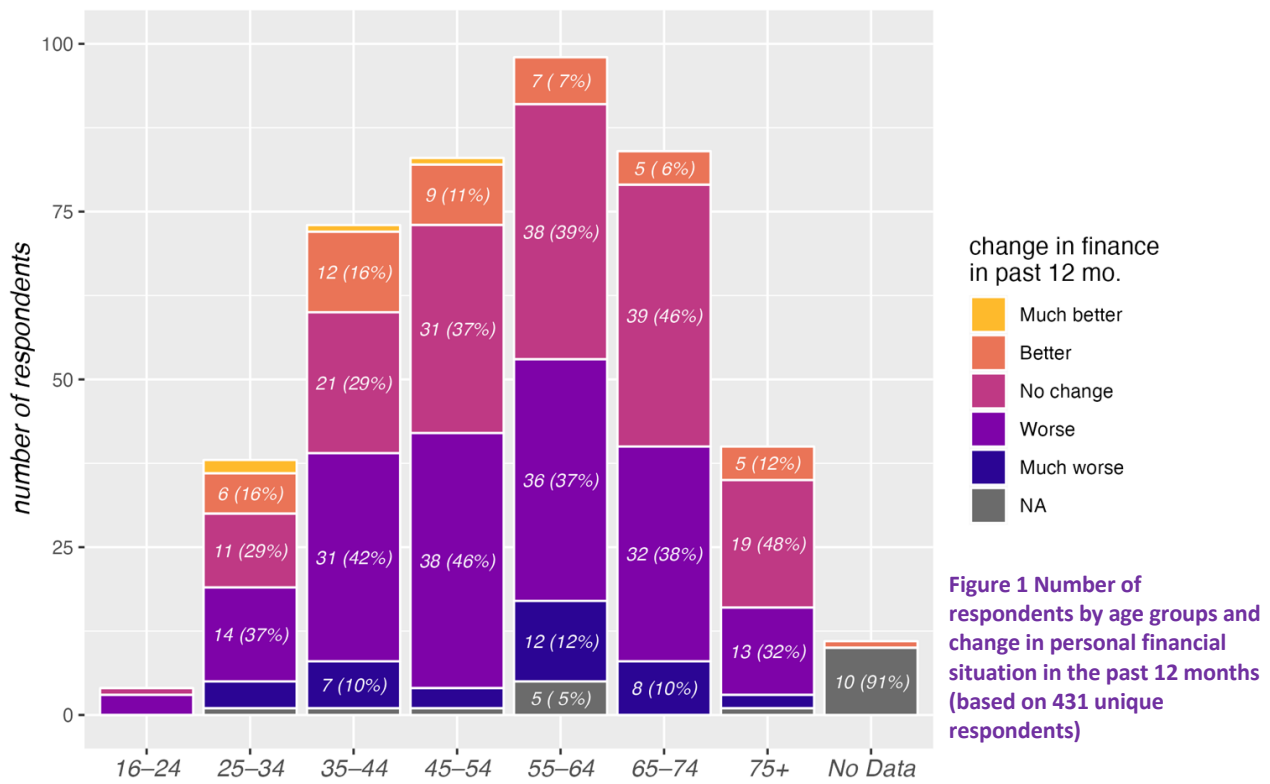


Figure 2 illustrates the breakdown of the respondents by age group and property type. Detached, semi-detached, and terraced properties are grouped together as 'houses' as these properties typically do not share either floor or ceiling with others. Significantly higher proportion of respondents in the younger age groups (especially under 45) are flat owners.

3.1.1 Potentially vulnerable respondents

Vulnerable population is typically defined as those at greater risk of poor physical, mental or social health. The vulnerable status is determined differently in different contexts, but is usually based on various demographic and socioeconomic factors. In this consultation survey, not all relevant attributes (e.g. disability, household income) were collected. Of the attributes that were asked in the survey, almost a third of the respondents (29%) prefer not to answer one or more of the questions. As a result, there is insufficient data to perform a rigorous comparison between vulnerable and non-vulnerable respondents. However, some information collected in the survey *potentially* point to a possible vulnerable status. These are the following:

- Answered 'yes' to the question 'Do you have any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?' (n = 78 out of 431 unique respondents); or
- Selected 'yes, a lot' to the question 'Does your condition or illness/do any of your conditions or illnesses reduce your ability to carry-out day-to-day activities?' (n = 12); or
- Of age group '75+' (n = 40); or
- Indicated they are the primary carer for disabled children, disabled adults, or elderly (n = 23)

Based on these criteria, a total of 116 *potentially* vulnerable respondents were identified. Analysis by this potentially vulnerable status was performed wherever relevant in the rest of this report.

3.2 Property Characteristics

A breakdown of property characteristics (that were asked in the questionnaire survey) is summarised in Table 2. There are more house-type properties (detached or terraced/semi-detached dwellings that do not share floor or ceiling with another unit) than flat/maisonette-type properties. Usurprisingly, the vast majority of the properties (80%) are noted as pre-1900. Importantly, 14% of the properties do not have an Energy Performance Certificate (EPC) and almost half of the properties (44%) are missing this information.

The City of Edinburgh has 50 Conservation Areas. However, only 33 are represented in this consultation (Figure 3). New Town has the most representation at 32% of all properties, followed by Stockbridge Colonies at 11% and Marchmont, Meadows, and Bruntsfield at 8%. It should be noted that not all listed properties are situated within a conservation area, although the majority of them do. In this report, 'historic property' is used to refer to both listed properties and properties that are not listed but located inside a conservation area.

A significantly higher proportion of house owners have owned their properties for 10 years or more (Figure 4). There is no significant difference between the property types in terms of the owners' potentially vulnerable status (Figure 5).

Listed / Conservation Area Status	
In CA only	129 (29.7%)
Listed and in CA	292 (67.3%)
Listed only	13 (3.0%)
Property Type	
Detached	10 (2.3%)
Terraced/Semi-detached	131 (30.2%)
Flat/maisonette	270 (62.2%)
NA (missing data)	23 (5.3%)
Property Age	
Pre-1900	346 (79.7%)
1900s	62 (14.3%)
2000s	5 (1.2%)
NA (missing data)	21 (4.8%)
Property EPC	
A to C	47 (10.8%)
D to G	136 (31.3%)
Don't have an EPC	62 (14.3%)
NA (missing data)	189 (43.5%)
Ownership length	
< 2 years	60 (13.8%)
2 to < 5 years	62 (14.3%)
5 years to < 10 years	77 (17.7%)
10+ years	215 (49.5%)
NA (missing data)	20 (4.6%)

} Grouped together as 'houses'

Table 2
Characteristics of properties represented in the consultation survey responses (based on 434 unique properties)

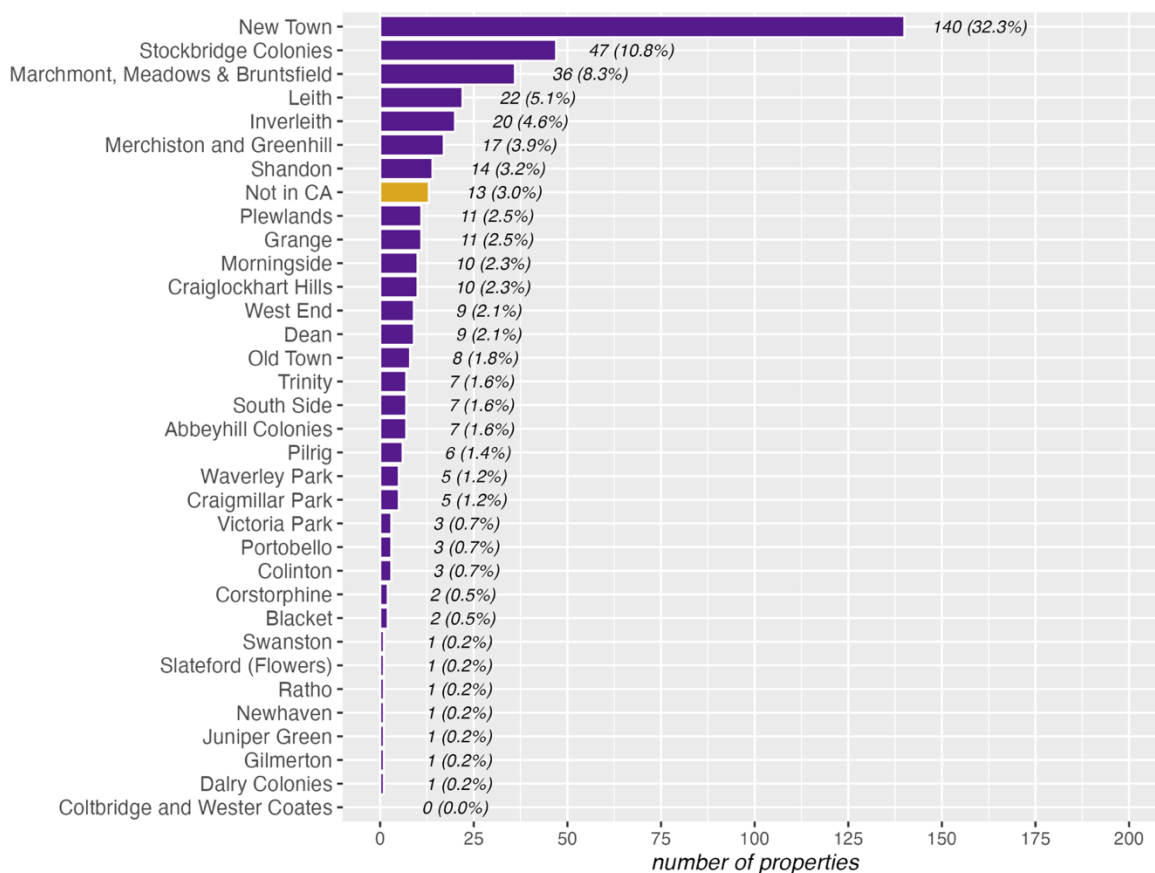


Figure 3 Number of properties in the response sample by conservation area (only 33 out of 50 Conservation Areas are represented)

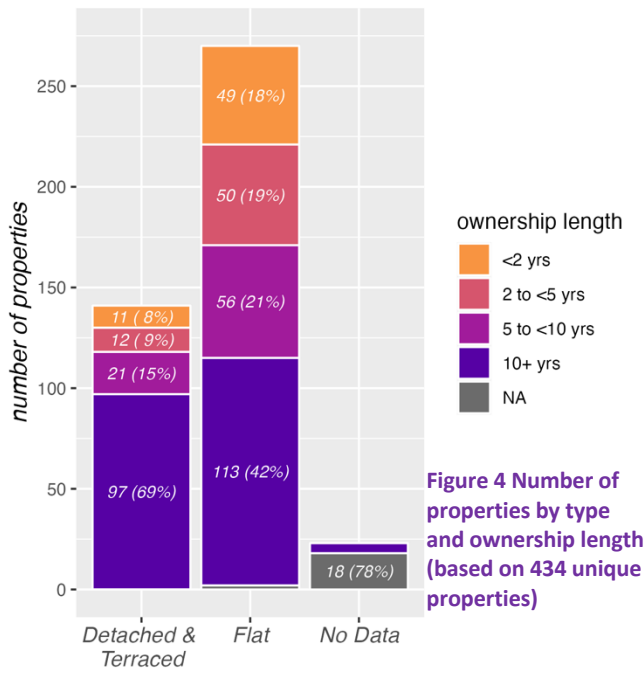


Figure 4 Number of properties by type and ownership length (based on 434 unique properties)

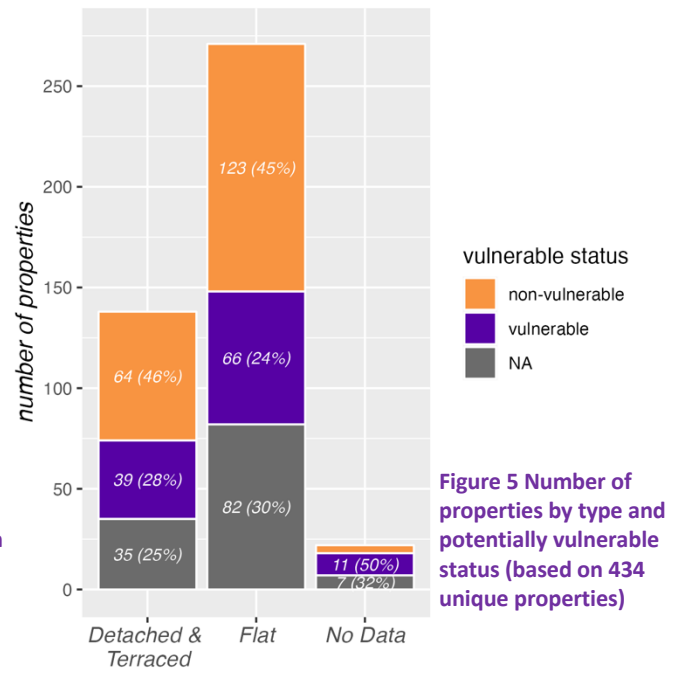


Figure 5 Number of properties by type and potentially vulnerable status (based on 434 unique properties)

4 Issues experienced in historic properties

Question phrasing as appeared in the survey:

Have you experienced any of the following in relation to your property / properties? (Tick all that apply)

- Damp to external walls
- Damp to internal walls
- Mould
- Condensation
- Wet and dry rot
- Water ingress/flooding
- Drainage issues
- Failed gutters and downpipes
- Roof repairs/structural issues
- Overheating
- Cold/draughts
- Poor ventilation
- Issues with stonework/masonry
- Others

Out of 434 properties, only 26 (6%) had not experienced any issue. On average, flat properties have more types of issue than detached/terraced house properties. Specifically, owners of detached/terraced houses experienced 3.9 ($sd^5=2.4$) different types of issues, whereas for flat owners it is 4.6 ($sd= 2.5$). This difference is statistically significant ($p^6 < .05$) with a small effect size (0.25), which measures the *strength* of that difference. Figure 6 illustrates the *proportion* (expressed as percentages) of each property type experiencing each issue. A comparison by proportion rather than by the number of properties is necessary because the numbers of house and flat properties differ widely (141 vs. 271).

For both detached/terraced houses and flats, cold/draughts is the issue most experienced by owners; followed by roof repairs. Whilst condensation is the third most experienced issue in flat properties, for house properties the third most experienced issue is with stonework/masonry. Several respondents wrote in element-specific issues, including:

- Window repair and maintenance (n = 11)
- No or poor loft/wall insulation (n =10)
- Single-glazed cupolas (n = 3)

Two respondents also noted 'traffic noise' as an issue.

The *proportions* of each property type experiencing each issue are comparable for the most part. However, significantly more flat properties have experienced the following issues than have house properties. These differences are statistically significant.

- Condensation ($p < .01$, effect size = 0.29)
- Failed gutters and downpipes ($p <.01$, effect size = 0.30)

⁵ sd = standard deviation

⁶ p -value = probability that the data would have occurred by random chance. In this instance, $p < .05$ means that there's less than 5% chance that the difference we observe between the number of issues house owners and flat owners experienced happen by random.

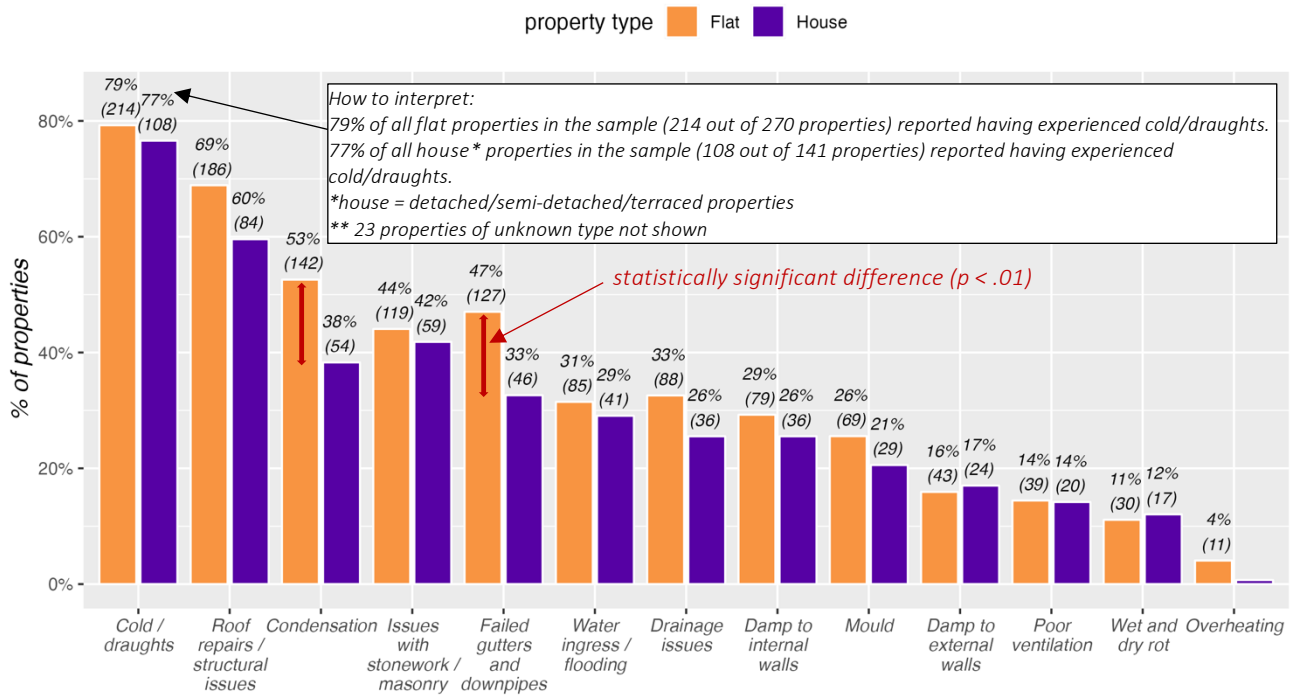


Figure 6 Issues experienced in historic properties by property type; expressed as proportion (percentage %) of each property type

5 Status quo of retrofit and adaptation works in historic properties

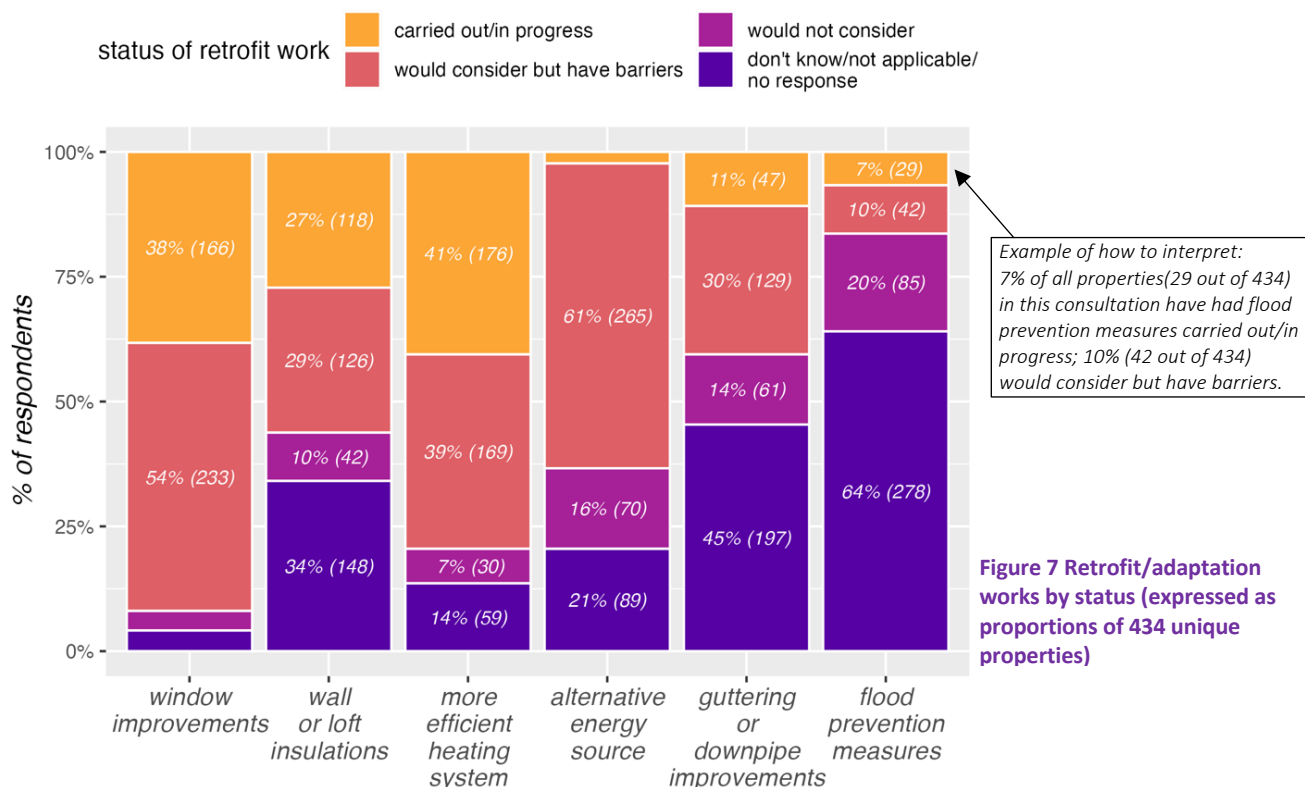
Question phrasing as appeared in the survey:

Have you considered carrying out any of the following works to your property / properties?

- Window improvements such as double or secondary glazing
- Cavity wall or loft insulation
- Adaptation / installation of guttering and downpipes to increase capacity and/or provide rain overflow outlets
- Installation of flood prevention measures to your building; its boundaries; or within garden ground / site
- Installation of new heating system such as a more energy efficient boiler
- Installation of an alternative energy source heating system such as an air / ground source heat pump, solar panels, wind turbine or other

Figure 7 illustrates the status breakdown of each retrofit/adaptation work. Not all works are relevant for all property types. Among the different works, ‘window improvement’ and ‘alternative energy source’ have the highest proportions of properties where the owners wish to carry out the work but face barriers (54% and 61%, respectively). ‘Window improvement’ and ‘more efficient heating system’ also have the highest proportions of properties where the owners have already carried out the work or are in the progress of doing so. ‘Alternative energy source’ and ‘flood prevention measures’ have the least number of properties having had the work done (n = 10 and n = 27, respectively).

A statistical analysis comparing the status of work between houses and flats found that significantly higher proportion of house properties than flat properties have had window improvements carried out (46% vs. 33 %; $p < .05$, effect size = 0.27) and wall or loft insulation carried out (46% vs. 17 %; $p < .001$, effect size = 0.63). In contrast, significantly higher proportion of flat properties have owners that wish to carry out window improvements (61% vs. 42%; $p < .001$, effect size = 0.63) and guttering or downpipe improvements (33% vs. 21%; $p < .05$, effect size = 0.27) but are facing barriers.



6 Current barriers to retrofit and maintenance works experienced by historic property owners

Question phrasing as appeared in the survey:

What barriers prevent you from doing work to maintain or adapt your property / properties? (Tick all that apply)

- Financial cost
- Don't know who to contact or where to look for advice or support
- Process of applying for appropriate consent / permissions
- Availability of skilled tradespeople and professionals
- Timescales to undertake work
- Complexity of work required
- Seeking agreement with neighbours for shared repairs / work to be carried out
- Impact on the special architectural character or historical interest of the building / area
- Other

6.1 Difference in barriers experienced between flat and detached/terraced house property owners

When asked to identify the barriers that prevent works being carried out, 70% of all respondents (303 out of 434 properties) selected financial cost, 55% (238 out of 434) selected the process of applying for permission, 49% (212 out of 434) selected impact on special architectural character as barriers, followed by the availability of tradespeople at 35% (153 out of 434) and seeking agreement with neighbours at 32% (139 out of 434). It is important to recognise that many of the barriers in turn contribute to the overall financial cost of undertaking the retrofit or maintenance works (discussed in section 6.4 below).

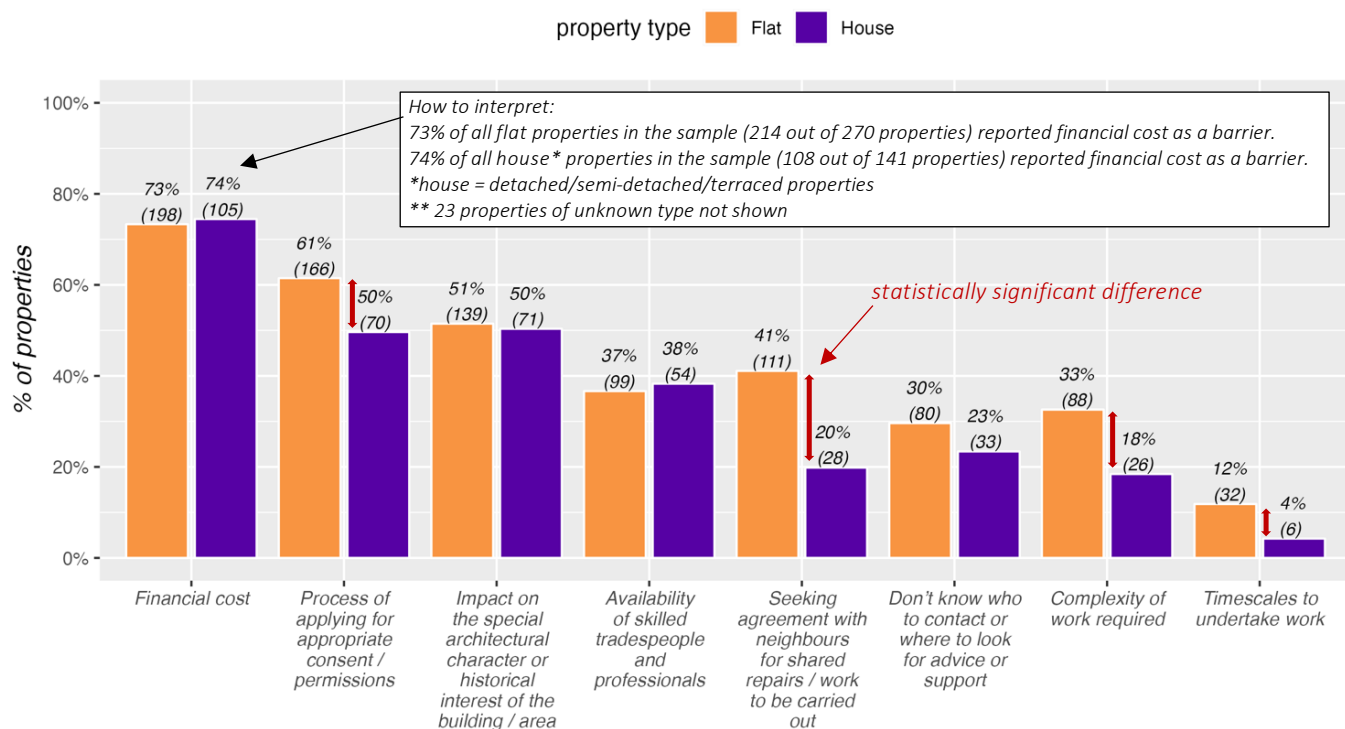


Figure 8 Barriers to retrofit/maintenance works by property type; expressed as proportion (percentage %) of each property type

The average number of barriers owners of detached/terraced houses have is 2.8(sd=1.6), whereas for flat owners it is 3.4(sd= 1.7). This difference is statistically significant ($p < .001$) with a small effect size (0.36), which measures the *strength* of the difference.

Figure 8 illustrates the breakdown of the barriers experienced by property types. Significantly higher proportions of flat properties have experienced the following barriers than have house properties. These differences are all statistically significant:

- Process of applying for appropriate consent/permissions ($p < .01$, effect size = 0.33)
- Seeking agreement with neighbours for shared repairs/work to be carried out ($p < .001$, effect size = 0.47)
- Complexity of work required ($p < .01$, effect size = 0.33)
- Timescales to undertake work ($p < .05$, effect size = 0.29)

6.2 Difference in barriers experienced between vulnerable and non-vulnerable respondents

No statistically significant difference in barriers experienced were found between potentially vulnerable and non-vulnerable populations. However, this result should be interpreted cautiously, because not enough data were collected to compare between potentially vulnerable and non-vulnerable respondents, as explained in section 3.1.1.

6.3 Difference in barriers faced by respondents experiencing different changes in financial situation

There is, however, a statistically significant difference in the financial burden experienced between respondents who have had no change (or fared better) in personal financial situation and respondents who had fared worse in the past year (Figure 9).

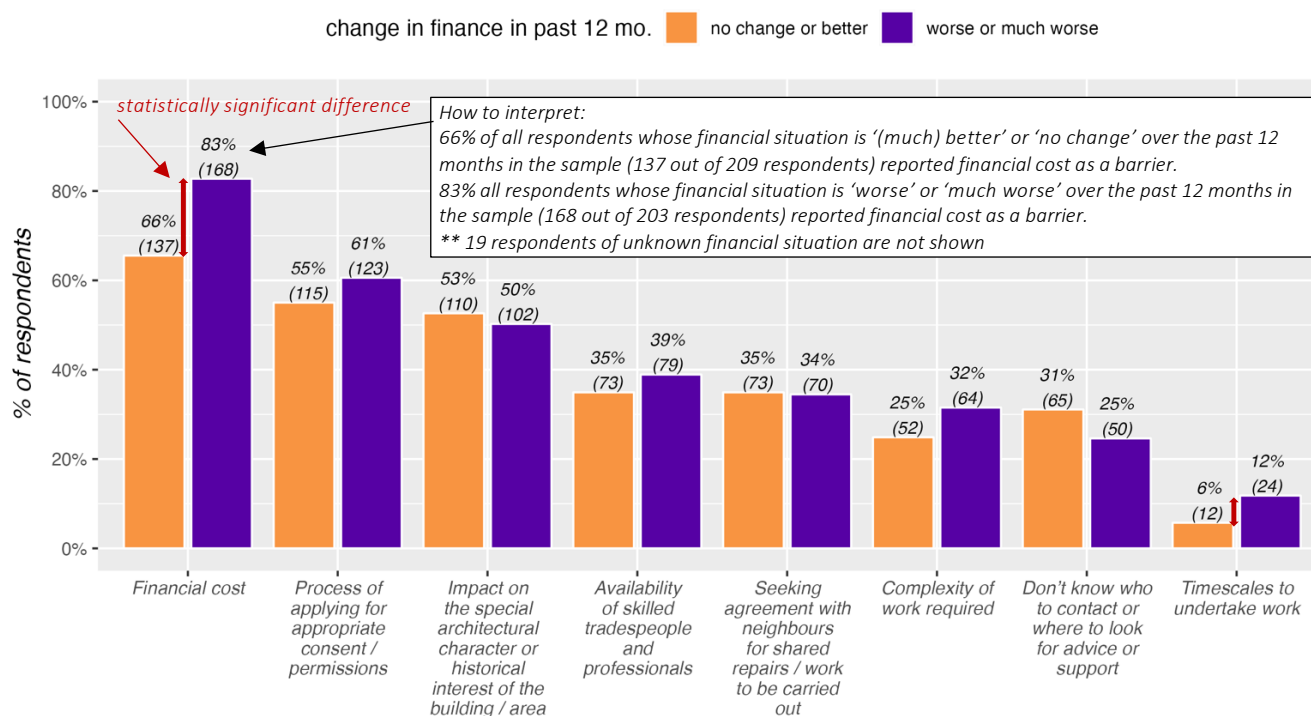


Figure 9 Barriers to retrofit/maintenance works by change in financial situation in the past 12 months; expressed as proportion (percentage %) of those answered 'no change', 'better', or 'much better', and those answered 'worse' or 'much worse'

This difference is strongly statistically significant ($p < .00001$) and is of medium-large effect size (0.40), which measures the *strength* of the difference. It is important to note that even for those who reported no change or better in their financial situation in the past year, 66% still indicated financial cost as a barrier. The other barrier that affected different property types disproportionately is ‘timescales to undertake work’, where again it is the respondents who had fared worse in the past year who had a higher proportion facing this barrier ($p < .05$, effect size = 0.22). However, notably overall this barrier is only experienced by 8% ($n = 36$) of all respondents (regardless of property type).

6.4 Free text comments about barriers to retrofit and maintenance

Question phrasing as appeared in the survey:

Please use the space below for any comments relating to the barriers you face when maintaining or adopting your property/properties.

The free text analysis accounts for comments by all unique respondents, including respondents representing organisations ($n=440$). Out of 440 responses, 299 (70%) wrote in comments to elaborate on the barriers they face when maintaining or adapting their properties.

6.4.1 Unpacking the cost barrier

As previously shown, cost is overwhelmingly the most encountered barrier – selected by 70% of all respondents including those who reported no change or better in their personal financial situation in the past year. In addition to selecting ‘financial cost’ in the survey question, 123 respondents elaborated on this particular barrier in the free-text comment section. Analysis of these comments suggests three sources of cost when considering or undertaking retrofit and maintenance work in a historic property:

1. Upfront cost of having the work done

A total of 52 respondents remarked on how the upfront cost is exacerbated by the requirement for period-appropriate materials in the conservation areas. Most prominently, respondents found that timber frame windows to be much more expensive than uPVC frame windows.

- ‘The cost of using traditional materials is a major barrier. We recently replaced out original, single-glazed sash and case windows with policy compliant double glazing. The additional costs compared with using modern alternatives was significant - possibly £10,000 more.’ – age 45-54
- ‘The ban on PVC windows in conservation areas makes keeping draughts out totally unaffordable...PVC sash and case are almost a third of the price of timber (we were quoted £11k for sash and case PVC that look just like timber from the street, compared to £27k plus timber maintenance for timber)...I appreciate that timber can last longer, but the upfront cost is so high that we just can’t afford it.’ – age 35-44
- ‘We have had quotes to have [single-glazed windows] replaced but because we are a listed building it will cost over £30,000 to have all the windows in our house replaced in accordance with the Listed Buildings Consent process. This is because it requires us to use timber sash and case windows rather than being able to use more modern materials which are cheaper and, as advised by the glaziers, more effective/efficient. If we could use these cheaper options (e.g. aluminium/PVC) we could afford to replace our windows.’ – age 35-44
- ‘The requirement to ensure that window/door replacements match the design and materials utilised in the existing build means that installing double glazing is prohibitively expensive. I have been quoted from around £14k-£16k for double-glazed sash windows, which I simply cannot afford. This would be prohibitively expensive at the best of times, but the current cost-of-living crisis means I have less disposable income to save for energy

efficiency improvements, and current rates of interest mean that borrowing money to fund improvements is similarly unaffordable. – age 25-34

- ☞ *'...to replace with wood would cost at least double, which for something which is already expensive is prohibitive.'* – age 45-54
- ☞ *'The only windows which are allowed under planning restrictions are 3 to 4 times more expensive than uPVC windows.'* – age 65-74
- ☞ *'Cast iron gutter and drainage (external) pipes are very costly and alternatives should be possible! Repairs to listed buildings are more expensive because of expensive materials and labour'* – age 65-74
- ☞ *'Cast iron guttering to the rear of the building should probably be replaced. However planning portal says it must be replaced by cast iron. Cost of this is currently around £37 per metre. Cost of cast iron effect PVC guttering is currently around £8 per metre.'* – age 65-74

Furthermore, due to limits on the width of the between-pane cavity (in order to preserve window sightlines⁷) many respondents felt that the only double-glazing option they have is the slim-profile type, which is inferior to the standard double-glazing windows (with wider between-pane cavity) in terms of thermal performance and durability:

- ☞ *'Slimelite is twice as expensive as regular double glazing. The units also fail more and need replacing.'* – age 35-44
- ☞ *'Given the cost involved in installing double glazing & the fact it may have to be a slimline version in order to comply with regulations & the reduced effectiveness of thermal gain with slimline units as opposed to normal gap units make me consider whether the cost is justifiable for the performance gain.'* – age 65-74
- ☞ *'The required windows that are within the regulation for our type of listed building are excessively expensive and do not deliver adequate improvement to the EPC.'* – age 35-44
- ☞ *'I have slimline glazing which helps but still have lots of draughts and this means heating costs are very high.'* – age 75+

Research⁸ conducted by Glasgow Caledonian University in 2010 has demonstrated that slim-profile⁹ double glazing provides 'a significant improvement [over single-glazing but] are not optimised for thermal performance'. Specifically, the whole-window U-values¹⁰ of the slim-profile double-glazed windows range between 2.3-3.4 W/m²K (depending on the type of gas used to fill the gap; vacuum can bring it down to 1.9 W/m²K but is significantly more expensive); whereas a single-glazed window is 5.2 W/m²K.¹¹ As a comparison, the Scottish Building Standards for new build domestic properties stipulated a maximum U-value (i.e. worst allowed) of 1.4 W/m²K for windows.¹² The Glass and Glazing Federation (GGF) has also issued a statement¹³ expressing their concern that many slim-profile double glazing windows may not conform to BS EN 1279 (a product standard for the manufacture of insulated sealed glass units).

⁷ Window sightline refers to the amount of window frame you see when viewed from the front of the window; wider between-pane cavity means a thicker overall window ensemble which requires thicker frame to hold

⁸ Baker, Paul (2010). 'In situ measurements of the U-values of double glazed replacement units in Georgian sash and casement windows'. Part of Historic Environment Scotland's Technical Paper 09, available at <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8c01582b-c71e-45d7-8991-a59400e44b0d>

⁹ Often referred to as 'slimline' or 'slimlite', which is a product name of one of many available slim-profile double glazing windows

¹⁰ Whole-window U-value differ from U-value of the glass pane as it accounts for thermal bridging such as via astragals

¹¹ Baker, Paul (2010). 'Calculation of whole-window U-values from in-situ measurements'. Also part of Historic Environment Scotland's Technical Paper 09.

¹² Building Standards Domestic Technical Handbook: June 2023 Edition. Available at <https://www.gov.scot/publications/building-standards-technical-handbook-2023-domestic/>

¹³ <https://www.ggf.org.uk/low-sightline-insulated-glass-units/>

2. Cost of maintenance

The extra cost of period-appropriate material carries over to the maintenance of properties. With respect to windows replacement, several respondents commented on their wish to avoid wood frame windows not only due to the higher upfront cost, but also the ongoing cost (and hassle) of repainting:

- ☞ *'Wooden window frames rots are costly to try and maintain especially if they are 7 foot high.'* – age 55-64
- ☞ *'I do not want wooden frames as that is extra cost for painting. I have kept my windows when replaced in the 80's to sash style which is in keeping but would like to change to triple glazing still sash but without the upkeep of painting them.'* – age 55-64
- ☞ *'Wooden windows also require ongoing maintenance (repainting) in a way that PVC does not.'* – age 45-54

3. Cost of applying for permission

Whilst the Listed Building Consent application does not carry a fee, planning permission and building warrant applications do. But in addition to the application fees, respondents also found the cost of managing this process – specifically the hiring of professionals to deal with the paperwork and do the required drawings – added to the overall cost of carrying out work on their properties:

- ☞ *'The financial cost of these measures is also prohibitive to start with so adding additional planning costs makes it unpalatable.'* – age 35-44
- ☞ *'...paying for planning permission, even though it was a few hundred pounds meant I did not go ahead.'* – age 55-64
- ☞ *'It is so costly to have to get drawings each time we want to do any work to our homes because of the need for a building warrant.'* – age 35-44
- ☞ *'Had to get an architect involved as there is no way I'd try myself. This makes it very expensive to even simply get permissions!'* – age 45-54

However, from the comments there emerged areas where clarifications may make the planning application process easier and, in some cases, obviate the need to hire a professional and therefore reduce the cost associated with the application process. For instance, the below respondent noted:

- ☞ *'Perhaps add to portal that an architect's survey of property may not always be required. When I applied for permission to replace windows, the information showed that I needed some property drawings ... A friendly architect told me all that was needed was a map from the Ordinance Office. Saved me vast expense and was accepted by planning.'* – age 45-54

An additional barrier related to cost is the long return on investment (ROI), especially for owners who do not plan to stay in the property long. As Figure 2 illustrates, older age group residents are more likely to be house property owners, suggesting that the younger property owners trade in their flats for detached or terraced homes as they progress through life stages such as having a family.

- ☞ *'We expect to stay only a few years, efficiency gains will take too long to pay back improvements.'* – age 25-34
- ☞ *'In our late seventies with equity release- it makes no sense.'* – age 75+
- ☞ *'Options such as secondary glazing do not give a good return on investment - the pay pack period is ten years plus even with today's electricity prices!'* – age not given
- ☞ *'We are elderly and so don't see any personal benefit.'* – age 75+

6.4.2 Conservation area designation and listing status as a barrier

The costs associated with using period-appropriate material and the application process led many respondents (n=139) to see the conservation area designation or listing status, and by extension the CEC, as a barrier itself. In answering the original survey question 'What barriers prevent you from doing work to

maintain or adapt your property?' 35 respondents selected 'other' then wrote in either 'the council' or 'conservation area':

- 💬 *'Edinburgh planning dept. forcing high cost wooden sash /case whereas modern uPVC sash/case is more cost effective with less maintenance. Almost seems like there is a closed shop with planners and wooden window companies are in cahoots.'* – age 65-74
- 💬 *'The overwhelming feeling I - and others I know - have is that the council barely want us to touch a scratch on our home and would rather have rotting old window casings than energy efficient double glazing.'* – age 45-54
- 💬 *'Having listened to the minutes from the councillors who refused [our planning application to upgrade windows], their main reasoning was that we could install timber framed windows as it was only a "little" bit more expensive. In fact the cost of doing that was £25k, 2.5X more expensive than installing PVC. They had obviously no appreciation for the cost of these kind of changes.'* – age 25-34

In terms of alternative energy source, specifically the installation of photovoltaic panels, 33 respondents noted that the conservation area status prevented them from installing or limited their installation of PV panels on their roofs:

- 💬 *'Would love to install solar and wind but as we are in a conservation area we could possibly install only a few panels where it can't be seen from the street which wouldn't make it worthwhile. it would need to be the whole roof area which would make it then worthwhile but council would object.'* – age 35-44
- 💬 *'Roofs with perfect south orientation for solar panels but barrier due to conservation area.'* – age 45-54
- 💬 *'I couldn't install on a partial flat roof because regulations say that height must not be increased'* – age 75+

6.4.3 Limitations with currently available financial support

As cost emerged as the biggest barrier, it is no surprise that many respondents expressed a wish for financial support in the form of grants or loans. A number of schemes exist. However, respondents' comments suggest that there are several limitations with the financial support that are currently available:

- Grants/loans condition tied to EPC or Home Energy Report, which does not recognise the conservation area/listed status and often recommends improvements such as internal wall insulation that is often inappropriate or unpractical for historic properties. It also ignores the impacts of certain features that are common in historic properties, such as cupola.
 - 💬 *'I still have the original single-glazed cupola which allows a huge heat loss. I have no more funds to replace this and looked to the home energy trust for funding. However because this wasn't picked up on my home energy report they were unable to give funding.'* – age 45-54
- Grants/loans application process is slow:
 - 💬 *'I did apply for loan for secondary glazing but by the time they responded the quote was out of date and I lost the will'* – age 55-64
 - 💬 *'Have accessed three HES loans but slow and bureaucratic.'* – age 45-54
- Grants/loans conditions exclude historic buildings by targeting lower-cost solutions which are not permitted in conservation area or listed buildings:
 - 💬 *'There are grants for PVC windows but if you live in a conservation area you aren't allowed to use this material so everyone with wooden frames gets no support.'* – age 65-74
 - 💬 *'Lots of schemes financing window replacement don't cover heritage windows so can't get financing for double glazing.'* – age 25-34
 - 💬 *'Many of these improvements cost lots of money and, while covered by grant funding from Home Energy Scotland, often they aren't possible in a listed building.'* – age 35-44

- Grants not available for double glazing:¹⁴
 - ☞ *'Grants are available for the installation of air-source heat pumps but only if the applicable property has already had conservation area compliant doubled glazed windows installed for which... no grants are available. The outlay for this is so considerable that it's unlikely that owners would ever afford to progress to the installation of an air-source heat pump.'* – age 65-74
 - ☞ *'Large Victorian windows greatest heat loss but no available grants.'* – age 65-74

- Grants/loans amount not sufficient:
 - ☞ *'My house has 14 single-glazed windows. I have already used the maximum allowance of the council's interest free finance scheme to upgrade 2 windows which is all I could afford because I'm in a conservation area.'* – age 45-54
 - ☞ *'An air-source heat pump, is far too expensive to afford even with grant funding.'* – age 35-44
 - ☞ *'Only had 2 double glazed windows done. loft partially insulated and tried to get a grant but was unable to although I am just above income benefit level'* – age 65-74

- Grants/loans not available for some of the 'low(er)-hanging fruits' in terms of improving energy efficiency, such as window draughtproofing, which is recommended by current guidance as a step to take before considering window replacement:
 - ☞ *'Some grants are available, but not support for the things I feel are important first (e.g. airtightness and possible ventilation, as a result).'* – age 55-64
 - ☞ *'It does not make sense to heat all rooms in the property when 2 or 3 are occupied, but the cost of smart valves (e.g. Tado¹⁵) is a barrier'* – age 35-44

6.4.4 Lack of skilled, trustworthy, and available tradespeople

Around a third of the respondents noted that the lack of appropriate tradespeople as a barrier (Figure 8). The free-text comments from 40 respondents suggest that in addition to skills (that are quality assured) and availability, trustworthiness and affordability are also important considerations:

- ☞ *'Very difficult to find tradesmen that [are] good, turn up and are not overpriced.'* – age 45-54
- ☞ *'The lack of skilled, reliable, trustworthy tradespeople to carry out any tiny jobs, let alone serious big repairs and maintenance to old, listed homes is the biggest hurdle of all.'* – age 65-74
- ☞ *'Found it difficult to find a specialist company who could repair our wooden shutters to enable them to close properly for better winter thermal efficiency.'* – age 55-64
- ☞ *'A number of tradespeople refuse to carry out work due to the location of the property (difficulty parking and very expensive!) and the fact that it's on the third floor with no lift.'* – age 35-44
- ☞ *'Don't really know where to start, and any engagement with commercial contractors is likely to end up in a sales-driven process.'* – age 45-54
- ☞ *'Concern that tradespeople would not use appropriate materials and cause longer term issues e.g. not using lime mortar.'* – age 55-64

6.4.5 Trouble liaising with neighbours

As Figure 8 above illustrates and can be expected, significantly more flat owners experience trouble in seeking agreement with neighbours. Respondents' comments suggest two main issues: the lack of legally enforced

¹⁴ Home Energy Scotland does not offer grants for double glazing and loans are capped at £8000, see <https://www.homeenergyscotland.org/funding/grants-loans/overview/>

¹⁵ A smart heating system that allows one to set temperatures in individual rooms (rather than the whole house) by controlling individual thermostatic radiator valves (TRV)

accountability of all involved (instead of relying on goodwill) especially when the neighbouring units are rental properties; and the lack of clarity on title deeds.

- 💬 *'Honestly, we can barely get the neighbours to pay for things like THE ROOF IS LEAKING, never mind upgrades. It took a lot of stress to get the gutters cleaned.'* – age 35-44
- 💬 *'The most difficult thing I have faced has been seeking agreement with my neighbours. Even for a smaller building like us, one of our residents is an absentee-landlord with absolutely no interest in improving the property or even allowing us access to perform upgrades/maintenance. There is no one to turn to for help in this matter. It's very frustrating.'* – age 16-24
- 💬 *'We set up an owners association but there is no legal measure to require payment of regular maintenance funds in communal account in an old tenement.'* – age 25-34
- 💬 *'About a third of flats are Air B&B. Owners reluctant to spend money on maintenance has been a problem'* – age 75+

The challenge of getting different owners to agree extends to the installation of alternative energy source such as photovoltaic panels and gas-alternative heating systems such as heat pumps. Again this is an issue that disproportionately impacted flat owners:

- 💬 *'Owning a tenement flat makes it really difficult to consider things like ground or air-source heat pumps, solar panels etc because they need [to be] located on common ground or roof space any fixings to common areas would mean you are responsible for the part of the building if anything goes wrong.'* – age 45-54, flat owner
- 💬 *'We have spoken to several neighbours who are very in support of the installation of heat pumps in the neighbourhood, but are hesitant or discouraged because others say that they would object to planning applications or make complaints if they saw heat pumps installed.'* – age 35-44, flat owner

6.4.6 Lack of clear, centralised, and neutral advice

Financial, regulatory, and cooperative barriers aside, 58 respondents commented on the lack of clear, centralised, neutral, and practical advice regarding retrofit and adaptation works. It is not clear if these respondents are aware of existing resources such as *The Engine Shed*¹⁶ or Home Energy Scotland¹⁷, and most recently, the EcoCosi service¹⁸ offered by Changeworks.

- 💬 *'Mainly knowing who and where to go for help in a listed building, I would love to start making some of the changes but not sure where and how best to start.'* – age 45-54
- 💬 *'The uncertainties arising from there not being a single reliable independent trustworthy source of information and advice - there is a lot of more or less conflicting advice there.'* – age 55-64
- 💬 *'Listed building issues should be incorporated within a retrofit one-stop shop to ensure it's simple for owners to upgrade buildings.'* – age 65-74
- 💬 *'More detailed information on how listed buildings could be improved would be useful for lay people to actually understand what is involved'* – age 55-64
- 💬 *'The [guidance] document starts with the assumption that you know what work you want to do. I am starting from the point where I know my flat is energy inefficient but require expert help on the most cost-effective changes that can be made that don't compromise the integrity or character of the building and which will be permissible to do (either with or without planning permission).'* – age 55-64

Incidentally, several respondents also commented on not knowing where to find grants/financial support or feeling that available financial support had dwindled:

¹⁶ The Engine Shed is part of Historic Environment Scotland. <https://www.engineshed.scot/building-advice/>.

¹⁷ <https://www.homeenergyscotland.org/>

¹⁸ <https://www.changeworks.org.uk/energy-advice/homeowners/>

- ☞ *'Cost could be prohibitive for all concerned and not aware of any grants or financial support we could apply for' – 65-74*
- ☞ *'Some grants etc for "green" interventions but confusing and difficult to find'. – 65-74*
- ☞ *'Once there were grants to help now there appear none.' – age 65-74*

6.4.7 Time implications of the barriers

Whilst 'timescale to undertake work' appears to be a barrier least experienced by all respondents (Figure 8), free-text comments suggest that the time it takes to organise and manage the practical details of retrofit or maintenance work is not trivial (due to other barriers discussed in this report), regardless of the time required for the actual work itself.

- ☞ *'Even minor changes/improvements such as fitting double glazing is complicated and time consuming and often rejected.' – age 55-64*
- ☞ *'It just takes a long time to get listed building consent and then for the glazing firm to have time to do the work.' – age 55-64*
- ☞ *'Other flats are rental. Have done work but it takes time to get people on board.' – age 65-74*

In addition to time, several respondents also noted 'hassle', 'disruption', and 'mess' as barriers. For residents with disability or illness, these can be especially daunting:

- ☞ *'Health issues, our age as well as financial restraints make installations daunting. We would probably have to move out if major work was needed and one of us has to use a dialysis machine overnight, every night making major work something we couldn't face or undertake.' – age 75+*

6.4.8 Limited retrofit and adaptation options due to building design

The physical designs of many historic properties limit the type of retrofit and adaptation works that can be undertaken. Specifically, many respondents remarked that internal wall insulation (an energy efficiency measure frequently recommended by the EPC) simply does not suit historic properties for several reasons: (1) it reduces internal floor area; (2) it is a complicated process, driving up the hassle factor and cost; and (3) it is especially inappropriate for listed buildings where cornices and moulding may be damaged. Several respondents also noted the difficulties of carrying out loft insulations.

- ☞ *'The level of work necessary ... on internal walls etc. would seriously damage the style of the listed building and the cost would be beyond what a pensioner like me could afford.' – age 65-74*
- ☞ *'I would like to insulate my lounge walls, but there is a recessed cupboard, wall panelling, a mantelpiece, built-in bookcases, and an ornate cornice. it would be a horrendous job and very expensive.' – age 65-74*
- ☞ *'We would like to get roof insulation but the space is not accessible.' – age 45-54*
- ☞ *'Part of my property's roof is flat, and there is no gap (for example, attic space) between the inside area and the outside area, therefore there is a large area that cannot be easily insulated.' – age 45-54*

6.4.9 Specific barriers to gas-alternative heating systems

Despite the Government-funded Electrification of Heat project¹⁹ concluded that 'there is no property type or architectural era that is unsuitable for a heat pump', respondents from this consultation raised several feasibility issues in Edinburgh's historic properties. Three major barriers are identified:

1. Space (either physical or permitted) limitation:

¹⁹ The Electrification of Heat (EoH) demonstration project (<https://es.catapult.org.uk/project/electrification-of-heat-demonstration/>) – funded by the Department for Business, Energy and Industrial Strategy (BEIS) – installed 742 heat pumps of various types across Great Britain (including South East of Scotland) from July 2020 – October 2021. The projects' *Installation Statistics Report* (available on its website) indicates that 58 properties (7.8%) covered by the project dated pre 1919 but none of which is of the flat property type. Overall, the project installed 41 (5.5%) heat pumps in flat properties.

- ☞ *'Installing an ASHP is unlikely due to physical space constraints at the rear of the building (first floor, near a lot of windows)' – age 35-44, flat owner*
- ☞ *'The shape and accessibility of my back garden doesn't really lend itself to the installation of vertical or horizontal elements.'* – age 45-54, terraced property owner

2. Property not insulated enough for heat pump to be cost effective; this is often related to the window improvement and insulation barriers discussed above:

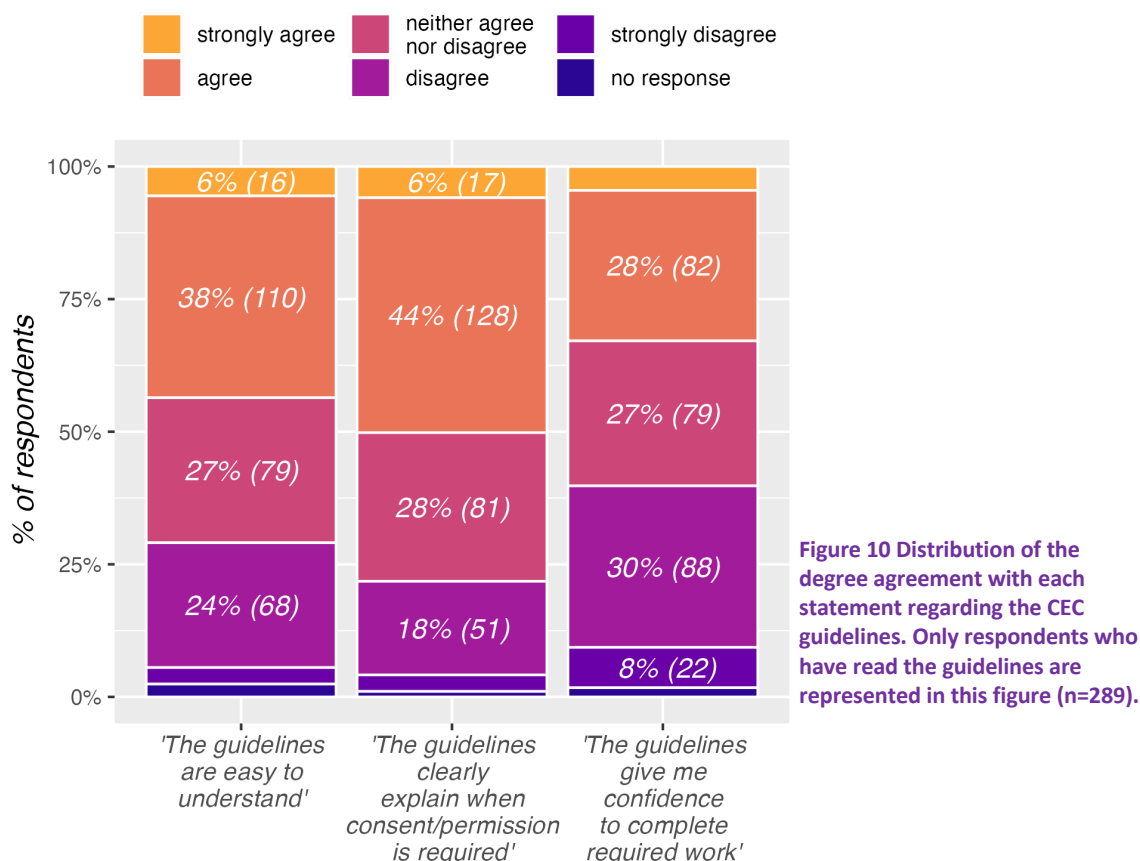
- ☞ *'We were told we can't have a heat pump as the building can't be insulated enough to make it work.'* – age 35-44, terraced property owner
- ☞ *'Think house is unsuitable to maximise benefit of heat pumps as house not well enough insulated'* – age 45-54, flat owner

3. Cost: not only the initial outlay of the heat pump installation itself, but also additional required work for heat pump to work efficiently (larger radiators, new piping)

- ☞ *'Installing a heat pump would be great, but I've been told it wouldn't work since the radiators wouldn't give out enough heat and the property is too draughty for it to cope.'* – age 45-54, terraced property owner
- ☞ *'I would also like to replace my gas boiler with an air-source heat pump... but as I understand it would involve a costly retrofit to the radiators'* – age 25-34, flat owner

7 Feedback on the CEC Listed Building and Conservation Areas Guidance

Out of 431 unique respondents, 67% (289) has read the guidance. The other 33% (142) responded 'Don't know/Can't remember'. A copy of the guidance²⁰ was linked to and displayed in-browser on the questionnaire platform. For the most part, respondents who did not read the guide did not go on to answer the rest of the three questions about the Guidance, and are therefore omitted in the following analysis. Figure 10 illustrates the breakdown of the level of agreement to each statement regarding the CEC guidance.



7.1 Free text comments about the CEC Listed Building and Conservation Areas Guidance

Question phrasing as appeared in the survey:
 Please use the space below for any comments or suggestions about the guidelines.

Out of 440 responses, 146 (33.2%) provided comments and/or suggestions about the guidance document. Several themes emerged and are discussed below.

²⁰ Available as a PDF at https://consultationhub.edinburgh.gov.uk/sfc/conservation-adaptation2023/supporting_documents/Listed_Buildings_Guidance_14_October_2022.pdf

7.1.1 Desire for clarity

Several respondents expressed the wish for a glossary or laymen's explanations for technical terms such as 'sightline' and 'permitted development'. More importantly, many respondents noted that some guidelines are too vague and open to interpretation:

- ☞ *"Like for like' is very poorly defined (upgrading is by definition NOT like for like)' – age 25-34*
- ☞ *'The guidelines mention a "Where a significant proportion of historic glass (such as Crown, cylinder and drawn sheet) remains on an individual window, it should be retained or re-used" but does not state what a significant proportion is.' – age 45-54*
- ☞ *'The guide left a lot open to interpretation and no pre application discussion was allowed.'* – age 35-44

7.1.2 Desire for compromise

Comments from the respondents overwhelmingly reflected that it is possible to strike a balance between adapting to climate change and conserving historic properties if only some rules can be relaxed. Specifically, several respondents felt that permission should be allowed (or not even required) for works done on the rear façades:

- ☞ *'In my view planning should not be required ... for homes in a conservation area so long as the panels and associated equipment is not visible from the road.'* – age 35-44
- ☞ *'I feel for rooms that do not face on to the street, I should be able to double glaze as I see fit.'* – age 25-34
- ☞ *'At least normal double glazing should be applied to the rear of the buildings.'* – age 65-74

The overall sentiment is not to disregard conservation wholesale, but to allow some flexibility in detail, which would also ensure larger damage would not occur:

- ☞ *'[Allowing] conservation-grade PVC windows would ... ensure people don't put in cheap and ugly PVC windows which is what is happening.'* – age 55-64
- ☞ *'Solar panels should be of uniform design and appearance and that their layout on the roof-slope should be uniform in pattern (e.g. in regular rows as close as possible to the bottom of the slope) - all in order to maintain so far as possible the ordered appearance of terraced housing ... and avoid the development of a haphazard and "higgledy-piggledy" profusion of different panels laid out in different arrangements on different roofs.'* – age 75+
- ☞ *'I think the important issue is balance; preserving the character does not necessarily mean keeping things exactly as they were, and we should not let the perfect be the enemy of the good. And then there's the urgency aspect- if one believes the climate situation is urgent, then by not allowing sensible efficiencies to be made, our sandstone buildings won't be preserved anyway'* – age 45-54

Several respondents also remarked that it is possible to get uPVC frame windows that look like timber frame windows, especially when the windows are on upper storey where one can only view from afar:

- ☞ *'I work in heritage and completely agree with the need to maintain the character of the neighbourhood. However, today one can purchase sash and case uPVC windows that look exactly like the timber replacements'* – age 45-54
- ☞ *'I wish to install conservation grade, high quality, woodgrain effect uPVC double-glazed windows which will be indistinguishable from the original windows, and which will be more thermally efficient than timber.'* – age 35-44

Currently, the comments from the respondents suggest that historic property owners felt that the authorities prioritise appearance over more urgent issues, such as cost-of-living crisis and the climate emergency, and that the current regulation is not in step with the time:

- ☞ *'The image, at the very least, is that building conservation is far prioritised over living, energy, and environmental issues. We love Edinburgh, its heritage, and its architecture. But we need to prioritise our families' wellbeing and their future.'* – age 45-54
- ☞ *'I do believe it's important to protect architectural heritage. However the level of restriction can actively have an impact on standard of living.'* – age 45-54
- ☞ *'There's an existential climate emergency facing us all and yet the planning restrictions' focus on aesthetics blocks important work being done (e.g. no solar PV visible from the street; restrictions on thicker double glazing etc). The balance of priorities needs to be shifted to better reflect the desperate reality.'* – age 35-44
- ☞ *'The fact that Planning restricts people from making important changes to adapt to climate change and to reduce the risk of fuel poverty and/or improve the comfort and health of their homes is incredibly frustrating.'* – age 55-64
- ☞ *'Planning rules and building listing status are so outdated and predate concerns around climate change and cost-of-living and now require serious review and revision.'* – age 45-54
- ☞ *'I am very pro maintaining the historic and architectural beauty of Edinburgh, however it is my view that we cannot prioritise this, over sensible and much needed practical changes to the city's buildings, to support the collective need to combat global warming and climate change.'* – age 55-64
- ☞ *'Changing windows which look the same in conservation areas to high quality uPVC with double or triple glazing is far more important to the future of this planet than making sure it looks traditional. It is time planning consents caught up with the crisis facing the world.'* – age 55-64
- ☞ *'The guidelines do not make any allowance for sympathetic energy efficiency measures. They are not in step with climate targets'* – age 45-54

7.1.3 Desire for consistency

Whilst there is 'no precedent in planning', comments from many respondents (n = 34) clearly reflected a desire for consistency as they see many (apparent) violations around them where the rules are not reinforced:

- ☞ *'You can't conserve an area when there is so much non-compliance /inappropriate buildings/conversions being approved.'* – age 65-74
- ☞ *'Feels inconsistent approach applied with some properties having double glazing that is non-compliant'* – age 45-54
- ☞ *'I strongly support maintaining our historic built environment. However, our home is surrounded by properties with uPVC or equivalent replacement windows. We have paid a significant premium to comply with a policy that is at best inconsistently applied, or more likely simply ignored by many homeowners.'* – age 45-54
- ☞ *'The approach is also not consistent, e.g. I was allowed to installed double glazing because it was "like for like" (probably illegal installation by previous owners) but my neighbours can only install single glazing or slimline double- there is no difference in how they look but a massive difference in energy efficiency.'* – age 35-44
- ☞ *'The most frustrating thing is most of the flats in my area are already double-glazed with PVC even though it's a conservation area. But by following the rules I have to suffer. Or by breaking the rule I take an absolutely enormous risk of having to pay to revert them back to non-PVC if its challenged.'* – age 35-44

7.1.4 Current guidance does not recognise the limitations of alternative measures

Respondents' comments suggest that alternative measures to improve thermal performance of windows, such as window refurbishment, draughtproofing, and using internal shutters²¹, may not be sufficient in all situations:

- ☞ *'We have refurbished the windows but feel this is not enough to prevent draughts.'* – age 45-54, Grange
- ☞ *'We spent around £5000 to have sash windows refurbished with insulation brushes, but this had less effect on draughts than expected.'* – age 45-54, Merchiston & Greenhill

²¹ As recommended on page 12 of the CEC Guidance

- ☞ *'Draught proofing is not completely effective for very old windows (late 19th century) which are 12 ft tall.'* – age 55-64, New Town
- ☞ *'We also refurbished all our windows at vast expense ... We are still cold and losing heat big-time from large bay window.'* – age 75+, New Town
- ☞ *'Had sash and case windows refurbished. Expensive but still draughty.'* – age 75+, New Town

7.1.5 Desire for long-term plan

Respondents reflected that there is a lack of long-term planning on decarbonisation, specifically on eliminating gas-reliant heating. The position is particularly precarious for those who are on the precipice of replacing an old boiler:

- ☞ *'We shall have to install a gas boiler and have no idea what we will do when the Scottish government bans them from use.'* – age 55-64
- ☞ *'Gas boiler reaching end of life and would be keen to replace with zero emissions alternative but not clear about whether we are likely to part of heat network area or should seek to install heat pump.'* – age 45-54
- ☞ *'The guidelines do not take a zero-carbon future into account and do not give guidance on what can be done today or in the next 10 years to prepare for a zero carbon future.'* – age 45-54

7.1.6 Desire for larger scale or community-wide approach

Several respondents from different conservation areas have expressed a wish for a community-wide approach:

- ☞ *'We need to make it easy for homeowners to heat their homes without fossil fuels, and district heating²² looks far more promising to me than trying to get individual homeowners to install heat pump systems on a large scale'* – age 25-34, flat owner
- ☞ *'it might make sense to have one large heat pump for whole stair in back green? ... Stair are civil but not all are interested. seems too daunting to start.'* – age 55-64, flat owner
- ☞ *'There should be a street by street / area-based approach to energy efficiency and heat decarbonisation. Allowing an ad hoc property by property approach, led by homeowners themselves leads to piecemeal improvements, and will not support the wholesale adoption of [heat pumps] or the installation of district heating.'* – age 45-54, flat owner
- ☞ *'It would be great to see a community heat pump/local technology that heats a large number of homes without having to adapt individual houses.'* – age 25-34, flat owner

²² District heating is not the same as community heating. See Energy Saving Trust's blog (<https://energysavingtrust.org.uk/what-district-heating/>)

8 Feedback on the planning application process

Question phrasing as appeared in the survey:

In the past year, have you applied for any of the following consents for work to be carried out?

Out of 431 unique respondents, a total of 122 (28.3%) have applied for some form of consent in the past year. Table 3 shows the breakdown by application type and property type.

	Detached/ Terraced	Flat	Not specified	Total (% of all respondents)
Listed Building Consent (LBC)	12	27	2	41 (9.5%)
Planning Permission	19	25	2	46 (10.7%)
Building Warrant	12	21	2	35 (8.1%)

Table 3 Number of respondents who have applied in the past year by

8.1 Free text comments about the application process

Question phrasing as appeared in the survey:

Please use the space below for any comments about your experience or suggestions on how we could improve this process.

Out of 440 responses, 112 (25.5%) commented on their experience applying for planning permission, LBC, or building warrants. Sixteen respondents reported having had a (relatively) positive experience:

- 💬 *'The process was relatively straightforward but the communication was poor.'* –age 35-44
- 💬 *'I applied for a completion certificate for my building warrant. I liked the online system for this and found it relatively easy to use.'* –age 65-74
- 💬 *'The process was fine. Our architects secured consent in reasonable time.'* – age 55-64

However, significantly more respondents (n=52) commented that the process was difficult either from first-hand experience, having looked into the process (but had not actually made an application), or perception from the experiences of neighbour/family/friends:

- 💬 *'I was put off ... by the complicated planning process due to living in a conservation area.'* – age 25-34
- 💬 *'Very slow. Very difficult to navigate through portal. Cannot get a site visit as so few building officers.'* – age 55-64

Six respondents commented on the usability of the planning application website whilst several respondents (n=19) specifically noted the slowness of the process:

- 💬 *'Planning permission was slow and quite hard to approach as felt the planning officer did not know the area and the range of styles/ alterations in the [neighbourhood redacted]'* – age 25-34
- 💬 *'...a process that took 3 months - longer than the actual renovation.'* – age 75+

Several respondents of varying age groups also pointed out that they did not know where to begin or are concerned about the application process:

- 💬 *'I find the listed building consent confusing and unsure how to proceed with appropriate consents for replacing windows with double glazing.'* – age 25-34
- 💬 *'My greatest plea is for help with submitting a Planning Application'* – age 75+

- ☞ *'Wouldn't know where to begin to get planning permission' – age 55-64*

Although it appears that the difficulties may have more to do with the communication and instructions for the application process, and not the process itself. One respondent noted:

- ☞ *'Having been initially daunted by the guidelines and application process, I spent time, together with a neighbour, in working through the guidelines and came to the conclusion that the application process was not as difficult as it appeared. My neighbour and I then wrote guidance for people living in similar properties as ourselves to help them feel less daunted by the process.'* – age 65-74

Nevertheless, the current state of the application process is perceived as difficult and complex enough such that many respondents opted to hire professionals to take care of the application process for them, which added to the total cost burden of carrying out the work (discussed in section 6.4.1):

- ☞ *'We used a company to fit double-glazing in our main home ... who offered the service of getting LBC for us, that was the only reason we chose them - although a professional ... in my day job, I felt too daunted by trying to ascertain what would be needed, do drawings, get specs for the new windows etc.'* – age 45-54
- ☞ *'Our improvements were done in partnership with an architect who guided us through this. I would have been confused otherwise I am sure!'* – age 35-44
- ☞ *'The planning dept. is so difficult to deal with and so unhelpful that without paying an architect or technician to deal with the applications, it is so difficult to make any headway with CEC.'* – age 35-44

An area in the application process that needs clarification is whether consent is required. Several respondents commented that they went through the process only to find out that consent was not even needed. Others also found Planning Department's advice to 'apply and see' to be frustrating:

- ☞ *'Process took ages and in the end consent did not appear to be required. Complete waste of time.'* – age 45-54
- ☞ *'After explaining the situation to three different planning officers, I was told there was no way the council could tell me if I needed ... and I would have to apply for full permissions to find out. A lengthy process later, we were told we did not need any permissions - or to have needed to apply for planning permission... Absolute waste of time.'* – age 35-44
- ☞ *'I have lived in two listed properties...Both times, I have applied for listed building consent and planning for different things - both times have tried to find out if I actually need listed building consent/planning for the planned works and have been told I have to apply anyway to find out. Both times, I have not needed listed building consent/planning for parts of my works, meaning it has been a waste of time and resources for both us and the Planning Department!'* – age 35-44
- ☞ *'I contacted the council via email to find out if permission was needed. They said the only way to find that out was by completing an application form.'* – 25-34

Finally, several respondents (n=21) commented on the unresponsiveness of the Planning Department and expressed their wish for better communication in assisting with the application process and fielding queries:

- ☞ *'Impossible to contact Planning Department to obtain advice' – age 65-74*
- ☞ *'It is impossible to get easy to understand pre-application advice from anyone.'* – age 55-64
- ☞ *'Policy guidelines are all very well but over-the-counter discussion is often the only way to get the advice one needs.'* – age 75+
- ☞ *'Lack [of] pre application discussion. Trying to even speak with a person in planning was impossible. People asking the phone telling you to email, when you email you get a generic response.'* – age 35-44
- ☞ *'Reinstating the in-person planning help desk would make it easier to clarify the Council's requirements and avoid unnecessary work and cost for both the Council and applicants.'* – age not specified

9 Views on climate change, adaptation, comfort, and heritage conservation

Question phrasing as appeared in the survey:

Which of the following statements, comes closest to your own view about climate change? Climate change is...

- ... an immediate and urgent problem
- ... a problem for the future
- ... not really a problem
- ... not happening

The respondents overwhelmingly (88%, n = 381 out of 431) view climate change as ‘an immediate and urgent problem’, as shown in Figure 11. Only 6 respondents regard climate change as ‘not really a problem’; and a further 7 respondents believe that climate change is ‘not happening’.

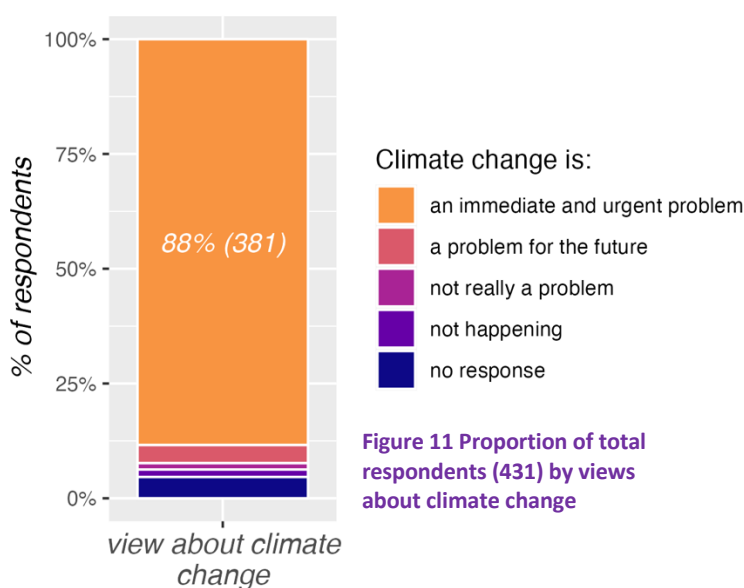
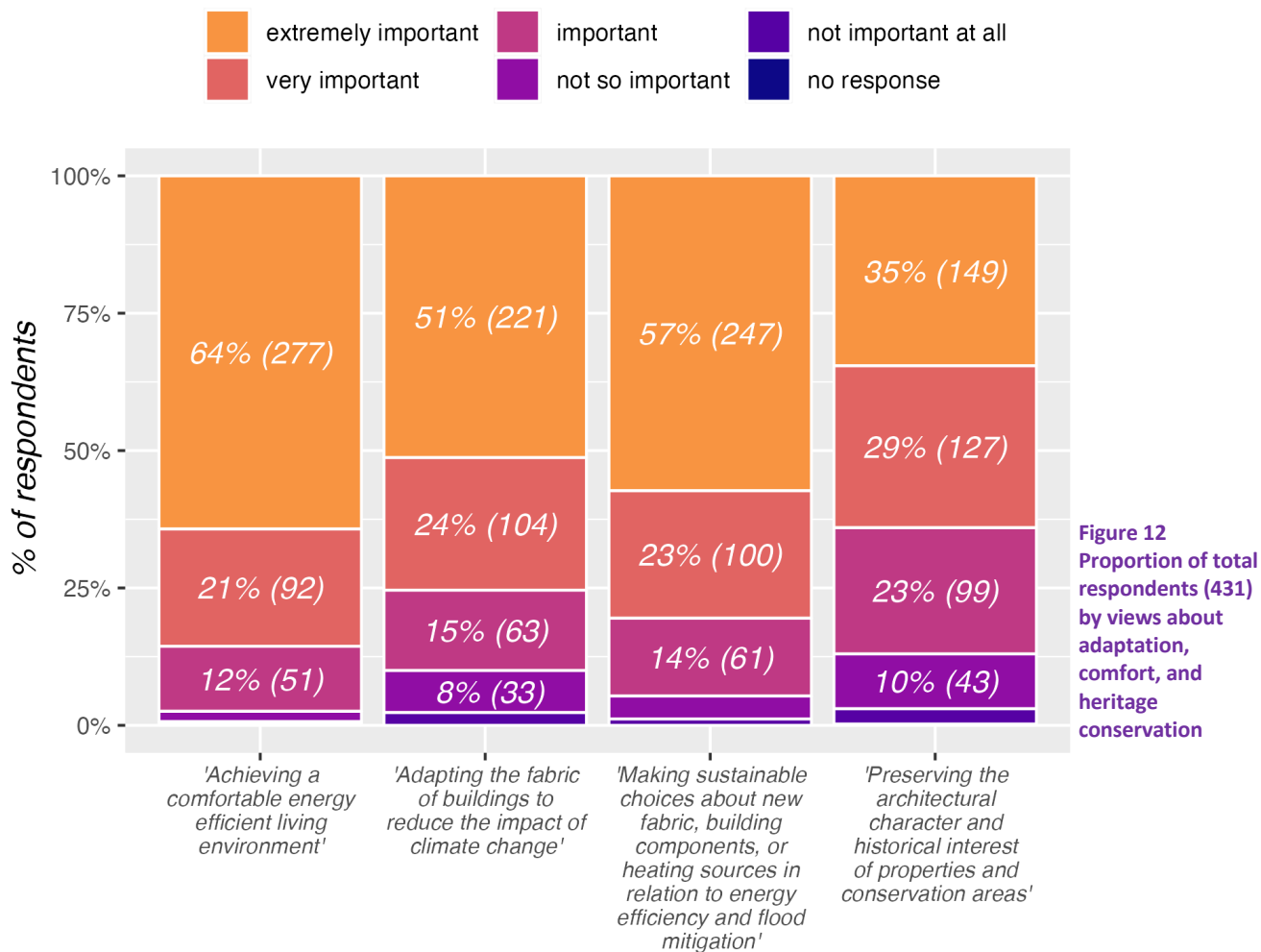


Figure 11 Proportion of total respondents (431) by views about climate change

Question phrasing as appeared in the survey:

How important do you think the each of the following statements are regarding listed buildings and the city’s built heritage?

- Achieving a comfortable energy efficient living environment
- Adapting the fabric of buildings (e.g., walls, roofs, floors) to reduce the impact of climate change
- Making sustainable choices about new fabric, building components or heating sources in relation to energy efficiency and flood mitigation.
- Preserving the architectural character and historical interest of properties and conservation areas.



As shown in Figure 12, whilst the vast majority of the respondents considered all four statements to be important, significantly fewer respondents considered the preservation of architecture character and historical interest of properties to be very or extremely important. Only a few respondents expressed in the free-text comment that conservation should be valued above all else.

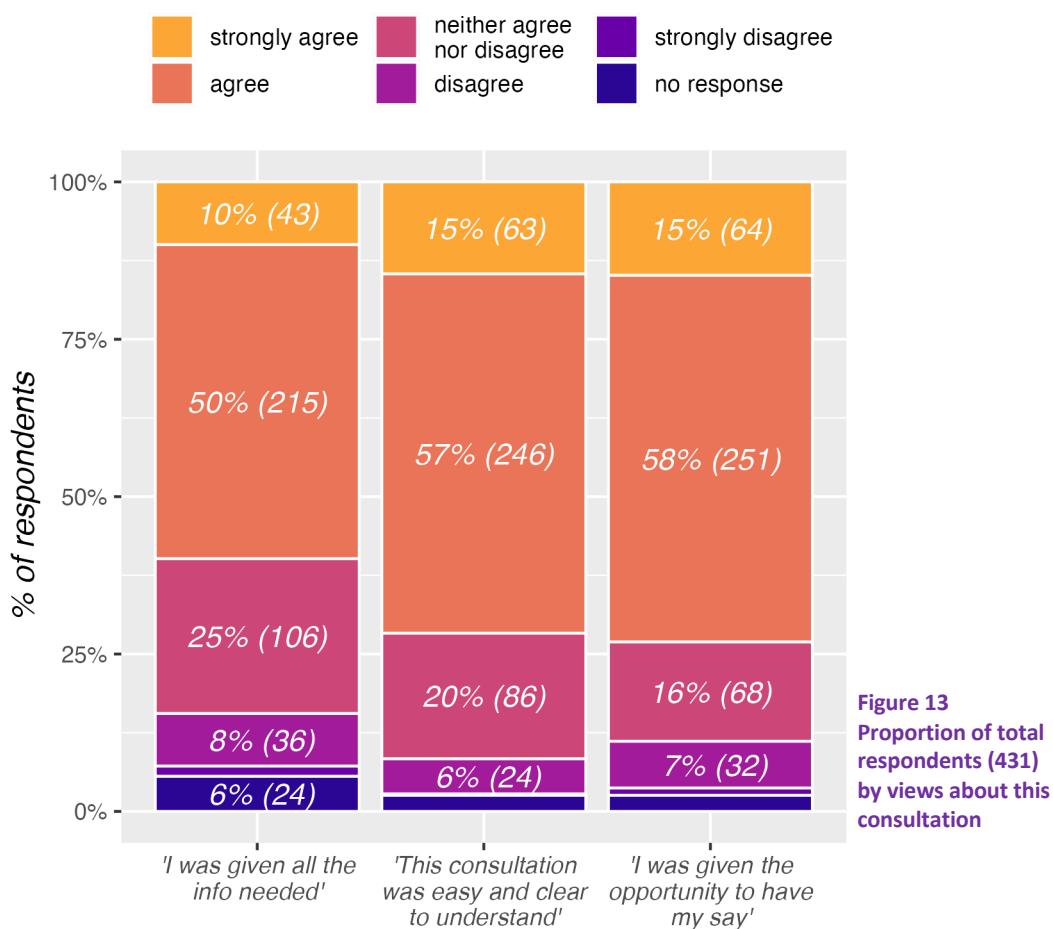
10 Feedback on this consultation exercise

Question phrasing as appeared in the survey:

To what extent do you agree or disagree with the following statements about this consultation?

- I was given all the information that I needed to have my say.
- This consultation was clear and easy to understand.
- I was given the opportunity to have my say.

As shown in Figure 13, the vast majority of the respondents considered that they have been given all the information needed (60%) and the opportunity to have their say (73%). They also agreed that the consultation was easy and clear to understand (72%).



10.1.1 Free text comment about this consultation

Out of 440 responses, 140 (31.8%) commented on their experience with this consultation. Of those who commented (n=140), 12 expressed positive reactions to the consultation:

- 💬 'REALLY good and appreciated that the Council is including/involving its community and their views/needs in such an issue.'
- 💬 'Very glad to see some constructive communication to start alleviating climate change problems and financial hardships through higher fuel costs.'

Several respondents (26 out of 140) expressed a clear desire to be kept informed of the outcome and to see swift actions from the Council:

- ☞ *'Hurry up and organise community level support... there are plenty of us want to do this but need real time input and community level planning.'*
- ☞ *'I hope to get feedback from the survey and some ACTION.'*
- ☞ *'The Council should implement any changes to policy quickly, otherwise respondents will feel disengaged from taking part in future surveys if resulting change is too slow.'*
- ☞ *'I hope you will provide feedback on (a) the result of the consultation and (b) what the Council is doing about it as a result of the Consultation.'*

A few respondents (n=6) were unsure what the outcome of the consultation will be whilst others (n=6) expressed a lack of confidence with regards to what will come of this consultation. Five respondents specifically referenced the consultation as a 'tick-box' or tokenistic exercise.

Ten respondents commented that they felt the consultation was not sufficiently well publicised and recommended that the request for consultation should be directly communicated from the Council:

- ☞ *'I only found this survey by chance - it would be worth considering how you promote these consultations and surveys'*
- ☞ *'I found out about this on [name redacted] Facebook page so I am really concerned that I had not heard directly from the Council - you could have put a note in about consultation with Council Tax for example. I have shared with neighbours, but I am concerned about the reach of the consultation and potential low response rate unless you are more pro-active in seeking responses.'*

Several respondents (39 out of 140 comments) noted needed improvements on some aspects of the survey design and questions asked. A few respondents also expressed the desire to discuss the issues in more depth (rather than via a survey) and be given the opportunity to provide suggestions directly to the authorities:

- ☞ *'There needs to be clear town hall meeting to address these questions- a survey does not capture the essence of the problem.'*
- ☞ *'Invite interested property owners like myself to speak directly to any committee, councillors, etc. who are looking into this.'*
- ☞ *'Before individuals and owners can act on the Issues of conservation and climate there needs to be recognition from Council and ScotGov that it is the Public Realm which must lead.'*

11 Conclusions

The City of Edinburgh Council's *Conservation & Adaptation* public consultation set out to understand the current challenges owners of historic properties face in maintaining and adapting their properties amid the climate emergency and cost-of-living crisis. The consultation was conducted as an online questionnaire survey and was open to responses from 31 March to 11 June 2023. This report has detailed the analysis of the responses, both quantitatively and qualitatively.

The key findings are as followed:

- The distribution of property issues experienced and barriers faced by owners are not equal between flat properties and house-type properties (detached/semi-detached/terraced homes). On average, flat owners have more *types* of issues in their properties, and face more *types* of barriers than house owners when maintaining and adapting their properties.
- Cold/draughts is the issue most experienced by all owners of all property types; followed by roof repairs. However, a significantly higher proportion of flats have condensation issues and failed gutters and downpipes.
- Financial cost is the barrier most experienced by owners of all property types; even for those who reported no change or better in their financial situation in the past year. The second most experienced barrier by all is the process of applying for permissions, which affected a significantly higher proportion of flat owners. A higher proportion of flat owners also experienced barrier in seeking agreement with neighbours.
- Free-text comments from respondents provided insights into the financial barrier, specifically on the high cost of period-appropriate materials stipulated by the current listed building/conservation areas guidance. Additional barriers include the lack of skilled and trustworthy tradespeople, as well as clear, centralised, and neutral advice on selecting and proceeding with the most cost-effective works.
- The respondents overwhelmingly (88%) view climate change as 'an immediate and urgent problem'. This sentiment, however, is not at odds with the desire for heritage conservation: the majority of respondents also see preserving the architecture character and historical interest of properties and conservation areas to be 'very or extremely important'. Comments from the respondents overwhelmingly reflected that it is possible to strike a balance between adapting to climate change and conserving historic properties if only some rules can be relaxed to lower the cost barrier and to allow alternative energy sources or heating systems to be installed.

Finally, the responses from this consultation echoed the findings from the Scottish Government's 2019 consultation *Energy Efficient Scotland: Improving energy efficiency in owner occupied homes*.²³ Although not targeted at historic property owners (but all owner-occupiers across the whole of Scotland), responses from the 2019 consultation (with 148 responses from both individuals and organisations) also highlighted the cost of energy efficiency improvements specifically for older homes, the need for financial support and information, and the importance of compliance monitoring and reinforcement.

²³ The consultation and its outcome can be found at: <https://consult.gov.scot/housing-and-social-justice/energy-efficient-scotland-owner-occupier-proposals/>

12 References and Resources

Baker, Paul (2010). *Calculation of whole-window U-values from in-situ measurements*. Part of Historic Environment Scotland's Technical Paper 09. Historic Environment Scotland. Available from <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8c01582b-c71e-45d7-8991-a59400e44b0d>.

Baker, Paul (2010). *In sit measurements of the U-values of double glazed replacement units in Georgian sash and casement windows*. Part of Historic Environment Scotland's Technical Paper 09. Historic Environment Scotland. Available from <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8c01582b-c71e-45d7-8991-a59400e44b0d>.

The City of Edinburgh Council (2021). *2030 Climate Strategy: Delivering a net zero, climate ready Edinburgh*. Available from <https://www.edinburgh.gov.uk/2030climatestrategy> [Accessed 10 August 2023].

The City of Edinburgh Council (2022, October). *Listed Buildings and Conservation Areas Guidance*. Available from https://consultationhub.edinburgh.gov.uk/sfc/conservation-adaptation2023/supporting_documents/Listed_Buildings_Guidance_14_October_2022.pdf [Assessed 13 March 2023].

Changeworks (2023). *EcoCosi retrofit service*. Available from <https://www.changeworks.org.uk/energy-advice/homeowners/> [Assessed 13 August 2023].

Energy Saving Trust (2021, September 13). *What is district heating? A low-carbons solution for the UK's homes*. Available from: <https://energysavingtrust.org.uk/what-district-heating/> [Assessed 13 August 2023].

Energy Systems Catapult (2021). *Electrification of Heat UK demonstration project*. Available from <https://es.catapult.org.uk/project/electrification-of-heat-demonstration/> [Assessed 2 August 2023].

The Engine Shed (n.d.). *Building Advice: Guidance for Owners of Traditional Buildings*. Historic Environment Scotland. Available from <https://www.engineshed.scot/building-advice/>. [Assessed 6 July 2023].

The Glass and Glazing Federation (2017, September 15). *Low Sightline Insulated Glass Units*. GGF News. Available from <https://www.ggf.org.uk/low-sightline-insulated-glass-units/> [Accessed 23 July 2023].

Historic Environment Scotland (2020). *The Listed Building Dataset*. Historic Environment Scotland and Ordnance Survey data. Available from <https://portal.historicenvironment.scot/downloads/listedbuildings> [Accessed 11 August 2023].

Home Energy Scotland (n.d.). *What the Home Energy Scotland Grant and Loan covers and how to apply*. Home Energy Scotland website. Available from <https://www.homeenergyscotland.org/funding/grants-loans/overview/> [Assessed 8 August 2023]

Scottish Government (2021). *Energy Efficient Scotland: Improving energy efficiency in owner-occupied homes. Analysis of responses to the public consultation exercise*. Available from: <https://consult.gov.scot/housing-and-social-justice/energy-efficient-scotland-owner-occupier-proposals/> [Assessed 2 August 2023].

Scottish Government (2023). *Building Standards Domestic Technical Handbook: June 2023 Edition*. Available from <https://www.gov.scot/publications/building-standards-technical-handbook-2023-domestic/> [Assessed 20 July 2023].

Scottish Government (2023). *Scottish House Condition Survey: 2021 Key Findings. An Experimental Statistics Publication for Scotland*. Available from <https://www.gov.scot/publications/scottish-house-condition-survey-2021-key-findings/> [Accessed 12 August 2023].