

Notice of meeting and agenda

Policy and Sustainability Committee

10.00 am Friday, 15th December, 2023

Virtual Meeting - via Microsoft Teams

This is a public meeting and members of the public are welcome to watch the webcast live on the Council's website.

The law allows the Council to consider some issues in private. Any items under "Private Business" will not be published, although the decisions will be recorded in the minute.

Contacts

Email: jamie.macrae@edinburgh.gov.uk / jacqueline.boyle@edinburgh.gov.uk

Tel: 0131 529 4264

1. Order of Business

- 1.1 Including any notices of motion and any other items of business submitted as urgent for consideration at the meeting.

2. Declaration of Interests

- 2.1 Members should declare any financial and non-financial interests they have in the items of business for consideration, identifying the relevant agenda item and the nature of their interest.

3. Deputations

- 3.1 If any

4. Business Bulletin

- 4.1 Business Bulletin 5 - 28

5. Executive Decisions

- 5.1 Draft Climate Ready Edinburgh Plan for Consultation – Report by the Executive Director of Place 29 - 110
- 5.2 Edinburgh Local Heat and Energy Efficiency Strategy and Delivery Plan – Report by the Executive Director of Place 111 - 404

6. Routine Decisions

- 6.1 None.

7. Motions

- 7.1 If any

Nick Smith

Service Director, Legal and Assurance

Committee Members

Councillors Councillor Cammy Day (Convener), Councillor Danny Aston, Councillor Alan Beal, Councillor Fiona Bennett, Councillor Marco Biagi, Councillor Kate Campbell, Councillor Sanne Dijkstra-Downie, Councillor Phil Doggart, Councillor Kevin Lang, Councillor Lesley Macinnes, Councillor Adam Nols-McVey, Councillor Jane Meagher, Councillor Claire Miller, Councillor Alys Mumford, Councillor Ben Parker, Councillor Mandy Watt and Councillor Iain Whyte

Information about the Policy and Sustainability Committee

The Policy and Sustainability Committee consists of 17 Councillors and is appointed by the City of Edinburgh Council. This meeting of the Policy and Sustainability Committee is being held virtually by Microsoft Teams.

Further information

If you have any questions about the agenda or meeting arrangements, please contact Jamie Macrae, Committee Services, City of Edinburgh Council, Business Centre 2.1, Waverley Court, 4 East Market Street, Edinburgh EH8 8BG, Tel 0131 529 4264, email jamie.macrae@edinburgh.gov.uk / jacqueline.boyle@edinburgh.gov.uk.

The agenda, minutes and public reports for this meeting and all the main Council committees can be viewed online by going to <https://democracy.edinburgh.gov.uk/>.

Webcasting of Council meetings

Please note this meeting may be filmed for live and subsequent broadcast via the Council's internet site – at the start of the meeting the Convener will confirm if all or part of the meeting is being filmed.

The Council is a Data Controller under the General Data Protection Regulation and Data Protection Act 2018. We broadcast Council meetings to fulfil our public task

obligation to enable members of the public to observe the democratic process. Data collected during this webcast will be retained in accordance with the Council's published policy including, but not limited to, for the purpose of keeping historical records and making those records available via the Council's internet site.

Any information presented by individuals to the Council at a meeting, in a deputation or otherwise, in addition to forming part of a webcast that will be held as a historical record, will also be held and used by the Council in connection with the relevant matter until that matter is decided or otherwise resolved (including any potential appeals and other connected processes). Thereafter, that information will continue to be held as part of the historical record in accordance with the paragraphs above.

If you have any queries regarding this, and, in particular, if you believe that use and/or storage of any particular information would cause, or be likely to cause, substantial damage or distress to any individual, please contact Committee Services (committee.services@edinburgh.gov.uk).


Business Bulletin

Policy and Sustainability Committee

10.00am, Friday 15, December 2023

Virtual Meeting - Microsoft Teams

Policy and Sustainability Committee

Convener:	Members:	Contact:
<p>Convener: Councillor Cammy Day</p> 	<p>Councillor Cammy Day (Convener) Councillor Danny Aston Councillor Alan Beal Councillor Fiona Bennett Councillor Marco Biagi Councillor Kate Campbell Councillor Sanne Dijkstra-Downie Councillor Phil Doggart Councillor Kevin Lang Councillor Lesley Macinnes Councillor Adam McVey Councillor Jane Meagher Councillor Claire Miller Councillor Alys Mumford Councillor Ben Parker Councillor Mandy Watt Councillor Iain Whyte</p>	<p>Jamie Macrae, Committee Officer</p> <p>Jacqueline Boyle, Assistant Committee Officer</p>

Recent News	Background
<p><u>LGBF Sustainability Indicators Update</u></p> <p>The LGBF board has agreed to include the following measures into the LGBF dataset:</p> <ul style="list-style-type: none"> • Emissions from Transport per Capita • Emissions from Electricity per Capita • Emissions from Natural Gas per Capita <p>These are all measures in the Public Bodies Climate Change Reports (submitted by all local authorities on an annual basis). The Improvement Service (who collate and release the LGBF dataset) are now working to add these measures into the dataset in time for the first data release of the 22/23 dataset (expected early 2024). We will include these measures in our reporting when the data becomes available.</p> <p>Family group assignment</p> <p>The current sustainability measures are reported against the demographic rather than the deprivation family group. The rationale behind this is that analysis, completed by the Improvement Service as part of adding these measures, showed a clearer relationship with geography, with rural authorities reporting significantly higher CO2 emissions. This rationale still stands and so these measures will continue to be shown against the demographic family group in the national reporting of the LGBF data.</p> <p>However, we can do the calculations locally to show these measures against the deprivation family group. We will include this additional analysis so the climate change measures will be shown against both demographic and deprivation family groups as part of our next LGBF reports to committee.</p>	<p><u>Contact</u></p> <p>Catherine Stewart, Lead Change and Delivery Officer Corporate Services</p>
<p><u>Scottish Government Consultation on the Scottish Biodiversity Strategy</u></p> <p>This Scottish Government consultation is seeking views on a range of topics and proposals related to biodiversity and tackling the nature emergency in Scotland.</p> <p>It covers three parts of the Biodiversity Strategic Framework:</p> <ol style="list-style-type: none"> 1. The Scottish Biodiversity Strategy which sets out the 	<p><u>Contact</u></p> <p>Caroline Peacock, Biodiversity Officer, Place</p>

vision to halt and reverse biodiversity loss;

2. The first five-year Delivery Plan which contains the actions to deliver the vision; and
3. The proposed Natural Environment Bill which will provide a framework for establishing statutory nature targets to drive delivery and the transformational change we need.

The consultation document is set out in two parts. Part A is consulting on the final draft of the Scottish Biodiversity Strategy, the first five-year Delivery Plan, and policy frameworks for Nature Networks and protecting at least 30% of our lands and seas by 2030 (30 by 30).

Part B of the consultation seeks views on proposals related to tackling the nature emergency that will require legislation, specifically statutory targets for nature restoration and changes to National Parks legislation.

The Council's response to the consultation (attached as an appendix) is broadly supportive of the aims within the latest iteration of the Strategy. However, the response identifies a need for the Delivery Plans to better reflect the significant amount of work being delivered at a local level by Local Authorities and Local Biodiversity Partnerships. This includes protecting important sites through the Local Nature Conservation Sites system, activity on important habitat types not mentioned in the strategy and creating mechanisms to prevent habitat loss outside of designated sites. It also:

- Seeks clarity on the first five-year delivery plan, in particular on who the lead agencies are responsible for delivering each element;
- Highlights that Local Authorities are well placed to respond to the nature emergency as Planning Authorities and land managers, but recognises there are challenges of capacity and resource constraints;
- Recommends that nature restoration activity should be informed by local as well as national priorities; and
- Recommends that the value of urban greenspace and green networks is recognised in responding to the nature and climate emergencies.

The Edinburgh Biodiversity Partnership have input to the consultation response and responded from within their own

organisations.

Direct Payment (DP) Policy and Procedure

During the Policy and Sustainability Committee in June 2023, EHSCP committed to developing a Direct Payment (DP) Policy and Procedure to provide clarity on the process for reclaiming unspent DP funds. At the same time Children, Education and Justice Services had an internal audit and the recommendation was to update a Self-Directed Support (SDS) Policy with EHSCP. Direct Payment is a component of this policy and other associated actions as part of the Internal Audit action.

However, there was no Self-directed support policy, and this needed a full policy development across EHSCP and Childrens Services with stakeholder engagement, IIA and training for staff to incorporate the government legislation and practice framework – a much larger piece of work than the audit action implied. EHSCP are a key stakeholder of the SDS Policy and will support its development with Childrens Services, ensuring consultation with members of the public and relevant council officers. Revised timescales have been agreed with Internal Audit. We plan to take a draft Policy and Practice framework to an engagement event on 6 December 2023 with an Integrated Impact Assessment taking place in January 2024.

Quality assurance tools have been created and will be used once all relevant colleagues have received training to be able to deliver in line with government legislation and the SDS practice framework.

Contact:

[Mike Massaro-Mallinson](#),
Strategic Programme
Manager,
Strategic Planning &
Modernisation

Forthcoming activities:

Respondent Information Form



Tackling the Nature Emergency - Consultation on Scotland's Strategic Framework for Biodiversity

Please Note this form **must** be completed and returned with your response.

To find out how we handle your personal data, please see our privacy policy: <https://www.gov.scot/privacy/>

Are you responding as an individual or an organisation?

- Individual
 Organisation

Full name or organisation's name

City of Edinburgh Council

Phone number

Address

Waverley Court, 4 East Market Street, Edinburgh

Postcode

EH8 8BJ

Email Address

biodiversitv@edinburgh.gov.uk

The Scottish Government would like your permission to publish your consultation response. Please indicate your publishing preference:

- Publish response with name
 Publish response only (without name)
 Do not publish response

Information for organisations:

The option 'Publish response only (without name)' is available for individual respondents only. If this option is selected, the organisation name will still be published.

If you choose the option 'Do not publish response', your organisation name may still be listed as having responded to the consultation in, for example, the analysis report.

We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

Yes

No

Tackling the Nature Emergency: Consultation on Scotland's Strategic Framework for Biodiversity

Questions

We are inviting responses to this consultation by **14 December 2023**.

You are not required to answer every question in the consultation. The consultation is set out in sections to help you identify matters in which you may have a particular interest.

Please note that Section 1 of the consultation document does not contain any questions, so question numbering starts from Section 2.

Section 2 – Scottish Biodiversity Delivery Plan

Question 2a: Have we captured the key actions needed to deliver the objective: accelerate restoration and regeneration?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

...

The ambition to accelerate restoration and regeneration is supported. The actions as set out are also broadly supported, with additional suggestions set out here. However, there are significant gaps, examples of these are commented on below.

As an overarching comment, the draft Delivery plan and actions have been published without an indication of who lead agencies and delivery partners are. This makes it difficult to fully respond and comment on the proposals from a Local Authority perspective. Clarity on this is required when the plans are finalised and published to ensure effective delivery.

As land managers, Planning authorities and Local Biodiversity Partnership lead organisations, Local Authorities are well placed to support the aims for protection, restoration and regeneration of biodiversity.

There is a significant amount of Local Biodiversity Partnership working across Scotland, informed by national and local priorities. This is poorly reflected in the draft delivery plan and should be addressed. Direct engagement with the Scottish Local Biodiversity Network stakeholder group is required to ensure optimal implementation of finalised delivery plans across the country. The group has representation for all local authority and National Park areas in Scotland and a

wealth of experience and insight on what is required to enable successful local delivery.

There are no proposals included in the Delivery Plans on how to prevent further biodiversity loss through habitat loss, degradation and fragmentation. The policy framework around development has been strengthened in NPF4, but there also needs to be a robust regulatory framework to prevent habitat loss which is not associated with development. For example, there are regulations around felling licences which help to prevent uncontrolled woodland removal. Outside of designated sites, there are no such controls to prevent removal of other important habitats in the wider landscape. Without addressing this, biodiversity loss will continue.

.....
The delivery plan and key actions do not mention anywhere important habitat types such as unimproved grasslands and ponds/wetlands, examples of two important habitat types which have been substantially lost in the last century. Restoration and creation of these are integral to nature-rich landscapes. Along with urban greenspaces, parks and gardens, these are both essential components of achieving the aims to halt and reverse biodiversity loss and should be clearly embedded in the Strategy and Delivery Plans.

There is also no separate mention of ‘creation’ of habitat, so it is unclear if ‘restoration’ means both restoring degraded habitats and creating lost habitats. In addition, how is ‘restoration’ to be defined for each ecosystem? How will this be monitored?

There is little mention of one of the key risks to biodiversity, which is a lack of appropriate management of habitats. The aim of bringing all habitats into appropriate management should be stated in the Delivery Plans.

A focus on restoration of ancient woodlands is supported and Edinburgh has areas of ancient woodlands which can be prioritised for protection and restoration. The consultation draft does not explain why a new register of ancient woodland is required, to replace the inventory of Ancient and Long Established Woodlands. Effective protection for remnants of ancient woodland, until such time as they can be restored, should be enacted through the Local Nature Conservation Site system of local designations. The new draft Planning Guidance supporting Policy 3 in NPF4 should, when updated, highlight the unique conservation value of ancient woodlands.

In addition, younger areas of native or near-native semi natural woodlands should also be identified and protected, and prioritised for enhancement and management to improve habitat condition where needed. This should include woodland which has naturally regenerated. Conditions should be created which allow for continued natural regeneration of native semi natural woodland, which is the best outcome for biodiversity, carbon and soil. Allowing space and the long time periods required for

natural regeneration and habitat succession is often overlooked in restoration and management, and this must change.

To be effective, legislation should go further in relation to INNS and require removal of widespread and established terrestrial INNS wherever they occur, irrespective of land use type – for example Giant Hogweed, Japanese Knotweed, Himalayan Balsam, Rhododendron Ponticum. A regulatory framework for biosecurity is needed, not just a voluntary code of conduct.

.....
.....
.....
.....
.....

Question 2b: Are the key actions, to support the objective: accelerate restoration and regeneration, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

The following additional actions are suggested.

.....
...Policy and legislative improvements are also required to prevent further losses of biodiversity due to habitat destruction, degradation and fragmentation. Statutory or regulatory powers to prevent the destruction of nature rich areas outside of designated sites should be considered, and also extended to include locally designated sites such as Local Nature Conservation Sites.

.....
...The actions would be better set out as a framework of all priority habitats to be protected, created, connected and restored which can be applied at different scales including localised projects, rather than a programme of just six large scale national restoration projects and the national priorities of peatland and woodland. Reflecting and enabling action across all areas is critical to accelerated success and not adequately reflected in the proposals.

.....
Though NPF4 protects the environment and ensures mitigation, some form of standardised habitat banking such as Biodiversity Net Gain or an adapted Scottish variation must be mandatory, not only to prove evidence based net gains in biodiversity but to also encourage and create investment which is crucial to combat reductions in budgets and resources. This would be in line with the success stories of many English local authorities who are benefitting from a habitat banking model.

For private investors, a consistent and recognisable standard is important, and aligning with the approach in England would help achieve this.

.....
.....
.....

Question 2c: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....Ecosystem restoration particularly at a range of scales; action to reduce deer numbers; action to improve freshwater through RBMP and other activity.

.....
.....
.....
.....
.....

Question 2d: Have we captured the key actions needed to deliver the objective: protect nature on land and at sea across and beyond protected areas?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

.....

The key actions presented are broadly supported, but again there are important gaps and some changes are needed, particularly to timescales on a small number of actions relating to Nature Networks and green-blue spaces.

Although the title of this section includes ‘beyond protected areas’ there is little in the proposed key actions to show any action to protect nature beyond existing protected areas. An exception is the reference to urban green-blue spaces. As commented above, where are the measures to prevent further habitat loss in the wider countryside? This is needed alongside positive action within protected areas.

There is no recognition or reference to the network of designated Local Nature Conservation Sites. The LNCS designation system is supported by national guidance, which is currently being refreshed. They are recognised in the Planning system and incorporated into Local Development Plans. There is an excellent foundation to strengthen the status of these sites, both for greater protection from damage and introduce mechanisms to support and require positive management are put in place. There is a direct link between LNCS and local nature networks and this

is particularly important in urban areas. These are an excellent fit, both for identifying local priority sites and opportunities for core Nature Networks, and embedding Nature Networks into Local Development Plans.

The importance of LNCS may have been overlooked because a national perspective has been applied to the development of draft key actions. As LNCS systems are applied at a local authority scale, the opportunities they offer have perhaps been missed, as local area stakeholders have not had an opportunity to input to the development of the key actions in the draft delivery plans. This should be corrected as the delivery plans and key actions are finalised.

The proposal to promote the Scottish Geodiversity Charter in the Delivery Plans is related to LNCS designations, and is supported.

On Nature Networks, the 2030 target across these key actions is too late. The original target date in the programme for government was set for 2026. Many areas are already developing spatial Nature Networks to support Local Development Plans. Waiting 7 years to have these in place does not fit with an accelerated approach to reversing biodiversity loss.

Related to this is the proposal to develop toolkits to support creation of nature networks. This is an unnecessary step for creating the spatial Nature Network. All Local Authorities use GIS mapping, and creating an initial spatial Nature Network only requires access to designated site boundaries, already held by Local Authorities, and access to available habitat and species data and any other relevant urban greenspace data. A simple methodology can be adopted and rolled out relatively quickly to create an initial spatial Nature Network, which can be developed over time into opportunity areas for expansion and improvements. This both speeds up the timescale and simplifies the process, removing barriers to implementation.

The ambition to have a National Charter on urban green-blue spaces is welcome, however once again the timescale is too far in the future. Many local authority areas have carried out urban greenspace improvements for biodiversity for many years. Some are already actively looking at green-blue improvements required in the near future. A proposal to develop a Charter by 2030 feels again like this is too long a timescale for an “accelerated response”. Considering the related need to improve urban green-blue spaces for climate adaptation, this timescale for action does need to be brought forward. The more significant question, not address here, is identifying capacity and resources to deliver these outcomes.

The plans for Wee Forests is supported, but action is also needed to ensure that existing semi natural urban woodlands are being appropriately managed and enhanced for biodiversity. In the last twenty years initiatives to create Millennium Woodlands and Woodlands In and Around Towns have created large areas of new woodland and the management of these to maturity should not be overlooked in the push to plant more trees.

The action to require transport and active travel infrastructure to also deliver green-blue outcomes is welcome. The wording should go further and require that impacts on existing biodiversity is avoided, particularly the loss of trees or woodlands corridors, which commonly happens.

In relation to NPF4, requirement for proof of maintenance of green/blue infrastructure is supported for ensuring good habitat establishment, but any long-term maintenance, management and monitoring must be supported through funding and resources.

.....

Question 2e: Are the key actions, to support the objective: protect nature on land and at sea across and beyond protected areas, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

.....
...Not fully, for the reasons set out above in question 2d.
.....
.....
.....
.....
.....

Question 2f: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....
.....The actions on 30x30, Nature Networks, NPF4 and urban green-blue space are likely to have the most wide-reaching impact.
.....
.....
.....
.....

Question 2g: Have we captured the key actions needed to deliver the objective: embed nature positive farming, fishing and forestry?

- Yes **YES with one addition suggested**
- No
- Unsure

Please explain the reasons for your response:

.....
 ...A key action should be added for the local area Forestry and Woodland Strategies, which are required under the Planning (Scotland) Act 2019. These Strategies should require identification and protection of ancient woodlands for future restoration, ensuring that semi natural urban woodlands of any age are under positive management, and the importance of trees and woodlands in urban area for both biodiversity and climate adaptation through canopy cover and urban cooling/flood water alleviation.

.....
 Embedding nature positive agriculture should include promotion of exemplar projects such as the Lauriston Farm Agro-ecology site in Edinburgh.

.....
Question 2h: Are the key actions, to support the objective: embed nature positive farming, fishing and forestry, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No
- Unsure

Please explain the reasons for your response:

.....

Question 2i: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....

Question 2j: Have we captured the key actions needed to deliver the objective: protect and support the recovery of vulnerable and important species and habitats?

- Yes
- No **NO – only partly**
- Unsure

Please explain the reasons for your response:

.....
...The key actions set out are presented from a national perspective, which does not reflect the large amount of work carried out through Local Biodiversity Partnership working. Local work on vulnerable and important species is cumulatively of great significance to national delivery, and should be reflected in the Delivery Plans. Only delivering the national work mentioned will not be sufficient to reverse biodiversity loss.

The Edinburgh Biodiversity Action Plan has delivered conservation outcomes for vulnerable and important species such as Swifts, Terns, rare plants and insects, as well as species monitoring activity and citizen science.

Updating the Scottish Biodiversity List is a very important piece of work and is welcomed. Developing the list to make it easier to identify priorities by geographical area would be helpful. A wider review gathering information on all partnership projects for vulnerable and important species, including local level, should be undertaken. This should include identification of where additional capacity is needed for necessary conservation work. This will demonstrate the extent of the effort required to protect and support species at risk across Scotland. It will also facilitate knowledge sharing and further collaborations. Some of the key actions proposed are better suited to local delivery, and are already being delivered locally, eg citizen science.

.....
.....
.....
.....
.....

Question 2k: Are the key actions, to support the objective: protect and support the recovery of vulnerable and important species and habitats, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

.....
...More resources for work at local scales are required to ensure a higher number vulnerable species at risk are protected. To focus only on national priorities will be very insufficient. Local Biodiversity Partnership projects are currently only able carry out the required conservation activities on a small proportion of rare and notable species, without additional and sustained funding.
.....
.....
.....
.....
.....

Question 2l: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Question 2m: Have we captured the key actions needed to deliver the objective: invest in nature?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response:

.....
The scope of the Biodiversity Investment Plan must include local biodiversity delivery if Objective 5 is to be fully met. Suggest it is worth having an additional key action on ensuring that all public subsidies, grants and investment should also deliver nature-positive outcomes. For example, all infrastructure investment, transport, active travel, forestry funding cross referenced to other parts of the document.

The timing and duration of funding is absolutely critical to success. Too much funding is short term and available at short term. Nature conservation inherently needs to be planned over long timescales to be effective and successful. Piecemeal and short-term funding does not support this.

.....
.....
.....

.....
.....

Question 2n: Are the key actions, to support the objective: invest in nature, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....

Question 2o: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....
.....
.....

Question 2p: Have we captured the key actions needed to deliver the objective: take action on the indirect drivers of biodiversity loss?

- Yes
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....

Question 2q: Are the key actions, to support the objective: take action on the indirect drivers of biodiversity loss, sufficient to put Scotland on track to ending the loss of biodiversity by 2030?

- Yes
- No

- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Question 2r: Which actions do you think will have most impact?

Please state the actions and explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Section Three – Nature Networks Policy Framework

Question 3a: Do you have any comments on the Nature Networks Framework?

Please provide any comments:

The Nature Networks Framework is welcomed. The concept builds on fundamental principles of increasing, improving and connecting habitat networks which are widely understood. Earlier iterations of habitat network mapping and availability of habitat and species data through existing local biodiversity partnership working means that re-framing priorities as 'Nature Networks' is a logical extension of previous work. Embedding spatial Nature Networks in Local Development Plans is a key additional benefit. The principle, particularly for urban areas, also supports health and wellbeing and climate adaptation outcomes.

-
- Long term “permanent” support is needed for a nature network as it requires staff with a range of skills to work together, from community engagement, project management and ecology to ensure the longevity of an effective nature network which contains actions supported from the outset which can be monitored and evaluated through the years and continue to build a nature network.
 - Is a nature network now mandatory by 2030 or 2026? Previously, we had heard it was 2026.

- An update related to these points is needed within the NatureScot Nature Network guidance to encourage and ensure that any work contributing to the creation and development of a nature network prior to its mandatory status is in line with expectations.
The document states that nature networks need to be 'measurable increases in urban biodiversity', so there needs to be more standardised monitoring with what they're expecting in terms of which metrics are acceptable and encouraged.

.....

Section Four – 30 by 30 Policy Framework

Question 4a: Do you have any comments on the 30 by 30 Framework?

Please provide any comments:

.....
 The 30 by 30 Policy Framework is supported. As outlined earlier in this response, the inclusion of Local Nature Conservation Sites have been overlooked, possibly because local authorities and stakeholders who lead the process or designation were not sufficiently represented in developing the framework. There is an important opportunity to review and strengthen this established system for protection of locally important sites for biodiversity, which should not be missed. LNCS are far more numerous and extensive than other designations, so provide a significant increase in coverage and connectivity across areas.

Section Six – Statutory Targets for Nature Restoration

Question 6a: Do you agree with this approach to placing targets on a statutory footing?

- Yes **YES**
- No
- Unsure

Please explain the reasons for your response:

.....
...The principle outlined is broadly supported. However, the experts included in the Programme Advisory Group should be broadened out to also include experienced practitioners, including experts with experience of delivery and challenges of achieving good biodiversity outcomes at a local scale. This could help inform meaningful targets which translate into meaningful biodiversity gains. Outcome based targets should be set which focus resources into interventions which deliver real biodiversity gains.

For example, for urban greenspaces, percentage targets to convert amenity grassland into species rich meadows or other habitats from a baseline; targets for year on year increase in the percentage area of semi natural habitats under positive management or restoration. These examples are readily understood by local authorities or other large scale landowners. They address some fundamental challenges like habitat homogeneity and lack of management.

.....
.....
.....
.....

Question 6b: Do you agree with the criteria set out for the selection of targets?

- Yes
- No
- Unsure **UNSURE**

Please explain the reasons for your response:

.....
.....The process set out seems reasonable, however how is the high level target influenced by action and decisions? Who is accountable if targets are missed? Species abundance is mentioned, and this can be affected by many factors. How would the high level targets be reported at a regional or local scale? The challenge with setting targets is to make them reflect the outcomes from choices and decisions implemented at a variety of scales.

.....
.....
.....
.....

Question 6c: Do you agree statutory targets should include a combination of outcome targets and output targets?

- Yes **YES**
- No
- Unsure

Please explain the reasons for your response:

.....Yes, with the caveat of the comments made for question 6b.

Question 6d: Is the list of potential target topics sufficiently comprehensive in terms of the focus of proposed target areas and overall scope?

- Yes
- No **NO**
- Unsure

Please explain the reasons for your response. If you answered “No”, please provide details of any target topics which you think are missing from the list.

...It is comprehensive but there are a few suggested additions which, if included, would be a better fit with missing Global Biodiversity Framework indicators.

1. Measure loss of high biodiversity areas.
2. % of degraded ecosystems under active restoration – a meaningful version of what is proposed.
3. % of unsealed surface in urban areas (this is related to Nature Based Solutions/adaptation and is a proxy indicator). Alternatives are % of natural habitats in urban areas/% tree canopy cover in urban areas.

Question 6e: Do you have any other comments on the list of potential target topics?

- Yes **YES**
- No

If you answered “Yes”, please provide your comments below.

The potential target topics 1 to 9, on ecosystems, habitats and species, should definitely be included.

.....
.....
.....
.....
.....
.....

Question 6f: Do you agree with the proposal to have the smallest feasible number of targets which reflects the complexity of nature restoration?

- **Yes YES**
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Question 6g: Do you agree statutory targets should align with the 2030 and 2045 timescales set out in the Strategy?

- **Yes YES**
- No
- Unsure

Please explain the reasons for your response:

.....Yes, but with the caveat that for some habitat types, these are in fact very short timescales. Large scale and very long-term restoration projects in Scotland have timelines of 200 years, so there should also be vision set out for ecological restoration for even longer timescales, eg 2100.

.....
.....
.....
.....
.....

Question 6h: Do you agree the Bill should allow for the review of statutory targets?

- Yes **YES**
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Question 6i: Do you agree that reporting on targets should align with existing Biodiversity reporting requirements?

- Yes **YES**
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....
.....

Question 6j: Do you agree that an Independent Review Body is needed to report on Government's progress in meeting the statutory targets?

- Yes **YES**
- No
- Unsure

Please explain the reasons for your response:

.....
.....
.....
.....
.....
.....

This page is intentionally left blank

Policy and Sustainability Committee

10.00am, Friday, 15 December 2023

Draft Climate Ready Edinburgh Plan for Consultation

Executive/routine
Wards

Executive
All

1. Recommendations

- 1.1 It is recommended that Policy and Sustainability Committee:
 - 1.1.1 Approves the Draft Climate Ready Edinburgh Plan 2024-2030 which has been informed by the updated citywide climate change risk assessment commissioned by the Council for public consultation;
 - 1.1.2 Notes that this plan has been developed in partnership by the Edinburgh Adapts Group and led by Gordon Reid, General Manager Zero Emissions, Scottish Water; and
 - 1.1.3 Notes that, if approved, a 12-week consultation on the draft plan will be held with the aim of bringing the final plan back to the Policy and Sustainability Committee for approval in Spring 2024.

Paul Lawrence

Executive Director of Place

Contact: Fiona Macleod, Senior Climate Change and Sustainability Officer

E-mail: fiona.macleod@edinburgh.gov.uk

Draft Climate Ready Edinburgh Plan for Consultation

2. Executive Summary

- 2.1 Edinburgh's 2030 Climate Strategy placed a renewed focus on adapting the city to the effects of climate change. The Edinburgh Adapts Partnership has led this work on behalf of the city and has developed the Climate Ready Edinburgh (CRE) plan 2024-2030 for public consultation. If approved by Committee, a 12-week consultation will be held on the plan.
- 2.2 Development of the draft CRE plan has been informed by an updated climate change risk assessment, which identified the risks, impacts and potential adaptation options that could be taken to adapt the city. This assessment sets out the evidence base of why we need to adapt. This includes the most up-to-date projections of how Edinburgh's climate is likely to change in the future; the risks arising; their impacts; and the implications this could have for Edinburgh.
- 2.3 An economic assessment of the costs of adapting Edinburgh as compared to business as usual will be completed by spring 2024. The outcomes of this will feed into the Climate Ready Edinburgh Plan.

3. Background

- 3.1 The City of Edinburgh Council declared a Climate Emergency in 2019 and a Nature Emergency in 2023.
- 3.2 A key ambition of Edinburgh's 2030 Climate Strategy was the development of a Climate Ready Edinburgh Plan to continue the process of adapting the city to the impacts of climate change. The Council is working closely alongside cross-sector partners to align action in response to this, maximising resource efficiencies and cross capital benefits.

4. Main report

- 4.1 A Draft Climate Ready Edinburgh (CRE) plan to 2030 has been developed as the next phase of Edinburgh Adapts. This has been informed by:
 - 4.1.1 Actions developed through the 2030 Climate Strategy;

- 4.1.2 The outcomes of the citywide and Edinburgh's World Heritage risk assessments;
 - 4.1.3 Coastal work undertaken in collaboration with the University of Glasgow; and
 - 4.1.4 New actions identified by the adaptation partnership and key stakeholders.
- 4.2 CRE aims to ensure a just transition and climate justice approach to adaptation, through working inclusively and collaboratively with communities, partners and other sectors to ensure that all our citizens benefit, with a focus on our most disadvantaged and vulnerable citizens and communities.
- 4.3 As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the climate and nature emergencies. Green blue infrastructure and nature-based solutions play a crucial role in helping the city adapt as well as supporting the aim of Edinburgh becoming a nature positive city by 2030.
- 4.4 The CRE plan identifies the short, medium and long-term actions that need to be taken to adapt the city. This includes working towards achieving a whole system transformational approach to adaptation, moving away from taking incremental action to embedding adaptation into everything we do and into all levels of governance across the city.
- 4.5 Edinburgh's updated climate change risk assessment has shown a number of key risks and impacts for the city, with flooding and overheating identified as the ones that will impact the city most. As such, action to alleviate these risks and impacts are prioritised in the CRE plan.
- 4.6 The draft plan priority themes are in the following eight areas:
- 4.6.1 **Planning and the built environment:** actions that will help to mitigate the effects of climate change by making our buildings and infrastructure more resilient;
 - 4.6.2 **Water management and resilience:** actions to tackle flooding and associated impacts from severe weather events;
 - 4.6.3 **Coastal adaptation:** actions to manage sea level rises and the impact to our coastline and surrounding communities;
 - 4.6.4 **Sustainable transport:** actions to support a well-connected city;
 - 4.6.5 **Safeguarding and enhancing our natural environment:** actions that will support our natural environment and biodiversity;
 - 4.6.6 **Strong, healthy community and economy:** actions to support our communities, addressing climate justice, to create a thriving city;
 - 4.6.7 **Building understanding of climate risk:** actions to continue to ensure our understanding of how the climate is changing and the impacts of this to the city are based on the latest climate science;- and
 - 4.6.8 **Governance and risk:** actions to drive delivery and partnership working.

- 4.7 The plan is not starting from scratch in adapting the city. Many of the actions are already underway, including the award winning work on developing Edinburgh's Green Blue Network (which received an 'Excellence in climate, environment and social outcomes' award from The Landscape Institute).
- 4.8 The Development Framework approved for Granton Waterfront aims to create a new vibrant, green and sustainable coastal quarter on Edinburgh's waterfront. This includes the creation of a coastal park as part of the development to provide natural resilience to coastal flooding from rising sea levels and storm surges.
- 4.9 Edinburgh was the first local authority in Scotland to develop a nature network. Developed by the Council's Thriving Green Spaces project, Scottish Wildlife Trust and the University of Edinburgh, it aims to connect, create and improve our natural spaces across Edinburgh for the benefit of people and nature.

5. Next Steps

- 5.1 If approved, a 12-week citywide public consultation on the draft Climate Ready Edinburgh Plan 2023-2030 will be held. During this period, a number of engagement exercises will be held, including workshops targeting the city's public, private and third sectors and internal partner workshops to ensure that the actions in the plan assigned to them are correct and align with their organisational priorities.
- 5.2 A final version of the plan will be brought to Committee for approval by Spring 2024.
- 5.3 The business case for undertaking a city region climate change risk assessment under the Edinburgh and East of Scotland City Region Deal's Shared Prosperity Framework has just been approved. This assessment will be undertaken over an 18 month period.
- 5.4 An economic assessment of the costs of adapting Edinburgh as compared to business as usual will be completed by Spring 2024 for committee consideration. The outcomes of this will feed into the CRE Plan.

6. Financial impact

- 6.1 Substantial investment and thorough planning are needed to meet the climate challenges Edinburgh faces. Adaptation of the city is a long-term agenda that needs to be planned and prioritised. The draft implementation plan consists of actions which are of minimal impact, are currently underway, already built into budgets or will need further investment to take forward. As this work develops and the need to adapt the city to the impact of a changing climate grows, the need for additional investment by all partners will become more acute.
- 6.2 Adapting the city will require the Council to ensure it uses our existing funds effectively to achieve our adaptation aims. We will also have to look at using funds differently, including through a mixture of public, partner and private finance to fund our adaptation aims. An investment and delivery plan and a series of business

cases will be developed as part of the plan, so that the Council is ready to apply for investment opportunities as and when they arise. Work will continue with City Deal regional partners to ensure a clear and consistent approach to defining the funding needs across Edinburgh and the Southeast Scotland.

- 6.3 Resource to enable delivery will also be a key challenge. Ongoing maintenance will also require additional time which will impact key delivery services across the city. Further work on the skills and resource needed to support a climate adapted city will be required.

7. Equality and Poverty Impact

- 7.1 Equality and poverty must be a key consideration of all our sustainability work. The CRE Plan aims to ensure that all our citizens will benefit from adaptation, with a focus on our most disadvantaged and vulnerable citizens and communities, by, for example, reducing the risk of flooding to homes, tackling dampness and water ingress of homes and buildings, reducing transport disruption from severe weather events, and tackling overheating in homes, health facilities and other public buildings.
- 7.2 The Integrated Impact Assessment (IIA) process for the plan has commenced, and will be further developed through the consultation period, taking account of insights emerging from the consultation and other engagement activity over the early part of 2024 as outlined above.
- 7.3 An Interim IIA has been completed ([Interim IIA](#)).
- 7.4 A full IIA will be published when the final Plan is brought to Committee in Spring 2024. Further IIAs will be carried out (as appropriate) as the implementation plan and wider work programme develops.

8. Climate and Nature Emergency Implications

- 8.1 The CRE Plan sets out the actions that need to be taken over the next few years to continue to adapt the city to the unavoidable impacts of our changing climate. By adapting, emissions will also reduce through, for example, maintaining and increasing carbon stores, reducing the vulnerability of the built environment and infrastructure to extreme weather events, and reducing energy demand for heating in buildings.
- 8.2 Edinburgh declared a nature emergency in 2023. As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the nature emergency. The CRE Plan is closely aligned with and supports Edinburgh's Biodiversity Action Plan, Edinburgh's Nature Network, and Million Tree City initiative, and specific actions are aimed at protecting and building the resilience of Edinburgh's species and habitats and using green and blue

infrastructure and nature-based solutions. This will support the aim of Edinburgh becoming a nature positive city by 2030.

9. Risk, policy, compliance, governance and community impact

- 9.1 The plan has been developed considering the substantial feedback received internally within the Council from a wide range of Council service areas, the Council's Sustainability Board and Sustainability and Climate and Nature Emergencies All Party Oversight Group and externally from members of the Edinburgh Adapts partnership and Net Zero Edinburgh Leadership Board.
- 9.2 The emphasis of the consultation on the draft plan will be on setting out the proposals and actions for how the city will prepare for and adapt to the impacts of climate change. The consultation will ensure it provides enough information to allow people to make meaningful representations in the response to the above.
- 9.3 The following activities will be used to raise awareness of the plan, encourage people to have their say and support the IIA of the final plan from an early stage:
- 9.3.1 Launch of the consultation document and questions on Consultation Hub. Publicity to raise awareness of the consultation;
 - 9.3.2 Notification to third sector, community and city partner groups and individuals telling them how to comment;
 - 9.3.3 Series of public events for third sector, community, and community council partners allowing opportunity to find out more about the consultation proposals, including specific engagement with seldom-heard groups; and
 - 9.3.4 Series of events with key stakeholders and sectors including business, investment, developers and public bodies.
- 9.4 The council's [risk appetite](#) for Health and Safety risk is currently set at minimal to low, meaning the Council will seek to take action to manage and mitigate risks assessed above this level. The risks caused by flooding leading to serious or fatal injury is noted as high within the CRE risk assessment. The CRE Plan can be considered as part of the management of this risk as it outlines projects and plans that address different types of flooding to mitigate these risks, so far as is reasonably practicable.

10. Background reading/external references

- 10.1 [2030 Climate Strategy: Delivering a net zero, climate ready Edinburgh](#)
- 10.2 [2030 Climate Strategy: Delivering a net zero, climate ready Edinburgh](#)
- 10.3 [2030 Climate Strategy Executive Summary](#)
- 10.4 [Edinburgh Adapts Climate Change Action Plan 2016-2020](#)

11. Appendices

Appendix 1 – Draft Edinburgh Climate Ready Plan 2024-2030 for consultation

Draft Climate Ready Edinburgh Plan 2024-2030

December 2023

Foreword

In 2019, the City of Edinburgh Council declared a climate emergency and made a commitment to be net zero by 2030. This recognised both the scale of the challenge ahead of us and the role we must play as Scotland's capital city.

Since then, the Council has declared a nature emergency and made ambitious commitments to support the health and wellbeing of our city and citizens.

Our 2030 Edinburgh Climate Strategy sets out what it will take to meet these goals. This includes the actions, investments, and changes we need to undertake as a Council and as a society to truly become a net zero, adapted and nature positive city.

While reducing our carbon emissions is crucial to the future of our city, we also need to recognise that a changing climate presents new risks to how we live both now and in the coming years. Put simply we need to adapt for our city to thrive.

For this reason, we need a single plan for how we can adapt to climate change, the *Climate Ready Edinburgh* plan.

Global and local events tell us we have no other choice. In Edinburgh, we are already experiencing extreme weather. From rising temperatures which have resulted in heatwaves and drought to heavy rainfall and significant flooding events across the city.

Extreme weather will create disruptions to how we all live, which is why we must take an inclusive approach with

climate justice at the heart of how we work. We know that inequality persists in our city, and we must ensure that climate change and our responses to it do not take us further away from our goal to end poverty in Edinburgh.

We will ensure that the needs of all our citizens, especially the most vulnerable, are understood and considered in every decision we take.

Poverty, nature and climate change are inter-related challenges which need to be addressed with urgency, determination, skill, and investment.

We know that the decisions we make now can secure the comfort, safety and wellbeing of future generations in a thriving green city, and we hope that you will work with us to help deliver our vision for a city and region, where people, communities and nature can live well in a changing climate.

Councillor Cammy Day

Leader of the City of Edinburgh Council and Chair, Edinburgh Partnership

Gordon Reid

General Manager Zero Emissions, Scottish Water and Chair, Edinburgh Adapts

Contents

Introduction	4
The Case for Adaptation.....	10
Climate Ready Edinburgh.....	19
Climate Ready Edinburgh Action Plan.....	21
Climate Ready Edinburgh Implementation Plan.....	36
Appendix 1 – Collaboration and Partnership Working	61
Appendix 2 - Climate Ready Scotland: climate change adaptation programme 2019-2024	62
Appendix 3 – Strategic Drivers and Policy Drivers	63
Appendix 4: Climate Risk Across Sectors	67

Introduction

We're going to consult on this plan with the aim of having a final Climate Ready Edinburgh Plan by summer 2024. This is a progression from the 2016 to 2020 Edinburgh Adapts Plan. Based on the latest available evidence, this plan provides an assessment of the city's vulnerability to climate change. It builds on the Edinburgh 2030 Climate Strategy and sets out the actions needed to ensure the city can adapt to climate change. The strategy aims to adapt in a way which is fair, equitable and beneficial to our citizens, culture, communities, businesses, and nature.

What do we mean by climate adaptation?

As defined by Adaptation Scotland, '*Adaptation is about responding to the changes that we have seen in Scotland's climate over the last few decades, and preparing for the challenges and opportunities that we will face as our climate continues to change in the decades ahead. Adaptation goes hand in hand with work to reduce greenhouse gas emissions, often referred to as climate change mitigation.*'

Climate Justice: a definition

'Justice that links development and human rights to achieve a human-centred approach to addressing climate change, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly.'

Intergovernmental Panel on Climate Change (IPCC)

Just Transition: a definition

'A transition that ensures the economic, environmental and social consequences of the ecological transformation of economies and societies are managed in ways that maximise opportunities of decent work for all, reduce inequalities, promote social justice, and support industries, workers and communities negatively affected, in accordance with nationally defined priorities, and based on effective social dialogue.'

Joint Oireachtas Committee on Climate Action.

A Nature Positive City

'In 2050 Edinburgh will have a species-rich nature network from the uplands of the Pentland Hills to the coastal waters of the Firth of Forth. It will be an environment abundant in wildlife that is enjoyed and respected by people, making Edinburgh a beautiful place to live, work and visit.'

Edinburgh Biodiversity Action Plan 2022-2027 Vision

Vision

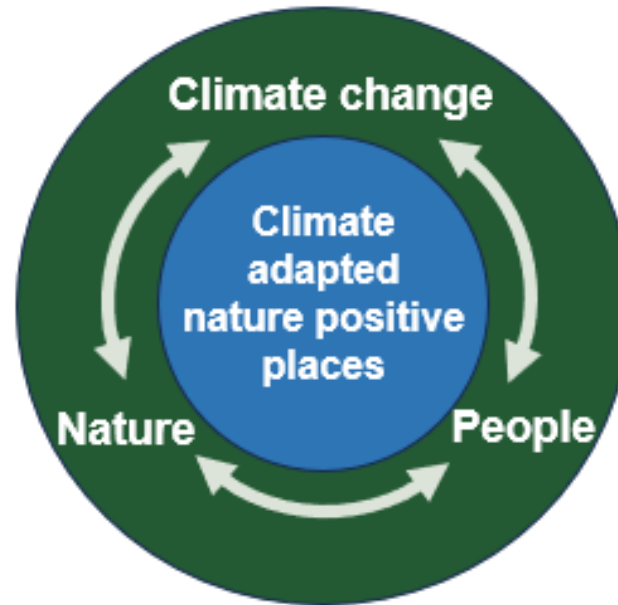
The vision of the plan links directly with our city's aims to be a net zero, climate resilient, and nature positive Edinburgh. It also aligns with climate justice principles and guaranteeing a Just Transition for all our citizens.

Figure 1 The Vision for a 'Climate Ready Edinburgh'



The relationship between climate change, nature and people are interconnected and will impact one another as the risks of climate change become more acute. We therefore consistently refer to them all when we discuss climate change.

Figure 2 Relationships between climate change, nature, people.

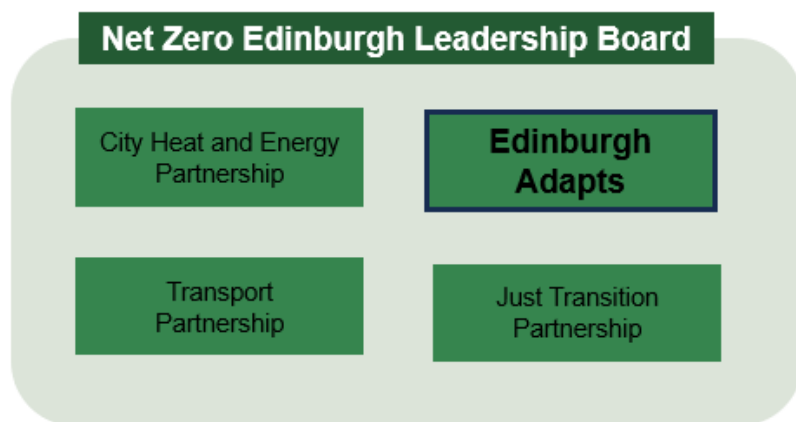


Governance and Delivery

This Climate Ready Edinburgh plan has been developed by the Edinburgh Adapts Partnership chaired by Scottish Water, and approved by the Net Zero Edinburgh Leadership Board (NZELB). The delivery of adaptation actions will be through the Edinburgh Adapts partners. This will be alongside supporting agencies from the Net Zero Edinburgh Leadership Board, key stakeholders and city-wide organisations.

The Edinburgh Adapts Partnership is one of four thematic interconnected workstreams that reports to the Net Zero Edinburgh Leadership Board (figure 1). We will use both the Edinburgh Adapts Partnership and the NZELB to monitor progress and support partnership working.

Figure 1 Governance structure of adaptation in Edinburgh



Supporting and interconnected partnerships are:

- Transport Partnership chaired by City of Edinburgh Council
- Just Transition Partnership chaired by Edinburgh Chamber of Commerce
- Heat and Energy Efficiency Partnership chaired by SP Energy Networks and University of Edinburgh.

Working in Partnership

The Edinburgh Adapts Partnership is made up made up of The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency, Edinburgh World Heritage Ltd, Historic Environment Scotland, NHS Lothian, Naturescot, University of Edinburgh, Heriot-Watt University, Napier University, Edinburgh College and SNIFFER.

In some instances, it will be better to take actions forward at a regional level. Therefore, we are working with regional partners in surface water flooding and risk assessment. This helps ensure a clear and consistent approach to adaptation across Edinburgh and southeast Scotland.

All the actions will be examined through a lens of climate justice to ensure that we prioritise funding and work to support our most vulnerable citizens and communities.



THE UNIVERSITY
of EDINBURGH



NatureScot
NàdarAlba



“A changing climate is a here and now problem and we need to adapt. We in Scottish Water and our customers are already seeing the impacts. There is a lot to do, and no single organisation can solve this in isolation, and I welcome the publication of this plan as a key step in preparing Edinburgh for the future.”

Gordon Reid
General Manager Zero Emissions, Scottish Water and Chair, Edinburgh Adapts.

"Sniffer is delighted to be part of the Climate Ready Edinburgh partnership, and to support the development and delivery of the Plan through the Adaptation Scotland Programme. Climate Ready Edinburgh is a leading example of the place-based, collaborative approach to climate adaptation that is crucial to ensuring that Scotland's cities and regions can flourish in our changing climate"

Ben Connor
Head of Climate Ready Placemaking, Sniffer

“The Climate Ready Edinburgh plan is a stepping stone to protect and sensitively adapt the Old and New Towns of Edinburgh World Heritage Site against the current and future impacts of climate change. Its vision and actions will support Edinburgh World Heritage efforts to address these challenges whilst sustaining the Outstanding Universal Value of the World Heritage Site and enhancing the quality of life of its residents” **Yann Grandgirard, Head of Climate Change Edinburgh World Heritage**

“NatureScot recognises the extent of the challenges that climate change will bring to the City of Edinburgh, including the direct and long-term implications for our coastal and terrestrial habitats and species. While these challenges are often complex and difficult, we recognise there is also an opportunity to make the city greener, more nature rich and better for people through the process of climate change adaptation and infrastructure renewal. NatureScot warmly welcomes the content of the Adaptation Plan and looks forward to playing a collaborative role in its delivery, working with all stakeholders to ensure we protect, restore and value nature as part of the process.”

Frazer McNaughton
Operations Manager, Strategy and Partnerships, National Operations South NatureScot

“Climate adaptation presents a proactive approach and pathway to safeguarding our future. Navigating the challenges of a changing climate requires collaboration, and the Climate Ready Edinburgh Plan exemplifies the collective effort needed. Embracing climate change adaptation not only enhances resilience but also presents a unique opportunity to shape a more equitable and just society for generations to come.”

Dave Gorman
Director of Social Responsibility and Sustainability, University of Edinburgh

Policy context

Under the Public Bodies Duties requirements of the Climate Change (Scotland) Act 2009, local authorities are required to help prepare Scotland for future changes in climate and take measures to adapt. This is an ever-changing and evolving area and the Climate Ready Edinburgh Plan will be revisited annually to ensure that its context and strategic direction are still correct.

The plan sets out short, medium and long-term actions, bringing together planned and ongoing actions across multiple strategies, new actions and a vision for a well-adapted city.

It embeds the seven outcomes of the Scottish Climate Change Adaptation Programme (SCCAP) which were developed by the Scottish Government. For further information on SCCAP outcomes see [Appendix 2](#). A new SCCAP is in development and the Climate Ready Edinburgh Plan will be revisited to ensure it continues to align with these outcomes.

This plan does not sit in isolation. It brings together key city strategies including:

- [End Poverty in Edinburgh Plan 2020-2030](#)
- [Vision for Water Management in the City of Edinburgh](#),
- [Edinburgh Biodiversity Action Plan](#)
- proposed [City Plan 2030](#)
- [City Mobility Plan 2030](#)
- [World Heritage Management Plan for Edinburgh Old and New Towns](#)
- [Thriving Green Spaces Strategy](#).

For further strategies and information see [Appendix 3](#).

The plan will enable the city to unlock and prioritise vital adaptation work to support the city to thrive whilst tackling the challenges we will face from the changing climate and nature emergencies, ensuring a Just Transition.




The Case for Adaptation

How has Edinburgh’s climate already changed?

The City of Edinburgh Council commissioned AtkinsRealis to undertake an updated climate change risk assessment for the city. This included looking at how our climate has already changed. This work was based on the Met Office’s “State of the UK Climate¹” report which is produced annually.

Findings from the Met Office’s report show that recent decades have been warmer, wetter and sunnier, with changes in rainfall patterns and more frequent, heavy downpours. Sea levels are rising along our coast and there have been fewer days with frost and snow cover.

The changes in climate that we are already experiencing are projected to continue and intensify.

	<p>Scotland's 10 warmest years on record have all occurred since 1997.</p>
	<p>There has been an increase in rainfall over Scotland in the past few decades with an increasing proportion of rainfall coming from heavy rainfall events.</p>
	<p>Mean sea level around the UK has risen by approximately 1.4 mm/year from the start of the 20th century.</p>

¹ The State of the UK Climate report is an annual publication which provides an accessible, authoritative and up-to-date assessment of UK climate trends, variations

and extremes, based on the latest available climate quality observational datasets. The [latest report](#) is available on the Met Office website.

How will Edinburgh's climate change in the future?

The climate change risk assessment also examined how the climate is predicted to change in the future.






The updated climate risk assessment used information from the Met Office's UK Climate Projections 2018 (UKCP18). The UKCP18 provides the most up-to-date and appropriate climate change scenarios for understanding climate change in Edinburgh².

There are four potential climate outcomes included in UKCP18 going from an assumption of sustained and rapid reductions in greenhouse gas emissions globally to more extreme changes that are projected if emissions continue to rise and emission reduction targets are not achieved.

The amount of change that occurs will depend on how successful we are in reducing greenhouse gas emissions globally.

For this plan, we have chosen the most extreme scenario called the 'high emissions scenario' (Relative Concentration Pathway 8.5 (RCP8.5)). This approach is recommended by the UK Climate Change Committee, who advise taking a precautionary approach and adapting to 2°C of warming while preparing for a 4°C temperature rise.

From the risk assessment analysis of UKCP18 for Edinburgh, the long-term projected climate trends for Edinburgh are:

	Average temperatures will continue to increase across all seasons.
	Typical summers will be warmer and drier and winters milder and wetter.
	Weather will remain variable and may become more variable.
	Intense, heavy rainfall events will increase in both winter and summer.
	As global average temperatures increase, we will also experience rises in sea level around Edinburgh's coast.

The next section provide a more detailed breakdown of these climate trends.

² [Adaptation Scotland's summary of UKCP18 projections for Scotland](#)

Temperature

- Temperatures in the 21st century are around 1°C higher than in the pre-industrial era³ and this warming trend is projected to continue into the latter half of the century. We therefore need to be ready for:
- Average temperature increases exceeding 5°C in the summer and 3°C during winter months.
- The number of days exceeding 22°C increasing in frequency to 11 days per year by the 2070s.
- Heatwaves becoming around 4 times more frequent.
- Overnight temperatures increasing minimum comfort thresholds for sleeping.
- The number of days below 14.4°C decreasing over the next 60 years.
- Extreme cold and snow events are likely to become less frequent, but extreme events such as the 2018 “Beast from the East” may still occur.

Rainfall

- Rainfall patterns are changing and will continue to change. Average winters are projected to become wetter, with more heavy rainfall and a greater number of wet days.
- Summers will become drier. However, summer heavy rainfall events are projected to become more extreme, with greater amounts of rain falling over a shorter period of time.
- A notable increase in storm intensity can be expected over the next 30 years, with further increases in the subsequent 20 years.
- Climate projections are uncertain regarding changes in wind speed. However, it is more likely that wind gust speeds and storm intensity will increase under a warming climate.



³ [UK MET Office Climate Projections: Headline Findings](#)

Figure 1 Edinburgh average monthly temperatures for the baseline and future 2070s period under the high emissions scenario

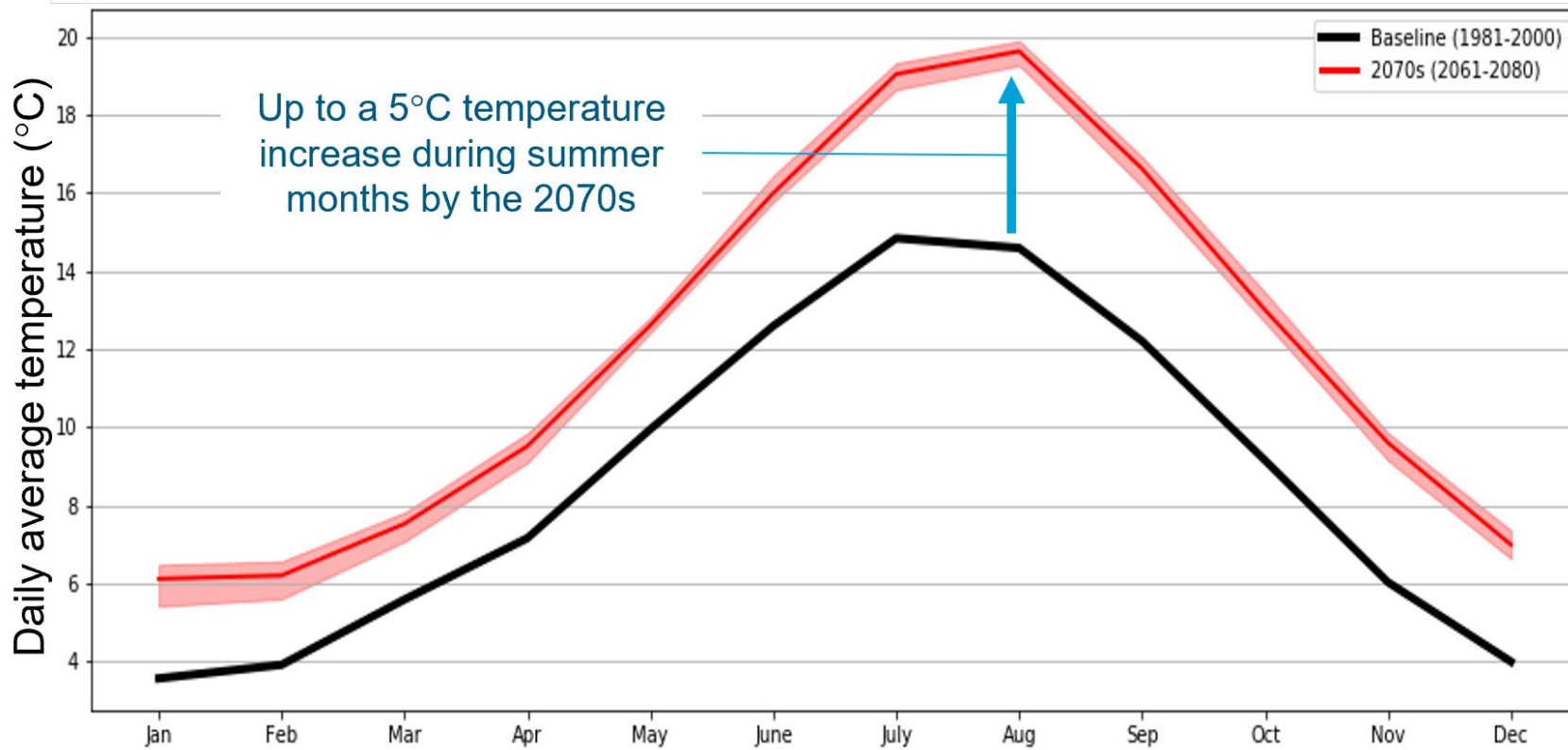
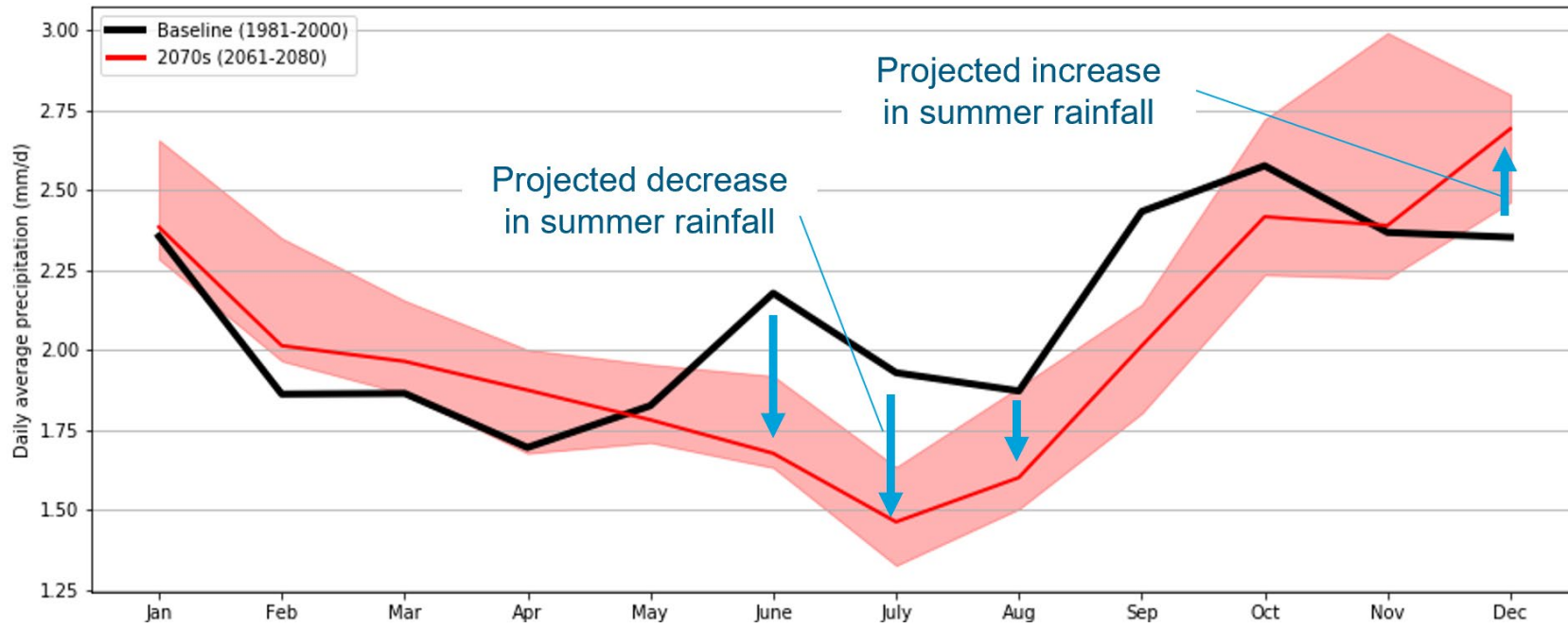


Figure 2 Edinburgh average monthly precipitation for the baseline and future 2070s period under the high emissions scenario



Drought

Increasing temperatures and reduced average rainfall during summer months could lead to prolonged periods of hot and dry weather, leading to periods of localised drought. This will exacerbate the effects of changing rainfall patterns on lochs and reservoir levels and impact on river levels, wetlands and other water bodies in the city.

Sea level rises

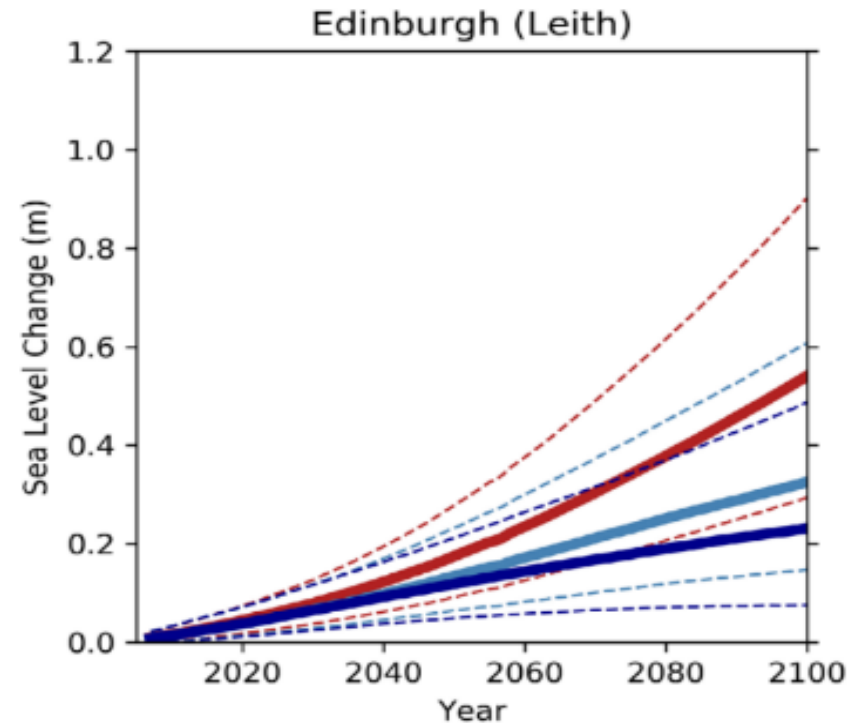
As global temperatures increase, sea levels will continue to rise along Edinburgh's 27 km coastline. This is associated with the increase in global temperatures and its impact on oceanic thermal expansion and ice melt. This trend is projected to accelerate in the decades ahead.

This means that sea levels are rising around Edinburgh's coast, with minimum increases of between 16-20 cm likely in the next 20 years. In the latter half of the century increases as high as 90 cm are possible under the high emissions scenario. A medium emissions scenario could result in sea level rise of 30-40cm but with the possibility of rising by up to 60cm. This is illustrated in Figure 4.

In addition, there is also a low possibility that sea level rise this century could be much faster than anticipated as a result of additional melt from the Greenland and Antarctic ice sheets. This means that a sea level rise of 2m by 2100 cannot be ruled out for the UK.

Rising sea levels will mean extreme events such as storms having a greater impact and a greater risk of flooding from wave overtopping. Sea level rise will also lead to greater erosion of Edinburgh's coastline and put increasing pressure on our sea defences.

Figure 3 Sea level rise projections for Edinburgh to 2100, the bold lines show the 50th percentile predictions, the dotted lines the 5th and the 95th. This is for the high (red), medium (light blue) and low (dark blue) scenarios.



The risks from climate change

To build Edinburgh's climate resilience we need to understand how climate change is likely to impact the city and how best to address this.

This includes:

- understanding how climate change has already and will continue to affect Edinburgh and the potential consequences of this.
- quantifying the extent to which appropriate, prompt and long-term action will bring long term savings.
- making sure that the techniques used to adapt our city create beautiful, nature positive places.

The effects of climate change will not be felt evenly across the city and will depend on both geography and socio-economic circumstances. Climate change impacts are a threat multiplier which will affect certain groups disproportionately and could lead to increasing inequalities.

The experience of recent years has shown that global climate change and extreme weather events have already impacted many aspects of our lives locally, nationally, and globally.

The risks and impacts of these changes across key sectors of the city

The impact of these climate change risks will be wide ranging and we need to understand the extent to which action now could bring about long-term benefit to Edinburgh. The common factor among these risks is the threat they pose to the health, safety and wellbeing of not

only our citizens but our natural environment. A full risk assessment for each impact is in [Appendix 4](#).

Public health

The greatest risks from climate change are loss of human life associated with extreme weather and climate change events such as flooding and heat waves.

There is also a risk that there will be an increase in inequality across the city. Rising temperatures, increasing rainfall and extreme weather events are likely to impact the most vulnerable individuals, households and businesses.

This potentially amplifies the effects of the recent global pandemic and the cost of living crisis. Individuals who do not have the assets, finances and support to adapt will be impacted the hardest making life even more challenging.

Those in low paid work may experience more challenging working conditions, which in turn will negatively impact health and wellbeing. There will also be a knock-on impact in education services, with schools and educational establishments closing for periods, widening the attainment gap for those living in poverty. There will also be increased demand on our healthcare and emergency services who will struggle to respond to growing pressures, resulting in reduced care provision and overall poorer health for our citizens, especially those most in need.

Housing, built environment and city landscapes

The built environment covers all infrastructure, including homes, commercial buildings, city landscapes, schools and hospitals. Our built environment is already experiencing the

impacts of our changing climate in the form of flooding, storms and coastal erosion resulting in damage to buildings, the public realm and infrastructure. The risk assessment has identified flooding, heatwaves, sea level rise and both drought and subsidence as emerging risks which will grow increasingly more severe in the next few decades. Many properties and areas of townscape in Edinburgh's World Heritage Site and conservation areas in the city are particularly vulnerable to these climate impacts due to their location, construction, age and cost to adapt.

Climate change will not impact all residents equally. While those who own properties may be able to adapt them to the impacts of climate change, tenants who rent their homes will depend on landlords to improve the resilience of their buildings.

There will also be increased risk to public health and risk to life from rising temperatures and severe weather, especially as many of our buildings and city landscapes were not designed with climate resilience in mind. Whilst there is a huge pressure to reduce emissions from buildings and construction of new townscapes, it is key that this is done in tandem with future proofing the buildings and the public realm to the shocks and stresses of climate change to ensure a resilient built environment.

Natural environment

The natural environment has already experienced major changes and losses, with the city declaring a nature emergency in 2023. We know that we must work hard to protect and restore nature and our natural environment

both in the city and surrounding areas as we integrate climate adaptation measures using nature-based solutions.

Edinburgh is a place of great beauty and natural heritage. From the Pentland Hills to the Firth of Forth there is a wide diversity of habitats and natural places. This includes the Red Moss of Balerno on the edge of the Pentlands which is Edinburgh's raised peatland. Some of these places are home to rare and protected plants and animals, for example the Firth of Forth is of global and national importance for some species of birds. Added to this is habitat crucial for pollinators.

Rising temperatures, changing rainfall patterns, longer growing seasons and changes in seasonal events as well as extreme weather events will place increasing pressure on Edinburgh's unique and special natural environment, especially our sensitive habitats, species and ecosystems, as well as the ecological services they provide.

Transport Infrastructure

Our transport infrastructure is vital to Edinburgh remaining a thriving, connected and desirable place to live, work and visit. Edinburgh's transport sector has already started to face regular disruption from severe rainfall and storms. Flooding caused by severe rainfall causes the greatest disruption and this risk will increase in the future. High winds and storms have also affected transport services and caused delays and cancellations.

Disruption to transport does not affect communities equally, with citizens in low income and in minority groups most likely to be impacted when transport and related infrastructure is disrupted. We must therefore ensure our

transport is well protected to ensure inequalities are not further exacerbated.

Reducing emissions from transport will remain a key focus through the City Mobility Plan, but this will be further supported by embedding climate adaptation measures into key transport infrastructure and working with partners to minimise disruptions.

Call to action

This Climate Ready Edinburgh Plan is a call to action for our city. Our research has told us that we need to adapt now to mitigate the impacts of climate change. This means that all of our public health, infrastructure and investment decisions must embed climate adaptation and climate justice at the core of decision making.

We are focused on the actions Edinburgh must take to manage the shocks and stresses from predicted climate change and the impact this will have on nature, culture and our citizens, particularly our most vulnerable. This plan highlights the fundamental actions required to adapt the city. It also shows how much we can achieve by working in partnership across both the city and the region.

The next sections of this plan describe the actions we deliver over the next seven years. In the delivery of these actions, we think that Edinburgh can be a resilient, thriving, nature positive and 'Just' city.

This means that we need:

- Citizens to join us on our mission to be a climate adapted and nature positive city, that is inclusive and supports our most vulnerable as we tackle climate change.
- All organisations, public, private and third sector to collaborate with us, building relationships of trust and problem solving for our city together.
- The Scottish Government to commit to working with the city to unlock and facilitate new legislative powers, policy, and funding to enable good adaptation measures to be realised.



Climate Ready Edinburgh

What does good adaptation look like?

Overall, we think that good adaptation should include the following key building blocks:

- Focusing on a whole system approach to address structural and infrastructure issues. While the role of individuals, citizens and communities cannot be underestimated, we will also need to work in partnership across the city to address the major infrastructure requirements.
- Working inclusively and collaboratively with communities, ensuring no one is negatively impacted by climate change, to ensure a just transition and climate justice remains at the core of decision making.
- Using governance to provide oversight, drive delivery and ensure actions are implemented and changes can be documented and monitored.
- Recognising that we need multiple funding streams and investment from both government and the private sector.
- Using data, evidence and emerging research to inform our decision-making processes.

This plan sets out the specific actions our partnership has agreed are essential if we are to address the risks of climate change. We have identified eight priority themes, which each have a set of actions for delivery over the next between now and 2030.

For each action, the plan sets out the city partners who need to act, and the changes that need to be made to support climate justice and our natural environment.

Climate Ready Edinburgh Priority Themes

A - Planning and the build environment: actions that will help to mitigate the effects of climate change by making our buildings and infrastructure more resilient

B - Water management and resilience: actions to tackle flooding and associated impacts from severe weather events

C - Coastal adaption: actions to manage sea level rises and the impact to our coastline and surrounding communities

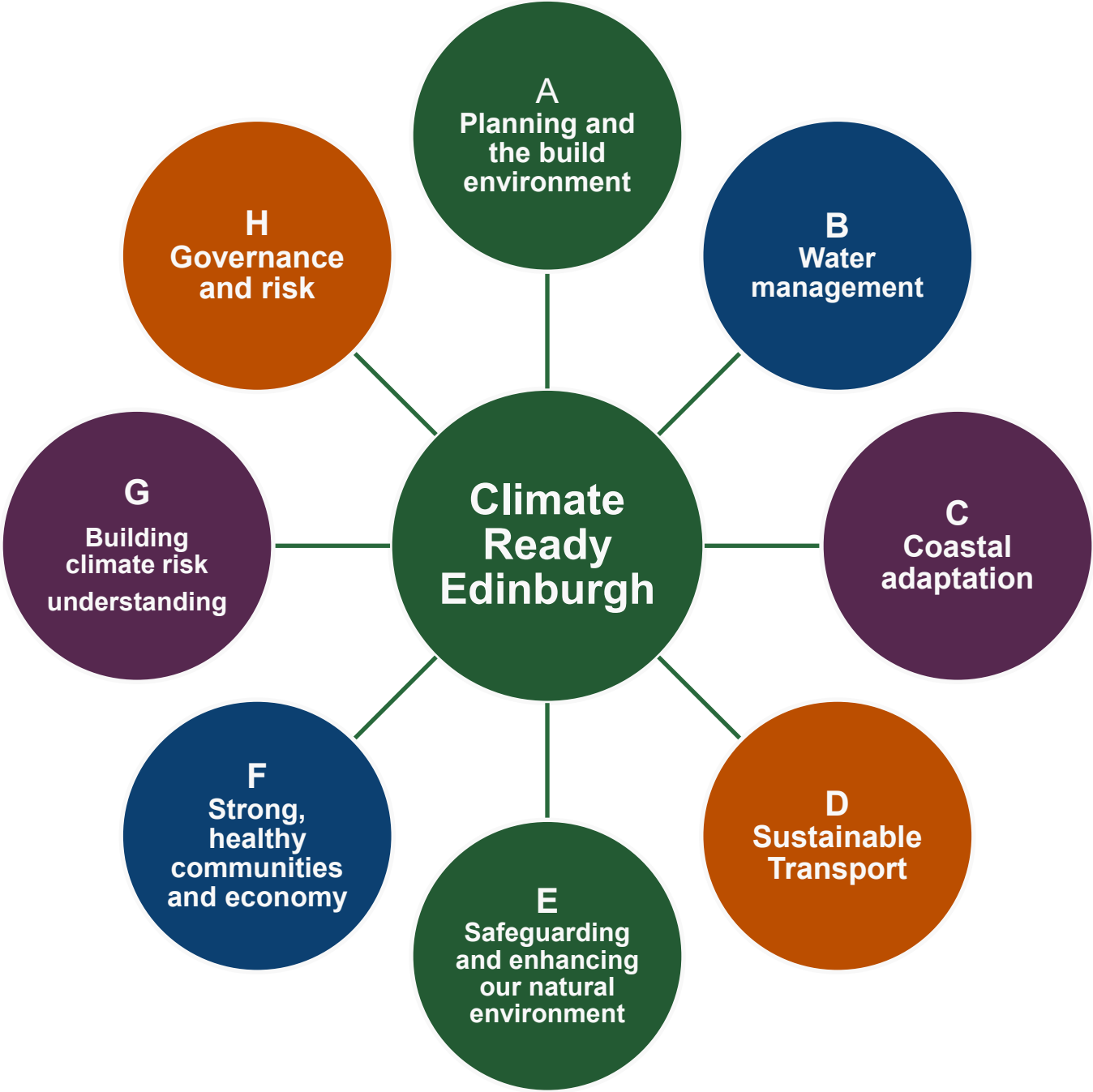
D – Sustainable Transport: actions to support a well-connected resilient city

E - Safeguarding and enhancing our natural environment: actions that will support our natural environment and biodiversity

F - Strong, healthy communities and economy: actions to support our communities, addressing climate justice, to create a thriving city

G - Building understanding of climate risk: actions to continue to ensure our understanding of how the climate is changing and the impacts of this to the city are based on the latest climate science.

H - Governance and risk: actions to drive delivery and partnership working.



A: Planning and the built environment

We can already see the impact of climate change on our built environment. Rising temperatures and severe weather are damaging our buildings and infrastructure and creating travel disruption. As temperatures rise, overheating of buildings will become an issue. Increasing frequency of severe weather will also lead to greater flooding, water ingress and dampness, increasing damage to the fabric of our buildings and surrounding areas.

The effects of climate change will not be felt evenly across the city. How exposed a place or community is to these impacts, the nature of surrounding built and natural environment and differences in socio-economic circumstances will all impact on people's ability to adapt, especially the poorest, most marginalised and vulnerable.

To build resilience into Edinburgh's built environment, we need to:

- Embed climate change adaptation into all the policies and guidance that we use to plan and develop Edinburgh's buildings and infrastructure. This means updating Edinburgh Design and Street Guidance to reflect City Plan 2030 planning policies relating to climate change adaptation, using Nature Based Solutions to enhance Edinburgh's green spaces, protect biodiversity, reduce flood and heat risk, improve air and water quality.
- Improve the resilience of Edinburgh's World Heritage Site (WHS) to the impacts of climate change by

continuing to develop and deliver adaptation actions in the next Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031.

- Improve our understanding of and develop practical guidance to address climate change risks posed to Edinburgh's buildings and infrastructure in the WHS and conservation areas, including vulnerability and ability to cope with increasing heat, flooding and extreme weather events.
- Use this methodology and approach to extend this guidance and solutions to building types and areas outside the WHS and conservation areas.
- Work with the Council's Housing Team, social landlords and education institutions to adapt Edinburgh's housing and educational buildings and their landscapes.
- Engage with developers, investors and landowners to embed climate adaptation into existing developments.
- Embed adaptation into the Council's Corporate Property Strategy and as part of the Council's retrofit programme
- Embed adaptation into the Council's Authority Construction Requirements (ACRs) and link the ACR to Edinburgh's Design Guidance and Street Guidance.
- Support owners of basement properties to prepare for increased risk of ground water and surface water flooding through resilient design including garden areas.

Climate Adaptation in Action: Old and New Towns of Edinburgh UNESCO World Heritage Site



In 2021, the Edinburgh World Heritage Trust undertook a Climate Change Risk Assessment (CCRA) project for Edinburgh's UNESCO World Heritage Site. The project's aim was to understand the challenges posed by climate change to Edinburgh's [Old and New Towns](#) and its communities who live and work there or visit the site. The work was supported by the [Place-Based Climate Action Network \(P-CAN\)](#) and the [AtlaS World Heritage project](#).

Extensive engagement was carried out, using two climate change risk and vulnerability assessment methodologies: one developed during the project, and the [Climate Vulnerability Index \(CVI\)](#) created by James Cook University Australia and applied for the first time to a 'urban' World Heritage Site.

This led to a draft Climate Action Plan for the Old and New Towns which will inform mitigation and adaptation policies and actions to help increase the site's resilience to climate change while preserving what makes it a unique place to live and visit.

Edinburgh World Heritage's Climate Emergency Grant

In December 2022, Edinburgh World Heritage launched a new Climate Emergency Grant to address issues identified during implementation of the CCRA project. The grant provides funding to private owners and public, private and third sector organisations wishing to carry out targeted energy efficiency improvements or adaptation interventions alongside conservation repairs to their properties. The fund specifically focuses on two priorities:

- energy efficiency improvements to historic windows or external doors to increase their thermal performance and reduce heat losses.

- adaptation of rainwater goods to increase their capacity in handling larger volumes of rainwater.

Learning from these pilot projects will provide practical and replicable solutions that suit Edinburgh's local context. These will inform case studies and future guidance to support residents, local stakeholders, and construction professionals, in addition to supporting conservation repairs in the World Heritage Site and raising awareness on climate change challenges.

The first funding round attracted a high number of applications, and subsequent rounds are expected to be launched in the next three years.

B: Water Management

Flooding has a huge impact on all sectors of society. In terms of severity, river, surface water and coastal flooding are one of the key risks that will impact the city the most. The Scottish Environment Protection Agency National Flood Risk Assessment 2018 estimated that in Edinburgh, there are currently 28,200 homes, businesses and services at risk of flooding from all sources in a significant storm. This event has a 29.5% chance of happening in a 70 year period⁴. Due to climate change this could increase by 37% to 38,800 homes, businesses and services by the end of the century.

The impact of flooding will not be felt evenly across the city, with vulnerable communities disproportionately affected when flooded. Flooding events have already led to disruptions to transport infrastructure, cutting off parts of the city, as well as damaging homes, communities, businesses, and our natural environment. At the same time, we know we will also experience more periods of water scarcity and drought affecting water supply, agriculture, city landscapes and increasing fire risks.

To build resilience into our water management systems, we need to:

- Update and deliver Edinburgh's Water Management Vision which will include the objectives to:
 - Further develop the Strategic Green Blue Network for the city, ensuring our waterways and green

spaces are interconnected and managed to deal with extreme weather events, provide biodiversity corridors and cool routes for people.

- Deliver blue green infrastructure to help reduce flooding and remove surface water from combined sewers in prioritized areas of the city and deliver biodiverse, beautiful places.
 - Update Edinburgh Design Guidance design, Sustainable Rainwater Management Guidance and factsheets for all types of flooding, water scarcity and fluvial erosion risks.
 - Support a city-wide communication and engagement programme to champion good rainwater management and water stewardship and value the water we use every day in homes and businesses.
- Work with the public and private sectors to develop risk assessments to support city wide resilience to flood events.
 - Develop and support the Gogarburn Partnership and other cross boundary river partnerships to explore Natural Flood Management opportunities upstream and improvements to river corridors. Support Edinburgh's Canal Partnership.
 - Manage demand for domestic and commercial water supplies during drought by working with key partners to increase infrastructure efficiency to reduce leaks and minimise water loss.

⁴ [Vision for Water Management in the City of Edinburgh](#), Page 9.

Climate Adaptation in Action: A Water Management Vision for Edinburgh

Edinburgh's Water Vision aims to deliver a long term and sustainable approach to river and storm water management and conservation across the city to help manage current and future flood and drought risk in a changing climate.

This is being taken forward by Edinburgh's Blue-Green city partnership comprising the City of Edinburgh Council, Scottish Water, SEPA and NatureScot. The partnership reports to the Edinburgh and Lothians Strategic Drainage Partnership who co-ordinate action to tackle surface water and sewer flooding in the city.

Guidance has been produced under this Vision, including on Sustainable Rainwater Management with factsheets to help ensure all projects manage surface water sustainably.



Climate Adaptation in Action: Edinburgh's Green Blue Network

Edinburgh's Green Blue network aims to deliver a network of beautiful, biodiverse, water resilient, connected places to help alleviate flood risk, enhance biodiversity connectivity, and provide cool green spaces and routes for people to move freely around the city.

Stage one of the project mapped Edinburgh's nature network, protected landscapes, future and existing slow active travel routes, all types of flooding and culverted water courses plus ecosystem services. Figure 5 shows the initial phase of the Green Blue Network.

Also from this mapping exercise, a prioritized list of blue green neighbourhoods across the city were identified.

The first blue green neighbourhood to be taken forward is the Drylaw, Craigleith and Inverleith area of Edinburgh. Flood modelling and more detailed townscape studies have built on the green blue network information. This has allowed a list of projects within this area to be prioritised. This is now being taken forward by a multi-disciplinary design team.

Edinburgh's Green Blue network and neighbourhood work known as 'Climate Ready Edinburgh' won The Landscape Institute Awards 2023 in 'Excellence in climate, environment, and social outcomes.'

These projects will deliver beautiful, green, biodiverse, well-connected places that also reduce the risk of surface water flooding.



Figure 4 Edinburgh's initial phase of the Green Blue network



What is a green and blue network?

A Blue Green network is a broad term that refers to a set of interconnected green and blue spaces in our environment and refers to linked parks, woodlands, rivers and waterways, raingardens and tree-lined streets. Successful green and blue networks allow us to support biodiversity and nature restoration, increase the city's resilience to the impacts of climate change whilst providing safe and beautiful routes and places for people.

C: Coastal Adaptation

Driven by global temperature increases, rising sea levels and increased coastal erosion are now emerging as key climate risks for Edinburgh.

Although storms coupled with high tides have caused damage to our coastal defences in the past, to date coastal flooding in the city has been relatively limited. Between 2008 and 2011 maintenance and repairs to coastal defences in Edinburgh was estimated at £740,000. Maintenance and repair costs are likely to increase as coastal defences are nearing or already past their design life, and defences are more frequently tested by storm events. Buildings and other infrastructure currently exist in areas that would be at risk if these coastal defences were breached. Whilst there is ongoing monitoring and management of existing defences, further understanding of the risks posed by sea level rise and coastal erosion is required to protect existing infrastructure and facilitate future coastal development.

As well as impacting our communities, sea level rise and coastal erosion presents a direct risk to nature with potential knock-on effects for other habitats and species for which these assets provide important corridors that contribute to ecological connectivity. Edinburgh's coast is globally important for nature and parts of it are designated as a Special Protection Area. This is an international designation for the protection of rare, threatened and vulnerable bird species.

To manage the risk to our coastal communities and infrastructure we need to:

- develop and deliver a new Coastal Change Adaptation Plan by 2026.
- deliver the actions set out in the Local Flood Risk Management Plan with City Region and key partners.
- work collaboratively to engage with communities to ensure increased awareness of risks to homes and businesses and to support action to protect and increase resilience.

To ensure we are protecting and enhancing this key habitat and ecosystem we will:

- Continue to work with partners to identify and undertake measures to increase the resilience of coastal habitats.
- Where feasible, develop natural coastal defences which are fit for purpose, protecting both communities and the natural environment.

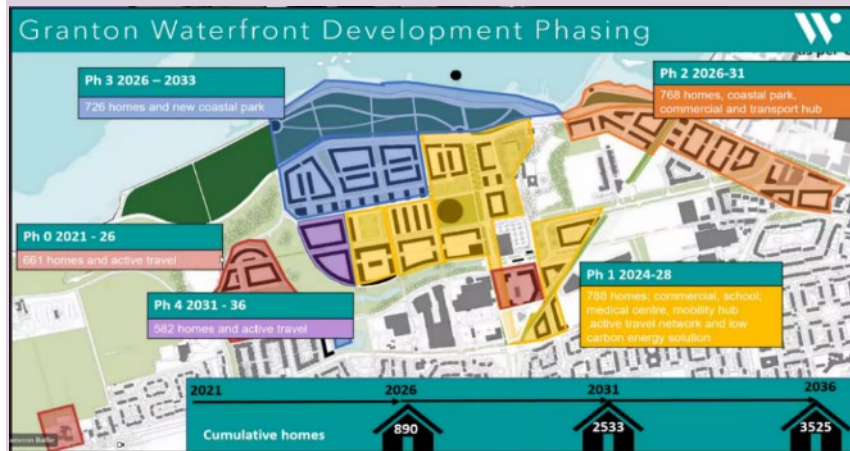


Climate Adaptation in Action: Granton Waterfront

A Development Framework has been approved for Granton Waterfront to create a new vibrant, green and sustainable coastal quarter on Edinburgh’s waterfront.

This includes the creation of a coastal park as part of the development to provide natural resilience to coastal flooding from rising sea levels and storm surges, and networks of natural spaces and blue and green infrastructure which will help to protect and enhance biodiversity and improve health and well-being.

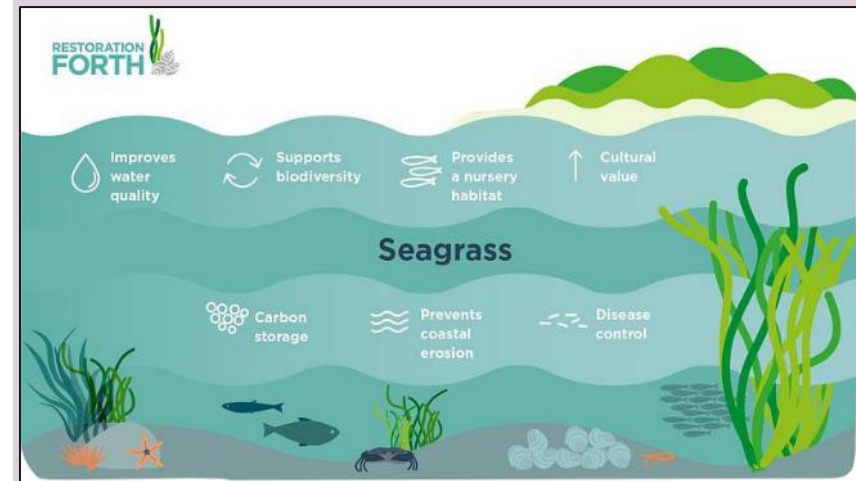
Granton Waterfront is the largest regeneration project of its kind in Scotland. Edinburgh’s ambitions to tackle climate change and transition to a net zero-carbon economy are fundamental to the Granton Waterfront vision.



Climate Adaptation in Action: Restoration Forth

Restoration Forth, led by WWF, is a conservation partnership between charities, local community groups and scientists which aims to restore seagrass and oyster reef habitats in the Firth of Forth in order to enhance the coastal environment of the Forth, helping to support biodiversity, prevent coastal erosion, sequester carbon and improve water quality.

This project works closely with local communities through volunteering activities, citizen science and marine awareness programmes to restore these habitats and to champion habitat restoration in the marine environment for the benefit of these communities.



D - Sustainable Transport

Edinburgh's transport infrastructure plays a key role in helping our city prosper and stay connected. It helps people access jobs, education, and services they depend on, and helps our businesses to access customers and investors they need to thrive.

Our transport systems are exposed to the elements throughout the year and already experience disruption caused by flooding and damage from trees caused by high winds and storms. All these events cause disruption, cancellations and delays to people's ability to move efficiently and safely across the city. These disruptions could increase in severity and frequency in coming years as a result of climate change.



To ensure our transport infrastructure adapts and increases its resilience to climate change we need to:

- Work with national and local transport providers on raising awareness of the impacts of climate change on our transport infrastructure and services, and on ways to incorporate adaptation into future planning and development of travel services to increase resilience.
- Embed adaptation into Edinburgh's City Mobility Plan by ensuring Edinburgh's upcoming Circulation Plan and associated Streetspace Allocation Framework considers green blue infrastructure, biodiversity requirements and ways to reduce surface water runoff. Other adaptive measures to reduce the urban heat island effect by providing shade and improving air quality also need to be included in strategies and plans.
- Engage with the ports sector on risks to their operations from climate change and explore options for building resilience.
- Build climate resilience into Edinburgh's roads network. This includes delivering training for road engineers on nature based solutions and using surface treatments to extend the life of roads to minimise the requirement for full resurfacing.

E: Safeguarding and enhancing our natural environment and city landscapes

Edinburgh declared a nature emergency in 2023 in recognition of the need for an accelerated response to reversing global biodiversity loss.

Climate change is placing additional pressure on already struggling habitats and species in and around Edinburgh. The increasing occurrence and severity of climate change related events such as flooding, sea level rises, droughts and wildfires are expected to result in species and habitat change and loss, affecting species ability to survive and adapt.

These changes represent a risk to the city's natural environment and city landscapes, as well as its role as a safe and vibrant place to live and work. But it also has serious implications for Edinburgh's resilience to the climate emergency. As well as protecting and enhancing nature, a resilient natural environment is a critical part of the solution to the climate emergency. Nature-based solutions play a vital role in helping the city to adapt as well as supporting the aim of Edinburgh becoming a nature positive city by 2030.

To safeguard and enhance the natural environment and city landscapes, we will:

- embed adaptation into city planning processes, land management plans and strategies which will include;
 - developing a Forestry and Woodland Strategy to improve protection for ecologically important areas of woodland habitat, identify priority areas for woodland restoration, creation and regeneration, carbon sequestration, a reduced heat island effect, flood mitigation and nature recovery.
- embedding adaptation as part of the delivery of Edinburgh's Thriving Greenspaces Strategy and Nature Network. This will include development of park masterplans which include sustainable drainage features and improvements for nature.
- Ensure Edinburgh's habitats and species are protected, enhanced and resilient to climate change by:
 - undertaking a natural capital and biodiversity assessment of the city, identifying habitats, ecosystems and ecological services at greatest risk from climate change and those which offer the greatest benefits to nature and adaptation.
 - supporting delivery of the key actions in Edinburgh's Biodiversity Action Plan, the Strategic Green Blue Network, the proposed Nature Vision, Nature Networks, One Million Tree City project.
 - developing guidance on priority habitats and special landscape areas in the city, the risks and opportunities to these from climate change, carbon capture potential, and species choice for future habitat resilience within different city development contexts.
 - Updating the iTree Survey to feed into all plans and strategies in the Council as required and help define

city wide tree canopy targets and protection mechanisms.

- Developing a drought and fire risk strategy for all council owned trees and greenspaces to feed into management plans.
- Developing a Green Finance model to help fund nature and adaptation projects (FIRNS)
- Building a coordinated approach to protecting and enhancing Edinburgh's natural assets across key public and private sector estates

Climate change has also had a significant impact on soil health globally. We will introduce measures to encourage management and protection of soil during planning, development and construction while also implementing measures to restore soil function and the natural processes which aid carbon sequestration and slow run off within wider catchments.

Edinburgh's New Gardens Project programme – FIRNS

The Edinburgh New Gardens project is part of a national programme of exploratory blended finance projects called 'FIRNS' (Facility Investment in Nature Ready Scotland). Blended finance is money that comes from both the private and the public sectors. Edinburgh's project will build a methodology for a blended green finance model using Drylaw, Craigleith and Leith projects. These projects have already been designed to a stage that we can measure (and put a financial value to) the improvements to the environment that would be created after construction.

Ultimately, we hope to use green finance to plan, design and construct many projects for climate adaptation and nature recovery in the city.

Stakeholders who are working with us include: the Scottish Wildlife Trust (SWT), Scottish Environment Protection Agency (SEPA), Scottish Water, Finance Earth, Scottish Nature Finance Pioneers and AtkinsRealis.

Climate Adaptation in Action: Edinburgh's Biodiversity Action Plan and Nature Network

Edinburgh's Biodiversity Action Plan (EBAP) is the framework for nature conservation in the city. The EBAP aligns with the 2050 Goals A and B of the [Global Biodiversity Framework](#), which aims to increase natural ecosystems, reduce species loss, protect genetic diversity, and restore ecosystem services. It also responds to emerging commitments including ensuring Edinburgh becomes a nature positive city by 2030.

There are over 30 organisations and groups working as part of the Edinburgh Biodiversity Partnership. From research organisations such as Royal Botanic Garden Edinburgh and city universities, to government agencies, environmental and conservation charities, expert species and nature groups, and local communities working in parks and greenspaces, there is a huge resource of people and knowledge committed to improving our city for nature.

Actions in the EBAP aim to connect, protect, improve and create new habitats within the city and increase the resilience of ecosystems which enable species to cope with the climate change pressures placed upon them. Actions also aim to increase understanding of how Edinburgh's changing climate is affecting the city's habitats, species and the functioning of its ecosystem services, and what measures need to be taken to alleviate them.



Climate Adaptation in Action: Edinburgh Nature Network

As part of Edinburgh's Thriving Green Spaces initiative, the City of Edinburgh Council has become the first local authority in Scotland to develop a citywide nature network, developed in partnership with Scottish Wildlife Trust, University of Edinburgh, Edinburgh Biodiversity Partnership members and other stakeholders.

The aim of the network is to protect and enhance the city's species and habitats and the ecological services they provide, as well as creating nature corridors to increase species movement and expansion.

The majority of the Network is based on the city's large network of designated sites and priority habitats. Mapping these areas gives the core Nature Network area. A buffer zone has also been added. Opportunities for habitat creation in this zone deliver an increase in the coverage of the network.

The nature network has been incorporated into Edinburgh's green blue network. Development of the network provides multiple benefits for people, wildlife, and climate across the city.



F: Strong, Healthy Communities and Economy

Communities across the city are vulnerable to a whole range of impacts from climate change, including flooding, damage to property and temperature fluctuations. Climate change impacts are frequently felt most by the poorest and most marginalised groups in society, who may also suffer from reduced health and wellbeing. Addressing climate impacts requires a cross sector approach in recognition of the many factors that contribute to health, ensuring that we protect all our citizens, especially the most vulnerable.

Climate change also poses a threat to the future prosperity of Edinburgh. A vibrant economy is vital to the continued success of the city and the wellbeing of its communities. Appropriate adaptation is required to maintain a city that remains attractive to investors and businesses. Edinburgh is Scotland's leading tourist destination with a unique cultural and historic environment, and world renown events destination which could be impacted by future climate events.

We need to protect our citizens, economy and embed a Climate Justice approach in the following ways:

- Align climate change adaptation measures with plans to alleviate poverty, recognising that these two issues are interlinked and must be addressed in tandem to support Climate Justice.
- Improve community resilience to climate change, targeting disadvantaged and vulnerable groups.
- Work with the Edinburgh Partnership to develop actions to build community climate resilience into Edinburgh's

Local Outcome Improvement Plan and Local Improvement Plans

- Build community capacity through promoting Adaptation Scotland's "Community Climate Adaptation Routemap: A practical guide for communities to adapt to climate change" and working with existing citizen platforms and community initiatives.

Improve the health sector's ability to adapt by:

- Working with health providers on reducing the impact of those whose health will be most impacted by climate change.
- Working with key health providers on ways to improve the climate resilience of key health infrastructure in the city, such as care homes and hospitals.
- Embedding climate change in health and social care planning and in business continuity arrangements.
- Utilise the Integrated Impact Assessment process to ensure we are protecting vulnerable communities and inequalities are key considerations of all city developments, strategies, projects and upgrades to infrastructure.

We will support Edinburgh's economy and prosperity through a Just Transition by:

- Work with Edinburgh's business sector to ensure a proactive strategic approach to climate change adaptation.
- Embedding climate adaptation measures across all areas of the city, strengthening the understanding and

utilising key partnerships such as the Just Economic Transition forum.

- Increasing the resilience of Edinburgh's cultural sector, festivals and events through venue management and training.

Listening to our communities will be a key focus as we adapt to climate change. We are committed to engaging with communities, ensuring we are inclusive in our decision making and all voices are represented.



G: Building understanding of climate change risks

Understanding the risks and consequences of climate change, and the impacts this will have on our city will be key to ensuring the right investment decisions are taken, whilst also ensuring our communities and nature are protected. The need to adapt will require us to continually engage in new research to ensure our level of understanding and resilience planning is always fully embedded in our decision-making processes.

We will ensure we embed climate change risks and build our understanding of climate impacts through:

- Ongoing monitoring, evaluation and research to inform decision-making on climate change adaptation.
- Transparency on our progress and ensuring public climate change datasets are available to the public in user friendly and accessible formats.
- Working collaboratively with leading industry experts to ensure future policies take account of climate adaptation measures.
- Learning from our own and the successes of others and applying those to future interventions.

H: Governance and investment

Ensuring we embed climate adaptation across our work, organisations and communities will be key to ensuring action and delivery of climate adaptation measures. Governance and collaborative working will enable us to tackle this challenge as a collective.

Governance of this strategy has already been established through the Net Zero Edinburgh Leadership Board, with the Edinburgh Adapts partnership responsible for overseeing the delivery of this plan and cross sector working with supporting workstreams.

This Plan will be further embedded in key governance structures by:

- Establishing an Edinburgh Adapts core review group to annually monitor and update the plan, which works with and reports into the Net Zero Edinburgh Leadership Board.
- Embedding adaptation across all Council services, including risk and establishing governance to support delivery.

Funding the challenge will be a key area of focus. To address the investment gap, we must:

- Work with the Scottish Government to unlock and facilitate new legislative powers, policy and funding to enable good adaptation measures to be realised.
- Unlock investment and reevaluate current capital budgets to ensure resource can be allocated to climate adaptation measures.

- Support the delivery of a regional climate change risk assessment focusing on the Forth estuary and ESECRD local authority partner area.
- Collaborate with key partners, including the government to develop a pipeline of investable projects.

Protecting our most vulnerable citizens is also a key area of focus. To ensure a just transition we must:

- Embed adaptation across all plans, policies and strategies including health and social care.
- Ensure that citizens and areas that are most vulnerable to the adverse effects of climate are prioritised for action.

Funding the change

Substantial investment will be required to address the impacts of climate change in our city. By acting now, we can minimise the longer-term investment requirements to create a fair, green, inclusive and adapted city. New investment, using existing funds differently and leveraging in private finance will be key to addressing the funding gap.

Climate Ready Edinburgh Implementation Plan

A: Planning and the Built Environment

Objective 1: Embed climate change adaptation into future planning policy and guidance				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Update Edinburgh Design and Street Guidance to reflect City Plan 2030 planning policies relating to climate change adaptation (enhance Edinburgh's green spaces, protect biodiversity, reduce flood and heat risk, improve air and water quality)	2023 - 2024	Embed climate change adaptation into city and area spatial strategies, masterplans, development briefs and project requirements to address National Planning Framework Four (NPF4) and Local Development Plan requirements	2024 - 2030	The City of Edinburgh Council City partners
		Embed climate change adaptation into Edinburgh's next local development plan (City Plan 2040)	2026 - 2030	The City of Edinburgh Council City partners
Objective 2: Adapt the Old and New Towns of Edinburgh World Heritage Site to be resilient to climate change				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Continue to support the development of adaptation actions in the next Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031	2023 - 2024	Implement the adaptation actions in the Old and New Towns of Edinburgh World Heritage Site Management Plan 2023-2031	2024 -2030	Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council

	Deliver heritage adaptation and energy retrofit pilots to test innovative approaches to adapting the World Heritage Site buildings and infrastructure	2023 - 2030	Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council
--	---	-------------	---

Objective 3: Deliver climate resilient buildings and infrastructure across the city

Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Undertake consultation on the risks posed to Edinburgh’s buildings and infrastructure from climate change in Edinburgh’s World Heritage Site and conservation areas, including vulnerability and ability to cope with increasing heat, dampness, mould flooding and extreme weather events. Develop guidance and practical solutions to alleviate the issues identified	2023 - 2024	Work with the Council’s Housing Team, social landlords and further and higher education partners, across the city on ways to adapt Edinburgh’s social housing stock and educational establishments including finance mechanisms and creation/retrofitting of green spaces and rain gardens around housing estates, social housing and educational establishments including schools, as well as the ongoing maintenance of measures once installed.	2024 - 2030	The City of Edinburgh Council, University of Edinburgh, Edinburgh and South East Scotland City Region Deal partners Edinburgh World Heritage, Social/private landlords, development sector, construction industry, building owners
Extend the WHS/conservation areas consultation to other building types and areas of the city, using similar methodologies and consultation approaches. Develop guidance and	2024 - 2026	Engage with developers, investors and landowners to fully embed climate adaptation into existing developments.	2024 - 2030	

practical solutions to alleviate the issues identified.				
Embed adaptation into the Council’s Authority Construction Requirements (ACRs) and link the ACR to Edinburgh’s Design Guidance and Street Guidance.	2024 - 2026	Embed adaptation into the Council's Corporate Property Strategy and as part of the Council's retrofit programme	2024 - 2030	The City of Edinburgh Council
Support owners of basement properties to prepare for increased risk of ground water and surface water flooding through resilient design including garden areas.	2024 - 2025			The City of Edinburgh Council

Objective 4: Reduce the impact of urban creep and increase green and permeable surfacing in public spaces

Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Promote retrofitting of green roofs, introduction of raingardens, permeable hard landscape areas and not paving over front gardens in the city. Undertake a review of permitted development rights for householders to increase permeability and prevent urban creep. Ensure Edinburgh’s Water Vision, Sustainable Rainwater Management Guidance and Edinburgh Design Guidance provides sufficient guidance and support.	2024 - 2030	The City of Edinburgh Council, Edinburgh and Lothians Strategic Drainage Partnership Developers, utilities providers, transport agencies

B: Water Management

Objective 1: Deliver a long term and sustainable approach to water management across Edinburgh				
Short term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Update Edinburgh's Water Management Vision for dealing with water scarcity	2024-2025	Deliver a city-wide Surface Water Management Plan, identifying priority areas and supporting strategic projects to improve flood resilience and placemaking in those areas.	2023-2030	Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot) , Edinburgh World Heritage, Council Nature Recovery and Climate Adaptation Working Group
Support the development of the Gogarburn Partnership and other cross boundary river partnerships in delivering natural flood management upstream and improvements to river corridors. Support Edinburgh's Canal Partnership.	2024-2027	Deliver green and blue infrastructure in prioritised areas of the city (Drylaw, Inverleith, Craigeith then Morningside and Oxgangs)	2023-2030	Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot) , Council Nature Recovery and Climate Adaptation Working Group
		Work within the ELSDP to remove surface water from the combined sewer network	2023-2030	Edinburgh and Lothians Strategic Drainage Partnership (The City of Edinburgh Council, Scottish Water, SEPA, NatureScot) , Council Nature Recovery and Climate Adaptation Working Group
		Develop Council processes to support the introduction of	2023-2030	Edinburgh and Lothians Strategic Drainage Partnership (The City of

		shared surface water maintenance agreements within Scottish Water (Section 7 Agreements (of the Sewerage (Scotland) Act 1968). Maintain above ground landscape aspects of the adopted sustainable drainage assets.		Edinburgh Council, Scottish Water, SEPA, NatureScot), Edinburgh World Heritage, Council Nature Recovery and Climate Adaptation Working Group (NRCA)
Update Edinburgh Design Guidance design and Sustainable Rainwater Management Guidance and factsheets for all types of flooding, water scarcity and fluvial erosion risks	2024-2026	Work with local communities through delivery partnerships to contribute to the maintenance of city landscapes and green spaces.	2024-2030	Edinburgh and Lothians Strategic Drainage Partnership (ELSDP) , Council NRCA Group, Edinburgh and Lothians Greenspace Trust, Royal Botanic Garden Edinburgh, Edinburgh World Heritage
Objective 2: Deliver a strategic Green Blue Network for Edinburgh				
Medium/Long Term Delivery Actions			Delivery Timescale	Delivery Partners
Define Edinburgh's Strategic Green Blue Network and identify and prioritise projects on the network that will complete the missing links. Embed these into Edinburgh's Local Development Plan and in all council plans and strategies.			2023 – 2030	ELSDP, Council NRCA Group , Historic Environment Scotland, Edinburgh World Heritage

Objective 3: Manage demand for domestic and commercial water supplies during drought		
Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Manage the increased risk of lower river and reservoir levels associated with droughts by managing demand for water all year round, through reduced leakage and water efficiency improvements, in alignment with SEPA’s water supply and wastewater sector plan.	2024 - 2030	Scottish Water
Objective 4: Build public and private sector organisational resilience to water management		
Short Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with public and private sector partners on the development of climate risk assessments of their organisations and estate and on measures to adapt their systems, assets and services, assess the efficiency and inspect the condition of existing networks (operational, repair, frequency of maintenance). Includes both urban and rural agricultural working practices.	2024 - 2025	The City of Edinburgh Council, Scottish Water, SEPA, Edinburgh and South East Scotland City Region Deal (ESECRD) partners

C: Coastal Adaptation

Objective 1: Ensure future development of Edinburgh's coast is resilient to climate change

Medium Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Continue to take forward Edinburgh's coastal actions in Cycle 2 of the Local Flood Risk Management Plan (LFRMP) for the Forth Estuary Catchment	2022-2028	The City of Edinburgh Council, neighbouring local authorities, SEPA, Scottish Water	Continue robust inspection regimes and maintenance of coastal defences	2022-2030	The City of Edinburgh Council
Deliver an Edinburgh Coastal Change Adaptation Plan, taking into account research on sea level rise, coastal erosion and storm surge from Dynamic Coast and the regional climate assessment. The plan will inform the measures to be taken to adapt and protect Edinburgh's coast, and when.	2023 - 2026	The City of Edinburgh Council, Dynamic Coast Partnership (SEPA, NatureScot, Scottish Government, University of Glasgow), Edinburgh and South East Scotland City Region Deal partners	Use the Coastal Change Adaptation Plan to inform the implementation of City Plan 2030 planning policies, development plans and decisions, infrastructure investment and habitat protection along the coast.	2026 - 2030	The City of Edinburgh Council, Scottish Water, SEPA Edinburgh Biodiversity Partnership, NatureScot
			Engage with Scottish Water on coastal climate risks affecting their infrastructure and assets	2024-2030	Scottish Water

Objective 2: Protect and enhance Edinburgh’s coastal habitats and species					
Medium Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with partners to understand the implications of climate change on coastal habitats and species	2024-2026	The City of Edinburgh Council, Edinburgh Biodiversity Partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners	Implement measures to protect, restore and enhance coastal habitats and species through the next local development plan and projects	2026-2030	The City of Edinburgh Council, Edinburgh Biodiversity Partnership Forth Estuary Forum, Edinburgh Living Landscapes
			Support the development of natural coastal defences to improve the resilience of vulnerable soft coastal areas to flooding and erosion. Where this is not possible and hard engineering is required, use eco-engineering methods to ‘green the grey’ hard surfaces to provide habitat for marine life.	2024-2030	The City of Edinburgh Council, Edinburgh Biodiversity Partnership Forth Estuary Forum, Edinburgh Living Landscapes

Objective 3: Protect coastal communities and businesses

Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Raise awareness with residents, businesses and others of the risks to the coast from climate change to help them take action to increase the resilience of their homes, businesses and communities	2024-2030	Edinburgh and South East Scotland City Region Deal partners, The City of Edinburgh Council, SNIFFER, Edinburgh Community Climate Forum, Just Economic Transition Partnership

D: Sustainable Transport

Objective 1: Build resilience into Edinburgh’s transport network and infrastructure

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Actively engage with local transport companies and providers on the risks and impacts of climate change on their services and infrastructure and ways to alleviate them	2024 -2026	Engage with regional and national transport providers on building resilience into major transport infrastructure and routes in and out of the city. This includes working with road and rail providers to ensure design and specifications for current and future transport infrastructure are robust to future climate impacts such as flooding and heat.	2024 - 2030	City Transport Infrastructure Partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners , Transport Scotland, Transport for Edinburgh, Lothian Buses, Network Rail, Edinburgh Adapts Partnership
		Engage with the ports sector on risks to their operation due to sea level rise, storms and coastal erosion and options for adaptation.	2024-2030	Edinburgh Adapts Partnership

Objective 2: Embed adaptation into Edinburgh’s City Mobility Plan

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivered By
Ensure Edinburgh's upcoming Circulation Plan and associated Streetspace Allocation Framework considers blue green infrastructure and biodiversity requirements, permeable surfaces and other adaptive	2023-2025	Ensure the design and routing options of any future tram extensions has adaptation embedded and takes into consideration increasing heat, flooding and extreme	2023-2025	The City of Edinburgh Council

measures to reduce the urban heat island effect, provide shade, reduce flood risk and improve air quality.		weather events, and impacts on existing green infrastructure and green corridors.		
Objective 3: Build resilience into Edinburgh's road network				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivered By
Deliver training for road designers on how to incorporate sustainable drainage within roads design to help ensure the city's transport infrastructure is future proofed	2024-2026	Sustainably design, plan, upgrade, maintain and manage Edinburgh's local road network, to increase the city's resilience to extreme weather, and reduce embodied carbon in road and infrastructure construction.	2023-2030	The City of Edinburgh Council
Use surface treatments to extend the life of roads to minimise the requirement for full resurfacing	2023-2025			The City of Edinburgh Council

E: Safeguarding and enhancing our natural environment

Objective 1: Embed adaptation into city planning processes, land management plans and strategies relating to the natural environment					
Short Term Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Develop a Forestry and Woodland Strategy to improve protection for ecologically important areas of woodland habitat, identify priority areas for woodland restoration, creation and regeneration, carbon sequestration, a reduced heat island effect, flood mitigation and nature recovery.	2024 - 2026	The City of Edinburgh Council, Forestry Commission, NatureScot	Embed adaptation policies into Edinburgh’s Nature Vision and all land use planning decisions through Local Development Plan processes and guidance. This would include tree canopy cover and habitat creation, restoration and enhancement.	2024 - 2030	The City of Edinburgh Council, Edinburgh Biodiversity Partnership University of Edinburgh, NHS Lothian
Embed adaptation as part of the delivery of Edinburgh’s Thriving Greenspaces Strategy and Nature Network. This would include development of park masterplans, school playgrounds which include sustainable drainage features, heat energy solutions and improvements for nature.	2024 - 2025	The City of Edinburgh Council			

Objective 2: Ensure Edinburgh’s habitats and species are protected, enhanced and resilient to climate change					
Short Term Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Undertake a natural capital and biodiversity assessment of the city, identifying habitats, ecosystems and ecological services at greatest risk from climate change and those which offer the greatest benefits to nature and adaptation.	2024 - 2025	The City of Edinburgh Council	Embed the findings of the natural capital and biodiversity assessment into Edinburgh’s Strategic Green Blue network, Nature Network, Biodiversity Action Plan, site management plans and other policies and projects to increase habitat and species resilience, connectivity, reduce flood risk, provide shade, improve air and water quality.	2024-2030	Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal partners, Edinburgh Biodiversity Partnership, The City of Edinburgh Council, University of Edinburgh, Other relevant partners
Support delivery of the key actions in Edinburgh's Biodiversity Action Plan, the Strategic Green Blue Network, Local Nature Networks and One Million Tree City project	2023 - 2027	Edinburgh Biodiversity Partnership, Edinburgh Living Landscapes, Edinburgh and Lothians Greenspace Trust, Woodland Trust	Create a practical guide for climate adaptation and nature recovery for communities and individuals	2024-2030	The City of Edinburgh Council

Develop guidance on priority habitats and special landscape areas in the city, the risks and opportunities to these from climate change, carbon capture potential, and species choice for future habitat resilience within different city development contexts.	2024 - 2025	Edinburgh Biodiversity Partnership, NatureScot, Scottish Wildlife Trust, Historic Environment Scotland, RBGE	Work in partnership on assessing the risks and opportunities to priority habitats and protected historic and special landscape areas within in the city.	2023-2027	The City of Edinburgh Council, NatureScot, Scottish Wildlife Trust, Royal Botanic Garden Edinburgh
Update the iTree Survey to feed into all plans and strategies in the Council as required	2024 - 2025	The City of Edinburgh Council	Provide information and training for landscape architects/managers and associated professionals who work on future planning of the city's landscape and habitats	2024 - 2030	The City of Edinburgh Council, Edinburgh Living Landscapes, Edinburgh and Lothians Greenspace Trust, Woodland Trust, RBGE
Develop a drought and fire risk strategy for all council owned trees and greenspaces to feed into management plans	2023 - 2025	The City of Edinburgh Council	Continue robust inspection regimes and maintenance of the Council owned trees and greenspaces	2023-2030	The City of Edinburgh Council
Develop a Green Finance model to help fund nature and adaptation projects (FiRNS)	2023-2025	The City of Edinburgh Council	Continue robust inspection regimes and maintenance of the Council owned trees and greenspaces	2023-2030	The City of Edinburgh Council

Objective 3: Build a co-ordinated approach to protecting and enhancing Edinburgh’s natural assets across key public and private sector estates					
Short Term Delivery Actions			Delivery Timescale	Delivery Partners	
Support the preparation and updating of landscape management plans for key sites across the city to improve climate resilience and biodiversity, complimenting Historic Environment Scotland’s work on historic landscapes.			2024 - 2025	Edinburgh Adapts partnership, Historic Environment Scotland Other public, higher and further education and private sector organisations	
Objective 4: Encourage minimum disturbance, positive management and protection of soil during planning, development and construction processes, to maintain soil function, natural processes, quality and stability					
Short Term Delivery Actions	Delivery Timescale	Delivery Partners	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Signpost to good practice guidance and provide information on ways to improve soil management for land managers and those involved in food growing in the city. Include information about the importance of preserving soil function and the natural processes that aid carbon sequestration, flood reduction and biodiversity.	2024-2025	Edinburgh Biodiversity Partnership NatureScot, Edinburgh Adapts partnership	Develop policy and guidance to reinforce the importance of soil and construction risks. Include training for planners, key construction professionals including land surveyors, Homes for Scotland and local community councils, architects, landscape architects and engineers. Update council strategies and Edinburgh Design Guidance and embed in future Local Development Plans.	2024-2030	The City of Edinburgh Council SEPA, construction sector, NatureScot

F: Strong, healthy communities and economy

Objective 1: Improve community resilience to climate change, targeting disadvantaged and vulnerable groups

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with the Edinburgh Partnership to develop actions to build community climate resilience into Edinburgh's Local Outcome Improvement Plan and Local Improvement Plans	2024 - 2026	Build community capacity through promoting Adaptation Scotland's "Community Climate Adaptation Routemap: A practical guide for communities to adapt to climate change" and work with existing citizen platforms and community initiatives.	2024 - 2030	Edinburgh Partnership Community Planning partnerships, Edinburgh Adapts Partnership, Voluntary and community organisations
Hold a citywide summit to raise awareness of adaptation and engage with all sectors on the Plan, including community, public, private and third sector.	2024 - 2025	Align climate change adaptation measures with plans to alleviate poverty, recognising that these two issues are interlinked and must be addressed in tandem to support climate justice.	2024 - 2030	The City of Edinburgh Council
Use the Integrated Impact Assessment process to ensure we are protecting vulnerable communities and inequalities are key considerations of all city developments, strategies, projects and upgrades to infrastructure.	2024 - 2025	Work with key agencies and stakeholders to improve systems for reporting flooding and co-ordinating responses, and to improve advance warning of flood risk	2024 - 2030	The City of Edinburgh Council, Scottish Water, SEPA

Objective 2: Improve the health sector's ability to adapt		
Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Work with health providers on reducing the impact of those whose health will be most impacted by climate change	2024 - 2030	NHS Lothian Emergency Services
Work with key health providers on ways to improve the climate resilience of key health infrastructure, such as care homes and hospitals	2024 - 2030	NHS Lothian
Embed climate change in health and social care planning and in business continuity arrangements	2024 - 2030	NHS Lothian Emergency Services
Objective 3: Build up the resilience of Edinburgh's cultural sector, festivals and events		
Short Term Delivery Actions	Delivery Timescale	Delivery Partners
Encourage and support the Council's cultural sector partners to increase the adaptive capacity of their venues, events and collections including promotion of training and sources of advice.	2024 - 2030	The City of Edinburgh Council , Creative Carbon Scotland, Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Edinburgh's cultural sector, Festivals Edinburgh
Encourage and support the climate resilience of Edinburgh's winter festivals and other major events.	2024-2030	The City of Edinburgh Council

Objective 4: Work with Edinburgh’s business sector to ensure a proactive strategic approach to climate change adaptation				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Build understanding of the impacts and risks of climate change to Edinburgh’s business sector	2024-2026	Investigate opportunities for innovation, technology and skills development in the adaptation sector.	2026 -2030	Edinburgh Adapts Partnership , ESECRD partners, Just Economic Transition Partnership, Sniffer
Promote Adaptation Scotland’s guidance and tools to support small businesses to adapt.	2024-2026	Encourage local production and markets to reduce climate change induced disruptions in global trade impacting the city	2024-2030	Edinburgh Adapts Partnership , ESECRD partners, Just Economic Transition Partnership, Sniffer
		Work with the Scottish government and educational institutes to ensure development of relevant skills and supply chains to enable the industry to deliver and maintain climate adaptation infrastructure.	2024-2030	The City of Edinburgh Council Higher education sector

G: Building understanding of Climate Change Risks

Objective 1: Ensure ongoing monitoring, evaluation and research to inform decision-making on climate change adaptation

Delivery Partners

University of Edinburgh ECCI, Edinburgh and South East Scotland City Region Deal (ESECRD), Sniffer, Dynamic Coast, SEPA, DDI, The City of Edinburgh Council, further and higher education partners, wider city

Medium/Long Term Delivery Actions

Delivery Timescale

Utilise latest research and data to drive innovation in tackling climate change including collation of key evidence sets (flood risk maps, Urban Heat Island/coastal change etc) and make these available to update risk assessments and improve decision making. Work with SEPA to improve mapping of surface water flood risk.

Ongoing

Make sure public climate change datasets are available to the public in understandable and accessible forms

2024-2030

Carry out further research to enable options appraisals and cost benefit analysis of different adaptation responses in Edinburgh to improve decision making

2024-2024

Encourage research programmes to address adaptation gaps and build knowledge of adaptation measures that work for Edinburgh.

2024-2030

Develop a spatial map showing locations across Edinburgh most at risk from overheating/exceeding different temperature thresholds.

2024-2025

Research design guidelines for increased temperatures including consideration of the thermal comfort impact for people including the measurement of radiant temperatures. Support and inform the development of planning policy to help reduce exposure and enhance ability to react (e.g. affect building planning guidelines, shading, and density controls).

2025-2026

Develop adaptation partnership training and placement opportunities for students

2024-2030

Learn from successful research and projects in other cities and regions and apply lessons learned to adaptation in Edinburgh

2024-2030

H: Governance and Investment

Objective 1: Ensure governance structures are in place to adapt Edinburgh to the impacts of climate change

Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Establish an Edinburgh Adapts core review group to annually monitor and update the plan, which works with and reports into the Net Zero Edinburgh Leadership Board.	Annually	Develop an engagement plan with businesses and organisations to support and mitigate against the impacts of climate change and future proof their organisations	2024-2028	Edinburgh Adapts partnership , Dynamic Coast, SEPA, Scottish Water, NatureScot, Net Zero Leadership Board and partnerships
Embed adaptation across all Council services, including health and social care, including risk and establish governance to support delivery	2024 -2026			The City of Edinburgh Council
Ensure that citizens and areas that are most vulnerable to the adverse effects of climate are prioritised for action.	2024-2026			The City of Edinburgh Council

Objective 2: Increase investment in adaptation				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Embed adaptation into the Council's Capital Budget Strategy, ensuring resources are set aside for investment in adaptation measures and that new investments take account of the impacts of climate change	2024 -2026	Work in partnership to develop a pipeline of priority investment adaptation proposals and business cases to deliver the key priorities of the Plan. This includes identification of a pipeline of pilot projects building on current and future partnership working and demonstration of best practice	2024 - 2030	Edinburgh Adapts partnership, The City of Edinburgh Council, Edinburgh and South East Scotland City Region Deal (ESECRD) partners
		Embed adaptation into city financial plans. Any new investment should take account of climate change to avoid later retrofit or redesign.	2024 - 2030	Edinburgh Adapts partnership, The City of Edinburgh Council, Edinburgh and South East Scotland City Region Deal (ESECRD) partners
		Work with the Scottish Government and partners to develop sustained and dedicated resources across all sectors to enable development, installation, maintenance and management of adaptation infrastructure.	2024 - 2030	The City of Edinburgh Council

Objective 3: Support the development of a regional climate change risk assessment and adaptation measures				
Short Term Delivery Actions	Delivery Timescale	Medium/Long Term Delivery Actions	Delivery Timescale	Delivery Partners
Support the delivery of a regional climate change risk assessment focusing on the Forth estuary and ESECRD local authority partner area	Delivered by 2026	Collaborate with ESECRD partners on regional approaches and opportunities for cross-boundary and shared action on adaptation	2026-2030	Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Sniffer
		Support proposals to develop a regional climate adaptation investment technical assistance fund, to develop and test new business models and bankable project ideas.	2024-2030	Edinburgh and South East Scotland City Region Deal (ESECRD) partners, Sniffer
Objective 4: Deliver rapid whole-system change				
Ongoing Delivery Actions			Delivery Partners	
Advocate nationally and influence for review of key national and local policy, fiscal and regulatory frameworks to support climate action at the pace and scale required to respond to the climate and nature emergencies			Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners NatureScot, other partners	
Collaborate with Scottish Government and other partners on identifying resources for supporting local partnerships in developing a pipeline of investable sustainability projects			Edinburgh Adapts partnership, Edinburgh and South East Scotland City Region Deal (ESECRD) partners NatureScot, other partners	

Appendix 1 – Collaboration and Partnership Working

This Plan was built in collaboration with the following partnerships, programmes and initiatives across the city in order to embed climate adaptation across the city.

Edinburgh Adapts Partnership	The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency, Edinburgh World Heritage, Historic Environment Scotland, NatureScot, University of Edinburgh, Heriot Watt University, Napier University, Edinburgh College, SNIFFER
Net Zero Edinburgh Leadership Board	<p>Board Members The University of Edinburgh (representing the FE and HE sector), SP Energy Networks, Scottish Gas Networks, NHS Lothian, Scottish Water, Edinburgh Chamber of Commerce and City of Edinburgh Council</p> <p>Advisory Members Edinburgh Climate Change Institute, Climate-KIC, members of City of Edinburgh Council</p>
Edinburgh and Lothians Strategic Drainage Partnership	The City of Edinburgh Council, East Lothian and Mid Lothian Councils, Scottish Water, SEPA, NatureScot
Blue Green City Partnership	The City of Edinburgh Council, Scottish Water, Scottish Environment Protection Agency
Old and New Towns of Edinburgh World Heritage Site Steering Group	Edinburgh World Heritage Trust, Historic Environment Scotland, The City of Edinburgh Council
Dynamic Coast	SEPA, NatureScot, Scottish Government, University of Glasgow
Edinburgh and South East Scotland City Region Deal partnership (regional adaptation partnership)	East Lothian, Edinburgh, Fife, Midlothian, Scottish Borders and West Lothian Councils
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research

Appendix 2 - Climate Ready Scotland: climate change adaptation programme 2019-2024

Read about [the programme](#) on Scottish Government's website.

- Outcome 1: Our communities are inclusive, empowered, resilient and safe in response to the changing climate
- Outcome 2: The people in Scotland who are most vulnerable to climate change are able to adapt and climate justice is embedded in climate change adaptation policy
- Outcome 3: Our inclusive and sustainable economy is flexible, adaptable and responsive to the changing climate
- Outcome 4: Our society's supporting systems are resilient to climate change
- Outcome 5: Our natural environment is valued, enjoyed, protected and enhanced and has increased resilience to climate change
- Outcome 6: Our coastal and marine environment is valued, enjoyed, protected and enhanced and has increased resilience to climate change
- Outcome 7: Our international networks are adaptable to climate change

Appendix 3 – Strategic Drivers and Policy Drivers

The Climate Ready Edinburgh Plan has been developed taking into account international, national and local drivers, including policy and legislation. This is an ever-changing and evolving area and the plan will be revisited annually to ensure that its context and strategic direction are still correct.

International

[EU Adaptation Strategy](#)

[Paris Agreement](#), a legally binding international treaty on climate change

The “[Glasgow Climate Pact](#)”- agreed at the UN Climate Change Conference (COP26) in November 2021 set up processes towards delivering a global goal on adaptation.

[IPCC Summary for Policymakers: Global Warming of 1.5°C](#). An IPCC Special Report' 2018

Intergovernmental Panel on Climate Change (IPCC) assessment report, [AR6 Climate Change 2021: The Physical Science Basis](#) indicated that human induced climate change is already affecting many weather and climate extremes.

[United Nations Framework Convention on Climate Change](#)

Climate Action is one of the [17 UN Global Goals](#), encouraging urgent action to combat climate change and its impacts.

National

[Stern Review on the Economics of Climate Change](#), 2006 concluded the benefits of strong and early action far outweigh the economic cost of not acting

[Climate Change Act 2008](#) sets a framework for a UK reduction in greenhouse gas emissions and provision for adaptation to climate change.

[Third UK Climate Change Risk Assessment 2022](#). The assessment is required by the Act and updated every 5 years.

[UK Climate Projections \(UKCP18\)](#) provide evidence on projected changes to climate.

Committee on Climate Change [Independent Assessment of UK Climate Risk](#) identified 8 areas of risk requiring most urgent attention in the next 2 years

[Evidence for the Third UK Climate Change Risk Assessment](#) – Summary for Scotland identified 61 risks, 51 with high urgency scores for Scotland

[UK Climate Resilience Programme](#), bringing together climate research and expertise

[Supplementary Green Book Guidance: Accounting for the Effects of Climate Change](#)

[Climate Change \(Scotland\) Act 2009](#), includes objectives in relation to adaptation. Part 4 of the Act places duties on the public sector to act in the way best calculated to help deliver the Scottish Adaptation Programme.

[Climate Ready Scotland: 2nd Scottish Adaptation Programme](#), updated every five years and addresses climate risks for Scotland identified in the UK Climate Risk Assessment.

[Flood Risk Management \(Scotland\) Act 2009](#)

[National Flood Risk Assessment \(NFRA\) 2018](#)

[National Planning Framework 4](#)

[Scotland's Biodiversity Strategy 2022-2045](#)

Regional

[Forth Estuary Local Flood Risk Management Plan 2022-2028](#)

[Edinburgh and Lothians Strategic Partnership](#)

[Edinburgh and East of Scotland City Region Deal](#) and [Regional Prosperity Framework](#)

Local

[Edinburgh City Vision 2050](#)

[2030 Climate Strategy: Delivering a Net Zero, Climate Resilient Edinburgh](#)

[City Plan 2030](#) and [Strategic Flood Risk Assessment](#)

[Vision for Water Management in the City of Edinburgh](#)

[Edinburgh Green Blue Network](#)

[World Heritage Management Plan for Edinburgh Old and New Towns](#)

[City Mobility Plan 2030](#)

[The Edinburgh Partnership: Local Outcome Improvement Plan](#)

[End Poverty in Edinburgh Plan 2020-2030](#)

[Equality and Diversity Framework 2021-2025](#)

[THRIVE Edinburgh: A mental health and wellbeing road map for all](#)

[20-minute Neighbourhood Strategy](#)

[Thriving Green Spaces Strategy](#)

[Edinburgh Biodiversity Action Plan](#)

[Edinburgh Living Landscapes programme](#)

[Million Tree City Initiative](#)

[Edinburgh 2030 Tourism Strategy](#)

[Citywide Culture Plan Edinburgh 2023-2030](#)

Appendix 4: Climate Risk Across Sectors

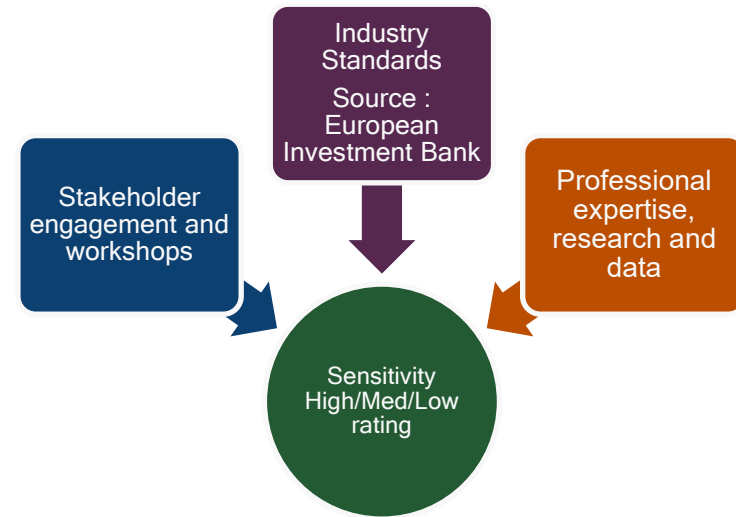
The Council commissioned consultants to assess the vulnerability of people, locations and assets in Edinburgh to the impacts of climate change. The consultants used European Investment Bank industry standards, professional judgement based on analysis of all the available data, and engagement with stakeholders to assess:

- the exposure of people, locations and assets to climate events such as flooding or storms
- the sensitivity or degree to which each would be affected by the climate event

Scoring these as low, medium or high, the vulnerability to these climate risks was worked out as shown in the table. When both the sensitivity and exposure were high, this would result in a high vulnerability score. Where there was a mixture of scorings, further work was undertaken to determine the most likely vulnerability.

This provides a starting point for informing the prioritization of climate action and investment in adaptation in the city.

We have summarised the risk assessment for the strategy but email us for a copy of the full report Climatechange@edinburgh.gov.uk.



Vulnerability Assessment

	High Sensitivity	Medium Sensitivity	Low Sensitivity
High Exposure	High	High	Medium
Medium Exposure	High	Medium	Medium/Low
Low Exposure	Medium	Medium/Low	Low

Climate vulnerability of the Public Health Sector in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
Flooding	Red	Red	Red	Hospitals, care homes, and private homes are vulnerable to all types of flooding. Flooding can impact on the ability to deliver healthcare services, reduce or prevent access to medical facilities and disrupt or damage the infrastructure that health facilities rely on, such as power and communications. It can also cause physical and mental health impacts.
Sea level rise and coastal erosion	Amber	Green	Green	Sea level rise and coastal erosion present a risk to people living or working in close proximity to the coast. While the physical health risks are low because measures are taken to safeguard people and homes from coastal flooding and erosion, the impacts on mental health over the long term could be higher due to anxiety and uncertainty regarding the viability of coastal communities.
Storms	Red	Red	Red	Increasing frequency and intensity of extreme weather events is likely to increase the demand for healthcare services due to physical and health impacts associated from injury and trauma in storms, such as from road accidents. Storms also impact critical infrastructure that health facilities rely on. Heavy rainfall could also increase damp and mould in buildings, increasing respiratory and related problems. Power and communications outages caused by storms can have significant impacts on vulnerable people in care homes and private homes.
Heatwaves	Amber	Amber	Amber	Climate change increases the likelihood of heatwaves which will be felt most among vulnerable, older people and children. This could increase the number of heat related illnesses and is a particularly high risk in care homes. Rising summer temperatures may lead to a rise in hospital admissions and respiratory problems. Higher temperatures and longer growing seasons could also increase pollen levels in the air affecting those suffering from asthma and related conditions. Higher temperatures can also adversely

				affect air quality and lead to an increase in ground level ozone. Higher temperatures with periods of reduced rainfall or drought will increase the risk of wildfires, again impacting on air quality and people's health.
Drought	Amber	Amber	Amber	Drought impacts on public water supply would have significant consequences for hospitals, care homes, and private homes. Drought can have a significant impact on natural environments and green spaces in the city, diminishing the recreation and amenity value that these areas provide which could impact both mental and physical health. Drought can also impact the availability of food, at worst resulting in food shortages and increases in food prices, however this is considered lower risk for Edinburgh.

Climate Vulnerability of Housing and Built Environment in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
Flooding	Red	Red	Red	River, surface water and coastal flooding all affect Edinburgh's built environment. Flooding can cause structural damage including to the external fabric of the building and increase building dampness and mould. Flooding of basement flats is a particular issue in some areas of the city.
Sea level rise and coastal erosion	Amber	Amber	Amber	Edinburgh has 27km of coastline. Sea level rise will increase the risk of coastal flooding, erosion and wave overtopping during storms, damaging buildings and infrastructure situated at or near the coast.
Storms	Red	Red	Red	Storms pose a significant risk to Edinburgh's built environment. Driving wind and rain can cause structural damage to buildings and infrastructure and disrupt travel, This includes longer term damage to buildings through water ingress, dampness and mould. They can create public safety concerns from disruptions to services and the danger of falling masonry, trees and branches etc.
Heatwaves	Amber	Amber	Amber	Prolonged exposure to temperature extremes can cause damage to buildings. Excessive indoor temperatures can affect thermal comfort, health and productivity. In high density urban areas such as Edinburgh, the urban heat island effect can exacerbate overheating. Building materials and design can enhance or reduce this effect. Increased greening of the built environment can reduce the heat island effect, e.g. shading from trees, areas of vegetation including living roofs which cool internal spaces. The risk of heat and extreme temperatures is currently assessed as moderate but will increase as temperatures rise. This is a risk that the city has not traditionally had to manage, meaning that preparedness may be low. Historic buildings, with thick walls and high ceilings are in many cases better equipped to

				deal with heat than more modern buildings with limited ventilation and no air conditioning.
Drought	Amber	Amber	Amber	Warmer temperatures and changes to precipitation accelerate the deterioration of buildings materials. Subsidence can also occur as a result of drought which can affect building foundations and levels. Drought also impacts the built environment by increasing water shortages.

Climate vulnerability of the natural environment in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
Flooding	Amber	Amber	Amber	<p>Increases in frequency of flooding can lead to changes in habitat and species distribution (see below) and influence processes of soil formation and erosion. Areas of existing public greenspace may be unusable during floods or at greater susceptibility to damage. Wash outs can deposit sediments that overwhelm vegetation and fish species, and sewage overflows can result in the transfer of pests, diseases, and invasive non-native species. Natural assets or parts of assets could be lost to flood damage or their condition/quality can be degraded through multiple events over time. Damages caused by flood events will also place increasing pressure on already sensitive habitats and species that are also susceptible to other pressures. Natural assets located within flood zones, adjacent to watercourses, or at the Edinburgh coast will be most exposed. Specialised habitats and their species such as the Firth of Forth coastal complex are likely to be most sensitive. Natural assets can also contribute to flood protection through investment in nature-based solutions. It is important that these solutions are designed to be resilient to flooding and other climate hazards.</p>

Sea level rise and coastal erosion	Red	Red	Red	Sea level rise and coastal erosion presents a direct risk to nature with potential knock-on effects for other habitats and species for which these assets provide important corridors that contribute to ecological connectivity. Edinburgh's Firth of Forth's Site of Special Scientific Interest and beaches are particularly exposed and can be considered highly sensitive due to their national and international designation. These habitats may also be susceptible to "coastal squeeze" whereby coastal habitats are unable to retreat inland over time through natural processes due to the presence of hard infrastructure. Hazards to these assets will make Edinburgh more susceptible to sea level rise and coastal erosion given the natural protection they provide. Ensuring these assets can be resilient to change will contribute to mitigating this hazard.
Storms	Amber	Amber	Amber	Increasing frequency and intensity of extreme weather events is likely to damage natural assets and place increasing pressure on already sensitive habitats and species. Examples include wind damage to urban trees and woodland leading to losses of carbon and the amenity value of greenspaces. Increased flooding (see above) and risk of wildfires (see below) are related hazards. Woodlands, coastal habitats, and peatlands are likely to be the most exposed. Assets could be lost to storm damage reducing quantity, or their condition/quality could be degraded through multiple events over time.
Heatwaves	Amber	Amber	Amber	Climate change will bring heatwaves of greater duration, frequency, and extremity. This will affect the natural environment through drought and changes in habitat ranges and phenology (see below). Assets which are most sensitive will be those most dependent on stable temperature regimes, such as the peatland at Balerno Red Moss Nature Reserve as peat requires cool damp conditions for formation. This is also likely to put increasing pressure on public greenspaces as demand for outdoor space will increase. Natural assets such as urban woodland, street trees, living roofs, wetlands and ponds provide an important role in urban cooling. Reduced quantity and quality of these assets due to heatwaves and other climate hazards will increase the magnitude of this risk to the natural environment and other sectors. It is important that nature-based solutions that provide urban cooling, such as increased urban tree cover, are designed to be resilient to climate change by choosing appropriate tree species.

Drought	Red	Amber	Red	<p>Water can be considered a natural capital stock and drought would reduce the quantity available for public supply. Drought also poses risks for all natural assets as less water would be available in the environment for plants and animals. This increases their susceptibility to other climate hazards and non-climate related pressures. Water-based assets such as rivers, ponds, wetlands, and peatbogs would be particularly sensitive. This could have knock-on consequences for soil erosion and storage of carbon in soils and peat loss due to dependence on specific wetting regimes for their formation. These risks will particularly affect small or shallow water bodies. Damage and loss of natural assets due to drought would increase their susceptibility to drought in the future: vegetation cover promotes a more humid environment through evapotranspiration and encourages infiltration of water into soil to slow and reduce runoff. Drought risks to the natural environment poses risks to other sectors.</p>
Wildfires	Red	Amber	Red	<p>Upland habitats including peat are most exposed and most sensitive to wildfires. There are areas of peatland in the Pentland Hills, such as at Balerno Red Moss nature reserve. Due to changes in temperature and precipitation patterns and increased likelihood of heatwaves, wildfires are more likely and these habitats are particularly sensitive due to their large stores of carbon. Losses and degradation of these assets due to wildfires will increase carbon emissions and thus undermine Edinburgh's capacity to contribute to climate mitigation. Peatland restoration can increase resilience to wildfires, as well as providing carbon storage and mitigating flood impacts downstream.</p>

Changes in habitat and species ranges, and timings	Red	Red	Red	<p>Changing climate conditions alter the intricate ecological balances that let plants and animals grow and survive. Extreme events such as sea level rise, wildfires and wind damage will result in the direct damage or a total loss of some areas of habitat. These could lead to changes in habitat distribution, species ranges, and phenology (periodic events in biological life cycles which are influenced by seasonal and interannual variations e.g. bird migrations, flowering). How these changes will manifest in Edinburgh are uncertain, although there is evidence of these changes in Scotland and the rest of the UK. Due to temperature and precipitation regimes, related erosion, and wildfires it is possible that the areas of Pentland peatland may be lost, as well as beaches and coastal habitats due to sea level rise. <i>The effects of these in driving other climate hazards is discussed for each hazard.</i> Phenology changes could mean that young birds might not hatch at the same time as their prey, and flowers might not open when their pollinators are active. Relationships between pests or diseases and their hosts will also change. These impacts will further increase the sensitivity of natural assets to climate hazards and other pressures.</p>
---	------------	------------	------------	---

Climate Vulnerability for Transport in Edinburgh

Climate Hazard	Sensitivity	Exposure	Vulnerability	Summary
River and surface water flooding	Red	Red	Red	Extreme rainfall events create a number of challenges for rail infrastructure including inundation of rail lines and flooding of underground tunnels. Railbed damage and a decrease in structural integrity can occur due to erosion, landslides and increased soil moisture levels. Heavy rains may result in flooding, which could disrupt traffic, delay construction activities, and weaken or wash out the soil and culverts that support roads, tunnels and bridges. Exposure to more intense precipitation also shortens the life expectancy of highways and roads. Key rail and road routes in Edinburgh suffer disruption from flooding, including the M8, flooding between Haymarket and Edinburgh Waverley stations, and flooding on critical routes such as the Edinburgh-Glasgow, and Edinburgh to Berwick-on-Tweed rail lines. The airport has a moderate risk of flooding. The tram depot has flooded in the past following heavy rainfall, and parts of the tram network may also face areas of flood risk. Both surface water flooding and river flooding are expected to increase in future.
Sea level rise and coastal erosion	Red	Amber	Red	This is a localised risk, however, storm surges and coastal erosion can destroy coastal road, rail and future tram infrastructure, as well impacting harbour and port activities. Road infrastructure in coastal areas is particularly sensitivity to more frequent and permanent flooding from sea level rise, storm surge and storm tide. Sea level rise will increase the risk from storm surges.
Storms	Red	Red	Red	Storms and high winds can cause damage to rail and tram infrastructure and electrified tracks with overhead cables. Strong winds can cause obstruction of rail, tram, and road due to fallen trees. Storms and high winds cause delays to flights and could cause cancellations.

Heatwaves	Amber	Amber	Amber	Thermal expansion can cause rail and tram track movement, leading to slowing down or disruption of services. Overheating is a risk particularly on older forms of public transport. Higher temperatures can cause pavements to soften and expand. This can create rutting and potholes, particularly in high-traffic areas and can place stress on bridge joints. Heat waves can also limit construction activities. Increases in maximum temperature are likely to increase disruption to both road, tram, and rail transport and pose a risk to elderly and vulnerable passengers in particular.
Landslides	Red	Amber	Amber	Landslides and soil movement pose a risk to certain areas of the rail network, in particular cuttings, and can result in tracks being blocked. Increased rainfall intensity will increase the likelihood of landslides, however, for Edinburgh there are few locations where landslides pose a threat to transport.
Drought	Amber	Amber	Amber	Drought can cause subsidence and destabilise and damage road and rail infrastructure. There is a moderate risk from drought to the transport sector across Edinburgh.

This page is intentionally left blank

Policy and Sustainability Committee

10.00am, Friday, 15 December 2023

Edinburgh Local Heat and Energy Efficiency Strategy and Delivery Plan

Executive/routine
Wards

Executive
All

1. Recommendations

- 1.1 It is recommended that Policy and Sustainability Committee:
 - 1.1.1 Approves the Edinburgh Local Heat and Energy Efficiency Strategy (LHEES), attached as Appendix 1;
 - 1.1.2 Approves the Delivery Plan, attached as Appendix 2;
 - 1.1.3 Approves the formation of a LHEES Office, as set out in the Delivery Plan;
 - 1.1.4 Agrees that the LHEES Office will lead on work to develop heat networks in Edinburgh on behalf of the Council;
 - 1.1.5 Agrees that a further phase of public consultation will be carried out on the Edinburgh LHEES and Delivery Plan; and
 - 1.1.6 Notes that resource limitations will constrain the Council's ability to fully deliver the Edinburgh LHEES and Delivery Plan.

Paul Lawrence

Executive Director of Place

Contact: Kyle Drummond, Programme Development Officer

E-mail: kyle.drummond@edinburgh.gov.uk | Tel: 0131 529 4849

Edinburgh Local Heat and Energy Efficiency Strategy and Delivery Plan

2. Executive Summary

- 2.1 This report introduces the Edinburgh Local Heat and Energy Efficiency Strategy (LHEES) and the associated Delivery Plan.

3. Background

- 3.1 The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 requires all Scottish local authorities to publish a LHEES, along with a Delivery Plan, by the end of 2023.
- 3.2 An LHEES is a long-term plan for decarbonising heat in buildings and improving energy efficiency across a local authority. The central aims of an LHEES are to improve the energy efficiency and decarbonise the heat supply of buildings and to eliminate poor energy efficiency as a driver for fuel poverty.

4. Main report

- 4.1 The Council has prepared the Edinburgh LHEES along with a Delivery Plan, which are attached as Appendices 1 and 2.
- 4.2 The Edinburgh LHEES sets out a strategic approach to improving the energy efficiency of buildings in Edinburgh and decarbonising their heating. The document sets out the context and background for the strategy including relevant policies and ongoing activities, as well as a detailed baseline analysis of Edinburgh's building stock. It then sets out "Strategic Zones": geographical areas of Edinburgh that highlight particular solutions (for example areas where heat networks or heat pumps are assessed as being most viable) and particular challenges (for example areas with the poorest energy efficiency). The Edinburgh LHEES further sets out proposed high-level underpinning principles.
- 4.3 The Delivery Plan sets out short- to medium-term actions associated with the implementation of the Edinburgh LHEES. These actions reflect what is considered to be achievable given the resources and powers currently available to the Council.

While recognising the ambitions of the Council with respect to net zero carbon, the Delivery Plan takes a pragmatic approach that focuses on what can be delivered at this time, while setting out where additional resource would allow for more to be delivered. The Delivery Plan also sets out “Delivery Areas” (areas that are proposed to be the focus of early interventions around energy efficiency and heat pump deployment) and “Heat Network Zones” (areas judged to have the greatest potential for the development of heat networks). Further, the Delivery Plan sets out a proposed structure for delivery of the Edinburgh LHEES.

- 4.4 The Edinburgh LHEES is a city-wide strategy that covers all buildings in Edinburgh, not just the Council’s estate. However, the Council’s ability to compel third parties to (for example) decarbonise heating of buildings in their ownership is limited, and inevitably early interventions will be focused upon areas where the Council has the most control, particularly its own properties.
- 4.5 As set out in the Delivery Plan, it is proposed to form a “LHEES Office” to support delivery of the Edinburgh LHEES. In the first instance, the LHEES Office would be staffed by an existing Council Energy Officer. However, it is envisaged that the capabilities of the LHEES Office will be expanded in future as resources permit.
- 4.6 The Scottish Government published the first part of the Green Heat Finance Taskforce report on 22 November 2023 and the consultation paper on the Heat in Buildings Bill on 28 November 2023. The timings of these papers have not allowed them to be incorporated into this version of the Edinburgh LHEES, but officers will update the Edinburgh LHEES to reflect them.

5. Next Steps

- 5.1 Subject to the Committee approving the Edinburgh LHEES and Delivery Plan, a LHEES Office will be established and delivery commenced. Initially, the LHEES Office will comprise of one officer (an Energy Officer), funded from existing budgets. The Energy Officer will have a dedicated budget of £75,000 per annum from the ring-fenced Scottish Government grant, and potentially additional budget from other sources (such as the emerging Local Authority Cost Strategy for the Heat Networks (Scotland) Act 2021). Subject to resource being secured, the ambition is to grow the LHEES Office to have officers with a range of capabilities (for example, project management, planning, energy, etc).
- 5.2 A public consultation on the Edinburgh LHEES and Delivery Plan will be carried out that will build on the engagement and consultation carried out to date. Any amendments to the Edinburgh LHEES and Delivery Plan stemming from this public consultation will be presented to Committee for approval.
- 5.3 The Order requires an LHEES to be published every five years. A second iteration of the LHEES will therefore be produced by the end of 2028.
- 5.4 The actions set out in the Delivery Plan include further engagement with the Scottish Government to secure additional resources and powers to enable delivery

of the Edinburgh LHEES. Officers will work with elected members to agree how best to take this engagement forward, including consideration of a cross-local authority approach.

6. Financial impact

- 6.1 The total cost of delivering the Edinburgh LHEES – i.e. of improving the energy efficiency and decarbonising the heat of every building in Edinburgh – will be in the order of several billion pounds over the next 20+ years.
- 6.2 Delivery of the Edinburgh LHEES will initially be focused on areas where there is existing funding in place, for example the retrofit of the Council’s housing estate, the Area Based Schemes, and the Green Growth Accelerator-backed retrofit pilot of the Council's operational estate, as well as external funding that third parties can access such as the grant schemes administered by Home Energy Scotland.
- 6.3 Ultimately, the Edinburgh LHEES will not be deliverable using public funds alone. The scale of investment required is likely to necessitate institutional investment. The Council is maintaining a watching brief on the outputs of the Scottish Government’s Green Heat Finance Task Force which is developing models for financing retrofit and leveraging institutional money.
- 6.4 At present, the only new dedicated funding that has been made available for the delivery of the Edinburgh LHEES is an annual grant of £75,000 per annum from the Scottish Government for the period 2022/23 to 2027/28. The Council will also receive additional funding associated with its duties under the Heat Networks (Scotland) Act 2021. Officers will make a case to the Scottish Government for additional dedicated funding to enable delivery of the Edinburgh LHEES to be accelerated.
- 6.5 The Council currently has one dedicated officer who will focus on delivery of the Edinburgh LHEES, in particular areas where there is limited existing Council resource (such as heat network development). The cost of this post will be met from existing budgets.
- 6.6 The overall scale of investment required to fully deliver the Edinburgh LHEES is significant and there is not yet a comprehensive funding strategy. However, existing funding sources will enable the Council to begin delivery, with a focus on the Council’s own estate and areas at greatest risk of fuel poverty.

7. Equality and Poverty Impact

- 7.1 The Delivery Plan sets out Delivery Areas that are proposed to be the initial areas of focus in terms of interventions around energy efficiency. The selection of these Delivery Areas has been made based upon considerations including assessed risk of fuel poverty. The potential interventions in these Delivery Areas are therefore expected to help reduce fuel poverty via reducing heating costs.

8. Climate and Nature Emergency Implications

- 8.1 The Edinburgh LHEES does not set new targets; rather it reflects existing national targets around heat decarbonisation. However, the Edinburgh LHEES sets out pathways and interventions that will help meet these targets. The Edinburgh LHEES will help reduce carbon emissions by facilitating improvements to energy efficiency (reducing heat demand) and decarbonising heating (reducing emissions associated with residual heat demand).

9. Risk, policy, compliance, governance and community impact

- 9.1 The Edinburgh LHEES and Delivery Plan have been prepared to fulfil the Council's statutory duties under The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022. The outputs from the Edinburgh LHEES will also help the Council fulfil its statutory duties under the Heat Networks (Scotland) Act 2021.
- 9.2 In the hierarchy of Council strategies and policies, the Edinburgh LHEES sits beneath the [2030 Climate Strategy: Delivering a Net Zero, Climate Ready Edinburgh](#). The 2030 Climate Strategy sets overall ambitions for the decarbonisation of Edinburgh, whereas the Edinburgh LHEES sets out pathways and actions concerning the decarbonisation of Edinburgh's building stock specifically. The Edinburgh LHEES also overlaps with other Council strategies such as the [Council Emissions Reduction Plan](#) and the [Housing Revenue Account Capital Programme](#).

10. Background reading/external references

- 10.1 Not applicable.

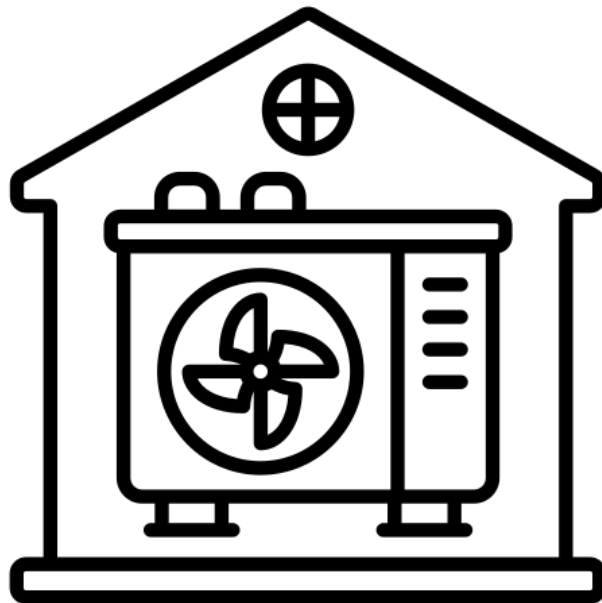
11. Appendices

- 11.1 Appendix 1 – Edinburgh Local Heat and Energy Efficiency Strategy.
- 11.2 Appendix 2 – Delivery Plan.

The City of Edinburgh Council

Edinburgh Local Heat and Energy Efficiency Strategy

December 2023





You can get this document on audio, CD, or in Braille or large print if you ask us. Please contact Interpretation and Translation Service (ITS) on its@edinburgh.gov.uk and quote reference number 23-9172. ITS can also give information on community language translations.

[Title page icon by shmai](#)

1. Foreword



- 1.1.1. “On behalf of the City of Edinburgh Council, I am pleased to introduce the first iteration of the Edinburgh Local Heat and Energy Efficiency Strategy (LHEES).
- 1.1.2. “The Edinburgh LHEES is ‘a long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority’s area, and the reduction of greenhouse gas emissions resulting from the heating of such buildings.’ The Edinburgh LHEES will help steer interventions over the coming years aimed at making buildings in Edinburgh more energy efficiency and migrating the heating of buildings away from fossil fuel-based solutions such as gas boilers to zero direct emissions solutions such as heat pumps and heat networks. The Edinburgh LHEES therefore links to the Scottish Government’s target of decarbonising the heating of all buildings in Scotland by 2045 and, in turn, the wider target of making Scotland net zero carbon by 2045, as well as the Council’s own target of making Edinburgh a net zero carbon city as set out in its 2030 Climate Strategy.
- 1.1.3. “It is important to recognise that achieving these targets will be extremely challenging, and will necessitate large-scale activity by both the public sector and the private sector and the commitment of significant resources. A wide variety of stakeholders will require to be mobilised towards these goals.
- 1.1.4. “The Edinburgh LHEES is being published at a time of great flux, with areas such as the regulatory regime for heat networks; regulations around gas boilers; funding mechanisms for retrofit; the role of hydrogen; and the electricity pricing system all currently under review. The decisions taken with respect to these areas will inform what is and is not achievable over the coming years.
- 1.1.5. “In light of these challenges, the Delivery Plan for 2024 to 2028 that has been prepared alongside the inaugural Edinburgh LHEES focuses on the areas where it is considered there is greatest potential for intervention in the short to medium-term in light of the limited existing powers and resources the Council has access to. The focus of the Delivery Plan is therefore upon areas where the Council has the greatest influence, for example the retrofit of its own estate and the roll-out of heat networks in areas where the Council has significant influence, as well as on the areas of Edinburgh that represent the most significant opportunities in Edinburgh. It is envisaged that future iterations of the Delivery Plan will have a wider focus.
- 1.1.6. “I hope you find the Edinburgh LHEES to be a useful document in setting out how Edinburgh’s buildings can move to net zero.”

– Councillor Cammy Day, Leader of the City of Edinburgh Council

2. Contents

2.1. Chapters

- 1. Foreword..... 3
- 2. Contents..... 4
 - 2.1. Chapters..... 4
 - 2.2. Tables 9
- 3. Executive summary 11
 - 3.1. Introduction..... 11
 - 3.2. Methodology 11
 - 3.3. Policy and strategy context 12
 - 3.4. Ongoing activity in Edinburgh 13
 - 3.5. Baselineing..... 14
 - 3.6. Generation of Strategic Zones and pathways..... 15
 - 3.7. Edinburgh LHEES findings and next steps 19
- 4. Introduction to the Edinburgh LHEES..... 21
 - 4.1. Overview of the Edinburgh LHEES 21
 - 4.2. Edinburgh LHEES governance 23
 - 4.3. Edinburgh LHEES structure and layout 23
 - 4.4. Edinburgh LHEES scope and limitations..... 24
 - Scope..... 24
 - Limitations 25
 - 4.5. Review of key concepts 26
 - Heat decarbonisation 26
 - Energy efficiency..... 27
 - Insulation 28
 - Fuel poverty..... 29
 - Direct electric heating 29
 - Heat networks / communal heating systems 30
 - Heat pumps..... 32
 - Hydrogen 34
 - Solar water heating 36

Biomass.....	36
Micro combined heat and power	37
Electricity pricing	37
Resources for private building owners	39
Resources for public sector building owners.....	40
5. Methodology	42
5.1. Edinburgh LHEES approach	42
Heat network Consideration – methodology	44
Other LHEES Considerations – stage 3 methodology	45
Other LHEES Considerations – stage 4 methodology	46
Other LHEES Considerations – stage 5 methodology	47
5.2. LHEES Considerations	47
5.3. Areas of strategic importance	49
5.4. Consultation and engagement.....	50
5.5. Strategic Environmental Assessment.....	51
6. Policy and strategy context	53
6.1. Summary of key targets and regulations.....	53
Targets.....	53
Regulations	53
6.2. National policy landscape	54
Climate change	54
Energy efficiency and zero direct emissions heating.....	55
Fuel poverty.....	57
Heat networks	58
New builds	59
Energy planning.....	60
Housing	62
Supply chain.....	62
6.3. Local policy landscape.....	63
6.4. Planning policy context	63
Edinburgh Local Development Plan	63
City Plan 2030	64
National Planning Framework 4.....	65
Permitted Development Rights.....	66

7.	Ongoing activity in Edinburgh	67
7.1.	Edinburgh context	67
7.2.	2030 Climate Strategy	67
7.3.	Council estate and Council-led area interventions.....	71
	Refurbishment of existing social housing	71
	Mixed Tenure Improvement Service.....	72
	Area-Based Schemes	72
	Development of new social housing.....	73
	Operational estate.....	74
	Investment portfolio.....	74
	Parks and greenspaces	75
7.4.	Heat networks	75
	Overview.....	75
	Existing heat networks	76
	First National Assessment	77
	Granton Waterfront.....	78
	Edinburgh BioQuarter	79
	Gracemount	79
	Seafield	80
	Cross-boundary Heat Network Zones.....	80
	Communal heating systems	80
7.5.	Solar installations	81
7.6.	Energy for Edinburgh.....	81
7.7.	Conservation areas adaptation.....	81
7.8.	Net zero communities	82
7.9.	Supply chain development and procurement	82
7.10.	City Heat & Energy Efficiency Board	83
8.	Baseline analysis	84
8.1.	Overview of building stock.....	84
	Emissions	84
	Housing stock.....	85
	Performance of housing stock	88
	Non-domestic stock.....	93
	Performance of non-domestic stock.....	95

	Headline findings.....	95
	Challenges and opportunities	96
9.	Generation of Strategic Zones and pathways.....	98
9.1.	Overview.....	98
9.2.	Off-gas grid buildings.....	98
	Introduction.....	98
	Process.....	98
	Outputs.....	100
9.3.	On-gas grid buildings.....	102
	Introduction.....	102
	Process.....	102
	Outputs.....	103
9.4.	Heat networks.....	105
	Introduction.....	105
	Process.....	107
	Outputs.....	108
9.5.	Poor building energy efficiency.....	111
	Introduction.....	111
	Process.....	111
	Outputs.....	111
9.6.	Poor building energy efficiency as a driver for fuel poverty.....	113
	Introduction.....	113
	Process.....	113
	Outputs.....	114
9.7.	Mixed-tenure, mixed-use, and historic buildings.....	114
	Introduction.....	114
	Process.....	115
	Outputs – mixed-tenure and mixed-use.....	115
	Outputs – historic buildings.....	117
10.	Edinburgh LHEES findings and next steps.....	120
10.1.	Summary of Edinburgh LHEES findings.....	120
10.2.	Edinburgh LHEES areas of focus and approach.....	121
10.3.	Edinburgh LHEES principles.....	122
	[A] Interventions should be on a “fabric first” basis.....	122

[B] Interventions should be solution agnostic.....	122
[C] Interventions must make financial sense for building users.....	123
[D] New build properties offer the greatest potential	124
[E] Significant additional external funding will be required	124
[F] More comprehensive and robust data is needed	125
[G] Additional levers will be required to catalyse change	125
11. Appendices	127
11.1. Heat network background information.....	128
Schedule of existing heat networks and communal heat networks in Edinburgh.....	128
Figure 01: Plan of existing heat networks and communal heat networks in Edinburgh.....	134
Figure 02: First National Assessment – potential Heat Network Zones identified in Edinburgh (baseline and stringent criteria).....	135
Figure 03: First National Assessment – largest potential Heat Network Zone identified in Edinburgh (stringent criteria).....	136
Figure 04: The Coal Authority map of underground workings in Edinburgh	137
Figure 05: Scottish Water map of potential wastewater heat extraction opportunities in Edinburgh	138
Figure 06: Map of potential waste heat sources in Edinburgh	139
Datasets used to identify waste heat sources in Edinburgh	140
11.2. Heat network methodological information.....	141
Datasets used to inform the Heat Network Zone analysis.....	141
Figure 07: Linear heat density buffer zone methodology	142
Figure 08: Buffer zones based on linear heat density of 4,000 kWh per metre per year	143
Figure 09: Buffer zones based on linear heat density of 8,000 kWh per metre per year	144
Figure 10: Process for the prioritisation of potential zones.....	145
Figure 11: Prioritised potential Heat Network Zones in Edinburgh based on linear heat density of 4,000 kWh per metre per year.....	146
Figure 12: Prioritised potential Heat Network Zones in Edinburgh based on linear heat density of 8,000 kWh per metre per year.....	147
Figure 13: Selected prioritised potential Heat Network Zones in Edinburgh	148
Figure 14: Initial Heat Network Zones in Edinburgh, overlaid with areas of new development and planned heat networks	149
Figure 15: Refined initial Heat Network Zones in Edinburgh.....	150
11.3. Strategic Zones	151
Figure 16: Off-gas homes in category 0.....	151
Figure 17: Off-gas homes in category 1.....	152

Figure 18: Off-gas homes in category 2	153
Figure 19: Off-gas homes in category 3	154
Figure 20: On-gas homes in category 0	155
Figure 21: On-gas homes in category 1	156
Figure 22: On-gas homes in category 2	157
Figure 23: On-gas homes in category 3	158
Figure 24: Prospective Heat Network Zones in Edinburgh	159
Figure 25: Homes in Edinburgh with solar suitability	160
Figure 26: Homes with uninsulated walls in Edinburgh	161
Figure 27: Homes with solid brick/stone uninsulated walls in Edinburgh	162
Figure 28: Areas of high fuel poverty and poor energy efficiency	163
Figure 29: Scottish Index of Multiple Deprivation 2020 heat map of Edinburgh	164
Figure 30: Mixed-tenure homes in Edinburgh	165
Figure 31: Homes in Edinburgh in buildings with >1 dwellings	166
Figure 32: Homes in listed buildings in Edinburgh	167
Figure 33: Homes in conservation areas in Edinburgh	168
11.4. Core stakeholders	169
11.5. Glossary	171
11.6. Endnotes	176

2.2. Tables

- [Table 01: Key national policies underpinning the Edinburgh LHEES](#)
- [Table 02: UK building heat demand by source \(2050 scenario\)](#)
- [Table 03: Electricity and gas end-user unit prices in European countries, c€/kWh \(July 2023\)](#)
- [Table 04: LHEES Considerations](#)
- [Table 05: Prioritisation of LHEES Considerations](#)
- [Table 06: Breakdown of emissions in Edinburgh and Scotland by end user sector \(kt CO2e\) \(2020\)](#)
- [Table 07: Emissions in Edinburgh by end use sector \(kt CO2e\) \(2010 to 2020\)](#)
- [Table 08: Breakdown of homes in Edinburgh by type](#)
- [Table 09: Breakdown of homes in Edinburgh and Scotland by type \(2017\)](#)
- [Table 10: Breakdown of homes in Edinburgh by tenure](#)
- [Table 11: Breakdown of homes in Edinburgh and Scotland by tenure \(2017–2019\)](#)
- [Table 12: Breakdown of homes in Edinburgh by mixed-tenure status](#)
- [Table 13: Breakdown of homes in Edinburgh by age](#)
- [Table 14: Breakdown of homes in Edinburgh and Scotland by age \(2017–2019\)](#)
- [Table 15: Breakdown of homes in Edinburgh by listed status](#)
- [Table 16: Breakdown of homes in Edinburgh by energy performance certificate rating](#)
- [Table 17: Breakdown of homes in Scotland by EPC rating \(2021\)](#)

- [Table 18: Breakdown of homes in Edinburgh by wall construction and insulation](#)
- [Table 19: Breakdown of hard-to-treat cavity walls in Edinburgh by reason](#)
- [Table 20: Breakdown of homes in Scotland by wall construction / insulation \(2021\)](#)
- [Table 21: Breakdown of homes in Edinburgh by loft insulation](#)
- [Table 22: Breakdown of homes in Scotland by loft insulation \(2021\)](#)
- [Table 23: Breakdown of homes in Edinburgh by window glazing](#)
- [Table 24: Breakdown of homes in Edinburgh by gas grid connection](#)
- [Table 25: Breakdown of homes in Edinburgh by primary and secondary fuel type](#)
- [Table 26: Breakdown of homes in Scotland by main fuel type \(2021\)](#)
- [Table 27: Breakdown of homes in Edinburgh by main heating system](#)
- [Table 28: Homes in Edinburgh and Scotland with central heating by tenure \(2017–2019\)](#)
- [Table 29: Breakdown of non-domestic properties in Edinburgh and Scotland by type \(March 2023\)](#)
- [Table 30: Breakdown of non-domestic properties in Edinburgh by type](#)
- [Table 31: Breakdown of non-domestic properties in Edinburgh by floor area](#)
- [Table 32: Breakdown of non-domestic properties in Edinburgh by urban-rural classification](#)
- [Table 33: Breakdown of non-domestic properties in Edinburgh by main fuel type](#)
- [Table 34: Breakdown of off-gas domestic properties in Edinburgh by category and tenure](#)
- [Table 35: Edinburgh datazones with highest counts of category 1 off-gas homes](#)
- [Table 36: Edinburgh datazones with highest % of local authority-owned category 1 off-gas homes](#)
- [Table 37: Breakdown of on-gas domestic properties in Edinburgh by category and tenure](#)
- [Table 38: Edinburgh datazones with highest counts of category 1 on-gas homes](#)
- [Table 39: Edinburgh datazones with highest % of Council-owned category 1 on-gas homes](#)
- [Table 40: Summary of prospective Heat Network Zones in Edinburgh](#)
- [Table 41: Breakdown of poor energy efficiency homes in Edinburgh by characteristic\(s\)](#)
- [Table 42: Edinburgh datazones with highest count of Council-owned homes with uninsulated walls](#)
- [Table 43: Edinburgh datazones with highest count of homes with all three characteristics of poor energy efficiency](#)
- [Table 44: Edinburgh datazones with highest number of homes in buildings with >1 dwelling](#)
- [Table 45: Edinburgh datazones with highest number of homes in mixed-tenure buildings](#)
- [Table 46: Edinburgh datazones with highest number of homes in listed buildings](#)
- [Table 47: Edinburgh datazones with highest number of homes in conservation areas](#)
- [Table 48: Schedule of existing heat networks and communal heating systems in Edinburgh](#)
- [Table 49: Datasets used to identify waste heat sources](#)
- [Table 50: Datasets used to inform the Heat Network Zone analysis](#)
- [Table 51: Edinburgh LHEES abbreviations](#)
- [Table 52: Edinburgh LHEES terms](#)

3. Executive summary

3.1. Introduction

3.1.1. This document is the Local Heat and Energy Strategy (LHEES) for the City of Edinburgh. An LHEES is a long-term plan for decarbonising heat in buildings and improving energy efficiency across a local authority. The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022 requires all Scottish local authorities to publish an LHEES, along with a Delivery Plan, by the end of 2023. The central drivers of the Edinburgh LHEES are the statutory national targets of achieving net zero emissions by 2045 (with a 75% reduction by 2030) and, so far as reasonably possible, eradicating fuel poverty by 2040. The Edinburgh LHEES is a place-based and locally-led strategy for Edinburgh covering the following aims:

- Improving the energy efficiency and decarbonising the heat supply of buildings.
- Eliminating poor energy efficiency as a driver for fuel poverty.

3.1.2. The Edinburgh LHEES follows an area-wide approach, meaning it addresses all buildings in the City of Edinburgh area, not just the Council's own building stock. It covers all homes (whether owned by owner-occupiers, social landlords, or private landlords) and all non-domestic buildings (whether owned by the Council, other public bodies, businesses, or the third sector). The Edinburgh LHEES is not just a plan for the Council but one relevant to all owners and occupiers of Edinburgh's buildings, and thus can only be delivered by the concerted effort of all of these people.

3.1.3. The Edinburgh LHEES utilises a standardised methodology to:

- Set out how each segment of Edinburgh's building stock needs to change.
- Identify strategic heat decarbonisation zones within Edinburgh and set out the principal measures for reducing buildings emissions within each zone.
- Prioritise areas for delivery.

3.1.4. Information on key concepts such as heat networks, heat pumps, and energy efficiency is set out in the Edinburgh LHEES.

3.2. Methodology

3.2.1. The methodology for preparing the Edinburgh LHEES has largely followed the guidance issued by the Scottish Government and Zero Waste Scotland where possible. Details of the approach taken to carrying out the analysis underpinning the designation of the Strategic Zones and Delivery Areas is set out in this document. Production of the Edinburgh LHEES has been supported by the consultancies Turner & Townsend; Ramboll; Changeworks; (all stages) and Atkins (stages one and two). Challenges arising during the process have included shortages of data and errors in both datasets and tools. The Edinburgh LHEES has been shaped by both internal and external consultation.

3.2.2. Following the submission of a Screening Report, the Council was advised that a Strategic Environmental Assessment was not required for the Edinburgh LHEES.

3.3. Policy and strategy context

3.3.1. The Edinburgh LHEES sits within a complex and rapidly evolving landscape of policies, strategies, and regulations. The primary policies among these which were central to the development of the Edinburgh LHEES are summarised in Table 01:

Table 01: Key national policies underpinning the Edinburgh LHEES

Policy area	Policy	Description
Heat decarbonisation; energy efficiency	The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	Statutory targets for reducing all of Scotland's greenhouse gas emissions to net zero. These includes a headline target of net zero by 2045 and intermediate reductions targets, such as a 75% reduction by 2030.
Heat decarbonisation; energy efficiency	Climate Change Plan (2018, 2020)	Targets and a comprehensive set of policies for emissions reductions by 2032 covering all emission categories, including relevant categories of electricity generation, buildings, and industry.
Fuel poverty	Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019	Statutory targets to be achieved by 2040: no more than 5% of households in Scotland in fuel poverty and no more than 1% of households in Scotland in extreme fuel poverty
Heat networks	Heat Networks (Scotland) Act 2021	A framework for developing heat networks throughout Scotland and statutory target of heat networks supplying 2.6 terawatt hours of thermal energy by 2027 (equivalent to circa 120,000 additional homes) and 6 terawatt hours by 2030 (equivalent to circa 400,000 additional homes).
Heat decarbonisation; energy efficiency; fuel poverty	Heat in Buildings Strategy (2021)	Programmes, standards and regulations for heat, energy efficiency and fuel poverty to ensure that all buildings are energy efficient by 2035 and use zero direct emissions heating and cooling systems by 2045, as well as minimising fuel poverty in line with statutory targets.

3.3.2. National policies give rise to a series of ambitious goals around energy efficiency improvements and reductions in fuel poverty. The key policy targets and regulations relating to the Edinburgh LHEES are summarised below:

- By 2045, buildings in Scotland will no longer contribute to climate change.
- By 2040, no more than 5% households in Scotland will be in fuel poverty and no more than 1% will be in extreme fuel poverty (Fuel Poverty (Target, Definition and Strategy) (Scotland) Act 2019).
- By 2030, over one million homes and 50,000 non-domestic buildings in Scotland will have converted to zero or low emissions heating systems (Heat in Buildings Strategy).
- By 2030, 6.0 terawatt hours of heat energy will be supplied by heat networks in Scotland by 2030 (Heat Networks (Scotland) Act 2021).
- All homes in Scotland will achieve an Energy Performance Certificate of at least 'C' by 2040 (Energy Efficient Scotland).

- The use of direct emissions heating systems in new buildings in Scotland is proposed to be prohibited from 1 April 2024 (New Build Heat Standard).
- 3.3.3. A key challenge in respect of the Edinburgh LHEES is that many of the national policies, strategies, and regulations that will determine the climate for the delivery of Edinburgh LHEES are still in formulation. These include the Heat in Buildings Bill, the permitting and consenting regime for heat networks in Scotland, and the finalised Energy Efficiency Standard for Social Housing post 2020 (EESH2).
- 3.3.4. The 2030 Climate Strategy is the overall strategy for Edinburgh to become a net zero city by 2030. The Edinburgh LHEES sits below the Climate Strategy, being the strategy for transitioning the heating of buildings in Edinburgh to net zero. The Climate Strategy identifies seven priorities for action, of which two relate directly to the Edinburgh LHEES: “accelerate energy efficiency in homes and buildings” and “enable the development of a citywide programme of heat and energy generation and distribution”. It sets the following targets of relevance to the Edinburgh LHEES:
 - All new Council-led housing developments to be net zero.
 - Develop regional renewable energy solutions.
 - Identify Heat Network Zones across the city.
 - Develop a plan for retrofitting social housing across the city to the highest energy standards, to reduce energy demand and tackle fuel poverty.
 - Establish an Energy Efficient Public Buildings Partnership.

3.4. Ongoing activity in Edinburgh

- 3.4.1. There is significant activity ongoing in Edinburgh around energy efficiency and heat decarbonisation. Key areas of activity include:
 - Energy efficiency improvements to the Council’s existing social housing stock under the “whole house retrofit” approach.
 - Energy efficiency improvements to mixed-tenure buildings (buildings where ownership is shared between the Council and private owners) via the Mixed Tenure Improvement Service (MTIS).
 - Energy efficiency improvements to private homes at risk of fuel poverty via Area-Based Schemes.
 - The development of new social housing with zero direct emissions heating sources and to Passivhaus energy efficiency standards.
 - Energy efficiency improvements to the Council’s operational estate, spearheaded by a pathfinder pilot project.
 - Development of heat network projects in Edinburgh, most significantly ongoing work to appoint a concessionaire to deliver and operate a heat network in Granton Waterfront.
- 3.4.2. There are a range of existing initiatives that can support private building owners with improving energy efficiency and decarbonising heat. Home Energy Scotland, Business Energy Scotland, and Local Energy Scotland are services funded by the Scottish Government and managed by the Energy Saving Trust. They provide households, businesses, and community

groups with advice and support on saving energy, decarbonising properties, and generating renewable energy. They also administer various grant and loan schemes to help owners with retrofit costs. The Scottish Government manages multiple schemes, targeted largely at public bodies (though with exceptions). These include funds and support to retrofit non-domestic public buildings, social housing, and privately-rented and owner-occupied housing in fuel poverty. The Scottish Government leads the Heat Network Support Unit which provides support and administers grant funding to facilitate heat network developments.

3.5. Baseline

3.5.1. To set the context for the Edinburgh LHEES, a comprehensive assessment of the current performance of the city's building stock has been undertaken, providing a thematic overview of Edinburgh's building stock in the context of heat decarbonisation and energy efficiency. It profiles characteristics such as energy performance; fuel type; tenure; type; and age. This information helps inform key decisions about the Edinburgh LHEES and its direction. The data used to prepare this assessment was primarily drawn from the Home Analytics and Non-Domestic Analytics datasets. Headline findings from the assessment include the following:

- 69% of homes in Edinburgh are flats – a far greater proportion than Scotland overall.
- Private landlords account for 21% of homes in Edinburgh – again far greater than Scotland overall.
- Around half of all homes in Edinburgh are located in mixed-tenure buildings.
- Homes in Edinburgh are significantly older than the Scottish average, with a tenth being listed and a quarter lying within conservation areas.
- Most homes in Edinburgh (91%) are connected to the gas grid.
- Due to the lack of data for the non-domestic stock there are many unknowns around the baseline building stock performance.

3.5.2. Key implications from the assessment are that:

- 120,938 homes in Edinburgh have an Energy Performance Certificate rating worse than 'C' and will therefore require upgrading to meet national targets.
- To achieve recommended levels of energy efficiency, 129,706 homes in Edinburgh will require wall insulation (including 80,708 homes with hard-to-treat solid walls); 66,903 homes in Edinburgh will require (improved) loft insulation; and 52,279 homes will require improved glazing: a total of 248,888 interventions.
- To achieve decarbonisation of heat, at least 229,798 homes in Edinburgh will need their existing fossil fuel-based heating systems replaced, the vast majority of them (227,550) being homes currently heated using gas boilers.
- At least 6,551 non-domestic buildings in Edinburgh will need their existing fossil fuel-based heating systems replaced.

3.5.3. This baseline assessment has identified the following key challenges with regards to Edinburgh's building stock:

- Edinburgh's very high proportion of flats (including its traditional tenements) and mixed-tenure buildings will greatly increase the challenge of implementing solutions. Unlike standalone homes with a single owner, where decisions can be straightforwardly taken, taking forward interventions to blocks of flats and other

mixed-tenure buildings will require securing agreement from a range of stakeholders, including difficult to engage with parties such as absentee landlords. Given that coordinating even relatively uncontroversial matters such as essential repairs has historically proven challenging in some cases, it is envisaged that securing agreement from all necessary stakeholders for potentially complex and costly interventions will be particularly challenging. The high prevalence of flats also gives rise to practical challenges, for example a lack of space in which to install heat pumps and limited potential to install solar panels to offset electricity costs. However, with the appropriate financing options and a clear regulatory landscape there is a major opportunity for rolling out large-scale archetype-based retrofit projects.

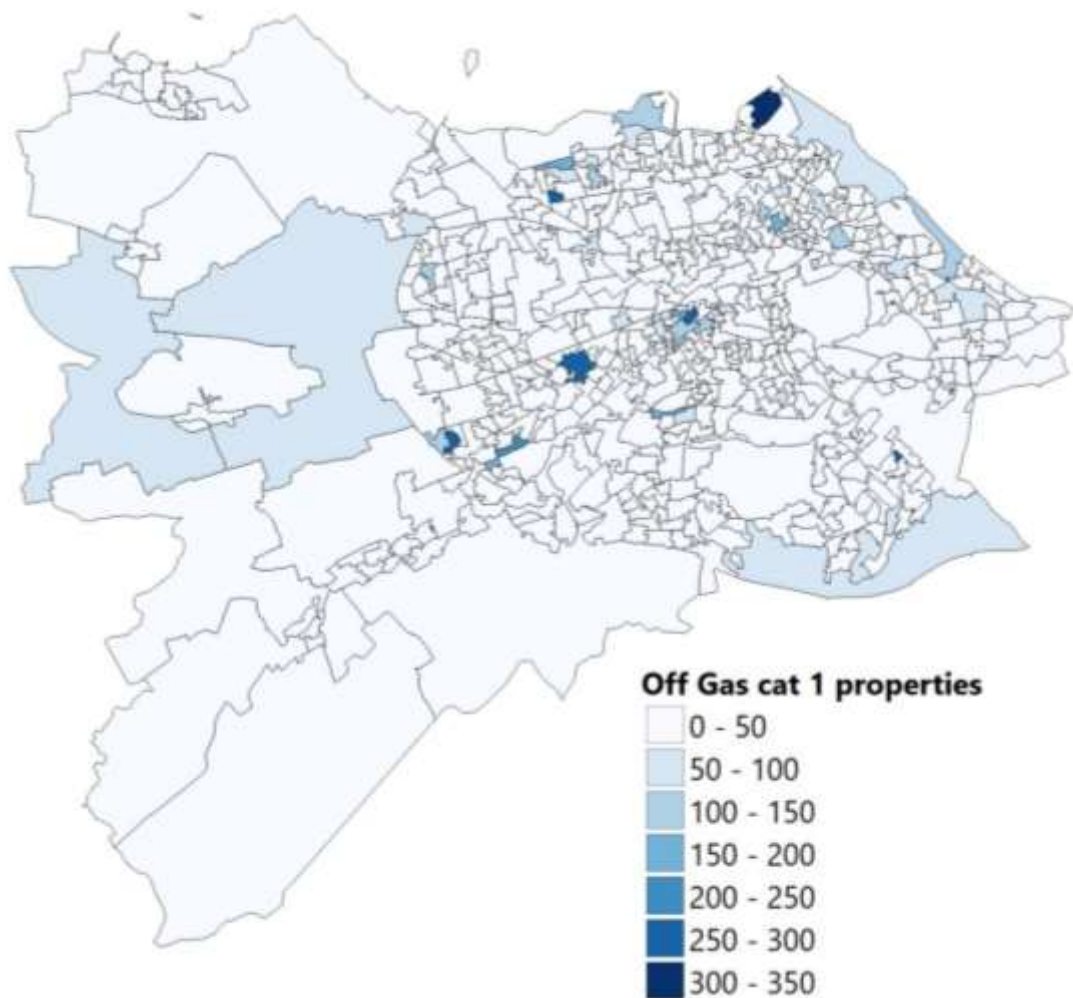
- As a predominantly urban local authority, the vast majority of homes in Edinburgh are connected to the gas grid, as compared to other local authorities where a greater proportion of residents are reliant on alternative heating solutions such as oil. When secondary fuels are included, over 99% of homes in Edinburgh use gas. This is likely to increase the challenge of migrating homes to zero direct emissions heating sources, as gas heating offers many benefits: it is relatively cheap; offers a high flow temperature; is well understood in the marketplace; and it has a well-developed supply chain. As set out in [section 10.3](#), the move to zero direct emissions heating will need to make financial sense for building users. Heat networks can potentially play a major role in retaining many of the benefits of gas, with the added benefits of maintenance cost savings and screening customers against energy price volatility.
- Relative to Scotland overall, Edinburgh has a very high proportion of rental homes owned by private landlords: more than one in every five homes. Conversely, Edinburgh has a considerably smaller social housing sector. This means that the City of Edinburgh Council (and other social housing providers) have far less direct influence over housing stock than other Scottish local authorities. Additionally, this means that achieving net zero will require securing buy-in from a large cohort of private landlords, who are likely to be primarily profit-driven and who do not have a direct incentive to improve energy efficiency of their properties (e.g. compared to owner-occupiers who can benefit from lower bills and increased comfort).
- Relative to Scotland overall, Edinburgh has a considerably older housing stock, with close to a third of homes being over a century old. One in 10 homes are listed. As set out elsewhere in the Edinburgh LHEES, this historicity gives rise to both practical and policy challenges to carrying out interventions.
- Edinburgh has a higher proportion of homes with uninsulated walls than Scotland (over two-fifths), and in particular has a high proportion of hard-to-treat solid stone walls. One in five homes in Edinburgh do not have double/triple glazing.

3.6. Generation of Strategic Zones and pathways

- 3.6.1. Analysis has been carried out to identify “Strategic Zones” in Edinburgh for each LHEES Consideration. These are areas that highlight pathways for intervention, e.g. what the optimal solution is in an area to decarbonise heat. This analysis sets a starting point for the generation of, and prioritisation, of more granular Delivery Areas, as well as for further engagement and actions in the Delivery Plan. Through stakeholder engagement and data

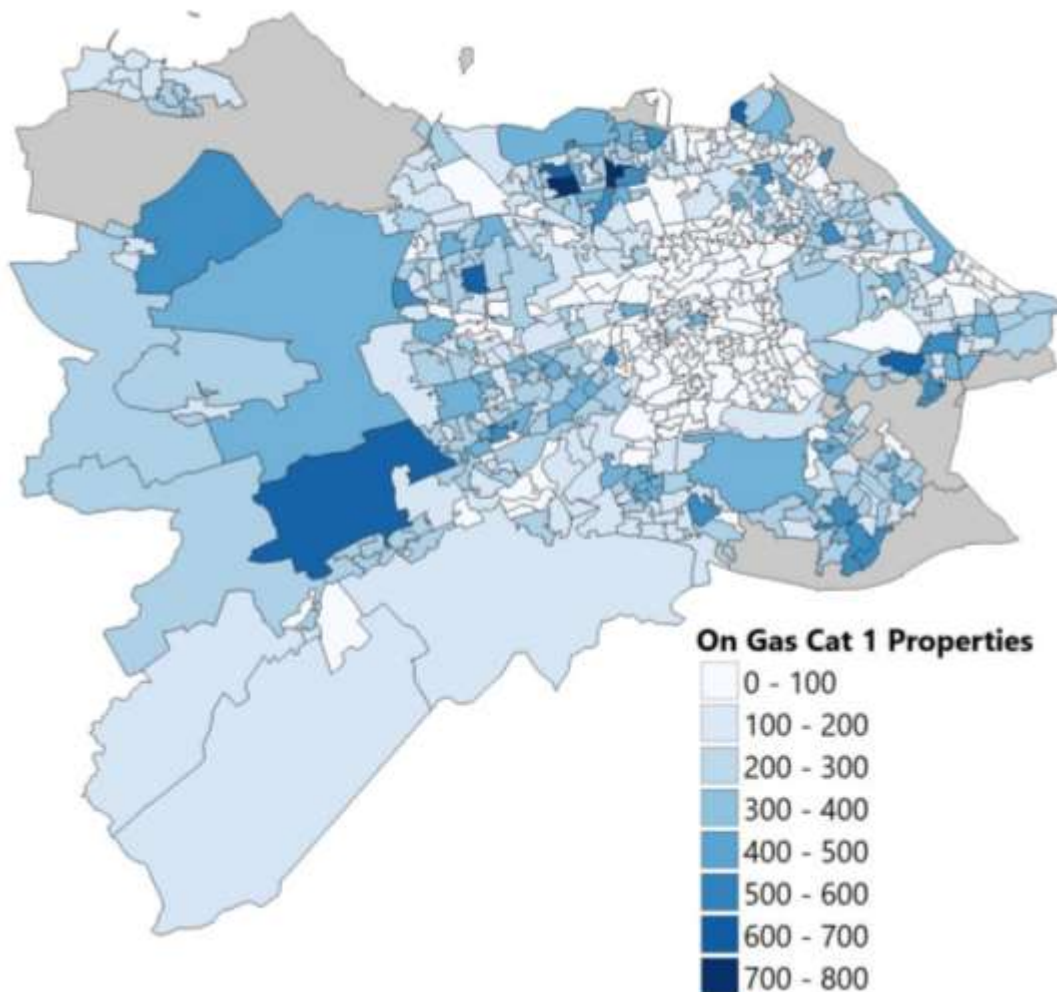
analysis, the Council has identified three priority areas of focus: fuel poverty; heat networks; and heat pump-ready properties.

3.6.2. The first LHEES Consideration concerns the strategy for decarbonising buildings that are not currently connected to the gas grid. Strategic Zones have been produced showing the areas of Edinburgh containing the greatest number of homes not connected to the gas grid assessed as having good potential to be migrated to heat pumps. These areas are distributed across Edinburgh with no easily interpretable geographical pattern. 39.2% of homes in Edinburgh not currently connected to the gas grid are assessed as falling into category 1, i.e. have the greatest potential to be converted to heat pumps. The below plan shows datazones in Edinburgh with the highest number of on-gas grid category 1 ('heat pump ready') properties (darker zones represent a higher number of properties).

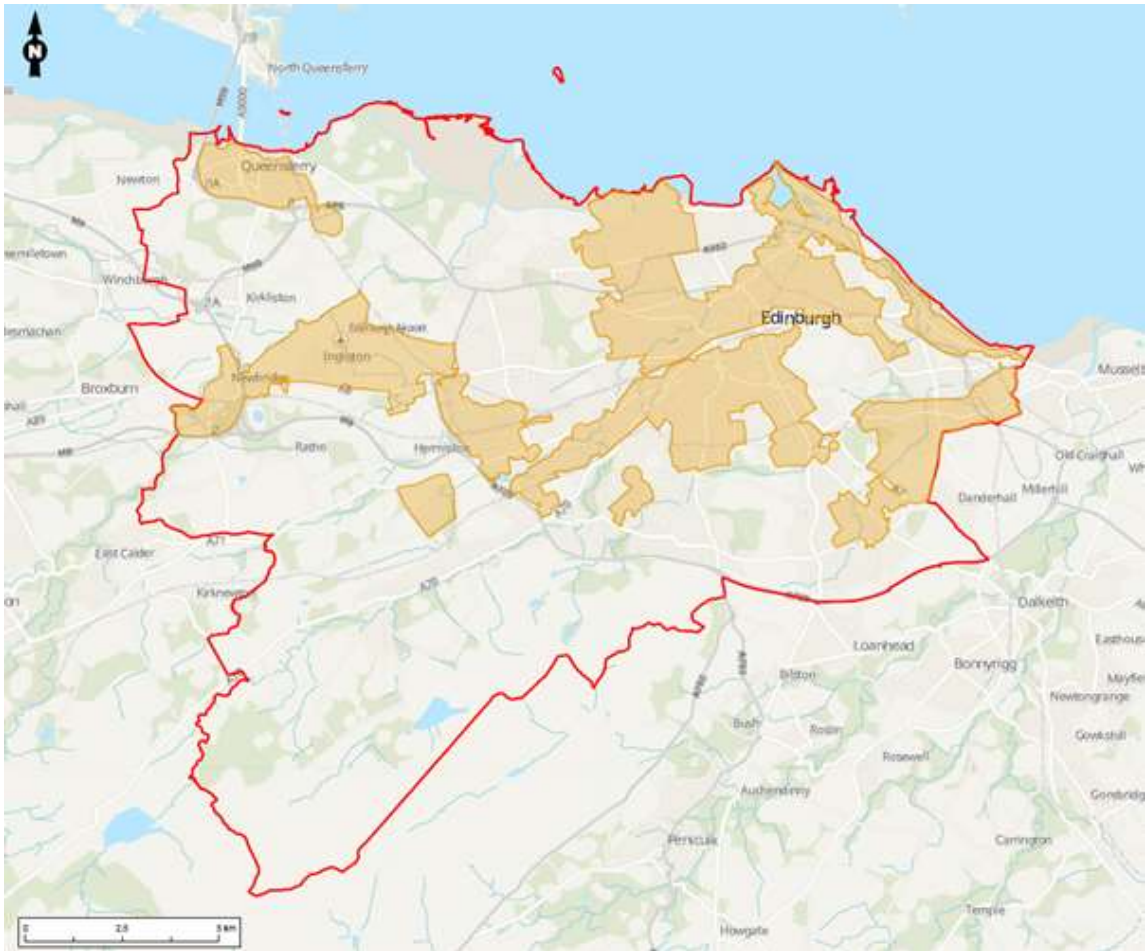


3.6.3. The second LHEES Consideration concerns the strategy for decarbonising buildings that are currently connected to the gas grid. Strategic Zones have been produced showing the areas of Edinburgh containing the greatest number of homes connected to the gas grid assessed as having good potential to be migrated to heat pumps. These areas are distributed across Edinburgh with no easily interpretable geographical pattern. 44.7% of homes in Edinburgh not currently connected to the gas grid are assessed as falling into category 1, i.e. have the greatest potential to be converted to heat pumps. The below plan shows the datazones in

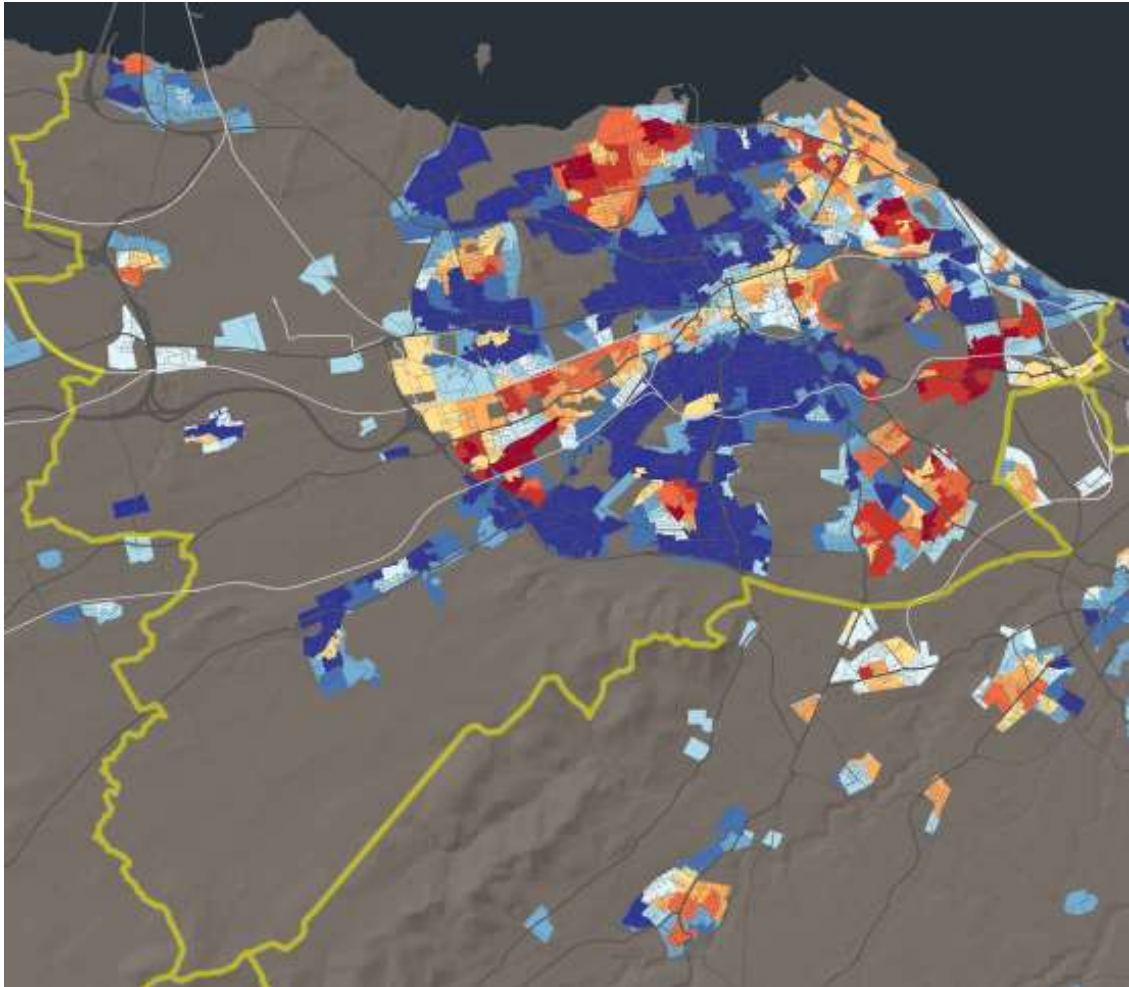
Edinburgh with the highest number of off-gas grid category 1 ('heat pump ready') properties (darker zones represent a higher number of properties).



- 3.6.4. For both off gas and on gas properties, the most realistic and pragmatic approach for Edinburgh is to begin with less complicated and simpler decarbonisation projects, moving into more complex retrofits as the Council, supply chain, stakeholders and property owners expand their learning. As such, the Council proposes a focus on category 1 properties. The Delivery Plan therefore highlights Delivery Areas with a focus on category 1 properties.
- 3.6.5. The third LHEES Consideration concerns the scope to develop heat networks providing decarbonised heat. Edinburgh has a relatively high heat density, good availability of heat sources, and many buildings with high energy use intensity which can serve as “anchor loads” increasing the viability of a heat network. These advantages may give rise to scope for large and continually expanding city heat network (or “network of networks”) covering much of Edinburgh’s population. 17 prospective Heat Network Zones across Edinburgh have been identified based on data analysis and stakeholder engagement, spanning a significant proportion of Edinburgh and representing a diverse mix of areas where there is economic and practical viability for a heat network (there is heat demand and potential to supply heat), as well as taking into account practical considerations. The 17 prospective Heat Network Zones are shown in the below plan; the Delivery Plan presents more detailed maps and prospective Heat Network Zones to take forward.



- 3.6.6. The fourth LHEES Consideration concerns poor energy efficiency in Edinburgh. Strategic Zones have been produced showing the areas of Edinburgh with the poorest energy efficiency. These are closely aligned to areas with high concentrations of historic buildings, reflecting the challenges associated with (for example) insulating solid stone walls.
- 3.6.7. The fifth LHEES Consideration concerns poor energy efficiency as a driver of fuel poverty in Edinburgh. Due to concerns about the robustness of the outputs generated by the LHEES Methodology for this Consideration, the Council intends to instead utilise the 2020 Scottish Index of Multiple Deprivation (SIMD) rankings as a proxy for fuel poverty. The below plan shows the SIMD rankings of each datazone of Edinburgh (warmer zones represent more deprivation, i.e. a higher likelihood of fuel poverty). The Delivery Plan identifies the specific Delivery Areas identified for this strategic priority.



3.6.8. The sixth LHEES Consideration concerns mixed-tenure, mixed-use, and historic buildings – buildings that for practical reasons are likely to prove more challenging to retrofit. Strategic Zones have been prepared for each of these themes.

3.7. Edinburgh LHEES findings and next steps

3.7.1. The baseline analysis undertaken as part of the Edinburgh LHEES has identified multiple key challenges to decarbonising heat in buildings and improving energy efficiency across a local authority stemming from the particular characteristics of Edinburgh’s building stock.

3.7.2. The analysis undertaken against the six LHEES Considerations has given rise to “Strategic Zones”. These Zones are at the heart of the Edinburgh LHEES, setting out at a strategic level potential pathways for decarbonisation of Edinburgh’s building stock and identifying areas of pressure in terms of energy efficiency.

- 3.7.3. Three areas of activity have been identified that are assessed as representing the most appropriate focus for the inaugural Edinburgh LHEES:
- Targeting areas with the highest occurrences of fuel poverty and the 20% most deprived areas of Edinburgh as per the Scottish Index of Multiple Deprivation.
 - Decarbonising Council-owned housing and non-domestic stock in line with national timescales.

- Supporting wider decarbonisation of Edinburgh within the funding and resources that are made available to the Council, beginning with a focus on facilitating a city-wide heat network (or “network of networks”), and upon area with the largest numbers of heat pump-ready homes as a prospective “quick win” in terms of heat decarbonisation.

3.7.4. The following high-level principles are proposed to underpin how the Edinburgh LHEES is delivered and, in turn, how buildings in Edinburgh are made more energy efficient and their heating decarbonised:

- [A] Interventions should be on a “fabric first” basis;
- [B] Interventions should be solution agnostic;
- [C] Interventions must make financial sense for building users;
- [D] New build properties offer the greatest potential;
- [E] Significant additional external funding will be required;
- [F] More comprehensive and robust data is needed;
- [G] Additional levers will be required to catalyse change.

4. Introduction to the Edinburgh LHEES

4.1. Overview of the Edinburgh LHEES

- 4.1.1. This document is the Local Heat and Energy Strategy (LHEES) for the City of Edinburgh. It has been prepared in response to the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022, which requires all Scottish local authorities to publish an LHEES – defined as “a long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority’s area, and the reduction of greenhouse gas emissions resulting from the heating of such buildings” – by 31st December 2023, and thereafter at intervals of no more than five years.
- 4.1.2. The scale of the challenge this represents should not be underestimated. Achieving this goal will require greatly increasing the pace of deployment of zero direct emissions heating systems. The decarbonisation of buildings has been compared to the advent of central heating in the 1960s.¹ At a UK level, the Committee on Climate Change has estimated that approximately £250 billion will need to be invested in upgrading UK homes by 2050 to achieve targets around carbon reductions.² As of mid-2021, Edinburgh was home to 0.79% of the UK population.³ On a pro rata basis, this would indicate that £1.964 billion of investment was needed in homes in Edinburgh. This does not include investment required in non-domestic properties. In December 2022, the Scottish Government estimated that it would cost over £33 billion to “upgrad[e] the energy efficiency of domestic and non-domestic properties and replac[e] their heating systems with zero emissions alternatives”; on a pro rata basis, this would represent a cost of £3.170 billion in Edinburgh.⁴ Investment of this scale will inevitably necessitate a role for private capital, as it is highly unlikely to be fundable by the public sector alone. As the Council’s own limited resources will be focused on its own sizeable and complex estate, alternative funding sources and solutions will be needed for other organisations’ properties in the city.
- 4.1.3. The Scottish Government has estimated that the typical cost of decarbonising a home will be £10,000 to £12,000: a typical cost of £10,000 for a heat pump, along with costs of up to £2,000 for energy efficiency measures.⁵ However, it is noted that these costs will vary greatly depending upon the characteristics of the home, and in some cases will be far higher. The costs of decarbonising non-domestic properties will also vary significantly.
- 4.1.4. The function of the Edinburgh LHEES is to set out the overall strategy for achieving heat decarbonisation and energy efficiency improvements in the building stock of Edinburgh. It assesses the scale of the challenge in terms of the degree and cost of the work required to Edinburgh’s building stock and identifies a route map of potential “pathways” for delivery.
- 4.1.5. The Edinburgh LHEES sets out how Edinburgh will help realise national ambitions around the heating of buildings in Scotland and what this means for the climate and for building users. At a national level, the Heat in Buildings Strategy sets out a vision that by 2045, buildings in Scotland will no longer contribute to climate change.ⁱ The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 sets a target of no household in Scotland being in fuel

ⁱ This target in turn relates to the statutory target of achieving net zero carbon emissions in Scotland by 2045 (with interim targets of a 75% reduction by 2030 and a 90% reduction by 2040) set by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

poverty by 2040. Achieving these targets will require both investing in the fabric of buildings to improve their energy efficiency and investing in zero direct emissions heating solutions.

- 4.1.6. At an Edinburgh level, the Edinburgh LHEES sits beneath the 2030 Climate Strategy, which sets a target of Edinburgh being a net zero city by 2030. Of the seven priorities set out in the Strategy, the first is to accelerate energy efficiency in homes and buildings.ⁱⁱ The second is to enable the development of a citywide programme of heat and energy generation and distribution. The Edinburgh LHEES will help translate the targets and priorities of the 2030 Climate Strategy into actions. However, it is important to note that Edinburgh is not currently on trajectory to decarbonise all buildings in the city by 2030, and so from that perspective the 2030 net zero city target will not be attainable unless the pace of activity – and, by extension, the resources available – significantly increases (which would be extremely challenging given resource pressures and the disruption to building occupiers this would entail).
- 4.1.7. The Edinburgh LHEES is the principal mechanism for the locally led, place-based decarbonisation of heat in buildings, having cognisance to the specific context and priorities of Edinburgh. It will support local planning, coordination, and delivery of the heat transition throughout Edinburgh. It will set out how each segment of Edinburgh’s building stock needs to change; identify strategic zones for heat decarbonisation and the principal measures needed in each zone; and prioritise area for delivery. It will help direct capital investments.
- 4.1.8. It is important to note that achieving the headline targets set out in the Edinburgh LHEES will not be possible without significant action by other organisations. In particular major legislative, regulatory, and budgetary decisions by the Scottish Government and UK Government will be required for the Edinburgh LHEES to be successfully delivered. At present, there is no financial strategy for the investment required to decarbonise Edinburgh or Scotland. The Edinburgh LHEES therefore largely sets out what may be possible with the commensurate resources and powers being made available.
- 4.1.9. The audience for the Edinburgh LHEES includes residents of Edinburgh; businesses and third sector organisations with a presence in the city; the Scottish Government; other public sector bodies; utility network operators; and developers.
- 4.1.10. The Edinburgh LHEES should be read in conjunction with the Delivery Plan, which sets out how the Edinburgh LHEES is to be implemented, with a focus on early, low-regrets actions over the first five years of the Edinburgh LHEES (2024 to 2028).
- The Edinburgh LHEES sets out Strategic Zones that provide pathways for the decarbonisation of heat and the improvement of energy efficiency in different areas of Edinburgh. The Edinburgh LHEES also sets out areas of focus, the Council’s approach, and high-level principles to guide activity over the period.
 - The Delivery Plan identifies the actions the Council itself will take to deliver the Edinburgh LHEES, and the Delivery Areas in which these actions will be concentrated. It is important to note that there is no dedicated budget for the delivery of the Edinburgh LHEES. Actions set out in the Delivery Plan are therefore focused on currently funded area of activity and additional areas of activity that can be met from existing resources, albeit this can be revisited should additional funding be

ⁱⁱ The 2030 Climate Strategy notes that energy utilised to heat and power Edinburgh’s buildings accounts for 68% of the city’s total emissions.

made available for the delivery of the Edinburgh LHEES. Accordingly, the more substantial actions set out in the Delivery Plan are heavily skewed towards the Council's own estate.

- 4.1.11. The Edinburgh LHEES has been prepared in a limited timescale and in the context of challenges such as data limitations, methodological issues, and a rapidly evolving regulatory context. These factors have inevitably had a bearing upon the end results. It is envisaged that the second iteration of the Edinburgh LHEES will benefit from a more stable regulatory context, better quality data, and additional time and resources for preparation.
- 4.1.12. Achieving the ambitions of the Edinburgh LHEES will require partnership working across the public, private and third sectors. As such, the Edinburgh LHEES has been developed with input from key stakeholders and is subject to an open public consultation. Through these engagements, the Council has sought to establish a foundation for area-wide joint action. The Edinburgh LHEES presents an opportunity for a holistic approach at the intersection of multiple policy areas. Edinburgh can capitalise on benefits wider than just net zero and fuel poverty, including economic growth, green employment and skills, just transition, and the development of a clean heat and retrofit supply chain benefitting owners across all tenures.

4.2. Edinburgh LHEES governance

- 4.2.1. The Edinburgh LHEES is a formal strategy of the City of Edinburgh Council in line with the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022.
- 4.2.2. The Edinburgh LHEES falls within the remit of the Council's Policy and Sustainability Committee.
- 4.2.3. The Council has appointed a dedicated Energy Officer who will be responsible for the finalisation of the Edinburgh LHEES and Delivery Plan following consultation and subsequently lead work looking at what can be delivered.

4.3. Edinburgh LHEES structure and layout

- 4.3.1. The structure and layout of the Edinburgh LHEES is briefly summarised below. The document is aligned to the LHEES Guidance issued by the Scottish Government, but with some adjustments aimed at improving the flow of information from an Edinburgh perspective.
 - [Chapter 1](#) is the foreword to the Edinburgh LHEES from the Leader of the City of Edinburgh Council, Councillor Cammy Day.
 - [Chapter 2](#) sets out the contents of the Edinburgh LHEES.
 - [Chapter 3](#) is the executive summary of the Edinburgh LHEES.
 - [Chapter 4](#) is the introduction to the Edinburgh LHEES. This includes a general overview of the Edinburgh LHEES, a summary of the structure and layout of the Edinburgh LHEES, and a summary of what is and is not in the scope of the Edinburgh LHEES, along with a review of key concepts underpinning the Edinburgh LHEES.
 - [Chapter 5](#) sets out the methodological approach to the Edinburgh LHEES. This includes a description of the approach of the Council to preparing the Edinburgh LHEES, a summary of the LHEES Considerations, a summary of consultation and engagement undertaken as part of the preparation of the Edinburgh LHEES, and a review of formalities associated with the Edinburgh LHEES.

- [Chapter 6](#) sets out the policy and strategy context for the Edinburgh LHEES, looking at the relevant policy and strategies at a local, Scottish, and UK level.
- [Chapter 7](#) summarises ongoing workstreams of relevance to the Edinburgh LHEES.
- [Chapter 8](#) sets a baseline assessment of Edinburgh’s property stock and its performance in terms of the LHEES Considerations.
- [Chapter 9](#) identifies “Strategic Zones”: geographical subdivisions of Edinburgh that allow for the visualisation of spatial trends aligned with the LHEES Considerations, helping identify pathways (strategic approaches) for the decarbonisation of the building stock in each Strategic Zone. This chapter also identifies potential Heat Network Zones within Edinburgh.
- [Chapter 10](#) summarises the findings of the Edinburgh LHEES and sets out the next steps.
- [Chapter 11](#) contains the appendices to the Edinburgh LHEES.

4.3.2. This iteration of the Edinburgh LHEES has been prepared as a traditional text-based document. However, the scope for (and benefits of) displaying the Edinburgh LHEES outputs in a more interactive fashion, for example utilising GIS or StoryMaps, is recognised and the Council intends to explore this for updates to, and future iterations of, the Edinburgh LHEES.

4.4. Edinburgh LHEES scope and limitations

Scope

- 4.4.1. The scope of the Edinburgh LHEES is the decarbonisation of building stock in Edinburgh via a combination of energy efficiency improvements and zero direct emissions carbon solutions, helping deliver the vision that by 2045, buildings in Scotland will no longer contribute to climate change. The Edinburgh LHEES therefore relates to the overall vision of making Scotland net zero carbon by 2045. It is noted however that the Edinburgh LHEES is only one strand of a wider programme of activity required to achieve net zero carbon, and does not encompass other areas such as transport and agriculture. Further, the focus of the Edinburgh LHEES is upon decarbonisation and its scope therefore does not include matters such as climate resilience and ecology.
- 4.4.2. The Edinburgh LHEES covers the entirety of the City of Edinburgh local authority area, including the city proper, the settlements of South Queensferry, Kirkliston, Newbridge, Ratho Station, and Ratho, and various smaller settlements in rural west Edinburgh.
- 4.4.3. The focus of the Edinburgh LHEES is primarily on the physical changes required to decarbonise Edinburgh’s building stock, e.g. capital investment in energy efficiency measures and energy infrastructure. It does not focus upon activities aimed at reducing energy consumption and ameliorating fuel poverty, for example advice on conserving household energy and financial support with energy bills for low-income households. However, some consideration is given to the wraparound activities required to support physical improvements to the building stock.
- 4.4.4. For the purposes of the Edinburgh LHEES, “energy efficiency” refers purely to the energy required to heat a property. It does not include energy utilised for other purposes, for example the energy used to power household appliances or the energy used for industrial processes in commercial buildings such as factories.

- 4.4.5. It is recognised that the move to net zero carbon is heavily driven by technological advancements, e.g. the development and enhancement of solutions for the generation, transmission, and storage of energy from low/zero emissions sources. The Edinburgh LHEES is not a strategy for supporting innovation or technical innovation. However, cognisance has been given to the scope for emerging solutions, for example green hydrogen, to play a role in achieving net zero.
- 4.4.6. The Edinburgh LHEES includes analysis on rooftop solar PV potential for domestic properties ([Figure 25](#)) but does not include plans for wider renewable generation opportunities such as solar farms, renewable potential for non-domestic properties, the deployment of other renewable, or electricity and heat storage options throughout the city.

Limitations

- 4.4.7. Transforming Edinburgh's building stock is a large, complex, multigenerational challenge which will require extended time and resources. The Council has been delivering projects in this area for over a decade and the publication of the Edinburgh LHEES is a milestone which will set the agenda for the coming two decades to the net zero deadline. The Edinburgh LHEES makes its contribution but with recognised limitations.
- 4.4.8. The datasets underpinning the Edinburgh LHEES represents complex and rapidly shifting real circumstances. This can mean that sometimes the data available has gone out of date or is incomplete. The following have been the main limitations:
- Fuel poverty and extreme fuel poverty have arisen to become acute and evolving issues at a national scale following the cost-of-living crisis, but the data is not entirely up-to-date with some of these major shifts.
 - Only 16% of Scotland's non-domestic buildings have an Energy Performance Certificate (EPC) and there is not a large amount that can be done with this partial dataset. Due to a lack of information, it has been difficult to plan decarbonisation pathways for non-domestic buildings in the way the Council would have preferred.
- 4.4.9. The Council receives a grant of £75,000 per annum from the Scottish Government from 2022/23 to 2027/28 to deliver the Edinburgh LHEES. Compared to the scale of investment the Edinburgh LHEES is intended to direct over the coming two decades, this amount is insufficient. With severe stress on its budget and limited funding from the government the Council has been limited against the ambition it would like to deliver on. A realistic and practical level of funding will be required if the Council is to match the scale of delivery required to reach net zero.
- 4.4.10. The landscape around funding and regulation is rapidly evolving, with certain vital pieces of information unavailable at the time of writing. These include:
- The content of the Heat in Buildings Bill.
 - The findings of the Green Heat Finance Taskforce
 - Detail on the permitting and consenting regime for heat networks in Scotland.
 - Information on mandatory heat network connections.
 - A timescale for banning the installation of gas boilers in existing properties.
 - Finalised Energy Efficiency Standard for Social Housing post 2020 (EESH2) guidance.
 - Confirmation on grant funding post-2026.

- Details on the reform of Energy Performance Certificates.
- Confirmation on funding for local authorities for new duties associated with LHEES and heat networks.

4.5. Review of key concepts

4.5.1. This section of the Edinburgh LHEES briefly reviews select relevant key concepts.

Heat decarbonisation

- 4.5.2. Heat decarbonisation refers to reducing or completely removing the carbon produced as a negative by-product of heating buildings. Heating buildings is essential for people’s health and wellbeing, but is also one of the major contributing factors to carbon emissions. At a Scottish level, as of 2019, 81% of households used mains gas as their primary heating fuel, while 8% used other emissions generating fuels such as oil, liquefied petroleum gas, solid mineral fuels, and biomass. 1% used communal heating systems, while 11% used electrical heating.⁶ Figures for Edinburgh are set out in [Chapter 8](#).
- 4.5.3. In practice, heat decarbonisation is largely about replacing existing carbon intensive heating solutions (such as gas boilers) with lower carbon alternatives. The main options for zero direct emissions heating include direct electric heating; heat networks; heat pumps; and hydrogen.
- 4.5.4. The Climate Change Committee has prepared scenarios for the decarbonisation of heat in buildings across the UK overall.⁷ The share of demand met by each net zero heating system as of 2050 in its “Balanced Net Zero Pathway” is set out in Table 02. This scenario envisages heat networks and heat pumps as fulfilling the vast majority (94%) of heat demand, with direct electric heating and hydrogen boilers accounting for the remainder.

Table 02: UK building heat demand by source (2050 scenario)

Heat source	% heat demand
Direct electric heating	1%
Heat networks	42%
Heat pumps	52%
Hydrogen boilers	5%

[Source: Climate Change Committee](#)

- 4.5.5. Key challenges to heat decarbonisation include the installation and operating costs of the alternative heating solutions (which are often higher than the existing solutions); the limited availability of people with the technical skills required to install and maintain these alternative heating solutions; local and national constraints on the electricity grid; the need for extensive retrofit works to make existing properties suitable for low carbon heating solutions, and knowledge and perceptions of low carbon technology amongst the public.
- 4.5.6. Wet heating systems operate on the basis of supply/flow and return temperatures. The supply/flow temperature is the temperature of the water sent to the radiator, while the return temperature is the temperature of the water returning to the heating system. Conventional radiators in the UK are designed to operate with supply/flow temperatures of 82°C and return temperatures of 71°C. Zero direct emissions heating systems generally utilise lower temperatures. For example, an air source heat pump utilises an optimal supply/flow

temperature of 45°C and a return temperature of 40°C,ⁱⁱⁱ while fourth generation heat networks generally utilise a supply/flow temperature of 55°C and a return temperature of 25°C. The practical implication of this is that replacing a gas boiler with a zero direct emissions heating system will require the property in question to be suitably adapted to enable the heating system to operate effectively. In particular, the property will require to be well-insulated and suitable radiators will be required. Radiators for low temperature heating system typically require to be around 2.5 times larger than a conventional radiator and are generally made out of materials with high thermal conductivity, for example Zintec steel.^{iv} This can give rise to challenges when retrofitting properties.

4.5.7. In 2023, research was published on the energy performance of Scottish public buildings and the impact thereof on their ability to use low-temperature heat in the buildings.⁸ The research looked at the scope to utilise low temperature heating systems in 121 buildings owned by the City of Edinburgh Council. The research concluded the following:

- Pre-1980 buildings do not require renovation of the building envelope to use low temperature heating, albeit this is preferable. These buildings could operate with supply/flow temperatures of below 70°C for 96% to 99% of the year, and below 55°C for 67% to 71% of the year.
- Post-1980s building (which predominantly utilise mechanical ventilation systems) could have limitations in terms of their ability to utilise low temperature heating, especially in windy conditions.
- New and renovated buildings are recommended to be designed to operate with a cap on supply/flow temperature of 55°C.

Energy efficiency

4.5.8. Energy efficiency considers the amount of energy required to heat a building and the building's ability to retain that heat. This can be affected by many factors including the design of the property and the materials used to build it. Physical measures to increase energy efficiency can include adding wall, roof, and floor insulation; low energy lighting; improved heating controls; and double or triple glazed windows. Energy efficiency is also dictated by the actions of users, for example avoiding heat waste by keeping doors and windows closed. In simple terms, the more energy efficient the building, the lower the quantity (and cost) of energy will be needed to heat it.

4.5.9. The most common way to measure energy efficiency is through an Energy Performance Certificate (EPC), which provides a simple rating of energy efficiency of the building. This rating is derived from two main factors: the amount of energy required per square metre, and the level of carbon dioxide emissions produced by the building (quoted in tonnes per year). Ratings can range from "A" (very efficient) to "G" (very inefficient). EPCs will typically include recommendations to improve the energy efficiency of the building and a potential rating. Ratings are valid for 10 years and, in Scotland, must be completed by organisations on the national EPC Register. The Scottish Government is reviewing EPCs with a view to

ⁱⁱⁱ As specified by BS EN 14511.

^{iv} Another option is to utilise a fan-assisted radiator which can achieve three times as much heat output as a conventional radiator.

introducing new metrics that better measure energy efficiency.^v In February 2023, the Climate Change Committee stated that EPCs are “used to define standards and targets for reducing emissions from homes – but are poorly suited to this role” and “do not accurately incentivise the energy efficiency and heating solutions required to deliver net zero homes”; the Committee recommended that domestic EPCs should be reformed to focus on four primary metrics: “Energy” (total energy use intensity, measured in kilowatt hours per square metre per annum); “Fabric” (space heating demand intensity, measured in kilowatt hours per square metre per annum); “Heating” (heating system type, ranked from 1 to 6); and “Cost” (energy cost intensity, measured in pounds per square metre per annum).⁹ It is understood that revised Energy Performance of Buildings (Scotland) Regulations are programmed to be put before the Scottish Parliament in 2024.

- 4.5.10. Achieving good energy efficiency in historic buildings is recognised as being inherently more challenging than with modern properties due to typical design features of historic buildings such as solid stone walls and wooden sash-and-cash windows. Various initiatives have been undertaken to attempt to develop standardised packages of interventions for specific building archetypes. The Niddrie Road project in Glasgow – a retrofit of eight one-bedroom tenement flats in Glasgow by the Southside Housing Association – has been hailed as an exemplar. The project saw interventions delivered including triple glazing; air sealing via insulation of walls, floors, and lofts; and the installation of mechanical ventilation systems, along with the installation of air source heat pumps serving four of the flats. The project has significantly improved energy efficiency and reduced occupants' heating bills. However, the costs of the project average £35,000 to £40,000 per flat (with costs for larger properties likely to be higher), meaning its scope to be rolled out more widely may be limited.¹⁰

Insulation

- 4.5.11. Insulation here refers to the use of materials to slow the rate at which heat is lost from a building to the outside. This is one of the most affordable and effective ways of reducing heat demand by improving heat retention. The main elements of a typical building that can be insulated to increase heat retention are the roof/loft; the floor; the walls; and the windows. The most common kind of insulation option is blanket insulation which is easier to install and cost-effective. A variety of materials may be used dependent on availability and the size of the space, including wool fibre, polyethylene, and foam.
- 4.5.12. Roof insulation is key to containing heat as heat naturally rises out of the building; up to 25% of heat can be lost through a building's roof.
- 4.5.13. Floor insulation is generally focused on insulating the ground floor of a building; this can be carried out in older buildings that have suspended timber floors, or on top of concrete floors. The Leeds Sustainability Institute has calculated that carpets can reduce air leakage in some homes by up to one-third.^{vi 11}

^v Energy Performance Certificates were developed to measure the cost efficiency of running a building in terms of its energy performance. As a result, the higher installation and running costs of a heat pump relative to a gas boiler would mean that an EPC would not recommend the replacement of a gas boiler with a heat pump, even though this would reduce the carbon emissions of the building.

^{vi} It is estimated that 1.2 million people in the UK have no carpet or other flooring in their bedrooms and living rooms, 760,000 of them in social housing.

- 4.5.14. Cavity walls can be insulated through injecting insulation into the cavity. This method is primarily applicable for homes newer than 1920s. For older homes that have solid walls, insulation can still be installed to increase energy efficiency. This can be applied to the inside or outside of the wall, however, outside insulation may require more time, costs, and planning. Solid wall insulation is more expensive but does make a considerable increase in the amount of heat retained.
- 4.5.15. Windows can be made more energy efficiency by the use of double or triple glazing. Where the replacement of windows is not possible – for example in period properties – an alternative solution is to install a secondary internal window.

Fuel poverty

- 4.5.16. Fuel poverty is defined in Scotland as a household spending more than 10% of its income on fuel costs where the remaining household income is insufficient to maintain an adequate standard of living. Statutory targets for the reduction of fuel poverty are set by the 2019 Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act.
- 4.5.17. Whilst income poverty and fuel poverty are often correlated, the latter focuses on households in any income band that are spending a disproportionately high amount of money on fuel bills. Often fuel poverty impacts those in energy inefficient rented homes where it is not possible for the tenant to implemented energy efficiency improvements.
- 4.5.18. The number of Scottish households in fuel poverty is currently projected to rise due to increases in energy prices. The UK Government has implemented temporary measures to combat the effects of the increase in energy pricing including the Energy Bills Support Scheme and the Warm Home Discount scheme for households on pension credit or low incomes.

Direct electric heating

- 4.5.19. Direct electric heating is the use of electricity to heat spaces and water directly (rather than interpolating other systems such as heat pumps). Direct electric heating solutions are typically relatively low cost and require very little maintenance. There are multiple different heating systems that directly utilise electricity, including:
- Electric central heating – a “wet” system similar to that associated with a gas boiler, but with the hot water being supplied from an electric boiler, which uses an immersion heater or element to heat the water. Electric combi boilers can supply both heat and hot water.
 - Electric radiators – convection and radiation-based heaters that use an element to heat a thermodynamic fluid (typically glycol) which conducts the heat to the surface of the radiator.
 - Panel heaters – simple convection-based heaters that draw in cold air, run it over a exposed wire element, and emit warm air.
 - Infrared heaters – heaters that emit radiant heat, instantly warming people and objects rather than the air, meaning good insulation is not essential.
 - Storage heaters – heaters that use an element to heat a ceramic or clay brick which is then gradually released. The heaters warm the bricks during the night (capitalising on the lower cost “Economy 7” electricity tariff) with heat then being slowly released as hot air during the day. Modern storage heaters have controls and thermostats.

- 4.5.20. Direct electric heating has a coefficient of performance of 1 – i.e. every kilowatt of electricity utilised generates one kilowatt of heat – compared to around 0.9 for a gas boiler. However, as electricity unit prices in the UK have traditionally been around three times higher than gas unit prices, direct electric heating is not generally cost effective.^{vii} As a result, alternative solutions may be more economical, for example heat pumps (which typically have a coefficient of performance of 3 to 4, helping offset the higher input cost).^{viii} Significant additional adoption of direct electric heating is therefore unlikely unless the cost of electricity in the UK falls. The running costs of direct electric heating can be cross-subsidised using solar panels or other micro-generation technologies, which provide “free” electricity. However, solar panels are most efficacious during the daytime in sunnier months and are generally at their least effective when demand for heat is typically highest, meaning storage of electricity (or heat) is necessary to balance the load. Other micro-generation technologies such as wind turbines or hydro power generally have limited potential in an urban setting.^{ix}
- 4.5.21. Direct electric heating does not generate direct emissions. The UK Government has committed to fully decarbonising the UK’s electricity grid by 2035.¹² As a result, from 2035 onwards direct electric heating should not make any indirect contribution to carbon emissions. At a UK level, the required peak capacity of the National Grid is expected to double from 60 gigawatts to 20 gigawatts in 2050, with a quadrupling of green electricity.¹³

Heat networks / communal heating systems

- 4.5.22. A heat network is a heating system that works on the principle of distributing heat generated at one or more central sources to users rather than generating heat using systems in individual properties. The centrally generated heat is distributed through pipes to customers such as homes, commercial buildings, and public sector buildings (known as “off-takers”) who control the heat they receive via an interface unit. The most important customers in terms of scale and consistency of heat demand are known as “anchor loads”.
- 4.5.23. Heat networks are classified by “generation”, with the generation referring to a major change in the underlying technology.
- First generation heat networks date from the 1880s, supplying heat using steam at temperatures of up to 200°C produced centrally by burning coal and waste and transmitted using concrete ducts. First generation heat networks were largely superseded in the 1930s, although some remain in use worldwide.
 - Second generation heat networks date from the 1930s, supplying heat using pressurised hot water via pipes at temperatures of over 100°C produced centrally by burning coal, waste, and oil.
 - Third generation heat networks emerged in the 1970s in response to that decade’s energy shocks. They distribute centrally generated heat from sources including gas,

^{vii} As of June 2023, the Ofgem price caps were 33.2 pence per kilowatt hour for electricity and 10.3 pence per kilowatt hour for gas (a price ratio of 3.22:1).

^{viii} The coefficient of performance is a measure of the efficiency of a heating system, expressed as a ratio of the power output to the power input. For example, an electric heater may convert 1 kilowatt of electricity into 1 kilowatt of heat (a coefficient of performance of 1). A coefficient of performance greater than one means that the system is outputting more energy than is being input.

^{ix} While solar panels are less challenging to implement in an urban setting, one obstacle is that, as solar panels can be used to export electricity to the national grid, they put pressure on grid capacity which may mean the potential to deploy solar panels at scale in some areas of Edinburgh is limited.

combined heat and power, biomass, and waste at temperatures of 70°C to 100°C using pre-insulated metal pipes. Most existing heat networks in the UK are third generation.

- Fourth generation heat networks are emerging in response to concerns around climate change. They incorporate higher levels of renewable heat sources, e.g. heat pumps and waste, and supply heat and hot water at lower temperatures (below 70°C), using plastic pipes reducing transmission losses. Due to the lower temperatures, boosting is required for domestic hot water.
- Fifth generation heat networks distribute heat at ambient temperatures (between 10°C and 30°C), thus minimising transmission losses. Rather than a centralised heat source, heat is generated at multiple points across the network. Buildings can both consume and provide heat, turning them into “prosumers”. Other design characteristics include the use of networks for both heating and cooling (with bi-direction thermal energy flows); integrated thermal storage to balance demand; and optimised energy flows based on algorithms utilising real-time data. Due to the lower temperatures, boosting is required for domestic hot water. Fifth generation heat networks are complex and costly and therefore may be best suited to projects where there is a need to balance heating and cooling demands.

- 4.5.24. Heat networks are most efficient in dense built-up urban areas due to cost efficiencies, but have also been proposed as a solution for more rural communities without gas connections. Across Scotland, as of 2022 there were an estimated 1,080 heat networks supplying approximately 1.18 terawatt-hours of heat to around 30,000 homes and 3,000 non-domestic properties. There are dozens of existing heat networks in Edinburgh, but these are generally relatively small-scale, focused on a single off-taker (for example the University of Edinburgh), and supplied from carbon emitting heat sources.
- 4.5.25. Heat networks can contribute to heat decarbonisation by supplying heat from a centralised low/zero direct emissions source, for example the air, geothermal heat, or waste heat (such as heat generated from the incineration of refuse, which would otherwise be vented into the atmosphere and “wasted”). Even when heat networks supply heat from a more carbon intensive source, they can enable the larger system to be decarbonised in the future without having to make changes to each individual property supplied by the network.
- 4.5.26. An advantage of heat networks in the context of heat decarbonisation is that they do not place the same demand pressures on the electricity grid as heat pumps or direct electric heating. A heat decarbonisation solution for Edinburgh that incorporates a mix of heat networks and electricity-based solutions will therefore give rise to fewer electricity infrastructure requirements than one focused on electricity-based solutions.
- 4.5.27. The main challenge to deploying heat networks is the upfront capital costs required in terms of constructing the energy centre and associated infrastructure as well as making the connections to individual properties. Most schemes deployed in Scotland so far have been delivered by local authorities to serve their estates or by property developers to serve new building developments. Engineering solutions have been developed to help reduce upfront costs, including pipework being laid above ground and trenchless options.
- 4.5.28. Heat networks have hitherto been largely unregulated in Scotland and the UK. The Heat Networks (Scotland) Act 2021 introduces a regulatory regime for Scotland. As heat networks

are classed as commercial rather than domestic supplies, they are not covered by the OFGEM energy price cap (or the UK Government's Energy Price Guarantee).¹⁴

- 4.5.29. A communal heating system is a smaller-scale heat network wherein heat generated at a central source is distributed to two or more units within a single building. Communal heating systems are most commonly associated with blocks of flats. As of 2023, there were approximately 14,000 blocks of flats in the UK served by communal heating.¹⁵

Heat pumps

- 4.5.30. Heat pumps are devices that heat buildings through capturing existing heat in the environment. The pump captures heat from the environment and uses a heat exchange to increase it to supply heat to a building. The pump itself produces no carbon dioxide emissions, albeit electricity is required to power the system. Unlike most heating technologies, heat pumps can also be used for cooling (by reversing the flow of refrigerant). A typical heat pump serving a home will range from 6 kilowatts to 15 kilowatts; the cooler the minimum outdoor temperature, the larger the heat pump that will be required. A typical cost for a heat pump serving a home would be approximately £10,000.¹⁶
- 4.5.31. There are two main types of heat pumps: air source heat pumps and ground source heat pumps, which capture heat from the air and from the ground respectively. Air source heat pumps are the most common option currently in use in Scotland. Other types include water source heat pumps and sewer source heat pumps.
- 4.5.32. As heat pumps capture “free” heat from the environment (e.g. from the air), they can achieve comparatively high coefficients of performance (typically 3 to 4). However, this must be balanced against the relatively high unit cost of electricity in the UK (typically around three times greater than the unit cost of gas), which generally makes the economic case for migrating from gas to heat pumps marginal at best. Heat pumps are therefore a financially attractive alternative to direct electric heating, but are less so with regards to gas. The running costs of heat pumps can be cross-subsidised using solar panels (albeit as noted solar panels are least effective when heat demand is highest, e.g. after sunset and in the winter) or other micro-generation technologies. To help minimise the running costs of heat pumps, the UK Government has proposed to require all heat pumps installed in the UK to be capable of modulating electricity consumption in response to time-of-use tariffs, enabling customers to align usage with costs. The UK Government has also undertaken to “rebalance” electricity and gas costs. Other proposals have included removing “green levies” used to subsidise renewable energy schemes from household electricity bills.^{x 17}
- 4.5.33. Heat pumps work best in well insulated buildings and where pipes and radiators are appropriately sized; as wet heating systems based on heat pumps have lower flow temperatures than those based on gas boilers, larger radiators are needed to achieve the same results. As a result, the like-for-like replacement of a gas boiler with a heat pump may not deliver optimal results without complementary upgrades to the energy efficiency of the property being carried out. The efficiency of heat pumps generally varies depending upon the time of year, being lower when temperatures are lower (when heat demand is generally higher), meaning user comfort can be poor during cold periods (below 7°C).

^x As of 2021, “environmental and social levies” used to fund various initiatives around clean energy and fuel poverty accounted for approximately 12% of electricity bills (£119 per year per home), compared to 3.4% of gas bills (£33 per year per home).

- 4.5.34. Heat pumps cannot provide hot water on demand in the same way as a combi-boiler. Therefore, for a heat pump to supply hot water to a property, a hot water cylinder will be required to store the hot water (potentially supplemented by an immersion heater). This can give rise to complications such as a risk of legionella bacteria. Alternately, hot water demand can be met using another solution such as an instantaneous water heater.
- 4.5.35. Other challenges associated with heat pumps can include the operating noise (which can reach 60 decibels) and the need for a suitable space in which to install the heat pump.
- 4.5.36. Currently, approximately 3,000 to 4,000 domestic heat pumps are installed in Scotland annually, with the vast majority being air source heat pumps.¹⁸ The Scottish Government has set a target of increasing annual heat pump installations to 170,000 by 2030.¹⁹ At a UK level, approximately 50,000 to 60,000 heat pumps are installed annually; the UK Government wishes to increase this to 600,000 by 2028. Public knowledge and awareness of heat pumps is poor, with a poll in 2022 suggesting 80% of UK residents do not know what a heat pump is.²⁰ The UK is one of the slowest adopters of heat pumps in Europe; at current rates of installation, it would take 400 years for all homes in the UK to be fitted with a heat pump.²¹
- 4.5.37. There are currently an estimated 3,000 to 4,000 heat pump engineers in the UK; the charity Nesta has estimated that 27,000 heat pump engineers will be required to carry out the proposed 600,000 installations annually from 2028 (approximately 22 installations per engineer per annum). While qualified gas engineers can be retrained to work on heat pumps in a matter of weeks, new heat pump engineers will likely require to complete a three-four year college course or apprenticeship. Nesta has proposed offering existing gas engineers a financial inducement to retrain.^{22 23}
- 4.5.38. The UK Government has created various schemes to support the heat pump industry, including the Heat Pump Investment Accelerator Competition (which is providing capital grants towards heat pump manufacturing); the Heat Pump Ready Programme (which is supporting the development of new heat pump technologies); grants for training to install heat pumps; and a new Low Carbon Heating Technician apprenticeship.
- 4.5.39. In March 2023, the UK Government consulted on a proposed Clean Heat Market Mechanism (CHMM) to support the development of the heat pump market. The aim of the CHMM is to provide the heating appliance industry with sufficient confidence to make investments in scaling up, in turn expanding heat pump manufacturing in the UK; reducing the installation and operating costs of heat pumps; and growing the number of skilled heat pump installers. The proposed CHMM would require manufacturers of heating appliances to sell a minimum number of low-carbon heat pumps in the UK market each year relative to gas, oil, or LPG-fired boilers, with the ratio beginning at 4% in 2024/25 and rising steadily thereafter. This would operate via a system of tradeable credits, giving manufacturers flexibility as to how to meet their obligations. Manufacturers would be fined £5,000 for every fossil fuel-fired boiler sold over their quota. The UK Government has suggested that the CHMM could support the installation of 60,000 heat pumps in 2024/25, rising to 90,000 in 2025/26; 150,000 in 2026/27, 250,000 in 2027/28; and 400,000 in 2028/29.²⁴
- 4.5.40. While hitherto much of the focus on heat pumps has been around building-level heating solutions, there is also growing interest in large-scale heat pumps that can serve heat networks. The German manufacturer MAN ES has produced a 48-megawatt heat pump, thousands of times more powerful than a model that would be used to heat a home. Most existing heat pump-based heat networks utilise several pumps, for example Stockholm's heat

network has a capacity of 215-megawatt based upon two 40-megawatt heat pumps and five 27-megawatt heat pumps.²⁵

- 4.5.41. While heat pumps are a zero direct emissions heating solution, they can emit hydrofluorocarbons, which have a global warming potential over 1,000 greater than CO₂. Research by Eunomia Research & Consulting and the Centre for Air Conditioning and Refrigeration Research of London Southbank University suggests that the annual leakage rate for domestic heat pumps averages 3.5%, recommending seeking to reduce leakage in the short-term while incentivising increase usage of low global warming potential refrigerants in the longer-term.²⁶

Hydrogen

- 4.5.42. Hydrogen is the most common element in existence, and can potentially be used to generate electricity, fuel cars, and heat buildings. It is a potential alternative to natural gas, currently the primary heat source for Scotland, that does not release CO₂ when burned. It has the potential to be produced domestically, helping insulate consumers from price fluctuations associated with imported fossil fuels such as natural gas. However, increasing hydrogen usage would require significant investment in production and distribution infrastructure; upgrading boilers and other gas-fired appliances; and testing of how infrastructure and appliances perform using hydrogen.^{xi} Hydrogen is a highly volatile and flammable element and extensive safety measures as well as specially-adapted infrastructure (e.g. pipes and boilers) are therefore required to prevent leakage and explosions. The cost of producing hydrogen (particularly green hydrogen) is also currently relatively high, albeit expected to fall with time and scale.
- 4.5.43. Hydrogen can be produced via several different methods which impact the carbon emissions of the resource. There are other types of hydrogen production methods, but there are three types that are the most common in Scotland:
- “Grey hydrogen” (or “black hydrogen”) is produced through using steam to decompose methane into hydrogen and carbon dioxide (or by burning coal to isolate hydrogen) and therefore produces carbon dioxide emissions (circa 10 kilograms of CO₂ for every 1 kilogram of grey hydrogen), meaning while it is a zero direct emissions heat source (i.e. combusting the hydrogen does not produce carbon emissions), producing it creates carbon emissions. Grey hydrogen does not use carbon capture to retain the carbon produced during the process and hence is the most polluting process. However, it is currently the most available and cost-effective production method and hence is the most common, representing over 99% of global production.
 - “Blue hydrogen” is produced via the same means as grey hydrogen, but the CO₂ byproduct is partially sequestered through carbon capture and storage (CCS) technology, thus reducing the carbon emissions released into the atmosphere by 90% to 95%. However, there is uncertainty about the scope for large-scale CCS. Blue hydrogen also currently accounts for less than 1% of global hydrogen production.
 - “Green hydrogen”, or renewable hydrogen, separates water into hydrogen and oxygen using electrolysis powered by renewable energy. It therefore produces no

^{xi} For example, there are concerns around combustion knock associated with hydrogen.

carbon emissions. This option is the lowest carbon approach, but production is expensive. Green hydrogen currently accounts for less than 0.05% of global hydrogen production.

- 4.5.44. While hydrogen itself is a zero-carbon energy source, the combustion of hydrogen can emit nitrogen oxide, a greenhouse gas. Should hydrogen leak into the atmosphere, it can interact with greenhouse gases and exacerbate their global warming potential. 9 kilogrammes of water are required to produce 1 kilogram of green hydrogen, with implications for water conservation.²⁷
- 4.5.45. At present, the Gas Safety (Management) Regulations 1996 limit the concentration of hydrogen that can be transmitted via existing public gas networks in the UK to 0.1%. The UK Government has mooted raising this limit, with a landmark decision on the future role of hydrogen in space heating in the UK expected to be taken in 2026.
- 4.5.46. Testing has been carried out on a private network at Keele University supplying a mix of up to 20% hydrogen to live buildings, while concept “hydrogen homes” with 100% hydrogen-fuelled appliances have been developed at Northern Gas Networks’ innovation site in Gateshead. A pilot project supplying 100% green hydrogen to homes, “H100”, is currently under development in Levenmouth, Fife with the network scheduled to begin operation in 2024. It has been suggested that a 20% mix could be added to the UK’s gas grid from 2028, with a shift to 100% hydrogen by the mid-2040s.²⁸
- 4.5.47. The UK’s gas grid companies have carried out investments to make the grid ready for transmission of 20% hydrogen blends. SGN has indicated that, subject to positive regulatory decisions, large-scale migration of buildings to hydrogen could begin in 2030, with a transition period of around 20 years.²⁹ The Energy Networks Association has stated that moving to a 20% hydrogen blend across the gas grid would save approximately six million tonnes of CO₂ per annum.³⁰ From the perspective of gas grid operators, hydrogen represents an opportunity to continue to drive value from existing gas transmission infrastructure, which could become obsolescent in a scenario where heat demand was met via other means such as electric heating and heat networks.
- 4.5.48. Since 1996, all gas appliances installed in the UK have been required to be designed to operate with a hydrogen mix of up to 23%. Using higher levels of hydrogen would require installing upgraded appliances. In December 2022, the Department for Business, Energy and Industrial Strategy (BEIS) began consulting on potentially requiring all boilers to be installed in the UK from 2026 to be “hydrogen-ready”.
- 4.5.49. In May 2023, the UK Government stated that its Energy Bill (formerly known as the Energy Security Bill) would include provisions for a hydrogen levy to fund a mechanism to subsidise hydrogen transport and storage – thus bridging the production cost gap between natural gas and green hydrogen – with the levy to be in place by 2025.³¹ The cost of the hydrogen levy was forecast by the thinktank “Onward” to be £118 per year for an average dual fuel household.³²
- 4.5.50. In June 2023, Secretary of State for the Department for Energy Security and Net Zero Grant Shapps MP suggested that hydrogen is unlikely to be used to heat homes and that it is better suited to energy storage, heavy industry, and transport, noting reservations around the quantity of pipework requiring to be replaced and the challenge of producing the requisite volume of green hydrogen. Mr Shapps also stated that the Government no longer intended

to introduce a hydrogen levy on household energy bills, suggesting that the costs of subsidising hydrogen would need to be met “further up the chain”.³³

- 4.5.51. In June 2023, the Carbon Trust published a briefing setting out its view on the role of hydrogen in the UK’s energy system. While seeing a significant role for hydrogen in decarbonisation more broadly, the Carbon Trust opined: “The overwhelming majority of evidence indicates that hydrogen boilers would be less efficient and more expensive to run than electrified heat, such as heat pumps. Retrofitting hydrogen heating infrastructure is highly complex and cost-intensive, even in the UK where there is an existing gas network for residential heating. While there may be a limited number of applications for hydrogen-based heating as part of a regional cluster approach (e.g. where the primary hydrogen use is for industry), hydrogen should not be pursued as the primary route to decarbonisation of home heating.”³⁴
- 4.5.52. In 2023, the International Energy Agency suggested that hydrogen would have a “negligible” role in heating. A House of Lords stated that hydrogen is “not a serious option for home heating in the short to medium-term and its use is expected to be limited in the long-term”. A 2023 study by ETH Zürich suggested that a green hydrogen heating system in the European Union would be approximately “two to three times more expensive” than one relying on heat pumps, as well as having a greater adverse environmental impact.³⁵
- 4.5.53. The Scottish Government’s Hydrogen Action Plan suggests that hydrogen “can be used to decarbonise many parts of our economy, including industry, transport, power and heat [...] transported through the gas grid it could help decarbonise commercial premises and make a contribution to decarbonising home energy use”. However, it also states “we do not consider that hydrogen will play a central role in the overall decarbonisation of domestic heat and therefore cannot afford to delay action to decarbonise homes this decade through other available technologies.”³⁶
- 4.5.54. The scope for hydrogen to place a significant role in the decarbonisation of Edinburgh’s buildings is therefore unclear at this time, with significant unknowns around cost, regulation, and other matters. The prevailing view appears to be that, while hydrogen may have some applications, it is unlikely to be a “silver bullet” that supersedes other solutions.

Solar water heating

- 4.5.55. Solar water heating is the use of solar power to raise the temperature of water, which is then stored in a hot water cylinder. Solar collectors filled with a mix of water and glycol (typically installed on the building’s roof) convert light into heat and then transfer this heat to the water in the cylinder. Solar water heating typically meets only a modest share (circa 10%) of a home’s overall heat demand; the proportion of hot water demand met by solar water heating ranges from 25% to 90% depending on the time of year. It therefore generally requires to be supplemented by other heating systems. Solar water heating requires space to install the solar collectors and the hot water cylinder.

Biomass

- 4.5.56. Biomass here refers to the combustion of wooden pellets, chips, or logs (or some other plant matter) to generate heat. This is one of the longest-established renewable energy sources, with the approach being sustainable where the vegetation used as a fuel source is replanted at a sufficient rate to ensure a continuous supply and ensure carbon storage in trees is not reduced. Biomass systems work in a broadly similar fashion to conventional gas boilers.

- 4.5.57. Biomass can be a viable option for some residential and commercial properties, particularly those that are not connected to the gas or electrical grid,^{xii} or for older buildings which cannot utilise other energy efficiency improvements. A key consideration when installing a biomass system is securing and storing the fuel source.
- 4.5.58. While biomass is deemed a low carbon heating solution, it does result in some direct emissions, albeit these can be mitigated via design, operation, and maintenance choices. It is therefore not a zero direct emissions heating solution.
- 4.5.59. The Scottish Government has stated that biomass (or other forms of bioenergy such as bio-heating oil or bio-propane) may have a role in heating buildings in off-gas grid areas where this displaces fossil fuels (such as liquefied petroleum gas) and where zero direct emissions alternatives are unsuitable. The Scottish Government has established a Bioenergy Working Group which will publish a Bioenergy Action Plan setting out the most appropriate and sustainable approach to the use of bioenergy in Scotland.

Micro combined heat and power

- 4.5.60. Micro combined heat and power (micro-CHP) is the simultaneous generation (“cogeneration”) of heat and electricity on a micro-scale (less than 50 kilowatts). A domestic micro-CHP system is typically of a similar size to a domestic boiler. Traditionally micro-CHP systems have been fuelled by natural gas or liquefied petroleum gas, but some systems run off biogas or biodiesel. A step beyond micro-CHP is micro combined cooling, heat, and power (CCHP), or “trigeneration”. This entails the simultaneous generation of heat and electricity with some of the heat produced used to produce coolth using an absorption chiller.
- 4.5.61. Micro-CHP is considered a low carbon alternative to gas boilers as it is more efficient, as heat produced as a by-product of the generation of electricity is captured. Additionally, generating electricity for use on site avoids transmission losses. The low carbon nature of micro-CHP can be maximised by the use of biofuels rather than fossil fuels. Micro-CHP is, however, not a zero direct emissions heating solution, and the relative environmental benefits of generating electricity on-site will diminish as the UK’s electricity grid is increasingly decarbonised.
- 4.5.62. Micro-CHP may represent a good solution for properties where zero direct emissions solutions are not feasible. However, as they still generate direct emissions, they will not be suitable for widespread use if buildings are to be fully decarbonised. Future advances may deliver zero direct emissions micro-CHP systems, for example running off green hydrogen.

Electricity pricing

- 4.5.63. As noted above, the high cost of electricity in the UK is a barrier to the electrification of heat via solutions such as direct electric heating and heat pumps. This is a product of the UK’s pricing regime which ties the cost of electricity to that of gas. Analysis by the Energy & Climate Intelligence Unit suggests that gas prices accounted for 95% of the increase in UK electricity prices seen in 2022.³⁷
- 4.5.64. Based on analysis of 33 European countries as of July 2023 by the Household Energy Price Index, the UK had the second highest electricity unit prices, behind only Ireland. Of the 29 countries for which both electricity and gas prices were available, the UK had the fourth highest ratio of electricity prices to gas prices, behind only Belgium, Latvia, and Estonia.³⁸

^{xii} According to the 2019 Scottish House Condition Survey, 17% of dwellings in Scotland are estimated to be outwith the coverage of the gas grid.

Table 03: Electricity and gas end-user unit prices in European countries, c€/kWh (July 2023)

Country	Electricity unit price	Gas unit price	Ratio
Austria	32.3	13.7	2.4
Belgium	33.2	7.5	4.4
Bulgaria	13.2	7.4	1.8
Croatia	14.4	4.6	3.1
Cyprus	35.2	N/A	N/A
Czechia	40.0	12.4	3.2
Denmark	35.6	13.5	2.6
Estonia	25.8	6.4	4.1
Finland	20.3	N/A	N/A
France	27.0	10.0	2.7
Germany	38.6	11.3	3.4
Greece	25.5	7.1	3.6
Hungary	9.9	2.7	3.6
Ireland	47.1	16.2	2.9
Italy	37.7	14.7	2.6
Latvia	38.7	9.3	4.2
Lithuania	25.2	10.8	2.3
Luxembourg	21.4	9.7	2.2
Malta	12.3	N/A	N/A
Montenegro	10.5	N/A	N/A
Netherlands	31.9	16.8	1.9
Norway	12.9	N/A	N/A
Poland	23.3	7.3	3.2
Portugal	22.5	14.7	1.5
Romania	16.2	6.2	2.6
Serbia	9.8	4.2	2.3
Slovakia	19.7	6.1	3.2
Slovenia	19.4	12.1	1.6
Spain	21.2	10.2	2.1
Sweden	23.6	28.9	0.8
Switzerland	28.0	18.8	1.5
Ukraine	4.2	2.0	2.1
United Kingdom	44.0	11.3	3.9
Average	24.9	10.6	2.4

[Source: Household Energy Price Index](#)

- 4.5.65. As noted in [section 6.2](#), the UK Government has set out proposals for a “rebalancing” of gas and electricity prices. This has the potential to incentivise greater adoption of electricity-based heating solutions, and equally to disincentivise the use of gas.

Resources for private building owners

- 4.5.66. There are a range of existing initiatives that can support private building owners with improving energy efficiency and decarbonising heat. The key initiatives are summarised below.
- 4.5.67. **Area-Based Schemes** are an initiative delivered by local authorities which delivers energy efficiency improvements (primarily improved insulation) to private homes in areas of high fuel poverty.
- 4.5.68. The “Home Energy Scotland” service managed by the Energy Saving Trust provides households with advice and support on saving energy. Home Energy Scotland administers the **Home Energy Scotland Grant and Loan** scheme, which offers homeowners grants and interest-free loans for energy efficiency upgrades and renewable technology installations, including grants of up to £7,500 towards heat pumps. Home Energy Scotland also administers the **Private Rented Sector Landlord Loan**, which offers loans to registered private landlords for energy efficiency measures and renewable energy installations; loans to landlords with portfolios of five or fewer properties are not charged interest, while loans to landlords with six or more properties are charged interest at a rate of 3.5%.
- 4.5.69. The **Warmer Homes Scotland** scheme administered by Warmworks provides grants to homeowners and private tenants to improve the energy efficiency of homes via measures such as the installation of insulation and central heating systems. The typical value of interventions is around £5,000. Support is restricted to people living in a home with poor energy efficiency who are either aged 75 or older with no working heating system or aged 16 or older and in receipt of certain benefits.
- 4.5.70. The **ECO4 scheme** and **Great British Insulation Scheme**^{xiii} are administered by large UK energy suppliers. The schemes provide homeowners and tenants with “fabric first” upgrades, with a focus on lower cost interventions such as improved insulation. ECO4 is targeted at homeowners and tenants in receipt of certain benefits living in homes with an Energy Performance Certificate rating of ‘D’ or lower. The Great British Insulation Scheme is targeted at a wider base with 80% of funding ring-fenced for households in homes in Council Tax bands A to E with an Energy Performance Certificate rating of ‘D’ or lower, while 20% of funding is ring-fenced for households on means-tested benefits or in fuel poverty.
- 4.5.71. The **Energy Redress Scheme** administered by the Energy Saving Trust provides charities, community interest companies, co-operative societies, and community benefit societies with grants to assist households at risk from cold homes and high energy bills. This includes the Carbon Emissions Reduction Fund, which can be utilised for projects that will reduce carbon emissions from energy use.
- 4.5.72. The “Business Energy Scotland” service managed by the Energy Saving Trust provides small and medium-sized enterprises with advice and support on saving energy. Business Energy Scotland operates the **SME Loan and Cashback Scheme** which offers loans of up to £100,000 (and cashback grants of up to £30,000) to finance investments in energy efficiency

^{xiii} Formerly known as the ECO+ scheme.

improvements such as insulation, LED lighting, double/secondary glazing, and the installation of renewable technologies such as solar panels and wind turbines.

- 4.5.73. The “Local Energy Scotland” consortium provides support and advice for community energy projects. It currently operates the **Let’s Do Net Zero Community Buildings Fund** (which provides grants worth up to 80% of eligible costs – capped at £80,000 – for community organisations to invest in renewable technologies and energy efficiency measures), the **Let’s Do Net Zero Off Electricity Grid Communities Fund** (which provides development and capital funding for off-grid communities to develop resilient, net zero-ready local independent electricity grids), and the **Community Heat Development Programme** (which provides support to groups of householders and community organisations to help them develop proposals for local low and zero carbon heat projects).
- 4.5.74. The Scottish Government’s **Heat Network Fund** provides grants for large-scale heat network and communal heating system projects in Scotland that deliver emissions reductions and demonstrate a positive social and economic benefit. The Fund will provide enabling support of up to 10% of CAPEX (capped at £100,000), commercialisation support of up to 10% of CAPEX (capped at £1 million), and capital grants of up to 50% of CAPEX. Grants must be drawn down by March 2026.
- 4.5.75. The **Smart Export Guarantee** is a UK Government scheme that requires larger UK electricity suppliers to pay small-scale generators of low/zero carbon electricity for excess electricity exported to the National Grid. Tariffs must be above zero, with different suppliers offering different tariffs. The scheme applies to solar photovoltaic, wind, hydro, and anaerobic digestion installations of up to 5 megawatts and micro-combined heat and power installations of up to 50 kilowatts. The Smart Export Guarantee can help defray the costs of installing renewable energy technologies. However, the typical tariffs from exporting electricity under the Smart Export Guarantee are relatively modest, with the best rate offered by energy suppliers in January 2023 being 15 pence per kilowatt hour (compared to a UK price cap of 33.2 pence per kilowatt hour).
- 4.5.76. Various UK mortgage lenders have introduced schemes wherein customers can access financial inducements to install a heat pump, for example interest-free loans and cashback.
- 4.5.77. In addition to the above, there are a wide variety of public and third sector resources offering advice on matters such as energy conservation and reducing energy bills. These include the Council’s Advice Shop, Citizens Advice, and Changeworks, which is contracted by the Council to provide advice to households.
- 4.5.78. The majority of funding schemes relating to energy efficiency and renewable energy installations will, as it currently stands, expire in 2025 or 2026 upon the expiration of the current terms of the UK Parliament and Scottish Parliament. As a result, there is little certainty as to the longer-term prospects for funding of projects of this nature.

Resources for public sector building owners

- 4.5.79. There are a range of existing initiatives that can support public sector building owners with improving energy efficiency and decarbonising heat. The key initiatives are summarised below.
- 4.5.80. The Scottish Government’s **Social Housing Net Zero Heat Fund** offers local authorities (along with registered social landlords and energy services companies) grant funding equivalent to 45%-50% of eligible costs for social housing retrofit projects delivering zero direct emissions

heating systems (such as heat pumps and heat networks) and energy efficiency improvements.

- 4.5.81. The Scottish Government's **Scotland's Public Sector Heat Decarbonisation Fund** provides grants to Scottish local authorities, universities, and arm's-length external organisations to decarbonise their estates. The Fund will meet up to 80% of eligible costs.
- 4.5.82. The Scottish Government's **Scottish Central Government Energy Efficiency Grant Fund** offers Scottish central government organisations with no access to borrowing powers (including health boards and further education colleges) capital grants of up to £2 million per annum towards heat decarbonisation and energy efficiency retrofit projects.
- 4.5.83. The **Scottish Public Sector Energy Efficiency Loan Scheme** administered by Salix Finance offers local authorities and certain other Scottish public bodies interest free loans for "spend to save" energy efficiency retrofit projects to help achieve net zero carbon.
- 4.5.84. As noted, the Scottish Government's **Heat Network Fund** provides grants for large-scale heat network and communal heating system projects in Scotland. Additionally, the **District Heating Loan Fund** administered by the Energy Saving Trust offers local authorities (along with registered social landlords, small and medium sized enterprises, and energy services companies) unsecured loans of £1 million plus for heat network projects, with a typical interest rate of 3.5% for low-risk projects.
- 4.5.85. The Scottish Government's **Non-Domestic Energy Efficiency Framework** has been established to help Scottish public bodies carry out energy efficiency retrofit projects with a value of £1 million plus to non-domestic buildings, with payment for works linked to the realisation of outcomes such as energy bill savings or carbon emission savings. Organisations utilising the Framework can access up to £50,000 of grant-funded project management, technical advisory, and procurement advisory services.

5. Methodology

5.1. Edinburgh LHEES approach

5.1.1. The Council has prepared the Edinburgh LHEES and the Delivery Plan in line with the guidance issued by the Scottish Government and the methodology issued by Zero Waste Scotland, with departures as required due to data availability or other considerations as set out below.

5.1.2. In line with the guidance and methodology, the preparation of the Edinburgh LHEES and Delivery Plan has followed eight stages. The activity carried out in each stage is summarised below:

- Stage 1: Policy and strategy review – this stage entails identifying the national and local policies, targets, and strategies relating to the Edinburgh LHEES, as well as identifying resources and stakeholders germane to the delivery of the Edinburgh LHEES.
- Stage 2: Data and tools library – this stage entails identifying and maintaining a record of the data and tools required for the analysis underpinning the Edinburgh LHEES.
- Stage 3: Strategic zoning and pathways – this stage entails assessing the present performance of Edinburgh’s building stock in terms of energy efficiency and heat decarbonisation and setting out “Strategic Zones”^{xiv} and “pathways”^{xv} for each of the six LHEES Considerations.
- Stage 4: Generation of initial Delivery Areas – this stage entails setting out proposed “Delivery Areas” for each of the LHEES Considerations.^{xvi}
- Stage 5: Building-level pathway assessment – this stage entails identifying detailed interventions to decarbonise buildings within Delivery Areas and quantifying the costs and benefits of these interventions.
- Stage 6: Finalisation of delivery areas – this stage entails finalising the Delivery Areas identified at stage 4 based upon considerations such as existing programmes of work and priority areas for intervention.
- Stage 7: LHEES – this stage entails assembling the outputs from the earlier stages into the Edinburgh LHEES itself – i.e. this document, its appendices, and supporting materials.
- Stage 8: Delivery Plan – this stage entails preparing a Delivery Plan setting out how the Edinburgh LHEES is to be implemented, with a focus on early, low-regrets actions over the first five years of the Edinburgh LHEES (2024 to 2028).

^{xiv} A “Strategic Zone” is a geographical area that “present[s] a visualisation of the potential pathways to decarbonise the building stock at a local authority level” created “to understand the baseline performance, the scale of potential and initial areas of focus”.

^{xv} A “pathway” here refers to the approach taken to decarbonise a property, i.e. the potential energy efficiency retrofit technologies and low carbon heating system.

^{xvi} A “Delivery Area” is a geographical area that is more granular than a Strategic Zone that “set[s] out clusters of buildings within a Strategic Zone or across the whole local authority that identify potential solution(s) at a delivery level”.

- 5.1.3. In 2021, the Council appointed the consultancy Atkins to support with stages one and two (policy and strategy review and data and tools library) of the Edinburgh LHEES. The analysis carried out by Atkins underpins the Edinburgh LHEES, in particular [Chapter 6](#). The following recommendations were made by Atkins:
- “Where various policies/funding mechanisms overlap with the different LHEES objectives, coordination of resources will be required to effectively align with and achieve these objectives.”
 - “Update action plans for Renewable Energy and Heat Networks to set out specific investment targets, and timelines.”
 - “Develop a dedicated hydrogen strategy with timelines that align with industry (e.g. SGN’s plans for use of hydrogen and what impact this may have of carbon emissions). This can play more of an active role in [the Council’s] net zero objectives post-2030 and at least provide estimates for how the gas grid may be decarbonised between now and 2030.”
- 5.1.4. In 2023, the Council appointed Turner and Townsend, Ramboll, and Changeworks to support with stages three to eight of the Edinburgh LHEES. The analysis carried out by these suppliers underpins [Chapter 8](#) and [Chapter 9](#) of the Edinburgh LHEES.
- 5.1.5. The Council has appointed an Energy Officer to coordinate the publishing, implementation, and delivery of the Edinburgh LHEES and Delivery Plan. In particular it is anticipated that the Energy Officer will place a central role in the roll-out of heat networks across Edinburgh.
- 5.1.6. The Council’s approach to producing the Edinburgh LHEES has been shaped by the short timescale in which the strategy was required to be produced to comply with the Local Heat and Energy Efficiency Strategies (Scotland) Order 2022. In particular the statutory timescale has meant that consultation on the Edinburgh LHEES has required to be abbreviated.
- 5.1.7. In line with the LHEES Methodology, the Council has utilised the Home Analytics dataset maintained by the Energy Saving Trust as the principal source for data on Edinburgh’s housing stock. Consideration was given as to whether this dataset could be supplemented using data held by the Council on its own housing stock. Following discussions with relevant Council officers, it was determined that the datasets held by the Council are not suitable for analysis of this nature. However, data held by Changeworks as part of its role in delivering Area-Based Schemes in Edinburgh has been utilised to augment the Home Analytics dataset.
- 5.1.8. Manual review of the outputs of the Domestic Baseline Tool and Non-Domestic Baseline Tool has identified high levels of inaccuracy in some fields. For example, the quality of data on property age from the Non-Domestic Baseline Tool is very poor. Where there are significant concerns around data quality this information has been omitted from the Edinburgh LHEES.
- 5.1.9. The Council has made use of the following data portals:
- The SP Energy Networks LHEES Portal, which enable the impact of installing low carbon technologies on the electricity network to be simulated, identifying network constraints and required reinforcement works (and consequent costs). This has been used to inform the selection of Delivery Areas for heat pumps.
 - The Scottish Water Waste Water Heat Extraction Opportunities, which sets out flow data for sewage pipes of over 300 millimetres in diameter and with potential sewage flow rates of 40 litres per second or more (estimated using hydraulic flow modelling)

to enable analysis of where wastewater infrastructure may be suitable as a source of low carbon heat. This tool has been utilised as part of analysis around potential heat sources for heat networks. [Figure 05](#) sets out a high-level overview of wastewater heat extraction heat opportunities in Edinburgh.

- 5.1.10. The Council has collaborated with the following existing research projects to augment the Edinburgh LHEES:
- The Edinburgh Climate Change Institute has carried out research on behalf of the Infrastructure Investment Programme Board that aims to create a consolidated GIS-based plan of all infrastructure in Edinburgh germane to achieving net zero, drawing together data from a vast range of sources. This plan has been overlaid with other relevant datasets, including linear heat density clusters.
 - Energy Systems Catapult has produced a “Local Energy Asset Representation” (LEAR) for southeast Scotland (defined as Edinburgh, Fife, and the Lothians). The LEAR is a visual representation of local energy assets (e.g. energy generation and storage assets) along with other data sets such as fuel poverty.

Heat network Consideration – methodology

- 5.1.11. Analysis to inform the identification of prospective Heat Network Zones was carried out by Ramboll. The analysis was based on metrics such as linear heat density, anchor load threshold criteria, and gridded heat density, supplemented by local knowledge.
- 5.1.12. The first step of the analysis was to identify and collect all the datasets required for the analysis (following the LHEES Methodology – Stage 4 – Heat Networks Approach V04). The main dataset that was used for the analysis was the 2020 Scotland Heat Map dataset. This dataset was cleaned and prepared for input into GIS. Additional datasets were also used to identify opportunities and constraints; these datasets are set out in [Table 50](#).
- 5.1.13. The second step of the analysis was to identify potential zones based on linear heat density (LHD). LHD is used as an indicator of the likeliness of financial viability of a heat network. However, it is not the only criterion. LHD is calculated by dividing the total annual heat demand by the total length of the network. Where there is no heat network in place, LHD benchmarks are used to identify a buffer zone around areas of heat demand. In Edinburgh, LHDs of 4,000 kilowatt hours per metre per year and 8,000 kilowatt hours per metre per year were used to create two sets of buffer zones. The size of buffer zones were later limited to 250 metres to screen buildings with particularly high heat demand. [Figure 07](#) summarises the methodology that was followed to identify the potential zones in the City of Edinburgh, while [Figure 08](#) and [Figure 09](#) depict the area covered by the buffer zones for the two scenarios.
- 5.1.14. The third step of the analysis was to prioritise the potential zones identified in the second step by applying criteria focused on anchor loads to indicate likely viability for heat networks. An anchor load is a building with a high heat demand that, if connected to a heat network, can enable its financial viability. Due to the high number of buildings with high heat demands in Edinburgh, the default value of 500 megawatt hours per annum (suggested by the methodology) was used to map anchor loads. Following the mapping of all the anchor loads, all the potential zones with fewer than two anchor loads were removed based on the Council’s long-term vision for the development of large-scale heat networks in the city, with the identification of strategic Heat Network Zones that were not driven purely by the

presence of anchor loads. [Figure 10](#) summarises the methodology used to create two sets of prioritised potential zones: one representing long-term potential and the other representing the opportunities likely to be more commercially attractive in the short-/medium-term.

- 5.1.15. The fourth step of the analysis was to review the sets identified in the third step at a stakeholder engagement workshop. Based upon feedback from the workshop, Ramboll selected one set of prioritised potential zones comprising urban and suburban areas (criteria of LHD of 4,000 kilowatt hours per metre per year, anchor loads of 500 megawatt hours per year, and two or more anchor loads) ([Figure 11](#)) and dense urban areas (criteria of 8,000 kilowatt hours per metre per year, anchor loads of 500 megawatt hours per year, and two or more anchor loads) ([Figure 12](#)). The categorisation of an area as dense urban, urban, or suburban was based on the area's heat density and number of anchor loads. [Figure 13](#) depicts the single set that was taken forward for further analysis.
- 5.1.16. The fifth step of the analysis was to overlay the selected prioritised zones with development sites identified in City Plan 2030 and existing plans for heat networks (as depicted in [Figure 14](#)). New developments are considered high potential areas for the development of heat networks, and accordingly they were included in the initial Heat Network Zones if there was a prioritised zone in near proximity. Similarly, areas with planned heat networks can also serve as starting networks for the development of larger district networks and therefore they were included in the initial Heat Network Zones if there was a prioritised zone in near proximity.
- 5.1.17. The sixth step was to use additional data to refine the initial Heat Network Zone boundaries. These datasets (presented in [Table 50](#)) include heat density (used to refine zone boundaries in order to include areas with high heat density in near proximity with a selected prioritised zone missed by the methodology); available heat sources (used to refine the zone boundaries to include available heat sources in near proximity to a selected prioritised zone) and practical constraints such as rivers, major roads, and rail lines (used to split large zones when a significant constraint(s) was present). Overall, this information was used either to combine zones, expand the boundaries of a zone to account for opportunities in near proximity, or split zones where the development of a single heat network was deemed technically difficult, e.g. where pipes would need to cross a railway line. [Figure 15](#) presents the outcome of this analysis.
- 5.1.18. The seventh and final step was to divide initial Heat Network Zones with the aim of creating zones with common characteristics to facilitate the discussion around the development of heat networks in these areas. These form the prospective Heat Network Zones. The division was based on knowledge of the local area and building typologies. An overview map of the prospective Heat Network Zones is presented in [Figure 24](#), while further information on the prospective Heat Network Zones is set out in [section 9.4](#).

Other LHEES Considerations – stage 3 methodology

- 5.1.19. The Council's stage 3 followed the standardised methodology provided by Zero Waste Scotland on behalf of the Scottish Government. From the eight-stage process set out in the LHEES Methodology, the first six stages encompass data analysis and evidence gathering in order to complete the latter stages of producing a Strategy document and a Delivery Plan for the implementation of the Edinburgh LHEES. The purpose of Stage 3 of the LHEES Methodology is to support local authorities to understand the current energy efficiency and

heat decarbonisation performance of the building stock at a local authority wide level. It also supports further analysis to set out Strategic Zones and pathways for each LHEES Consideration, as far as reasonably possible. The Strategic Zones identify potential solutions for inclusion in the LHEES (Stage 7) when accompanied by the outputs of the Heat Network Zone analysis (from Stage 4).

- 5.1.20. The main outputs from Stage 3 were the “Domestic Baseline Tool” and “Non-Domestic Baseline Tool”, which use Home Analytics as the core source data to enable analysis of each sector. These tools set out the baseline performance of Edinburgh’s buildings using archetypes, ages of buildings, tenures, heating system types, floor area. The data can be aggregated and analysed to set out Strategic Zones. These tools were the main outputs which were then used to input data to generate various heat maps. The outcomes of the baseline analysis are set out in [Chapter 8](#).
- 5.1.21. The heat maps visualise opportunities focusing on the LHEES Considerations including heat pump readiness and energy efficiency. The maps therefore inform the Strategic Zones for Edinburgh and, thus, pathways to decarbonisation.

Other LHEES Considerations – stage 4 methodology

- 5.1.22. The objective of stage 4 is to generate initial Delivery Areas at a higher granularity than stage 3 across Edinburgh. This analysis serves as the starting point for more detailed engagement, building level assessment of interventions and cross-checking against the Policy and Strategy Review to enable finalisation of the Delivery Areas.
- 5.1.23. The standard procedure suggested by the LHEES Methodology was used to develop delivery areas. This consists of GIS techniques to generate potential areas.
- 5.1.24. The databases used to generate the maps are Home Analytics, Non-Domestic Analytics, and the Address Gazetteer data, depending on the type of property (domestic, non-domestic, mixed use). This consisted of using the postcode-level domestic database (Home Analytics) property counts to generate heat maps. The maps are generated by using the property counts to create a continuous 100 metre by 100 metre grid defining areas of high density of different properties.
- 5.1.25. Zones of high concentration were defined by using a 2x standard deviation method. This means that when a value falls outside 2x the standard deviation of a cluster, the boundary is defined at the limit of that grid cell. These delivery areas also show property level point data categorized by the above criteria. For category 1-3 properties it also provides sub-categories based on heat pump, biomass, direct electric heating, and mixed biomass-direct electric heating.
- 5.1.26. The outcome of this assessment is a list of delivery areas mapped and with a summary table listing the properties within. These delivery areas are classified based on the following criteria:
- Off-gas grid (shows the initial delivery areas with the highest number of properties in off-gas category 0 / off-gas category 1 / off-gas category 2 / off-gas category 3).
 - On-gas grid (Shows the initial delivery areas with the highest number of properties in on-gas category 0 / on-gas category 1 / on-gas category 2 / on-gas category 3).
 - Mixed tenure, mixed-use and historic buildings (shows the areas with the highest concentration of domestic mixed-use / domestic mixed tenure / non-domestic mixed

use / mixed use (domestic and non-domestic) / listed properties (domestic and non-domestic. These delivery areas also show the concentration of properties within a conservation area).

- Poor energy efficiency and energy efficiency as a driver for fuel poverty (the generated Delivery Areas with the highest concentration of properties scored highest to be suitable for interventions including heat pumps, double glazing, loft insulation, and wall insulation).

5.1.27. This data is used as a basis for stage 5 and to inform the Delivery Plan.

Other LHEES Considerations – stage 5 methodology

5.1.28. The goal of stage 5 is to establish in more detail the type of interventions required to decarbonise the buildings identified in stage 4 from a heating and energy efficiency perspective. Stage 5 helps to gain an improved understanding of the costs and the energy and carbon savings associated with interventions.

5.1.29. The Council followed the standard procedure suggested by the LHEES Methodology. This involved the use of the Portfolio Energy Analysis Tool (PEAT) alongside processed Home Analytics information; together, they provide a wide range of information around energy efficiency and heat decarbonisation measures applicable at the individual building (address) level, which can be aggregated into information at an area-wide or delivery area level (for example, total financial cost, total CO₂ reduction resulting from measures, running cost savings, etc). Outputs for Stage 5 are created by matching addresses identified from Delivery Areas, integrating these with the PEAT, and then summarising the results with a delivery code. This allows for re-prioritisation of delivery areas depending on specific priorities, e.g. most properties within a Delivery Area, Delivery Areas with the highest total CO₂ reduction, etc.

5.1.30. Outputs from the above are presented through a Power BI dashboard, integrating Stage 4 GIS map results with Stage 5 inputs. The dashboard is interactive, allowing the user to select and view different priorities.

5.1.31. The outputs from Stage 5 represent an examination of core data indicators across the Strategic Zones structured around building characteristics, such as energy efficiency or heating type. They have been used to prepare the Delivery Area maps set out in the Delivery Plan.

5.2. LHEES Considerations

5.2.1. The guidance issued by the Scottish Government stipulates that the Edinburgh LHEES should be framed around the “LHEES Considerations”.^{xvii} These form the basis for understanding, interpreting, and developing the pathways to decarbonisation. They cover the overarching priorities at the national level which should apply to each local authority, though in different ways and to different degrees. One of the main ways to view the Edinburgh LHEES is as a tool to fulfil each of these Considerations. The LHEES Considerations are set out in Table 04.

^{xvii} Referred to as “LHEES Priorities” in earlier versions of the LHEES Methodology.

Table 04: LHEES Considerations

Theme	Consideration	Description
Heat decarbonisation	Off-gas grid buildings	Transitioning from heating oil and LPG in off-gas areas
Heat decarbonisation	On-gas grid buildings	On-gas grid heat decarbonisation
Heat decarbonisation	Heat networks	Decarbonisation with heat networks
Energy efficiency and other outcomes	Poor building energy efficiency	Poor building energy efficiency
Energy efficiency and other outcomes	Poor building energy efficiency as a driver for fuel poverty	Poor building energy efficiency as a driver for fuel poverty
Energy efficiency and other outcomes	Mixed-tenure, mixed-use and historic buildings	Mixed-tenure, mixed-use buildings, listed buildings, and buildings in conservation areas

5.2.2. The scope of the Edinburgh LHEES with regards to each consideration is as follows:

- Off-gas grid buildings: identifying “low regrets” pathways and opportunities for converting properties not connected to the gas grid that currently use high emissions alternatives to gas (for example, oil, liquefied petroleum gas, and solid fuels) for heating to zero direct emissions alternatives.^{xviii} This entails categorising properties based upon their suitability for heat pump retrofit, ranging from properties that already have a low or zero direct emissions heating system to properties that have tertiary potential due to needing significant fabric upgrade to be heat pump ready or otherwise being less suited to heat pump technology.
- On-gas grid heat decarbonisation: identifying pathways and opportunities for converting properties currently heated using natural gas to zero direct emissions alternatives. Similarly to the prior Consideration, this entails categorising properties based upon their suitability for heat pump retrofit.
- Heat networks: identifying zones within Edinburgh where heat networks are judged to present a potential option for decarbonisation based on factors such as heat demand density, the presence of anchor loads, and specific opportunities or constraints. This analysis will form the basis of the formal designation of Heat Network Zones in Edinburgh in line with the Heat Networks (Scotland) Act 2021.
- Poor building energy efficiency: identifying areas of Edinburgh with poor building energy efficiency and identifying pathways and opportunities for addressing this.
- Poor building energy efficiency as a driver of fuel poverty: identifying areas of Edinburgh where poor building energy efficiency is a driver of fuel poverty to ensure that area-based energy efficiency and heat decarbonisation projects are effective in reducing fuel poverty, and to identify areas of extreme fuel poverty where further support may be required.

^{xviii} For the avoidance of doubt, homes currently heated via electrical means with no direct emissions are not in the scope of this Consideration.

- Mixed-tenure, mixed-use and historic buildings: identifying areas of Edinburgh where there are buildings of mixed-tenure, buildings of mixed-use, historic buildings, and conservation areas to identify the appropriate interventions in each case.

5.2.3. To focus limited resources, the Council has opted to prioritise on aspects of these Considerations for the Edinburgh LHEES, as set out in Table 05:

Table 05: Prioritisation of LHEES Considerations

Consideration	Prioritisation
Off-gas grid buildings / on-gas grid buildings	Category 1 properties (properties suitable for a zero-emission heating system, e.g. a heat pump). This will help build momentum with less complicated retrofits.
Heat networks	Heat networks present a major opportunity for Edinburgh to decarbonise at scale and provide homes and businesses with access to affordable energy. Edinburgh is well placed to reap the benefits of a city-wide heat network (or “network of networks”).
Poor energy efficiency / poor energy efficiency as a driver of fuel poverty	Edinburgh has a significant number of buildings with poor energy efficiency. However, these have to be targeted to arrive at a more manageable volume for the short-mid-term. These should be homes where poor energy efficiency is a driver for fuel poverty since these homes are in most urgent need of support.
Mixed-tenure, mixed-use and historic buildings	There is a large volume of these building types in Edinburgh. The Council has an existing programme of supporting retrofit of mixed-tenure and mixed-use buildings focused on areas with high fuel poverty. This is currently limited in scale due to the complexities of dealing with these properties. This work will be used as the basis for future expansion as resources permit.

5.3. Areas of strategic importance

5.3.1. The Council has identified multiple regions of strategic importance, all of which have been incorporated into various aspects of the Edinburgh LHEES:

- City Plan 2030 development areas
- Areas with ongoing or planned infrastructure development
- Areas of economic importance
- Business and industrial areas
- Areas of future planned retrofit scheme delivery
- Areas with planned retrofits by the Council on its own stock

5.3.2. Each of these areas are relevant in their own way to one or multiple aspects of the Edinburgh LHEES, including delivery area selection and development, and prospective Heat Network Zones. They have fed into the analysis and are key influencers in the development of delivery areas. Moving forward, these areas and the Edinburgh LHEES will continue to feed into each other to maximise synergies between Council policies and projects as well as encourage efficient use of public resources.

5.4. Consultation and engagement

- 5.4.1. As an area-wide plan which concerns everyone in Edinburgh, it is imperative that the Edinburgh LHEES has cross-stakeholder buy-in. While the Edinburgh LHEES is a data-driven and evidence-based strategy, it is also subject to interpretation and prioritisation which feed into the decisions taken. The Council has taken steps, including a public consultation, to ensure people can provide their input and feedback on proposals. This section describes the stakeholder consultation and engagement work undertaken to date.
- 5.4.2. The approach to engagement and consultation has been developed based on the LHEES Guidance, which emphasises continuous stakeholder engagement, albeit while reflecting the significant practical constraints of the statutory timescale for preparation of the Edinburgh LHEES which have obliged the duration and extent of consultation to be curtailed.
- 5.4.3. In November 2022, the Council formed an internal working group for the Edinburgh LHEES and for heat networks. The working group brings together staff from the Council's Edinburgh Waterfront; Housing and Regeneration; Neighbourhood Environmental; Planning; Policy and Insight; Shared Repairs; Strategic Asset Planning; and Sustainable Construction Delivery service areas. The working group has been used to raise awareness of the Edinburgh LHEES within the Council, share information on projects between key staff, and as a sounding board for emerging proposals.
- 5.4.4. From January 2023 to November 2023, the Council attended a series of "Clean Heat Forum" events organised by Transition Edinburgh, a community-led network that "connects and supports community groups, and initiates practical projects that strive for a greener, fairer, healthier and more resilient Edinburgh". The event was used to raise awareness of the Edinburgh LHEES and share information on the emerging proposals around heat networks.
- 5.4.5. In April 2023, the Council delivery team met with Scottish Government officers to discuss the emerging Edinburgh LHEES. During the meeting, the Council identified certain challenges associated with the development and delivery of the Edinburgh LHEES, including timescales; the lack of certainty as to the availability of funding following 2026/27; the rapidly evolving policy and regulatory context; the potential requirement for a Strategic Environmental Assessment; and uncertainty around the regulatory provisions for heat networks.
- 5.4.6. In May 2023, the Council hosted an event to provide tenement owners with information on maintenance, management, shared repairs, retrofit, and energy efficiency within tenements in Edinburgh. Speakers at the event included Home Energy Scotland and the charity Under One Roof (which provides advice on tenement maintenance and management). The event was utilised to raise awareness of the Edinburgh LHEES and share information on the support available to tenement owners.
- 5.4.7. In June 2023, the Council presented on the Edinburgh LHEES to the Edinburgh Association of Community Councils.
- 5.4.8. As part of stage 1 (policy and strategy review), key stakeholders germane for the Edinburgh LHEES were mapped. The ultimate outputs of this exercise are set out in [section 11.4](#). These stakeholders were targeted as part of the wider public consultation exercise.
- 5.4.9. For stage 2 (data and tools library), the Council identified and engaged with stakeholders responsible for datasets required support the preparation of the Edinburgh LHEES. This primarily included Scottish Government (Scotland Heat Map); Energy Saving Trust (Home

Analytics, Non-Domestic Analytics and PEAT data); Scottish Power Energy Networks (Grid capacity data), the Edinburgh Climate Change Institute and Net Zero Edinburgh (consolidated GIS data of Edinburgh's infrastructure and environment required to achieving net zero), and others. This stage also entailed executing information sharing agreements with the Council's consultant team and updating licence agreements with the Energy Saving Trust accordingly.

- 5.4.10. For stage 3 and 4 the Council invited numerous stakeholders to review the maps and other outputs as part of a series of virtual sounding boards, workshops, one-on-one meetings, and public events. Stakeholders helped to sense check emerging outputs and highlight any data that had been omitted, and to identify any indicators or areas that are considered to be strategically important for Edinburgh. This included workshops on emergent Heat Network Zones where stakeholders advised on the scale of the ambition and fed back on boundaries of these zones.

5.5. Strategic Environmental Assessment

- 5.5.1. The Environmental Assessment (Scotland) Act 2005 sets a statutory requirement for Scottish public bodies to carry out a Strategic Environmental Assessment (SEA) of the expected environmental impacts of strategies expected to have a significant environmental impact.
- 5.5.2. The Council prepared a Screening Report for the Edinburgh LHEES and Edinburgh LHEEDP, which was submitted to the SEA Gateway on 10th May 2023. The Council's view was that an SEA was not required in this case as the Edinburgh LHEES and Edinburgh LHEEDP were not expected to have a significant environmental impact. This view was based on the following:
- The Edinburgh LHEES will not introduce any new powers, initiate any legislation, or allocate any significant resources. It is primarily an information document that identifies opportunities.
 - The Edinburgh LHEES does not itself set headline targets, as these are set nationally. The Edinburgh LHEES will rather identify the optimal pathways for achieving said national targets – for example, it will identify which buildings in Edinburgh are better suited to connecting to heat networks and which are better suited to being served by heat pumps, based on technical data.
 - The Council's 2030 Climate Strategy has been subject to a full SEA.³⁹ The Climate Strategy sets out strands of work required to make Edinburgh a net zero city, one of which is "net zero energy generation and energy efficient buildings". This strand of work includes "improving the energy efficiency of Edinburgh's existing homes", "developing heat networks", and "develop[ing] a mechanism for unlocking and enabling domestic and small business energy retrofit at pace and scale". These items cover the key areas of focus of the Edinburgh LHEES. This strand is therefore considered to cover the same ground as the Edinburgh LHEES, meaning an SEA of the Edinburgh LHEES would largely duplicate the recent SEA for the 2030 Climate Strategy.
 - The national Heat in Buildings Strategy – which sets out the goal of achieving net zero emissions in Scotland's buildings which the Edinburgh LHEES is to deliver – has also been subject to a full SEA.⁴⁰
- 5.5.3. In June 2023, the Council received screening responses from the Consultation Authorities (Historic Environment Scotland, NatureScot, and the Scottish Environment Protection

Agency). Each of the authorities concluded that the Edinburgh LHEES is unlikely to have significant environmental effects. Accordingly, on 21st June 2023, the Council wrote to the SEA Gateway to advise that, as the Responsible Authority under the Environmental Assessment (Scotland) Act 2005, the Council had determined that SEA was not required.

- 5.5.4. It is anticipated that an SEA may be required for the statutory Heat Network Zone designation process, expected to take place in the first half of 2024.

6. Policy and strategy context

6.1. Summary of key targets and regulations

Targets

6.1.1. Key headline targets relative to the Edinburgh LHEES are summarised below:

- Decarbonise the heating of all buildings in Scotland by 2045.
 - Decarbonise the heating of one million homes across Scotland by 2030.
 - Decarbonise the heating of 50,000 non-domestic buildings across Scotland by 2030.
 - All publicly owned buildings to meet zero direct emissions heating requirements by 2038.
 - All new homes developed by local authorities or Registered Social Landlords to be zero emissions by 2026.
 - The vast majority of Scottish off-gas homes switching to zero direct emissions heat.
 - One million Scottish on-gas homes switching to zero direct emissions heat.
- Supply 6.0 terawatt hours of heat energy from heat networks in Scotland by 2030.^{xix}
 - Supply 2.6 terawatt hours of heat energy from heat networks in Scotland by 2027.
- No more than 5% of households in Scotland in fuel poverty by 2040 (and no more than 1% in extreme fuel poverty).
 - No more than 15% of households in Scotland in fuel poverty by 2030 (and no more than 5% in extreme fuel poverty).
 - No more than 10% of households in Scotland in fuel poverty by 2035 (and no more than 3% in extreme fuel poverty).
- Net zero greenhouse gas emissions by 2045.
 - A 75% reduction in Scottish greenhouse gas emissions by 2030.
 - A 90% reduction in Scottish greenhouse gas emissions by 2040.

Regulations

6.1.2. Key existing and proposed regulations relative to the Edinburgh LHEES are set out below. It is noted that this is a high-level summary and, in most cases, certain exemptions or relaxations are in place.

- All homes in Scotland to achieve a minimum Energy Performance Certificate rating of 'C' by 2033.^{xx}
 - All private rented homes marketed to new tenants to have a minimum Energy Performance Certificate rating of 'C' as of 2025.

^{xix} For context, the current figure is 1.18-terawatt hours.

^{xx} "Where technically and legally feasible and cost-effective."

- All private rented homes actively rented to have a minimum Energy Performance Certificate rating of 'C' as of 2028.
- All social housing in Scotland to achieve a minimum Energy Performance Certificate rating of 'B' by 2032.
- No social housing in Scotland with an Energy Performance Certificate rating below 'D' to be re-let from December 2025.
- All homes in Scotland with households in fuel poverty to achieve a minimum Energy Performance Certificate rating of 'B' by 2040.
- All homes in Scotland with households in fuel poverty to achieve a minimum Energy Performance Certificate rating of 'C' by 2030.
- All homes in Scotland to use zero direct emissions heating systems by 2045.
 - Prohibiting the use of direct emissions heating systems in new buildings in Scotland from 1 April 2024.
 - Proposals to require the installation of zero (or very near zero) direct emissions heating systems in existing buildings from 2025, with a backstop of 2045.
- All non-domestic buildings in Scotland to be net zero by 2045.
 - All publicly owned buildings to use zero direct emissions heating systems by 2038.

6.2. National policy landscape

6.2.1. The policy landscape for carbon reduction and energy efficiency in Scotland is complex with multiple relevant policies and rapidly evolving targets. National policies give rise to a series of ambitious goals around energy efficiency improvements and reductions in fuel poverty.

Climate change

- 6.2.2. The Scottish Government has set headline targets for the reduction of greenhouse gas emissions. The **Climate Change (Emissions Reduction Targets) (Scotland) Act 2019** sets statutory targets around reducing Scotland's emissions of all greenhouse gases to net zero. These includes a headline target of net zero by 2045, with intermediate target reductions of 56% by 2020, 75% by 2030, and 90% by 2040.
- 6.2.3. The **Climate Change Plan (2018, 2020)** sets out targets for emissions reductions by 2032 in view of energy requirements for electricity generation, buildings, and industry. The Plan sets an overall target of reducing emissions by 28% by 2032. For buildings, a target of a 33% reduction in emissions between 2018 and 2032 is set. By 2032, emissions from domestic buildings are targeted to decrease by 23%, and emissions from non-domestic buildings are targeted to reduce by 53%.
- 6.2.4. Within the "electricity" section of the Climate Change Plan, targets are set linked to renewable energy production and decarbonisation. From 2020 onwards, Scotland's electricity grid intensity is targeted to be below 50 grammes of CO₂ per kilowatt hour, with at least 1 gigawatt of renewable energy in community or local ownership. Going forward, a target is set of Scotland's electricity demand being "largely" generated from renewable sources (including onshore wind, offshore wind, hydro, solar, marine and bioenergy) by 2032. This is linked to the rising demand in electricity for home usage, as homes switch from gas to

electricity. As set out by SP Energy Networks, there are two primary factors driving increased electricity consumption: people switching to electric to heat their homes, and people generally using more electricity, for example for electric vehicle charging. SP Energy Networks has identified a requirement to increase peak demand capacity fourfold by 2050.

- 6.2.5. Within the buildings section of the Climate Change Plan, Scotland’s statutory fuel poverty targets require that by 2040 no more than 5% of households are in fuel poverty; that no more than 1% of households are in extreme fuel poverty; and the fuel poverty gap is reduced to £250 (adjusted for 2015 prices). This is in line with the **Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019**. The Plan notes that the current rate of conversions to low and zero direct emissions systems – for example, heat pumps, heat networks, and (potentially) hydrogen – need to be substantially increased to meet targets.
- 6.2.6. The latest iteration of the **Climate Change Plan**, as revised in 2020, integrates the targets set in the **Climate Change Act 2008** as amended in 2019. The revised Plan notes the continued need to invest in renewable generation, heat networks, and related infrastructure to ensure greenhouse gas emissions. The Plan also notes increased homeworking and how this changes the profile of heating and electricity demand (including increased risk of fuel poverty and energy debt due to increased domestic energy use at home) and the potential to support jobs in low/zero heat and energy efficiency-related sectors.
- 6.2.7. The most recent **Programme for Government (2022)** sets out several actions linked to supporting heat and energy policy. Several targets are linked to reducing the effects of fuel poverty through financial support towards heating costs. This includes the £214 Child Winter Heating Assistance (which supports families of severely disabled children and young people with their energy costs); the Winter Heating Payment (which guarantees a £50 annual payment to around 400,000 low-income households); doubling the Fuel Insecurity Fund to £20 million to help households at risk of self-disconnection or self-rationing of energy use in response to OFGEM energy price cap rises; and expanding Home Energy Scotland advice centres. These actions do not directly relate to the Edinburgh LHEES but will support a reduction in the immediate impact of fuel poverty. More directly linked to the Edinburgh LHEES, the Programme expands the criteria for the Warmer Homes Scotland fuel poverty programme (through lowering the youngest required age to 60 years old) and introduces a Scotland-wide public information campaign to highlight help and support available to households as well as energy efficiency measures for households to minimise heating costs.

Energy efficiency and zero direct emissions heating

- 6.2.8. The **Heat in Buildings Strategy (2021)** sets out how buildings in Scotland will be heated to meet greenhouse gas reduction targets whilst addressing fuel poverty. The Strategy updates the Energy Efficient Scotland route map and commits to putting in place standards and regulation for heat and energy efficiency to ensure that all buildings are energy efficient by 2035 and use zero direct emissions heating and cooling systems by 2045. The Strategy sets out 107 actions and proposals that the Scottish Government will take to work towards target and aspirations. By 2030, over one million homes and over 50,000 non-domestic buildings are targeted to have converted to using zero or low emissions heating systems. The Strategy further sets a target of all public sector buildings in Scotland using zero direct emissions heating by 2038.

- 6.2.9. The **Heat in Buildings Bill** is a bill announced by the Scottish Government that will “set out our initial proposals for the role that regulations can play in driving better energy efficiency standards and zero direct emissions heating in Scotland’s existing buildings from 2025”.⁴¹ The Bill is expected to introduce more stringent energy efficiency standards. Consultation on the Bill is expected to begin by the end of 2023.
- 6.2.10. The Scottish Government had originally proposed that all private rented homes in Scotland would be required to achieve a minimum EPC rating of ‘D’ by 2025. This has been revisited in light of recognition of the disruption caused by the COVID-19 pandemic, it is now proposed that, as of 2025, any home marketed for private rent must have a minimum EPC rating of ‘C’, while all actively privately rented homes must have a minimum EPC rating of ‘C’ by 2028 (albeit with exemptions where a ‘C’ rating is not cost effective or technically feasible).
- 6.2.11. The **Energy Efficiency Standard for Social Housing post 2020** (EESH2) sets out a raised standard for the energy efficiency of social housing in Scotland in order to reduce carbon emissions and eradicate poor energy efficiency as a driver for fuel poverty. EESH2 sets out a milestone of all social rented homes in Scotland achieving at least EPC ‘B’, or otherwise being as energy efficient as practically possible, by the end of December 2032 (“within the limits of cost, technology and necessary consent”). EESH2 further sets out that no social housing below EPC ‘D’ should be re-let from December 2025 (subject to temporary specified exemptions).⁴² A new milestone to replace the 2032 target is currently being developed.
- 6.2.12. There are not currently minimum EPC standards for non-domestic properties in Scotland.^{xxi} However, the Scottish Government has stated that it will introduce regulations in 2025 requiring all non-domestic buildings to meet zero direct emissions heating requirements by 2045 (and all publicly owned buildings to meet zero direct emissions heating requirements by 2038).⁴³ In August 2023, the commercial property consultancy Knight Frank carried out analysis on Scotland’s office stock in which it concluded that properties with an EPC rating of ‘F’ and ‘G’ accounted for 13% of total floor area, which would in principle be unlettable if the same standards were in place in Scotland as in England and Wales. Properties with an EPC rating below ‘C’ accounted for 55% of floor area, while properties with an EPC rating below ‘B’ accounted for 79% of the floor area; this implies that, were the same standards in place in Scotland as in England and Wales, 55% of office floor space in Scotland would be unlettable as of 2027 and 79% as of 2030, underscoring the quantity of work likely to be required.⁴⁴
- 6.2.13. **Energy Efficient Scotland** (2018) is a 20-year route map aimed at making Scotland’s buildings net zero carbon by 2050, in a way that is socially and economically feasible. Two main objectives are set out in the route map: remove poor energy efficiency as a driver for fuel poverty, and reduce greenhouse gas emissions through more energy efficient buildings and the decarbonisation of heat supply. The road map aims to have all Scottish homes achieve at least an EPC ‘C’ rating by 2040 (where technically and financially feasible), with a target set for fuel poor households of all homes in this category reaching at least an EPC ‘C’ rating by 2030. For homes, the aim is to achieve a 15% heat demand reduction and 35% heat from low carbon sources by 2032. For non-domestic properties, the aim is to achieve 20% heat demand reduction and meet 70% of heat demand from low carbon sources by 2032.

^{xxi} The “Minimum Energy Efficiency Standards” in place in England and Wales make it an offence for a landlord to lease out a non-domestic property with an EPC rating of ‘F’ or ‘G’ unless an exemption is in place. It is expected that the minimum EPC rating will be raised to ‘C’ in 2027 and ‘B’ in 2030.

- 6.2.14. The UK Government’s **Clean Growth Strategy** (2017) sets a goal of getting as many homes as possible to at least an EPC rating of ‘C’ by 2035 (2030 for rental homes and fuel poor homes). These are the same target ratings, as set out in the Energy Efficient Scotland roadmap, but with different timescales. The Clean Growth Strategy also sets out a pathway for expanding heat networks, setting out a scenario of heat networks supplying up to 17% of heat demand in residential properties and 24% of heat demand in (non-industrial) non-residential properties by 2050 (compared to approximately 1% of all buildings in the UK presently).
- 6.2.15. The UK Government has stated that it intends to ban the sale of gas boilers from 2035, albeit with an exemption for “households who will most struggle to make the switch to heat pumps or other low-carbon alternatives” – expected to cover around 20% of homes in the UK. The UK Government has further stated that it intends to ban the installation of oil and LPG boilers and coal heating in off-gas grid homes from 2035.⁴⁵
- 6.2.16. The Scottish Government’s **Hydrogen Action Plan** (2022) suggests that hydrogen “can be used to decarbonise many parts of our economy, including industry, transport, power and heat [...] Transported through the gas grid it could help decarbonise commercial premises and make a contribution to decarbonising home energy use.” Actions set out in the Plan include “maintain dialogue with SGN and National Grid to understand the role hydrogen can play in meeting our heat decarbonisation targets.”⁴⁶
- 6.2.17. The Scottish Government has announced the establishment of a **National Public Energy Agency, Heat and Energy Efficiency Scotland**, to “provide the leadership and coordination needed to accelerate delivering the decarbonisation of heat across Scotland”. The Agency is planned to be operational on a standalone basis by September 2025. The Agency will accelerate transformational change in the heating of buildings; aid public understanding and awareness; and coordinate delivery of investment. A pledge to establish a new public energy company has been put on hold.⁴⁷
- 6.2.18. The Scottish Government has convened a **Green Heat Finance Taskforce** with the remit of developing “a portfolio of innovative financial solutions for building owners in Scotland to ensure that by 2045, our homes and buildings no longer contribute to climate change, as part of the wider just transition to net zero”.⁴⁸ It is understood that the Taskforce will publish its finding in two sequential reports: the first “setting out the heating finance landscape in Scotland and barriers to the growth of private financing” and making “recommendations to support scaling of individual products like green mortgages”, and the second focusing on “communal, or area based mechanisms, including heat as a service models” and “options for social housing”.

Fuel poverty

- 6.2.19. The **Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019** establishes a revised definition of fuel poverty as well as setting statutory targets to be achieved by 2040: no more than 5% of households in Scotland in fuel poverty and no more than 1% of households in Scotland in extreme fuel poverty. Intermediary targets are also set for 2030 and 2035. The new definition of fuel poverty in Scotland is as follows: a household is in fuel poverty if the household’s fuel costs (necessary to meet the requisite temperature and amount of hours as well as other reasonable fuel needs) are more than 10% of the household’s adjusted net income and after deducting these fuel costs, benefits received for a care need or disability, childcare costs, the household’s remaining income is not enough to maintain an acceptable

standard of living. This also include a definition of acceptable levels of heating, and the number of hours which this covers for an average household.

Heat networks

- 6.2.20. Heat networks in the UK have historically been largely unregulated. The **Heat Network (Metering and Billing) Regulations 2014** place obligations on heat suppliers to notify the Office for Product Safety and Standards about any new heat networks on or before the day the heat network becomes operational, to install metering devices (where cost effective), and bill off-takers based on actual consumption. The UK Government is currently preparing UK-wide **Heat Networks Technical Assurance Standards**.
- 6.2.21. Heat networks have been identified as a key technology for meeting emission reduction targets as set in out in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. The **Heat Networks (Scotland) Act 2021** aims to encourage greater use of heat networks in Scotland through the introduction of a regulatory system. The Act, and the subsequent **Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023**, put in place regulations on heat networks, including introducing a consent and license regime; making provision for Heat Network Zones and a permit system giving operators exclusivity; and giving licence holders powers such as wayleaves. The Act aims to encourage consumer confidence through an improved regulatory system and ensure greater certainty for investors. The practical steps for implementing the regulatory regime and supporting the development of heat networks are outlined in the Scottish Government's **Heat Networks Delivery Plan (2022)**.
- 6.2.22. The key elements of the regulatory regime introduced by the Heat Networks (Scotland) Act are as follows:
- Operators of heat networks must secure a license to ensure they are “solvent, fit and proper” and that heat networks are developed and maintained to high standards. Licence holders will be granted new rights such as wayleaves, compulsory purchase powers, and road work and surveying rights. OFGEM is proposed to serve as the licensing authority for Scotland, with consumer protection powers around matters such as fair pricing; quality and reliability of service; transparency of information; and additional protections for vulnerable customers. Licences will be awarded to companies rather than on a site-by-site basis.
 - Developers/operators of heat networks must secure consent before building or operating a heat network. A consent is a site-specific permission to develop and operate a heat network. The Scottish Government's Energy Consents Unit will be the consent authority by default; local authorities may request to be the consent authority (or may be designated as such by the Scottish Government).
 - Developers/operators of a heat network must hold a permit to build or operate a heat network in a given Heat Network Zones. Permits bestow exclusive rights upon developers/operators. The Scottish Government will be the permit authority, and will award permits on a competitive basis. Consideration is required as how permits will interface with existing heat networks and with existing concession agreements.
 - Asset schedules and transfer schemes will be put in place to provide for the transfer of operational rights for heat networks to a different operator to avoid supply interruptions if an operator ceases to operate a heat network.

- Certain areas will be designated as Heat Network Zones: areas particularly suitable for heat networks. These zones will form the basis of the heat network permits regime.
- 6.2.23. The Act sets a statutory target of heat networks supplying 2.6 terawatt hours of thermal energy by 2027 and 6.0 terawatt hours by 2030 (compared to approximately 1.18 terawatt hours per annum currently). This is equivalent to 3% and 8% of current total demand. This is equivalent to approximately 120,000 additional homes by 2027 and 400,000 additional homes by 2030; on a pro rata basis, this would translate to around 11,500 additional homes in Edinburgh by 2027 and 38,400 additional homes in Edinburgh by 2030 (albeit the Act does not specify the source of the demand so in practice some of this demand will relate to non-domestic properties).
- 6.2.24. The Act requires the owners of public sector non-domestic buildings with an annual heat demand of at least 73 megawatt-hours per year to produce “building assessment reports” (BARs) – summary reports on the heating systems and demand of buildings. It is anticipated that the duty to complete BARs will eventually be extended to private sector building owners. BARs must be completed on a five-yearly basis. Completed BARs are to be submitted to local authorities and to the Scottish Government to inform the development of heat networks and the designation of Heat Network Zones by enabling potential anchor loads to be identified.^{xxii}
- 6.2.25. The Scottish Government has established the **Heat Network Support Unit (HNSU)** with the remit of helping overcome challenges associated with the deployment of heat networks in Scotland, including providing support/expertise and grant funding.
- 6.2.26. As noted in [section 6.4](#), City Plan 2030 introduces a requirement for all new developments to connect to a heat network where possible. At present, there is no requirement in law for existing properties to connect to a heat network.
- 6.2.27. The UK Government’s **Energy Bill** (formerly known as the **Energy Security Bill**), introduced to Parliament in June 2022, introduces a UK-wide regulatory regime for heat networks. With respect to Scotland, the Bill enables the UK Government to designate the Gas and Electricity Markets Authority (GEMA) as the licensing authority for heat networks in Scotland as set out in the Heat Networks (Scotland) Act 2021. The Bill further empowers the UK Government to amend the Heat Networks (Scotland) Act 2021 to make provision for monitoring compliance with, and enforcing conditions of, heat network licences in Scotland.

New builds

- 6.2.28. The Scottish Government has stated that “with very few exceptions” new homes built in accordance with the **Building (Scotland) Amendment Regulations 2015** will achieve an EPC rating of at least ‘C’, with around 95% of homes expected to achieve ‘B’ or better.⁴⁹
- 6.2.29. The **Building (Scotland) Amendment Regulations 2022** were put in place in December 2022 to drive further improvements to building performance. These regulations require developers to reduce energy emissions for new buildings. The amended regulations are aligned to the proposal to prohibit direct emissions heating systems from April 2024.

^{xxii} Local authorities are therefore required both to prepare BARs for their own estate and also to collate the data from all BARs produced within their area.

- 6.2.30. Following these increased regulations on energy efficiency in new homes, the **New Build Heat Standard** (scheduled to be in effect by April 2024) will prohibit the use of direct emissions systems for the heating (or cooling) of any new buildings for which a building warrant is required, both domestic and non-domestic. Past this date, only zero direct emissions systems (for example, heat pumps, heat networks, and direct electrical heating) will be allowed in new buildings. This represents a significant pivot away from the longstanding use of gas boilers as the heat system of choice in Scotland.
- 6.2.31. The **Domestic Building Environmental Standards (Scotland) Bill** introduces new minimum environmental design standards for all new-build housing to meet the Passivhaus standard (or a Scottish equivalent) in order to improve energy efficiency and thermal performance. The bill was lodged in 2022, with plans to make subordinate legislation within two years to give effect to the proposal. Passivhaus standards consider a whole building approach focusing on energy efficiency and ensuring buildings maintain an almost constant temperature through solutions such as triple glazing and additional insulation. In December 2022, the Scottish Government stated that it intended to make secondary legislation within two years to enact minimum design standards for all newly built housing requiring it to achieve the equivalent of Passivhaus standard.
- 6.2.32. The **Net Zero Public Sector Buildings Standard** (2021) is a voluntary building standard which supports public bodies to meet net zero standard for their new build and refurbishment infrastructure projects. This standard has guidance for six stages of the project lifecycle to support quality assurance.
- 6.2.33. The **Performance of Non-domestic Buildings (Scotland) Regulations 2016** requires that non-domestic buildings with a floor area of more than 1,000 square metres produce an Energy Action Plan at the point of sale or rental. The Energy Action Plan must set out how building owners will improve energy efficiency and reduce the building's greenhouse gas emissions.

Energy planning

- 6.2.34. A fundamental challenge to the decarbonisation of heating is the cost of electricity relative to gas. In the UK, unit prices for electricity have traditionally stood at around three times those of gas. As noted in [section 4.5](#), this has made the economics of switching from gas boilers to electricity-based heat solutions (including heat pumps and direct electric heating) highly challenging. The **Independent Review of Net Zero** (2022) called for a “rebalancing” of gas and electricity prices. The Independent Review states, “the past approach of levying policy costs and taxes onto electricity bills keeps the price of electricity artificially high and can stifle the signal for the use of low-carbon technologies, from electrifying industrial fuel use to vehicles and heat pumps” and “keeping the relative price of electricity vs. gas consistently competitive on a long-term basis will be the single biggest determinant of ensuring that the transition brings a significant amount of savings to the average household”.⁵⁰ This recommendation was accepted by the UK Government, which in its 2023 policy paper **Powering Up Britain: Energy Security Plan** committed to setting out proposals in 2023/24 for the rebalancing of electricity and gas costs to reduce electricity costs and “generate the clear short-term price signal necessary to shift both households and businesses to lower-carbon, more energy efficient technologies like heat pumps”.⁵¹
- 6.2.35. The **Scottish Energy Strategy** (2017) sets a 2050 vision for energy in Scotland: to provide a “flourishing, competitive local and national energy sector, delivering secure, affordable, clean

energy for Scotland’s households, communities and businesses”. The Strategy sets out three central principles: take a whole-system view, have an inclusive energy transition, and a smarter local energy model. Two main targets are set by this Strategy: for the equivalent of 50% of the energy for Scotland’s heat, transport, and electricity consumption to be supplied from renewable sources by 2030, and for the productivity of energy use across the Scottish economy to be increased by 30% in by 2030.

- 6.2.36. In January 2023, the Scottish Government published the first draft of the national **Energy Strategy and Just Transition Plan**. The Energy Strategy sets out plans for transitioning Scotland to a climate friendly energy system. It sets targets including increasing renewable electricity generation capacity by 20 gigawatts by 2030 and for hydrogen to meet 15% of Scotland's energy needs by 2030. Key actions (some existing and others new) identified in the Energy Strategy with strong relevance to the Edinburgh LHEES include:
- Boosting the Home Energy Scotland advice service and widening the eligibility criteria of the Warmer Homes Scotland fuel poverty programme.
 - Providing a tailored package of support to remote and rural off grid communities through the Community and Renewable Energy Scheme, helping them to upgrade their energy systems.
 - Through Climate Action Hubs and Climate Action Towns, providing a vehicle for communities to work to identify local solutions and build a pipeline of investible projects and opportunities at a regional level.
 - Investing over £1.8 billion in decarbonising homes and buildings through Heat and Energy Efficiency Scotland over the course of the 2021-2026 Parliament.
 - Establishing a new regulatory regime for heat networks in Scotland and appropriate financial mechanisms.
- 6.2.37. The **Hydrogen Policy Statement** (2020) sets out a vision for Scotland to become a leading producer of reliable, competitive, and sustainable hydrogen. The Statement includes support for the development of a low-cost hydrogen capability to meet an initial ambition of producing five gigawatts of renewable and low-carbon hydrogen by 2030. The Statement identifies a potential role for hydrogen in decarbonising heat.
- 6.2.38. The **British Energy Security Strategy** (2022) sets out a package of measures intended to deliver “secure, clean and affordable British energy for the long term”. The Strategy sets out a 10-point plan; points of relevance to the Edinburgh LHEES are driving the growth of low carbon hydrogen; greener buildings; and green finance and innovation. Measures set out in the Strategy include zero-rating VAT on the installation of energy saving materials for five years; promoting the manufacture of heat pumps in the UK; promoting “green mortgages”;^{xxiii} and seeking to generate 10 gigawatts of low carbon hydrogen by 2030.
- 6.2.39. The UK Government’s **Energy Bill** (formerly known as the **Energy Security Bill**) was introduced to Parliament in June 2022. The Bill sets out multiple measures relating to the generation of energy (with a reduced reliance on imported fossil fuels) and the regulation of the energy market. Key measures introduced in the Bill include:

^{xxiii} Preferential mortgage terms offered on properties with greater energy efficiency.

- Enabling a large-scale hydrogen heating trial to inform strategic decisions on the role of hydrogen scheduled to be taken in 2026.
- Scaling-up heat pump manufacturing and installation.
- Introducing a regulatory regime for fusion energy.

Housing

- 6.2.40. The **Housing to 2040** strategy (2021) sets out a vision “where new homes are designed to be energy-efficient and use zero emissions heating systems and where existing homes are retrofitted to improve their energy efficiency and decarbonise their heating systems, whilst making fuel poverty a thing of the past”, along with a route map for how to achieve this vision. The strategy sets a target of delivering 100,000 new affordable homes by 2031/32 (70% of these social rent) and retrofitting existing homes so their occupants can benefit from improved energy efficiency and decarbonised heating. This is linked to the aims of the Heat in Buildings strategy. The strategy reiterates the target of emissions from heating buildings in Scotland reaching zero by 2045. The strategy notes that this will necessitate changing the heating systems in over two million homes and over 100,000 non-domestic buildings, and that this will require investment from the public sector, homeowners, private and social landlords, and others.
- 6.2.41. **Scotland's Sustainable Housing Strategy** (2013) notes Scotland's requirement for warm, high-quality, affordable, and low carbon homes. It details the delivery of the Home Energy Efficiency Programmes for Scotland (HEEPS); appropriate use of standards and regulation; and market transformation. The Strategy sets out a route map to 2027 with targets to achieve a reduction in fuel poverty, and a reduction in housing emissions.
- 6.2.42. The **Tenements (Scotland) Act 2004** regulates tenement flats in Scotland. This covers ownership, duties, and demolition. The Tenement Management Scheme, as outlined in schedule 1 of the Act, lists the “scheme property” (explaining what parts for the tenement every flat owner should maintain) and explains how owners are to come to arrangements about maintenance (“scheme decisions”) and how costs are to be shared. The Climate Change (Scotland) Act 2009 amends the Tenement Management Scheme to reclassify the installation of insulation as a maintenance measure rather than an improvement, allowing works to be approved via a majority rather than unanimously as previously.

Supply chain

- 6.2.43. The Scottish Government’s **Heat in Buildings Supply Chains Delivery Plan (2022)** sets out actions for developing the supply chain required for a transition to a “green heat” basis. Actions include allocating funding for research and development; using public procurement to maximise supply chain impacts; and developing a supplier-led incentives scheme to provide a route to market for new business models and consumer propositions. The Plan states that “the Green Heat supply chain is largely balanced at existing levels of demand” but notes a need for “skilled workers to support future deployment rates of heat pumps, heat networks, thermal insulation and direct electric heating systems”.
- 6.2.44. The **Climate Emergency Skills Action Plan 2020-2025** published by the Scottish Government and Skills Development Scotland sets out actions to meet skills demand associated with the transition to net zero, including those in energy transition and construction. In terms of construction, the Plan notes “an anticipated increased demand for professional level skills for jobs in planning, design, surveying and management” and “a requirement for the

development of specialist knowledge and skills round retrofit, zero emissions heating systems and heat networks for professional, technical and craft roles, as well as data and smart systems skills for delivering energy management in buildings services”.

6.3. Local policy landscape

6.3.1. Local policies support the realisation of national goals through solutions which are adapted for Edinburgh’s local circumstances, including developing new sustainable homes and upgrading existing homes to become more energy efficient.

6.3.2. The 2030 Climate Strategy (2021) is the overall strategy for Edinburgh to become a net zero city by 2030. The Climate Strategy identifies seven priorities for action, of which two relate directly to the Edinburgh LHEES: “accelerate energy efficiency in homes and buildings” and “enable the development of a citywide programme of heat and energy generation and distribution”.

6.3.3. The Climate Strategy sets the following key targets of relevance to the Edinburgh LHEES:

- All new Council-led housing developments 2020-2030 to be net zero.
- Develop regional renewable energy solutions, 2024-2027.
- Identify Heat Network Zones across the city.
- Develop a plan for retrofitting social housing across the city to the highest energy standards, to reduce energy demand and tackle fuel poverty.
- Establish an Energy Efficient Public Buildings Partnership.

6.3.4. The City of Edinburgh Council’s **Council Emissions Reduction Plan** (2021) sets out proposals for reducing all the Council’s emission sources, including building energy usage.

6.4. Planning policy context

6.4.1. Section 3F of the **Town and Country Planning (Scotland) Act 1997** requires all Scottish planning authorities to include policies in their local development plans requiring all developments to be designed to “avoid a specified and rising proportion of the projected greenhouse gas emissions from their use, calculated on the basis of the approved design and plans for the specific development, through the installation and operation of low and zero-carbon generating technologies”.

6.4.2. The **Edinburgh Local Development Plan** (ELDP) (2016) is the Council’s currently adopted LDP, however its successor, the emerging **City Plan 2030**, is the settled view of the Council having been consulted upon, approved by the Council, and submitted for examination; as such, it should be afforded material weight.

6.4.3. The **National Planning Framework 4** (NPF4) was adopted by Scottish Ministers in February 2023. It sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole.

Edinburgh Local Development Plan

6.4.4. Policy Des 6 – “Sustainable Buildings” of the ELDP states that planning permission will only be granted for new developments where it has been demonstrated that the carbon dioxide emissions reduction target has been met (with at least half of this reduction to be achieved through the use of low/zero carbon generating technologies such as solar panels, heat pumps, and heat network infrastructure) and that other features are incorporated that will

reduce or minimise environmental resource usage and impact (for example, green roofs and measures to promote water conservation). The Council sets out specific current requirements in an “S1 Sustainability Form” which applicants for planning permission must complete to demonstrate they have complied with the policy.

- 6.4.5. Policy RS 1 – “Sustainable Energy” of the ELDP states that planning permission will be granted for development of low and zero carbon energy schemes (for example solar panels, district heating, energy-from-waste plants, and small-scale wind turbine generators) will be granted where these do not cause significant harm to the local environment (in terms of natural heritage and area character) or to amenity). The policy further states that proposals to fit micro-generation equipment onto existing buildings will be assessed using policy RS 1 along with non-statutory planning guidance for householders, and that where the development of energy-from-waste plants or biomass is proposed, the opportunity for local reuse of heat energy is expected to be explored.

City Plan 2030

- 6.4.6. Policy Env 7 – “Sustainable Developments” of City Plan 2030 mandates that all detailed proposals involving the construction or change of use of one or more buildings must incorporate “all reasonably practicable measures to address the climate emergency”. For change of use proposals, the applicant must set out how the proposal incorporates “measures to increase resilience to future climate change and minimise greenhouse gas emissions such as built fabric efficiency improvement and low and zero carbon generating technology”.
- 6.4.7. Policy Env 8 – “New Sustainable Buildings” of City Plan 2030 mandates that new building developments for which a building warrant is required must “[achieve], predominantly through ultra-high fabric energy efficiency, a ‘net zero’ level of operational greenhouse gas emissions”, with this requirement to be controlled via planning conditions. The policy further states that “all new development requires to embed ultra-high fabric energy efficiency into its design and construction, with the optimal approach being for it to be built to Passivhaus standards” and that “the incorporation of low and zero carbon generating technologies into the new development is also supported.”
- 6.4.8. Policy Inf 16 – “Sustainable Energy and Heat Networks” of City Plan 2030 states that the development of “low and zero carbon energy schemes including small-scale wind turbine generators, solar panels, ground and air source heat pumps, water source heat and power, heat and/or power networks where energy comes from a renewable/low carbon source, and energy storage schemes that help support low and zero carbon energy schemes” will be supported where these do not harm natural heritage, area character, or amenity. The policy further states that proposals to fit micro-generation equipment onto existing buildings will be assessed using the above policy and non-statutory guidance for householders.
- 6.4.9. Policy Inf 16 further states that “all new developments should connect to an existing or planned heat network or other significant heat source wherever possible to do so”, that “where this is not possible then all substantial development must, subject to a viability and feasibility study, instead include a source of renewable/low carbon heat generation [...] and associated heat network”, and that any developments not heated through heat networks must be future proofed to allow a future connection to be made.

National Planning Framework 4

- 6.4.10. Policy 1 – “Tackling the climate and nature crises” of NPF4 encourages development that addresses climate and nature crises. It states, “when considering all development proposals significant weight will be given to the global climate and nature crises.” The policy requires local authorities’ Local Development Plans to ensure spatial strategies will reduce emissions.
- 6.4.11. Policy 2 – “Climate mitigation and adaptation” of NPF4 promotes development that minimises emissions. It includes the provisions that “development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible” and that “development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change will be supported”. The policy requires Local Development Plans to set spatial strategies to reduce, minimise, or avoid greenhouse gas emissions.
- 6.4.12. Policy 11 – “Energy” of NPF4 encourages renewable energy development onshore and offshore. The policy sets out a range of provisions, including that “development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported”. The policy further sets out that “grid capacity should not constrain renewable energy development. It is for developers to agree connections to the grid with the relevant network operator”. Local Development Plans are required to identify a range of opportunities for energy development.
- 6.4.13. Policy 12 – “Zero waste” of NPF4 encourages development consistent with the waste hierarchy. It sets out a range of provisions, including that development proposals for new or extended landfill sites will only be supported where waste heat and/or electricity generation is included, and that development proposals for energy-from-waste facilities will not be supported except under limited circumstances, including that a functional heat network can be delivered.
- 6.4.14. Policy 19 – “Heating and Cooling” of NPF4 promotes development that supports decarbonised solutions to heat and cooling demand. It sets out a range of provisions, including that “development proposals within or adjacent to a Heat Network Zone identified in a LDP will only be supported where they are designed and constructed to connect to the existing heat network”; that “where a heat network is planned but not yet in place, development proposals will only be supported where they are designed and constructed to allow for cost-effective connection at a later date”; and that “national and major developments that will generate waste or surplus heat and which are located in areas of heat demand, will be supported providing wider considerations, including residential amenity, are not adversely impacted”. Local Development Plans are required to take account of the relevant LHEES.
- 6.4.15. NPF4 promotes using empty buildings and developing on brownfield sites – particularly in the Central Belt of Scotland. Areas where land has not been used for decades, or where the land is accessible by sustainable modes, should be prioritised. There are several areas in Edinburgh which fit these requirements, such as Granton Waterfront. Within the heating and cooling policy section, the Edinburgh LHEES is referenced as the point of reference as well as Heat Network Zones. Within the quality homes section, net zero homes are noted as supporting a green economy and tackling fuel and child poverty. There are no energy-focused actions linked specifically to Edinburgh.

Permitted Development Rights

- 6.4.16. Under the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (as amended) householders in Scotland possess Permitted Development Rights that enable them to carry out certain developments without requiring planning permission. These rights include the installation of solar panels; air, ground, and water source heat pumps; free-standing wind turbines; and biomass heating systems.⁵² Certain non-domestic properties benefit from the same Permitted Development Rights.
- 6.4.17. As set out in the Heat in Buildings Strategy, the Scottish Government is considering introducing Permitted Development Rights for heat networks and extending existing Permitted Development Rights for micro-renewable technologies.

7. Ongoing activity in Edinburgh

7.1. Edinburgh context

- 7.1.1. Edinburgh is one of four local authorities in Scotland with a predominantly urban character. The city proper is relatively compact and densely populated, with tenement buildings and blocks of flats being the most common housing type.
- 7.1.2. Edinburgh has a significant degree of built heritage, with two UNESCO World Heritage Sites (one of which covers much of the city centre), 50 Conservation Areas, and around 5,000 listed buildings and structures, ranging from Georgian and Victorian tenements to medieval castles. This heritage presents challenges for decarbonisation, both in terms of practicalities (for example, the inability to deploy cavity wall insulation to solid wall buildings) and policy (for example, the inability to replace sash-and-case windows with more thermally efficient uPVC windows). The retrofitting of historic buildings is a challenge in and of itself.
- 7.1.3. Edinburgh is home to a range of large and complex buildings, including an international airport; football and rugby stadia; major hospitals; military installations; a prison; and multiple rail stations. These buildings will each present their own challenges in terms of achieving net zero.
- 7.1.4. The City of Edinburgh Council is the largest property owner in Edinburgh. Its estate includes over 20,000 social homes; 124 schools; and multiple other operational buildings including nurseries, libraries, museums, galleries, offices, depots, storage facilities, community centres, sporting facilities, a crematorium, a mortuary, greenhouses, and public toilets. The Council is also the owner of a sizeable investment estate including industrial units, shops, and offices. The Council's ownership of these properties naturally gives it far greater ability to take forward works to decarbonise these properties. However, it equally means that the costs of these works will in the first instance fall to the Council, representing a significant financial burden at a time of ongoing budgetary pressures.
- 7.1.5. Edinburgh has seen significant development in recent years. From 2013 to 2022, 21,767 new homes were completed in Edinburgh.⁵³ With each passing year, the property stock of Edinburgh is becoming gradually more modern as newly built properties make up an increasing proportion of all properties. This represents an opportunity to improve the overall performance of the city's building stock in terms of energy efficiency and heat decarbonisation by designing for these issues from the outset, which is inevitably more straightforward than making changes retroactively.

7.2. 2030 Climate Strategy

- 7.2.1. The 2030 Climate Strategy (2021) is the overall strategy for transitioning Edinburgh to a net zero carbon city. The Edinburgh LHEES sits below the Climate Strategy, being the strategy for transitioning the heating of buildings in Edinburgh to net zero.
- 7.2.2. The Climate Strategy sets out 27 actions to be progressed under the theme of "net zero energy generation and energy efficient buildings". These actions, and the current progress against each, are set out below.
 - "Set progressive planning policies to increase energy standards in new buildings" – as set out in [section 6.4](#), City Plan 2030 sets rigorous standards for new development in Edinburgh. In particular the policy requires new developments in Edinburgh to

achieve “a ‘net zero’ level of operational greenhouse gas emissions”. This means that all new developments in Edinburgh following the adoption of City Plan 2030 will require to be developed to net zero carbon standard. Further, City Plan 2030 requires all new developments in Edinburgh to connect to a heat network “wherever possible”. This policy will help drive the expansion of heat networks in Edinburgh by providing investors/operators with some assurance as to future connections.

- “Require the use of low and zero emissions technologies to heat and power the city’s buildings” – this action from the Climate Strategy is closely linked to one of the central purposes of the Edinburgh LHEES. A focus of the Edinburgh LHEES is on the decarbonisation of buildings in Edinburgh, which would necessitate the use of zero direct emissions heating systems. Low emissions heating systems still contribute to carbon emissions and therefore will not be an acceptable means of delivering the Edinburgh LHEES. City Plan 2030 mandates that all new buildings in Edinburgh achieve “a ‘net zero’ level of operational greenhouse gas emissions”, and requires them to connect to a heat network "if practical". This will be complemented by the proposed ban on gas boilers in new buildings in Scotland and other national regulations. The process for transitioning existing buildings to low and zero direct emissions heating technologies will be more complex and will require a "carrot and stick" mix of obligations (e.g. regulatory requirements) and incentives.
- “Convene a City Heat and Energy Partnership” – a City Heat & Energy Efficiency Board was established in 2022 with the remit of developing joint investment and heat masterplans for Edinburgh. The Board is co-led by the University of Edinburgh and SP Energy Networks in collaboration with the Council; businesses; community groups; the third sector, the education and culture sector; utilities; and other stakeholders.
- “Develop a city-wide heat and energy masterplan” – the Edinburgh LHEES will in effect form the first iteration of a city-wide heat and energy masterplan, with the City Heat & Energy Efficiency Board to carry out further work subsequently.
- “Develop a long-term city partner shared investment strategy to deliver the citywide heat and energy masterplan” – the shared investment strategy will follow on from the Edinburgh Heat and Energy Masterplan. It is envisaged that it will build upon investment proposals emerging from the Edinburgh LHEES. The Edinburgh Climate Change Institute is mapping the investment plans of all members of the City Heat & Energy Efficiency Board.
- “Agree appropriate delivery mechanisms for the energy investment strategy” – the shared investment strategy will follow on from the Edinburgh Heat and Energy Masterplan.
- “Establish a strategic partnership with SP Energy Networks” – the Council has established a senior working relationship with SP Energy Networks that enables both parties to raise matters for consideration. SP Energy Networks also co-chairs the City Heat & Energy Efficiency Board.
- “Align current and future grid development to the city’s projected energy needs” – the aforementioned partnership with SP Energy Networks gives the Council the

ability to seek to influence grid investments to align them with development activity in Edinburgh.

- “Develop regional renewable energy solutions which draw on the area’s wind, geothermal, hydro and solar assets” – by dint of its urban character, comparatively small area, and geology, Edinburgh has fewer intrinsic opportunities for renewable energy generation than elsewhere in Scotland. However, the city has seen deployment of small-scale schemes such as hydropower at Harlow Reservoir and Saughton Park. Edinburgh Airport and Edinburgh Zoo are among the landowners in Edinburgh with plans for solar meadows. Other potential opportunities include the extraction of heat from the Firth of Forth and from disused mine workings.
- “Learn from the H100 hydrogen pilot” – the Council is maintaining a watching brief on the H100 hydrogen pilot and on the wider developments in the hydrogen sphere. It is recognised that there are considerable differences of opinion as to the scope for hydrogen to play a meaningful role in space heating.
- “Collaborate with regional partners to decarbonise the region’s energy infrastructure” – some small-scale collaboration has been carried out to date, for example dialogue between the Council and Midlothian Council / East Lothian Council around a potential cross-boundary Heat Network Zone in southeast Edinburgh. It is envisaged that further dialogue will take place around the scope to utilise heat from disused mine workings.
- “Identify Heat Network Zones across the city” – this action is closely linked to the central purpose of the Edinburgh LHEES. Some initial analysis has been undertaken to identify areas within Edinburgh with strong potential for the development of a heat network, and several potential strategic heat networks are in various stages of development. Building upon the work to date, the Edinburgh LHEES provides robust analysis on the areas of Edinburgh with the greatest potential for Heat Network Zones. This analysis, along with additional data from building assessment reports, will form the basis of recommendations around the formal designation of Heat Network Zones in Edinburgh in line with the emerging regulatory regime stemming from the Heat Networks (Scotland) Act 2021.
- “Ensure all Council-led infrastructure investment plans seek opportunities to connect to heat networks, beginning with our learning estate programme” – City Plan 2030 requires all new buildings in Edinburgh to connect to a heat network “if practical”. In terms of existing buildings, where heat networks are present or are planned to be delivered, the scope to connect to these will be explored. This will begin with Granton Waterfront where existing Council operational properties are proposed to connect to the heat network once operational.
- “Work with communities and developers to deliver heat networks which meet the needs of key public sector buildings and major new developments across the city, beginning with Granton Waterfront and the BioQuarter” – as set out in [section 7.3](#), the Council and its partners are developing a suite of heat network projects, with Granton Waterfront and Edinburgh BioQuarter the two furthest advanced projects.
- “Collaborate on place-based joint energy infrastructure projects which maximise opportunities to deliver low-cost, clean, renewable energy to neighbourhoods and

communities, with a focus on areas experiencing inequalities” – no projects of this nature have been delivered to date. Consideration would need to be given to energy sources, funding models, and other practicalities.

- “Align strategic investment in the electricity grid with development plans, to support increased local energy generation” – as noted above, the Council has established a strategic relationship with SP Energy Networks.
- “Explore the potential for creating local energy generation communities as part of proposed net zero communities’ pilots” – phase two of the Net Zero Communities pilot will include an evaluation of community energy generation potential using “Green Heat in Green Spaces” data.
- “Develop a city-wide programme of community energy generation investment opportunities” – this programme has not yet been developed. Phase two of the Net Zero Communities pilot will inform development of this.
- “Develop a Whole House Retrofit delivery programme for retrofitting social housing across the city to the highest energy standards, to reduce energy demand and tackle fuel poverty” – as set out in [section 7.3](#), an investment programme is underway to retrofit the Council’s housing stock in line with the Energy Efficiency Standard for Social Housing 2.
- “Establish an Energy Efficient Public Buildings Partnership to collaborate on retrofit, align investment plans and encourage confidence in, and planning for, the business and skills supply chain needed to deliver” – this partnership has been established as part of the City Heat & Energy Efficiency Board.
- “Ensure retrofit programmes create green jobs and fair work opportunities for citizens, targeting those at greatest risk of poverty” – Council-led retrofit programmes will deliver community benefits as part of the procurement process.
- “Call on the Scottish Government to work with city partners to identify and deploy sufficient resources to deliver net zero public buildings” – the Scottish Government has deployed the Scottish Central Government Energy Efficiency Grant Fund, Scottish Public Sector Energy Efficiency Loan Scheme, and Scotland’s Public Sector Heat Decarbonisation Fund to support the costs of retrofitting national public sector bodies’ buildings. However, the costs of fully retrofitting all public sector buildings in Edinburgh is unlikely to be capable of being funded by the public sector directly, and so it is anticipated that mechanism will require to be developed to leverage institutional funds into retrofit in Edinburgh. Further, as set out in the Delivery Plan, greater certainty over long-term funding is necessary.
- “Develop a new mechanism and business plan to support small businesses, owner occupiers and private landlords to affordably retrofit their properties” – while grant funding from bodies such as Home Energy Scotland and Business Energy Scotland is available, it is recognised that these bodies will not be able to meet all the costs of retrofitting properties in Edinburgh. The scale of investment required is likely to require institutional funding. As above, a mechanism will require to be developed to support this investment.
- “Develop electricity grid infrastructure and capacity to respond to increased demand from electric-powered heat” – as noted above the Council has established a strategic

relationship with SP Energy Networks. The Edinburgh LHEES identifies the Strategic Zones where heat pumps are most likely to present a good solution.

- “Work with SP Energy Networks and the Scottish Government to identify measures to reduce the cost of electricity and support citizens to transition away from gas” – a reduction in electricity prices is likely to be pivotal to the decarbonisation of heat in Edinburgh, as presently the high cost of electricity relative to gas can make the viability of solutions such as heat pumps and direct electric heating a challenge. Reducing electricity prices is largely outwith the competencies of the Council. However, there is scope to reduce dependency on high grid prices via increased generation within Edinburgh (ranging from micro-renewable installations on buildings to larger projects such as solar meadows and hydropower) coupled with storage.
- “Call on the Scottish Government to bring forward at speed improved schemes to support citizens to fund energy efficiency upgrades and decarbonise of heat in their homes” – support for households to improve energy efficiency and decarbonise heating is provided by Home Energy Scotland and via Area-Based Schemes, as well as via others schemes such as Warmer Houses Scotland and ECO4 / the Great British Insulation Scheme. The lack of long-term certainty around these schemes has been identified by the Council as a challenge in terms of developing a long-term strategy for decarbonising homes. As noted above, institutional funds are likely to be required to achieve retrofit and decarbonisation of all homes.
- “Scope and test innovative approaches to retrofit in challenging mixed-tenure settings, to develop models and accelerate progress” – as part of the retrofit of its social housing stock and operational estate, the Council has developed models for the retrofit of various building archetypes.

7.3. Council estate and Council-led area interventions

Refurbishment of existing social housing

- 7.3.1. The Council is the largest registered social landlord in Edinburgh and one of the largest in Scotland with a growing portfolio of approximately 19,000 social homes.
- 7.3.2. The Energy Efficiency Standard for Social Housing 2 (ESSH2) sets a milestone of all social housing in Scotland achieving an Energy Performance Certificate rating of ‘B’ or better, or being “as energy efficient as practically possible”, by the end of 2032 (“within the limits of cost, technology and necessary consent”). The ESSH2 further states “no social housing below EPC Band D should be re-let from December 2025, subject to temporary specified exemptions.” The ESSH2 is currently being reviewed by the Scottish Government. As of March 2023, 12% of the Council’s social homes met ESSH2.
- 7.3.3. The Council’s investment in housing is underpinned by the Housing Revenue Account Business Plan for the 30-year period 2023/24 to 2052/53. The Business Plan projects that, based on annual rent increases of 2.5%, 81% of the Council’s portfolio of social housing could be brought up to ESSH2 standard over the lifetime of the Business Plan, i.e. by 2053. Accelerating this transformation would require increased rent or grant income.⁵⁴ Conversely, should rent income increase by less than this, the ability of the Council to achieve this target would be impeded.

Whole House Retrofit

- 7.3.4. The Council fully adopted a “Whole House Retrofit” (WHR) approach to the retrofit of high-rise housing blocks in 2023. This entails a “fabric first” approach to improving energy efficiency, designing-out poor performance (e.g. reducing heat loss, removing thermal bridges/cold spots, and reducing the build-up of moisture via an appropriate ventilation strategy) whilst ensuring all elements complement one another rather than work against one another. The Council has predicted that a WHR approach can reduce energy demand for the average home by 50% to 75%.
- 7.3.5. To support the delivery of the WHR programme, the Council is recruiting additional staff, upskilling existing staff, and delivering apprenticeships.
- 7.3.6. The cost of delivering the WHR programme is estimated to average approximately £56,000 per home. However, some properties are likely to prove significantly more expensive to address; the refurbishment of the residential blocks Inchmikery Court and Oxcars Court (representing a total of 151 homes) via the installation of a new external building envelope sitting 1.5 metres outwith the existing frame to improve the energy efficiency of the buildings (with a targeted improved Energy Performance Certificate rating of ‘B’) is projected to cost £25 million to £30 million: approximately £166,000 to £199,000 per home.
- 7.3.7. As noted, the WHR programme takes a fabric first approach. The Council does not currently plan to replace existing heating systems until they are nearing the end of their working lives., but the interventions carried out under the WHR programme will support the move to zero direct emissions heating systems at a future date. As noted below, all new build Council housing developments use zero direct emissions heating systems.

Mixed Tenure Improvement Service

- 7.3.8. The Council’s Mixed Tenure Improvement Service (MTIS) delivers improvements to energy efficiency (as well as common repairs and maintenance) in mixed tenure buildings where there are a mix of properties owned by private owners and the Council. The costs of common works are shared amongst the respective owners in line with the title deeds of the buildings in question and the Tenements (Scotland) Act 2004. MTIS organises, plans, and oversees works with input from tenants and private owners.
- 7.3.9. In 2021, the MTIS began a £30 million programme of upgrades to the Wester Hailes neighbourhood of Edinburgh, with the Council investing £20 million and private owners and Area-Based Scheme funding making up the remainder of contributions. The first two years of the works saw energy efficiency upgrades carried out to over 900 homes, including over 670 Council-owned homes and 230 privately-owned homes.
- 7.3.10. Following on from the Wester Hailes pilot, the MTIS service is planned to be expanded to cover other areas of Edinburgh, initially Lochend and Restalrig.

Area-Based Schemes

- 7.3.11. Area-Based Schemes (ABS) provide grant-in-aid for private households at risk of fuel poverty, prioritising harder to treat homes that require solid wall insulation or complex cavity wall insulation. The aim of the scheme is to bring all homes up to EPC ‘C’ standard by 2030.
- 7.3.12. ABS are funded by the Scottish Government and designed and procured by local authorities. The City of Edinburgh Council was offered £5.16 million of funding for 2022/23.

- 7.3.13. ABS are focused on homes in economic disadvantaged areas (Council Tax bands A to C and low-ranking SIMD areas) with an EPC rating below 'C'. Eligibility for the ECO3 scheme can be used as a proxy for eligibility.
- 7.3.14. ABS have been found to be a good solution for mixed tenure and multi-occupancy properties.
- 7.3.15. Between 2013/14 and 2023/14, a total of 11,072 interventions were carried out across Edinburgh under ABS, including 5,226 instances of cavity wall insulation; 4,005 instances of solid wall insulation; and 519 instances of loft insulation.

Development of new social housing

- 7.3.16. The Council resumed the development of new social housing in 2008 via its 21st Century Homes programme. In 2017, the Council set a target of delivering 10,000 new social homes by 2027.
- 7.3.17. In 2020, the Council adopted a housing sustainability approach. As part of this, no new Council homes are fitted with gas boilers, and homes are built to Passivhaus standard.
- 7.3.18. As of January 2023, the Council had 613 social homes under construction, with a further 1,044 in design or pre-construction. The housebuilding capital budget for 2023/24 was approximately £100 million. Current major ongoing and planned developments are:
 - D1 – 75 homes (including 48 social homes) heated via an air source heat pump-based communal heating system.
 - Fountainbridge – 464 homes (including 186 social homes) heated via individual air source heat pumps.
 - Granton Waterfront, phases 1 to 4 – 2,864 homes (including circa 700 social homes) heated via a 4-megawatt sewer-source heat pump (with a ground-mounted solar photovoltaic array helping meet the heat pump's electricity requirements).
 - Greendykes K and L – 140 homes (including 74 social homes) heated via a mix of individual air source heat pumps and individual exhaust air source heat pump.
 - Meadowbank – 680 homes (including 240 social homes) heated via individual air source heat pumps, supplemented via mechanical ventilation with heat recovery.
 - Murrayburn Gate – 73 homes (including 41 social homes) heated via individual air source heat pumps.
 - Powderhall – 259 homes (including 107 social homes) heated via individual air source heat pumps, supplemented by electric radiators, with rooftop mounted solar photovoltaics.
 - Silverlea – 142 homes (including 91 social homes) heated via individual air source heat pumps.
 - Western Villages – 444 homes (including 195 social homes) heated via an air source heat pump-based communal heating system.
- 7.3.19. The development of new social housing by the Council is steadily increasing the stock of energy efficient homes in Edinburgh.

Operational estate

- 7.3.20. The Council has a large and complex operational estate of over 400 buildings, many of them of advanced age. The Scottish Government's Heat in Buildings Strategy sets a target of all publicly owned buildings in Scotland meeting zero direct emissions heating requirements by 2038. The Council has set a target of all operational properties achieving net zero status by 2030.
- 7.3.21. In 2019, the Council adopted an Energy Management Policy that set out three aims with regards to the estate: to minimise energy consumption; to achieve ongoing improvements through recording, benchmarking, monitoring, and reporting on energy usage; and to promote the conservation of energy.⁵⁵ The Council's Corporate Property Strategy align lifecycle investment in the Council's operational estate with works to decarbonise properties.
- 7.3.22. Key identified challenges associated with decarbonisation of the operational estate include:
- The greater unit cost of electricity relative to gas, meaning a transition from natural gas to electricity will, all other things being equal, increase running costs of buildings.
 - Electricity grid constraints associated with a move from natural gas-based to electricity-based heating solutions.
 - Practical challenges associated with retrofitting certain buildings.
 - Financial challenges where retrofit does not present a conventional payback.
- 7.3.23. New Council operational buildings are built to Passivhaus standard by default to minimise energy consumption. For existing buildings, the Council has adopted an EnerPHit-informed standard as the most appropriate standard for deep energy retrofits.
- 7.3.24. In 2022, the Council approved the EnerPHit Tranche 1 Programme: a £61.83 million programme to retrofit 12 Council operational buildings to an EnerPHit-informed standard over the period 2022/23 to 2027/28.⁵⁶ This programme is intended to serve as a pathfinder for the retrofit of further Council properties.
- 7.3.25. In June 2023, the Council submitted a planning application for Brunstane Primary School, the first operational building to be piloted via the EnerPHit Tranche 1 Programme. Surveys of the school identified multiple challenges including a lack of insulation, poor U-values, poor airtightness, and significant thermal bridges. The measures that will be undertaken in response to these challenges are replacing doors and windows, adding new external wall insulation, adding roof insulation, replacing curtain walling with rainscreen cladding, and installing air source heat pumps providing space heating. The retrofit is planned to achieve a 73% reduction in energy usage, while increasing user comfort via providing more consistent temperatures and improved fresh air circulation.

Investment portfolio

- 7.3.26. The Council also has a large investment portfolio of over 1,000 buildings which are leased out to provide an income stream to the Council. By dint of this the Council is one of the largest commercial property landlords in Edinburgh.
- 7.3.27. The portfolio is highly diverse, with the main categories of property being (in descending order of quantity) industrial units, retail units, offices, and leisure properties (hotels, bars, and restaurants). It varies considerably in terms of age, condition, and other factors. The

portfolio experiences growth via a combination of acquisitions, new developments, and repurposing of existing Council assets as investment properties.

- 7.3.28. The Council's Portfolio Strategy sets a goal of managing the portfolio in accordance with the Council's climate and sustainability commitments.⁵⁷ The Strategy identifies that some elements of the investment portfolio require improvements in energy performance. The Strategy sets an action of preparing improvement plans to identify the necessary measures to improve the sustainability to the portfolio, with the relevant works to be undertaken when relevant funding has been identified.
- 7.3.29. New developments instructed by the Council as additions to the investment estate will be developed to achieve extremely high levels of energy efficiency. For example, the Hyatt Centric Edinburgh Haymarket hotel currently being developed for the Council (as head tenant) will be heated entirely using electricity, and is expected to achieve the best energy performance of any hotel of this scale in Scotland.

Parks and greenspaces

- 7.3.30. The Council has participated with Greenspace Scotland in the ParkPower project, which aims to leverage urban green and blue spaces to decarbonise energy in Scotland.
- 7.3.31. Saughton Park in Edinburgh has been transformed into Scotland's first "green-powered park". The park now incorporates a micro-hydro scheme to generate electricity and ground-source heat pumps to generate heat.
- 7.3.32. In June 2020, the consultancy Ramboll prepared a report for the Council on the energy potential of greenspaces in Edinburgh.⁵⁸ A total of 165 greenspaces were reviewed, of which two sites were identified as having the greatest potential:
- Inverleith Park – identified as a potential heat export site, with opportunities for both water-source heat pumps and ground-source heat pumps.
 - Jack Kane Centre and Park – identified as a potential heat island site, where the energy demand of buildings on site could be met on site.
- 7.3.33. In August 2020, Ramboll prepared a follow-up report for the Council.⁵⁹ The follow-up report set out a techno-economic appraisal of the potential for low carbon heat projects at Inverleith Park and the Jack Kane Centre and Park. The report identified the following:
- Inverleith Park – potential for 6.37-megawatt capacity heat pumps.
 - Jack Kane Centre and Park – potential for 0.16-megawatt capacity heat pumps.
- 7.3.34. Further development of this progress is pending management resource and funding.

7.4. Heat networks

Overview

- 7.4.1. The City of Edinburgh Council is currently supporting the development of multiple heat networks projects in Edinburgh. Of the 17 heat network projects being supported by the Scottish Government as of March 2023, four were in Edinburgh.⁶⁰
- 7.4.2. In addition to its role as a developer and customer of heat networks, the Heat Networks (Scotland) Act 2021 and The Heat Networks (Heat Network Zones and Building Assessment

Reports) (Scotland) Regulations 2023 introduce a number of duties for the Council with regards to heat networks. These are as follows:^{xxiv}

- Conducting a review to consider whether one or more areas within Edinburgh is likely to be particularly suitable for the construction and operation of a heat network (and publishing the results of the review).
- Designating areas deemed particularly suitable for the construction and operation of a heat network as “Heat Network Zones”.
- Acting as “consent authority” for Edinburgh, i.e. awarding (and revoking) consents for the development of heat networks in Edinburgh.^{xxv}
- Producing “building assessment reports” (BARs) for non-domestic buildings owned by the Council with an annual heat demand of at least 73 megawatt-hours per year, providing data on heat sources and demand, to inform whether areas are suitable for the development of heat networks.

Existing heat networks

7.4.3. Data from the Scotland Heat Map indicates that there were 153 heat networks and communal heating systems in Edinburgh as of 2023 – around 14% of the Scottish total. These are listed in [Table 48](#) and illustrated in [Figure 01](#).

7.4.4. Based on the Scotland Heat Map data, the following statements can be made about the 153 heat networks and communal heating systems:

- 127 (83%) of the heat networks / communal heating systems ran off a (gas) boiler; 11 (7%) ran off a combined heat and power plant; and one (1%) ran off trigeneration, with 18% (12%) running off an unknown technology.
- Three (3%) of the heat networks / communal heating systems were micro (less than 45 kilowatts); 113 (74%) were small to medium-sized (≥ 45 kilowatts to < 1 megawatt); and 20 (13%) were large (≥ 1 megawatt) with 17 (11%) being of unknown size.
- The neighbourhoods of Edinburgh (defined using intermediate areas) with the greatest number of heat networks / communal heating systems were “Old Town, Princes Street and Leith Street” (18 / 12%); “South Gyle” (10 / 7%); “Tollcross” (12 / 8%); “Deans Village” (12 / 8%); and “Meadows and Southside” (10 / 7%).

7.4.5. It is understood that many of the existing heat networks / communal heating systems are serving multiple units within a single building, or form part of a university campus or other cluster of buildings under a single ownership. It is further understood that most of the existing heat networks / communal heating systems run off mains gas and therefore would not currently contribute to the fulfilment of the targets set out in the Edinburgh LHEES. It is therefore envisaged that work will be required to decarbonise most of the existing heat networks.

7.4.6. It is noted that many of the existing heat networks fall within prospective Heat Network Zones. Dialogue with the Scottish Government has indicated that the emerging permit

^{xxiv} The Act also empowers the Scottish Government to designate bodies as the “permit authority” or “licensing authority”. It is possible that the Council could be designated the permit authority and/or the licensing authority for Edinburgh.

^{xxv} Subject to the Council writing to the Scottish Government to request it be designated as the consent authority, or the Scottish Government designating the Council as the consent authority.

regime will not apply to existing heat networks, i.e. existing heat networks that fall within a Heat Network Zone will not require to secure a permit in order to continue operating, nor will permit holders have the ability to “take over” existing heat networks within the Heat Network Zone in question. However, the introduction of the permitting system may nonetheless give rise to some challenges where there are existing heat networks, for example:

- If an existing heat network operator within a Heat Network Zone does not hold the permit for that zone, this may impede them from being able to expand their network.
- Where a heat network developer has secured a permit for a Heat Network Zone, the presence of existing heat networks within the zone may mean that the available demand is less than envisaged, for example where one or more anchor loads are already connected to an existing heat network.

First National Assessment

- 7.4.7. The First National Assessment of Potential Heat Network Zones was published by the Scottish Government in 2022.⁶¹ The assessment utilises data on heat demand to identify potential Heat Network Zones in Scotland; it does not account for considerations such as future developments, existing heat networks, sources of heat, and practical barriers. The analysis set out in the Edinburgh LHEES therefore builds upon the First National Assessment by incorporating a wider raft of considerations.
- 7.4.8. The prospective Heat Network Zones identified in the First National Assessment are primarily based upon linear heat densities of 4,000 kilowatt hours per metre (of pipe) per year as a baseline, or 8,000 kilowatt hours per metre (of pipe) per year as a more stringent approach.
- 7.4.9. The First National Assessment (baseline analysis) identified a total of 647 potential Heat Network Zones across Scotland with a notional combined heat demand of 25,672,514 megawatt hours per annum.^{xxvi} Anchor loads account for 14.1 terawatt hours per year – 54.9% of total demand.
- 7.4.10. Within Edinburgh, the First National Assessment identified a total of 41 potential Heat Network Zones. A map of the zones is shown at [Figure 02](#). The 41 zones represented a total of 51,206 properties (38,649 residential and 10,942 non-domestic), with a total combined heat demand of 3,404,609 megawatt hours per annum.^{xxvii} 569 anchor loads accounted for 43% of heat demand. Significantly, 24,531 (48%) of the properties were identified as “heritage” properties.
- 7.4.11. The single largest zone in Edinburgh identified in the First National Assessment is zone “CE-309-St1”, which is centred on the city centre, with spurs stretching southwest to Marchmont and Morningside, southeast to Newington, northwest to Orchard Brae, and northeast to Shrubhill. A map of this zone is shown at [Figure 03](#). The zone includes 14,024 properties with a combined annual demand of 1,011,845 megawatt hours per annum.^{xxviii} 79% of the properties are “heritage” properties.

^{xxvi} I.e., 25,673 gigawatt hours or 25.7 terawatt hours

^{xxvii} I.e., 3,405 gigawatt hours or 3.4 terawatt hours

^{xxviii} I.e., 1,012 gigawatt hours or 1.0 terawatt hours

7.4.12. The First National Assessment provides a useful illustration of where Heat Network Zones are most likely to be viable, and the potential scale of heat networks that could be realised in Edinburgh. Some of the Heat Network Zones identified in the First National Assessment may be unviable due to the practical considerations set out above, but conversely other zones may emerge due to pipeline property developments not captured by the First National Assessment.

Granton Waterfront

7.4.13. The Granton Waterfront is a 140-hectare brownfield ex-industrial neighbourhood. Over the next 10-15 years, the Council will take forward a major mixed-use regeneration of the area delivering thousands of homes, a primary school, a medical centre, and significant new commercial space. In line with the target of Edinburgh achieving net zero carbon by 2030, the Council is seeking to deliver a low carbon heat network that will supply cost-competitive heat from low carbon sources to Granton Waterfront and the surrounding area.

7.4.14. The Council has assessed various options for delivering a low carbon heat network at Granton Waterfront. In March 2022, the Council finalised an options appraisal and detailed technical feasibility study that identified a preferred solution for the heat source: a 4-megawatt heat pump utilising heat from the sewer running beneath Granton Waterfront, supplemented by two 10 megawatt electric boilers for resilience, with a 1-megawatt ground-mounted solar photovoltaic array helping meet the network's electricity requirements.

7.4.15. The anchor loads for the heat network would be 12 existing and new public sector buildings totalling over 86,900m², along with 3,383 domestic properties and a further 9,000m² of commercial space. There is scope to add additional connections.

7.4.16. Building on this preferred technical solution, the Council finalised an outline business case in March 2023. As part of this, a full options appraisal was carried out with a commercial advisor. Based on the size, scale and complexity of the network, and the risks around managing the timescales to meet the first connections along with securing enough heat demand to ensure its viability, it was determined that the preferred route to delivering the heat network is a concession model. This would see the Council enter into a 40-year design, build, operate, finance, and maintain concession agreement with a private sector concessionaire, ensuring a partner with a proven track record in managing networks takes this forward whilst achieving a high degree of risk transfer to the private sector while retaining Council control over key aspects including price controls and capped returns.

7.4.17. The projected capital expenditure required to deliver the heat network is £81.048 million. Grant funding of £19.892 million from the Heat Network Fund would achieve an internal rate of return of 10%, making the project commercially attractive.

7.4.18. The techno-economic model developed for the project indicates that, for a typical household with an assumed annual demand of 3,670 kilowatt hours, the heat network would achieve a fixed tariff of £621 and a variable tariff of £287, representing an indicative total annual cost of £909. This compares to a projected annual cost of £821 for gas boilers with 85% efficiency and low maintenance needs and £971 for gas boilers with 85% efficiency and high maintenance needs.

7.4.19. The next step for the Granton Waterfront heat network is to procure a concessionaire. It is planned that the heat network will be operational in late-2025 to coincide with the occupation of the first new homes delivered by the Granton Waterfront regeneration.

Edinburgh BioQuarter

- 7.4.20. Edinburgh BioQuarter is a major life sciences development in the Little France neighbourhood of Edinburgh centred on the Royal Infirmary of Edinburgh and the Royal Hospital for Children & Young People. The Edinburgh BioQuarter partnership – comprising the Council, NHS Lothian, Scottish Enterprise, and the University of Edinburgh – has developed proposals for a mixed-use expansion of Edinburgh BioQuarter delivering two million square feet of commercial innovation space and 2,000 homes. Work is currently ongoing to appoint a private development partner to take forward the future development of Edinburgh BioQuarter.
- 7.4.21. A sustainability strategy developed for Edinburgh BioQuarter requires all new buildings to be direct zero carbon by 2030 (and all existing buildings by 2040).
- 7.4.22. In March 2023, the consultancy Ramboll published a feasibility study on the scope to develop a heat network serving Edinburgh BioQuarter.⁶² The study concluded the preferred solution was a fourth-generation heat network and district cooling network utilising waste heat from the Millerhill Recycling and Energy Recovery Centre supplemented by peaking electric boilers.
- 7.4.23. The study found that the proposed heat network would achieve a variable heat charge tariff of circa 7.5 pence per kilowatt hour. It would achieve carbon savings relative to the business-as-usual scenario (which assumes a mix of gas boiler and building-level air source heat pumps) of 5,700 to 14,300 tonnes of carbon dioxide equivalent over the 40-year project period – 9.8% to 24.6%.
- 7.4.24. The next step for the project is for the various off-takers (including the Council) to develop business cases for connecting their properties to the proposed heat network.

Gracemount

- 7.4.25. In 2022, the Council appointed Buro Happold to prepare a feasibility study on the scope for a new heat network in the Gracemount neighbourhood of Edinburgh.⁶³ The proposed network would serve a cluster of Council-owned buildings – Gracemount High School; Gracemount Leisure Centre, Gracemount Nursery; Gracemount Primary School; Kaimes School; Libertus Services; St Catherine’s RC Primary School; and the South Neighbourhood Office and Library – and the NHS Medical Practice.
- 7.4.26. The feasibility study assessed various options based on air source heat pumps and ground source heat pumps which were compared with a counterfactual option of building-level air source heat pumps. The preferred option was identified as being a closed loop 750-kilowatt ground source heat pump with a 2,300-kilowatt electric boiler top-up and a 25,000m³ thermal store.
- 7.4.27. The heat network would achieve a heat sales tariff of 13.3 pence per kilowatt hour, which is comparable to that achieved by building-level air-source heat pumps but higher than the current cost of gas (circa 7.5 pence per kilowatt hour). However, it is noted that future increases in gas prices would narrow this gap, while there is scope to achieve lower electricity prices via (for example) private purchasing agreements.
- 7.4.28. The heat network would achieve carbon savings of 35,426 tonnes of carbon dioxide equivalent over a 40-year period relative to gas – savings of 96.5%. Further reductions could be achieved by sourcing green electricity.

- 7.4.29. The projected cost of delivering the heat network is £4.2 million, which represents a negative net present value. Grant funding of £1.62 million would achieve a positive internal rate of return of 4%.
- 7.4.30. The next step for the Gracemount heat network will be to prepare an outline business case.

Seafield

- 7.4.31. In 2023, the Council appointed a design team led by 7N Architects to prepare a masterplan for the regeneration of the Seafield Regeneration Area (SRA) in Edinburgh. As part of the commission, the design team was charged with producing “a low/zero carbon energy strategy for the SRA, to include an initial technical assessment of the scope to utilise heat from the Seafield Waste Water Treatment Works and the Firth of Forth for a district heating scheme”.
- 7.4.32. The design team has produced initial proposals for a heat network serving the SRA that would utilise wastewater discharged from the Treatment Works at a temperature of 15°C. The heat network could potentially be scaled further to serve other properties in the vicinity.
- 7.4.33. This proposal is at an early stage but offers scope to incorporate a low carbon heat network solution into a comprehensive regeneration project from the outset, potentially delivering significant efficiencies and informing other new developments.

Cross-boundary Heat Network Zones

- 7.4.34. In 2022, Zero Waste Scotland and Buro Happold – in conjunction with the City of Edinburgh Council, East Lothian Council, and Midlothian Council – carried out analysis on potential cross-boundary heat network opportunities in the three aforementioned local authority areas.⁶⁴ The analysis identified three potential cross-boundary zones King’s Buildings; Millerhill and Shawfair; and the Royal Infirmary of Edinburgh and Edinburgh BioQuarter.
- 7.4.35. The designation of cross-boundary Heat Network Zones is likely to add complexity in terms of the emerging licencing and permitting regime, albeit section 52 of the Heat Networks (Scotland) Act 2021 makes provision for Heat Network Zones spanning two or more local authority areas.

Communal heating systems

- 7.4.36. Multiple existing Council buildings have communal heating systems. The current communal heat source is primarily natural gas fired boilers, with some buildings being augmented by gas-fired combined heat and power machines or solar thermal storage vessels.
- 7.4.37. In 2023, the Council inaugurated a new framework for the operation, management, and maintenance of communal heating systems for Council homes. The framework covers design development guidance and support in addition to operational, maintenance, metering, and billing services for existing and new build housing developments that are served by communal heating or local heat networks.
- 7.4.38. The framework has been utilised for the Council’s D1 development in Granton Waterfront, which comprises 75 flats heated via a communal heating system fed by two air source heat pumps and two water-to-water heat pumps, achieving a flow temperature of 65°C and a return temperature of 57°C. Each flat will be fitted with smart meters. Under the terms of the framework, Vitali Energy will operate and maintain the communal heating system on behalf of the Council.

7.5. Solar installations

- 7.5.1. The City of Edinburgh Council (in partnership with the Edinburgh Community Solar Co-operative) has carried out multiple solar installations, primarily on the roofs of Council-owned buildings. These have typically been relatively small-scale and are dependent on the orientation of the building's roofs. Additionally, installing solar panels on building roofs has in some cases caused issues when the roofs in question required maintenance, with cost and disruption associated with relocating the panels. This has led the Council to explore the potential of larger-scale ground-mounted solar installations.
- 7.5.2. Initial investigation has been undertaken on several Council-owned sites to assess their readiness for solar installations, in particular the readiness of grid connections.
- 7.5.3. The replacement of Feed-in Tariffs with the Smart Export Guarantee means that developing solar installations for the purposes of exporting electricity is now unlikely to be financially viable. Given this, solar installations are likely to be most viable where the electricity generated can be used to supply buildings in the vicinity.
- 7.5.4. There is considered to be good potential for solar installations in Edinburgh, but further investigation into technical and commercial viability is required. A map of homes in Edinburgh identified as having good solar suitability is shown at [Figure 25](#).

7.6. Energy for Edinburgh

- 7.6.1. In 2016, the Council incorporated Energy for Edinburgh Limited ("EFE"), an arm's length energy services company. A business plan prepared at this time identified three immediate areas of focus for EFE: solar photovoltaics, heat networks, and non-domestic energy efficiency. The company has not traded since being incorporated. The company currently has approximately £190,000 of funding available for energy project activities.
- 7.6.2. In April 2023, the Council prepared an options appraisal on the future of EFE. The appraisal concluded that there is currently no clear role for EFE but that it could potentially be used to progress heat network projects subject to further, more detailed, assessment. In August 2023, the Council's Policy and Sustainability Committee agreed that, following the publication of the Edinburgh LHEES, the Council should develop a business case looking at the scope for EFE to deliver heat network projects on a joint venture approach, to include exploration of embedding cooperative principles and community wealth building into EFE.

7.7. Conservation areas adaptation

- 7.7.1. On 2 November 2022, the City of Edinburgh Council's Planning Committee agreed to establish a short-term working group to assess the additional challenges associated with the adaptation of homes in conservation areas to improve their energy efficiency, reflecting the need to balance making these improvements with protecting Edinburgh's built heritage.
- 7.7.2. In response to the decision, in spring 2023 the Council carried out consultation with residents living in listed buildings and/or conservation areas in Edinburgh on the challenges associated with adapting their homes to make them more efficient. The Council subsequently established a working group comprising planning officers; elected members; bodies with an interest in the historic environment, energy saving, and/or fuel poverty; and residents to review the feedback from the consultation and develop potential solutions. The

outcome of the working group was to improve communication of guidance and policies around retrofit works to historic buildings in Edinburgh.

7.8. Net zero communities

- 7.8.1. The 2030 Climate Strategy introduced a commitment to pilot a “net zero communities” approach: identifying a scalable approach to the retrofit of private housing across a community. The aim of the pilot is to improve understanding of building typologies; assess the level of opportunity for net zero projects within the community; enable community collaboration and decision making; identify existing funding packages; explore more strategic approaches to funding; and explore supply chains.
- 7.8.2. The Net Zero Communities pilot has been carried out on behalf of the Council by Changeworks. The second phase of the pilot will deliver the following:
- A technical feasibility assessment with detailed archetype modelling of measures and costs of net zero interventions for bungalows and one other typology, including evaluation of community energy generation potential.
 - An engagement plan setting out community barriers and needs to support further community buy-in for community-led retrofit.
 - High level toolkits and data for wider community use and deep modelling of “comfort as a service” potential to inform a scalable business case.
- 7.8.3. The Council is also involved in the Net Zero Neighbourhoods initiative led by the Cities Commission for Climate Investment (3Ci), which is exploring neighbourhood-level decarbonisation programmes. 3Ci has convened a Net Zero Investment Taskforce that is investigating the opportunities, challenges, and solutions around bringing additional private investment into neighbourhood-level decarbonisation projects.

7.9. Supply chain development and procurement

- 7.9.1. As set out in [section 4.5](#), there are significant pressures on the availability of skills associated with heat decarbonisation, in particular a lack of heat pump installers in the market.
- 7.9.2. The Council has held discussions with Scottish Enterprise (Scotland’s national enterprise agency) around the strengthening of the supply chain for net zero heating solutions. Scottish Enterprise’s primary focus is on manufacturers, technologists, and solution providers, but the agency will also support installers/contractors who have with innovative approaches that can reduce costs and disruption. Consideration has been given to staging “meet the buyer” events to stimulate the supply chain. Scottish Enterprise wishes to understand how the delivery of Local Heat and Energy Efficiency Strategies across the 32 Scottish local authorities will impact on the market.
- 7.9.3. Scotland Excel has developed a framework for procurement associated with Local Heat and Energy Efficiency Strategies. The framework is planned to be active from 2024 and is divided into three lots as follows:
- Lot 1 – Local Heat and Energy Efficiency Strategies (provision of services for Scottish local authorities related to Local Heat and Energy Efficiency Strategies).
 - Lot 2 – Heat Network Zoning (provision of services for Scottish local authorities related to heat network zoning, supporting local authorities to review and evaluate the potential for heat networks at a strategic, area-wide level and to further the

development of Heat Network Zones from this strategic level towards project identification and feasibility assessment).

- Lot 3 – Local Area Energy Planning (the provision of services for Scottish local authorities related to Local Area Energy Plans, supporting local authorities to complete the technical analysis required for Local Area Energy Plans to enable net zero planning).

7.9.4. As set out in [section 4.5](#), various government schemes are in place to help develop the supply chain, particularly with regards to heat pumps. While technological innovation is outwith the scope of the Edinburgh LHEES, it is recognised that this support has the potential to improve deliverability of heat decarbonisation.

7.10. City Heat & Energy Efficiency Board

7.10.1. A City Heat & Energy Efficiency Board for Edinburgh was established in 2023. This sits below the wider Edinburgh Infrastructure and Investment Programme Board (IIPB), now rebranded as the Net Zero Edinburgh Leadership Board, which was established to “support collaborative development of strategic city infrastructure in line with Edinburgh’s net zero target by 2030”.

7.10.2. The City Heat & Energy Efficiency Board is one of four thematic boards feeding in to the IIPB. Its aim is to “develop a whole city strategic approach for new build and retro fit of domestic and public buildings to meet [Edinburgh’s] future energy needs” and to “ultimately deliver a Heat and Energy Masterplan that supports inclusive growth, workforce opportunities”.

7.10.3. The goals of the Board are to:

- Develop a whole city strategic approach for new build and retrofit of domestic and public buildings while building new financial models for estates transformation.
- Complete an analysis of large building retrofit needs across the city.
- Deliver a Heat and Energy Masterplan.
- Develop an energy project pipeline.
- Share learning from feasibility studies and pilot retrofit projects.

8. Baseline analysis

8.1. Overview of building stock

8.1.1. This chapter of the Edinburgh LHEES provides a thematic overview of Edinburgh’s building stock in the context of heat decarbonisation and energy efficiency. It profiles the stock in terms of characteristics such as energy performance; fuel type; tenure; type; and age. The data used to populate this chapter is primarily drawn from the Domestic Baseline Tool and Non-Domestic Baseline Tool, which themselves are based upon Home Analytics and Non-Domestic Analytics databases.

Emissions

8.1.2. Table 06 sets out the emissions of Edinburgh as of 2020. In total, Edinburgh produced 2,046 kilo-tonnes (i.e. 2.046 million metric tonnes) of emissions expressed as carbon dioxide equivalents (CO₂e). The domestic sector (households) accounted for the plurality of emissions in Edinburgh. The next largest sector was transport, which is outwith the scope of the Edinburgh LHEES. The third largest sector by emissions was the commercial sector (the use of electricity and gas by businesses, other than where this falls into other sectors).

8.1.3. Edinburgh accounted for 5.4% of overall Scottish emissions. For context, Edinburgh accounted for 0.3% of Scotland’s land area and 9.6% of its population as of mid-2021.^{xxix} The breakdown of emissions for Edinburgh is considerably different to that of Scotland, reflecting Edinburgh’s character as a largely urbanised local authority area with a service sector focused economy. The domestic, commercial, and public sectors accounted for a disproportionately large share of emissions in Edinburgh relative to Scotland, while the agriculture, industry, and land use sector accounted for a disproportionately small share.

Table 06: Breakdown of emissions in Edinburgh and Scotland by end user sector (kt CO₂e) (2020)

Sector	Edinburgh emissions	Edinburgh percentage	Scotland emissions	Scotland percentage
Domestic	698	34.1%	8,236	21.7%
Transport	597	29.2%	8,496	22.4%
Commercial	247	12.1%	2,024	5.3%
Industry	176	8.6%	6,644	17.5%
Public	164	8.0%	1,208	3.2%
Waste management	124	6.0%	1,477	3.9%
Agriculture	29	1.4%	7,635	20.1%
Land use, land use change, and forestry	11	0.5%	2,223	5.9%
Total	2,046	100%	37,945	100%

[Source: Department for Business, Energy and Industrial Strategy, UK Local Authority and Regional Greenhouse Gas Emissions](#)

^{xxix} National Records of Scotland: Land area and population density by administrative area, Scotland, mid-2021

8.1.4. Table 07 sets out the change in emissions in Edinburgh between 2010 and 2020 by sector. Overall, emissions fell by 44.6%. The commercial sector saw the largest fall in emissions, while the transport and domestic sectors saw the lowest reduction.

Table 07: Emissions in Edinburgh by end use sector (kt CO₂e) (2010 to 2020)

Sector	2010	2020	Change	% change
Domestic	1,135	698	-437	-38.5%
Transport	901	597	-304	-33.8%
Commercial	725	247	-477	-65.9%
Industry	352	176	-175	-49.8%
Public	289	164	-125	-43.3%
Waste management	N/A	124	N/A	N/A
Agriculture	N/A	29	N/A	N/A
Land use, land use change and forestry	18	11	-7	-40.2%
Total	3,419	2,046	-1,526	-44.6%

[Source: Department for Business, Energy and Industrial Strategy, UK Local Authority and Regional Greenhouse Gas Emissions](#)

Housing stock

8.1.5. There is no single definitive count of the number of buildings in Edinburgh. In part this is due to the number of buildings continually fluctuating as buildings are constructed and demolished. In part it is due to whether certain structures (for example, outbuildings) are treated as separate buildings or whether they are treated as an ancillary element of another building; the approach to this differs by dataset. As of March 2023, the Lothian Valuation Joint Board recorded 262,616 domestic properties (homes) and 23,180 non-domestic properties in Edinburgh: a total of 285,796 buildings.

8.1.6. The analysis carried out found that there was an overall total of 266,144 homes in Edinburgh. Of these, 69% are flats and 30% are houses.

Table 08: Breakdown of homes in Edinburgh by type

Type	Number	Percentage
Flat	184,382	69.3%
...of which block of flats	74,754	28.1%
...of which flat in mixed-use building	36,654	13.8%
...of which large block of flats	36,630	13.8%
...of which small block of flats	36,344	13.7%
House	81,160	30.5%
...of which detached house	23,109	8.7%
...of which mid-terrace house	22,392	8.4%
...of which semi-detached house	21,648	8.1%
...of which end-terraced house	14,011	5.3%

Type	Number	Percentage
Other/unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.7. Data from 2017 shows that, compared to Scotland overall, Edinburgh has a far greater proportion of flats, and a far lower proportion of terrace, semi-detached, and detached homes.

Table 09: Breakdown of homes in Edinburgh and Scotland by type (2017)

Type	Edinburgh number	Edinburgh percentage	Scotland number	Scotland percentage
Flats	168,500	67.8%	980,290	37.7%
Terraced	30,671	12.3%	532,963	20.5%
Semi-detached	24,751	10.0%	511,583	19.7%
Detached	24,215	9.7%	558,911	21.5%
Unknown	222	0.1%	19,427	0.7%
Total	248,359	100%	2,603,174	100%

[Source: National Records of Scotland, Dwellings by Type](#)

8.1.8. The 266,144 homes identified as part of the analysis had an average annual heat demand of 11,537 kilowatt hours, representing a total combined demand of 3.071 billion kilowatt hours per annum (3,071 million megawatt hours per annum).

8.1.9. 60% of homes in Edinburgh are owner-occupied. 21% are rented from private landlords, 11% are rented from the Council, and 8% are rented from housing associations.

Table 10: Breakdown of homes in Edinburgh by tenure

Type	Number	Percentage
Owner-occupied	158,172	59.4%
Rented	107,370	40.3%
...of which rented from private landlords	55,958	21.0%
...of which rented from the Council	21,065	7.9%
...of which rented from housing associations	30,347	11.4%
Unknown	602	0.2%
Total	26,144	100%

Source: Domestic Baseline Tool

8.1.10. Data from 2017 to 2019 shows that, relative to Scotland overall, Edinburgh had a broadly identical mix of owner occupied to rented properties. However, 61% of rental homes in Edinburgh were owned by private landlords and 39% were owned by social landlords, whereas at a Scottish level two-thirds of rental homes were owned by private landlords. The private rented sector therefore plays a far more significant role in Edinburgh than nationally. 95% of private rented homes (and 82% of social rented homes) in Edinburgh are flats.

Table 11: Breakdown of homes in Edinburgh and Scotland by tenure (2017–2019)

Type	Edinburgh number (000s)	Edinburgh percentage	Scotland number (000s)	Scotland percentage
Owner occupied	148	63%	1,530	62%
Rented	88	37%	949	38%
...of which private rented	54	23%	311	13%
...of which social rented	34	14%	638	26%
Total	236	100%	2,479	100%

Source: Scottish Government, Scottish House Condition Survey: 2017-2019 Local Authority Tables

- 8.1.11. 48.9% of homes in Edinburgh are located in mixed-tenure buildings. This introduces challenges around the decision-making when multiple owners must align their choices and timings to enable a retrofit.

Table 12: Breakdown of homes in Edinburgh by mixed-tenure status

Mixed-tenure status	Number	Percentage
Not mixed-tenure	135,331	50.8%
Mixed-tenure	130,211	48.9%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

- 8.1.12. Only 16% of homes in Edinburgh date from post-2002, i.e. 84% of the city's housing stock is over 20 years old. The largest age band of homes is older pre-1919 buildings (29%) which are hard to treat and require an affordable solution for their owners to decarbonise. Many of these buildings will be among the 10.2% of Edinburgh's domestic buildings which are listed, making it generally unviable to clad them with external wall insulation. It is understood that insulating these buildings (i.e. internal wall insulation which might be the only viable option) can be cost prohibitive, disruptive, and sometimes impractical.

Table 13: Breakdown of homes in Edinburgh by age

Type	Number	Percentage
Pre-1919	78,225	29.4%
1919-1949	35,643	13.4%
1950-1983	71,912	27.0%
1984-1991	14,589	5.5%
1992-2002	23,294	8.8%
Post-2002	41,879	15.7%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.13. Data from 2017 to 2019 shows that, relative to Scotland overall, Edinburgh had a significantly older housing stock, with around half of all homes pre-dating 1945.

Table 14: Breakdown of homes in Edinburgh and Scotland by age (2017–2019)

Age	Edinburgh	Scotland
Pre-1945	48%	30%
1945 onwards	52%	70%
Total	100%	100%

[Source: Scottish Government, Scottish House Condition Survey: 2017-2019 Local Authority Tables](#)

8.1.14. The analysis found that there were 27,282 listed homes in Edinburgh – approximately 10% of the overall stock. 69,095 homes sat within conservation areas – 26% of the total stock.

Table 15: Breakdown of homes in Edinburgh by listed status

Type	Number	Percentage
Listed	27,429	10.2%
...of which A listed	6,253	2.3%
... of which B listed	15,288	5.7%
... of which C listed	5,888	2.2%
Not listed	238,715	89.7%
Total	266,144	100%

Source: Domestic Baseline Tool

Performance of housing stock

8.1.15. This section of the Edinburgh LHEES sets out baseline data on the city’s housing stock.

8.1.16. Table 16 breaks down the housing stock on Edinburgh by energy performance certificate (EPC) rating. As set out in [section 6.1](#), the Scottish Government has set a target of all homes in Scotland achieving a minimum EPC rating of ‘C’ by 2033 where “technically and legally feasible and cost-effective”, with regulations to be introduced to this effect. 144,604 homes in Edinburgh (54.3%) achieve an EPC rating of ‘C’ or above, while 120,938 (45.4%) do not.

Table 16: Breakdown of homes in Edinburgh by energy performance certificate rating

Type	Number	Percentage
A/B	33,263	12.5%
C	111,341	41.8%
D	87,144	32.7%
E	26,336	9.9%
F/G	7,458	2.8%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.17. Data from the Scottish House Condition Survey indicates that 53% of homes in Scotland achieved an EPC rating of 'C' or above as of 2021. While not directly comparable, this suggests Edinburgh has a similar performance as Scotland overall in terms of EPC ratings.

Table 17: Breakdown of homes in Scotland by EPC rating (2021)

Type	Number (000s)	Percentage
A/B	123	5%
C	1,185	48%
D	896	36%
E	248	10%
F/G	11	0%
Total	2,463	100%

Source: [Scottish House Condition Survey](#)

8.1.18. 51.0% of homes in Edinburgh have insulated walls, while 48.7% have uninsulated walls. There are approximately 129,706 homes in Edinburgh with uninsulated walls. Of these, 80,708 (62%) are solid brick or stone; 41,592 (32%) are cavity construction; 3,776 (3%) are timber frame; and 3,630 (3%) are system built.

Table 18: Breakdown of homes in Edinburgh by wall construction and insulation

Construction type	Number	Percentage
Insulated	135,836	51.0%
...of which cavity, insulated	89,450	33.6%
...of which solid brick/stone, insulated	7,895	3.0%
...of which system built, insulated	15,611	5.9%
...of which timber frame, insulated	22,880	8.6%
Uninsulated	129,706	48.7%
...of which cavity, uninsulated	41,592	15.6%
...of which solid brick/stone, uninsulated	80,708	30.3%
...of which system built, uninsulated	3,630	1.4%
...of which timber frame, uninsulated	3,776	1.4%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.19. Of the 41,592 homes with uninsulated cavity walls, 24,273 were classified as having hard-to-treat cavity walls, as set out in Table 19.

Table 19: Breakdown of hard-to-treat cavity walls in Edinburgh by reason

Construction type	Number	Percentage
Narrow uninsulated cavity risk	13,550	5.1%
Empty cavity: building likely greater than three storeys	10,697	4.0%

Construction type	Number	Percentage
Empty cavity: very severe or severe exposure zone	26	0.0%
Total	24,273	9.1%

Source: Domestic Baseline Tool

8.1.20. Data from the Scottish House Condition Survey indicates that 58% of homes in Scotland have insulated walls, while 42% have uninsulated walls. While not directly comparable, this suggests that Edinburgh performs somewhat worse than Scotland overall in terms of wall insulation.

Table 20: Breakdown of homes in Scotland by wall construction / insulation (2021)

Construction type	Number (000s)	Percentage
Insulated	1,478	58%
...of which cavity, insulated	1,371	54%
...of which solid/other, insulated	107	4%
Uninsulated	1,051	42%
...of which cavity, uninsulated	522	21%
...of which solid/other, uninsulated	529	21%
Total	2,529	100%

Source: [Scottish House Condition Survey](#)

8.1.21. 130,842 homes (49% of the total) in Edinburgh have lofts. Of these, 63,939 (48.9% of all homes with lofts) achieve the recommended level of loft insulation of 250 millimetres or more, while 66,903 (51.1% of all homes with lofts) have below the recommended level.

Table 21: Breakdown of homes in Edinburgh by loft insulation

Type	Number	Percentage
Loft	130,842	49.2%
...of which 99 mm ≤	25,823	9.7%
... of which 100 mm to 249 mm	41,080	15.4%
... of which ≥ 250 mm	63,939	24.0%
No loft	134,700	50.6%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.22. Data from the Scottish House Condition Survey indicates that, of the 76% of homes in Scotland that have lofts, 64% achieved at least 200 millimetres of insulation.

Table 22: Breakdown of homes in Scotland by loft insulation (2021)

Insulation	Number (000s)	Percentage
Loft	1,915	76%
...of which 99 mm ≤	130	5%

Insulation	Number (000s)	Percentage
... of which 100 mm to 199 mm	564	22%
... of which ≥ 200 mm	1,221	48%
No loft	614	24%
Total	2,529	100%

Source: [Scottish House Condition Survey](#)

8.1.23. 81% of homes in Edinburgh have double or triple glazing, while 19% have single (or partial) glazing.

Table 23: Breakdown of homes in Edinburgh by window glazing

Glazing	Number	Percentage
Double/triple	214,263	80.5%
Single/partial	51,279	19.3%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.24. 91% of homes in Edinburgh are connected to the gas grid, while 9% are not. Data from the Scottish House Condition Survey for 2017-2019 indicates that around three times as many properties were not connected to the gas grid at a Scottish level as in Edinburgh.

Table 24: Breakdown of homes in Edinburgh by gas grid connection

Gas grid connection status	Number	Percentage
Connected	241,396	90.7%
Not connected	23,735	8.9%
Unknown	1,013	0.4%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.25. 85.5% of homes in Edinburgh are heated using mains gas, while 12.4% are heated using electricity. Fewer than 1% of homes use other fuels such as liquified petroleum gas, oil, and biomass/solid fuels. 1.2% of homes have no fuel. A further 13.6% of homes use mains gas as a secondary fuel, indicating that in total 99.1% of homes in Edinburgh have some degree of reliance upon mains gas as a fuel type.

Table 25: Breakdown of homes in Edinburgh by primary and secondary fuel type

Type	Primary number	Primary percentage	Secondary number	Secondary percentage
Mains gas	227,550	85.5%	36,317	13.6%
Electricity	33,110	12.4%	33,659	12.6%
Oil	622	0.2%	15	0.0%
Biomass/solid fuels	602	0.2%	6,884	2.6%

Type	Primary number	Primary percentage	Secondary number	Secondary percentage
Liquefied petroleum gas	512	0.2%	64	0.0%
No fuel	3,146	1.2%	N/A	N/A
No secondary system	N/A	N/A	188,603	70.9%
Unknown	602	0.2%	602	0.2%
Total	266,144	100%	266,144	100%

Source: Domestic Baseline Tool

8.1.26. Data from the Scottish House Condition Survey indicates that 11% of homes in Scotland are heated via electricity, while 80% use mains gas.

Table 26: Breakdown of homes in Scotland by main fuel type (2021)

Type	Number	Percentage
Mains gas	2,027	80%
Electricity	270	11%
Oil	146	6%
Liquefied petroleum gas	26	1%
Biomass/solid fuels	26	1%
Communal heating system	32	1%
Total	2,527	100%

[Source: Scottish House Condition Survey](#)

8.1.27. Table 27 sets out the main heating system of homes in Edinburgh. The vast majority of homes utilise a boiler. A very small proportion of homes are currently heating via heat networks / communal heating systems or heat pumps.

Table 27: Breakdown of homes in Edinburgh by main heating system

Type	Number	Percentage
Boiler	223,294	83.9%
Storage heaters	20,883	7.8%
Room heaters	8,584	3.2%
Communal	6,768	2.5%
No heating or hot water system	2,883	1.1%
Other	1,878	0.7%
Heat pump	1,252	0.5%
Unknown	602	0.2%
Total	266,144	100%

Source: Domestic Baseline Tool

8.1.28. Data from 2017 to 2019 shows that, relative to Scotland overall, Edinburgh had a broadly similar proportion of homes with full central heating. Private rented homes were significantly more likely to lack full central heating.

Table 28: Homes in Edinburgh and Scotland with central heating by tenure (2017–2019)

Tenure	Edinburgh central heating	Edinburgh no central heating	Scotland central heating	Scotland no central heating
Owner occupied	96%	4%	96%	4%
Private rented	90%	10%	91%	9%
Social rented	98%	2%	98%	2%
Total	95%	5%	96%	4%

[Source: Scottish Government, Scottish House Condition Survey: 2017-2019 Local Authority Tables](#)

8.1.29. Of the 266,144 homes in Edinburgh, it is calculated that 54,932 households (20.6%) are in fuel poverty, while 18,364 (6.9%) are in extreme fuel poverty.^{xxx} The Scottish House Condition Survey suggests that, as of 2021, 19.6% of households in Scotland were in fuel poverty, while 9.5% were in extreme fuel poverty. These figures are likely to have been exacerbated due to the ongoing cost of living crisis.

Non-domestic stock

8.1.30. Table 29 sets out a breakdown of non-domestic properties in Edinburgh by classification as of March 2023. It can be seen that the four largest categories – offices; shops; industrial subjects; and hotels – together account for 76.4% of all non-domestic properties in Edinburgh. Relative to Scotland overall, Edinburgh has a significantly higher proportion of offices and hotels, and a significantly lower proportion of industrial and leisure properties.

Table 29: Breakdown of non-domestic properties in Edinburgh and Scotland by type (March 2023)

Type	Edinburgh number	Edinburgh percentage	Scotland number	Scotland percentage
Offices	7,009	30.2%	44,536	17.2%
Shops	5,785	25.0%	54,597	21.0%
Industrial subjects	3,147	13.6%	57,445	22.1%
Hotels etc	1,780	7.7%	5,657	2.2%
Public houses	503	2.2%	3,535	1.4%
Leisure, etc	419	1.8%	27,384	10.5%
Religious	400	1.7%	5,908	2.3%
Public service subjects	352	1.5%	9,219	3.6%
Other	3,785	16.3%	51,303	19.8%
Total	23,180	100%	259,584	100%

[Source: Lothian Valuation Joint Board, General Statistics](#)

^{xxx} Fuel poverty is here defined as fuel bills accounting for over 10% of household income, while extreme fuel poverty is defined as fuel bills accounting for over 20% of household income.

8.1.31. Table 30 sets out non-domestic properties in Edinburgh as enumerated by the Non-Domestic Baseline Tool. This returns a considerably lower figure for the number of properties in Edinburgh, which is a result of differing methodologies for identifying properties. The proportion of each property is also considerably different. The data from the Non-Domestic Baseline Tool gives a total of 19,094 properties in Edinburgh, with over half of these being retail properties.

Table 30: Breakdown of non-domestic properties in Edinburgh by type

Classification	Number	Percentage
Retail	10,401	54.5%
Offices	3,072	16.1%
Cafés, pubs, restaurants, and takeaways	1,689	8.8%
Residential	1,606	8.4%
Storage / distribution	444	2.3%
Hotels	363	1.9%
Education	307	1.6%
Clubs and community centres	296	1.6%
Health	220	1.2%
Light manufacturing / industry / workshop	137	0.7%
General sports and leisure	82	0.4%
Museums, art galleries, libraries, law courts	50	0.3%
Heavy manufacturing / industry	36	0.2%
Large entertainment sites (e.g. theatres, cinemas, conference centres)	22	0.1%
Emergency services	11	0.1%
Other / screened out	358	1.9%
Total	19,094	100%

Source: Non-Domestic Baseline Tool

8.1.32. Table 31 breaks down the non-domestic stock by floor area. Properties of up to 500 square metres (5,382 square feet) represent over 80% of the stock.

Table 31: Breakdown of non-domestic properties in Edinburgh by floor area

Floor area ^{xxxi}	Number	Percentage
0-100 m ²	7,478	39.2%
101-500 m ²	8,125	42.6%
501-1,000 m ²	1,332	7.0%
>1,001 m ²	2,159	11.3%
Total	19,094	100%

Source: Non-Domestic Baseline Tool

^{xxxi} The categories in the Non-Domestic Baseline Tool overlap, e.g. “0-100 m², 100-500 m²”. Dialogue with Changeworks has indicated that the categories are rolling.

8.1.33. Table 32 breaks down the non-domestic stock by the Scottish Government’s Urban Rural Classification (8-fold). Reflecting the primarily urban nature of Edinburgh, over 95% of properties are classified as being located in large urban areas. The remainder are located in accessible small towns (primarily properties in South Queensferry) and accessible rural areas (primarily the outskirts of Edinburgh proper and outlying villages such as Balerno, Dalmeny, Kirkliston, Newbridge, and Ratho).

Table 32: Breakdown of non-domestic properties in Edinburgh by urban-rural classification

Classification	Number	Percentage
1: Large urban areas	18,171	95.2%
2: Other urban areas	0	0%
3: Accessible small towns	265	1.4%
4: Remote small towns	0	0%
5: Very remote small towns	0	0%
6: Accessible rural areas	658	3.4%
7: Remote rural areas	0	0%
8: Very remote rural areas	0	0%
Total	19,094	100%

Source: Non-Domestic Baseline Tool

Performance of non-domestic stock

8.1.34. Table 33 breaks down the non-domestic stock of Edinburgh by heating system. Relative to domestic properties, a significantly greater proportion of properties are heated by electricity, which is the main fuel type for over half the non-domestic properties in Edinburgh.

Table 33: Breakdown of non-domestic properties in Edinburgh by main fuel type

Type	Number	Percentage
Mains gas	6,417	33.6%
Electricity	10,836	56.6%
Oil	134	0.7%
Other	1,707	8.9%
Total	19,094	100%

Source: Non-Domestic Baseline Tool

8.1.35. The 19,094 properties had a total combined annual heat demand of 828,229 kilowatt hours per annum.

8.1.36. Due to the lack of data for the non-domestic stock there are many unknowns around the building stock performance.

Headline findings

8.1.37. The headline findings from the baseline analysis are set out below:

- **69%** of homes in Edinburgh are flats – a far greater proportion than Scotland overall.
- Private landlords account for **21%** of homes in Edinburgh – again far greater than Scotland overall.

- Around half of all homes in Edinburgh are located in mixed-tenure buildings.
- Homes in Edinburgh are significantly older than the Scottish average, with a tenth being listed and a quarter lying within conservation areas.
- **120,938** homes in Edinburgh have an EPC rating worse than 'C' and will require upgrading to achieve the target of all homes attaining this by 2033.
- To achieve recommended levels of energy efficiency, **129,706** homes in Edinburgh will require wall insulation (including 80,708 homes with hard-to-treat solid walls); **66,903** homes in Edinburgh will require (improved) loft insulation; and **52,279** homes will require improved glazing: a total of **248,888** interventions.
- To achieve decarbonisation of heat, at least **229,798** homes in Edinburgh will need their existing fossil fuel-based heating systems replaced, the vast majority of them (227,550) homes currently heated using gas boilers.
- At least **6,551** non-domestic buildings in Edinburgh will need their existing fossil fuel-based heating systems replaced.

Challenges and opportunities

8.1.38. The assessment of the baseline stock identifies both challenges and opportunities in terms of heat decarbonisation. The key challenges identified are:

- Edinburgh's very high proportion of flats (including its traditional tenements) and mixed-tenure buildings will greatly increase the challenge of implementing solutions. Unlike standalone homes with a single owner, where decisions can be straightforwardly taken, taking forward interventions to blocks of flats and other mixed-tenure buildings will require securing agreement from a range of stakeholders, including difficult to engage with parties such as absentee landlords. Given that coordinating even relatively uncontroversial matters such as essential repairs has historically proven challenging in some cases, it is envisaged that securing agreement from all necessary stakeholders for potentially complex and costly interventions will be particularly challenging, and in many cases unrealistic without further guidance and regulation from the Scottish Government. The high prevalence of flats also gives rise to practical challenges, for example a lack of space in which to install heat pumps and limited potential to install solar panels to offset electricity costs.^{xxxii} However, with the appropriate financing options and a clear regulatory landscape there is a major opportunity for rolling out large-scale archetype-based retrofit projects.
- As a predominantly urban local authority, the vast majority of homes in Edinburgh are connected to the gas grid, as compared to other local authorities where a greater proportion of residents are reliant on alternative heating solutions such as oil. When secondary fuels are included, over 99% of homes in Edinburgh use gas. This is likely to increase the challenge of migrating homes to zero direct emissions heating sources, as gas heating offers many benefits: it is relatively cheap; offers a high flow temperature; is well understood in the marketplace; and it has a well-developed supply chain. As set out in [section 10.3](#), the move to zero direct emissions heating

^{xxxii} By their nature, flats have a low ratio of roof space to internal floor space, while the roofs of modern blocks of flats are often used for plant.

will need to make financial sense for building users. Heat networks can potentially play a major role in retaining many of the benefits associated with gas, with the added benefits of delivering maintenance cost savings and screening customers against energy price volatility whilst providing net zero heat.

- Relative to Scotland overall, Edinburgh has a very high proportion of rental homes owned by private landlords: more than one in every five homes. Conversely, Edinburgh has a considerably smaller social housing sector. This means that the City of Edinburgh Council (and other social housing providers) have far less direct influence over housing stock than other Scottish local authorities. Additionally, this means that achieving net zero will require securing buy-in from a large cohort of private landlords, who are likely to be primarily profit-driven and who do not have a direct incentive to improve energy efficiency of their properties (e.g. compared to owner-occupiers who can benefit from lower bills and increased comfort).
- Relative to Scotland overall, Edinburgh has a considerably older housing stock, with close to a third of homes being over a century old. One in 10 homes are listed. As set out elsewhere in this document, this historicity gives rise to both practical and policy challenges to carrying out interventions.
- Edinburgh has a higher proportion of homes with uninsulated walls than Scotland (over two-fifths), and in particular has a high proportion of hard-to-treat solid stone walls. One in five homes in Edinburgh do not have double/triple glazing.

8.1.39. No specific opportunities have been identified from the baseline analysis. As a more general point, it is noted that Edinburgh is a generally affluent city with a buoyant housing and commercial property market, meaning investment in upgrading properties may be more forthcoming than in areas with less buoyant markets. Edinburgh is also a compact, densely-populated city which may give rise to economies of scale and efficiencies around the roll-out of some solutions, for example heat networks. Edinburgh also benefits from the presence of many public sector bodies, universities, and other organisations who are expected to be key partners in delivering the Edinburgh LHEES.

9. Generation of Strategic Zones and pathways

9.1. Overview

- 9.1.1. This chapter of the Edinburgh LHEES sets out Strategic Zones for each of the six LHEES Considerations, identifying what needs to be done at a strategic level to adapt buildings (and the relevant infrastructure) in Edinburgh over the next 15-20 years to achieve the central aims of the Edinburgh LHEES – the “pathways” for decarbonising each element of the building stock.
- 9.1.2. This analysis sets a starting point for the generation of, and prioritisation, of Delivery Areas, as well as for further engagement and actions in the Delivery Plan.
- 9.1.3. Through stakeholder engagement and data analysis, the Council has identified the following priority areas of focus:
- Fuel poverty
 - Heat networks
 - Heat pump ready properties

9.2. Off-gas grid buildings

Introduction

- 9.2.1. This Consideration concerns the strategy for decarbonising buildings that are not currently connected to the gas grid. As set out in [Chapter 8](#), approximately 9% of homes in Edinburgh are not currently connected to the gas grid. Buildings that are not currently connected to the gas grid represent a natural focus for heat pumps.
- 9.2.2. The focus of this Consideration is upon categorising the areas of Edinburgh not currently served by the gas grid based upon their readiness for heat pump retrofit. Properties falling into category 1 are deemed to have the greatest potential, followed by those in Category 2. Therefore, the category 1 Strategic Zones are the logic areas of focus for the deployment of heat pumps.
- 9.2.3. The Delivery Plan identifies Delivery Areas within the category 1 Strategic Zones that are proposed to be short-term areas of focus for heat pump retrofit.
- 9.2.4. Properties falling in Category 3 are assessed as having the lowest potential for heat pump retrofit. Some of these properties fall into prospective Heat Network Zones, and therefore connection to a heat network may be a viable alternative in these cases. Category 3 properties that do not fall into prospective Heat Network Zones represent the greatest challenge in terms of heat decarbonisation. Depending on the existing heating solution for these buildings, options may include direct electric heating or bioenergy.

Process

- 9.2.5. Within this Consideration, indicators have been identified for each of the four categories into which properties are to be grouped in terms of readiness for heat pump retrofit.

- Off gas grid – properties to be assessed under this Consideration are initially identified by using the Home Analytics dataset to identify properties not connected to the gas grid.^{xxxiii}
- 9.2.6. Category 0 properties are those currently have a low or zero direct emissions heating system, or are connected to a heat work.
 - Properties falling under category 0 are identified by using the Home Analytics dataset to identify properties currently heated using a heat pump or via a heat network.^{xxxiv}
- 9.2.7. Category 1 properties are those considered as being highly suited for heat pump retrofit, being well insulated properties with wet heating systems.
 - Category 0 property – properties that fall into category 0 are excluded. Data for this indicator is derived from the Home Analytics dataset.
 - Listed property – properties that are listed are excluded from category 1, as listed buildings entail additional considerations for retrofit (such as listed building consent). Data for this indicator is derived from the Home Analytics dataset.
 - Conservation Area – properties that are within a Conservation Area are excluded from category 1, as Conservation Areas entail additional considerations for retrofit. Data for this indicator is derived from the Home Analytics dataset.
 - Insulated walls – properties must have insulated walls to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
 - Double/triple glazed windows – properties must have double or triple glazed windows to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
 - Loft insulation 99mm+ – properties must have at least 99mm of loft insulation to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
 - Main heating LPG, oil or biomass/solid – properties must be heated using liquefied petroleum gas, oil, or biomass/solid fuel, i.e. a “wet” system, to be included in category 1. This is as wet systems are considerably easier to transition to heat pumps than electric heating systems (or properties with no existing heating system). Data for this indicator is derived from the Home Analytics dataset.
- 9.2.8. Category 2 properties are those considered as having secondary potential for heat pump retrofit, needing moderate fabric upgrades and/or the addition of wet distribution systems.
 - Category 0 or 1 property – properties that fall into category 0 or 1 are excluded from category 2. Data for this indicator is derived from the Home Analytics dataset.
 - Insulated walls – properties that have uninsulated solid walls, or are system built, or have timber frames are excluded from category 2, as insulating these wall types to

^{xxxiii} This is done by selecting properties where the value for “off gas grid” is “yes”, or where the value for “off gas grid” is “unknown” and the value for “main fuel type” is not “mains gas”.

^{xxxiv} This is done by selecting properties where the value for “main heating system” is “communal” or “heat pump”.

an appropriate standard is considered beyond a moderate upgrade. Data for this indicator is derived from the Home Analytics dataset.

- Risk of narrow uninsulated cavity – properties that have narrow uninsulated cavities are excluded from category 2, as these walls will be challenging to bring up to the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.

9.2.9. Category 3 properties are those identified as having the least current potential for heat pump retrofit, i.e. significant fabric upgrades would be required to make them heat pump ready.

- Category 3 properties are identified as off-gas properties that do not fall into category 0, 1, or 2 as part of the above assessment.
- Main heating fuel is oil or LPG – properties must be heated using liquefied petroleum gas or oil to be included in category 3. This is as solid fuel-based systems are considered to be more suited to switching to biomass in these circumstances. Data for this indicator is derived from the Home Analytics dataset.

Outputs

9.2.10. Of the 24,146 homes in Edinburgh not currently connected to the gas grid, 2,218 (9.2%) fall into category 0, i.e. they already have a low or zero direct emissions heating system, or are connected to a heat network. 9,470 properties (39.2%) fall into category 1, i.e. are identified as having the greatest potential for heat pump retrofit, while a further 7,223 properties (29.9%) fall into category 2, i.e. have secondary potential for heat pump retrofit. The remaining 5,235 (21.7%) properties fall into category 3, having the lowest potential for heat pump retrofit. Overall, therefore, approximately 78% of homes in Edinburgh not currently connected to the gas grid already have decarbonised heating or have good/reasonable potential to migrate to heat pumps, while 22% would require significant works to effectively migrate to heat pumps.

Table 34: Breakdown of off-gas domestic properties in Edinburgh by category and tenure

Category	Local authority	Housing association	Owner occupied	Private rented	Total
0	210	653	654	701	2,218
1	1,711	1,249	4,308	2,202	9,470
2	143	365	4,574	2,141	7,223
3	1,157	188	1,870	2,020	5,235
Total	3,221	2,455	11,406	7,064	24,146

Source: Domestic Baseline Tool

9.2.11. The number of off-gas homes falling into each category for each datazone of Edinburgh is visualised in [Figure 16](#), [Figure 17](#), [Figure 18](#), and [Figure 19](#). It can be seen that there is limited geographical patterning to the distribution of category 1 off-gas homes in Edinburgh, with pockets of category 1 properties throughout the city. Interventions in relation to this consideration are therefore likely to be focused on specific neighbourhoods rather than wider areas of the city. Homes in category 3, i.e. those homes that are least suited to be adapted to heat pumps, are somewhat concentrated in the city centre.

9.2.12. The 10 datazones with the highest counts of category 1 off-gas homes are set out in Table 35. These areas may be strong candidates for early-stage interventions to retrofit homes for the installation of heat pumps.

Table 35: Edinburgh datazones with highest counts of category 1 off-gas homes

Datazone	Name	Cat 1 off-gas homes	Total off-gas homes	% off-gas homes Cat 1
S01008770	Western Harbour and Leith Docks – 03	316	596	53.0%
S01008658	Dalry and Fountainbridge – 08	277	1,197	23.1%
S01008478	Stenhouse and Saughton Mains – 06	266	712	37.4%
S01008569	Moredun and Craigour – 01	264	420	62.9%
S01008456	The Calders – 03	263	537	49.0%
S01008932	Muirhouse – 04	254	423	60.1%
S01008462	Murrayburn and Wester Hailes North – 04	249	357	69.8%
S01008843	Broughton South – 04	200	1,069	18.7%
S01008929	Muirhouse – 01	195	635	30.7%
S01008516	Morningside and Craighouse – 03	175	673	26.0%

Source: Domestic Baseline Tool

9.2.13. The 10 datazones with the highest proportions of category 1 off-gas homes owned by the City of Edinburgh Council are set out in Table 36. This indicates the geographical areas where the Council has the greatest influence in terms of being able to roll-out heat pumps.

Table 36: Edinburgh datazones with highest % of local authority-owned category 1 off-gas homes

Datazone	Name	Council-owned Cat 1 off-gas homes	Total off-gas homes	% off-gas homes Council owned Cat 1
S01008462	Murrayburn and Wester Hailes North – 04	235	259	65.8%
S01008569	Moredun and Craigour – 01	260	273	61.9%
S01008456	The Calders – 03	259	273	48.2%
S01008929	Muirhouse – 01	194	380	30.6%
S01008906	West Pilton – 03	115	135	29.1%
S01008455	The Calders – 02	129	136	23.9%
S01008562	Hyvots and Gilmerton – 04	50	58	10.3%
S01008903	Drylaw – 05	24	27	5.0%
S01008702	Craigmillar – 02	16	22	5.0%
S01008679	Old Town, Princes Street and Leith Street – 06	39	256	5.0%

Source: Domestic Baseline Tool

9.2.14. Overall, the analysis carried out against this Consideration indicates that a significant proportion of homes in Edinburgh not currently connected to the gas grid offer strong

potential for conversion to heat pumps. However, the properties with the greatest potential are largely scattered across the city, with limited obvious focal points.

- 9.2.15. The most realistic and pragmatic approach for Edinburgh is to begin with less complicated and simpler decarbonisation projects, moving into more complex retrofits as the Council, supply chain, stakeholders and property owners expand their learning. As such, the Council proposes that early interventions should focus on category 1 properties which are most “heat pump ready”. The Delivery Plan highlights Delivery Areas with a focus on category 1 properties.

9.3. On-gas grid buildings

Introduction

- 9.3.1. This Consideration concerns the strategy for decarbonising buildings that are currently connected to the gas grid. As set out in [Chapter 8](#), the vast majority of domestic properties and the majority of non-domestic properties in Edinburgh are currently heated via mains gas. The decarbonisation of the heating of buildings in Edinburgh will necessitate every property served by gas being retrofit with an alternative heating solution.
- 9.3.2. The focus of this Consideration is upon categorising the areas of Edinburgh currently served by the gas grid based upon their readiness for heat pump retrofit. Properties falling into category 1 are deemed to have the greatest potential, followed by those in category 2. Therefore, the category 1 Strategic Zones are the logic areas of focus for the deployment of heat pumps.
- 9.3.3. The Delivery Plan identifies Delivery Areas within the category 1 Strategic Zones that are proposed to be short-term areas of focus for heat pump retrofit.
- 9.3.4. Properties falling in Category 3 are assessed as having the lowest potential for heat pump retrofit. Some of these properties fall into prospective Heat Network Zones, and therefore connection to a heat network may be a viable alternative in these cases. Category 3 properties that do not fall into prospective Heat Network Zones represent the greatest challenge in terms of heat decarbonisation. Green/blue hydrogen may be a potential solution for these properties, albeit as set out in [section 4.5](#) the prospects for hydrogen are still unclear.

Process

- 9.3.5. Within this Consideration, indicators have been identified for each of the four categories into which properties are to be grouped in terms of readiness for heat pump retrofit.
- On gas grid – properties to be assessed under this Consideration are initially identified by using the Home Analytics dataset to identify properties connected to the gas grid.^{xxxv}
- 9.3.6. Category 0 properties are those already connected to a heat network (or communal heating system), which are deemed to be highly suited to a heat pump solution.
- Properties falling under category 0 are identified by using the Home Analytics dataset to identify properties currently connected to a heat network.^{xxxvi}

^{xxxv} This is done by selecting properties where the value for “main heating system” is “communal”.

^{xxxvi} This is done by selecting properties where the value for “off gas grid” is “no”, or where the value for “off gas grid” is “unknown” and the value for “main fuel type” is “mains gas”.

- 9.3.7. Category 1 properties are those considered as being highly suited for heat pump retrofit, being well insulated properties with wet heating systems.
- Category 0 property – properties that fall into category 0 are excluded. Data for this indicator is derived from the Home Analytics dataset.
 - Listed property – properties that are listed are excluded from category 1, as listed buildings entail additional considerations for retrofit (such as listed building consent). Data for this indicator is derived from the Home Analytics dataset.
 - Conservation Area – properties that are within a Conservation Area are excluded from category 1, as Conservation Areas entail additional considerations for retrofit. Data for this indicator is derived from the Home Analytics dataset.
 - Insulated walls – properties must have insulated walls to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
 - Double/triple glazed windows – properties must have double or triple glazed windows to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
 - Loft insulation 99mm+ – properties must have at least 99mm of loft insulation to be included in category 1, as this is required to achieve the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
- 9.3.8. Category 2 properties are those considered as having secondary potential for heat pump retrofit, needing moderate fabric upgrades and/or the addition of wet distribution systems.
- Category 0 or 1 property – properties that fall into category 0 or 1 are excluded from category 2. Data for this indicator is derived from the Home Analytics dataset.
 - Insulated walls – properties that have uninsulated solid walls, or are system built, or have timber frames are excluded from category 2, as insulating these wall types to an appropriate standard is considered beyond a moderate upgrade. Data for this indicator is derived from the Home Analytics dataset.
 - Risk of narrow uninsulated cavity – properties that have narrow uninsulated cavities are excluded from category 2, as these walls will be challenging to bring up to the energy efficiency required for heat pumps. Data for this indicator is derived from the Home Analytics dataset.
- 9.3.9. Category 3 properties are those identified as having the least current potential for heat pump retrofit, i.e. significant fabric upgrades would be required to make them heat pump ready.
- Category 3 properties are identified as on-gas properties that do not fall into category 0, 1, or 2 as part of the above assessment.

Outputs

- 9.3.10. Of the 241,396 homes in Edinburgh currently connected to the gas grid, 4,778 (2.0%) fall into category 0, i.e. they already have a low or zero direct emissions heating system, or are connected to a heat network. 107,847 properties (44.7%) fall into category 1, i.e. are identified as having the greatest potential for heat pump retrofit, while a further 33,603 properties (13.9%) fall into category 2, i.e. have secondary potential for heat pump retrofit. The remaining 95,168 (39.4%) properties fall into category 3, having the lowest potential for heat pump retrofit. Overall, therefore, approximately 61% of homes in Edinburgh currently connected to the gas grid already have decarbonised heating or have good/reasonable

potential to migrate to heat pumps, while 39% would require significant works to effectively migrate to heat pumps. This indicates that the migration of on-gas homes to heat pumps is likely to prove considerably more challenging than the migration of off-gas homes.

Table 37: Breakdown of on-gas domestic properties in Edinburgh by category and tenure

Category	Local authority	Housing association	Owner occupied	Private rented	Total
0	957	2,403	726	692	4,778
1	20,291	10,174	63,905	13,477	107,847
2	2,278	2,522	22,561	6,242	33,603
3	3,600	3,511	59,574	28,483	95,168
Total	27,126	18,610	146,766	48,894	241,396

Source: Domestic Baseline Tool

9.3.11. The number of on-gas homes falling into each category for each datazone of Edinburgh is visualised in [Figure 20](#), [Figure 21](#), [Figure 22](#), and [Figure 23](#). It can be seen that there is limited geographical patterning to the distribution of category 1 on-gas homes in Edinburgh, with pockets of category 1 properties throughout the city. Interventions in relation to this consideration are therefore likely to be focused on specific neighbourhoods rather than wider areas of the city. Homes in category 3, i.e. those homes that are least suited to be adapted to heat pumps, are somewhat concentrated in the city centre.

9.3.12. The 10 datazones with the highest counts of category 1 on-gas homes are set out in Table 38. These areas may be strong candidates for short-term interventions to retrofit homes for the installation of heat pumps.

Table 38: Edinburgh datazones with highest counts of category 1 on-gas homes

Datazone	Name	Cat 1 on-gas homes	Total on-gas homes	% on-gas homes Cat 1
S01008549	Gilmerton South and the Murrays – 03	2,263	2,577	87.8%
S01009002	Dalmeny, Kirkliston and Newbridge – 06	1,328	1,597	83.2%
S01008704	Craigmillar – 04	1,240	1,661	74.7%
S01008768	Western Harbour and Leith Docks – 01	1,077	1,515	71.1%
S01008720	Jewel, Brunstane and Newcraighall – 04	766	885	86.6%
S01008931	Muirhouse – 03	709	808	87.8%
S01008920	Granton and Royston Mains – 01	685	1,111	61.7%
S01008908	West Pilton – 05	681	823	82.8%
S01008701	Craigmillar – 01	643	744	86.4%
S01008771	Western Harbour and Leith Docks – 04	627	642	97.7%

Source: Domestic Baseline Tool

9.3.13. The 10 datazones with the highest proportions of category 1 on-gas homes owned by the City of Edinburgh Council are set out in Table 39. This indicates the geographical areas where the Council has the greatest influence in terms of being able to roll-out heat pumps. It can be seen

that the Granton South and Wardieburn and the Murrayburn and Wester Hailes North areas of Edinburgh may offer good potential for Council-led retrofit projects.

Table 39: Edinburgh datazones with highest % of Council-owned category 1 on-gas homes

Datazone	Name	Council-owned Cat 1 on-gas homes	Total off-gas homes	% on-gas homes Council owned Cat 1
S01008918	Granton South and Wardieburn – 03	257	298	86.2%
S01008919	Granton South and Wardieburn – 04	226	267	84.6%
S01008461	Murrayburn and Wester Hailes North – 03	412	557	73.7%
S01008460	Murrayburn and Wester Hailes North – 02	277	380	72.9%
S01008463	Murrayburn and Wester Hailes North – 05	251	364	69.0%
S01008471	Broomhouse and Bankhead – 04	238	360	66.1%
S01008459	Murrayburn and Wester Hailes North – 01	275	426	63.7%
S01008712	Bingham, Magdalene and The Christians – 01	363	580	61.0%
S01008917	Granton South and Wardieburn – 02	237	395	59.0%
S01008930	Muirhouse – 02	414	653	57.2%

Source: Domestic Baseline Tool

- 9.3.14. Overall, the analysis carried out against this Consideration indicates that a significant proportion of homes in Edinburgh currently connected to the gas grid offer strong potential for conversion to heat pumps, albeit with a substantial majority of homes falling in category 3. However, the properties with the greatest potential are largely scattered across the city, with limited obvious focal points. Several areas of the city where the Council has extensive ownership of category 1 on-gas homes may be logical locations for early intervention.
- 9.3.15. The most realistic and pragmatic approach for Edinburgh is to begin with less complicated and simpler decarbonisation projects, moving into more complex retrofits as the Council, supply chain, stakeholders and property owners expand their learning. As such, the Council proposes that early interventions should focus on category 1 properties which are most “heat pump ready”. The Delivery Plan highlights Delivery Areas with a focus on category 1 properties.

9.4. Heat networks

Introduction

- 9.4.1. This Consideration concerns the decarbonisation of space heating using heat networks. The Strategic Zones relating to this Consideration are the areas of Edinburgh that are deemed to be particularly suitable locations for the development of a heat network.
- 9.4.2. Edinburgh has a relatively high heat density, good availability of heat sources, and many buildings with high energy use intensity which can serve as “anchor loads” increasing the viability of a heat network. All of these have resulted in Edinburgh being ranked as the third-highest Scottish local authority area for potential of heat delivered by a heat network. There

may be scope to deliver a city-wide heat network (or “network of networks”) covering much of Edinburgh’s population.

- 9.4.3. This Consideration is of particular significance in that the Strategic Zones identified for it will form the basis of a statutory exercise that will be undertaken in line with the Heat Networks (Scotland) Act 2021 and Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023 to legally designate Heat Network Zones in Edinburgh. Therefore, unlike the other Considerations, the Strategic Zones associated with this Consideration will eventually have legal status, albeit the definitions of the Strategic Zones may evolve between the publication of the Edinburgh LHEES and the completion of the statutory exercise that will subsequently be undertaken. As noted in [section 6.2](#), the Heat Network Zones will form the basis of a permitting regime that is intended to catalyse investment in heat networks by providing heat network operations with exclusive access to the consumer base within a Heat Network Zone.
- 9.4.4. To distinguish between the Strategic Zones relating to the heat networks consideration that are identified as part of the Edinburgh LHEES and the Heat Network Zones that will be designated as part of the subsequent statutory exercise, the former are hereafter referred to as “prospective Heat Network Zones” and the latter as “statutory Heat Network Zones”.
- 9.4.5. It is important to note that a location not falling within a designated Heat Network Zone does not preclude the development of a heat network in that area; conversely, a location falling within a Heat Network Zone does not guarantee that a heat network will be developed there. Heat network zones purely identify areas that are assessed as having the greatest potential for heat networks, i.e. where heat networks are expected to be most viable. The Heat Network Zones set out in the Edinburgh LHEES are not an exhaustive schedule of the locations in Edinburgh where a heat network may prove viable, but rather the areas where heat networks are judged to have the greatest viability and/or to be of the greatest strategic importance.
- 9.4.6. Consideration has been given to potential heat sources for heat networks in Edinburgh. It is recognised that the best solution for a given heat network will depend upon site-specific technical and commercial factors, and therefore the Edinburgh LHEES is not prescriptive about heat sources. However, potential sources have been identified and highlighted to inform subsequent work to deliver heat networks. Key potential sources of heat in Edinburgh include:
- Air source heat pumps – producing heat centrally using air source heat pumps.
 - Sewer source heat pumps – capturing heat from the sewers running beneath Edinburgh. Scottish Water has advised that only sewers above 300mm in diameter and with potential sewage flow rates of 40 litres per second or faster are likely to be suitable. A plan showing these sewers in Edinburgh has been provided. A map of potential wastewater extraction opportunities is shown at [Figure 05](#).
 - Water source heat pumps – capturing heat from watercourses such as the Firth of Forth or the Almond River. Smaller watercourses such as the Water of Leith or Union Canal are unlikely to offer significant potential due to the environmental impact of extracting heat being proportionately greater.
 - Seafeld Waste Water Treatment Works – capturing heat from the treatment works, which currently discharges water into the Firth of Forth at a temperature of 15°C.

- Mine water heat – capturing heat from disused mine workings under Edinburgh. A map of known workings is shown at [Figure 04](#). The Coal Authority has been appointed to prepare a more detailed initial opportunity map for Edinburgh.
- Waste heat – capturing heat generated as a byproduct of activities in Edinburgh.⁶⁵ Analysis of Scotland Heat Map data shows 63 potential waste heat sources in Edinburgh – comprising seven bakeries; two breweries; three data centres; one distillery; 48 supermarkets; and two wastewater treatment plants – with a total combined waste heat potential of 127,372 megawatt hours. A map of potential waste heat sources is shown at [Figure 06](#).
- Millerhill Recycling and Energy Recovery Centre – utilising heat generated from the incineration of waste at the MRERC in Millerhill, Midlothian, which has the potential to offer a maximum heat export of 20 megawatt thermal to a heat network.

Process

- 9.4.7. Analysis has been undertaken to identify the locations in Edinburgh where it is judged that heat networks may represent a viable heat option. It is noted that the Edinburgh LHEES does not itself formally designate Heat Network Zones; rather, it sets out an evidence base that will support the formal designation of zones via a statutory process at a later date.
- 9.4.8. Analysis to identify the potential Heat Network Zones was undertaken on behalf of the Council by Ramboll. In line with the LHEES Methodology, Ramboll imported heat demand data from the Scotland Heat Map and created buffer zones around specific linear heat density levels. Detailed information on the methodology is set out in [section 5.1](#).
- 9.4.9. In July 2023, a workshop facilitated by Ramboll and Turner & Townsend was held with key Council officers along with representatives of the Scottish Government’s Heat Networks Regulation Team; SP Energy Networks; the University of Edinburgh; and Edinburgh World Heritage Trust.^{xxxvii} The purpose of the workshop was as follows:
- To review the shortlisted options and determine which was the most appropriate on which to establish a baseline map.
 - To review the baseline map and suggest any modifications and refinements based upon the knowledge and experience of the workshop attendees.
- 9.4.10. Key points raised in the workshop included:
- The emerging Heat Network Zones serve many of the most densely populated areas of Edinburgh.
 - Heat networks may prove challenging to deliver in areas of archaeological significance, for example the Old Town. Conversely, however, heat networks may be a better solution than heat pumps for many tenemental properties due to avoiding the need for as extensive retrofitting and the need to find a location to install the heat pumps.
 - Overly large Heat Network Zones raise the risk that property owners do not invest in zero direct emissions heating systems due to anticipating that they will be served by a heat network (which may take some time to manifest) whereas overly small heat

^{xxxvii} It was determined that it would not be appropriate to invite heat network developers/operators to the workshop as the Council was in the process of tendering for a concessionaire to deliver a heat network serving Granton Waterfront and therefore a conflict of interest could potentially arise.

networks raise the risk of stranded assets if zero direct emissions heating systems are installed serving properties that are later connected to a heat network.

- Having a single Heat Network Zone or a small number of zones poses the risk that heat networks will take a very long time to be delivered due to the right to develop the heat network resting with a single developer.
- To operate effectively, heat networks are likely to require a means of storing heat.

9.4.11. Further consultation with key stakeholders identified the following points:

- There is a risk that heat network delivery models will drive unwanted behaviour, e.g. if contracts require off-takers to pay for a minimum quantity of heat, thus compromising efforts to minimise energy usage.
- Fifth generation (ambient) heat networks have the potential to minimise waste by balancing heating and cooling loads. This may work most effectively in areas where there are residential properties and commercial properties in close proximity. Commercial properties such as offices, data centres, and supermarkets may have significantly coolth requirements which can be offset against the heat requirements of residential properties.
- The development of a heat network in the Old Town of Edinburgh may prove challenging due to the solid rock making the deployment of pipework costly.

9.4.12. Following the workshop, the map was further refined to reflect considerations such as alignment with physical barriers (e.g. railway lines).

9.4.13. It is noted that the prospective Heat Network Zones have been informed primarily by technical considerations. Additional work would be required to refine the zones to reflect commercial considerations, for example the minimum size/demand required for a zone to be viable.

Outputs

9.4.14. Based upon the analysis and consultation set out above, 17 prospective Heat Network Zones in Edinburgh have been identified. Table 40 presents summary information on the 17 prospective Heat Network Zones (extracted from the Heat Network Zone Summary tool). A map of the zones is shown at [Figure 22](#).

Table 40: Summary of prospective Heat Network Zones in Edinburgh

ID	Name ^{xxxviii}	Screening criteria	Annual heat demand (MWh / year)	Anchor loads
01	New Town	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	112,025	37
02	Leith Walk	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / meter / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	439,127	43

^{xxxviii} Names are purely illustrative.

ID	Name ^{xxxviii}	Screening criteria	Annual heat demand (MWh / year)	Anchor loads
03	Old Town & Southside	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	706,174	149
04	Gorgie & Dalry	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	630,021	14
05	Craigeleith	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	287,103	33
06	Granton	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	190,383	26
07	Leith	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	119,369	32
08	Portobello & Seafield	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	88,143	10
09	Morningside	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	283,938	17
10	South East Edinburgh	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	187,528	38
11	Colinton Mains	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	11,675	5
12	South West Edinburgh	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	119,474	27
13	Heriot-Watt	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	68,751	17
14	Sighthill & Gyle	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	138,136	45
15	Ingliston	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	90,287	34
16	South Queensferry	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	75,742	8

ID	Name ^{xxxviii}	Screening criteria	Annual heat demand (MWh / year)	Anchor loads
17	Second New Town	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre /year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	185,446	10

Source: Heat Network Zone Summary

- 9.4.15. The 17 zones cover a significant proportion of Edinburgh. Collectively, they represent 3,733,322 megawatt hours of heat demand.^{xxxix} This is a similar quantum to the First National Assessment, which, as set out in [section 7.4](#), identified 41 zones with a total combined heat demand of 3,404,609 megawatt hours per annum.
- 9.4.16. The zones cover a range of areas, including densely populated inner-city neighbourhoods; suburban residential areas; industrial areas; Edinburgh Airport; and Heriot-Watt University's campus. They encompass a significant proportion of the city's population and the vast majority of its key employment areas.
- 9.4.17. Further analysis and consultation will be required to fully assess the opportunities presented by each zones. However, the following observations are made:
- The Council is currently in the process of tendering for a concessionaire to build and operate a heat network within the Granton zone.
 - Other projects are at various stages of development within the Ingliston; South East Edinburgh; and Portobello & Seafield zones.
 - The Old Town & Southside zone has by far the largest heat demand, followed by the Gorgie & Dalry zone and the Leith Walk zone.
- 9.4.18. Strategic challenges to the roll-out of heat networks in these zones are expected to include:
- Potential difficulties in developing cost competitive proposition for off-takers, particularly for as long as mains gas remains an alternative option.
 - Potential difficulties securing connections, particularly while there is no legal requirement for any existing buildings to connect to heat networks.
 - Challenges associated with sub-ground conditions, for example the presence of archaeological remains or bedrock.
 - Challenges securing appropriate sites for energy centres and substations, particularly in the more central zones which are densely developed and are generally sensitive places to develop in terms of aesthetics.
- 9.4.19. It is noted that the Council will require to go through a further statutory process to formally designate Heat Network Zones. Given this, the prospective Heat Network Zones set out in the Edinburgh LHEES are likely to evolve somewhat.
- 9.4.20. Further information on the delivery of heat networks in Edinburgh is set out in the Delivery Plan.

^{xxxix} i.e., 1,419 gigawatt hours or 1.4 terawatt hours

9.5. Poor building energy efficiency

Introduction

- 9.5.1. This Consideration identifies strategic areas of focus in Edinburgh in terms of poor energy efficiency, identifying where interventions are required to drive reductions in heat demand.
- 9.5.2. Poor energy efficiency has been assessed based on three indicators: single glazed windows, no/minimal loft insulation, and uninsulated walls.

Process

- 9.5.3. Three indicators have been identified for this LHEES Consideration:
- Single glazed windows – this indicator has a 33.333% weighting. It is a binary indicator used to identify properties with single glazed windows, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.
 - Loft insulation – this indicator has a 33.333% weighting. It is a binary indicator used to identify properties with no/minimal loft insulation, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.
 - Wall insulation – this indicator has a 33.333% weighting. It is a binary indicator used to identify properties with uninsulated walls, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.

Outputs

- 9.5.4. Analysis was conducted on the 265,542 homes in Edinburgh with a confirmed heat demand above zero to identify which suffered from poor energy efficiency, utilising the metrics set out above. The data indicates that uninsulated walls is by far the biggest driver of poor energy efficiency, with close to half of all homes in Edinburgh affected by this issue. Slightly under one-fifth of homes have single glazed windows. A significant number of homes (44,403 – 16.7% of the total stock) have both uninsulated walls and single glazed windows. 6,156 homes – 2.3% of the total stock – were afflicted with all three characteristics; these homes could be expected to represent the absolute poorest stock in terms of energy efficiency.

Table 41: Breakdown of poor energy efficiency homes in Edinburgh by characteristic(s)

Characteristic(s)	Number	Percentage
Loft insulation <100 mm	25,823	9.7%
Single glazed windows	51,279	19.3%
Uninsulated walls	129,706	48.8%
Single glazed windows / loft insulation <100 mm	6,686	2.5%
Single glazed windows / uninsulated walls	44,403	16.7%
Uninsulated walls / loft insulation <100 mm	15,598	5.9%
Uninsulated walls / loft insulation <100 mm / single glazed windows	6,156	2.3%

Source: Domestic Baseline Tool

- 9.5.5. The number of homes with uninsulated walls in each datazone of Edinburgh is visualised in [Figure 26](#). It can be seen that these homes are concentrated in the city centre and in the neighbourhoods to the south, with additional pockets in the north and east of Edinburgh.

[Figure 27](#) shows the distribution of homes with solid stone/brick walls, which are likely to prove particularly challenging to insulate; again these are clustered around the city centre.

9.5.6. The 10 datazones with the highest number of homes with uninsulated walls owned by the City of Edinburgh Council are set in Table 42. This indicates the geographical areas where the Council has the greatest influence in terms of being able to roll-out wall insulation.

Table 42: Edinburgh datazones with highest count of Council-owned homes with uninsulated walls

Datazone	Name	Council-owned homes with uninsulated walls	Total homes	% homes Council-owned with uninsulated walls
S01008929	Muirhouse – 01	227	635	35.7%
S01008746	Northfield and Piershill – 04	198	604	32.8%
S01008787	Great Junction Street – 03	190	212	89.6%
S01008675	Old Town, Princes Street and Leith Street – 02	186	785	23.7%
S01008760	Restalrig and Lochend – 05	158	513	30.8%
S01008757	Restalrig and Lochend – 02	143	417	34.3%
S01008809	Hillside and Calton Hill – 04	141	543	26.0%
S01008785	Great Junction Street – 01	139	533	26.1%
S01008801	Easter Road and Hawkhill Avenue – 04	121	730	16.6%
S01008703	Craigmillar – 03	118	482	24.5%

Source: Domestic Baseline Tool

9.5.7. The 10 datazones with the highest proportions of homes with all three characteristics of poor energy efficiency are set out in Table 43. This indicates the geographical areas with the greatest issues in terms of energy efficiency. It can be seen that the areas in question are largely more affluent areas of the city with significant elements of build heritage. This suggests that poor energy efficiency in Edinburgh is largely a product of the city’s aged housing stock.

Table 43: Edinburgh datazones with highest count of homes with all three characteristics of poor energy efficiency

Datazone	Name	Homes with three characteristics	Total homes	% homes with three characteristics
S01008676	Old Town, Princes Street and Leith Street – 03	221	661	33.4%
S01008868	Deans Village – 01	105	673	15.6%
S01008882	Murrayfield and Ravelston – 02	105	446	23.5%
S01008861	Stockbridge – 05	98	414	23.7%
S01008593	Blackford, West Mains and Mayfield Road – 07	84	327	25.7%
S01008627	Morningside – 04	83	262	31.7%

Datazone	Name	Homes with three characteristics	Total homes	% homes with three characteristics
S01008685	Canongate, Southside and Dumbiedykes – 06	82	1235	6.6%
S01008852	New Town West – 04	73	642	11.4%
S01008600	Newington and Dalkeith Road – 02	71	337	21.1%
S01008850	New Town West – 02	70	465	15.1%

Source: Domestic Baseline Tool

9.5.8. The analysis against this Consideration has identified the quantity of interventions that will be required to achieve good energy efficiency across Edinburgh’s residential stock. It has also identified the geographical areas where the greatest number of interventions are expected to be required. The analysis shows that the required interventions are concentrated in areas of Edinburgh with significant levels of historic buildings, suggesting that taking forward these interventions will in many cases require a more specialised approach.

9.5.9. The datazones with the greatest proportion of Council-owned homes with poor wall insulation may represent logical candidates for early intervention.

9.6. Poor building energy efficiency as a driver for fuel poverty

Introduction

9.6.1. This Consideration identifies strategic areas of focus in Edinburgh in terms of poor energy efficiency where this is a driver of fuel poverty, identifying where interventions are required to drive reductions in fuel poverty via reducing heat demand.

9.6.2. Poor energy efficiency as a driver of fuel poverty was assessed based on four indicators: the assessed probability of the households of the home in question being in fuel poverty, coupled with three indicators pertaining to poor energy efficiency (single glazed windows, no/minimal loft insulation, and uninsulated walls).

9.6.3. The nature of interventions relating to this Consideration will be influenced by the tenure of the building.

Process

9.6.4. Four indicators have been identified for this LHEES Consideration – one pertaining to fuel poverty and three pertaining to energy efficiency:

- Probability of fuel poverty – this indicator has a 50% weighting. It refers to the assessed probability of the household of the home in question being in fuel poverty. Data for this indicator is derived from the Home Analytics dataset.
- Single glazed windows – this indicator has a 16.666% weighting. It is a binary indicator used to identify properties with single glazed windows, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.
- Loft insulation – this indicator has a 16.666% weighting. It is a binary indicator used to identify properties with no/minimal loft insulation, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.

- Wall insulation – this indicator has a 16.666% weighting. It is a binary indicator used to identify properties with uninsulated walls, which contributes to low energy efficiency. Data for this indicator is derived from the Home Analytics dataset.

Outputs

- 9.6.5. Analysis was conducted on the 265,542 homes in Edinburgh with a confirmed heat demand above zero to assess properties in fuel poverty and where poor energy efficiency was a likely contributor to that. It is estimated that 54,944 homes (20.7% of the total) in Edinburgh are in fuel poverty, while 18,367 (6.9%) are in extreme fuel poverty.
- 9.6.6. Incidences of high fuel poverty and poor energy efficiency (measured based on the proportion of uninsulated walls) in each datazone of Edinburgh are visualised in [Figure 28](#). It can be seen that the greatest concentration is shown to be in the historic city centre and the surrounding areas, as opposed to the areas of Edinburgh traditionally associated with deprivation. Given this, the Council has reservations about the robustness of these conclusions. Accordingly, the Council has opted not to focus on these conclusions for the purposes of interventions aimed at mitigating fuel poverty, but rather will continue to concentrate on areas of Edinburgh with high levels of deprivation as identified using the 2020 Scottish Index of Multiple Deprivation (SIMD), as this is judged to be a more robust approach. SIMD data is visualised in [Figure 29](#).
- 9.6.7. Addressing fuel poverty is a longstanding priority for the Council, and properties at risk of fuel poverty have been the focus of Area-Based Scheme and other initiatives. As and when resources and powers are made available for the delivery of the Edinburgh LHEES, the Council will potentially look to grow activities in these areas further by reaching various tenure types (and potentially also non-domestic buildings) to catalyse area-wide transformation of the building stock. The Delivery Plan identifies Delivery Areas identified for this Consideration.

9.7. Mixed-tenure, mixed-use, and historic buildings

Introduction

- 9.7.1. This Consideration concerns the strategy for decarbonising buildings that are complex due to being mixed-tenure (i.e. with properties of different tenures within the same building, e.g. a block of flats with privately-owned and Council-owned flats), mixed-use (i.e. occupied by both domestic and non-domestic properties), and/or historic (i.e. listed and/or within a conservation area). These buildings are likely to prove challenging to decarbonise due to the range of stakeholders involved, their design, and planning policies that restrict interventions.
- 9.7.2. Mixed-tenure buildings present complexities due to the added challenge of securing buy-in from the different parties within the building. A primary example would be multi-storey buildings in which the Council still owns some properties, but others have passed to private owners under the Right to Buy policy (and may in turn have become private rented properties). In buildings such as this, the Council is unable to act unilaterally, but would require to secure buy-in for any interventions from all parties.
- 9.7.3. Mixed-use buildings, for example a block of flats with commercial units on the ground floor, present complexities due to the different owners/tenancies and design considerations associated with the different use classes.

9.7.4. Historic buildings present complexities due to their design generally not being conducive to the typical interventions that would be carried out to boost a building's energy efficiency, for example solid stone walls that cannot be treated with cavity insulation. This is compounded by planning policies which restrict the interventions that are permissible, for example prohibiting the replacement of traditional sash and cash windows with more energy efficient, but non-historically accurate, uPVC windows. Achieving a high standard of energy efficiency in a historic building can in some cases require complex bespoke interventions.

Process

9.7.5. Within this Consideration, indicators have been identified for each of the sub-Considerations.

9.7.6. Three indicators have been identified for the mixed-tenure sub-Consideration:

- Dwellings in building – this indicator is used to identify if there is more than one dwelling within a building. This indicator has a 25% weighting. Data for this indicator is derived from the Home Analytics dataset.
- Mixed tenure – this indicator is used to identify if there are properties identified as being mixed tenure within a building. This indicator has a 25% weighting. Data for this indicator is derived from the Home Analytics dataset.
- Parent and child UPRNs – this indicator is used to identify buildings with a mix of domestic and non-domestic properties. This indicator has a 50% weighting. Data for this indicator is derived from the One Scotland Gazetteer.

9.7.7. One indicator has been identified for the listed buildings sub-Consideration:

- Identification of listed buildings: listed building grade – this indicator is used to identify if the domestic property in question is registered as a listed building (no data was available to identify listed non-domestic properties). Data for this indicator is derived from the Home Analytics dataset.

9.7.8. Two indicators have been identified for the Conservation Areas sub-Consideration:

- Identification of properties in Conservation Areas: Conservation Area – this indicator is used to identify if the domestic property in question falls within a Conservation Area. Data for this indicator is derived from the Home Analytics dataset.

Identification of properties in Conservation Areas: Conservation Area – this indicator is used to identify if the property in question falls within a Conservation Area. Data for this indicator is derived from the Scotland Heat Map.

Outputs – mixed-tenure and mixed-use

9.7.9. Of the 266,144 homes in Edinburgh, 265,542 have a confirmed annual heat demand above zero. Of these 265,542 homes, 183,583 (69.1%) are located within buildings containing more than one dwelling and 130,211 (49.9%) are located within buildings with more than one tenure represented (i.e. buildings containing some combination of owner-occupied, privately rented, and/or socially rented homes). The former figure reflects the large proportion of flats in Edinburgh, which is characterised by its tenements. The latter figure represents the mix of ownerships across Edinburgh, with tenements often comprising a mix of owner-occupied homes and privately-rented homes, and blocks of flats developed by the public sector often comprising a mix of social housing and owned occupied/privately rented homes acquired as part of the Right to Buy Scheme. Buildings containing multiple homes and where multiple

tenures are represented are likely to prove considerably more challenging to retrofit than mono-ownership/mono-tenure buildings due to the added difficulties of securing agreements, allocating costs, and coordination.

- 9.7.10. Analysis of Unique Property Reference Numbers (UPRNs) in Edinburgh indicates that there are a total of 20,267 “parent shell” UPRNs (i.e. buildings), of which 18,642 (92.0%) are domestic, 1,162 (5.7%) are non-domestic, and 463 (2.3%) are “mixed”. Mixed tenure buildings therefore account for a relatively low proportion of the total building stock in Edinburgh. Mixed tenure buildings in Edinburgh will typically be tenements (or more modern blocks of flats) with commercial units on the ground floor. As with mixed-ownership and mixed-tenure buildings, mixed-use buildings are likely to prove more challenging to retrofit.
- 9.7.11. The number of homes within buildings within more than one dwelling and within mixed-tenure buildings for each datazone of Edinburgh is visualised in [Figure 30](#) and [Figure 31](#).
- 9.7.12. The 10 datazones with the highest number of homes within buildings with more than one dwelling are set out in Table 44.

Table 44: Edinburgh datazones with highest number of homes in buildings with >1 dwelling

Datazone	Name	Homes in buildings with >1 dwelling	Total homes	% homes in buildings with >1 dwelling
S01008549	Gilmerton South and the Murrays – 03	1,689	2,577	65.5%
S01008768	Western Harbour and Leith Docks – 01	1,395	1,515	92.1%
S01008651	Dalry and Fountainbridge – 01	1,311	1,311	100%
S01008673	Meadows and Southside – 08	1,302	1,328	98.0%
S01008685	Canongate, Southside and Dumbiedykes – 06	1,197	1,235	96.9%
S01008658	Dalry and Fountainbridge – 08	1,196	1,197	99.9%
S01008843	Broughton South – 04	1,052	1,069	98.4%
S01008665	Tollcross – 07	1,033	1,055	97.9%
S01008920	Granton and Royston Mains – 01	1,009	1,111	90.8%
S01008691	Meadowbank and Abbeyhill North – 03	908	912	99.6%

Source: Domestic Baseline Tool

- 9.7.13. The 10 datazones with the highest number of homes within mixed-tenure buildings are set out in Table 45.

Table 45: Edinburgh datazones with highest number of homes in mixed-tenure buildings

Datazone	Name	Homes in mixed-tenure buildings	Total homes	% homes in mixed-tenure buildings
S01008549	Gilmerton South and the Murrays – 03	1,277	2,577	49.6%
S01008673	Meadows and Southside – 08	993	1,328	74.8%
S01008658	Dalry and Fountainbridge – 08	815	1,197	68.1%

Datazone	Name	Homes in mixed-tenure buildings	Total homes	% homes in mixed-tenure buildings
S01008843	Broughton South – 04	778	1,069	72.8%
S01008806	Hillside and Calton Hill – 01	735	762	96.5%
S01008800	Easter Road and Hawkhill Avenue – 03	733	735	99.7%
S01008778	The Shore and Constitution Street – 01	704	797	88.3%
S01008691	Meadowbank and Abbeyhill North – 03	687	912	75.3%
S01008496	Gorgie West – 05	677	677	100%
S01008855	Canonmills and New Town North – 03	671	705	95.2%

Source: Domestic Baseline Tool

9.7.14. Overall, the analysis carried out against this Consideration sets out the high proportion of multi-occupancy and mixed-tenure buildings in Edinburgh, reflecting the prevalence of flats in the city and the diverse ownership thereof. With 69.1% of homes in Edinburgh being in multi-occupancy buildings and 49.9% being with mixed-tenure buildings, planning and execution the works necessary to achieve improved energy efficiency and heat decarbonisation is likely to be complex, costly, and challenging.

Outputs – historic buildings

9.7.15. Of the 266,144 homes in Edinburgh, 265,542 have a confirmed annual heat demand above zero. Of these 265,542 homes, 27,282 (10.3%) are located within listed buildings and 68,834 (25.9%) are located within conservation areas.

9.7.16. The number of homes within listed buildings and within conservation areas for each datazone of Edinburgh is visualised in [Figure 32](#) and [Figure 33](#). It can be seen that homes in listed buildings are heavily concentrated in central Edinburgh, reflecting the historicity of the Old Town and New Town of Edinburgh. Homes within conservation areas follow a broadly similar pattern, but with a wider spread that reflects the distribution of Edinburgh’s 50 conservation areas.

9.7.17. The 10 datazones with the highest number of homes in listed buildings are set out in Table 46. This indicates the geographical areas where retrofit activities are likely to be more challenging given the nature of the buildings in question and the relevant planning policies. It can be seen that Dean Village and the Old Town and New Town of Edinburgh are the areas with the highest counts of homes in listed buildings, with in some cases virtually all of the homes within the datazones being within listed buildings.

Table 46: Edinburgh datazones with highest number of homes in listed buildings

Datazone	Name	Homes in listed buildings	Total homes	% homes in listed buildings
S01008868	Deans Village – 01	651	673	96.7%
S01008852	New Town West – 04	621	642	96.7%
S01008869	Deans Village – 02	604	778	77.6%

Datazone	Name	Homes in listed buildings	Total homes	% homes in listed buildings
S01008677	Old Town, Princes Street and Leith Street – 04	586	679	86.3%
S01008871	Deans Village – 04	576	593	97.1%
S01008849	New Town West – 01	542	552	98.2%
S01008854	Canonmills and New Town North – 02	501	522	96.0%
S01008850	New Town West – 02	461	465	99.1%
S01008679	Old Town, Princes Street and Leith Street – 06	456	785	58.1%
S01008851	New Town West – 03	451	727	62.0%

Source: Domestic Baseline Tool

9.7.18. The 10 datazones with the highest number of homes in conservation areas are set out in Table 47. Again, this indicates the geographical areas where retrofit activities are likely to be more challenging given the relevant planning policies.

Table 47: Edinburgh datazones with highest number of homes in conservation areas

Datazone	Name	Homes in conservation areas	Total homes	% homes in conservation areas
S01008673	Meadows and Southside – 08	1,328	1,328	100%
S01008685	Canongate, Southside and Dumbiedykes – 06	1,089	1,235	88.2%
S01008859	Stockbridge – 03	788	788	100%
S01008675	Old Town, Princes Street and Leith Street – 02	785	785	100%
S01008869	Deans Village – 02	777	778	99.9%
S01008778	The Shore and Constitution Street – 01	773	797	97.0%
S01008679	Old Town, Princes Street and Leith Street – 06	746	785	95.0%
S01008851	New Town West – 03	727	727	100%
S01008855	Canonmills and New Town North – 03	704	705	99.9%
S01008777	North Leith and Newhaven – 06	681	707	96.3%

Source: Domestic Baseline Tool

9.7.19. Overall, the analysis carried out against this Consideration reflects the historic nature of Edinburgh's built environment, with a high number and proportion of homes within historic buildings and neighbourhoods, particularly in central Edinburgh. The analysis identifies central Edinburgh as the area that is likely to prove most challenging to retrofit in terms of both the practical challenges of adapting the buildings in question and the planning policies governing what changes to the buildings are permissible.

- 9.7.20. Decarbonising heat in historic buildings is likely to prove challenging regardless of the solution chosen. Heat networks have the advantage of requiring less extensive works to the buildings, but deploying the necessary pipework in areas with (for example) cobbled streets and extensive archaeological remains is likely to be onerous. Heat pumps, however, are likely to prove challenging given the extensive works needed to the building to enable heat pumps to work effectively (for example, making the property highly energy efficient and oversizing the radiators) and the need to identify a suitable location to site the heat pumps themselves (which is likely to be particularly challenging in traditional tenement properties which generally have only a modest curtilage).
- 9.7.21. It is important to note that not all listed buildings are alike and some will inevitably prove more straightforward or more complex to adapt than others.

10. Edinburgh LHEES findings and next steps

10.1. Summary of Edinburgh LHEES findings

10.1.1. The baseline analysis undertaken as part of the Edinburgh LHEES ([Chapter 8](#)) has identified multiple key challenges to decarbonising heat in buildings and improving energy efficiency across a local authority stemming from the particular characteristics of Edinburgh’s building stock. In summary, these are:

- A very high proportion of flats and mixed-tenure buildings.
- Very high levels of existing gas grid connections.
- A high proportion of privately-rented homes and relatively small social housing sector.
- An aged housing stock with a significant proportion of listed buildings.
- A high proportion of homes with uninsulated walls, and in turn a high proportion of homes with hard-to-treat solid stone walls.

10.1.2. The analysis undertaken against the six LHEES Considerations has given rise to “Strategic Zones”. These Zones are at the heart of the Edinburgh LHEES, setting out at a strategic level potential pathways for decarbonisation of Edinburgh’s building stock and identifying areas of pressure in terms of energy efficiency.

10.1.3. The Strategic Zones for the three Considerations relating to heat decarbonisation are summarised below. In effect, the Strategic Zones for these Considerations show where heat pumps are judged to be a good solution, where heat networks are judged to be a good solution, where both are a viable solution, and where neither is judged to be a viable solution. This will help inform activity taken forward to decarbonise buildings.

- The Strategic Zones for off-gas grid buildings set out where there is greatest potential to migrate homes in Edinburgh not currently connected to the gas grid to heat pumps. The distribution of category 1 (highest potential) properties does not follow an easily interpretable geographic pattern.
- The Strategic Zones for on-gas grid buildings set out where there is greatest potential to migrate homes in Edinburgh currently connected to the gas grid to heat pumps. The distribution of category 1 (highest potential) properties does not follow an easily interpretable geographic pattern.
- The Strategic Zones for heat networks set out where there is judged to be greatest potential for the deployment of heat networks in Edinburgh. 17 zones have been identified across Edinburgh, reflecting a broad mix of different areas.

10.1.4. The Strategic Zones for the three Considerations relating to energy efficiency and other outcomes are summarised below. Rather than focusing on solutions, these Strategic Zones highlight areas of Edinburgh where there are the most acute pressures, and where there are characteristics of the building stock that is expected to add complexity to interventions.

- The Strategic Zones for poor building energy efficiency highlight the areas of Edinburgh where there are the highest incidences of poor energy efficiency due to inadequate insulation of walls, windows and/or lofts. These incidences of poor energy efficiency are concentrated in the more historic area of Edinburgh.

- The Strategic Zones for poor building energy efficiency as a driver for fuel poverty highlight areas of Edinburgh with both fuel poverty and high incidences of poor energy efficiency. Due to concerns about the robustness of the data emerging from the analysis relating to this Consideration, the Council has opted to instead use SIMD rankings as a proxy for fuel poverty.
- The Strategic Zones for mixed-tenure, mixed-use, and historic buildings highlight where there are high incidences of buildings that are expected to prove more challenging to retrofit due to their design and ownership. The Strategic Zones around historic buildings are as expected. The Strategic Zones for mixed-tenure and mixed-use buildings do not follow an easily interpretable geographic pattern.

10.2. Edinburgh LHEES areas of focus and approach

10.2.1. Since the Edinburgh LHEES covers a 20-year journey to decarbonisation, it is imperative to be selective about the highest priorities which the Council should bring forward. Three areas of activity have been identified that are assessed as representing the most appropriate focus for the inaugural Edinburgh LHEES:

- Targeting areas with the highest occurrences of fuel poverty and the 20% most deprived areas of Edinburgh as per the Scottish Index of Multiple Deprivation.
- Decarbonising Council-owned housing and non-domestic stock in line with national timescales.
- Supporting wider decarbonisation of Edinburgh within the funding and resources that are made available to the Council, beginning with a focus on facilitating a city-wide heat network (or “network of networks”), and upon area with the largest numbers of heat pump-ready homes as a prospective “quick win” in terms of heat decarbonisation.

10.2.2. Edinburgh’s approach to delivering these priorities will need to consider both the role of the Council as well as that of all other parties in delivering the Edinburgh LHEES. It is imperative that the Edinburgh LHEES is not considered as a route to only decarbonise the Council’s own (or only public sector owned) buildings, but rather a plan for everyone in Edinburgh to collectively decarbonise the city’s stock. This includes a key role for the Council to help organise this activity as well as an indispensable role for the Scottish Government in making the resources and powers available to enable this. However, it also includes an equally important role for every property owner, investors, public bodies, relevant service providers and operators, the supply chain, heat network operators, and many others who will collectively deliver the ambition of the Edinburgh LHEES. Engaging these stakeholders will require appropriate incentives (“carrots and sticks”).

10.2.3. The Council will seek to build the Edinburgh LHEES into its effective network of existing partnerships and relationships, and also seek new partnerships where they are productive. This is in recognition of the fact that on its own, the Council is unable to retrofit properties which it does not own or provide funding for those who ineligible for government schemes. Strong partnerships and coordinated activity will therefore be the basis for encouraging and directing wider action toward priorities.

10.2.4. The Edinburgh LHEES covers delivery of energy efficiency and decarbonisation measures across multiple tenures, types, and ages of building as well as heat networks across the city.

It does so with a deadline of 2040 for eliminating fuel poverty and 2045 for achieving net zero, making it one of the most complex and urgent challenges facing the city. It is therefore critical to adopt a programmatic approach for delivering the Edinburgh LHEES, accounting for the host of factors that need to be aligned for success, such as: a robust supply chain and efficient avenues to procure work; funding and financing to support property owners; and clear communication on best practice and the help available. The Delivery Plan provides the basis for this approach, which the Council would seek to build upon as and when the Scottish Government makes further resources available for the delivery of the Edinburgh LHEES.

10.3. Edinburgh LHEES principles

10.3.1. The Edinburgh LHEES does not set out actions or allocate resources: these are the preserve of the Delivery Plan, which is the document that translates the evidence base, analysis, and strategic prioritisation set out in the Edinburgh LHEES into activity. The role of the Edinburgh LHEES is to present the scale of the challenges and the most effective pathways for addressing them. However, this section of the Edinburgh LHEES sets out certain high-level principles that are proposed to underpin how the Edinburgh LHEES is delivered and, in turn, how buildings in Edinburgh are made more energy efficient and their heating decarbonised.

[A] Interventions should be on a “fabric first” basis

10.3.2. Mindful of the adage that “the cheapest unit of energy is the one you do not consume”, the minimisation of heat demand via improved energy efficiency is crucial to reducing fuel poverty.

10.3.3. While there are challenges around improving energy efficiency, the issues in question are largely practical/technical; energy efficiency improvements are therefore generally considerably less complex than heat decarbonisation interventions, and are considerably more likely to be no regret/low regret.

10.3.4. It is noted that physical interventions are typically not themselves enough to achieve sustained major reductions in heat demand; behavioural change is also vital.

10.3.5. Related to the above, it is important to ensure that solutions do not result in perverse incentives. For example, business cases developed to support the development of heat networks should not be contingent on heat demand rising or plateauing, and contractual arrangements put in place to deliver heat networks should not commit off-takers to consuming a minimum quantum of heat. Generating heat sustainably is a solution to a problem, not an end in itself.

[B] Interventions should be solution agnostic

10.3.6. The specific heating solution that is most appropriate for each building in Edinburgh will depend on a variety of factors, including financial considerations. Given this, it is proposed that the Council should take a solution agnostic approach to the decarbonisation of buildings in Edinburgh rather than favouring or prioritising a particular technological solution. Decisions on solutions should generally be taken on a technical basis. The role of the Edinburgh LHEES is to make the space and provide the direction and opportunities for people to decarbonise their properties in the best way they see fit. Where the Council needs to take direct decisions about energy efficiency and heat decarbonisation technologies (such as for retrofit of its own stock or to aid households in fuel poverty) these will be taken based on

capital and operating costs, practicality, infrastructure constraints and other considerations deemed appropriate by Council officers.

- 10.3.7. It is, however, recognised that the UK Government and Scottish Government have each undertaken significant measures to support the roll-out of heat pumps and heat networks. These include capital grants, regulatory regimes, supplier development programmes, and skills development programmes. Given this, it is considered that pragmatically, heat pumps and heat networks are likely to represent a more immediate opportunity than other solutions, for example direct electric heating. Further, it is recognised that heat networks are in some cases unlikely to be able to proceed without support from the public sector in the form of connecting anchor loads to the network, meaning in certain areas, e.g. the prospective Heat Network Zones, there may be a strategic case for selecting heat networks over heat pumps as a solution for buildings over which the public sector has influence.
- 10.3.8. Similarly, the Edinburgh LHEES does not rule out the scope for (green/blue) hydrogen to play a significant role in the heating of buildings in Edinburgh. However, it is recognised that the available evidence suggests there may be significant practical barriers to the widespread roll-out of hydrogen as a space heating solution. Given this, it is considered that the Council should retain an open mind to the use of hydrogen, but avoid relying upon it.
- 10.3.9. An exception to this principle is that City Plan 2030 mandates connections to existing heat networks.

[C] Interventions must make financial sense for building users

- 10.3.10. As set out in [section 4.5](#), heat decarbonisation is not straightforward, with all solutions having their own challenges. Due to a combination of technical and economic factors, there is no solution that is universally competitive with gas in terms of cost and performance.
- 10.3.11. While the importance of migrating away from gas is recognised, this must be balanced against the needs of building users. The Council will generally not be able to support interventions where these result in additional heating costs and/or reduced amenity to building users. In particular the Council will generally not be able to support interventions to social homes that present a risk of increasing fuel poverty or reducing tenants' wellbeing. Additionally, it will generally be challenging to justify the replacement of plant that is not nearing the end of its working life, both from a financial and an embodied carbon perspective.
- 10.3.12. In the hypothetical event that all buildings in Edinburgh currently heated by gas boilers were somehow immediately migrated to zero direct emissions heating solutions, this would introduce significant cost pressures for many households and other building users.
- 10.3.13. It is recognised that various models have been developed that entail front-funding of interventions to buildings that reduce running costs and improve user comfort, with building users using some or all of the savings achieved to repay the upfront investment. An optimal arrangement will be financially beneficial for both the building user and the funder of the interventions while improving user comfort and reducing carbon emissions.
- 10.3.14. Related to the above, it is considered that decarbonisation of heat on a strategic scale is likely to be extremely challenging possible without a major structural change in electricity pricing. The current price differential between gas and electricity, which as set out in [section 4.5](#) is one of the greatest in Europe, makes widespread electrification of heat unviable in many cases.

[D] New build properties offer the greatest potential

- 10.3.15. Many of the challenges associated with improving energy efficiency and decarbonising heat stem from the practical difficulties associated with retroactively implementing measures in buildings that were never designed for them. This results in design challenges along with ancillary issues such as disruption for building users. Given this, new build properties represent a natural opportunity to address these issues from the outset.
- 10.3.16. As set out in [section 6.4](#), City Plan 2030 requires all new build properties in Edinburgh to “[achieve], predominantly through ultra-high fabric energy efficiency, a ‘net zero’ level of operational greenhouse gas emissions”. In practice this amounts to a ban on gas boilers in new buildings in Edinburgh. The Scottish Government has also announced a proposed ban on the installation of gas boilers in new buildings in Scotland from 1 April 2024.
- 10.3.17. As set out in [section 7.3](#), the Council itself ceased installing gas boilers in new Council-built social homes in 2020.
- 10.3.18. To facilitate the transition to net zero, it is important that planning policies and building regulations ensure that new building properties are designed and built to achieve the various targets set out by the Scottish Government.
- 10.3.19. Where the redevelopment of properties is concerned, while new build properties will inevitably be more energy efficient than the vast majority of older properties, this must be balanced against the embodied carbon of existing buildings. The choice of whether to redevelop or refurbish buildings will require careful consideration of multiple factors.

[E] Significant additional external funding will be required

- 10.3.20. As set out in this document, the capital costs of implementing the Edinburgh LHEES are vast.
- 10.3.21. While the City of Edinburgh Council has prepared the Edinburgh LHEES, it is important to note that the Council does not have sole responsibility for achieving the Edinburgh LHEES. In particular it is noted that responsibility for improving energy efficiency and decarbonising heat for properties that the Council does not own does not sit with the Council. The Council has limited powers and resources to compel other property owners to invest in their properties.
- 10.3.22. The Council’s own financial resources will be focused on works to Council-owned properties, which themselves will be very costly to retrofit. It is extremely unlikely that the Council will be able to put significant resources into works to non-Council owned properties, except where these works are externally funded as in the Area-Based Schemes. Funding for works to non-Council owned properties will need to come from a range of sources, including the building owners themselves, institutional lenders, and grant funds.
- 10.3.23. As noted, the Scottish Government has established a Green Heat Finance Taskforce with the remit of developing “innovative financial solutions” for the retrofit of buildings in Scotland. Various other initiatives are ongoing around potential mechanisms for financing works to buildings. It is hoped that this work will deliver solutions that can be used to roll-out retrofit works on a widespread basis, albeit it is recognised that previous attempts such as the “Green Deal” have proven highly challenging with limited take-up.
- 10.3.24. The national funding landscape for retrofit works is complex with a vast array of grant and loan funds. It is suggested that there may be merit in rationalising this.

- 10.3.25. It is noted that all Scottish local authorities have been awarded a flat budget of £75,000 over the six-year period from 2022/23 to 2027/28 to “develop their strategies and delivery plans”. The Council has utilised some of this resource to prepare the inaugural Edinburgh LHEES, and will utilise funding in later years to develop the second iteration. Remaining funding will be used for administration costs and to support the progression of small-scale early-action projects. While this funding is greatly welcomed, it is suggested that additional funding, confirmed over a longer-term period, will be required to fully administer the delivering of the Edinburgh LHEES, in particular the roll-out of heat networks. Further consideration of administrative resources is set out in the Delivery Plan.
- 10.3.26. Beyond the £75,000 budget, the Council does not currently have a budget in place for the delivery of the Edinburgh LHEES. While there may be some potential to optimise how existing funding streams, such as the Area-Based Schemes, are utilised, it is considered that this potential is fairly limited. Successful delivery of the Edinburgh LHEES will require additional ring-fenced resources.
- 10.3.27. Where the Edinburgh LHEES and associated workstreams – for example heat networks – give rise to additional duties for the Council for which fees are levied, it is considered that these must be set on a full cost recovery basis to avoid putting pressure on existing Council budgets.

[F] More comprehensive and robust data is needed

- 10.3.28. The analysis conducted as part of the preparation of the Edinburgh LHEES (and by other local authorities) has highlighted significant gaps and deficiencies in the data available on Scotland’s building stock. For example, information on the energy efficiency and heating solutions of non-domestic buildings in Scotland is limited and inconsistent. These data gaps have been compounded by issues with the LHEES Methodology that have emerged over time.
- 10.3.29. Various areas of relevance to the Edinburgh LHEES are severely lacking in data. For example, data on existing heat networks in Scotland is very limited.
- 10.3.30. Bridging these data gaps will require both work by local authorities to improve understanding of the local picture and work by national bodies to strengthen data collection and compiling.

[G] Additional levers will be required to catalyse change

- 10.3.31. While, in line with principle ‘C’, interventions should ultimately be of the benefit of building users, it is suggested that additional powers to compel change will be required to deliver heat carbonisation in a timeous manner.
- 10.3.32. Without the appropriate standards, the Council is only able to encourage and inform homeowners and businesses to retrofit their properties after which it is their choice. Another example is that without widely available and easily accessible access to economically attractive finance, homes and businesses are unlikely to retrofit or be able to retrofit; the work of the Green Heat Finance Taskforce is required to unlock these avenues.
- 10.3.33. As noted, City Plan 2030 will mandate that new buildings connect to existing heat networks where this is possible. However, this policy has not yet been tested. Further, City Plan 2030 cannot compel existing properties to connect to heat networks. It is suggested that, for the roll-out of heat networks to be effective, new primary legislation compelling certain customers to connect to heat networks is likely to be required.

- 10.3.34. Also as noted, the proliferation of flats and mixed-tenure buildings in Edinburgh will greatly increase the complexity of implementing heat decarbonisation due to the difficulty of securing buy-in from all necessary stakeholders. It is suggested this may require legislative change that make it more straightforward for works to be agreed to be instructed to buildings of this nature, for example reform of the Tenements (Scotland) Act 2004 to widen the scope of the Tenement Management Scheme to cover energy efficiency upgrades and changes to heating systems.
- 10.3.35. In principle, every gas boiler in Edinburgh will require to be replaced to achieve net zero. Every additional gas boiler that is installed in an existing or new building therefore adds to the scale and cost of work that will be required to achieve net zero. Without action by government to prohibit this, the challenge of achieving net zero will continue to rise as technologies which, from a carbon perspective, are obsolescent continue to be installed. Further, the time and money invested in the installation of gas boilers (and other non-net zero carbon heating solutions) represent resources that could instead have been invested in net zero carbon heating solutions, while so long as gas boilers remain an option migration to other solutions by users and suppliers will be slower. A ban on the instalment of replacement gas boilers in existing buildings is therefore urgently needed.

11. Appendices

11.1. Heat network background information

Schedule of existing heat networks and communal heat networks in Edinburgh

Table 48: Schedule of existing heat networks and communal heat networks in Edinburgh

Name ^{xl}	Size	Technology	Intermediate area
"(013) / St Margaret's Court"	Unknown	Boiler	Baberton and Juniper Green
"(023) / Veitch's Square"	Unknown	Boiler	Stockbridge
"1 Dorset Place"	Small to medium (≥45kW to <1MW)	Boiler	Bruntsfield
"1 Exchange Crescent"	Large (≥1MW)	Boiler	Tollcross
"11-15 Thistle Street"	Small to medium (≥45kW to <1MW)	Boiler	New Town West
"113-115 George Street, Edinburgh"	Small to medium (≥45kW to <1MW)	Gas boiler	Deans Village
"116 Dundas St"	Small to medium (≥45kW to <1MW)	Boiler	Canonmills and New Town North
"1-17 Slateford Green"	Small to medium (≥45kW to <1MW)	Boiler	Gorgie West
"12 Royston Mains Crescent"	Small to medium (≥45kW to <1MW)	Other/unknown	Granton and Royston Mains
"12 Simpson Loan"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"120 Lasswade Road"	Small to medium (≥45kW to <1MW)	Boiler	Gracemount, Southhouse and Burdiehouse
"124-125 Princes Street"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"13 Manor Place"	Small to medium (≥45kW to <1MW)	Gas boiler	Deans Village
"13 Simpson Loan"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"14 Morrison Crescent"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"154 Dalry Road"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"1-6 Atholl Crescent"	Small to medium (≥45kW to <1MW)	Boiler	Tollcross
"160 Dundee Street"	Unknown	Other/unknown	Dalry and Fountainbridge
"17 Lauriston Park"	Small to medium (≥45kW to <1MW)	Boiler	Tollcross
"1984 - Argyle House"	Large (≥1MW)	Boiler	Tollcross
"2 Brandfield Street"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"20/22 Saughton Mains Terrace"	Small to medium (≥45kW to <1MW)	Other/unknown	Stenhouse and Saughton Mains
"21 Queen's Bay Crescent, Joppa, Edi"	Small to medium (≥45kW to <1MW)	Boiler	Joppa

^{xl} All sic.

Name ^{xl}	Size	Technology	Intermediate area
"23-1 South Fort Street, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Bonnington
"24-28 Frederick Street, Edinburgh"	Small to medium (≥45kW to <1MW)	Gas boiler	Old Town, Princes Street and Leith Street
"26 Norton Park"	Small to medium (≥45kW to <1MW)	Boiler	Hillside and Calton Hill
"27 Hyvot Mill Road"	Small to medium (≥45kW to <1MW)	Boiler	Hyvots and Gilmerton
"3 Semple Street Exchange Place 3"	Small to medium (≥45kW to <1MW)	Boiler	Tollcross
"34 South Gyle Crescent"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"343 Gorgie Road"	Small to medium (≥45kW to <1MW)	Boiler	Gorgie West
"38 Thistle Street"	Small to medium (≥45kW to <1MW)	Boiler	New Town West
"39-41 George St"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"4/5 Lochside View"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"4/8 South Charlotte St"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"43 Melville Street"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"44/46 Hanover Street"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"45 George Street"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"5 Semple Street Exchnage Place 2"	Large (≥1MW)	Boiler	Tollcross
"6 Royston Mains Close"	Small to medium (≥45kW to <1MW)	Boiler	Granton and Royston Mains
"60 Bingham Drive, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Bingham, Magdalene and The Christians
"6-10 Bellsbrae, Edinburgh"	Unknown	Boiler	Deans Village
"63-65 George Street The Auction Hou"	Small to medium (≥45kW to <1MW)	Gas boiler	Old Town, Princes Street and Leith Street
"6-8 George Street Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"68-70A George Street, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"7 and 9 Lanark Road"	Small to medium (≥45kW to <1MW)	CHP	Currie East
"7 Exchange Crescent"	Large (≥1MW)	Boiler	Tollcross
"7 Lochside View, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"7 Melville Crescent"	Small to medium (≥45kW to <1MW)	Gas boiler	Deans Village
"7 St Nicholas Place"	Small to medium (≥45kW to <1MW)	Boiler	Gorgie West
"8 Simpson Loan"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"80 George St"	Unknown	Other/unknown	Deans Village
"9 Gilmour's Close, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street

Name ^{xl}	Size	Technology	Intermediate area
"90 - 92 George Street"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"Abbeyhill, 82 Montrose Terrace"	Small to medium (≥45kW to <1MW)	Boiler	Abbeyhill
"Anna Macleod Hall"	Large (≥1MW)	CHP	Currie West
"Ardmore House, 40 George Street, Ed"	Micro (Less than 45 kW)	Other/unknown	Old Town, Princes Street and Leith Street
"Atholl Exchange, 6 Canning St"	Small to medium (≥45kW to <1MW)	Boiler	Tollcross
"Bainfield Student Accomodation"	Large (≥1MW)	Other/unknown	Dalry and Fountainbridge
"Boiler 1, 50 Frederick Street, Edin"	Small to medium (≥45kW to <1MW)	Boiler	New Town West
"Boiler 1, 6 Redheughs Rigg, Edinbur"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"Boiler 1, Edinburgh Quay 2, Edinbur"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"Boiler 1, Osborne House, 1-5 Osborn"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"Boiler 1, Quartermile One, 15 Lauri"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"Boiler 2, 50 Frederick Street, Edin"	Small to medium (≥45kW to <1MW)	Boiler	New Town West
"Boiler 2, 6 Redheughs Rigg, Edinbur"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"Boiler 2, Edinburgh Quay 2, Edinbu"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"Boiler 2, Osborne House, 1-5 Osborn"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"Boiler 2, Quartermile One, 15 Lauri"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"Boiler 3, 6 Redheughs Rigg, Edinbur"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"Boiler 3, Edinburgh Quay 2, Edinbur"	Small to medium (≥45kW to <1MW)	Boiler	Dalry and Fountainbridge
"Boiler 3, Quartermile One, 15 Lauri"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"Cables Wynd Edinburgh"	Unknown	Boiler	Great Junction Street
"Cables Wynd House"	Large (≥1MW)	Boiler	Great Junction Street
"Capital Building"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"Castlebrae Glebe"	Unknown	Boiler	Craigmillar
"Causewayside House"	Small to medium (≥45kW to <1MW)	Boiler	The Grange
"Centrum house"	Small to medium (≥45kW to <1MW)	Boiler	Canonmills and New Town North
"Chalmers Street"	Small to medium (≥45kW to <1MW)	Boiler	Meadows and Southside
"Christina Miller Energy Centre"	Small to medium (≥45kW to <1MW)	Other/unknown	Currie West
"Christina Miller Energy Centre"	Small to medium (≥45kW to <1MW)	CHP	Currie West
"Commercial Quay"	Unknown	Other/unknown	The Shore and Constitution Street

Name ^{xl}	Size	Technology	Intermediate area
"Conference House, 152 Morrison Stre"	Small to medium (≥45kW to <1MW)	Boiler	Tollcross
"Cornerstone Building"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"Deanhaugh St, Stockbridge, Edinburg"	Small to medium (≥45kW to <1MW)	Boiler	Stockbridge
"Drum Edinburgh"	Unknown	Boiler	Gilmerton South and the Murrays
"Elder House, 24 Elder Street"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"Elliot House"	Small to medium (≥45kW to <1MW)	Boiler	Hillside and Calton Hill
"Ferniehill Avenue/Drum Avenue"	Small to medium (≥45kW to <1MW)	Boiler	Fernieside and Moredun South
"Fortune Place (St Barnabas)"	Micro (Less than 45 kW)	CHP	Old Town, Princes Street and Leith Street
"Fountain Court"	Small to medium (≥45kW to <1MW)	Boiler	Moredun and Craigour
"George Square 1"	Unknown	CHP	Meadows and Southside
"Greendykes and Wauchope House"	Large (≥1MW)	Other/unknown	Niddrie
"Greendykes C"	Small to medium (≥45kW to <1MW)	Other/unknown	Craigmillar
"Greendykes Edinburgh"	Unknown	Boiler	Niddrie
"Harvester Way, Wester Hailes, Edinb"	Small to medium (≥45kW to <1MW)	Boiler	Clovenstone and Wester Hailes
"Haston House"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"Hays Community Business Centre"	Small to medium (≥45kW to <1MW)	Boiler	Niddrie
"Holyrood Park House"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"Kings Buildings 1"	Unknown	CHP	Blackford, West Mains and Mayfield Road
"Lady Nicolson Court"	Small to medium (≥45kW to <1MW)	Boiler	Canongate, Southside and Dumbiedykes
"Lanark Road West"	Small to medium (≥45kW to <1MW)	CHP	Currie East
"Lighthouse Court"	Small to medium (≥45kW to <1MW)	Boiler	Granton and Royston Mains
"Lochrin Square"	Small to medium (≥45kW to <1MW)	Other/unknown	Tollcross
"Lomond & Leven House, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	South Gyle
"London Road, Edinburgh"	Small to medium (≥45kW to <1MW)	Boiler	Meadowbank and Abbeyhill North
"Maidencraig Court"	Small to medium (≥45kW to <1MW)	Boiler	Blackhall
"Market Court"	Small to medium (≥45kW to <1MW)	Boiler	Granton and Royston Mains
"Milton Road Heating System"	Small to medium (≥45kW to <1MW)	Boiler	Joppa
"Murryburgh House"	Small to medium (≥45kW to <1MW)	Gas boiler	Murrayfield and Ravelston
"Nine Edinburgh BioQuarter, 9 Little"	Unknown	Boiler	Craigmillar

Name ^{x1}	Size	Technology	Intermediate area
"Omni Centre, 28 Greenside Place"	Small to medium (≥45kW to <1MW)	Boiler	Old Town, Princes Street and Leith Street
"Orchard Brae House, 30 Queensferry"	Large (≥1MW)	Boiler	Comely Bank
"Oriam South Bldg"	Small to medium (≥45kW to <1MW)	Boiler	Currie West
"Pollock Halls 1"	Unknown	CHP	Newington and Dalkeith Road
"Princes Edinburgh"	Unknown	Trigeneration	Old Town, Princes Street and Leith Street
"Quartermile One, 15 Lauriston Place"	Large (≥1MW)	Other/unknown	Meadows and Southside
"Riverside House, 502 Gorgie Road"	Small to medium (≥45kW to <1MW)	Boiler	Stenhouse and Saughton Mains
"Roland House, Newbridge"	Micro (Less than 45 kW)	Boiler	Dalmeny, Kirkliston and Newbridge
"Rosewell House, 2A Harvest Drive"	Small to medium (≥45kW to <1MW)	Other/unknown	Dalmeny, Kirkliston and Newbridge
"S0891 Clarendon House"	Small to medium (≥45kW to <1MW)	Boiler	Deans Village
"Sailmaker, Edinburgh"	Large (≥1MW)	CHP	Western Harbour and Leith Docks
"Saltire Court, 20 Castle Terrace, E"	Large (≥1MW)	Other/unknown	Tollcross
"Saltire Street (Upper Strand)"	Large (≥1MW)	Boiler	Granton and Royston Mains
"Saunders Court"	Small to medium (≥45kW to <1MW)	Boiler	Corstorphine
"Shore Road"	Small to medium (≥45kW to <1MW)	Boiler	Queensferry West
"Sirius Building, Clocktower Estates"	Small to medium (≥45kW to <1MW)	Other/unknown	South Gyle
"Slateford Green"	Small to medium (≥45kW to <1MW)	Boiler	Gorgie West
"Slateford Student Accomodation"	Small to medium (≥45kW to <1MW)	Other/unknown	Shandon
"SPACE, 11 Harewood Road"	Small to medium (≥45kW to <1MW)	Boiler	Craigmillar
"Spectrum House, 2 Powderhall Road"	Small to medium (≥45kW to <1MW)	Boiler	Broughton North and Powderhall
"Sports Academy Bldg"	Small to medium (≥45kW to <1MW)	Boiler	Currie West
"St James Shopping Centre"	Large (≥1MW)	Boiler	Old Town, Princes Street and Leith Street
"Station Car Park"	Unknown	Boiler	Old Town, Princes Street and Leith Street
"Stenhouse Mill Wynd"	Small to medium (≥45kW to <1MW)	Boiler	Slateford and Chesser
"Stewart House"	Small to medium (≥45kW to <1MW)	Boiler	New Town West
"Tanfield House"	Large (≥1MW)	Gas boiler	Broughton North and Powderhall
"The Green, Longstone Road, Edinburg"	Large (≥1MW)	Boiler	Longstone and Saughton
"The Student Housing Company (Edinbu"	Small to medium (≥45kW to <1MW)	CHP	Abbeyhill
"The Student Housing Company (Edinbu"	Small to medium (≥45kW to <1MW)	CHP	Tollcross

Name ^{xl}	Size	Technology	Intermediate area
"The Student Housing Company (Edinbu"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Dalry and Fountainbridge
"The Tun"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Longstone and Saughton
"The Waterfront"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Granton and Royston Mains
"Thomsons Court, 58 Grassmarket, Edi"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Old Town, Princes Street and Leith Street
"Thorntree Court"	Unknown	Boiler	South Leith
"Vantage Point, 23 St Johns Rd"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Corstorphine
"Waterfront Avenue, Edinburgh"	Large ($\geq 1\text{MW}$)	Boiler	Granton and Royston Mains
"Wemyss House, 6-8 Wemyss Place"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	New Town West
"West Pilton Crescent"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Other/unknown	West Pilton
"Westcott House"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Boiler	Queensferry East
"Westfield Avenue"	Small to medium ($\geq 45\text{kW}$ to $< 1\text{MW}$)	Other/unknown	Gorgie West
"Westfield Court"	Large ($\geq 1\text{MW}$)	Boiler	Gorgie West
"Wharton Square, Edinburgh"	Large ($\geq 1\text{MW}$)	Boiler	Meadows and Southside
"William Arrol Building"	Large ($\geq 1\text{MW}$)	Boiler	Currie West

Figure 01: Plan of existing heat networks and communal heat networks in Edinburgh

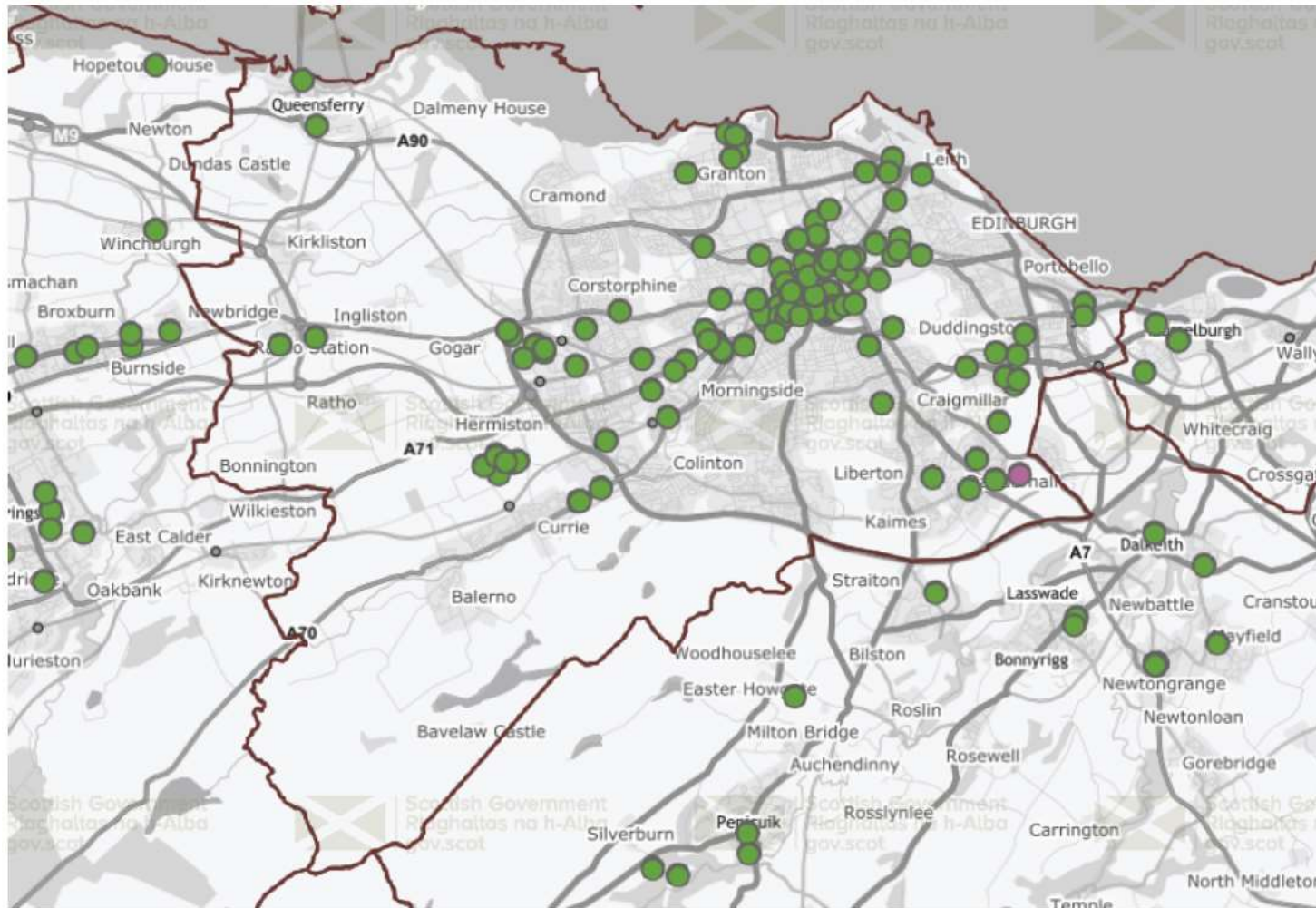


Figure 02: First National Assessment – potential Heat Network Zones identified in Edinburgh (baseline and stringent criteria)

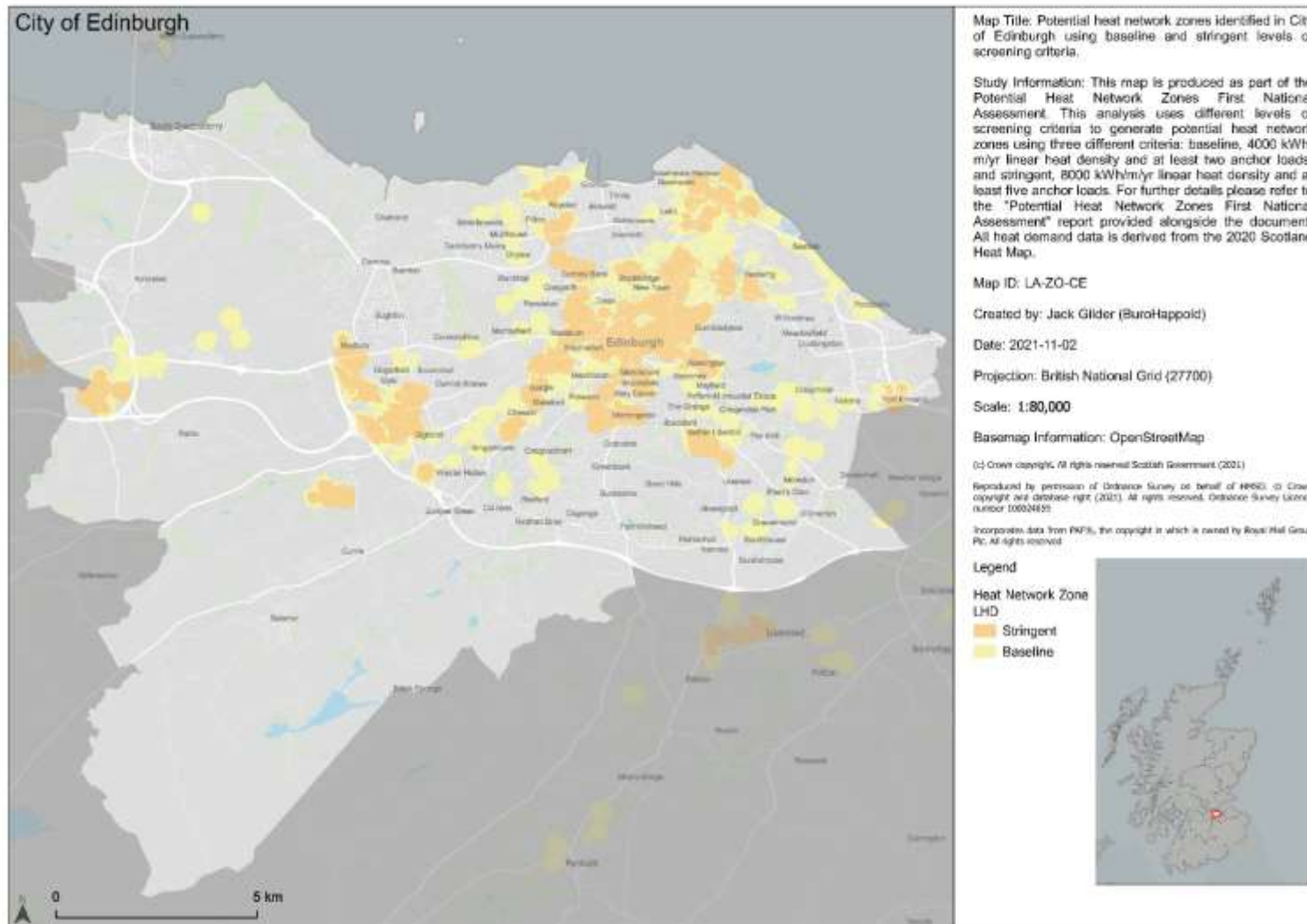


Figure 03: First National Assessment – largest potential Heat Network Zone identified in Edinburgh (stringent criteria)

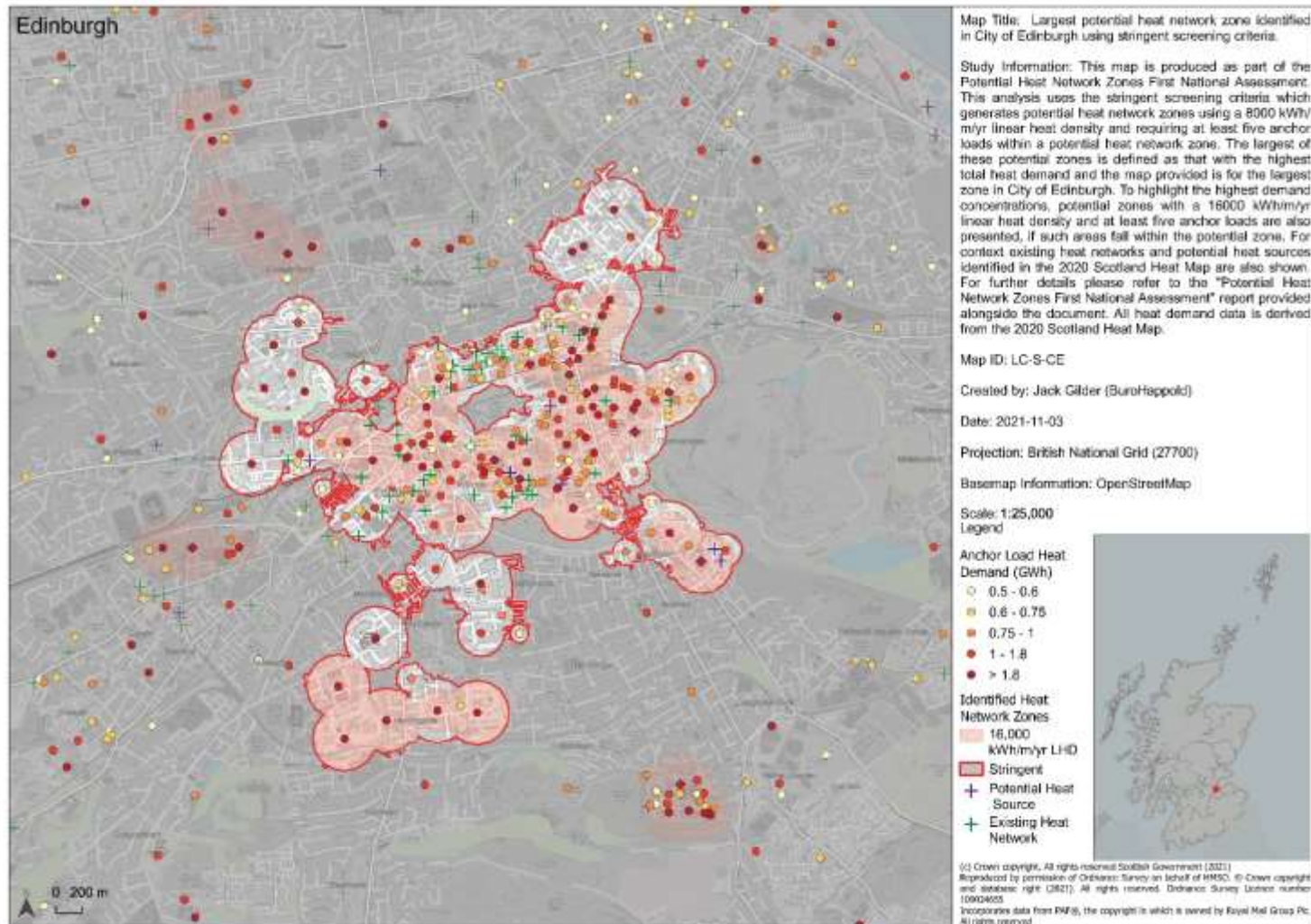


Figure 04: The Coal Authority map of underground workings in Edinburgh ^{xli 66}



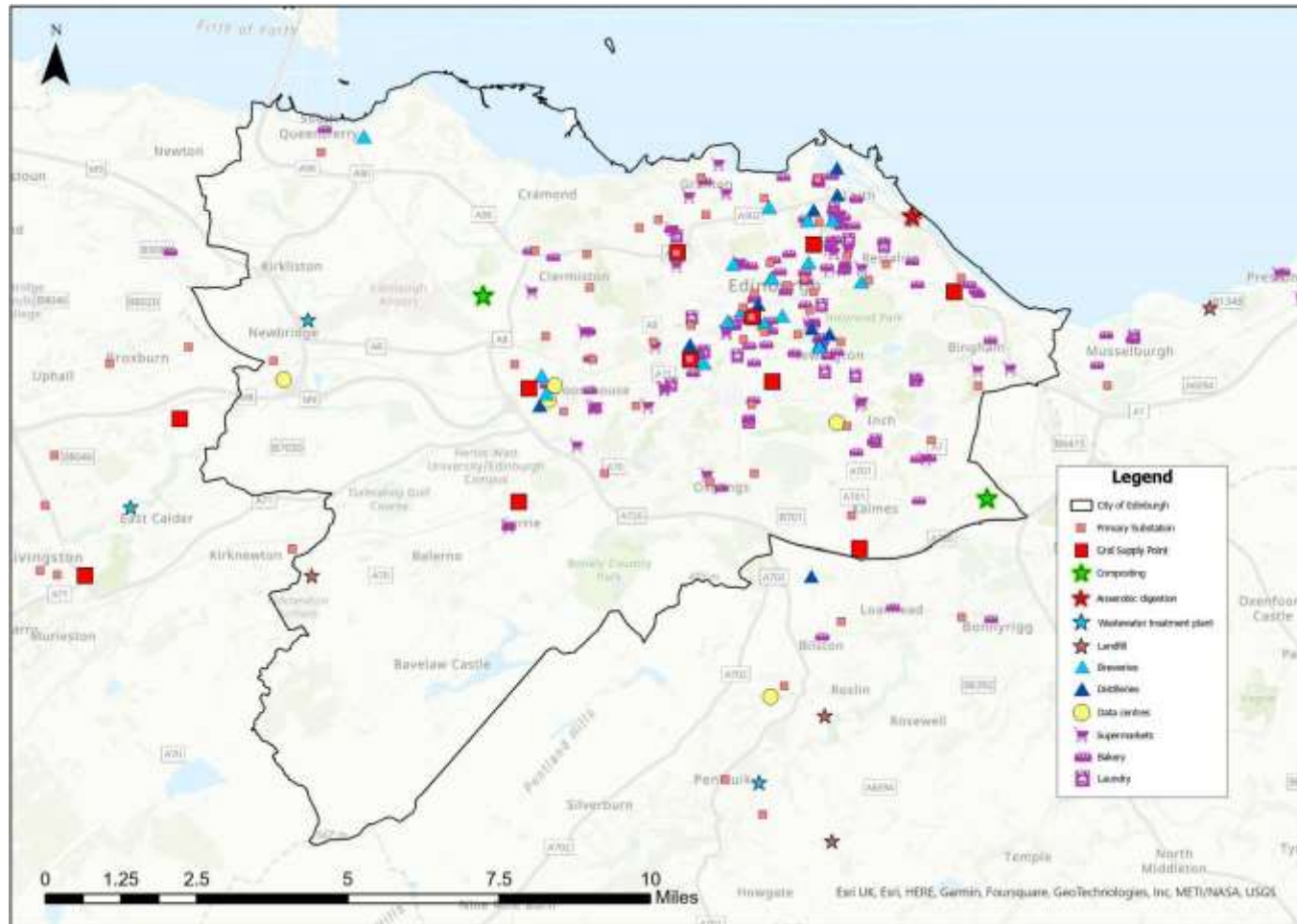
Page 252

^{xli} Workings are shown in lime green.

Figure 05: Scottish Water map of potential wastewater heat extraction opportunities in Edinburgh 67



Figure 06: Map of potential waste heat sources in Edinburgh ^{xlii} 68



^{xlii} The potential waste heat sources identified in the figure mirror the sectors identified in the ClimateXChange 2020 report [Potential Sources of Waste Heat for Heat Networks in Scotland](#). The report identifies and quantifies the likely waste heat potential 10 sources (distilleries, breweries, bakeries, paper and pulp, laundry, supermarkets,

Datasets used to identify waste heat sources in Edinburgh

Table 49: Datasets used to identify waste heat sources in Edinburgh

Waste heat source	Evidence source
Data centres	<ul style="list-style-type: none"> ▪ Data Center Map - Edinburgh Data Centers ▪ EPCC – Advanced Computing Facility ▪ University of Edinburgh – ACF Migration Frequently Asked Questions
Breweries	<ul style="list-style-type: none"> ▪ The Brewery Bible – Scotland Breweries
Distilleries	<ul style="list-style-type: none"> ▪ Truly Edinburgh – Edinburgh Whisky Distilleries ▪ Truly Edinburgh – The Best Gin Distilleries in Edinburgh ▪ VisitScotland – Whisky Distilleries in Scotland ▪ Scotch Whisky Association – Distillery Map ▪ Wandering Spirits Global – Scotland Whisky Distillery Map ▪ Whisky Invest Direct – Malt Whisky Distilleries in Scotland
Supermarkets	<ul style="list-style-type: none"> ▪ ArcGIS – OpenStreetMap Shops for Europe
Bakeries	<ul style="list-style-type: none"> ▪ ArcGIS – OpenStreetMap Shops for Europe
Laundries	<ul style="list-style-type: none"> ▪ ArcGIS – OpenStreetMap Shops for Europe
Landfill sites	<ul style="list-style-type: none"> ▪ SEPA – Scotland’s Waste Sites and Capacity Data Tool ▪ SEPA – Scottish Pollutant Release Inventory
Primary substations	<ul style="list-style-type: none"> ▪ SP Energy Networks - Distributed Generation SP Distribution Heat Maps – SPD Primary Substations
Grid supply points	<ul style="list-style-type: none"> ▪ SP Energy Networks - Distributed Generation SP Distribution Heat Maps – SPD Grid Substations

data centres, electricity substations, wastewater treatment plants (WWTP), and landfill). While data sharing restrictions currently preclude the sharing of the underlying data, the following map identifies the location of the same sources updated to 2023 with the exclusion of paper and pulp as no facilities were present in Edinburgh. Further steps could be taken to quantify the heat from these sources following the ClimateXChange methodology.

11.2. Heat network methodological information

Datasets used to inform the Heat Network Zone analysis

Table 50: Datasets used to inform the Heat Network Zone analysis

Dataset	Source
Heat demand	Scotland Heat Map
Heat density raster	Scotland Heat Map
Existing heat networks	Scotland Heat Map
Planned heat networks	The City of Edinburgh Council
Local Development Plan sites	The City of Edinburgh Council
NAEI large point emitters	National Atmospheric Emissions Inventory
SEPA waste sites	Scottish Environmental Protection Agency
Energy supply points	Scotland Heat Map
Wastewater treatment plants	CXC Waste Heat Dataset
Process loads - supermarkets, bakeries, breweries, distilleries, laundries, paper and pulp sites	CXC Waste Heat Dataset
Data centres	CXC Waste Heat Dataset
Primary substations	Scottish Power Energy Networks
Grid supply points	Scottish Power Energy Networks
OS greenspace	Ordnance Survey
Rivers and waterbodies	Ordnance Survey (OS OpenMap Local)
BGS Hydrogeology 625k	British Geological Survey
GeoTH Hot Sed Aquifer prospects	Scotland Heat Map
Coal mining reporting areas	British Geological Survey / The Coal Authority
The Coal Authority discharge Points	British Geological Survey / The Coal Authority
Roads, railway tracks, road/railway tunnels	Ordnance Survey (OS OpenMap Local)
Home Analytics	Energy Saving Trust

Figure 07: Linear heat density buffer zone methodology

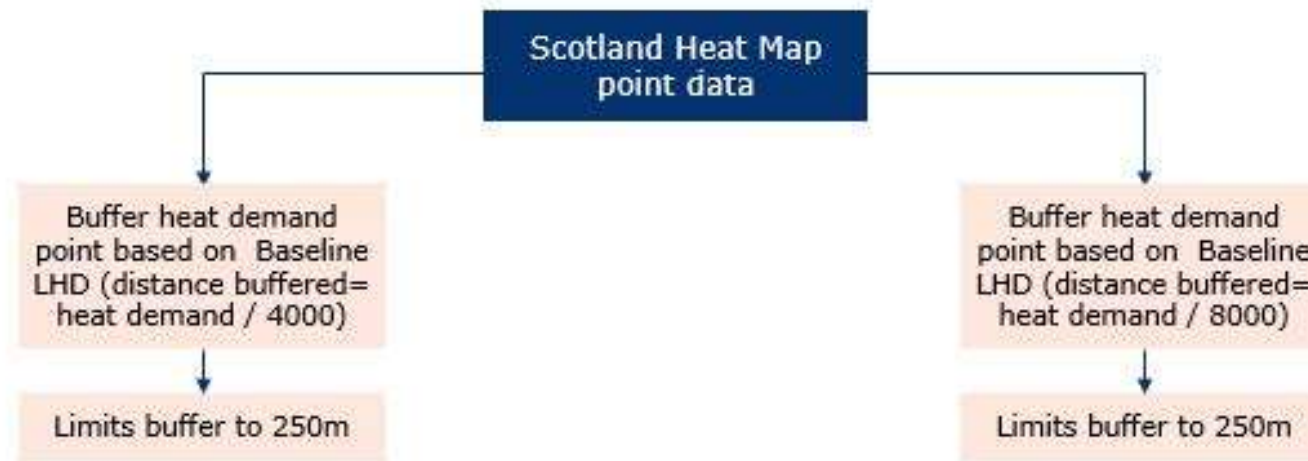


Figure 08: Buffer zones based on linear heat density of 4,000 kWh per metre per year

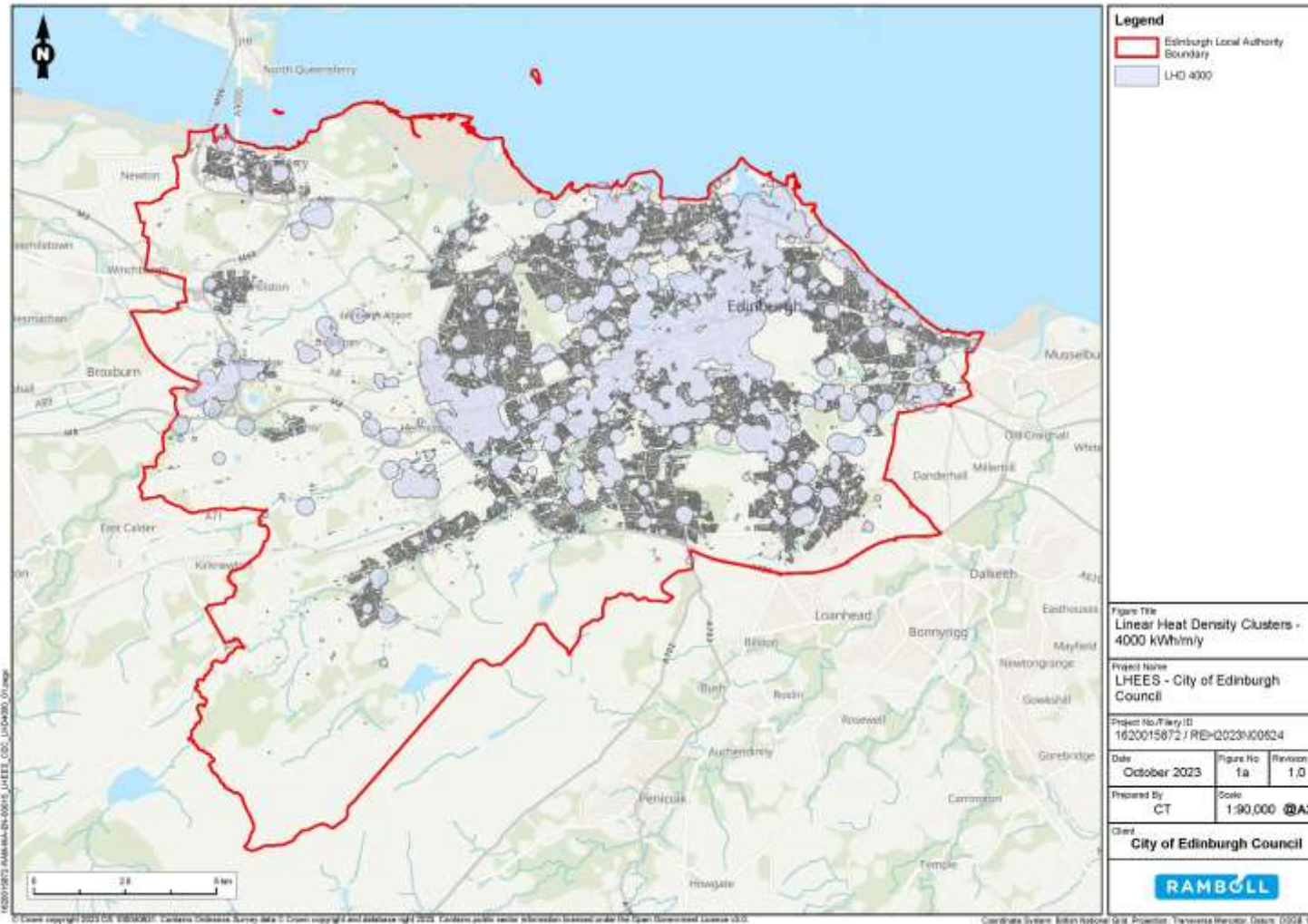


Figure 09: Buffer zones based on linear heat density of 8,000 kWh per metre per year

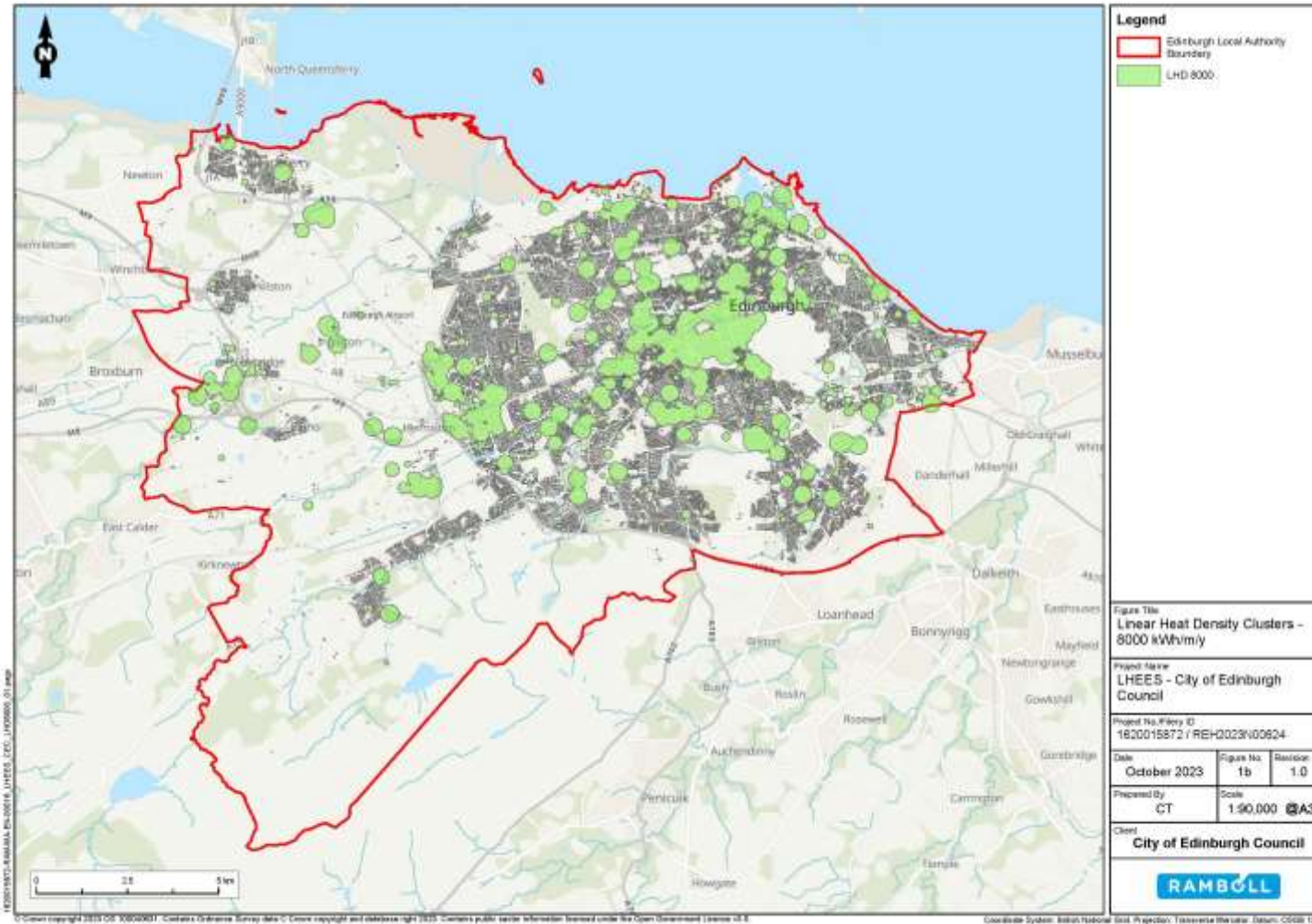


Figure 10: Process for the prioritisation of potential zones

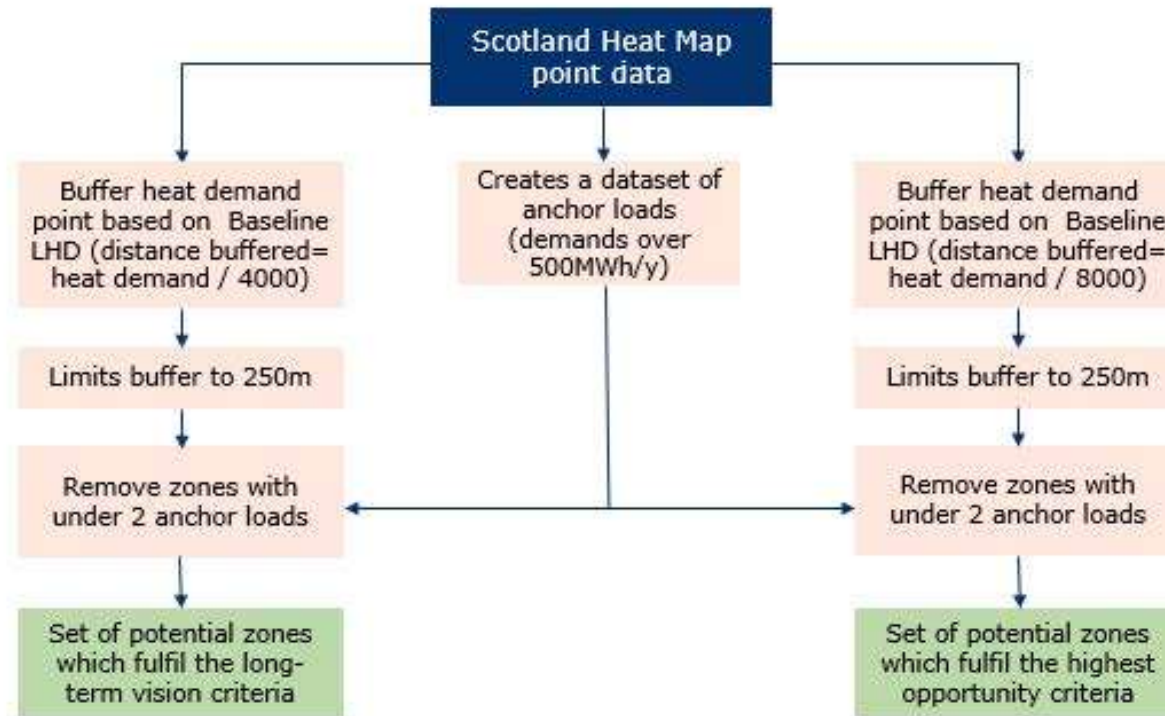


Figure 11: Prioritised potential Heat Network Zones in Edinburgh based on linear heat density of 4,000 kWh per metre per year

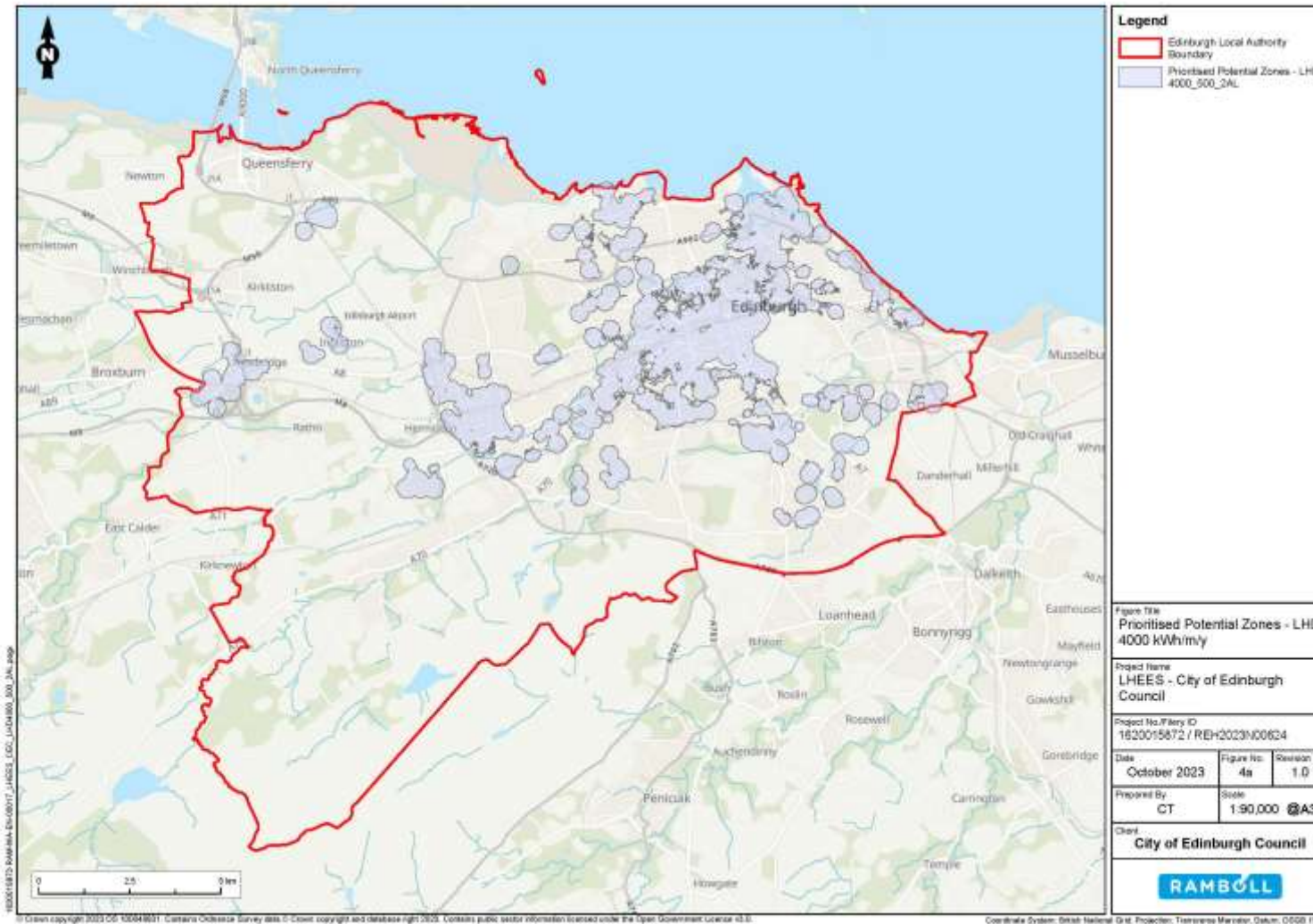


Figure 12: Prioritised potential Heat Network Zones in Edinburgh based on linear heat density of 8,000 kWh per metre per year

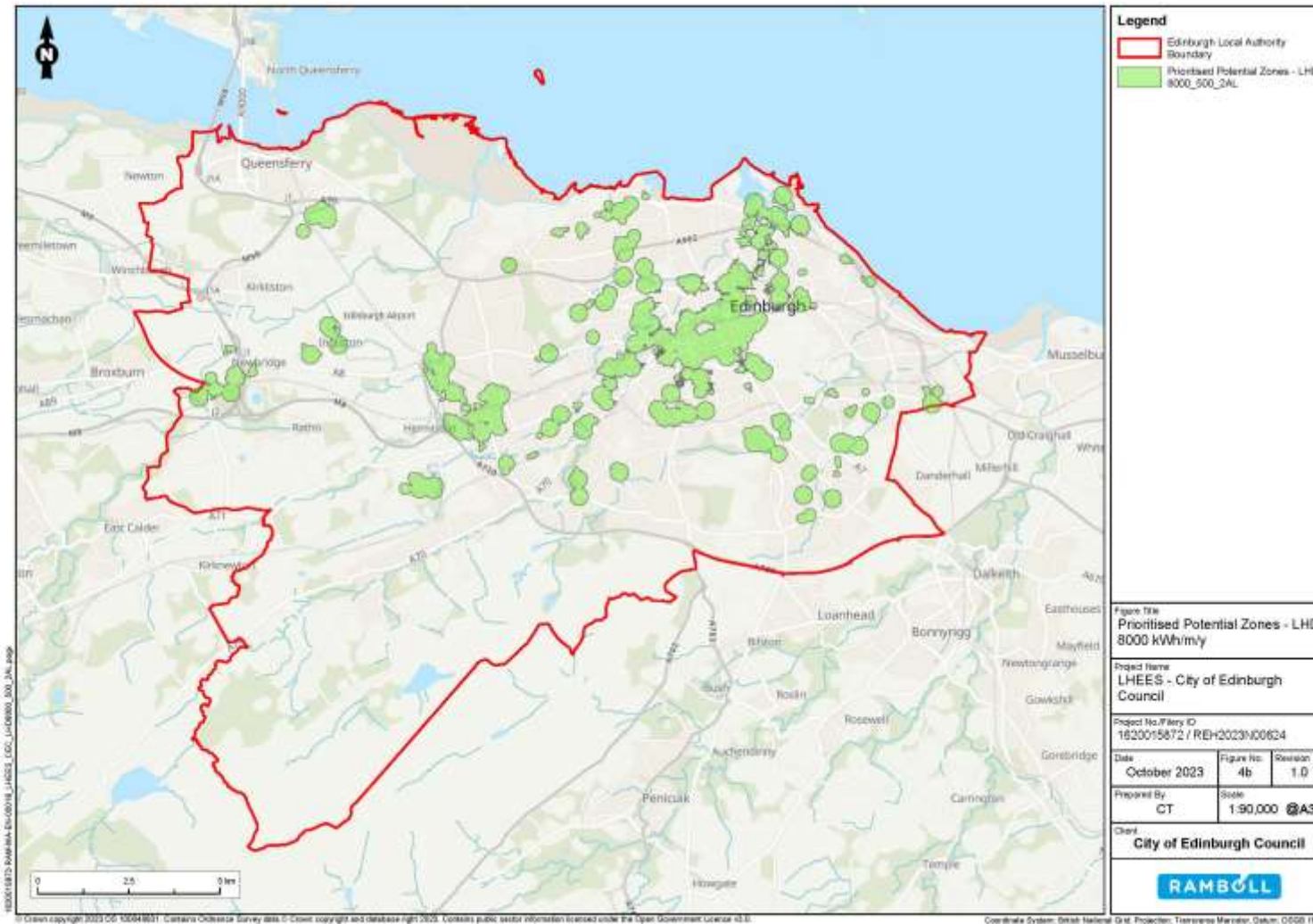


Figure 13: Selected prioritised potential Heat Network Zones in Edinburgh

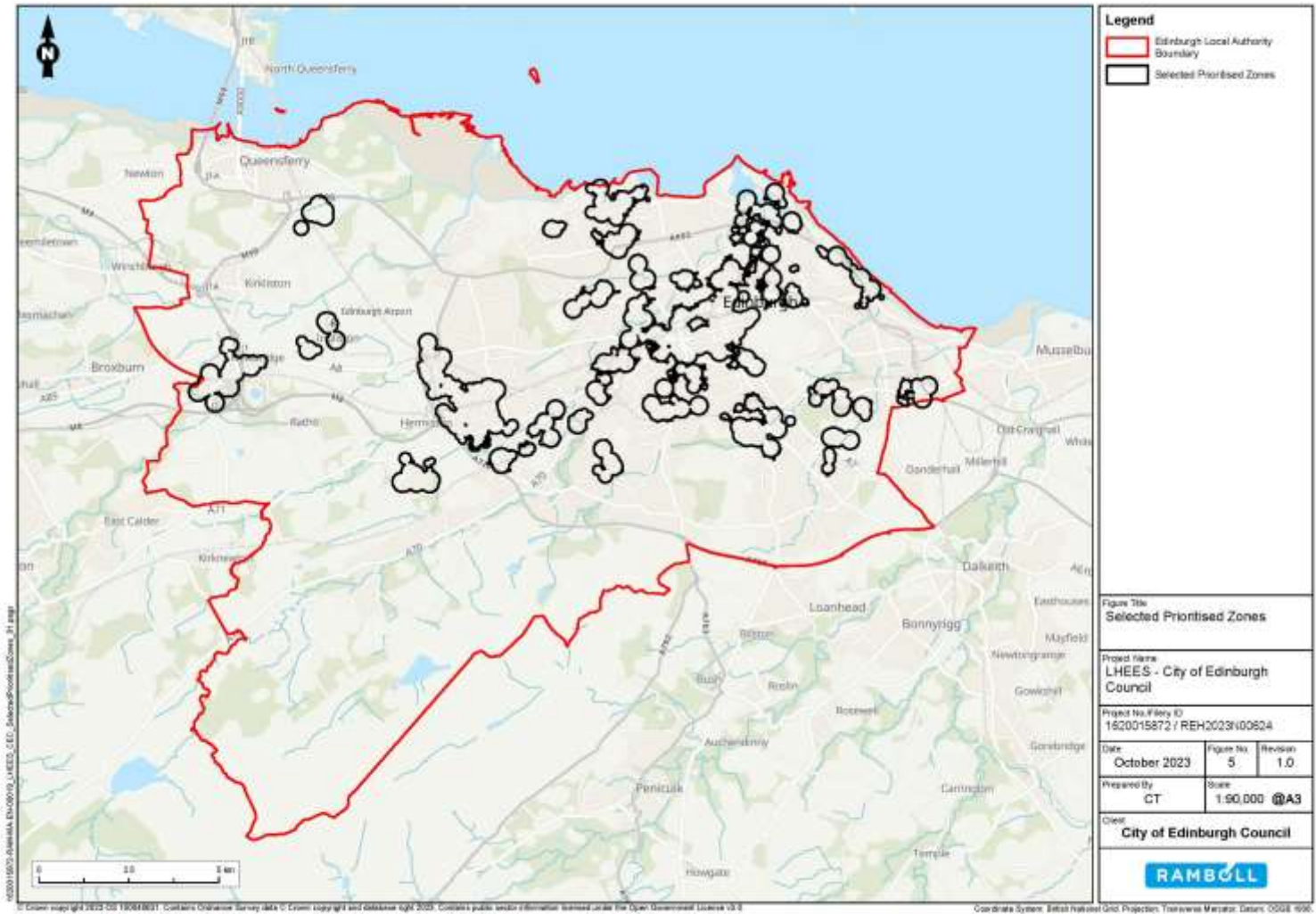


Figure 14: Initial Heat Network Zones in Edinburgh, overlaid with areas of new development and planned heat networks

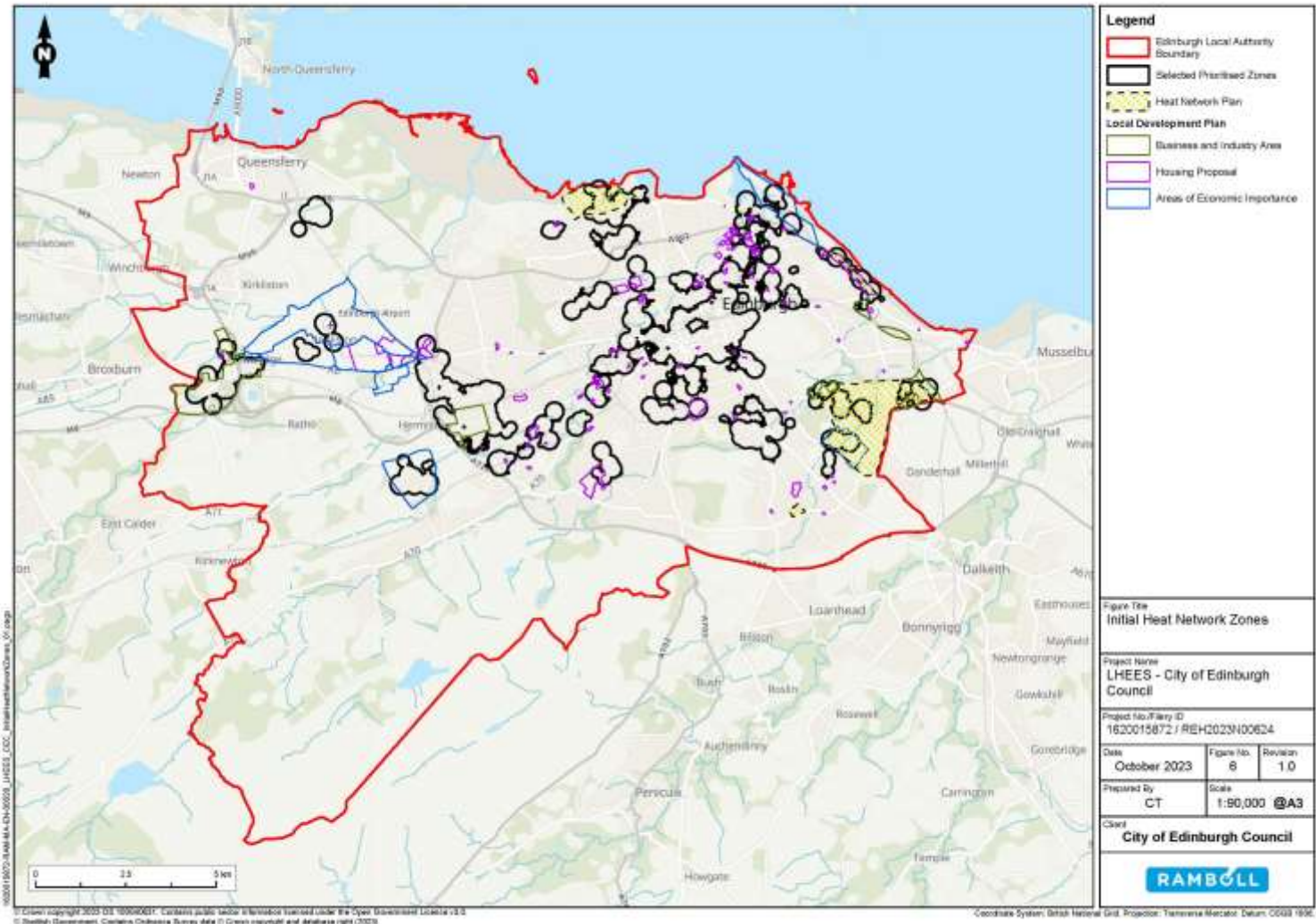
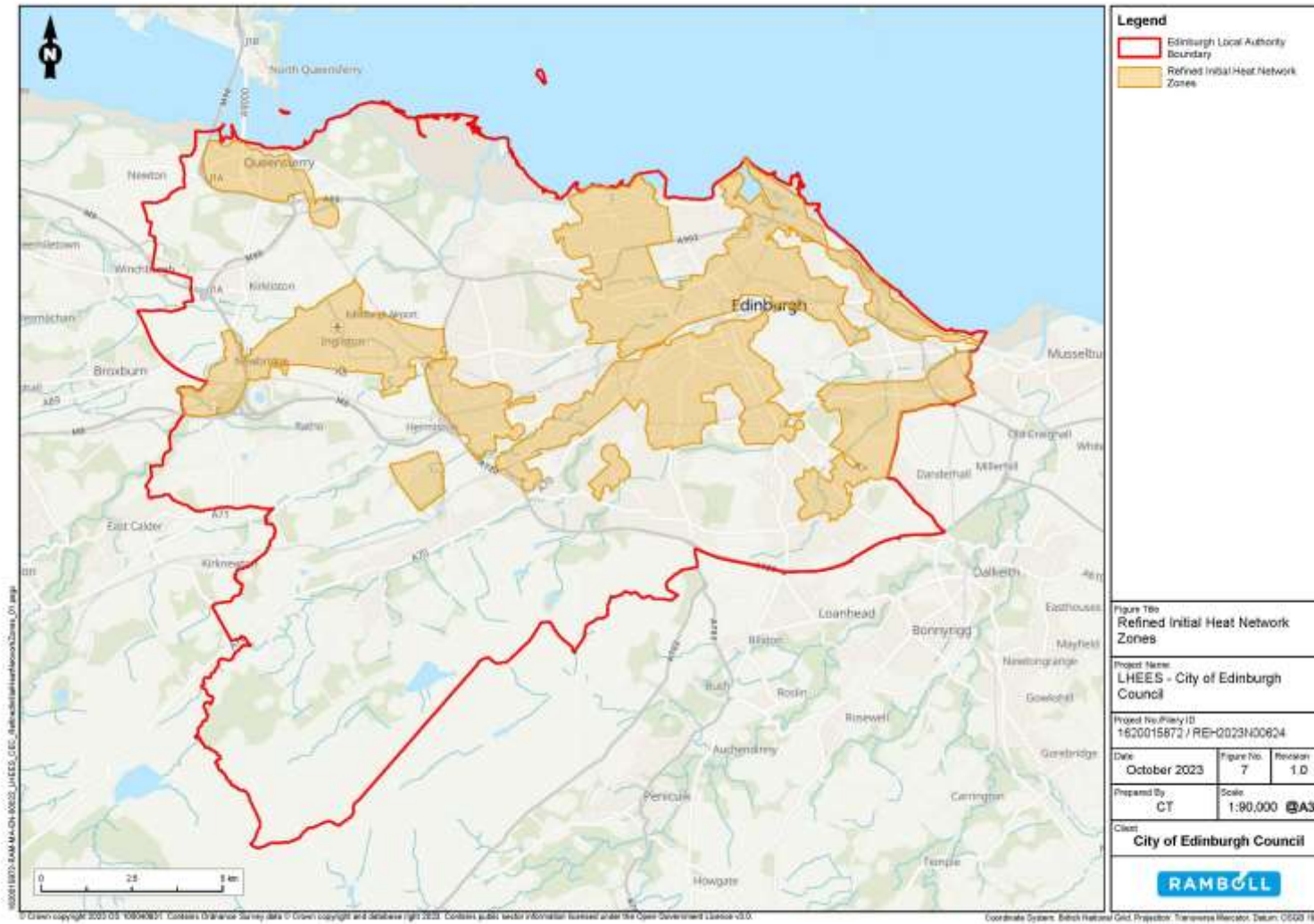


Figure 15: Refined initial Heat Network Zones in Edinburgh



11.3. Strategic Zones

Figure 16: Off-gas homes in category 0

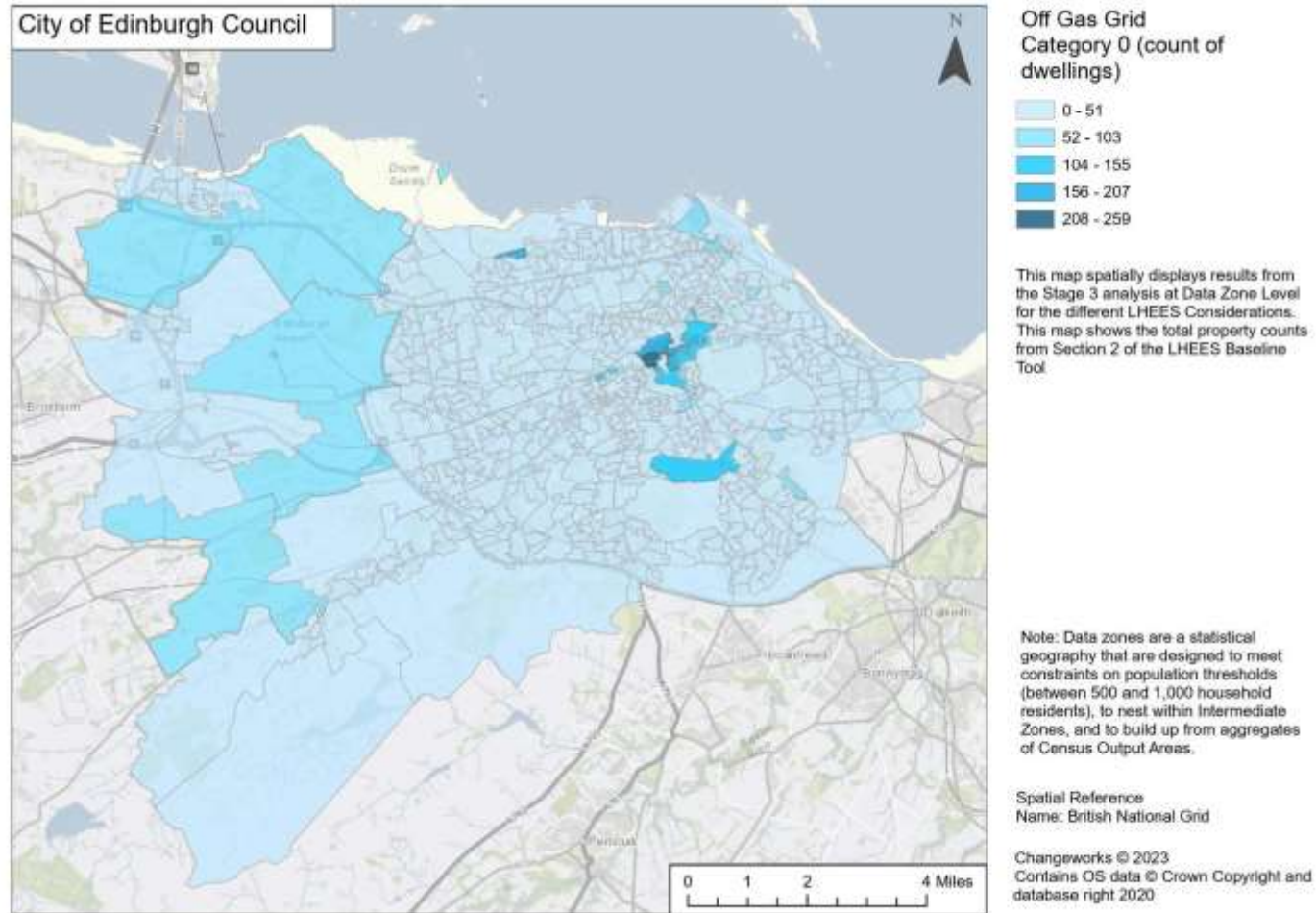


Figure 17: Off-gas homes in category 1

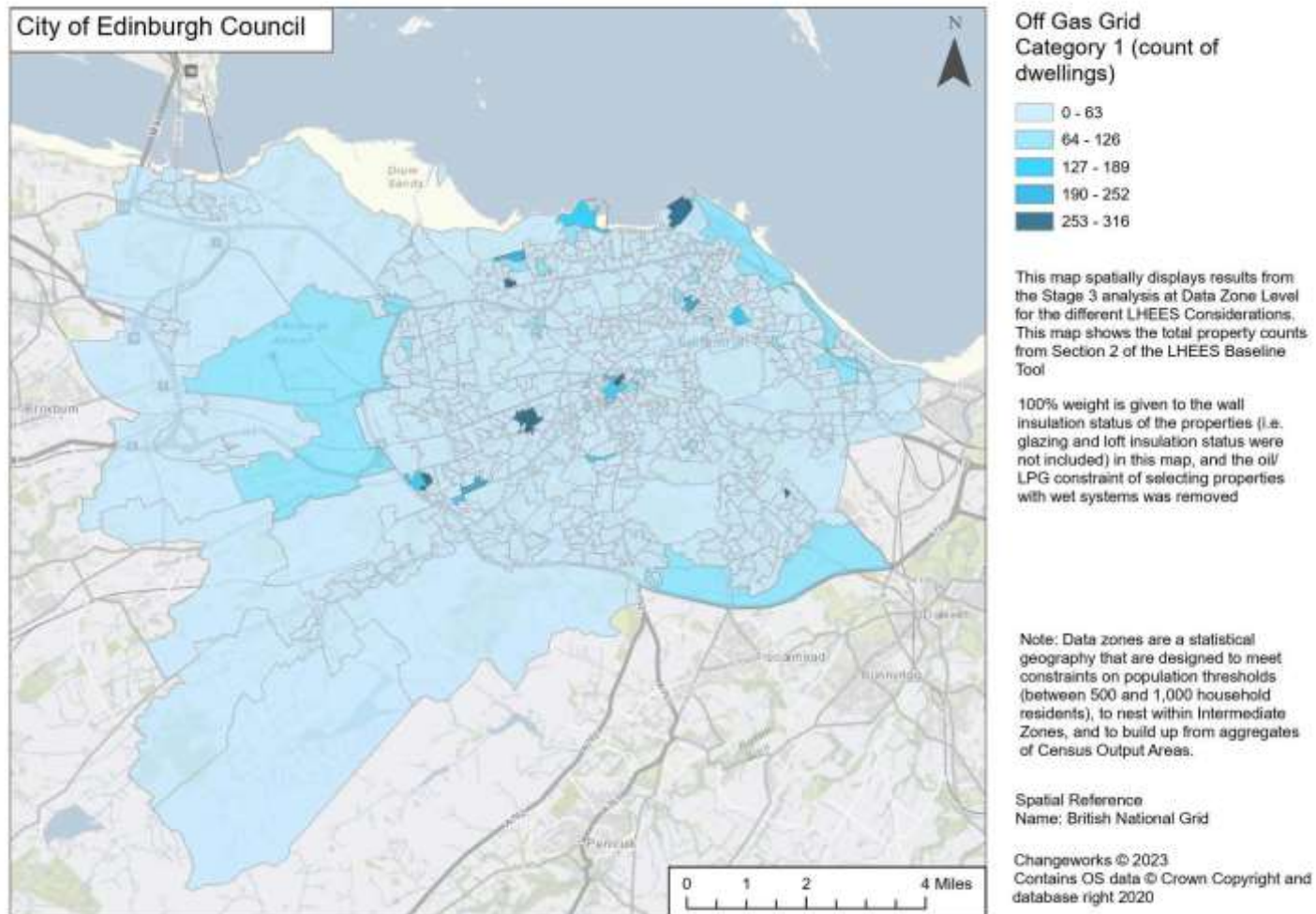


Figure 18: Off-gas homes in category 2

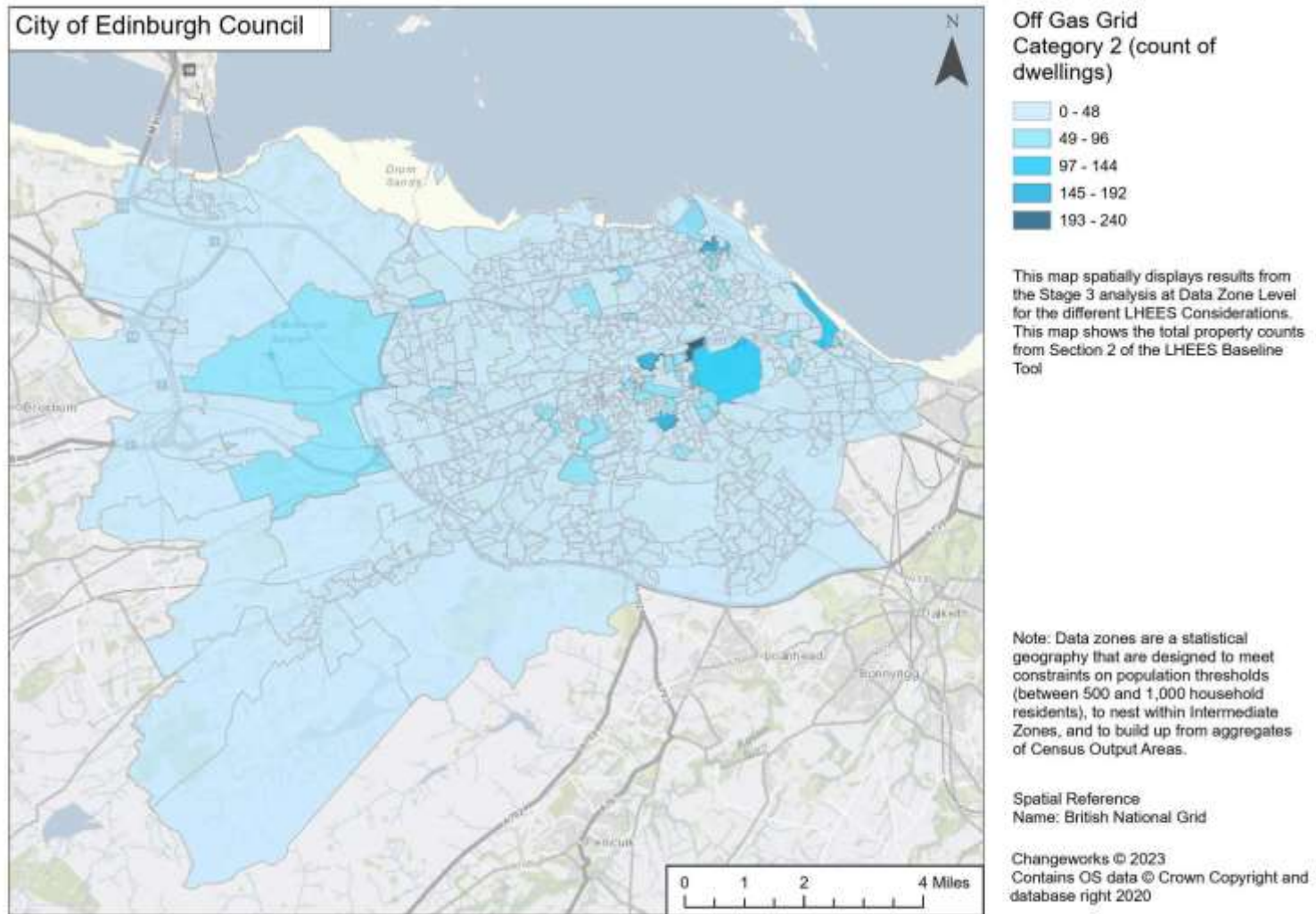


Figure 19: Off-gas homes in category 3

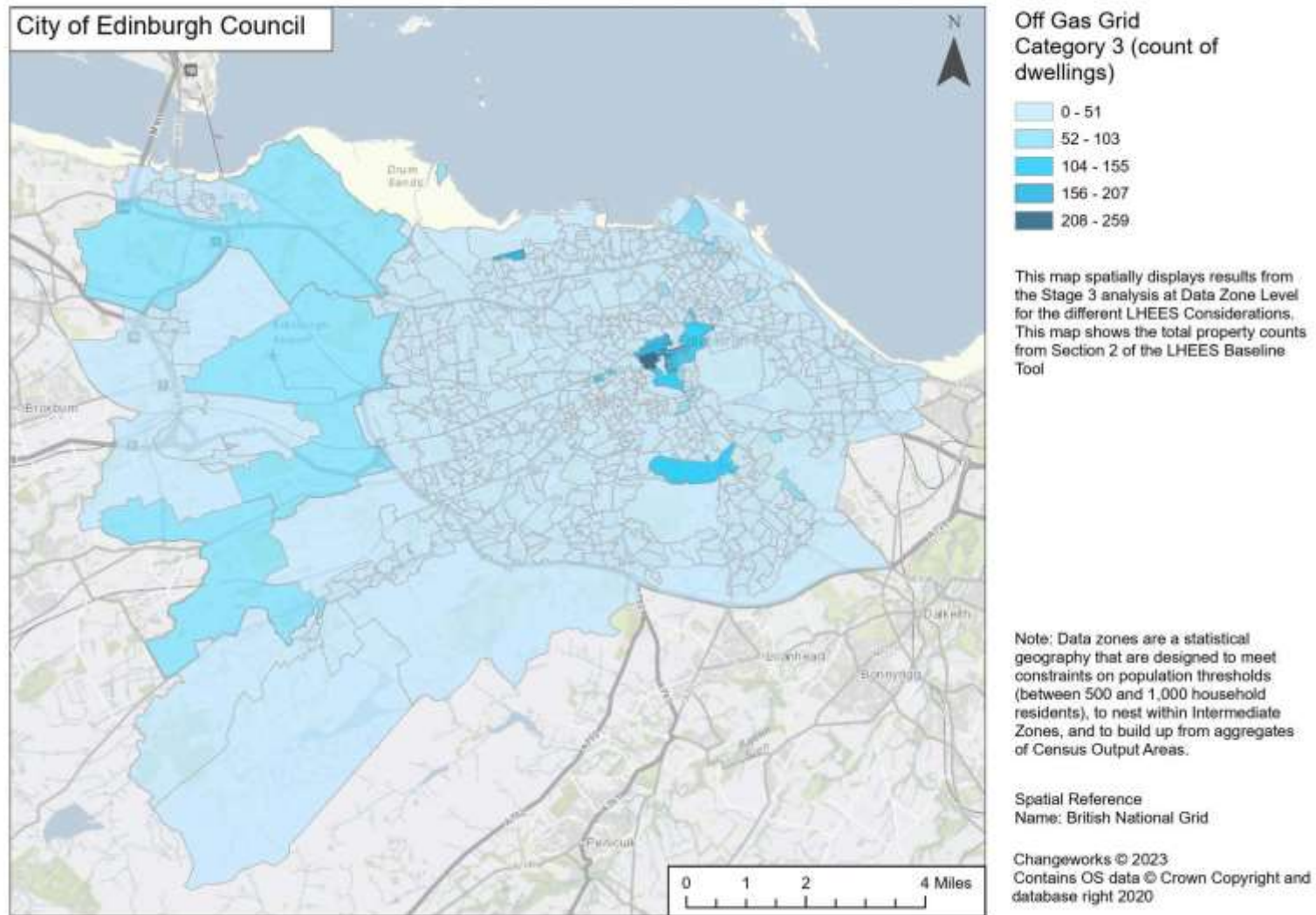


Figure 20: On-gas homes in category 0

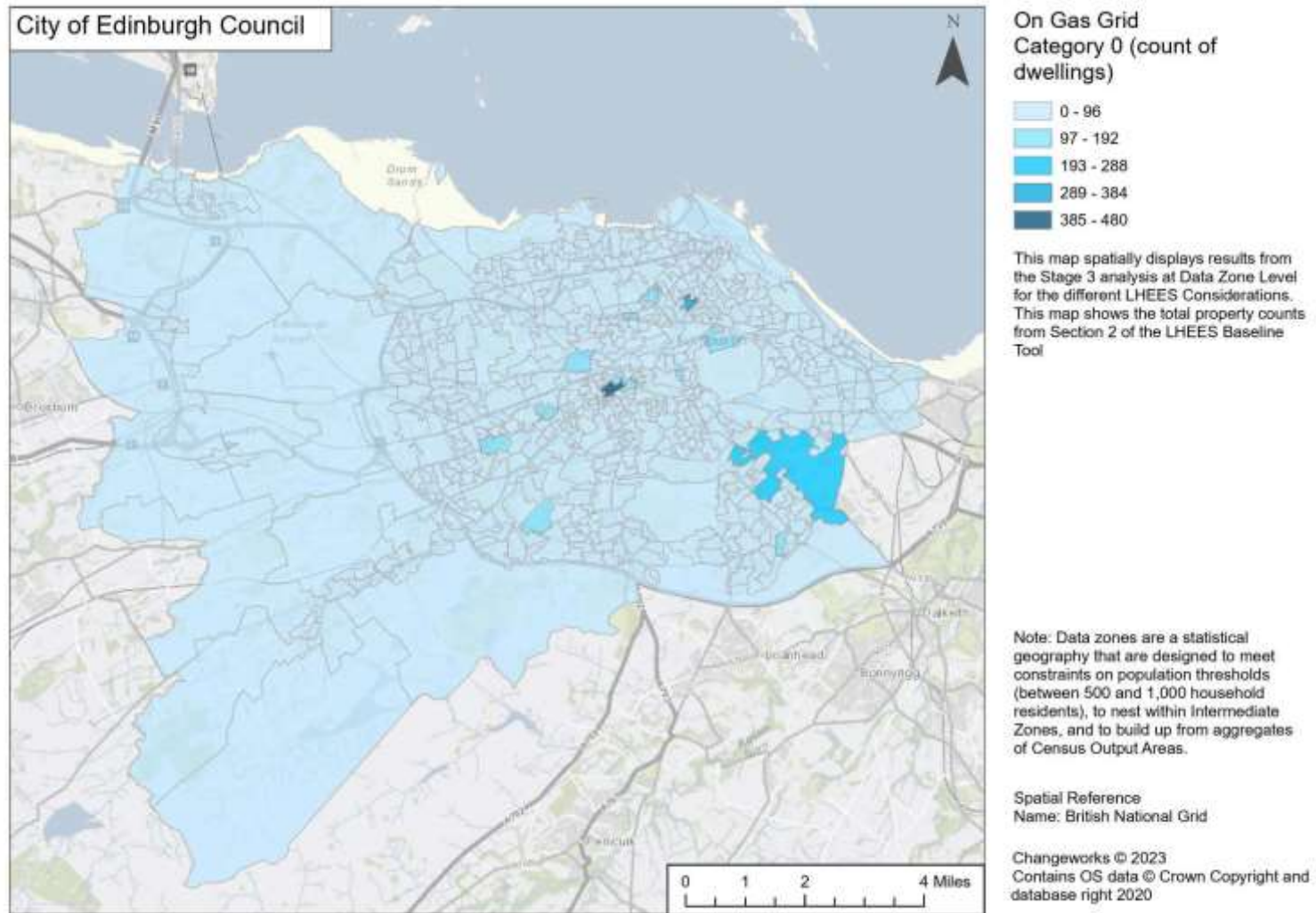


Figure 21: On-gas homes in category 1

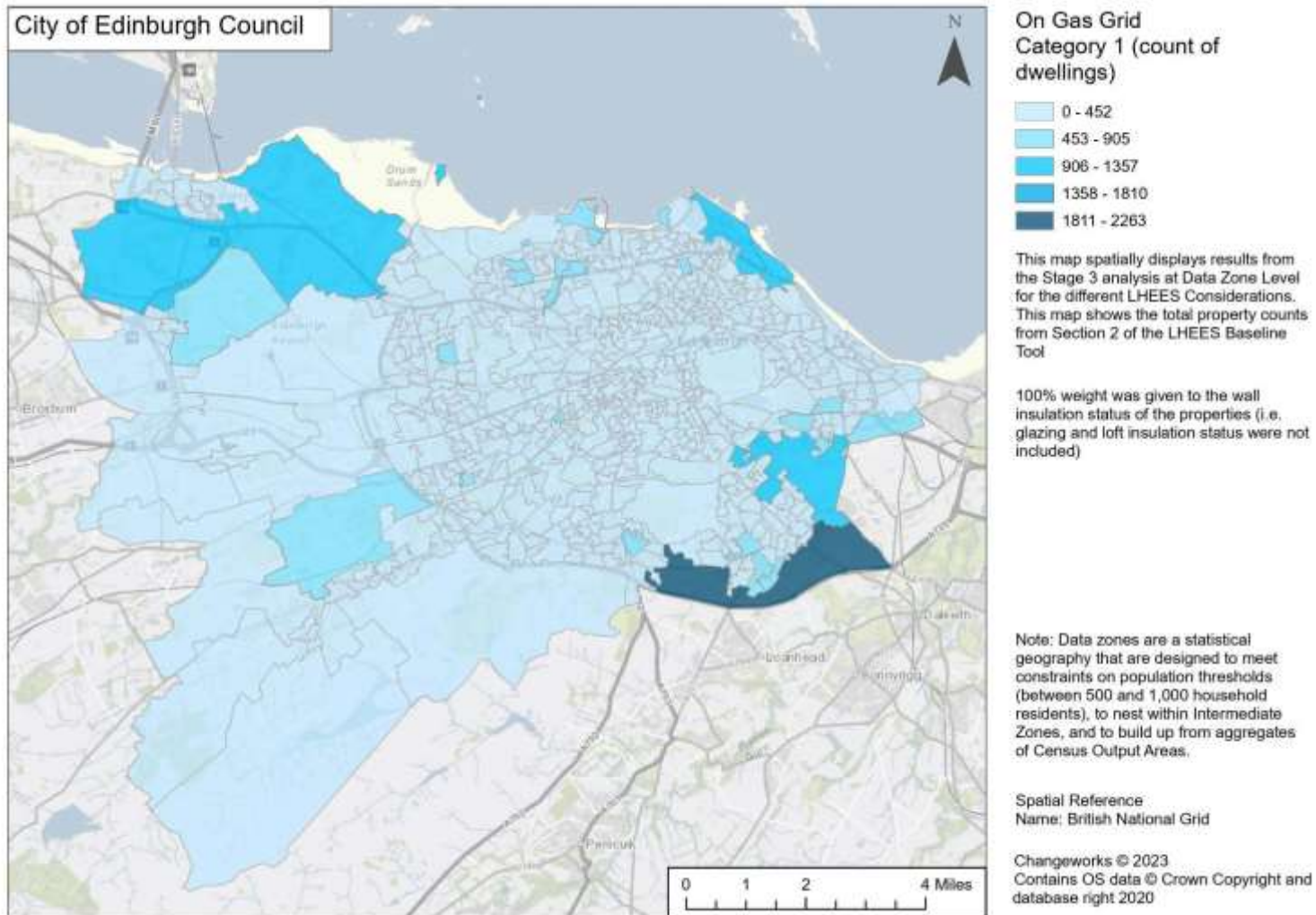


Figure 22: On-gas homes in category 2

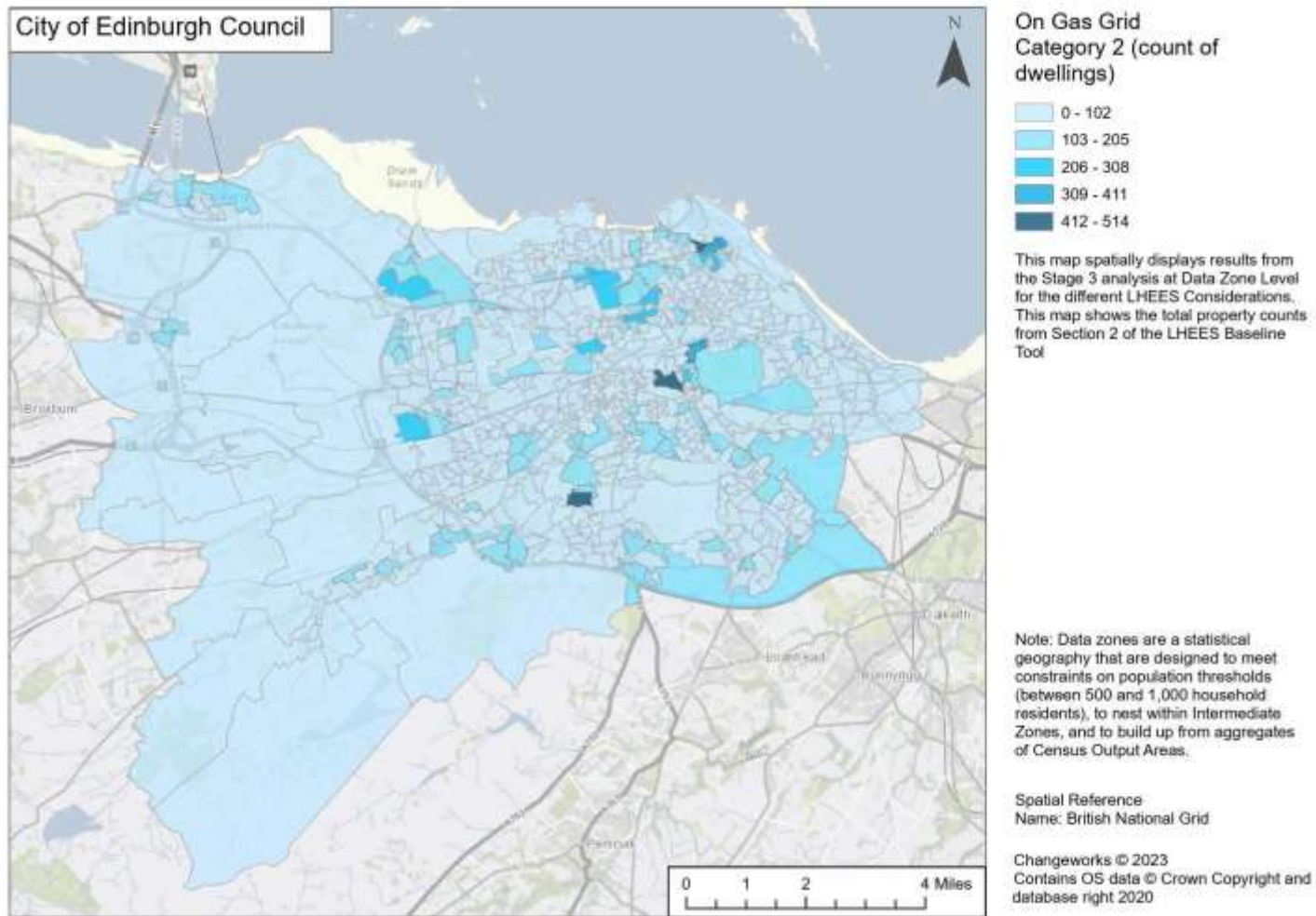


Figure 23: On-gas homes in category 3

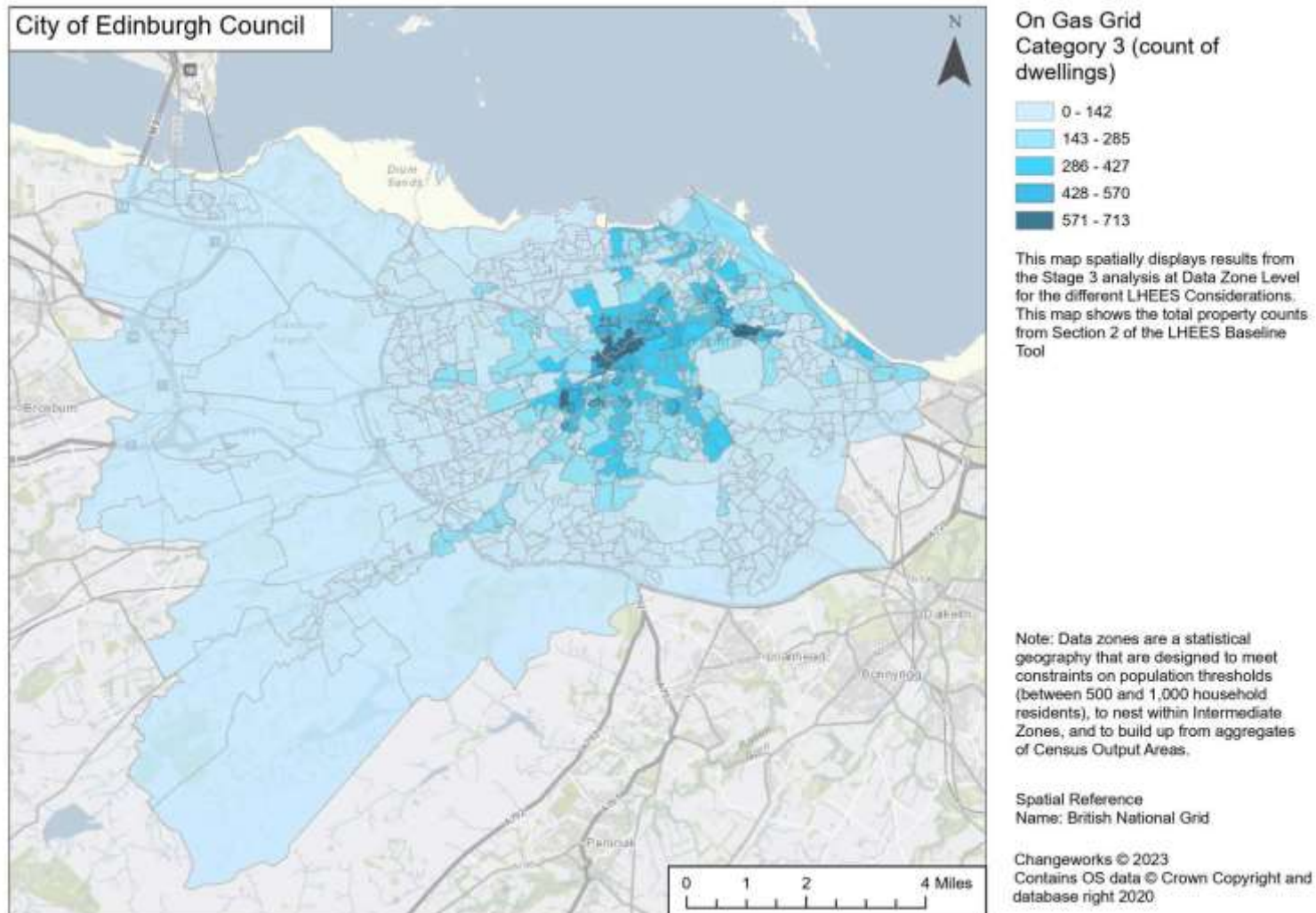


Figure 24: Prospective Heat Network Zones in Edinburgh

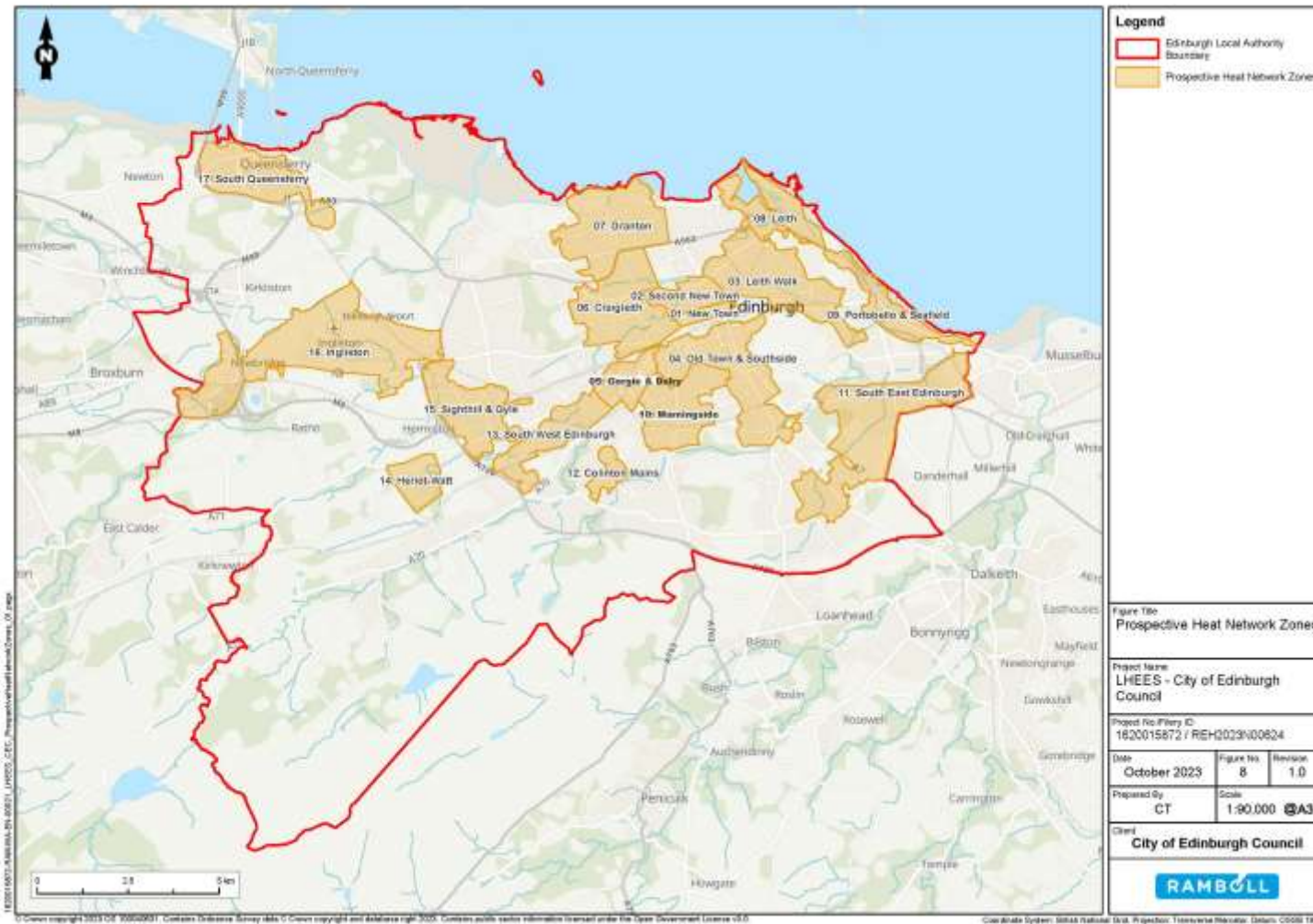


Figure 25: Homes in Edinburgh with solar suitability

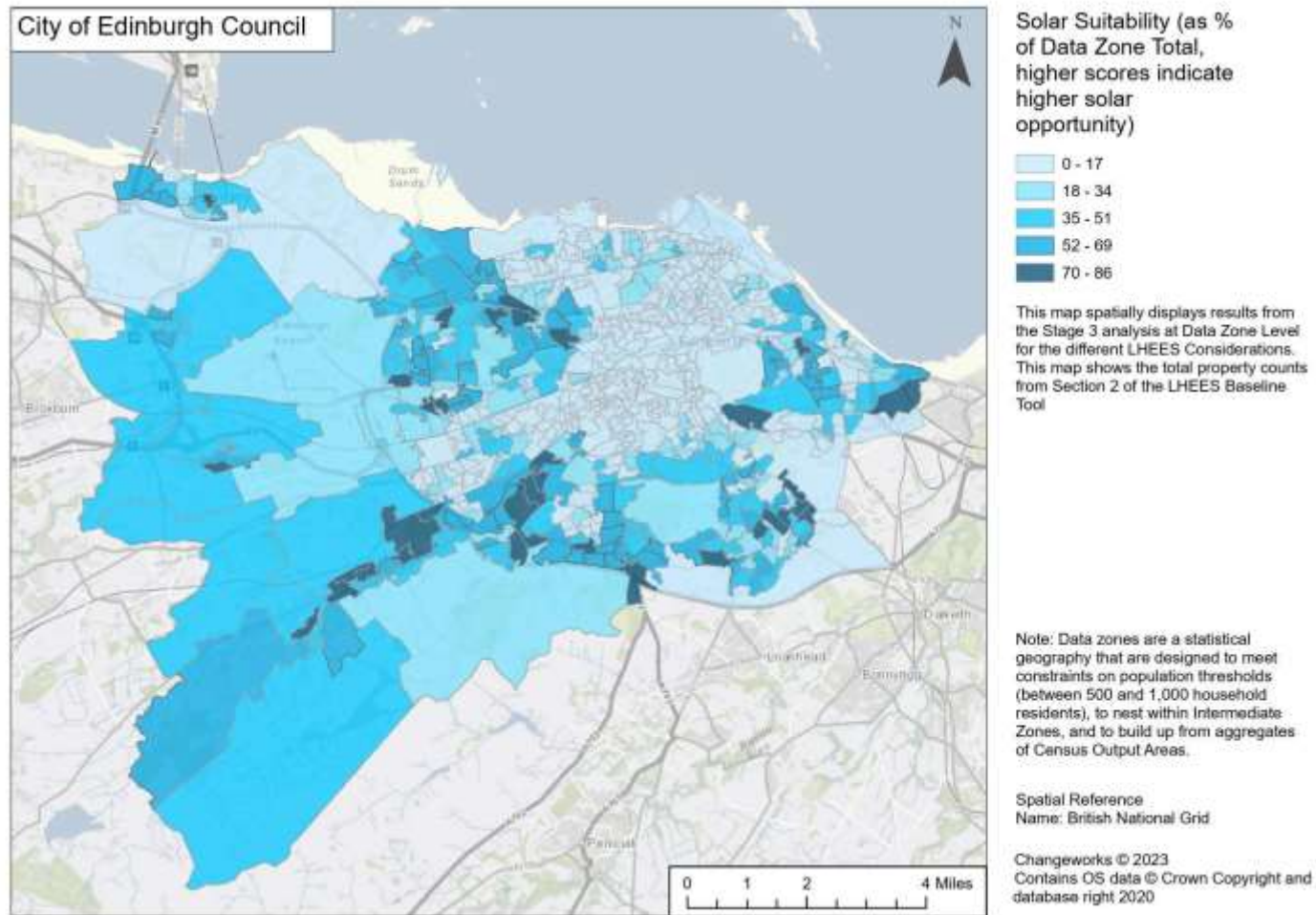


Figure 26: Homes with uninsulated walls in Edinburgh

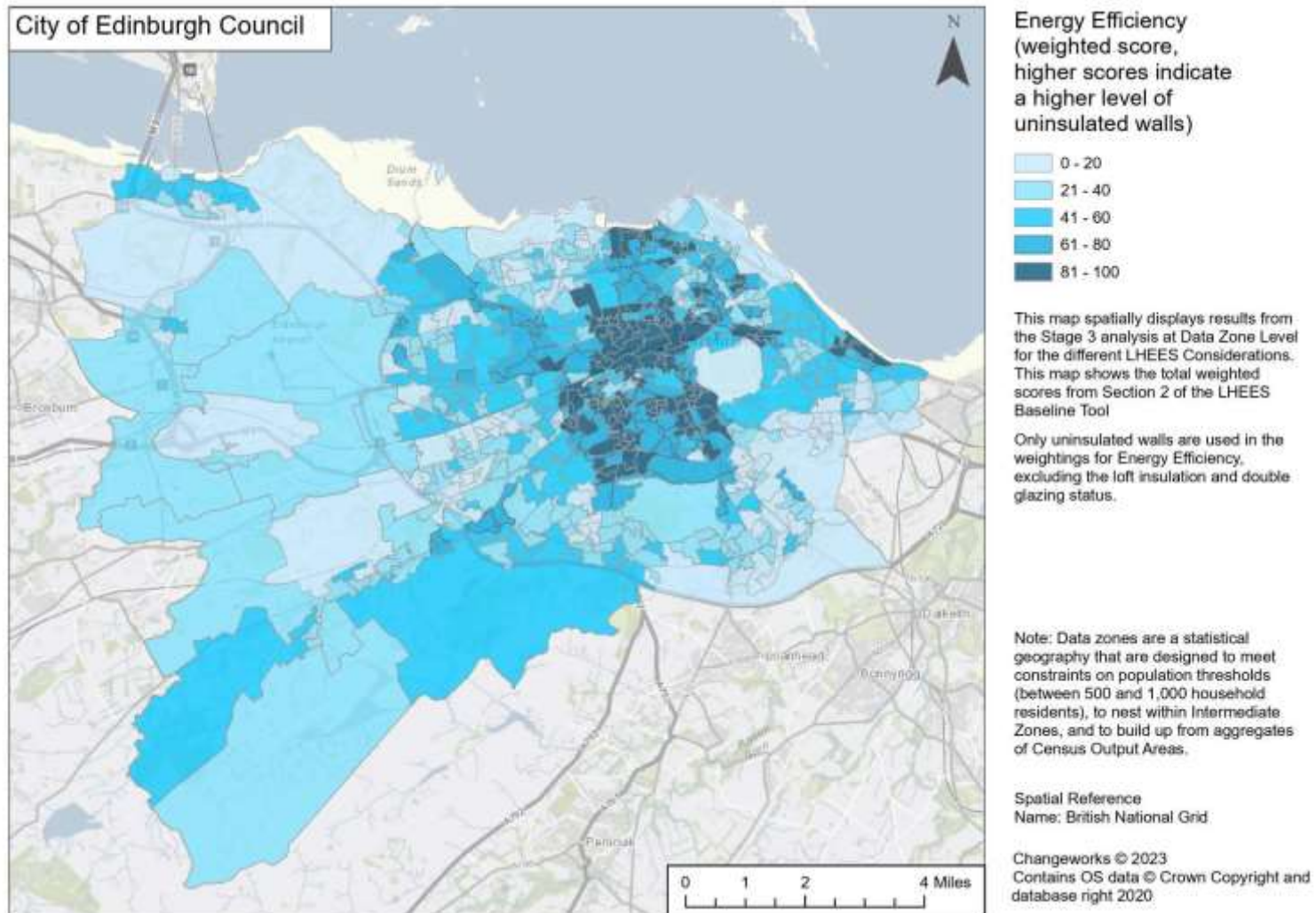


Figure 27: Homes with solid brick/stone uninsulated walls in Edinburgh

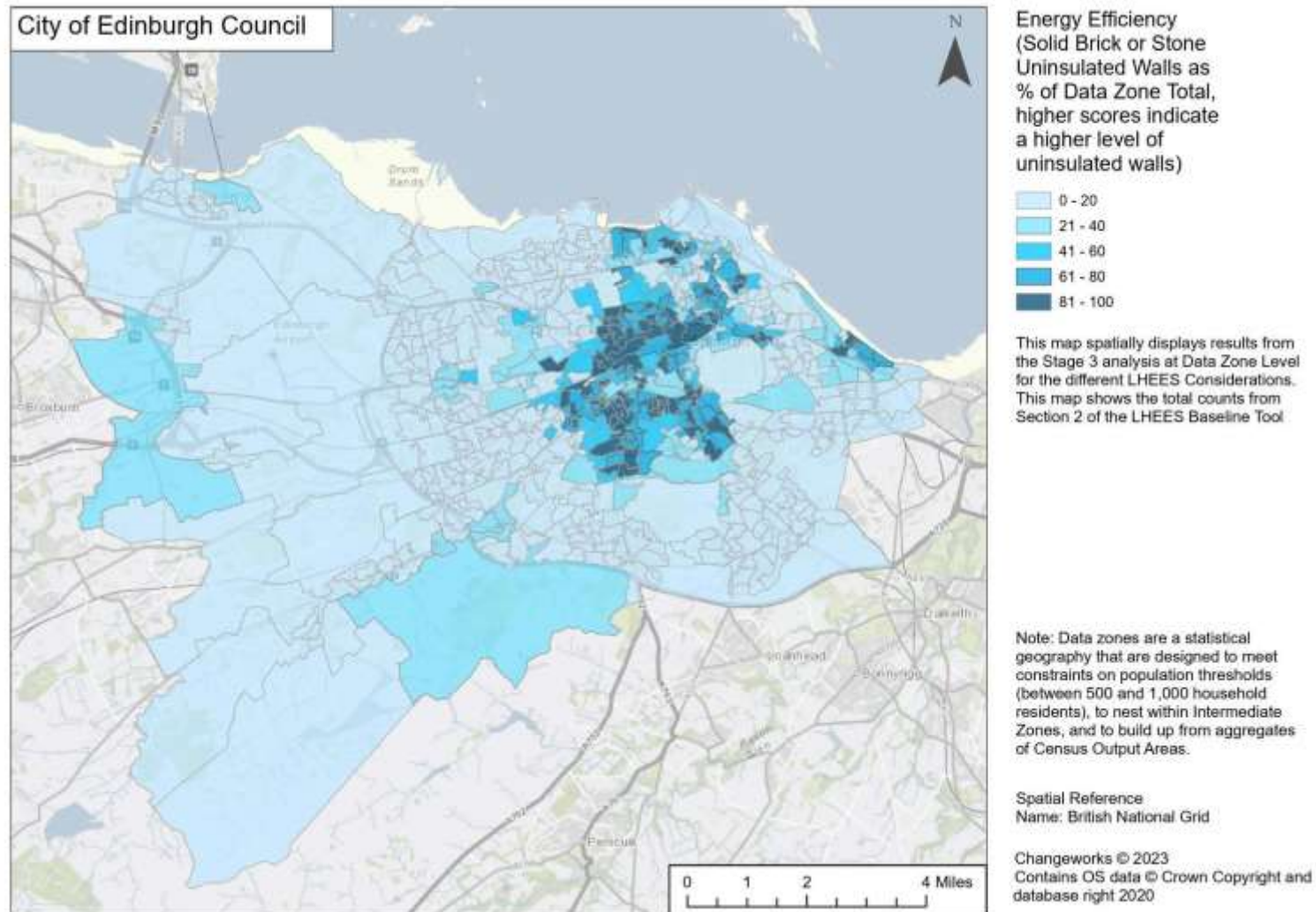


Figure 28: Areas of high fuel poverty and poor energy efficiency

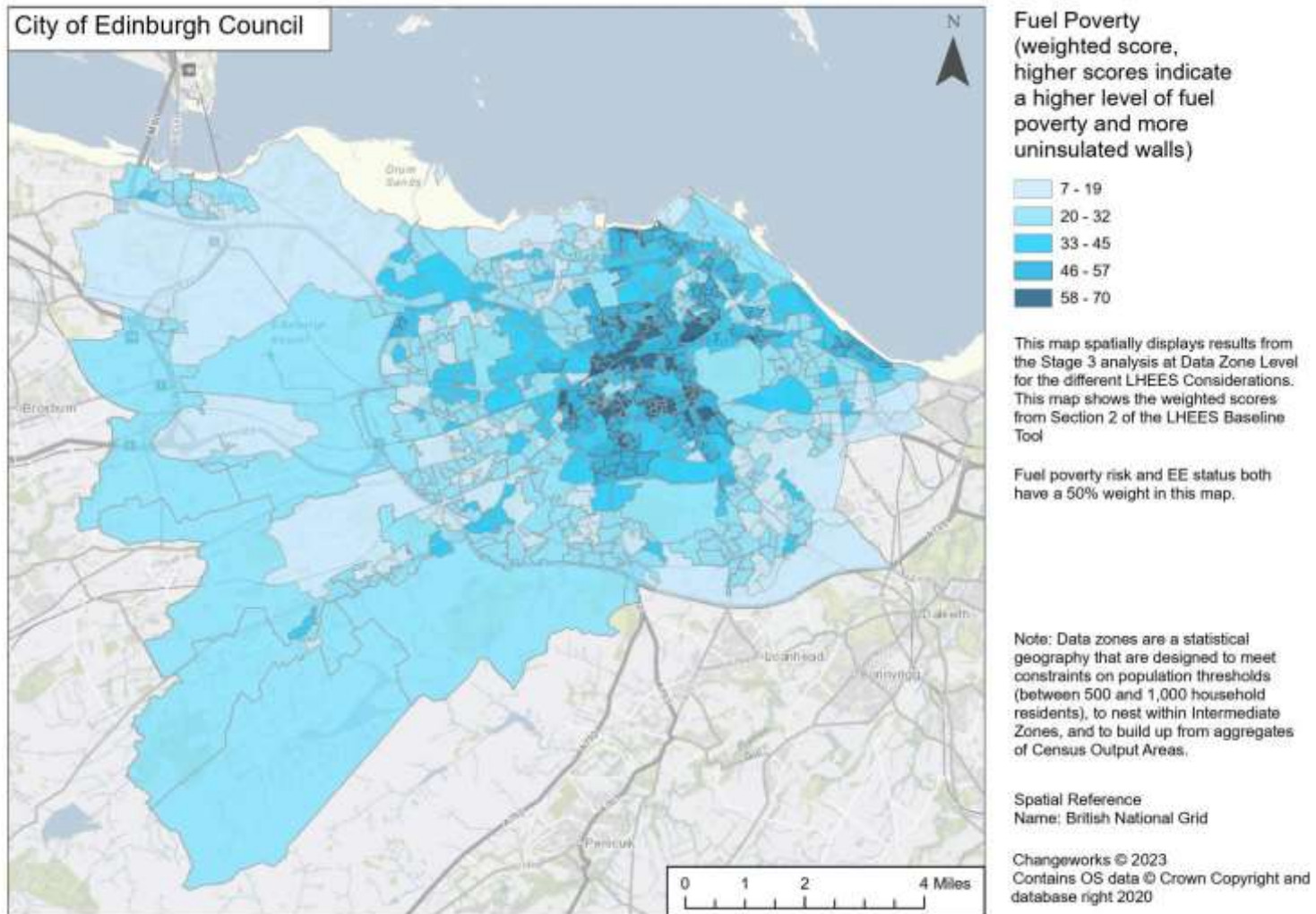
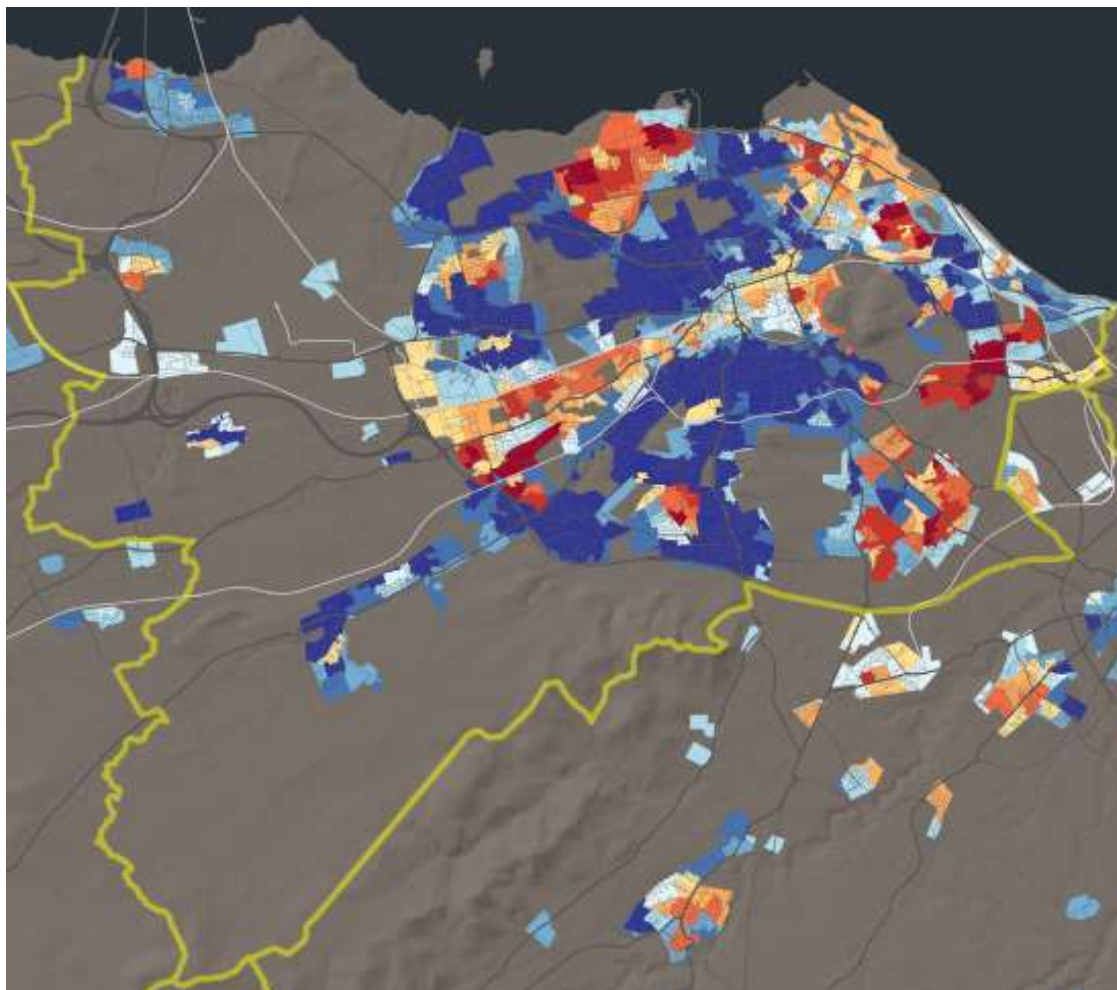


Figure 29: Scottish Index of Multiple Deprivation 2020 heat map of Edinburgh ^{xliii}



^{xliii} “Warmer” areas have a lower ranking on the SIMD, i.e. they are more deprived.

Figure 30: Mixed-tenure homes in Edinburgh

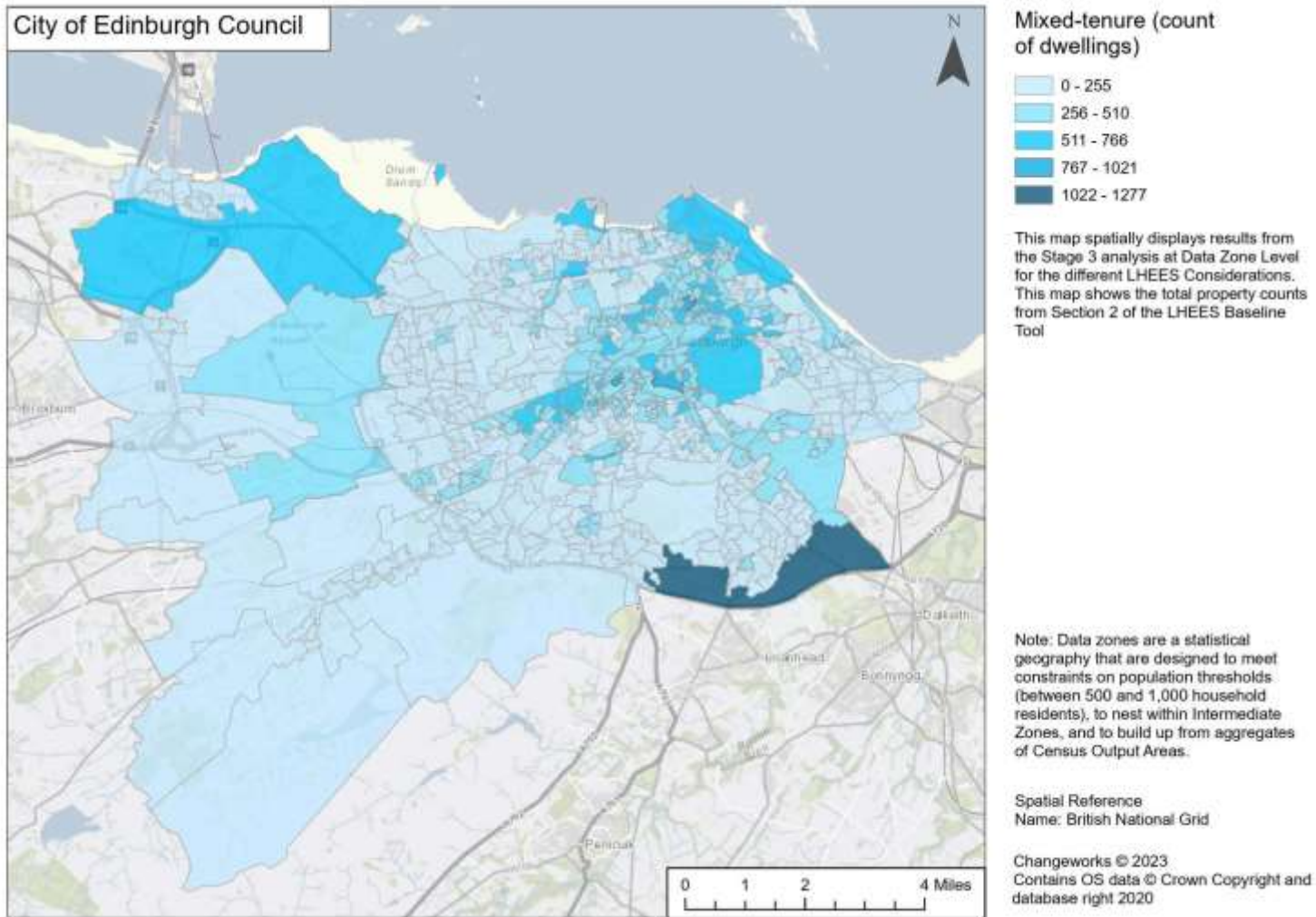


Figure 31: Homes in Edinburgh in buildings with >1 dwellings

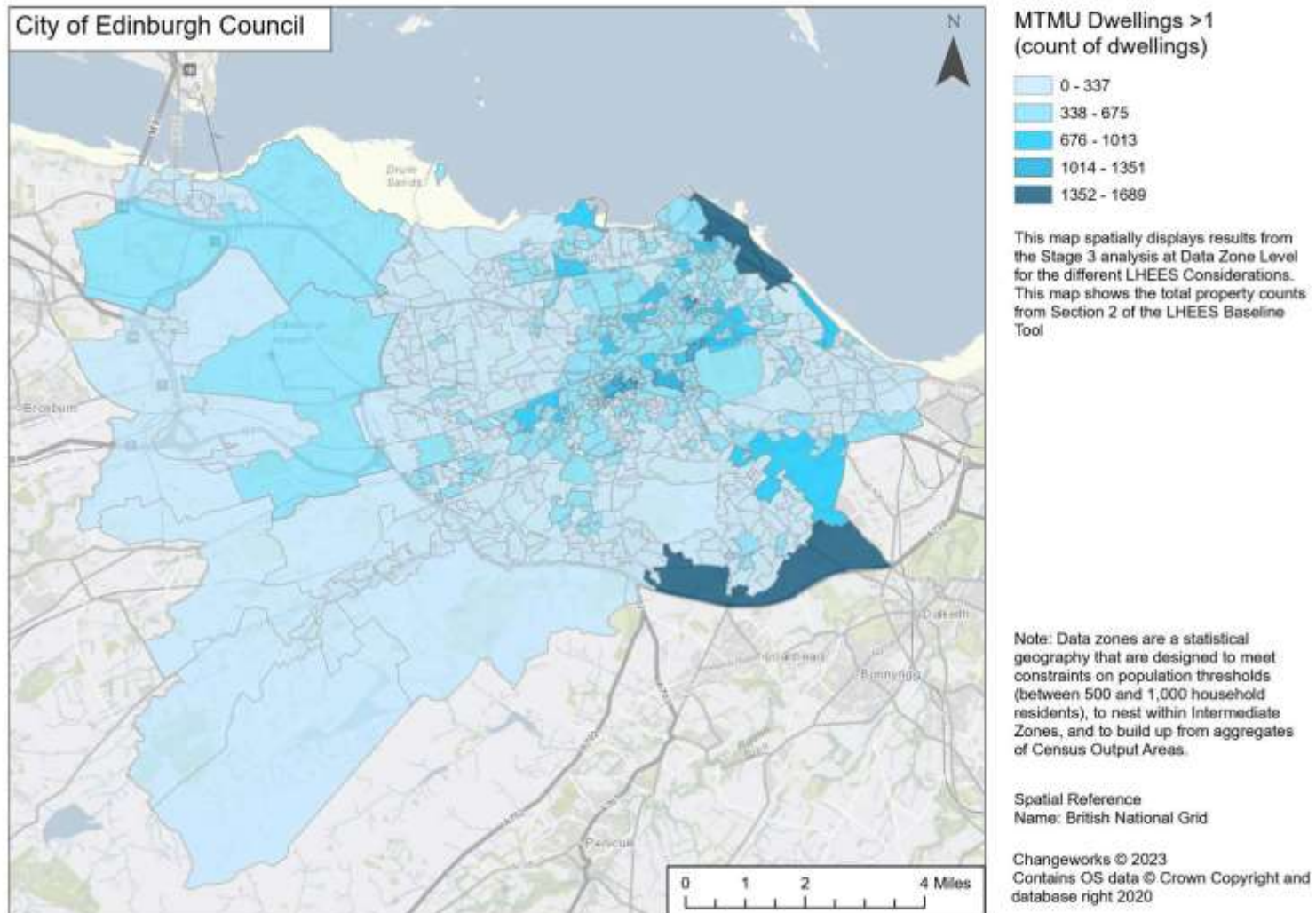


Figure 32: Homes in listed buildings in Edinburgh

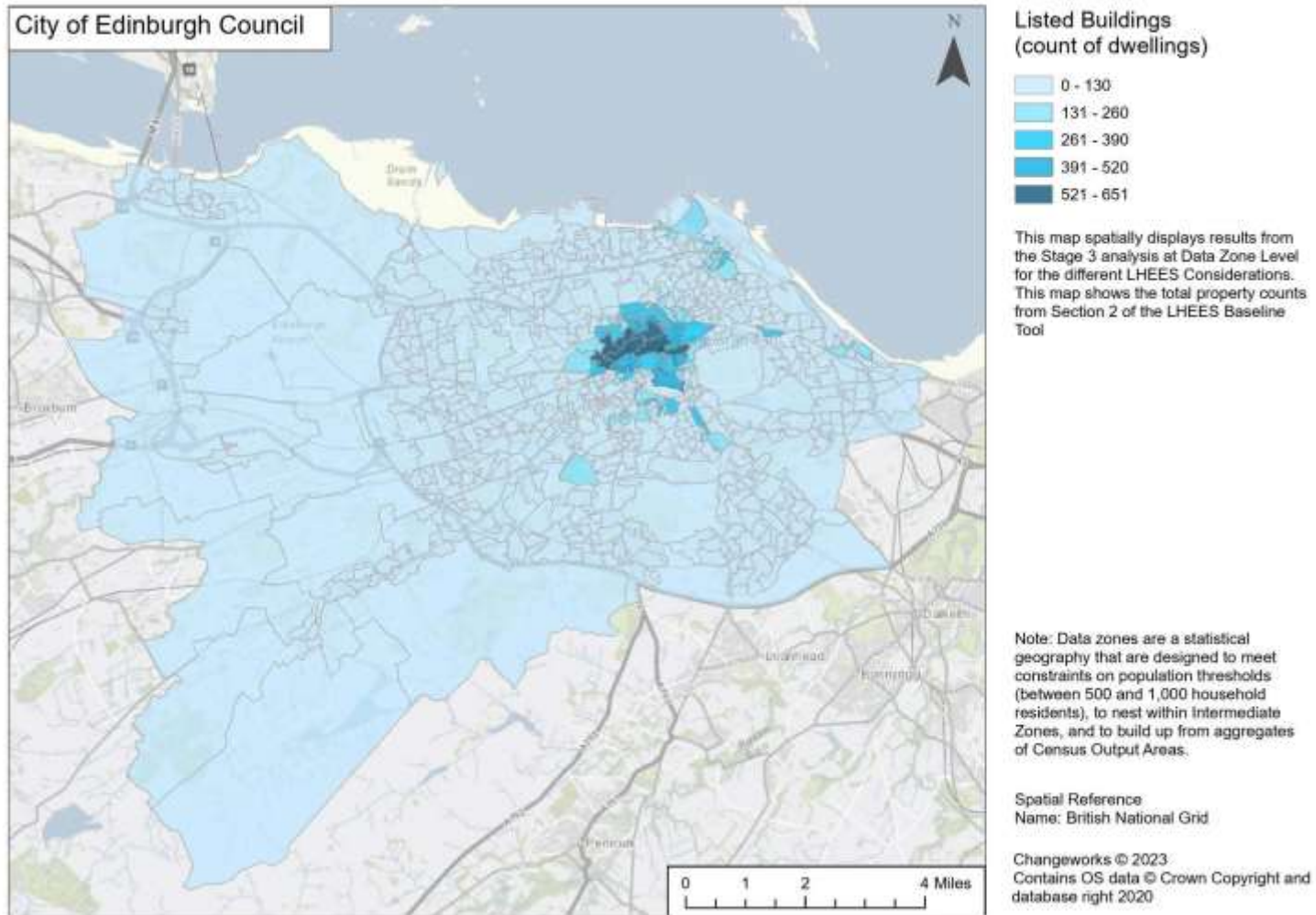
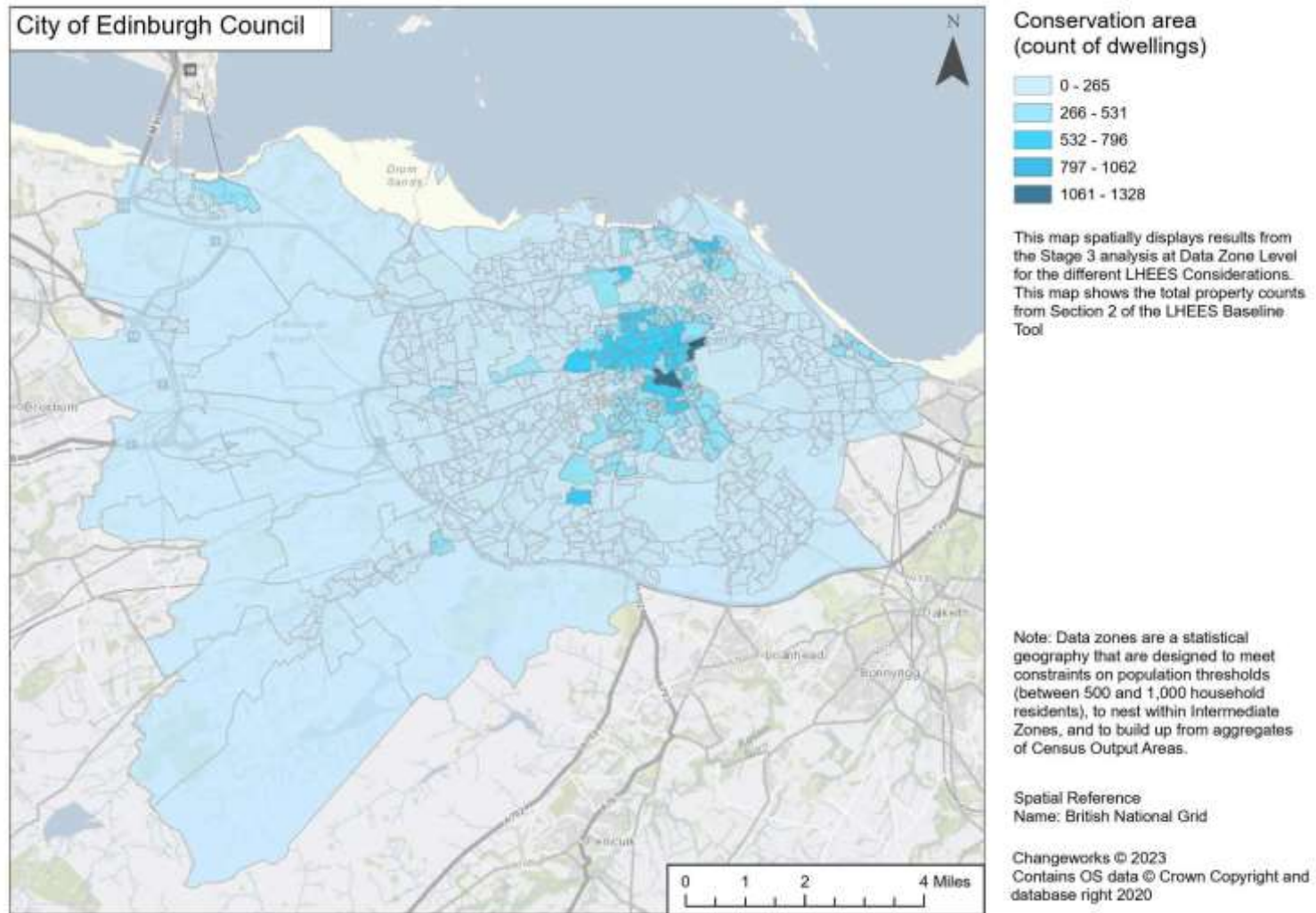


Figure 33: Homes in conservation areas in Edinburgh



11.4. Core stakeholders

Public sector

- Business Energy Scotland
- The Coal Authority
- Energy Saving Trust
- Green Heat Finance Taskforce
- Heat and Energy Efficiency Scotland
- Heat Network Support Unit
- Heat Networks & Non-Domestic Regulations Unit
- Historic Environment Scotland
- Home Energy Scotland
- Local Energy Scotland
- NHS Lothian
- Office of Gas and Electricity Markets (OFGEM)
- Scottish Enterprise
- Scottish Futures Trust
- Scottish Government
- Scottish Water / Scottish Water Horizons
- UK Government

Academic

- Edinburgh Climate Change Institute
- Edinburgh Napier University
- Heriot-Watt University
- University of Edinburgh

Residents and communities

- Association of Community Councils
- Clean Heat Forum
- Edinburgh Tenants Federation
- Our Future Edinburgh

Business

- Edinburgh Chamber of Commerce
- Energy for Edinburgh
- Essential Edinburgh
- Federation of Small Businesses
- Midlothian Energy
- Novoville
- Salix Finance
- Scotia Gas Networks (SGN)
- Scottish Power Energy Networks (SPEN)
- Utilita Energy

Housing providers

- Ark
- Blackwood Homes
- Cairn Housing Association
- Hanover (Scotland) Housing Association
- Harbour Homes
- Hillcrest Homes
- Home Group
- Homes for Scotland
- Lar Housing Trust
- Link Housing Association
- Lister Housing Co-operative
- Manor Estates Housing Association
- Muirhouse Housing Association
- Places for People Scotland
- Prospect Community Housing
- Trust Housing Association
- Viewpoint
- West Granton Housing Co-Operative
- Wheatley Homes East

Third sector

- Changeworks
- Energy Action Scotland
- Edinburgh Community Solar Co-operative
- Edinburgh Voluntary Organisations' Council (EVOC)
- Edinburgh World Heritage
- Greenspace Scotland
- Scotland Excel
- Social Investment Scotland
- Under One Roof
- Zero Waste Scotland

Commissions and partnerships

- Cities Commission for Climate Investment (3Ci)
- City Heat and Energy Partnership
- Edinburgh Building Retrofit and Improvement Collective
- Edinburgh Climate Commission
- Energy Efficiency Public Buildings Partnership
- Net Zero Edinburgh
- Warmworks

11.5. Glossary

Abbreviations

Table 51: Edinburgh LHEES abbreviations

Abbreviation	Definition
3Ci	Cities Commission for Climate Investment
ABS	Area-Based Scheme
ASHP	Air source heat pump
C	Celsius
CAPEX	Capital expenditure
CCS	Carbon capture and storage
CHMM	Clean Heat Market Mechanism
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COP	Coefficient of performance
EFE	Energy for Edinburgh
EESHS	Energy Efficiency Standard for Social Housing
EESHS2	Energy Efficiency Standard for Social Housing post-2020
ELDP	Edinburgh Local Development Plan
EPC	Energy Performance Certificate
ESCo	Energy services company
EST	Energy Saving Trust
FIT	Feed-in Tariff
FNA	First National Assessment
GIS	Geographic information system
GSHP	Ground source heat pump
GW	Gigawatt
GWh	Gigawatt hour
HEEPS	Home Energy Efficiency Programmes for Scotland
KT	Kiloton
KW	Kilowatt
KWh	Kilowatt hour
LA	Local authority
LED	Light-emitting diode
LHD	Linear heat density
LEAR	Local Energy Asset Representation
LHEES	Local Heat and Energy Efficiency Strategy

Abbreviation	Definition
LPG	Liquefied petroleum gas
MTIS	Mixed Tenure Improvement Service
MW	Megawatt
MWh	Megawatt hour
MWth	Megawatt thermal
NPF4	National Planning Framework 4
OFGEM	Office of Gas and Electricity Markets
PEAT	Portfolio Energy Analysis Tool
SAP	Standard Assessment Procedure
SEA	Strategic environmental assessment
SEG	Smart Export Guarantee
SGN	Scotia Gas Networks
SIMD	Scottish Index of Multiple Deprivation
TW	Terawatt
TWh	Terawatt hour
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPRN	Unique Property Reference Numbe
WHR	Whole house retrofit

Terms

Table 52: Edinburgh LHEES terms

Term	Definition
Anchor load	A building with a large, dependable, long-term, demand for heat which can offer surety of demand to a heat network operator, helping make the heat network commercially viable.
Baselining	Baselining is the purpose of understanding at local authority or strategic level, the current status of the buildings against the LHEES Considerations, targets, and indicators.
Biomass	Combustion of wooden pellets, chips, logs, or some other plant matter to generate heat.
Coefficient of performance	The power output by a system relative to the power input. A higher coefficient of performance represents a more efficient system.
Communal heating system	A smaller-scale heat network wherein heat generated at a central source is distributed to two or more units within a single building
Coolth	Cold as a commodity (Cf. heat / warmth).
Data Zone	Data zones are groups of output areas which have populations of around 500 to 1,000 residents.

Term	Definition
Delivery Area	Delivery areas are at a higher granularity than Strategic Zones. These spatial zones should set out clusters of buildings within a Strategic Zone or across the whole local authority that identify potential solution(s) at a delivery level. They will be an important starting point for identifying a range of projects, regulation and actions that are within the competence of the Scottish Government, local authorities and wider partners (included as actions to be developed in the Delivery Plan).
Delivery Plan	A Delivery Plan is a document setting out how a local authority proposes to support implementation of its Local Heat and Energy Efficiency Strategy.
Direct electric heating	Use of electricity to heat spaces and water directly (rather than interpolating other systems such as heat pumps).
Electric boiler	A boiler that works on the principle of heating water by passing it through an element, with carbon emissions based on the electricity grid emissions factor.
Energy centre	A building in which heat is generated.
Energy efficiency	The amount of energy required to heat a building (given its size) and the building's ability to retain that heat. The most common way to measure energy efficiency is through an Energy Performance Certificate (EPC), which provides a simple rating of energy efficiency of the building, albeit EPCs were originally designed to assess the cost of heating a building rather than the emissions associated with doing so.
Energy services company	A company providing energy services.
EnerPHit	A Passivhaus standard for the retrofit of existing buildings.
Fossil fuel	A non-renewable energy source, e.g. gas, oil, or coal.
Fuel poverty	As defined by the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019, circumstances in which a household spends over 10% of their net income after housing costs is spend on fuel needs and their residual income is less than 90% of the UK Minimum Income Standard, i.e. is insufficient to maintain an adequate standard of living.
Geographic information system	Software for analysing and displaying geographically-referenced information.
Gigawatt	A unit of power equal to one billion (1,000,000,000) watts.
Greenhouse gas	Gases in the earth's atmosphere that trap heat, in the main carbon dioxide; chlorofluorocarbons; methane; nitrous oxide; ozone; and water vapor.
Heat decarbonisation	Reducing or eliminating the carbon produced as a negative by-product of heating buildings.
Heat network	As defined in the Heat Networks (Scotland) Act 2021, a (district) heat network is "a network by which thermal energy is distributed from one or more sources of production to more than one building".
Heat pump	A heating solution that works on the principle of capturing thermal energy (heat) from a source such as the air, the ground, or a body of water (such as a river, sea, or sewer) and using the refrigeration cycle can convert it to supply

Term	Definition
	heat to the end user. The carbon emissions of a heat pump are based on the grid emissions factor.
Indicator	For a given Consideration, the purpose of an Indicator is: (1) to act as a key information field to help characterise and baseline the local authority; (2) to act as a key information field to support strategic zoning and generation of initial delivery areas; (3) if suitable, to act as a key information field to measure progress against Targets over the duration of the Edinburgh LHEES - set out in the Delivery Plan. For some Considerations, one Indicator may be sufficient, but for others a range may be appropriate.
Insulation	Use of materials to slow the rate at which heat is lost from a building to the outside. This is one of the most affordable and effective ways of reducing heat demand by improving heat retention.
Intermediate Zone	Intermediate zones are a statistical geography that are designed to meet constraints on population thresholds (2,500-6,000 household residents), to nest within local authorities, and to be built up from aggregates of data zones.
Kilowatt	A unit of power equal to one thousand (1,000) watts.
LHEES Considerations	The LHEES Considerations are a list of technologies, building typologies and policy priorities used to identify and target interventions. They comprise: Heat networks; Off-gas grid buildings; On-gas grid buildings; Poor building energy efficiency; Poor building energy efficiency as a driver for fuel poverty; and Mixed-tenure, mixed-use and historic buildings.
Linear heat density	In the context of a heat network, the annual demand for heat per meter of pipework.
Local Heat and Energy Efficiency Strategy	A long-term strategic framework for the improvement of the energy efficiency of buildings in the local authority's area, and the reduction of greenhouse gas emissions resulting from the heating of such buildings.
Megawatt	A unit of power equal to one million (1,000,000) watts.
Mixed-tenure, mixed-use and historic buildings	Mixed-tenure and mixed-use buildings could include a mixture of owner occupied, private rented and social housing, and also non-domestic uses, or simply multiple ownership within the same tenure. Historic buildings include the buildings that are within conservation areas or those that are listed buildings. These categories may require established alternative approaches and regulation for the installation of low carbon heat and energy efficiency solutions and where specific advice and support might be available relating to the installation of these solutions.
Net zero carbon	A scenario in which any carbon emissions are balanced by the removal of the same quantum of carbon from the atmosphere, meaning there has been no net change in carbon.
Passivhaus	A building standard wherein buildings achieve high levels of energy efficiency and user comfort.
Prospective Heat Network Zones	The analysis carried out for strategic zoning and pathways for the heat networks Consideration is to identify prospective zones rather than the otherwise used naming convention of Delivery Areas. The prospective zones identified are to be included in the Edinburgh LHEES and should inform actions

Term	Definition
	around further investigation / progression within the Delivery Plan. The heat networks Consideration analysis and activity carried out within the Edinburgh LHEES is also anticipated to support activity related to formal zone designation as required by the Heat Networks (Scotland) Act 2021.
Raster	A matrix of squares, or grid, used as a method of data analysis in a geographic information system.
Solar photovoltaic	Technology that converts sunlight into electricity energy.
Solar water heating	Use of solar power to raise the temperature of water, which is then stored in a hot water cylinder.
Solid fuel	Solid material that is burned to produce heat, for example coal or wood.
Strategic Zone	Strategic Zones present a visualisation of the potential pathways to decarbonise the building stock at a local authority level. These could, for example, be split out by intermediate zone or data zone. They are useful to understand the baseline performance, the scale of potential and initial areas of focus, which could be used to inform Delivery Areas and follow on engagement.
Tariff	The price charged for energy.
Targets	Targets are the measurable aspect of the Consideration and are likely to be taken directly from national and/or local policy documentation, for example net zero by 2045, or EPC 'C' by 2040. Targets are likely to comprise of end-point targets and milestone targets and would sit along a timeline within (and beyond) the Edinburgh LHEES. This timeline would help to prioritise the types of projects undertaken within the Edinburgh LHEES over its duration.
Terawatt	A unit of power equal to one trillion (1,000,000,000,000) watts
uPVC	Unplasticized polyvinyl chloride
U-value	A measure of thermal transmittance, i.e. the extent to which an object (for example, a pane of glass) allows heat to pass through. U-values generally range from 0.1 (minimal heat loss) to 1.0 (high heat loss).
Watt	The basic unit of power.
Weighting	For some Considerations, one Target and Indicator may be sufficient, but for others a range of Indicators may be appropriate to contextualise and characterise performance against a Target and/or progress towards a Consideration. If multiple Indicators are used in strategic zoning or the identification of delivery areas, a Weighting can be applied based on the importance of each.
Zero direct emissions heating system	A heating system that does not itself emit carbon (albeit the production of the fuel uses to drive it may have emitted carbon).

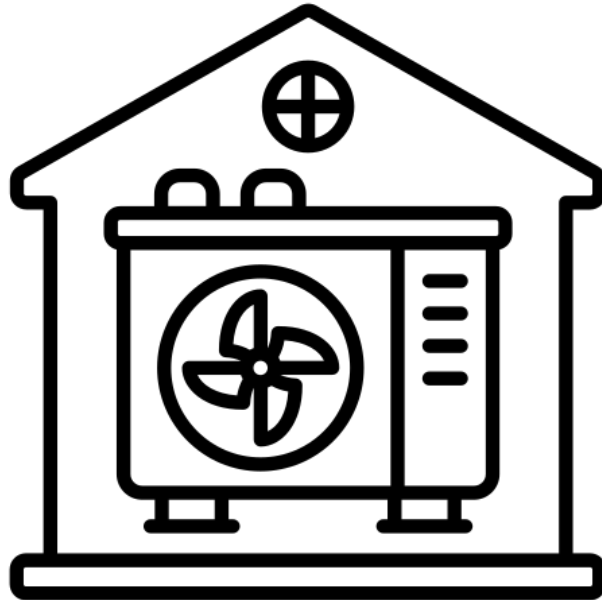
11.6. Endnotes

- ¹ Scottish Development International (23 August 2021) [The energy efficiency and low carbon heat revolution](#)
- ² House of Commons Business, Energy and Industrial Strategy Committee (18 January 2022) [Decarbonising Heat in Homes: Seventh Report of Session 2021–22](#)
- ³ Office for National Statistics (21 December 2022) [Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland](#)
- ⁴ Scottish Government (6 December 2022) [Information on costs of homes reaching energy efficiency targets: FOI release](#)
- ⁵ Scottish Government (6 December 2022) [Information on costs of homes reaching energy efficiency targets: FOI release](#)
- ⁶ Scottish Government (1 December 2020) [Scottish house condition survey: 2019 key findings](#)
- ⁷ Climate Change Committee (2020) [The Sixth Carbon Budget: Buildings](#)
- ⁸ A. Reguis, M. Tunzi, B. Vand, P. Tuohy, J. Currie, [Energy performance of Scottish public buildings and its impact on their ability to use low-temperature heat](#), Energy & Buildings (2023)
- ⁹ Climate Change Committee (2 February 2023) [Letter: Reform of domestic EPC rating metrics to Patrick Harvie MSP](#)
- ¹⁰ C. Wilson (22 September 2023) [Glasgow EnerPHit trial led to 'astounding' drop in bills](#)
- ¹¹ BBC News (19 May 2023) [Anger over carpet being ripped out of social housing](#)
- ¹² Department for Business, Energy & Industrial Strategy (7 October 2021) [Plans unveiled to decarbonise UK power system by 2035](#)
- ¹³ BBC News (1 August 2023) [The truth about heat pumps and the power needed to run them](#)
- ¹⁴ A. Lawson (16 January 2023) [Energy bills: British flat dwellers with communal heating could sue operators.](#) The Guardian
- ¹⁵ A. Lawson (16 January 2023) [Energy bills: British flat dwellers with communal heating could sue operators.](#) The Guardian
- ¹⁶ BBC News (2 August 2023) [Are Scotland's heat pump plans threatening to boil over?](#)
- ¹⁷ Energy & Climate Intelligence Unit (10 February 2021) [Energy bills: getting the balance right](#)
- ¹⁸ Scottish Government (2 December 2021) [Heat Pump Sector Deal Expert Advisory Group: final report](#)
- ¹⁹ NESTA (16 December 2022) [Anticipating the shape of the heat pump installation industry in Scotland](#)
- ²⁰ BBC News (23 February 2023) [Heat pumps: Lords slam 'failing' green heating scheme](#)
- ²¹ BBC News (1 August 2023) [The truth about heat pumps and the power needed to run them](#)
- ²² NESTA (7 July 2022) [The heat pump installer gap](#)
- ²³ BBC News (1 August 2023) [The truth about heat pumps and the power needed to run them](#)
- ²⁴ Department for Energy Security & Net Zero (March 2023) [Clean Heat Market Mechanism Consultation](#)
- ²⁵ BBC News (30 May 2023) [The 'exploding' demand for giant heat pumps](#)
- ²⁶ Department of Energy & Climate Change (March 2014) [Impacts of Leakage from Refrigerants in Heat Pumps](#)
- ²⁷ Carbon Trust (12 June 2023) [Worth the hype? The role of clean hydrogen in achieving Net Zero](#)
- ²⁸ British Gas (21 January 2022) [Hydrogen boilers: everything you need to know](#)
- ²⁹ SGN workshop "Decarbonising Multi-Occupancy Buildings" (18 July 2023)
- ³⁰ HyDeploy (2 January 2020) [UK's first grid-injected hydrogen pilot gets underway](#)
- ³¹ UK Government (9 May 2023) [Energy Security Bill factsheet: Hydrogen transport and storage business models](#)
- ³² Scottish Housing News (14 July 2023) [UK Government cools interest in hydrogen heating plan](#)
- ³³ Scottish Housing News (14 July 2023) [UK Government cools interest in hydrogen heating plan](#)
- ³⁴ Carbon Trust (12 June 2023) [Worth the hype? The role of clean hydrogen in achieving Net Zero](#)
- ³⁵ Carbon Brief (23 February 2023) [Heat pumps 'up to three times cheaper' than green hydrogen in Europe, study finds](#)
- ³⁶ Scottish Government (14 December 2022) [Hydrogen Action Plan](#)
- ³⁷ Energy & Climate Intelligence Unit (2 September 2022) [Energy prices – how the UK compares](#)
- ³⁸ [Household Energy Price Index](#) (July 2023)
- ³⁹ The City of Edinburgh Council (23 January 2023) [2030 Climate Strategy - SEA Post Adoption Statement](#)
- ⁴⁰ Scottish Government (26 February 2021) [Heat in Buildings Strategy: Strategic Environmental Assessment](#)

-
- ⁴¹ Scottish Government (31 October 2022) [Heat in Buildings Strategy: 2022 update](#)
- ⁴² Scottish Government (March 2021) [The Energy Efficiency Standard for Social Housing post 2020 \(ESSH2\) Scottish Government Guidance for Social Landlords](#)
- ⁴³ Scottish Government, [Energy efficiency in non-domestic buildings](#)
- ⁴⁴ Knight Frank (7 August 2023) Energy efficiency rules could make one-third of Scotland's office space obsolete
- ⁴⁵ Prime Minister's Office (20 September 2023) [PM recommit UK to Net Zero by 2050 and pledges a "fairer" path to achieving target to ease the financial burden on British families](#)
- ⁴⁶ Scottish Government (14 December 2022) [Hydrogen Action Plan](#)
- ⁴⁷ Scottish Government, [The National Public Energy Agency](#)
- ⁴⁸ Scottish Government, [Heat in Buildings: Green Heat Finance Taskforce](#)
- ⁴⁹ Scottish Government (6 December 2022) [Information on costs of homes reaching energy efficiency targets: FOI release](#)
- ⁵⁰ Rt Hon Chris Skidmore MP (2022) [Mission Zero: Independent Review of Net Zero - final report](#)
- ⁵¹ Department for Energy Security & Net Zero (4 April 2023) [Powering Up Britain: Energy Security Plan](#)
- ⁵² Scottish Government (1 April 2021) [Householder permitted development rights: guidance - updated 2021](#)
- ⁵³ Scottish Government (19 September 2022) [Housing statistics quarterly update: new housebuilding and affordable housing supply](#)
- ⁵⁴ The City of Edinburgh Council (2023) Housing Revenue Account (HRA) Budget Strategy 2023/2024 – 2032/2033 – referral from the Finance and Resources Committee
- ⁵⁵ The City of Edinburgh Council (2019) Energy Management Policy for Operational Buildings
- ⁵⁶ The City of Edinburgh Council (2022) EnerPHit Tranche 1 Programme
- ⁵⁷ The City of Edinburgh Council (2023) Portfolio Strategy
- ⁵⁸ Ramboll (June 2020) Park Power City of Edinburgh Council Assessment - Stage 1 Report
- ⁵⁹ Ramboll (August 2020) Park Power City of Edinburgh Council Assessment - Stage 1 Report
- ⁶⁰ Scottish Government (21 April 2023) [Heat network projects: quarterly reports – March 2023](#)
- ⁶¹ Scottish Government (13 April 2022) [Potential Heat Network Zones: first national assessment](#)
- ⁶² Ramboll (March 2023) Edinburgh BioQuarter Heat Network Feasibility Study
- ⁶³ Buro Happold (23 December 2022) Gracemount Heat Network Feasibility Study
- ⁶⁴ Buro Happold and Zero Waste Scotland (15 October 2022) Midlothian, City of Edinburgh and East Lothian Cross-Boundary Heat Network Opportunities
- ⁶⁵ C. Sinclair and G. Unkaya (November 2020) [Potential sources of waste heat for heat networks in Scotland](#)
- ⁶⁶ The Coal Authority, [Interactive Map](#)
- ⁶⁷ Scottish Water, [Waste Water Heat Extraction Opportunities](#)
- ⁶⁸ Compiled by the Edinburgh Climate Change Institute. In addition to the following attributions, see [Table 49](#) for the complete list of sources: © OpenStreetMap contributors, © 2023 Scottish Environment Protection Agency, Supported by SP Energy Networks Open Data, some content is available under the Open Government Licence v3.0; © Crown copyright.

The City of Edinburgh Council

Edinburgh Local Heat and Energy Efficiency Strategy Delivery Plan: 2024 – 2028





You can get this document on audio, CD, or in Braille or large print if you ask us. Please contact Interpretation and Translation Service (ITS) on its@edinburgh.gov.uk and quote reference number 23-9173. ITS can also give information on community language translations.

[Title page icon by shmai](#)

1. Contents

1.	Contents.....	3
2.	Introduction to the Delivery Plan	7
2.1.	Overview of the Delivery Plan	7
2.2.	Role of the Delivery Plan.....	7
2.3.	Content of the Delivery Plan	8
2.4.	Future of the Delivery Plan	8
3.	Delivery mechanism	10
3.1.	A programmatic approach	10
	Operating model.....	10
	Stakeholder engagement and communication	11
	Procurement and supply chain	11
	Funding and investment.....	12
3.2.	Heat network delivery programme	13
	Approach to heat network delivery.....	13
	Phase 1: Heat network delivery framework.....	13
	Phase 2: Heat network delivery programme.....	14
4.	Portfolio of projects.....	16
4.1.	Approach to projects	16
4.2.	Background to Delivery Areas (and Heat Network Zones)	16
4.3.	Energy efficiency Delivery Areas.....	17
4.4.	Heat pump Delivery Areas	18
4.5.	Prospective Heat Network Zones.....	20
4.6.	Other projects.....	23
	High-rise housing retrofit	23
	Non-domestic property retrofit	24
	Historic buildings	24
	Green heat	25
	New developments	25
	Other housing retrofit measures	26
5.	Delivery Areas and Heat Network Zones.....	27
5.1.	Overview plan of Delivery Areas and Heat Network Zones.....	27
5.2.	Delivery Area 01: Restalrig & Lochend (energy efficiency)	28

5.3.	Delivery Area 02: Bingham & Magdalene (energy efficiency)	30
5.4.	Delivery Area 03: Restalrig & Craigentenny (energy efficiency)	32
5.5.	Delivery Area 04: The Calders (energy efficiency)	34
5.6.	Delivery Area 05: Granton, Wardieburn & Royston (energy efficiency)	36
5.7.	Delivery Area 06: Niddrie & Craigmillar (energy efficiency)	38
5.8.	Delivery Area 07: Clovenstone & Wester Hailes (energy efficiency)	40
5.9.	Delivery Area 08: Muirhouse (energy efficiency)	42
5.10.	Delivery Area 09: Lochend Butterfly Way (heat pumps)	44
5.11.	Delivery Area 10: Waterfront Park (heat pumps)	46
5.12.	Delivery Area 11: Robertson Avenue (heat pumps)	48
5.13.	Delivery Area 12: Fountainbridge (heat pumps)	50
5.14.	Delivery Area 13: Oxgangs Avenue (heat pumps)	52
5.15.	Delivery Area 14: West Pilton Grove (heat pumps)	54
5.16.	Delivery Area 15: Craigour Place (heat pumps)	56
5.17.	Delivery Area 16: Elgin Street (heat pumps)	58
5.18.	Delivery Area 17: Morrison Crescent (heat pumps)	60
5.19.	Delivery Area 18: Craighouse Gardens (heat pumps)	62
5.20.	Heat Network Zone 01: New Town	64
5.21.	Heat Network Zone 02: Leith Walk	66
5.22.	Heat Network Zone 03: Old Town & Southside	68
5.23.	Heat Network Zone 04: Gorgie & Dalry	70
5.24.	Heat Network Zone 05: Craighleith	72
5.25.	Heat Network Zone 06: Granton	74
5.26.	Heat Network Zone 07: Leith	76
5.27.	Heat Network Zone 08: Portobello & Seafield	78
5.28.	Heat Network Zone 09: Morningside	80
5.29.	Heat Network Zone 10: South East Edinburgh	82
5.30.	Heat Network Zone 11: Colinton Mains	84
5.31.	Heat Network Zone 12: South West Edinburgh	86
5.32.	Heat Network Zone 13: Heriot-Watt	88
5.33.	Heat Network Zone 14: Sighthill & Gyle	90
5.34.	Heat Network Zone 15: Ingliston	92
5.35.	Heat Network Zone 16: South Queensferry	94
5.36.	Heat Network Zone 17: Second New Town	96
6.	Monitoring of actions	98

7. Financial resources	104
Grant funding	104
Loans	110
Income streams	112

Tables

- [Table 01: Energy efficiency Delivery Areas](#)
- [Table 02: Heat pump Delivery Areas](#)
- [Table 03: Prospective Heat Network Zones](#)
- [Table 04: Indicative high-rise housing retrofit programme](#)
- [Table 05: Tenure of homes in Delivery Area 01: Restalrig & Lochend](#)
- [Table 06: Recommended interventions to homes in Delivery Area 01: Restalrig & Lochend](#)
- [Table 07: Tenure of homes in Delivery Area 02: Bingham & Magdalene](#)
- [Table 08: Recommended interventions to homes in Delivery Area 02: Bingham & Magdalene](#)
- [Table 09: Tenure of homes in Delivery Area 03: Restalrig & Craigentenny](#)
- [Table 10: Recommended interventions to homes in Delivery Area 03: Restalrig & Craigentenny](#)
- [Table 11: Tenure of homes in Delivery Area 04: The Calders](#)
- [Table 12: Recommended interventions to homes in Delivery Area 04: The Calders](#)
- [Table 13: Tenure of homes in Delivery Area 05: Granton, Wardieburn & Royston](#)
- [Table 14: Recommended interventions to homes in Delivery Area 05: Granton, Wardieburn & Royston](#)
- [Table 15: Tenure of homes in Delivery Area 06: Niddrie & Craigmillar](#)
- [Table 16: Recommended interventions to homes in Delivery Area 06: Niddrie & Craigmillar](#)
- [Table 17: Tenure of homes in Delivery Area 07: Clovenstone & Wester Hailes](#)
- [Table 18: Recommended interventions to homes in Delivery Area 07: Clovenstone & Wester Hailes](#)
- [Table 19: Tenure of homes in Delivery Area 08: Muirhouse](#)
- [Table 20: Recommended interventions to homes in Delivery Area 08: Muirhouse](#)
- [Table 21: Tenure of homes in Delivery Area 09: Lochend Butterfly Way](#)
- [Table 22: Recommended interventions to homes in Delivery Area 09: Lochend Butterfly Way](#)
- [Table 23: Tenure of homes in Delivery Area 10: Waterfront Park](#)
- [Table 24: Recommended interventions to homes in Delivery Area 10: Waterfront Park](#)
- [Table 25: Tenure of homes in Delivery Area 11: Robertson Avenue](#)
- [Table 26: Recommended interventions to homes in Delivery Area 11: Robertson Avenue](#)
- [Table 27: Tenure of homes in Delivery Area 12: Fountainbridge](#)
- [Table 28: Recommended interventions to homes in Delivery Area 12: Fountainbridge](#)
- [Table 29: Tenure of homes in Delivery Area 13: Oxgangs Avenue](#)
- [Table 30: Recommended interventions to homes in Delivery Area 13: Oxgangs Avenue](#)
- [Table 31: Tenure of homes in Delivery Area 14: West Pilton Grove](#)
- [Table 32: Recommended interventions to homes in Delivery Area 14: West Pilton Grove](#)
- [Table 33: Tenure of homes in Delivery Area 15: Craigour Place](#)
- [Table 34: Recommended interventions to homes in Delivery Area 15: Craigour Place](#)
- [Table 35: Tenure of homes in Delivery Area 16: Elgin Street](#)

- [Table 36: Recommended interventions to homes in Delivery Area 16: Elgin Street](#)
- [Table 37: Tenure of homes in Delivery Area 17: Morrison Crescent](#)
- [Table 38: Recommended interventions to homes in Delivery Area 17: Morrison Crescent](#)
- [Table 39: Tenure of homes in Delivery Area 18: Craighouse Gardens](#)
- [Table 40: Recommended interventions to homes in Delivery Area 18: Craighouse Gardens](#)
- [Table 41: Headline information on Heat Network Zone 01: New Town](#)
- [Table 42: Headline information on Heat Network Zone 02: Leith Walk](#)
- [Table 43: Headline information on Heat Network Zone 03: Old Town & Southside](#)
- [Table 44: Headline information on Heat Network Zone 04: Gorgie & Dalry](#)
- [Table 45: Headline information on Heat Network Zone 05: Craigleith](#)
- [Table 46: Headline information on Heat Network Zone 06: Granton](#)
- [Table 47: Headline information on Heat Network Zone 07: Leith](#)
- [Table 48: Headline information on Heat Network Zone 08: Portobello & Seafield](#)
- [Table 49: Headline information on Heat Network Zone 09: Morningside](#)
- [Table 50: Headline information on Heat Network Zone 10: South East Edinburgh](#)
- [Table 51: Headline information on Heat Network Zone 11: Colinton Mains](#)
- [Table 52: Headline information on Heat Network Zone 12: South West Edinburgh](#)
- [Table 53: Headline information on Heat Network Zone 13: Heriot-Watt](#)
- [Table 54: Headline information on Heat Network Zone 14: Sighthill & Gyle](#)
- [Table 55: Headline information on Heat Network Zone 15: Ingliston](#)
- [Table 56: Headline information on Heat Network Zone 16: South Queensferry](#)
- [Table 57: Headline information on Heat Network Zone 17: Second New Town](#)
- [Table 58: Schedule of actions](#)

2. Introduction to the Delivery Plan

2.1. Overview of the Delivery Plan

- 2.1.1. This document, published by the City of Edinburgh Council, is the Delivery Plan for the Edinburgh Local Heat and Energy Efficiency Strategy (LHEES). It should be read in conjunction with the Edinburgh LHEES itself.
- 2.1.2. The Delivery Plan sets out how the Edinburgh LHEES is to be implemented, with a focus on actions over the period 2024 to 2028, particularly “no regrets” / “low regrets” actions that are deliverable in the current policy context and given existing funding and powers.
- 2.1.3. The Delivery Plan has been prepared at a time of great flux, with a rapidly evolving regulatory climate and considerable uncertainty around the financial climate for delivery of the Edinburgh LHEES. Given this, the focus of the inaugural Delivery Plan has been drawn relatively tightly to focus on the actions that the Council has greatest influence over and where there is greatest certainty over funding. It is envisaged that future iterations of the Delivery Plan will have a wider focus as the context for delivery becomes clearer, subject to resources.
- 2.1.4. There are two key themes the Council has considered to guide the development of this Delivery Plan. These are intended to maximise the effectiveness of delivery:
- Lead with Council assets
 - The most deliverable projects, and those within the Council's direct responsibility, are its involving own buildings. This can be the most effective way to encourage and launch wider action across an area.
 - Pragmatism and flexibility
 - The Council will continue to highlight to the Scottish Government the resource constraints facing the ambition. In the meantime, it will do its best to facilitate delivery with the modest existing resources.
 - The Edinburgh LHEES is a complex and multi-faceted strategy. It is also a novel approach. The Council will therefore prioritise the most urgent and important elements. It will also use this as an opportunity to learn and to prepare to scale-up action.

2.2. Role of the Delivery Plan

- 2.2.1. The role of the Delivery Plan is to help translate the opportunities identified in the Edinburgh LHEES into actions. As set out in the Edinburgh LHEES, there is not currently a comprehensive funding strategy for delivering the Edinburgh LHEES and in practice many of the prospective interventions are not deliverable at this time due to financial and other considerations. Accordingly, the Delivery Plan focuses on areas of greatest short-term opportunity.
- 2.2.2. The Delivery Plan is based on the foundations of existing activity and progress. The Council will continue to build on current and use these to spearhead further work, while also exploring ways in which it can link and expand these programmes, all of which are recognised as potential key contributors to the delivery of the Edinburgh LHEES. The Delivery Plan takes a programmatic approach to delivery where the Council has highlighted the aspiration to establish an “LHEES Office” providing various types of support to facilitate delivery, including bringing stakeholders together to align efforts.

- 2.2.3. The Delivery Plan outlines a potential pathway for upscaling activity, beginning with preparation and organisation, followed by a phase of learning and piloting approaches before activity can be scaled up with confidence as resources permit. This is also realistically aligned with supply chain capacity due to challenges to the delivery of large-scale schemes such as a lack of skilled workforce, but it can grow to support activity with time.
- 2.2.4. At the time of writing, no new funding has been made available for the delivery of the Edinburgh LHEES, other than an annual allocation of £75,000 (which it is envisaged will largely be utilised for overheads as well as for the preparation of the second iteration of the Edinburgh LHEES). Further, many of the existing key funding streams are not confirmed to continue beyond the end of the current parliamentary term in 2026. Additionally, at the time of writing, the Green Heat Finance Taskforce – charged with developing “a portfolio of innovative financial solutions for building owners in Scotland” – had not yet published any recommendations. The statutory timescales for the preparation of the Edinburgh LHEES and Delivery Plan also preclude alignment with the Council’s budgetary process. As a result, actions set out in the Delivery Plan are restricted to areas where there is greatest certainty over funding. However, the Delivery Plan identifies where additional activity could be taken forward should the appropriate resources and powers be made available to the Council.
- 2.2.5. The actions in the Delivery Plan overlap to some degree with those set out in the Council’s 2030 Climate Strategy. However, the Climate Strategy has a wider and more strategic focus, whereas the Delivery Plan focuses on actions concerning heat decarbonisation and energy efficiency that are judged to be able to be taken forward during the Delivery Plan period.

2.3. Content of the Delivery Plan

- 2.3.1. The Delivery Plan sets out a proposed programmatic approach to implementing the Edinburgh LHEES. It outlines the concept of an “LHEES Office” – a dedicated project management office – as the vehicle for coordinating delivery.
- 2.3.2. The Delivery Plan draws together a portfolio of projects in Edinburgh across the themes of heat decarbonisation and energy efficiency that the Council considers are capable of being delivered, or at least progressed, over the period 2024 to 2028. Given the limited budget available for the delivery of the Edinburgh LHEES at this time, coupled with the still evolving regulatory regime, new projects are restricted to those where there is greatest certainty around the ability to progress them in the current context.
- 2.3.3. The Delivery Plan sets out Delivery Areas: areas that are proposed to be the focus of interventions. These interventions, and the related Delivery Areas, are aligned to three thematic areas aligned to the two main national priorities of net zero and fuel poverty: improving energy efficiency in areas with the greatest risk of fuel poverty; piloting works to heat pump-ready homes; and rolling-out heat networks across Edinburgh.
- 2.3.4. The Delivery Plan also identifies the funding resources that are judged to be relevant to the delivery, albeit while noting that these are not regarded as being adequate to support the scale of interventions required, and while noting the limitations of a grant funding approach.

2.4. Future of the Delivery Plan

- 2.4.1. The Delivery Plan covers the period 2024 to 2028 in line with the statutory timescales set out in The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022. However, it is recognised that, given the ongoing flux in terms of policies and regulations around energy

efficiency and heat decarbonisation, coupled with uncertainty about the longer-term funding landscape, updates to the Delivery Plan will likely be required prior to 2028.

- **ACTION 01: Update and revise the Delivery Plan as required.**

2.4.2. The Edinburgh LHEES and Delivery Plan have initially been published as static documents. However, the scope for (and benefits of) displaying the maps and outputs in a more interactive fashion, for example utilising GIS or StoryMaps, is recognised.

- **ACTION 02: Publish the outputs from the Edinburgh LHEES and Delivery Plan in a map-based format.**
- **ACTION 03: Integrate data from the Edinburgh LHEES with other Council datasets.**

2.4.3. In line with the statutory timescales set out in The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022, a second iteration of the Edinburgh LHEES and the Delivery Plan will require to be formally published within five years of the first iteration.

- **ACTION 04: Publish a second iteration of the Edinburgh LHEES and the Delivery Plan by the statutory deadline of December 2028.**

3. Delivery mechanism

3.1. A programmatic approach

- 3.1.1. For the Edinburgh LHEES to be delivered, the Council’s aspiration is to develop an “LHEES Office”: a well-equipped and well-resourced programme management office. As a priority, the Council will seek support from the Scottish Government to enable the full establishment of an LHEES Office. Without support, much of the ambition around the Edinburgh LHEES will remain aspirational with the Council only able to take on limited additional activity.
- 3.1.2. The LHEES Office is envisaged as overseeing further analysis, planning, and implementation of projects in Delivery Areas and Heat Network Zones. It will leverage the expertise of multiple Council service areas and external stakeholders to deliver holistic area-based interventions, supporting property owners to incentivise and encourage retrofit.
- 3.1.3. At present, the Council has appointed an Energy Officer dedicated to taking forward the Edinburgh LHEES and Delivery Plan. This officer will administer the £75,000 of annual funding committed from the Scottish Government until 2027/28. At present, this capacity and resource represents the entirety of the LHEES Office (potentially supplemented by the work of other Council officers and a modest financial contribution from existing Council budgets). However, coordinating the delivery of a programme of the scale in question will require significant additional capacity in terms of dedicated personnel and budget.
- 3.1.4. The below sections set out the Council’s vision for how the LHEES Office would optimally be set-up and how it would operate. Again, it is noted that, without the necessary resources, the capacity of the LHEES Office will be greatly reduced.
- **ACTION 05: Establish an LHEES Office on a skeleton basis.**
 - **ACTION 06: Engage with the Scottish Government around the case for revenue funding for the full establishment of an LHEES Office.**

Operating model

- 3.1.5. The LHEES Office will require an appropriate operating model to enable operational efficiency and capability to delivery.
- 3.1.6. The Council will establish a clear cross-service operating model with the roles and responsibilities of officers within the LHEES Office, as well as those who will collaborate with the LHEES Office. This includes reporting, governance, working arrangements, and cross-programme relationships.
- 3.1.7. The LHEES Office will lead on the delivery of the Edinburgh LHEES as resources permit. It will also manage and refresh the datasets and plans underpinning the Edinburgh LHEES.
- 3.1.8. Overall responsibility for the delivery of the Edinburgh LHEES will rest with a member of the Council’s senior management team, ultimately falling within the remit of the Council’s Policy and Sustainability Committee which will agree progress reporting cadence and content.
- **ACTION 07: Develop appropriate governance structures for the delivery, monitoring, and evaluation of the Edinburgh LHEES and Delivery Plan.**
 - **ACTION 08: Assess the potential role of Energy for Edinburgh Limited – the Council’s energy services company – as part of the LHEES Office.**

Stakeholder engagement and communication

- 3.1.9. The Edinburgh LHEES identifies key stakeholders relevant to delivery. The LHEES Office will develop this into a stakeholder engagement programme which entails the following:
- Keeping the stakeholder mapping work updated.
 - Establishing clear working relationships with key external stakeholders, including putting in place memoranda of understanding, data sharing agreements, and other protocols where required.
 - In particular, the Council will seek to strengthen its links with SP Energy Networks in relation to the Edinburgh LHEES delivery. This will involve further engagement and planning in relation to the Delivery Areas and Heat Network Zones. The Council will aim to both positively influence decisions taken by SP Energy Networks while amending the Delivery Plan to reflect constraints highlighted by SP Energy Networks.
 - Developing a stakeholder engagement plan with reference to the relevant Delivery Areas and/or Heat Network Zones.
- 3.1.10. The ambition of the LHEES Office is to enable all relevant stakeholders to be involved in the delivery of the Edinburgh LHEES and promote the achievement of its targets. The stakeholder engagement initiative will aim to establish a two-way communication channel to promote active involvement of stakeholders.
- 3.1.11. Concepts such as heat pumps, heat networks, and building retrofit are not always well understood by people not involved in these spheres. To gain buy-in from residents and organisations, consistent, simple, and factual messaging about topics surrounding the Edinburgh LHEES is essential. The LHEES Office will be well-placed to deliver a communications programme at area-wide and city-wide levels to raise awareness of the topics, educate about options and actions, and encourage action.
- **ACTION 09: Maintain an up-to-date register of key stakeholders.**
 - **ACTION 10: Establish and/or develop relationships with key stakeholders.**
 - **ACTION 11: Develop a stakeholder engagement plan.**
 - **ACTION 12: Develop proposals for communications activity around the Edinburgh LHEES.**

Procurement and supply chain

- 3.1.12. One of the main barriers to the delivery of the Edinburgh LHEES is the shortage of suppliers with the necessary skills, for example tradespersons qualified to install and maintain heat pumps. This issue is faced by most types of projects across tenures and building types. Resolving this will require concerted national action. However, the Council can play a supportive role, including delivering training, re-skilling, and apprenticeship schemes and supporting consumer confidence via schemes such as Trusted Traders. There may also be scope for the Council to develop demand aggregation programmes which allow property owners to procure high-quality and standard-driven work at a more competitive price. Taking action in this area will not only aid in delivering the Edinburgh LHEES, but will also stimulate the local economy via job creation, upskilling, and the emergence of new sectors.

- **ACTION 13: Produce a People Strategy and Strategic Workforce Plan to support the recruitment, retention, and development/training of staff for delivery of retrofit works.**
- **ACTION 14: Conduct an audit of the market in Edinburgh in terms of heat pump installers.**
- **ACTION 15: Engage with Scottish Enterprise around the scope to stage “meet the buyer” events to stimulate the supply chain for zero direct emissions heating solutions.**
- **ACTION 16: Assess the scope to pilot demand aggregation schemes for retrofit works.**

Funding and investment

3.1.13. Existing interventions around energy efficiency are heavily focused on areas of need, e.g. low income households at risk of fuel poverty. These households can in many cases access extensive grant funding. However, available pots of grant funding will not be capable of funding retrofit works to all homes in Edinburgh in the timescales in question. It is anticipated that delivering these will require developing new financial models, likely entailing upfront funding of works by institutional funders with repayment being made from savings on heating bills.

3.1.14. The current finance landscape limits property owners’ options and is not convenient. Financing a retrofit is still significantly more complex than many other similarly priced endeavour (e.g. financing a car) and can often be more complicated than securing a mortgage. This is due to many issues, including the structure and application processes of existing grant and loan schemes and a lack of well-designed private finance products, e.g. Heat as a Service (HaaS) / Comfort as a Service (Caas) and other innovative models that have proven successful elsewhere in the world. It is anticipated that the outputs of the Green Heat Finance Taskforce will inform the development of these models that address these challenges. However, the Council also recognises there might be a role it can play to better facilitate finance access for property owners. For example, the Council may hold forums with private investors to help them shape and target their products based on the focus of the Edinburgh LHEES. The Council will invite engagement from potential investors to generate interest. In time, the Council will aim to present investible heat network opportunities into the market. It is not yet clear what model or shape these will take, but this clarity will be provided to develop certainty and investor confidence in the market.

- **ACTION 17: Maintain a watching brief on the outputs of the Green Heat Finance Taskforce.**
- **ACTION 18: Engage with financial providers with a presence in Edinburgh to better understand their products with respect to retrofit and energy efficiency, for example green mortgages.¹**
- **ACTION 19: Engage with potential investors to help them understand the nature and scale of opportunity associated with the Edinburgh LHEES.**

¹ Preferential mortgage terms offered on homes with greater energy efficiency.

- **ACTION 20: Engage with Home Energy Scotland, Business Energy Scotland, and Local Energy Scotland to identify opportunities to jointly increase awareness in Edinburgh of the advice and resources these services can offer.**

3.1.15. For the Council itself, a key challenge is that much of the funding available to it is available on a grant funding basis. While welcome, these pots of money are generally time bound and ring fenced, and require significant work in terms of applications. This is not conducive to a programme approach to delivering the Edinburgh LHEES. Accordingly, the Council would wish to explore a move away from pots of grant funding towards an approach that provides the Council with greater certainty over long-term income streams, potentially on a contractual basis with the Council entering into a long-term funding agreement with the Scottish Government that would enable it to draw down funding on the basis of agreed results.²

- **ACTION 21: Engage with the Scottish Government around the scope to migrate capital funding for Council projects away from grants towards a contractual model providing greater certainty.**

3.2. Heat network delivery programme

Approach to heat network delivery

3.2.1. Supporting the delivery of an Edinburgh-wide heat network (or “network of networks”) is a major ambition which will require significant ongoing resource, including technical skills the Council currently does not have, or only has to a limited degree. To achieve this ambition, it is envisaged that the LHEES Office would require officers who have skills and experience matching the complexity and scale of the undertaking. Developing a heat network is a major infrastructure investment, and delivering a city-wide heat network is akin to delivering a new city-wide transportation or utility system.

3.2.2. It is noted that the development of the Granton Waterfront heat network project – the most advanced of the heat network projects the Council is currently involved with – has taken several years, necessitated significant time inputs from six Council officers, and entailed approximately £300,000 of expenditure on technical and feasibility studies, design works, and business cases. While in the case of the Granton Waterfront heat network project these inputs have largely been able to be met from the resources of the wider Granton Waterfront programme team, it will not be possible to replicate this approach for all other Heat Network Zones identified in the Delivery Plan. Further, it is noted that the Granton Waterfront heat network is being delivered using a concession model; an alternative model wherein the Council played a more direct role would have still higher costs.

3.2.3. The LHEES Office will approach the heat network delivery programme in two phases.

Phase 1: Heat network delivery framework

3.2.4. The first phase will involve the development of a detailed framework for the heat network delivery programme, taking forward the work of the Edinburgh LHEES and this Delivery Plan. The purpose will be to establish a long-term plan and approach for rolling out heat networks. This will inform the set-up of the programme by addressing the following:

- An options appraisal of delivery models and vehicles for supporting the roll-out of heat networks in Edinburgh.

² The Green Growth Accelerator is considered to be an interesting model in this respect.

- A feasibility review of the prospective Heat Network Zones identified in the Edinburgh LHEES using a transparent and effective appraisal:
 - Gathering real-world consumption data via engagement with heat off-takers and anchor load operators.
 - Establishing a real picture of heat supply profile by engaging with waste heat site operators, Scottish Water Horizons, The Coal Authority, and other suppliers.
 - Accounting for electricity grid upgrades and location of energy centres.
 - Projecting future energy demand profiles, in particular vis-à-vis anchor loads.
 - Thoroughly assessing all constraints on the Heat Network Zone.
 - Develop an overall view of the investment proposition.
- Using the information gathered via the preceding points, refine the prospective Heat Network Zones into final Heat Network Zones, ensuring a balanced distribution of risk and opportunity.
- Develop a customer charter covering all heat networks in Edinburgh that outlines a set of principles that any customer in Edinburgh connected to a heat network should be able to expect.
- **ACTION 22: Develop the heat network delivery framework as resources permit.**

Phase 2: Heat network delivery programme

3.2.5. The second phase will involve the set-up of the heat network delivery programme as per the recommendations of the framework. However, there are some aspects of the programme which can be considered without the masterplan. It is proposed the heat network delivery programme will see the LHEES Office:

- Lead on all policies relating to heat networks.
- Establish close working relationships with various Council services to support heat network delivery or connections (e.g. Planning, Housing, Operational Property, etc).
- Establish relationships with external stakeholders (in particular the Heat Network Support Unit, SP Energy Networks, and registered social landlords) to gain and/or provide the appropriate support.
- Lead on the ambition to roll-out the Edinburgh-wide heat network according to the delivery model outlined in the masterplan, and promote and monitor the delivery of heat networks in Edinburgh.
- Seek to ensure proper execution and delivery of heat networks, such as the enforcement of the customer charter developed as part of the masterplan.
- Work to embed the delivery of heat networks with other initiatives within the wider Edinburgh LHEES programme.
- Act as a neutral liaison between heat suppliers and heat off-takers.
- Fulfilling the Council's responsibilities as set out in the Heat Network (Scotland) Act 2021, including:
 - The overall regulatory compliance function (where it has been delegated from the Scottish Government).

- Managing the lodgement of Building Assessment Reports, and using these to feed into heat network delivery.
 - Supporting the formal designation of Heat Network Zones.
 - Administering the consenting regime for heat networks.
 - Initiate and deliver, or support, pre-capital feasibility studies, outline business cases, and commercialisation activities for each Heat Network Zone to de-risk and attract investment.
- 3.2.6. It is reiterated that the above will largely not be possible without significant additional resources.
- **ACTION 23: Develop the heat network delivery programme as resources permit.**

4. Portfolio of projects

4.1. Approach to projects

- 4.1.1. This section of the Delivery Plan introduces a portfolio of projects that could potentially be delivered, or at least initiated/progressed, during the Delivery Plan period (2024 to 2028), subject to the necessary resources and powers being available.
- 4.1.2. The Delivery Plan has identified eight Delivery Areas on the theme of energy efficiency; 10 Delivery Areas on the theme of transition to heat pumps; and a further 17 prospective Heat Network Zones: a total of 35 Delivery Areas and Heat Network Zones, each representing an existing or potential project.

4.2. Background to Delivery Areas (and Heat Network Zones)

- 4.2.1. The Council has identified three forms of Delivery Area (and Heat Network Zone):
- Areas targeting households in high level of fuel poverty and the 20% most deprived areas as per the Scottish Index of Multiple Deprivation. These are the areas of greatest need in terms of fuel poverty/deprivation, and so are a natural area to focus interventions aimed at improving energy efficiency (and thus reducing heating costs). These Delivery Areas could form the basis of retrofits to the Council's own housing stock, delivery of the Mixed Tenure Improvement Service, the delivery of Area-Based Schemes, and other measures.
 - Areas with the largest numbers of homes (both on-gas grid and off-gas grid) that that are "heat pump ready". These areas represent potential "quick wins" in terms of heat decarbonisation and potential launchpads to build further momentum. These Delivery Areas could form the basis of retrofits to the Council's own housing stock and support for other owners to install heat pumps.³
 - Prospective Heat Network Zones: these are the areas of Edinburgh identified as having greatest potential for the development of heat networks.⁴

³ The category 1 'heat pump ready' delivery areas were developed GIS techniques to generate potential areas by using the same indicators and weightings used in the development of outputs in the Edinburgh LHEES. The databases used to generate the maps are Home Analytics, Non-Domestic Analytics, and the Address Gazetteer data, depending on the type of property (domestic, non-domestic, mixed use). This consisted of using the postcode level domestic database (Home Analytics) property counts to generate heat maps. The maps are generated by using the property counts to create a continuous 100 metre × 100 metre grid defining areas of high density of different properties. Zones of high concentration were defined by using a 2× standard deviation method. This means that, when a value falls outside 2× the standard deviation of a cluster, the boundary is defined at the limit of that grid cell.

⁴ An initial range of potential Heat Network Zones was identified using linear heat density and the radii-buffering approach. A filter was then applied to identify zones with a threshold number of anchor loads to indicate likely heat network viability. Drawing from these prioritised potential zones, the appropriate scale of zones was defined manually using different criteria such as the characteristic of the area (dense urban, urban, suburban). Thereafter, development proposals, planned heat networks, and constraints in parallel with stakeholder engagement were used to refine the selected prioritised zones; this information was used to combine zones, expand the boundaries of zones to account for opportunities in near proximity, or split zones where the development of a single heat network was deemed technically difficult. Finally, the zones were divided with the aim of creating zones with common characteristics based on knowledge of the local area and building typology. These form the prospective Heat Network Zones.

- 4.2.2. The Delivery Areas were developed in consultation with the Council’s Housing & Homelessness service which already manages a substantial programme of social housing retrofits, Mixed Tenure Improvement Service retrofits, and Area-Based Schemes.
- 4.2.3. It is expected that the Delivery Areas will continue to undergo an iterative process which updates them on an ongoing basis, reflecting shifting priorities and policies, ongoing stakeholder engagement, new local knowledge and changing scope of possibilities. Any adjustments to the Delivery Areas will be addressed within the aforementioned updates to the Delivery Plan.
- 4.2.4. An overview plan of the 35 Delivery Areas and Heat Network Zones is set out in [section 5.1](#). It is noted that there is some overlap between the Heat Network Zones and the heat pump Delivery Areas, i.e. in the locations in question both heat networks and heat pumps are identified as potential solutions. In these situations, decisions will be needed on a case-by-case basis as to which is the optimal solution. Under the fifth generation heat network model, homes with exiting heat pumps could potentially be integrated into heat networks as “prosumers”: both supplying and consuming heat to/from the heat network.

4.3. Energy efficiency Delivery Areas

- 4.3.1. The eight Delivery Areas on the theme of energy efficiency (in relation to fuel poverty) are summarised in the below table, which sets out the number of homes within each Delivery Area, the average cost of the retrofit works, and the savings these works could be expected to deliver in terms of both heating bills (via reduced usage) and CO₂ emissions.
- 4.3.2. It is noted that these costs are based on the Energy Saving Trust’s Portfolio Energy Analysis Tool (PEAT) in line with the LHEES Methodology. The Council’s experience is that actual costs are likely to be significantly higher, suggesting the PEAT cost data may not be robust.

Table 01: Energy efficiency Delivery Areas

#	Name	Homes	Average retrofit cost	Average annual bill savings	Average annual CO ₂ savings (kg)
01	Restalrig & Lochend	2,147	£8,389	£293.03	730.38
02	Bingham & Magdalene	1,575	£13,000	£327.04	1,510
03	Restalrig & Craigentenny	810	£5,557	£221.45	546.73
04	The Calders	1,456	£5,319	£206.25	415.94
05	Granton, Wardieburn & Royston	2,041	£5,028	£169.27	415.4
06	Niddrie & Craigmillar	3,005	£8,113	£195.75	821.55
07	Clovenstone & Wester Hailes	1,393	£6,862	£180.30	611.38
08	Muirhouse	2,427	£7,439	£245.24	668.94

- 4.3.3. A cursory comparison of the bill savings with the retrofit costs indicates that the interventions will not pay for themselves, and therefore these interventions would likely require to be partly or wholly subsidised.
- 4.3.4. The Council currently has three interrelated programmes for improving the energy efficiency of homes in Edinburgh:

- The Whole House Retrofit (WHR) programme of works to the Council’s own high-rise housing estate, aimed at bringing homes in line with the Energy Efficiency Standard for Social Housing (EESH2) via a fabric-first approach.
- The Area-Based Scheme (ABS) programme of works to mixed tenure blocks including private homes at risk of fuel poverty.
- The Mixed Tenure Improvement Service (MTIS) pilot programme of area-based works to low-rise blocks containing a mix of Council-owned and privately-owned homes.

4.3.5. The eight energy efficiency Delivery Areas are proposed to be areas of focus for interventions under the above programmes over the course of the Delivery Plan period, utilising existing Council resources as well as external funding opportunities such as the Social Housing Net Zero Heat Fund. The Delivery Areas include multiple datazones ranked in the 10% most deprived as of the 2020 Scottish Index of Multiple Deprivation (SIMD). Council ownership of homes within the Delivery Areas ranges from 21% to 56%, meaning the Council will require to work closely with owner-occupiers, private landlords, and housing associations to plan and deliver the interventions.

- **ACTION 24: Identify and progress retrofit projects for the energy efficiency Delivery Areas.**
- **ACTION 25: Produce a Retrofitting Strategy to steer the retrofit of the Council’s housing estate.**
- **ACTION 26: Make the case to Scottish Government for additional resources to support the WHR programme, MTIS programme, and other retrofit works.**
- **ACTION 27: Maintain a watching brief on the EESH2 review.**

4.4. Heat pump Delivery Areas

4.4.1. The eight Delivery Areas on the theme of heat pumps (as a route to heat decarbonisation) are summarised in the below table. The table sets out the number of homes within each Delivery Area, the average cost of the retrofit works, and the projected savings these works could be expected to deliver in terms of both heating bills (via reduced usage) and CO₂ emissions.

Table 02: Heat pump Delivery Areas

#	Name	Homes	Average retrofit cost	Average annual bill savings	Average annual CO ₂ savings (kg)
09	Lochend Butterfly Way	971	£631	£17.10	67.26
10	Waterfront Park	752	£915	£16.07	88.73
11	Robertson Avenue	685	£2,204	£44.19	129.9
12	Fountainbridge	684	£804	£17.73	45.68
13	Oxgangs Avenue	668	£4,622	£120.43	409.64
14	West Pilton Grove	106	£4,337	£223.55	244.86
15	Craigour Place	86	£4,300	£212.71	234.12
16	Elgin Street	79	£3,794	£134.25	147.52

#	Name	Homes	Average retrofit cost	Average annual bill savings	Average annual CO ₂ savings (kg)
17	Morrison Crescent	73	£4,086	£149.89	149.48
18	Craighouse Gardens	69	£4,042	£193.54	196.13

- 4.4.2. The 10 above areas represent clusters of homes with the greatest potential to migrate to heat pumps, as the homes in question are generally well suited to heat pumps with limited retrofit required.
- 4.4.3. The scope for interventions in these 10 Delivery Areas at this time is less clear than in the prior eight Delivery Areas. The Council does not consider that the conditions to support a large-scale roll out of heat pumps in Edinburgh are in place at this time. Challenges include:
- The existing electricity price regime, which in many cases makes heat pumps unattractive relative to gas from a running cost perspective.
 - The ability of households to continue to choose gas boilers (with the most recent date quoted for a ban on the installation of replacement boilers being 2035).
 - Limited capacity in the market for the supply, installation, and maintenance of heat pumps.
 - Pressures on the electricity grid.
 - The need for extensive retrofit to many properties to make heat pumps a functional solution, including the need to put in place a hot water solution.
 - A general lack of awareness of heat pumps amongst residents.
- 4.4.4. Notwithstanding the above, there may be scope to take forward pilot / demonstrator projects in the Delivery Areas aimed at developing a workable model for rolling-out heat pump retrofit whilst raising awareness and interest. A key consideration will be the ability of the electricity grid to accommodate the heat pumps.
- **ACTION 28: Assess the scale of any upgrades required for the electricity grid to be able to accommodate heat pumps in the Delivery Areas.**
 - **ACTION 29: Assess the scope to offset the running costs of heat pumps within the Delivery Areas via the installation of solar panels.**
- 4.4.5. For homes in Council ownership, the Council is well placed to carry out interventions, and resources such as the Social Housing Net Zero Heat Fund would help offset the capital costs of these. However, consideration would need to be given to disruption to tenants, impacts on heating bills, and the working life of the existing heating solution.
- **ACTION 30: Assess the scope for heat pump retrofit pilot projects on Council-owned homes within the Delivery Areas.**
- 4.4.6. For homes not in Council ownership, the ability of the Council to act is extremely limited. The Council cannot compel other property owners to switch to heat pumps, and the decision on which heating solution they wish to employ rests with them. The Council must also be cautious about advising other property owners to convert to heat pumps where this could result in higher heating bills and/or reduced comfort, i.e. the Council cannot endorse heat pumps without a full understanding of the specific situation. Further consideration as to how

these Delivery Areas are progressed is required. Home Energy Scotland is a key stakeholder in this respect given its role in providing advice and funding to households.

- **ACTION 31: Engage with Home Energy Scotland to discuss the scope for instigating heat pump retrofit projects on homes owned by third parties within the Delivery Areas.**

4.4.7. With respect to a wider scale roll-out of heat pumps, it is considered that the Council will require to wait until such time as national policy decisions have been taken that make transition to heat pumps more viable.

- **ACTION 32: Maintain a watching brief on the ban of replacement gas boilers.**
- **ACTION 33: Maintain a watching brief on the electricity pricing regime in view of the UK Government pledge to “rebalance” gas and electricity costs.**

4.4.8. The role of the Council with respect to each Delivery Area will depend upon a number of considerations, most significantly the extent of Council ownership. Further information is set out in [Chapter 5](#).

4.5. Prospective Heat Network Zones

4.5.1. The Edinburgh LHEES identifies the areas of Edinburgh assessed as having the greatest potential for the roll-out of heat networks. 17 prospective Heat Network Zones have been identified, representing a combined demand of 3,404,609 megawatt hours per annum. The prospective Heat Network Zones are summarised in the below table:

Table 03: Prospective Heat Network Zones

ID	Name	Screening criteria	Annual heat demand (MWh / year)	Anchor loads
01	New Town	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	112,025	37
02	Leith Walk	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / meter / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	439,127	43
03	Old Town & Southside	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	706,174	149
04	Gorgie & Dalry	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	630,021	14
05	Craighleith	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	287,103	33
06	Granton	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	190,383	26
07	Leith	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	119,369	32

ID	Name	Screening criteria	Annual heat demand (MWh / year)	Anchor loads
08	Portobello & Seafield	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	88,143	10
09	Morningside	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	283,938	17
10	South East Edinburgh	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	187,528	38
11	Colinton Mains	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	11,675	5
12	South West Edinburgh	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	119,474	27
13	Heriot-Watt	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	68,751	17
14	Sighthill & Gyle	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	138,136	45
15	Ingliston	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	90,287	34
16	South Queensferry	<ul style="list-style-type: none"> ▪ LHD level: 4,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	75,742	8
17	Second New Town	<ul style="list-style-type: none"> ▪ LHD level: 8,000 kWh / metre / year ▪ LHD anchor load prioritisation count: ≥ 2 ▪ Anchor load definition: 500 MWh / year 	185,446	10

- 4.5.2. There are live heat network projects in various stages of development in several of the 17 prospective Heat Network Zones. These include 06: Granton (being led upon by the City of Edinburgh Council); 12: South East Edinburgh (being led upon by Midlothian Energy Limited); and 15: Ingliston (being led upon by Edinburgh Airport).
- 4.5.3. The prospective Heat Network Zones are proposed to form the basis of statutory Heat Network Zones as designated in line with the Heat Networks (Scotland) Act 2021 (“the Act”). The statutory Heat Network Zones will in turn underpin the permitting regime being developed by the Scottish Government, which will offer exclusivity to heat network operators.
- 4.5.4. The Council essentially has three separate (but intersecting) roles with regards to the roll-out of heat networks in Edinburgh, as set out below.
- 4.5.5. Firstly, in its capacity as the local authority for Edinburgh, the Council is under a duty to review and designate Heat Network Zones as set out in the Act and the Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023 “(the

Regulations)”. The Act also places a duty on the Council to receive copies of Building Assessment Reports for buildings in Edinburgh. Additionally, the Council has agreed to make an application to the Scottish Government to be designated the Consent Authority for Edinburgh in line with the Act.

- **ACTION 34: Publish a Heat Network Zone review statement in line with legislation to support the designation of statutory Heat Network Zones.**
- **ACTION 35: Engage with neighbouring local authorities around the scope for cross-boundary Heat Network Zones.**
- **ACTION 36: Prepare a Strategic Environmental Assessment to support the review statement.**
- **ACTION 37: Work with the Scottish Government to develop a consenting regime for Edinburgh, including making a case for fees for heat network consents being set on a full cost recovery basis and for provision to be made for developer contributions.**
- **ACTION 38: Compile data from Building Assessment Reports received by the Council and develop a process for sharing these with prospective developers.**
- **ACTION 39: Engage with the Scottish Government around the strategy for resourcing the costs associated with the Council’s duties under the Heat Networks (Scotland) Act 2021.**
- **ACTION 40: Publish, consult on, and adopt updates to the Edinburgh Design Guidance containing information relating to the development of heat networks.**
- **ACTION 41: Seek to coordinate excavation works for heat networks with other utility works, travel infrastructure works, and other relevant works to maximise efficiencies and minimise disruption.**
- **ACTION 42: Participate in the Danish-Scottish District Heating Mentoring Programme.**

4.5.6. Secondly, as one of Edinburgh’s largest property owners, the Council is itself a major consumer of heat. Given this, the Council could potentially help make heat network developments eligible via its buildings acting as anchor loads. The preparation of Building Assessment Reports for all Council-owned buildings with a demand of 73 megawatt hours per year or greater will inform where the Council’s estate has the greatest potential to play a catalytic role.

- **ACTION 43: Prepare Building Assessment Reports for all eligible Council buildings.**

4.5.7. Thirdly, in line with its target to make Edinburgh a net zero city by 2030, the Council has a potential role in supporting the roll-out of heat networks in Edinburgh, as well as in supporting the overhauling of existing heat networks to become zero direct emissions. The specific role of the Council with respect to each Heat Network Zone will depend upon a number of considerations, most significantly the extent of Council ownership (further information on each Heat Network Zone is set out in [Chapter 5](#)).

- **ACTION 44: Appoint a concessionaire to deliver the Granton Waterfront heat network.**
- **ACTION 45: Produce a business case looking at the scope to connect Council buildings to a proposed southeast Edinburgh heat network.**
- **ACTION 46: Identify a preferred model for supporting the roll-out of future Council-led heat networks in Edinburgh.**

- **ACTION 47: Develop a business case looking at the scope for Energy for Edinburgh Limited to deliver heat network projects on a joint venture approach, to include exploration of embedding cooperative principles and community wealth building.**
- **ACTION 48: Develop and support proposals for heat networks in further Heat Network Zones where resources permit.**
- **ACTION 49: Promote the integration of heat network suitability analysis with all new construction and development proposals.**
- **ACTION 50: Develop a more detailed database of existing heat networks in Edinburgh and engage with operators around their future plans in terms of overhaul and/or expansion and/or integration into/with other existing or new heat networks.**
- **ACTION 51: Maintain a watching brief on proposals for mandatory connections to heat networks.**

4.6. Other projects

4.6.1. This section of the Delivery Plans sets out various projects that do not sit within specific Delivery Areas, but which form part of the delivery of the Edinburgh LHEES.

High-rise housing retrofit

4.6.2. The Council plans to retrofit the 50 high-rise housing blocks in Edinburgh in which it has an interest over the next 10-15 years. It is anticipated that design and development for each block will take approximately 12 months, with a subsequent construction period of approximately 12–24 months. The Council aims to have up to four projects in design and development and a further four projects under construction at any given time. An indicative programme for the first tranche of high-rise housing blocks over the course of the Delivery Plan period is set out in the below table.

Table 04: Indicative high-rise housing retrofit programme

Block	Homes	Design and development	Construction
Craigmillar Court	57	2022/23	2023/24
Peffermill Court	57	2022/23	2023/24
Oxcars Court	76	2022/23	2023/24
Inchmickery Court	75	2022/23	2023/24
Cables Wynd House	212	2023/24	2024/25
Linksvie House	95	2023/24	2024/25
Marytree House	91	2023/24	2024/25
Moncrieffe House	91	2023/24	2024/25
Moredun House	91	2023/24	2024/25
Castlevie House	91	2023/24	2025/26
Forteviot House	91	2023/24	2025/26
Little France House	91	2023/24	2025/26
Inchcolm Court	60	2024/25	2025/26

Block	Homes	Design and development	Construction
Inchgarvie Court	60	2024/25	2025/26
Restalrig House	76	2025/26	2026/27
Lochend House	76	2025/26	2026/27
Green dykes House	86	2025/26	2026/27
Wauchope House	86	2025/26	2026/27
Birnies Court	56	2026/27	2027/28
Fidra Court	56	2026/27	2027/28
Hawkhill Court	85	2026/27	2027/28
Nisbett Court	85	2026/27	2027/28
Cobbinshaw House	136	2027/28	2028/29
Dunsyre House	136	2027/28	2028/29
Medwin House	136	2027/28	2029/30
Kilncroft	87	2027/28	2028/29
Drovers Bank	87	2027/28	2028/29
Midcairn	86	2027/28	2029/30
Inchkeith Court	60	2028/29	2029/30
Northview Court	61	2028/29	2029/30

- **ACTION 52: Deliver a programme of retrofit works to the first tranche of high-rise housing blocks in Edinburgh, beginning with Craigmillar Court and Peffermill Court, followed by Inchmickery Court and Oxcars Court.**

Non-domestic property retrofit

4.6.3. The information base on non-domestic buildings in Edinburgh is much more limited than for homes, and accordingly fewer projects targeting this segment have been identified at this time. It is anticipated that the Heat in Buildings Bill, which is expected to set mandatory standards for non-domestic buildings in terms of energy efficiency, will shape future action in this area.

- **ACTION 53: Deliver the Enerphit-informed retrofit pilot of Council operational buildings.**
- **ACTION 54: Prepare improvement plans to identify the necessary measures to improve the sustainability of the Council's Investment portfolio.**
- **ACTION 55: Prepare a schedule of 100 of the most complex non-domestic buildings in Edinburgh and engage with owners about future plans for each.**
- **ACTION 56: Participate in the consultation on the Heat in Buildings Bill.**

Historic buildings

4.6.4. As set out in the Edinburgh LHEES, the prevalence of historic buildings in Edinburgh is one of the major challenges to delivery. The Strategic Zone plans set out in the Edinburgh LHEES

indicate that this historicity is one of the major drivers of poor energy efficiency in Edinburgh.

- **ACTION 57: Work with Edinburgh World Heritage to take forward a pilot project looking at a whole house retrofit approach to “hard-to-treat” historic homes.**
- **ACTION 58: Maintain a watching brief on work by the Edinburgh Climate Change Institute to develop building archetypes to inform retrofit.**
- **ACTION 59: Engage with the Scottish Government around the scope to amend the Tenements (Scotland) Act 2004 to make it easier for residents to agree to instruct energy efficiency upgrades and changes to heating systems within tenements.**
- **ACTION 60: Work with Edinburgh World Heritage, Historic Environment Scotland, and the University of Edinburgh to consider how to effectively communicate the information on the net zero retrofit of historical properties to the public.**
- **ACTION 61: Publish a refreshed version of the “Guidance for Listed Buildings and Conservation Areas”, including a specific focus on net zero retrofit works.**

Green heat

4.6.5. The decarbonisation of heat in Edinburgh will require identifying a myriad of heat sources that are alternatives to gas and other fossil fuels. Work can be progressed to increase understanding of opportunities for green heat (and, where relevant, green power).

- **ACTION 62: Support work by the City Heat & Energy Partnership to develop a city-wide Heat and Energy Masterplan.**
- **ACTION 63: Further develop the ParkPower project looking at the potential to export heat from green and blue spaces in Edinburgh.**
- **ACTION 64: Engage with waste heat sources in Edinburgh to improve understanding of the scope to utilise their waste heat for heating buildings.**
- **ACTION 65: Engage with Scottish Water Horizons to improve understanding of the scope to utilise wastewater heat for heating buildings.**
- **ACTION 66: Engage with The Coal Authority to improve understanding of the scope to utilise mine water for heating buildings (and heat storage).**
- **ACTION 67: Explore opportunities to increase solar installations as a means of offsetting electricity costs associated with heat decarbonisation.**
- **ACTION 68: Maintain a watching brief on the H100 pilot and on hydrogen policy.**
- **ACTION 69: Maintain a watching brief on proposals to extend Permitted Development Rights for micro-renewable technologies.**

New developments

4.6.6. As set out in the Edinburgh LHEES, new developments represent the most straightforward segment of Edinburgh’s building stock to decarbonise given the ability to design-in net zero elements from the outset.

- **ACTION 70: Via City Plan 2030 and subsequent policy and guidance documents, set increasingly rigorous net zero standards for new developments in Edinburgh.**
- **ACTION 71: Ensure where possible that all new Council developments utilise zero direct emissions heating sources and are designed on a fabric first basis.**

- **ACTION 72: Ensure where possible that all new buildings developed by the Council are designed to operate with a maximum supply/flow temperature of 55°C.**

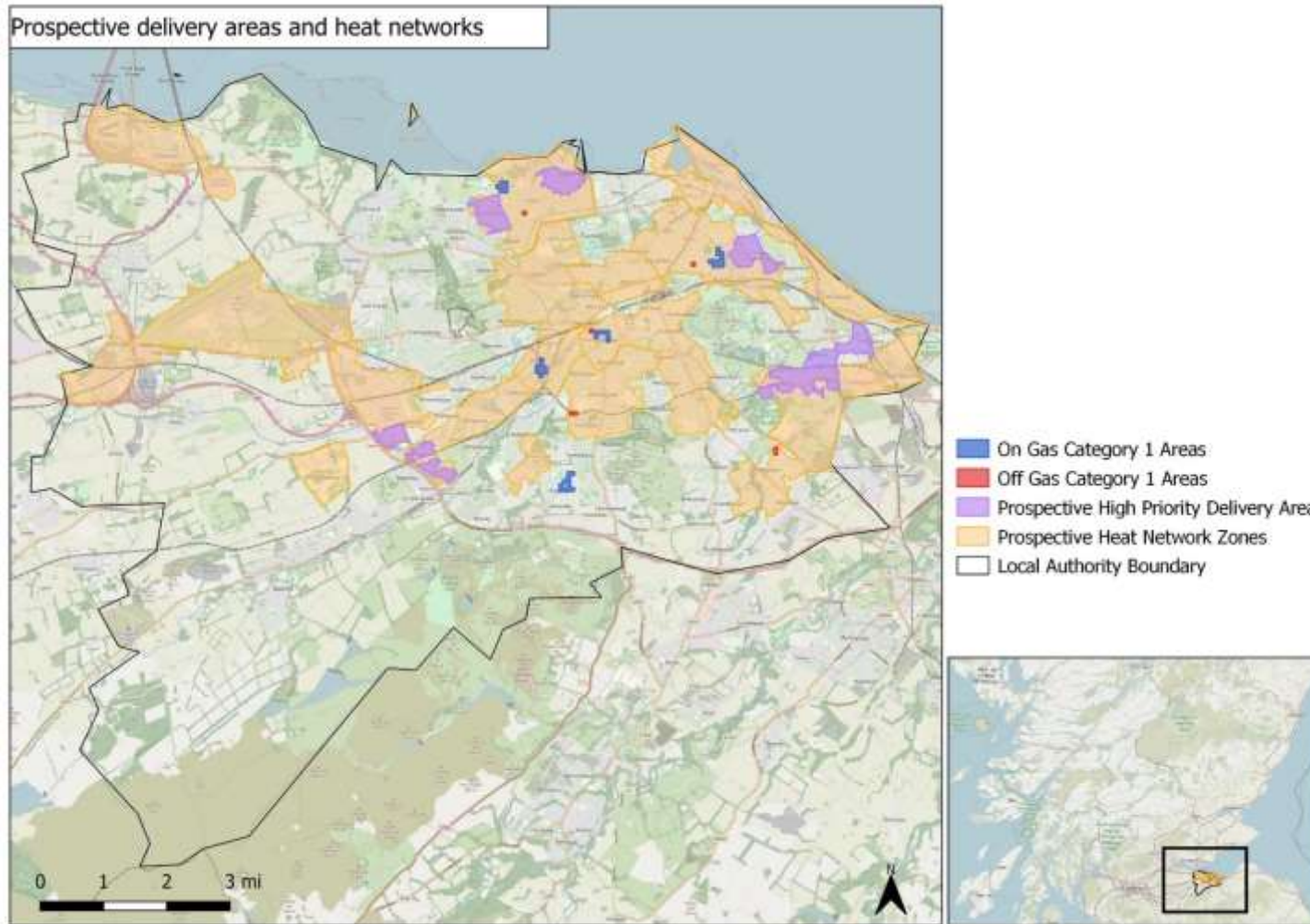
Other housing retrofit measures

4.6.7. In addition to the items set out above, there are other potential interventions that can be taken forward at this time with regards to housing retrofit.

- **ACTION 73: Deliver phase two of the Net Zero Communities pilot, providing detailed archetype modelling of measures and costs of net zero interventions including evaluation of community energy generation potential and deep modelling of “comfort as a service” potential.**
- **ACTION 74: Support the installation of smart meters in all Council-owned homes in Edinburgh.**
- **ACTION 75: Explore with partners the scope to create a Net Zero Community Hub as a means of educating residents of Edinburgh about decarbonisation and energy efficiency.**
- **ACTION 76: Explore with partners the scope to take forward low-cost interventions with disproportionately great impacts on energy efficiency, e.g. carpeting uncarpeted floors to reduce air leakage.**

5. Delivery Areas and Heat Network Zones

5.1. Overview plan of Delivery Areas and Heat Network Zones



5.2. Delivery Area 01: Restalrig & Lochend (energy efficiency)

- 5.2.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.2.2. Delivery Area 01: Restalrig & Lochend includes **2,147** homes in northeast Edinburgh. The majority of homes are low rise properties dating from the early twentieth century, but the Delivery Area also includes three 1960s high rise blocks of flats (Hawkhill Court, Nisbet Court, and Restalrig House).
- 5.2.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£8,389**; this would be expected to deliver average annual energy bill savings of **£293.03** and average annual CO₂ savings of **730.38** kilogrammes.
- 5.2.4. The below table summarises the breakdown of tenure in this Delivery Area. The Council is the largest owner, but there are significant numbers of homes across all tenures.

Table 05: Tenure of homes in Delivery Area 01: Restalrig & Lochend

Tenure	Count
Housing association	273
Local authority	929
Owner occupied	760
Privately rented	185

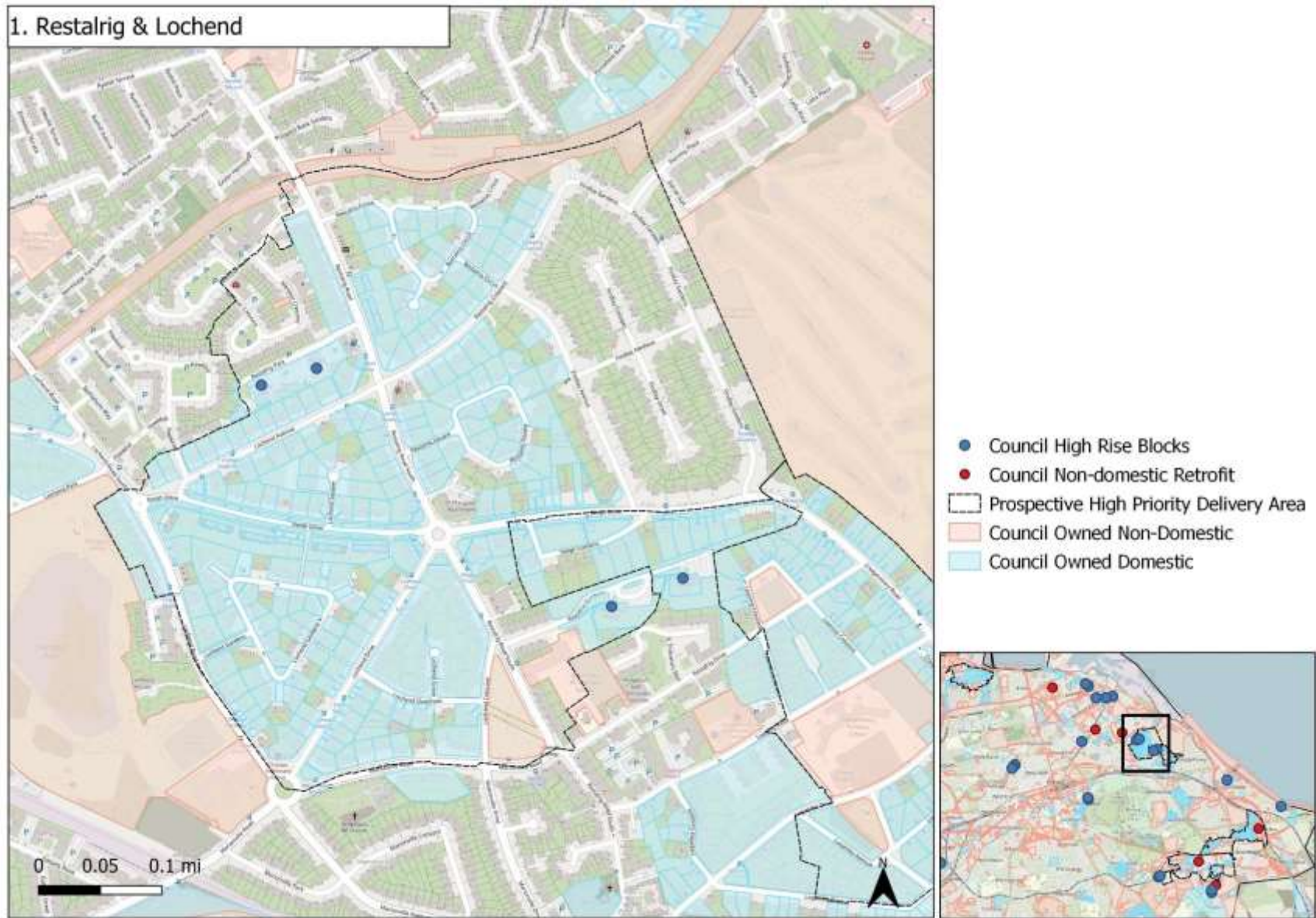
- 5.2.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.⁵

Table 06: Recommended interventions to homes in Delivery Area 01: Restalrig & Lochend

Intervention	Quantity
Cavity wall insulation required	475
Internal wall insulation required	55
External wall insulation required	467
Less than 100mm loft insulation	381
Flat roof insulation	6
Room in the loft insulation	2
Single glazing upgrade	72
Double glazing upgrade	2,121
Solar PV suitable	170
Suspended floor insulation	498
Solid floor insulation	28
Total	4,275

- 5.2.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.

⁵ It is noted that this sets out the full suite of potential interventions as recommended by the PEAT. The actual interventions to be taken forward will be determined by the Council on a case-by-case basis based upon practical site-specific considerations, for example cost and disruption to residents.



5.3. Delivery Area 02: Bingham & Magdalene (energy efficiency)

5.3.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.

5.3.2. Delivery Area 02: Bingham & Magdalene includes **1,575** homes in southeast Edinburgh. The majority of homes in this Delivery Area are low rise properties dating from the 1960s and from the late twentieth century.

5.3.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£12,941**; this would be expected to deliver average annual energy bill savings of **£327.04** and average annual CO₂ savings of **1,510.27** kilogrammes.

5.3.4. The below table summarises the breakdown of tenure in this Delivery Area. The Council is the largest owner, followed by owner occupiers.

Table 07: Tenure of homes in Delivery Area 02: Bingham & Magdalene

Tenure	Count
Housing association	65
Local authority	834
Owner occupied	575
Privately rented	101

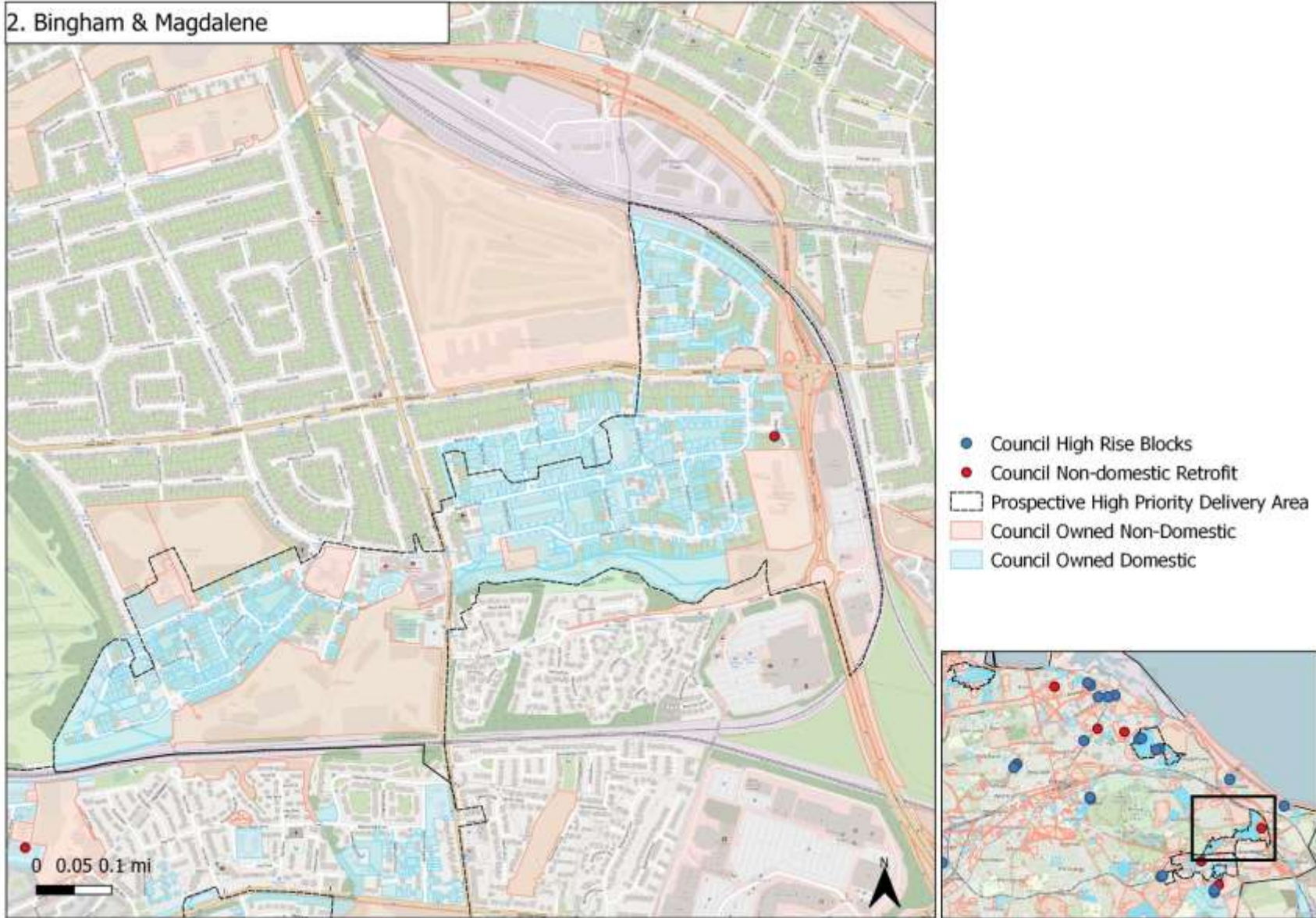
5.3.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 08: Recommended interventions to homes in Delivery Area 02: Bingham & Magdalene

Intervention	Quantity
Cavity wall insulation required	148
Internal wall insulation required	1
External wall insulation required	16
Less than 100mm loft insulation	355
Flat roof insulation	3
Room in the loft insulation	15
Single glazing upgrade	73
Double glazing upgrade	1,489
Solar PV suitable	462
Suspended floor insulation	770
Solid floor insulation	16
Total	3,348

5.3.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.

2. Bingham & Magdalene



5.4. Delivery Area 03: Restalrig & Craigentiny (energy efficiency)

5.4.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.

5.4.2. Delivery Area 03: Restalrig & Craigentiny includes **810** homes in northeast Edinburgh. The majority of homes in this Delivery Area are mid-rise properties built in phases from the 1930s to the 2000s.

5.4.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£5,557**; this would be expected to deliver average annual energy bill savings of **£221.45** and average annual CO₂ savings of **546.75** kilogrammes.

5.4.4. The below table summarises the breakdown of tenure in this Delivery Area. The largest number of homes are owner occupied, followed closely by Council-owned homes.

Table 09: Tenure of homes in Delivery Area 03: Restalrig & Craigentiny

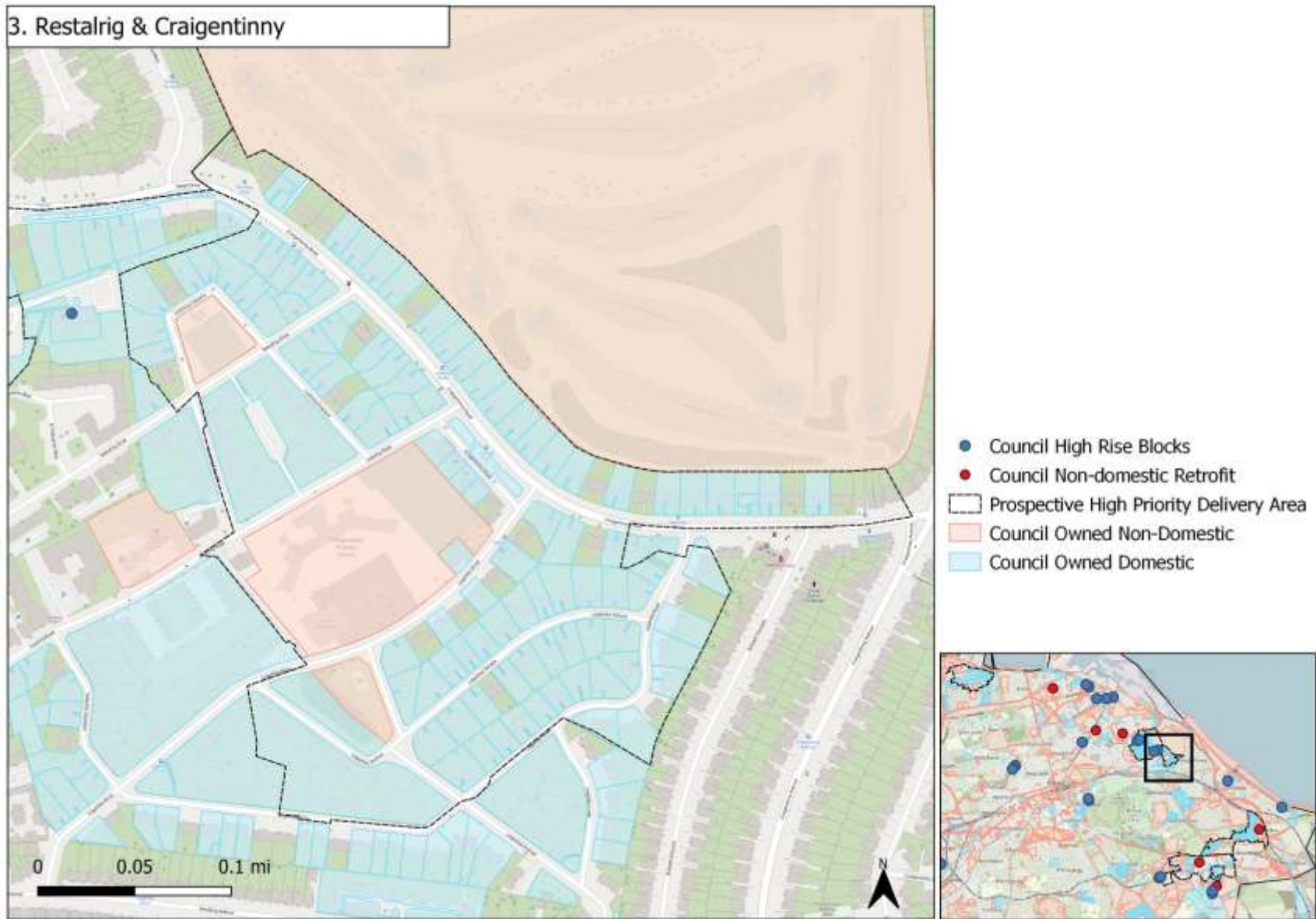
Tenure	Count
Housing association	33
Local authority	306
Owner occupied	354
Privately rented	117

5.4.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 10: Recommended interventions to homes in Delivery Area 03: Restalrig & Craigentiny

Intervention	Quantity
Cavity wall insulation required	383
Internal wall insulation required	3
External wall insulation required	30
Less than 100mm loft insulation	91
Flat roof insulation	1
Room in the loft insulation	2
Single glazing upgrade	205
Double glazing upgrade	785
Solar PV suitable	8
Suspended floor insulation	35
Solid floor insulation	0
Total	1,543

5.4.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.



5.5. Delivery Area 04: The Calders (energy efficiency)

- 5.5.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.5.2. Delivery Area 04: The Calders includes **1,456** homes in southwest Edinburgh. The majority of homes in this Delivery Area are mid-rise flats dating from the 1960s. The area also includes six high-rise blocks of flats also dating from the 1960s (Cobbinshaw House North; Cobbinshaw House South; Dunsyre House North; Dunsyre House South; Medwin House North; and Medwin House South).
- 5.5.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£5,319**; this would be expected to deliver average annual energy bill savings of **£206.25** and average annual CO₂ savings of **415.94** kilogrammes.
- 5.5.4. The below table summarises the breakdown of tenure in this Delivery Area. The largest number of homes are Council-owned homes, followed by owner occupied homes.

Table 11: Tenure of homes in Delivery Area 04: The Calders

Tenure	Count
Housing association	48
Local authority	889
Owner occupied	379
Privately rented	140

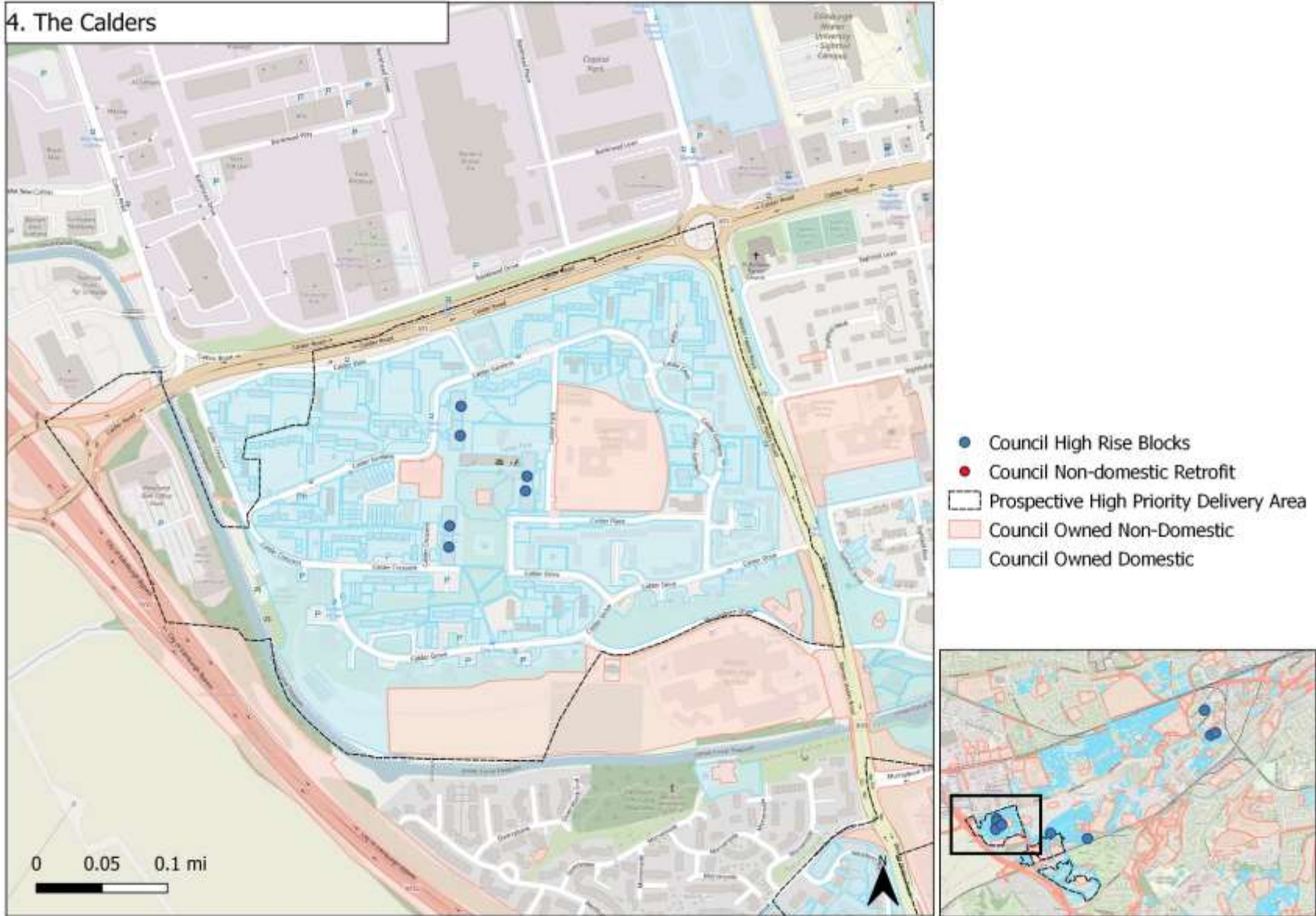
- 5.5.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 12: Recommended interventions to homes in Delivery Area 04: The Calders

Intervention	Quantity
Cavity wall insulation required	174
Internal wall insulation required	1
External wall insulation required	100
Less than 100mm loft insulation	95
Flat roof insulation	2
Room in the loft insulation	0
Single glazing upgrade	37
Double glazing upgrade	1,384
Solar PV suitable	3
Suspended floor insulation	137
Solid floor insulation	28
Total	1,961

- 5.5.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.

4. The Calders



5.6. Delivery Area 05: Granton, Wardieburn & Royston (energy efficiency)

- 5.6.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.6.2. Delivery Area 05: Granton, Wardieburn & Royston includes **2,041** homes in north Granton. The majority of homes in this Delivery Area are mid-rise flats dating from the 1940s-1950s.
- 5.6.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£5,028**; this would be expected to deliver average annual energy bill savings of **£169.27** and average annual CO₂ savings of **415.40** kilogrammes.
- 5.6.4. The below table summarises the breakdown of tenure in this Delivery Area. The majority of homes are Council-owned homes.

Table 13: Tenure of homes in Delivery Area 05: Granton, Wardieburn & Royston

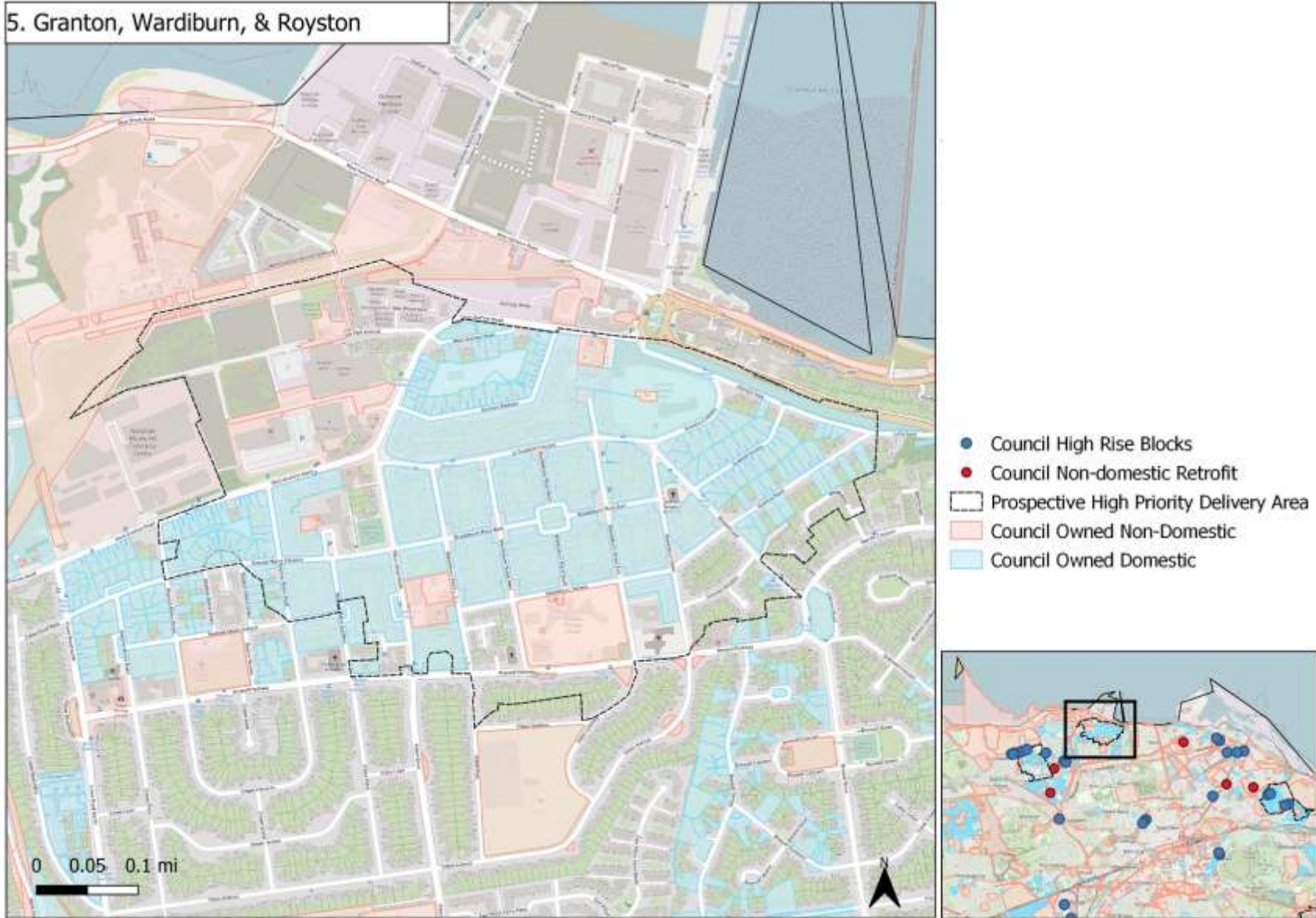
Tenure	Count
Housing association	175
Local authority	1,362
Owner occupied	400
Privately rented	104

- 5.6.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 14: Recommended interventions to homes in Delivery Area 05: Granton, Wardieburn & Royston

Intervention	Quantity
Cavity wall insulation required	171
Internal wall insulation required	7
External wall insulation required	6
Less than 100mm loft insulation	245
Flat roof insulation	6
Room in the loft insulation	14
Single glazing upgrade	175
Double glazing upgrade	1,869
Solar PV suitable	21
Suspended floor insulation	320
Solid floor insulation	4
Total	2,838

- 5.6.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.



5.7. Delivery Area 06: Niddrie & Craigmillar (energy efficiency)

- 5.7.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.7.2. Delivery Area 06: Niddrie & Craigmillar includes **3,005** homes in east Edinburgh. It includes a wide variety of properties, ranging from period houses to modern flats, among them two 1960s high rise blocks (Craigmillar Court and Peffermill Court).
- 5.7.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£8,113**; this would be expected to deliver average annual energy bill savings of **£195.75** and average annual CO₂ savings of **821.55** kilogrammes.
- 5.7.4. The below table summarises the breakdown of tenure in this Delivery Area. The largest number of homes are owned by housing associations, with a significant number also owned by the Council and owner occupied.

Table 15: Tenure of homes in Delivery Area 06: Niddrie & Craigmillar

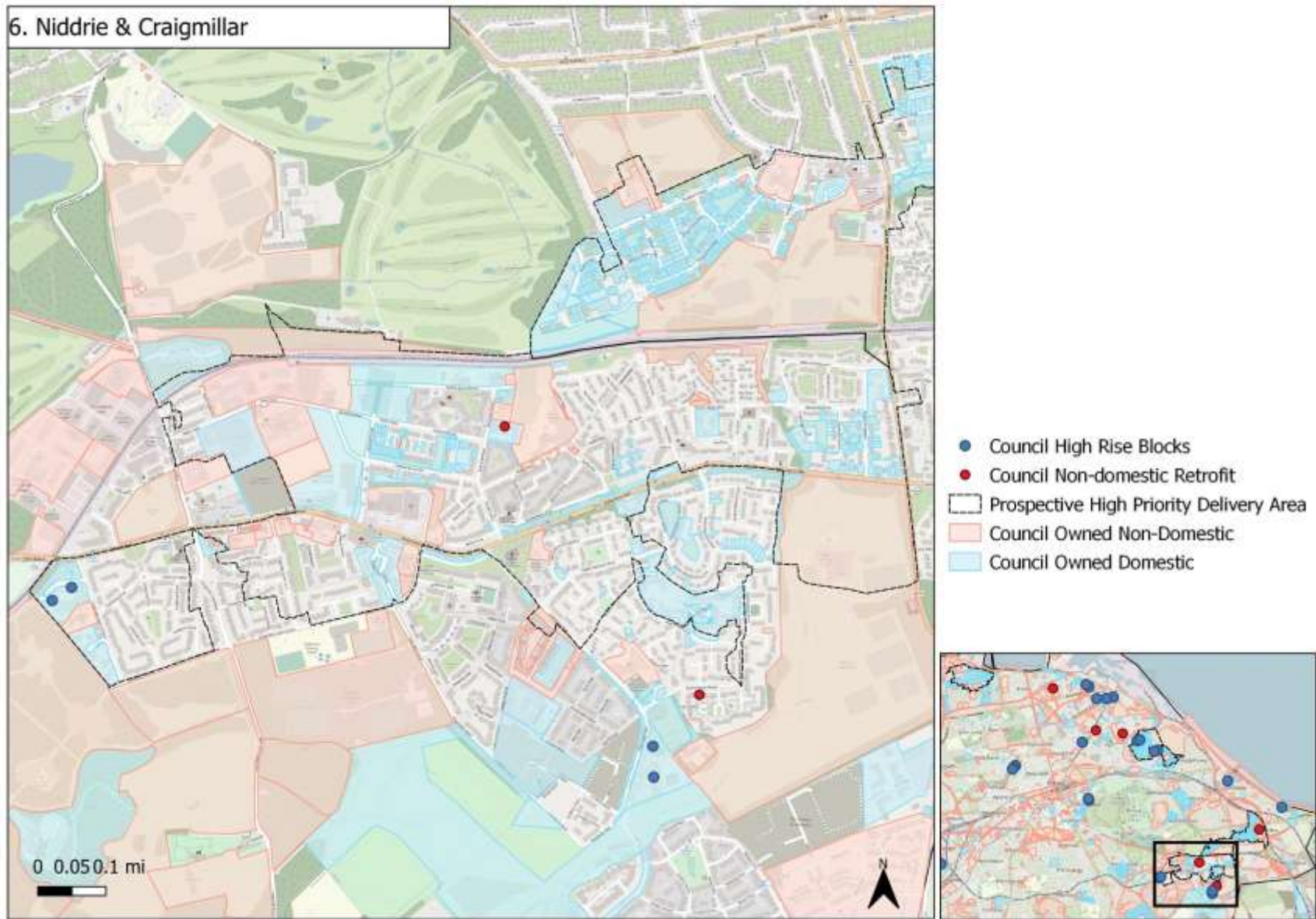
Tenure	Count
Housing association	1,074
Local authority	870
Owner occupied	844
Privately rented	217

- 5.7.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 16: Recommended interventions to homes in Delivery Area 06: Niddrie & Craigmillar

Intervention	Quantity
Cavity wall insulation required	131
Internal wall insulation required	63
External wall insulation required	134
Less than 100mm loft insulation	536
Flat roof insulation	25
Room in the loft insulation	32
Single glazing upgrade	123
Double glazing upgrade	1,697
Solar PV suitable	430
Suspended floor insulation	347
Solid floor insulation	53
Total	3,571

- 5.7.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.



5.8. Delivery Area 07: Clovenstone & Wester Hailes (energy efficiency)

- 5.8.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.8.2. Delivery Area 07: Clovenstone & Wester Hailes includes **1,393** homes in southwest Edinburgh. The majority of homes in this Delivery Area are mid-rise flats built in phases from the late twentieth century.
- 5.8.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£6,862**; this would be expected to deliver average annual energy bill savings of **£180.30** and average annual CO₂ savings of **611.38** kilogrammes.
- 5.8.4. The below table summarises the breakdown of tenure in this Delivery Area. The majority of homes are Council-owned.

Table 17: Tenure of homes in Delivery Area 07: Clovenstone & Wester Hailes

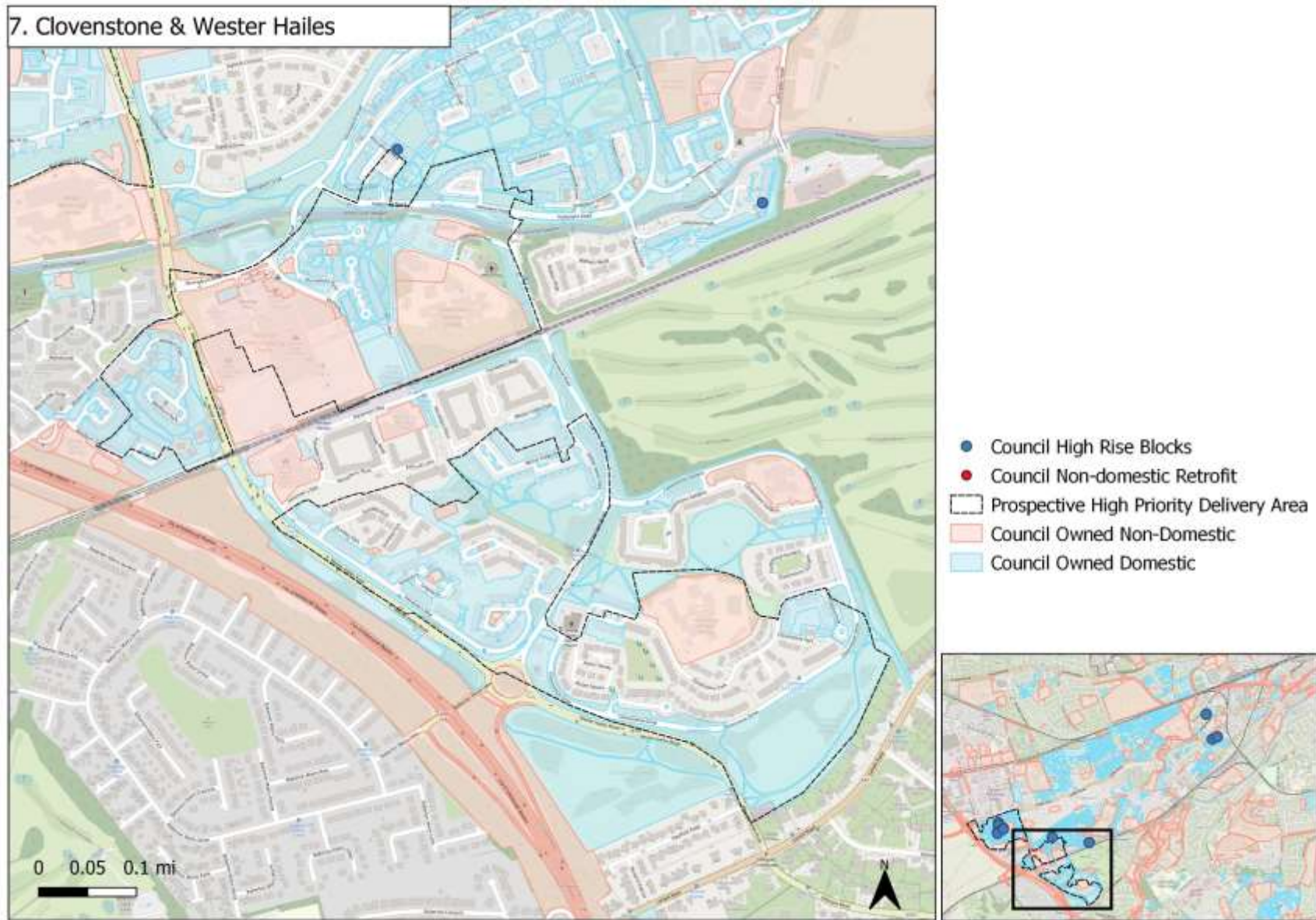
Tenure	Count
Housing association	341
Local authority	776
Owner occupied	202
Privately rented	74

- 5.8.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 18: Recommended interventions to homes in Delivery Area 07: Clovenstone & Wester Hailes

Intervention	Quantity
Cavity wall insulation required	164
Internal wall insulation required	1
External wall insulation required	70
Less than 100mm loft insulation	189
Flat roof insulation	1
Room in the loft insulation	3
Single glazing upgrade	25
Double glazing upgrade	1,312
Solar PV suitable	147
Suspended floor insulation	120
Solid floor insulation	11
Total	2,043

- 5.8.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.



5.9. Delivery Area 08: Muirhouse (energy efficiency)

- 5.9.1. This Delivery Area relates to the retrofit of homes to improve their energy efficiency.
- 5.9.2. Delivery Area 08: Muirhouse includes **2,427** homes in north Edinburgh. The Delivery Area comprises a mix of low-rise and mid-rise properties dating from the 1960s to the 2020s. It includes multiple high-rise flats.
- 5.9.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£7,439**; this would be expected to deliver average annual energy bill savings of **£245.24** and average annual CO₂ savings of **668.94** kilogrammes.
- 5.9.4. The below table summarises the breakdown of tenure in this Delivery Area. The majority of homes are Council owned, followed by housing association owned.

Table 19: Tenure of homes in Delivery Area 08: Muirhouse

Tenure	Count
Housing association	737
Local authority	1,241
Owner occupied	377
Privately rented	72

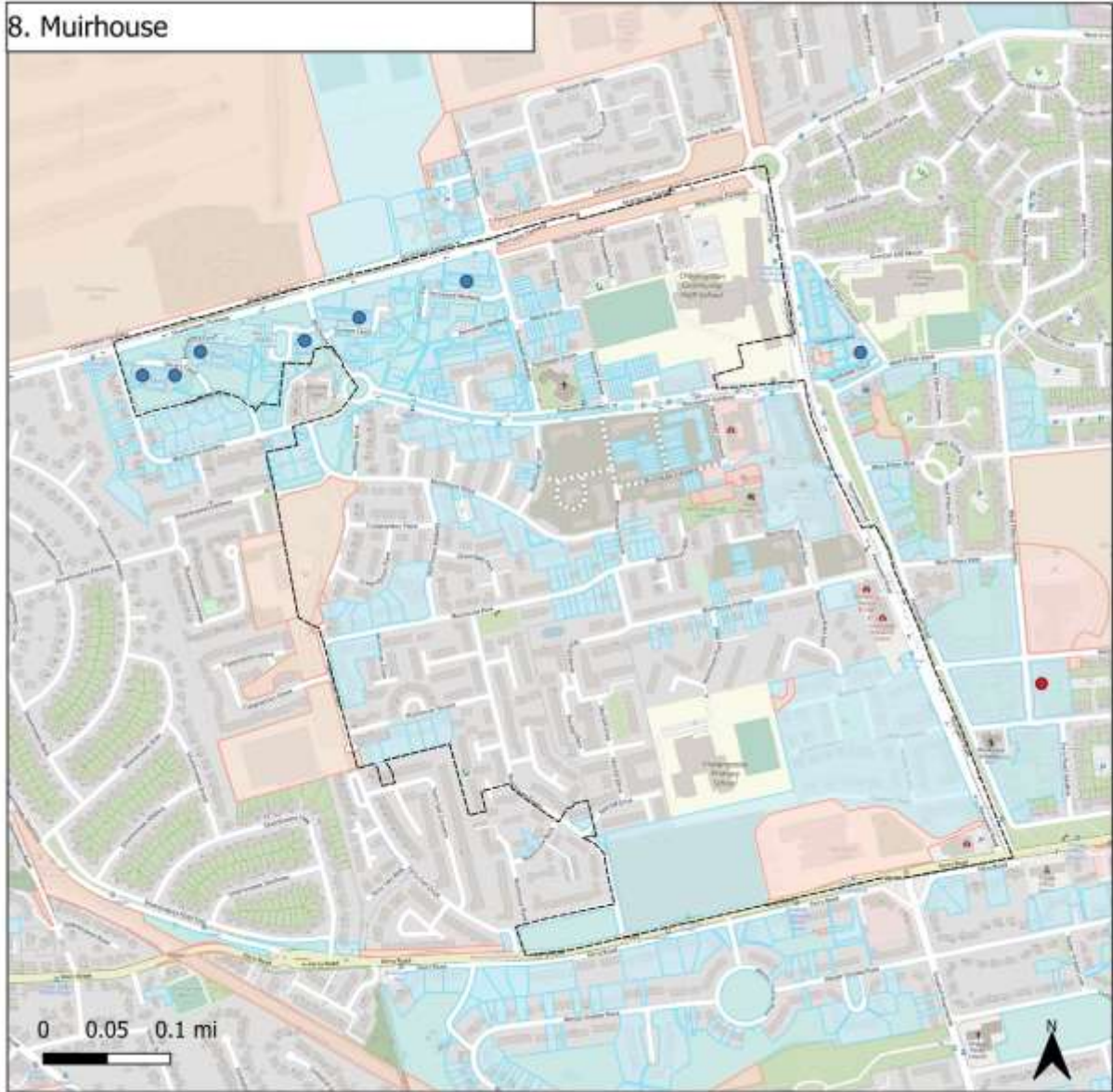
- 5.9.5. The below table summarises the recommended interventions in this Delivery Area. These cover a wide range, with the most common item being double glazing upgrades.

Table 20: Recommended interventions to homes in Delivery Area 08: Muirhouse

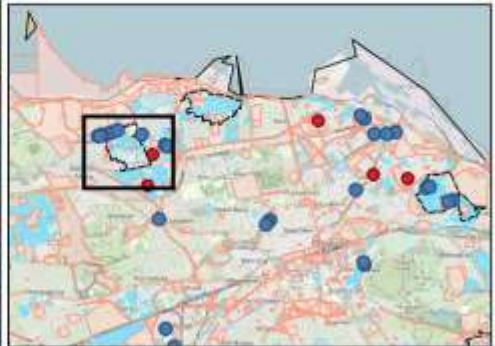
Intervention	Quantity
Cavity wall insulation required	45
Internal wall insulation required	10
External wall insulation required	306
Less than 100mm loft insulation	562
Flat roof insulation	2
Room in the loft insulation	3
Single glazing upgrade	18
Double glazing upgrade	1,480
Solar PV suitable	160
Suspended floor insulation	239
Solid floor insulation	68
Total	2,893

- 5.9.6. Interventions in this Delivery Area are proposed to be taken forward via the WHR programme, ABS programme, and MTIS.

8. Muirhouse



- Council High Rise Blocks
- Council Non-domestic Retrofit
- ▭ Prospective High Priority Delivery Area
- Council Owned Non-Domestic
- Council Owned Domestic



5.10. Delivery Area 09: Lochend Butterfly Way (heat pumps)

- 5.10.1. This Delivery Area relates to the retrofit of homes from gas boilers to heat pumps.
- 5.10.2. Delivery Area 09: Lochend Butterfly Way includes **971** homes. This Delivery Area comprises a cluster of mid-rise blocks of flats dating from the 2000s and 2010s, located between Easter Road football stadium and Lochend Park.
- 5.10.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£631**; this would be expected to deliver average annual energy bill savings of **£17.10** and average annual CO₂ savings of **67.26** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.10.4. The below table summarises the breakdown of tenure in this Delivery Area. This area is dominated by owner occupied and privately rented homes, with very limited Council and housing association-owned properties.

Table 21: Tenure of homes in Delivery Area 09: Lochend Butterfly Way

Tenure	Count
Housing association	10
Local authority	2
Owner occupied	571
Privately rented	388

- 5.10.5. The below table summarises the recommended interventions in this Delivery Area in order to render the homes in question suitable for the installation of heat pumps. The number of interventions is relatively low, primarily comprising improvements to loft insulation and upgrading of single glazed windows.

Table 22: Recommended interventions to homes in Delivery Area 09: Lochend Butterfly Way

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	50
Flat roof insulation	5
Room in the loft insulation	0
Single glazing upgrade	2
Double glazing upgrade	30
Solar PV suitable	1
Suspended floor insulation	16
Solid floor insulation	0
Total	104

- 5.10.6. Given the limited Council ownerships in this area, any project aimed at rolling out heat pumps would entail working with the private owners/landlords in the area to deploy them.



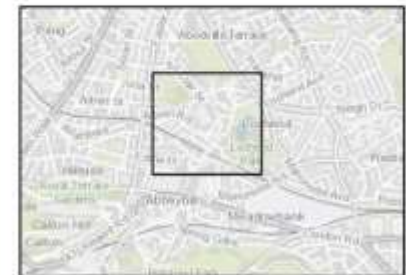
City of Edinburgh Council

On Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 On-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties where minimal fabric upgrade is needed prior to heat pump installation and they have a wet heating system in place.

- On Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.11. Delivery Area 10: Waterfront Park (heat pumps)

- 5.11.1. This Delivery Area relates to the retrofit of homes from gas boilers to heat pumps.
- 5.11.2. Delivery Area 10: Waterfront Park includes **752** homes. This Delivery Area comprises a cluster of mid-rise blocks of flats dating from the 2000s, located between West Granton Road and Forthquarter Park, adjacent to the Council's regeneration area. It falls within the Granton Waterfront prospective Heat Network Zone.
- 5.11.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£915**; this would be expected to deliver average annual energy bill savings of **£16.07** and average annual CO₂ savings of **88.73** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.11.4. The below table summarises the breakdown of tenure in this Delivery Area. The bulk of homes are privately owned, but with a significant number of homes owned by the West Granton Housing Co-operative.

Table 23: Tenure of homes in Delivery Area 10: Waterfront Park

Tenure	Count
Housing association	117
Local authority	17
Owner occupied	427
Privately rented	191

- 5.11.5. The below table summarises the recommended interventions in this Delivery Area. The number of interventions is relatively low, primarily comprising double glazing and loft insulation. Multiple flats are identified as being suitable for solar PV.

Table 24: Recommended interventions to homes in Delivery Area 10: Waterfront Park

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	14
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	1
Double glazing upgrade	39
Solar PV suitable	23
Suspended floor insulation	6
Solid floor insulation	3
Total	86

- 5.11.6. A pragmatic approach to this Delivery Area would be to engage with the West Granton Housing Co-operative to explore the scope for installing heat pumps in their properties.



City of Edinburgh Council

On Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 On-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties where minimal fabric upgrade is needed prior to heat pump installation and they have a wet heating system in place.

- On Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.12. Delivery Area 11: Robertson Avenue (heat pumps)

- 5.12.1. This Delivery Area relates to the retrofit of homes from gas boilers to heat pumps.
- 5.12.2. Delivery Area 11: Robertson Avenue includes **685** homes. This Delivery Area comprises a cluster of mid-rise blocks of flats dating from the 2000s and 2010s, located around Robertson Avenue in the Slateford neighbourhood of Edinburgh.
- 5.12.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£2,204**; this would be expected to deliver average annual energy bill savings of **£44.19** and average annual CO₂ savings of **129.9** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.12.4. The below table summarises the breakdown of tenure in this Delivery Area. This area is dominated by owner occupied and privately rented homes, with very limited Council and housing association-owned properties.

Table 25: Tenure of homes in Delivery Area 11: Robertson Avenue

Tenure	Count
Housing association	1
Local authority	12
Owner occupied	433
Privately rented	239

- 5.12.5. The below table summarises the recommended interventions in this Delivery Area. The vast majority of interventions concern upgrading to double glazing.

Table 26: Recommended interventions to homes in Delivery Area 11: Robertson Avenue

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	38
Flat roof insulation	6
Room in the loft insulation	0
Single glazing upgrade	2
Double glazing upgrade	321
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	367

- 5.12.6. Given the limited Council ownerships in this area, any project aimed at rolling out heat pumps would entail working with the private owners/landlords in the area to deploy them.



City of Edinburgh Council

On Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 On-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties where minimal fabric upgrade is needed prior to heat pump installation and they have a wet heating system in place.

-  On Gas Category 1 Delivery Areas
-  Council High-Rise Blocks
-  Council Non-domestic Retrofit
-  Council Owned Domestic
-  Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.13. Delivery Area 12: Fountainbridge (heat pumps)

- 5.13.1. This Delivery Area relates to the retrofit of homes from gas boilers to heat pumps.
- 5.13.2. Delivery Area 12: Fountainbridge includes **684** homes. This Delivery Area comprises a cluster of mid-rise blocks of flats mainly dating from the 2000s, located in the Fountainbridge neighbourhood of Edinburgh to the northeast of the major regeneration areas.
- 5.13.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£804**; this would be expected to deliver average annual energy bill savings of **£17.73** and average annual CO₂ savings of **45.68** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.13.4. The below table summarises the breakdown of tenure in this Delivery Area. The bulk of homes are privately owned, but with some housing association-owned homes.

Table 27: Tenure of homes in Delivery Area 12: Fountainbridge

Tenure	Count
Housing association	64
Local authority	3
Owner occupied	235
Privately rented	382

- 5.13.5. The below table summarises the recommended interventions in this Delivery Area. The vast majority of interventions concern upgrading to double glazing.

Table 28: Recommended interventions to homes in Delivery Area 12: Fountainbridge

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	4
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	1
Double glazing upgrade	115
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	120

- 5.13.6. A pragmatic approach to this Delivery Area would be to engage with housing associations to explore the scope for installing heat pumps in their properties.



City of Edinburgh Council

On Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 On-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties where minimal fabric upgrade is needed prior to heat pump installation and they have a wet heating system in place.

-  On Gas Category 1 Delivery Areas
-  Council High-Rise Blocks
-  Council Non-domestic Retrofit
-  Council Owned Domestic
-  Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.14. Delivery Area 13: Oxgangs Avenue (heat pumps)

- 5.14.1. This Delivery Area relates to the retrofit of homes from gas boilers to heat pumps.
- 5.14.2. Delivery Area 13: Oxgangs Avenue includes **668** homes. This Delivery Area comprises a cluster of mid-rise blocks of flats mainly dating from the mid-20th century, located in the Oxgangs neighbourhood of Edinburgh.
- 5.14.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£4,622**; this would be expected to deliver average annual energy bill savings of **£120.43** and average annual CO₂ savings of **409.64** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.14.4. The below table summarises the breakdown of tenure in this Delivery Area. The Council is the largest owner of homes in this area, with a significant number of homes also owned by various housing associations.

Table 29: Tenure of homes in Delivery Area 13: Oxgangs Avenue

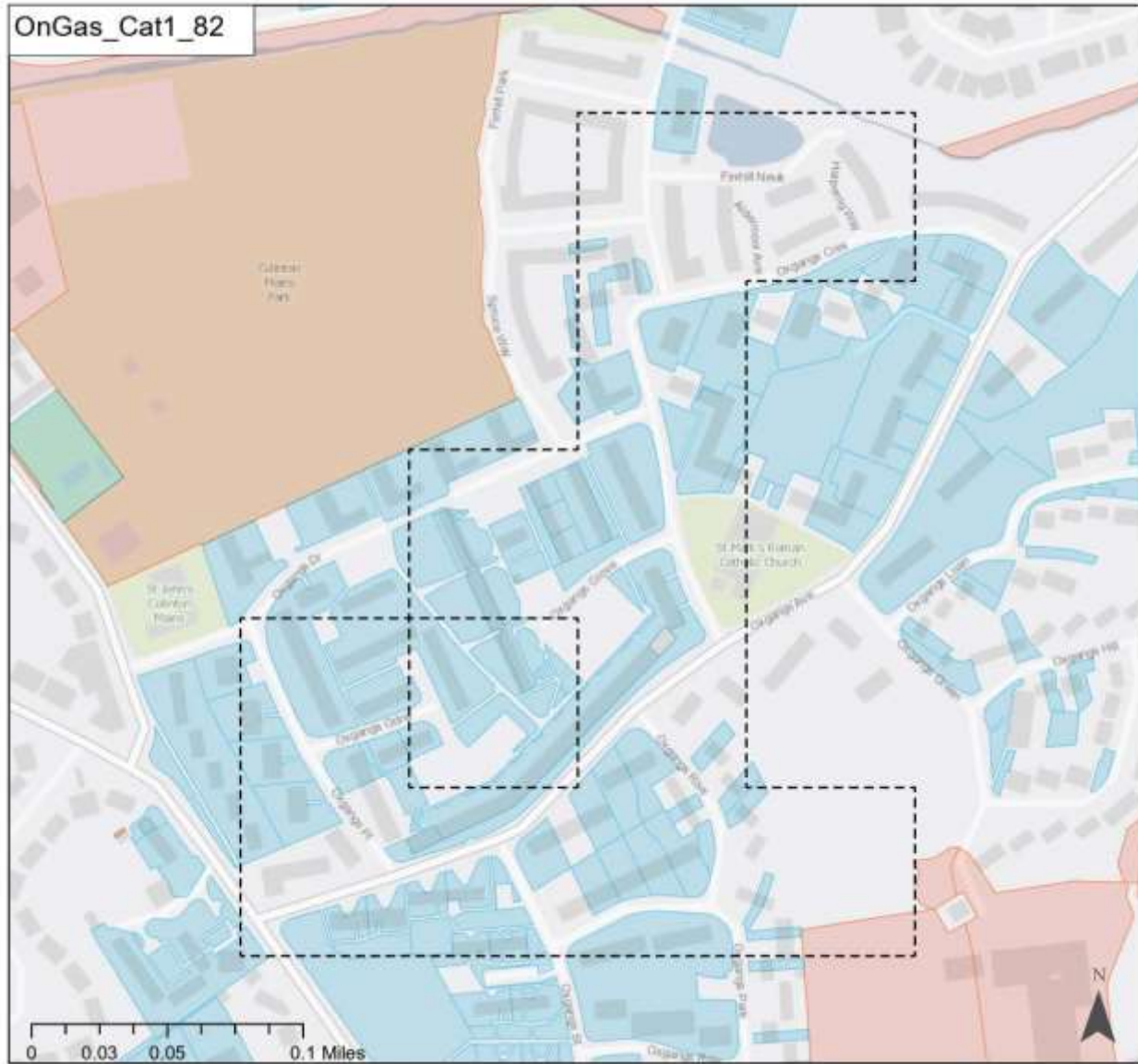
Tenure	Count
Housing association	152
Local authority	282
Owner occupied	187
Privately rented	47

- 5.14.5. The below table summarises the recommended interventions in this Delivery Area. The vast majority of interventions concern upgrading to double glazing and loft insulation.

Table 30: Recommended interventions to homes in Delivery Area 13: Oxgangs Avenue

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	101
Flat roof insulation	0
Room in the loft insulation	1
Single glazing upgrade	25
Double glazing upgrade	448
Solar PV suitable	35
Suspended floor insulation	37
Solid floor insulation	8
Total	655

- 5.14.6. Given the high proportion of Council-owned homes in this Delivery Area, the Council is well-placed to take forward interventions focusing on its own stock.



City of Edinburgh Council

On Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 On-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties where minimal fabric upgrade is needed prior to heat pump installation and they have a wet heating system in place.

-  On Gas Category 1 Delivery Areas
-  Council High-Rise Blocks
-  Council Non-domestic Retrofit
-  Council Owned Domestic
-  Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.15. Delivery Area 14: West Pilton Grove (heat pumps)

- 5.15.1. This Delivery Area relates to the retrofit of homes not currently connect to the gas grid to heat pumps.
- 5.15.2. Delivery Area 14: West Pilton Avenue includes **120** homes. This Delivery Area comprises two 1950s high-rise blocks (Inchcolm Court and Inchgarvie Court) in Pilton. As set out in [section 4.6](#), these properties are scheduled to be subject to energy efficiency retrofit works.
- 5.15.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£4,337**; this would be expected to deliver average annual energy bill savings of **£225.55** and average annual CO₂ savings of **244.86** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.15.4. The below table summarises the breakdown of tenure in this Delivery Area. All homes bar one are owned by the Council.⁶

Table 31: Tenure of homes in Delivery Area 14: West Pilton Grove

Tenure	Count
Housing association	0
Local authority	119
Owner occupied	1
Privately rented	0

- 5.15.5. The below table summarises the recommended interventions in this Delivery Area. Virtually all the interventions concern upgrading to double glazing.

Table 32: Recommended interventions to homes in Delivery Area 14: West Pilton Grove

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	5
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	1
Double glazing upgrade	106
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	112

- 5.15.6. Given the high proportion of Council-owned homes in this Delivery Area, the Council is well-placed to take forward interventions focusing on its own stock.

⁶ These figures are the Council's own figures as the figures produced by the LHEES Methodology are incorrect.



City of Edinburgh Council

Off Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 Off-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties which are considered to be highly suited to a heat pump solution, as there is an existing wet heating system in place and the property is well insulated

- Off Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- 📍 Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.16. Delivery Area 15: Craigour Place (heat pumps)

- 5.16.1. This Delivery Area relates to the retrofit of homes not currently connect to the gas grid to heat pumps.
- 5.16.2. Delivery Area 15: Craigour Place includes **86** homes. This Delivery Area comprises four high-rise blocks of flats dating from the 1960s (Castleview House, Little France House, Marytree House, Moredun House) in the Craigour neighbourhood. As set out in [section 4.6](#), these properties are scheduled to be subject to energy retrofit works.
- 5.16.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£4,300**; this would be expected to deliver average annual energy bill savings of **£212.71** and average annual CO₂ savings of **234.12** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.16.4. All homes bar 11 in this Delivery Area are owned by the Council.⁷

Table 33: Tenure of homes in Delivery Area 15: Craigour Place

Tenure	Count
Housing association	0
Local authority	353
Owner occupied	11
Privately rented	0

- 5.16.5. The below table summarises the recommended interventions for Little France House only. All interventions were around double-glazing upgrades.

Table 34: Recommended interventions to homes in Delivery Area 15: Craigour Place

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	0
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	0
Double glazing upgrade	86
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	86

- 5.16.6. Given the high proportion of Council-owned homes in this Delivery Area, the Council is well-placed to take forward interventions focusing on its own stock.

⁷ These figures are the Council's own figures as the figures produced by the LHEES Methodology are incorrect.



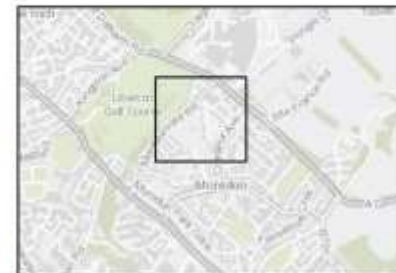
City of Edinburgh Council

Off Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 Off-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties which are considered to be highly suited to a heat pump solution, as there is an existing wet heating system in place and the property is well insulated

- Off Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.17. Delivery Area 16: Elgin Street (heat pumps)

- 5.17.1. This Delivery Area relates to the retrofit of homes not currently connect to the gas grid to heat pumps.
- 5.17.2. Delivery Area 16: Elgin Street includes **79** homes. This Delivery Area comprises blocks of mid-rise retirement flats dating from the 1990s between Leith Walk and Easter Road.
- 5.17.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£3,794**; this would be expected to deliver average annual energy bill savings of **£134.25** and average annual CO₂ savings of **147.52** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.17.4. All homes in this Delivery Area are owned by the housing association Harbour Homes.

Table 35: Tenure of homes in Delivery Area 16: Elgin Street

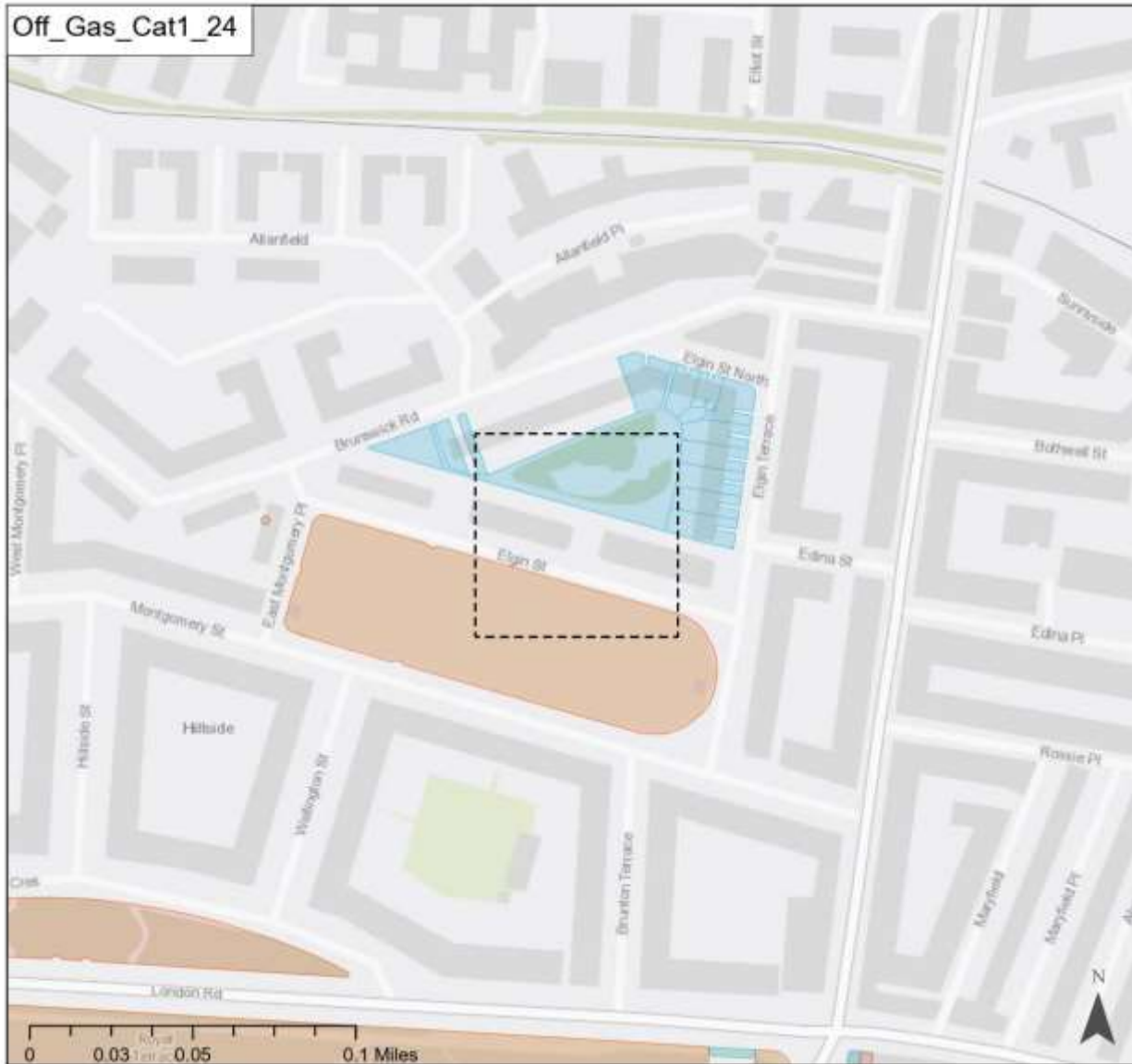
Tenure	Count
Housing association	79
Local authority	0
Owner occupied	0
Privately rented	0

- 5.17.5. The below table summarises the recommended interventions in this Delivery Area. The vast majority of interventions relate to double glazing upgrades.

Table 36: Recommended interventions to homes in Delivery Area 16: Elgin Street

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	4
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	1
Double glazing upgrade	79
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	84

- 5.17.6. Taking forward heat pump projects in this Delivery Area will require engagement with Harbour Homes.



City of Edinburgh Council

Off Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 Off-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties which are considered to be highly suited to a heat pump solution, as there is an existing wet heating system in place and the property is well insulated

- Off Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.18. Delivery Area 17: Morrison Crescent (heat pumps)

- 5.18.1. This Delivery Area relates to the retrofit of homes not currently connect to the gas grid to heat pumps.
- 5.18.2. Delivery Area 17: Morrison Crescent includes **73** homes. This Delivery Area comprises blocks of mid-rise flats dating from the 1990s in Edinburgh city centre.
- 5.18.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£4,086**; this would be expected to deliver average annual energy bill savings of **£149.89** and average annual CO₂ savings of **149.48** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.18.4. The below table summarises the breakdown of tenure in this Delivery Area. The majority of homes are owned by housing associations.

Table 37: Tenure of homes in Delivery Area 17: Morrison Crescent

Tenure	Count
Housing association	64
Local authority	0
Owner occupied	5
Privately rented	4

- 5.18.5. The below table summarises the recommended interventions in this Delivery Area. All interventions relate to double glazing upgrades.

Table 38: Recommended interventions to homes in Delivery Area 17: Morrison Crescent

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	0
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	0
Double glazing upgrade	73
Solar PV suitable	0
Suspended floor insulation	0
Solid floor insulation	0
Total	73

- 5.18.6. A pragmatic approach to this Delivery Area would be to engage with housing associations to explore the scope for installing heat pumps in their properties.



City of Edinburgh Council

Off Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 Off-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties which are considered to be highly suited to a heat pump solution, as there is an existing wet heating system in place and the property is well insulated

- Off Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

5.19. Delivery Area 18: Craighouse Gardens (heat pumps)

- 5.19.1. This Delivery Area relates to the retrofit of homes not currently connect to the gas grid to heat pumps.
- 5.19.2. Delivery Area 18: Craighouse Gardens includes **69** homes. This Delivery Area comprises blocks of mid-rise flats dating from the 1980s in the Craighouse area of Edinburgh.
- 5.19.3. The estimated average cost of energy efficiency interventions in this Delivery Area is **£4,042**; this would be expected to deliver average annual energy bill savings of **£193.54** and average annual CO₂ savings of **196.13** kilogrammes. This does not include the cost of the heat pump itself, only the interventions required for the heat pump to function optimally.
- 5.19.4. The below table summarises the breakdown of tenure in this Delivery Area. All homes were privately owned.

Table 39: Tenure of homes in Delivery Area 18: Craighouse Gardens

Tenure	Count
Housing association	0
Local authority	0
Owner occupied	56
Privately rented	13

- 5.19.5. The below table summarises the recommended interventions in this Delivery Area. The vast majority of interventions relate to double glazing upgrades.

Table 40: Recommended interventions to homes in Delivery Area 18: Craighouse Gardens

Intervention	Quantity
Cavity wall insulation required	0
Internal wall insulation required	0
External wall insulation required	0
Less than 100mm loft insulation	10
Flat roof insulation	0
Room in the loft insulation	0
Single glazing upgrade	1
Double glazing upgrade	69
Solar PV suitable	0
Suspended floor insulation	1
Solid floor insulation	1
Total	82

- 5.19.6. Given the limited Council ownerships in this area, any project aimed at rolling out heat pumps would entail working with the private owners/landlords in the area to deploy them.



City of Edinburgh Council

Off Gas Category 1 Delivery Areas

This map spatially displays results from the LHEES Stage 4 analysis for Category 1 Off-Gas properties. This map shows one of the top 5 delivery areas with the highest property counts.

Category 1 = properties which are considered to be highly suited to a heat pump solution, as there is an existing wet heating system in place and the property is well insulated

- Off Gas Category 1 Delivery Areas
- Council High-Rise Blocks
- Council Non-domestic Retrofit
- Council Owned Domestic
- Council Owned Non-domestic



Changeworks © 2023
Contains OS data © Crown Copyright and database right 2020

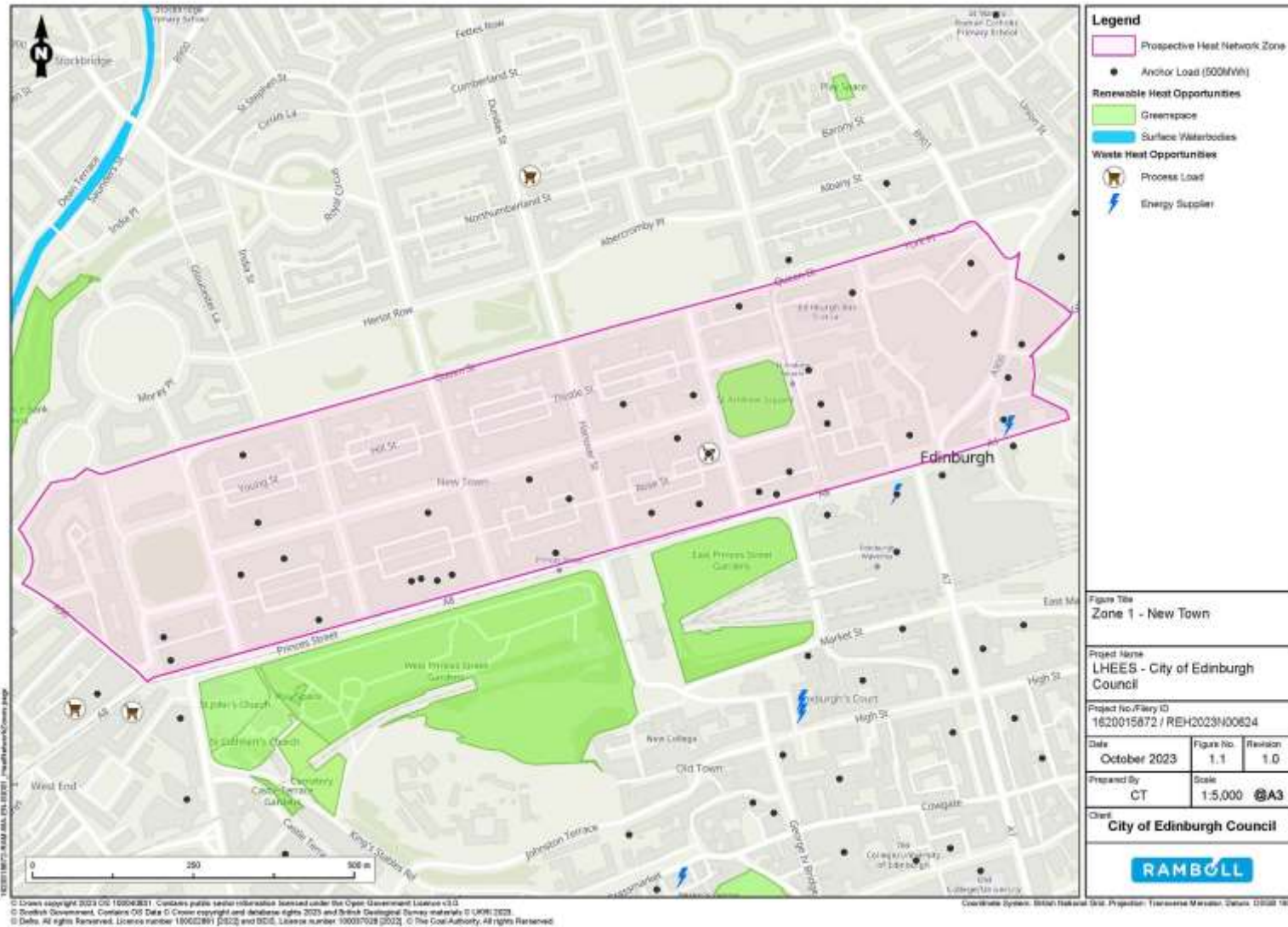
5.20. Heat Network Zone 01: New Town

5.20.1. Headline information on the first prospective Heat Network Zone, “New Town”, is set out in the below table:

Table 41: Headline information on Heat Network Zone 01: New Town

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	112,025
Total loads	1,560
Anchor loads	37
Area	52 hectares

- 5.20.2. This Heat Network Zone encompasses Edinburgh’s first New Town, along with the adjacent St James Quarter. It includes multiple large buildings, including shops, hotels, offices, and civic buildings such as General Register House. The Council has relatively few building ownerships in this Heat Network Zone with the most significant being the Assembly Rooms complex on George Street.
- 5.20.3. Potential heat sources within this Heat Network Zone include the Sainsbury's supermarket on St Andrew Square, a major sewer running beneath Princes Street Gardens, and green spaces such as Charlotte Square and St Andrew Square.
- 5.20.4. This Heat Network Zone forms part of the largest potential Heat Network Zone in Edinburgh identified in the First National Assessment.
- 5.20.5. The key challenges associated with the delivery of a heat network in this area concern its historical character. The bulk of buildings in the area are listed, making any interventions complex. The subterranean conditions are particularly complex with shallow basements, utilities, and old concrete tram sleepers. The heavily built-up nature of the New Town, coupled with its protected character, may also make finding a suitable location for an energy centre challenging.
- 5.20.6. The planned public realm works to George Street may represent an opportunity to future proof via the installation of ducts for pipes. Consideration would be needed as to whether this represents the optimal route for pipes.
- 5.20.7. A preliminary assessment of this Heat Network Zone suggests that it may have potential, but that the practical challenges and the Council’s limited ownerships may prove significant impediments.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

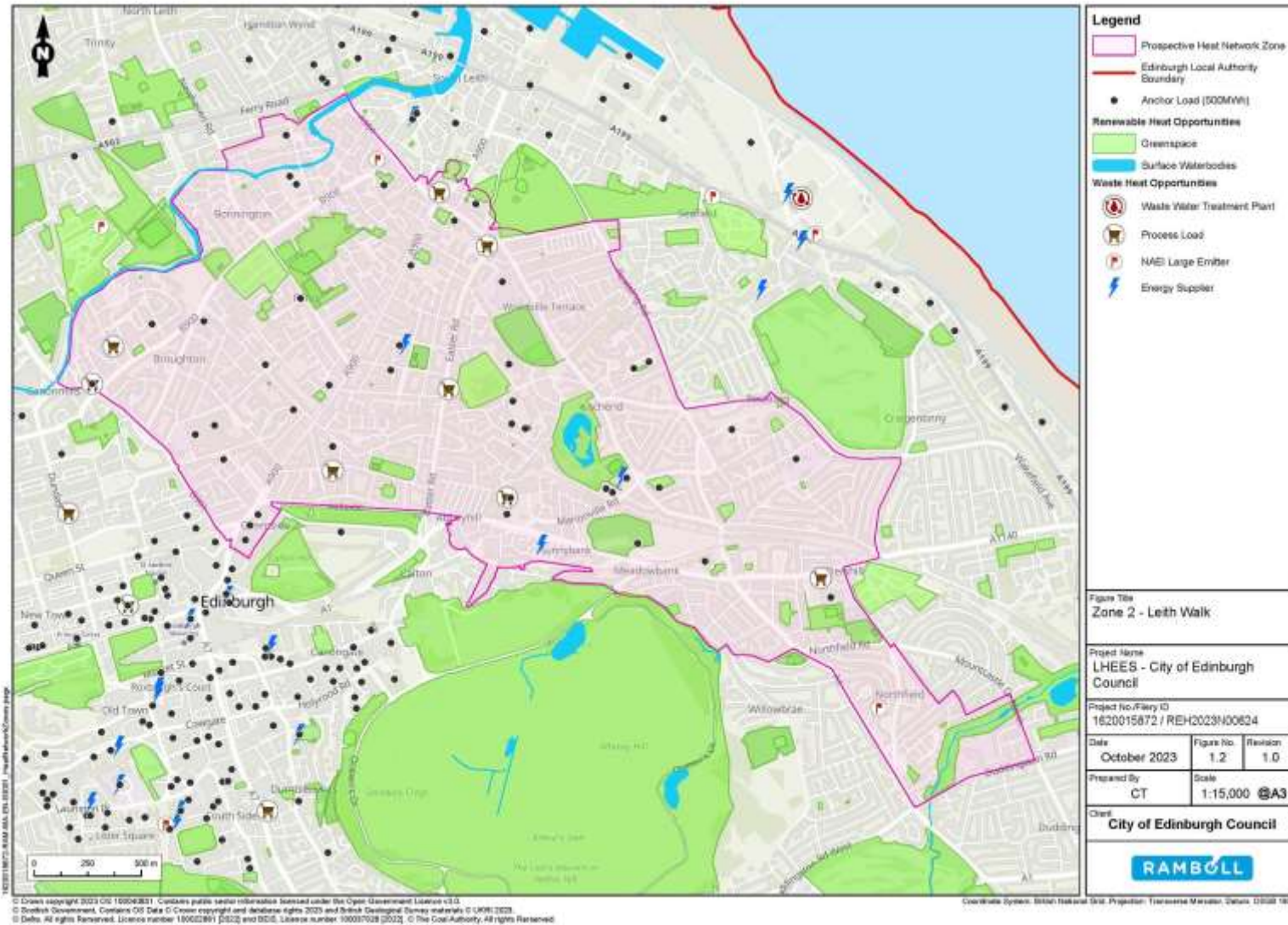
5.21. Heat Network Zone 02: Leith Walk

- 5.21.1. Headline information on the second prospective Heat Network Zone, “Leith Walk”, is set out in the below table:

Table 42: Headline information on Heat Network Zone 02: Leith Walk

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	439,127
Total loads	15,149
Anchor loads	43
Area	551 hectares

- 5.21.2. This Heat Network Zone encompasses the urban corridor between Edinburgh city centre and Leith. This is a heavily built-up area that includes some of the most densely populated parts of Scotland. The anchor loads across the site include a number of industrial properties which it is judged may come forward for redevelopment in future so further analysis would be required to identify a refined list of anchor loads offering the greatest certainty. The anchor loads are relatively dispersed across the Heat Network Zone meaning there is no obvious nexus for a heat network in this location. Key Council-owned buildings in this Heat Network Zone include Drummond Community High School and Leith Academy.
- 5.21.3. Potential heat sources in this Heat Network Zone include multiple supermarkets; multiple major sewers running beneath the site (particularly a sewer running east-west across the site with a flow rate of over 832.24 litres per second); green spaces such as Lochend Park and Pilrig Park; and water bodies such as the Water of Leith.
- 5.21.4. The area in question is densely developed with many historical properties. The route for pipes will be a key consideration. It is recognised that Leith Walk in particular has seen extensive works in recent years and any further excavations would cause additional disruption.
- 5.21.5. A preliminary assessment of this Heat Network Zone suggests that it may have potential, but that the scattered nature of the anchor loads may make delivery complex.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

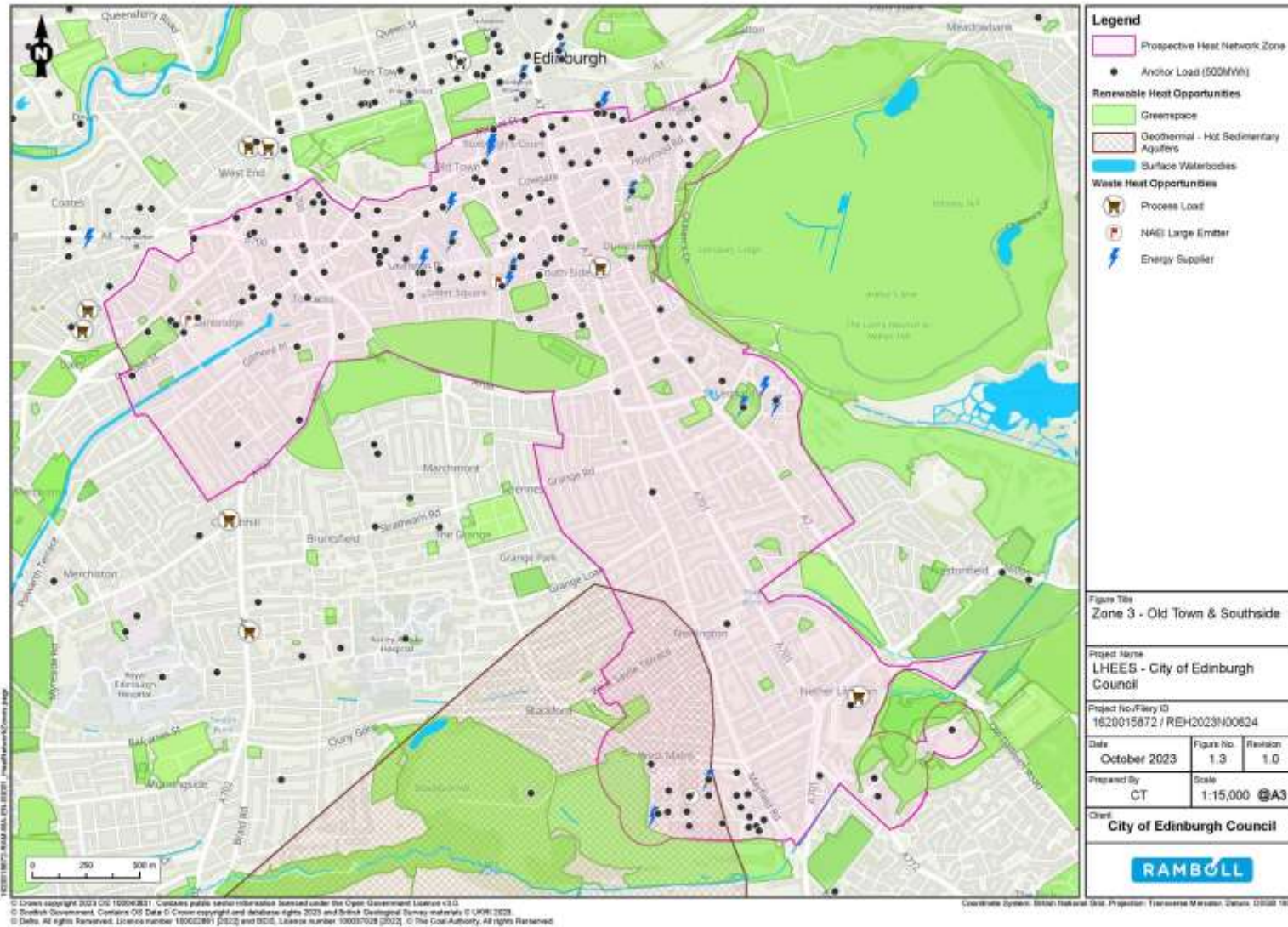
5.22. Heat Network Zone 03: Old Town & Southside

- 5.22.1. Headline information on the third prospective Heat Network Zone, “Old Town & Southside”, is set out in the below table:

Table 43: Headline information on Heat Network Zone 03: Old Town & Southside

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	706,174
Total loads	12,736
Anchor loads	149
Area	568 hectares

- 5.22.2. This Heat Network Zone encompasses Edinburgh’s Old Town, along with the modern Exchange District and Fountainbridge neighbourhoods to the west. It stretches south to the University of Edinburgh’s King’s Buildings campus. This Heat Network Zone includes a wide variety of anchor loads, including hotels, offices, and civic buildings. The University of Edinburgh is a key stakeholder within this Heat Network Zone with its various central campuses, the aforementioned King’s Buildings campus, and the Pollock Halls student accommodation area falling within the Zone. Key Council-owned buildings include the Royal Lyceum Theatre; Tollcross Primary School; and Usher Hall.
- 5.22.3. The anchor loads in this Heat Network Zone are somewhat clustered around the arterial roads running west to east from Dundee Street to Holyrood Road, suggesting this may represent a logical pipe route, potentially with a spur running up Lothian Road. Planning public realm and active travel works at Fountainbridge and Lothian Road may represent an opportunity to future proof via the installation of ducts for pipes. A connection to the southern part of the site may prove more challenging.
- 5.22.4. Potential heat sources within this Heat Network Zone include supermarkets; multiple major sewers; the Union Canal; green spaces such as the Meadows; substations; and potential geothermal resources to the south.
- 5.22.5. This Heat Network Zone forms part of the largest potential Heat Network Zone in Edinburgh identified in the First National Assessment.
- 5.22.6. The key challenges associated with the delivery of a heat network in this area concern its historical character coupled with challenging subterranean conditions.
- 5.22.7. A preliminary assessment of this Heat Network Zone suggests that it has strong potential given the clustering of anchor loads and the range of potential heat sources.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

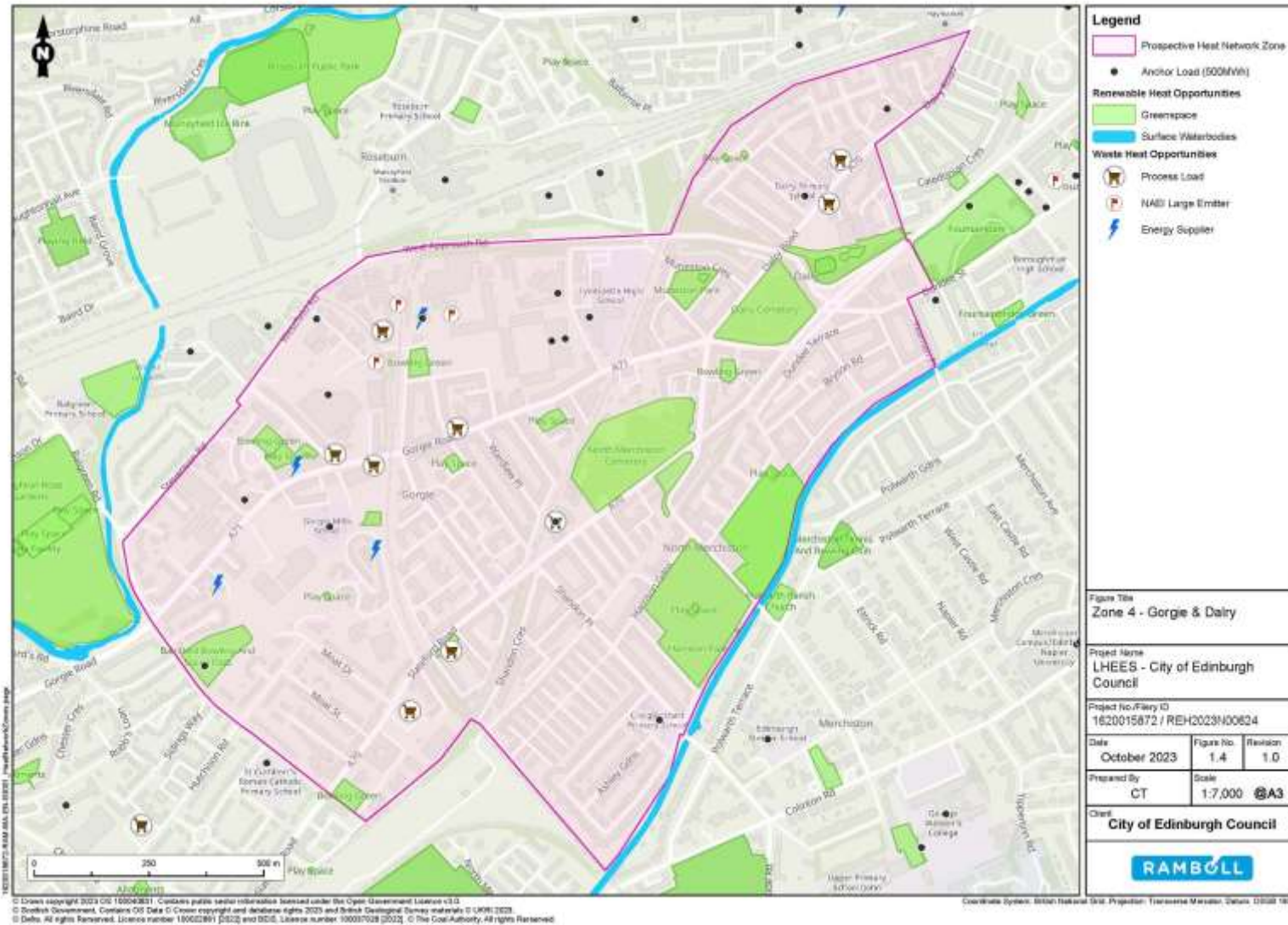
5.23. Heat Network Zone 04: Gorgie & Dalry

- 5.23.1. Headline information on the fourth prospective Heat Network Zone, “Gorgie & Dalry”, is set out in the below table:

Table 44: Headline information on Heat Network Zone 04: Gorgie & Dalry

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	630,021
Total loads	3,846
Anchor loads	14
Area	168 hectares

- 5.23.2. This Heat Network Zone encompasses neighbourhoods to the southwest of Edinburgh city centre. It has relatively few anchor loads, with such loads as there are being primarily located to the north of the site. Key Council-owned buildings include Tynecastle High School and Craiglockhart Primary School.
- 5.23.3. Potential heat sources within this Heat Network Zone include multiple supermarkets; major industrial uses at Wheatfield Road; the Union Canal; and green spaces such as Harrison Park.
- 5.23.4. A preliminary assessment of this Heat Network Zone suggests that it may have lesser potential than other Zones due primarily to the relatively low number of anchor loads.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

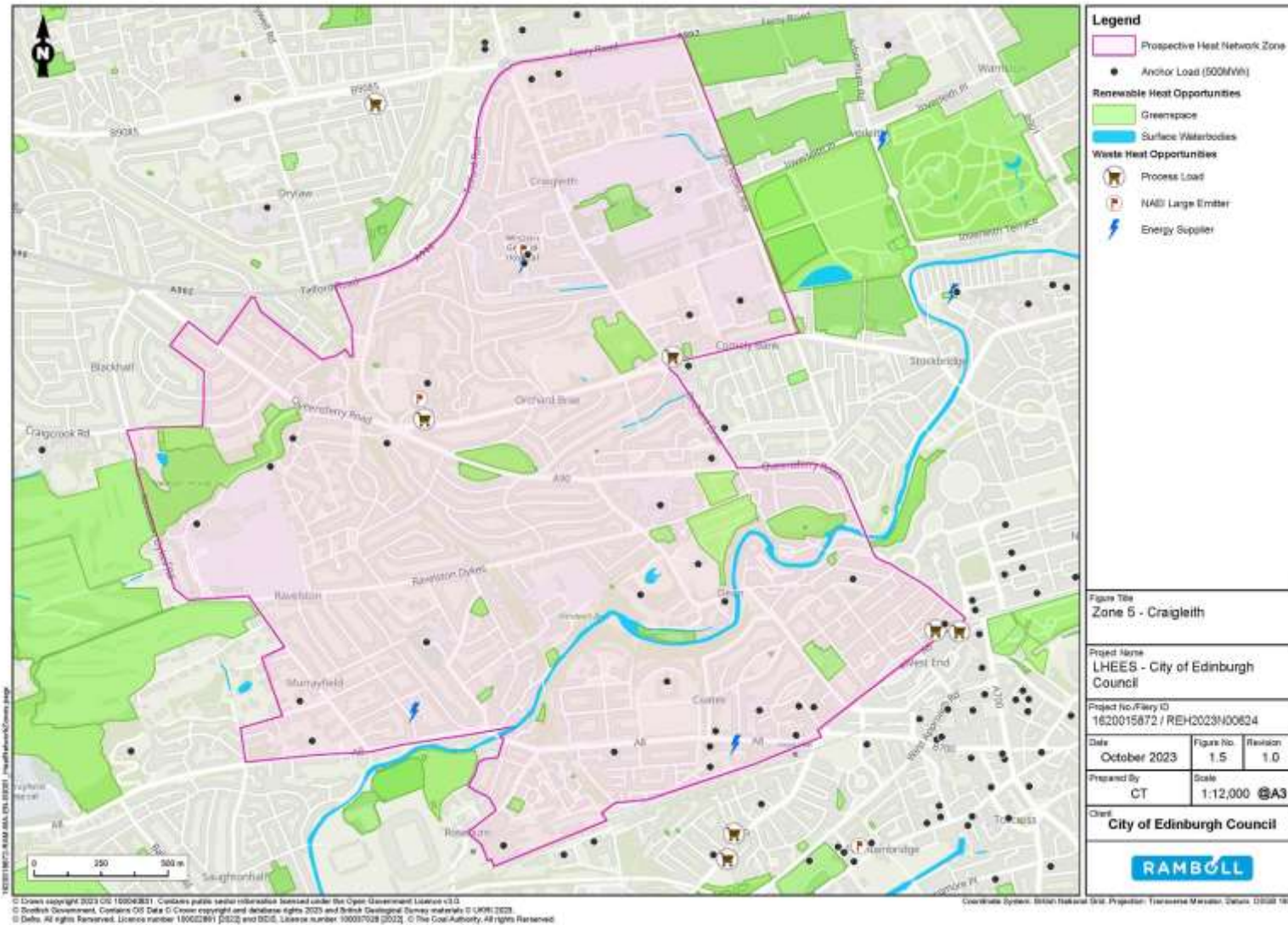
5.24. Heat Network Zone 05: Craigleith

5.24.1. Headline information on the fifth prospective Heat Network Zone, “Craigleith”, is set out in the below table:

Table 45: Headline information on Heat Network Zone 05: Craigleith

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	287,103
Total loads	7,589
Anchor loads	33
Area	506 hectares

- 5.24.2. This Heat Network Zone encompasses neighbourhoods to the northwest of Edinburgh city centre. Anchor loads in this Heat Network Zone including the Western General Hospital. Key Council-owned buildings include Broughton High School.
- 5.24.3. The anchor loads in this Heat Network Zone are relatively dispersed.
- 5.24.4. Potential heat sources within this Heat Network Zone include supermarkets and the Water of Leith.
- 5.24.5. A preliminary assessment of this Heat Network Zone suggests that it may have lesser potential than other Zones due primarily to scattered nature of the anchor loads.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

5.25. Heat Network Zone 06: Granton

- 5.25.1. Headline information on the sixth prospective Heat Network Zone, “Granton”, is set out in the below table:

Table 46: Headline information on Heat Network Zone 06: Granton

LHD level	4,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	190,383
Total loads	8,425
Anchor loads	26
Area	522 hectares

- 5.25.2. This Heat Network Zone encompasses the Granton Waterfront regeneration area in north Edinburgh – including brownfield land in and around the former Granton Gasworks – along with the housing estates of Muirhouse, Pennywell, and Pilton to the south. The Council itself has significant land and property ownerships in this area.
- 5.25.3. The anchor loads in this Heat Network Zone are somewhat clustered to the north of West Granton Road, with a smaller cluster around Ferry Road. The project developed by the Council focuses on the northern cluster, with the potential to add links to the southern cluster. In principle, the heat network could be expanded organically in future to encompass the other areas of the wider Heat Network Zone. A key aspect of this Heat Network Zone is the large-scale new housing and other development led by the Council planned for the Granton Waterfront regeneration area, with the intention being that these new properties will connect to the heat network from the outset.
- 5.25.4. Potential heat sources within this Heat Network Zone include the Firth of Forth; major sewers; supermarkets; and substations. Assessments commissioned by the Council suggest that the preferred solution would be a 4-megawatt heat pump utilising heat from the sewer running beneath Granton Waterfront, supplemented by two 10 megawatt electric boilers.
- 5.25.5. This Heat Network Zone is currently the subject of a live project, with the Council aiming to have a concessionaire to design, build and operate a heat network fully appointed by Q1 2025 and the first phase of the heat network operational in 2026. The development of this heat network is expected to inform projects to roll out heat networks in other Zones.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

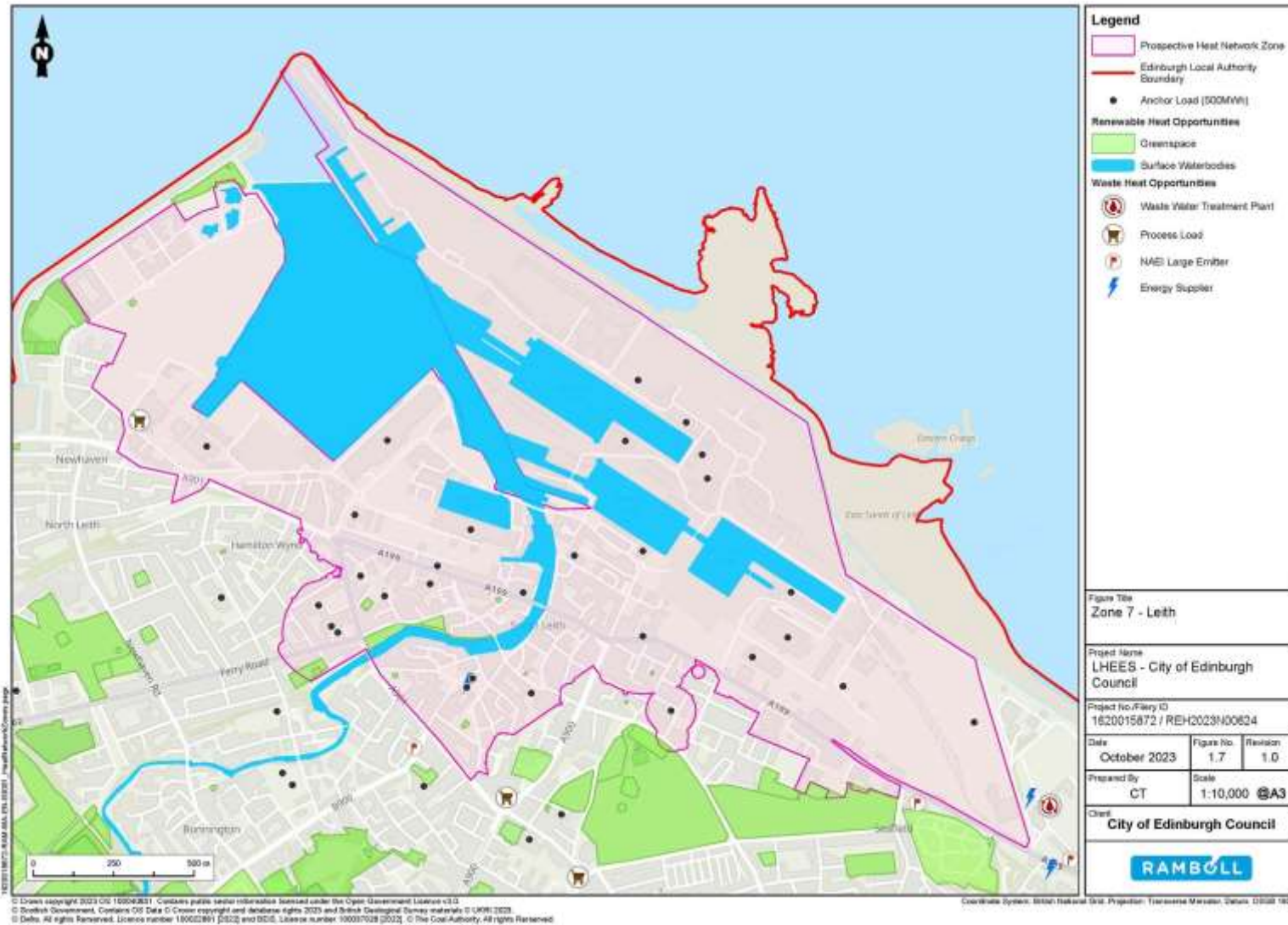
5.26. Heat Network Zone 07: Leith

5.26.1. Headline information on the seventh prospective Heat Network Zone, “Leith”, is set out in the below table:

Table 47: Headline information on Heat Network Zone 07: Leith

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	119,369
Total loads	2,047
Anchor loads	32
Area	273 hectares

- 5.26.2. This Heat Network Zone encompasses the Port of Leith along with surrounding residential and commercial areas.
- 5.26.3. The anchor loads in this Heat Network Zone are primarily within the Port of Leith, along with buildings such as the Ocean Terminal shopping centre, the Victoria Quay office building (home to Scottish Government officers), and other commercial properties.
- 5.26.4. Potential heat sources within this Heat Network Zone include the Firth of Forth, major sewers, and the Seafield Waste Water Treatment Plant immediately to the east.
- 5.26.5. Forth Ports, as the owner and operator of the Port of Leith, would be a key partner in the development of a heat network in this area.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

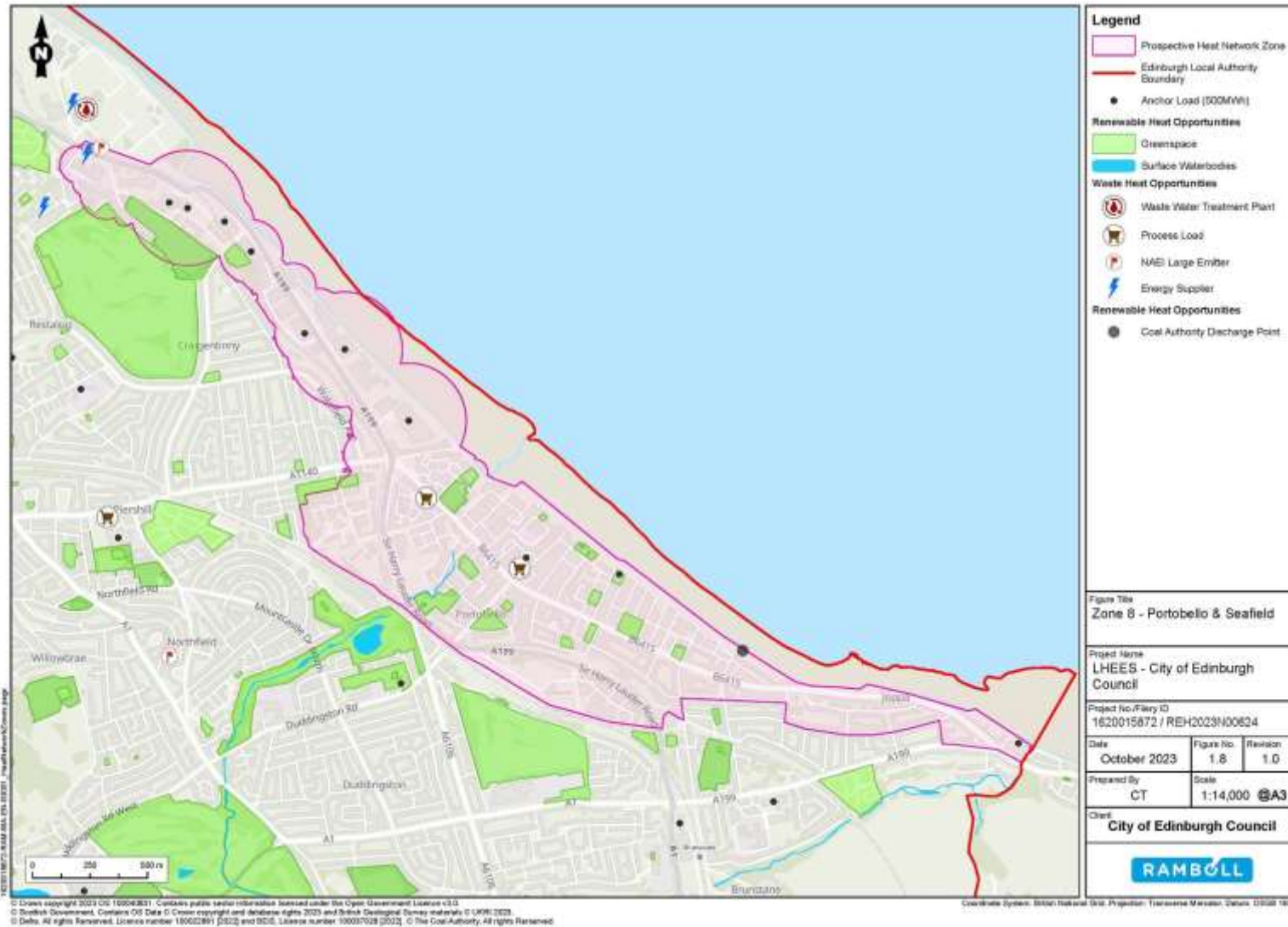
5.27. Heat Network Zone 08: Portobello & Seafield

- 5.27.1. Headline information on the eighth prospective Heat Network Zone, “Portobello & Seafield”, is set out in the below table:

Table 48: Headline information on Heat Network Zone 08: Portobello & Seafield

LHD level	4,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	88,143
Total loads	2,975
Anchor loads	10
Area	218 hectares

- 5.27.2. This Heat Network Zone encompasses a strip of land along the coast of Edinburgh between Seafield and Joppa. It includes the historical suburbs of Portobello and Joppa along with land at Seafield primarily occupied by industrial units and retail warehouses. The land at Seafield is proposed to be largely redeveloped to deliver a new residential-led mixed-use neighbourhood., which could in principle be connected to a heat network from the outset.
- 5.27.3. The anchor loads in this Heat Network Zone are generally located to the northeast of Seafield Road East and Portobello High Street, suggesting that this may be a local pipe route.
- 5.27.4. Potential heat sources within this Heat Network Zone include the Firth of Forth; a major sewer running under the Zone; and the Seafield Waste Water Treatment Plant. As part of early work around the redevelopment, initial assessment has been carried out into the scope to utilise waste heat from the Treatment Plant.
- 5.27.5. Many of the anchor loads in this area are existing commercial uses in Seafield, which as set out above is earmarked as a potential strategic redevelopment area. Any development of a heat network in this Zone would need to be integrated with development proposals, including any excavation works associated with active travel upgrades and other projects.
- 5.27.6. This Heat Network Zone may offer potential for a cross-boundary Heat Network Zone as it abuts Musselburgh in East Lothian.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

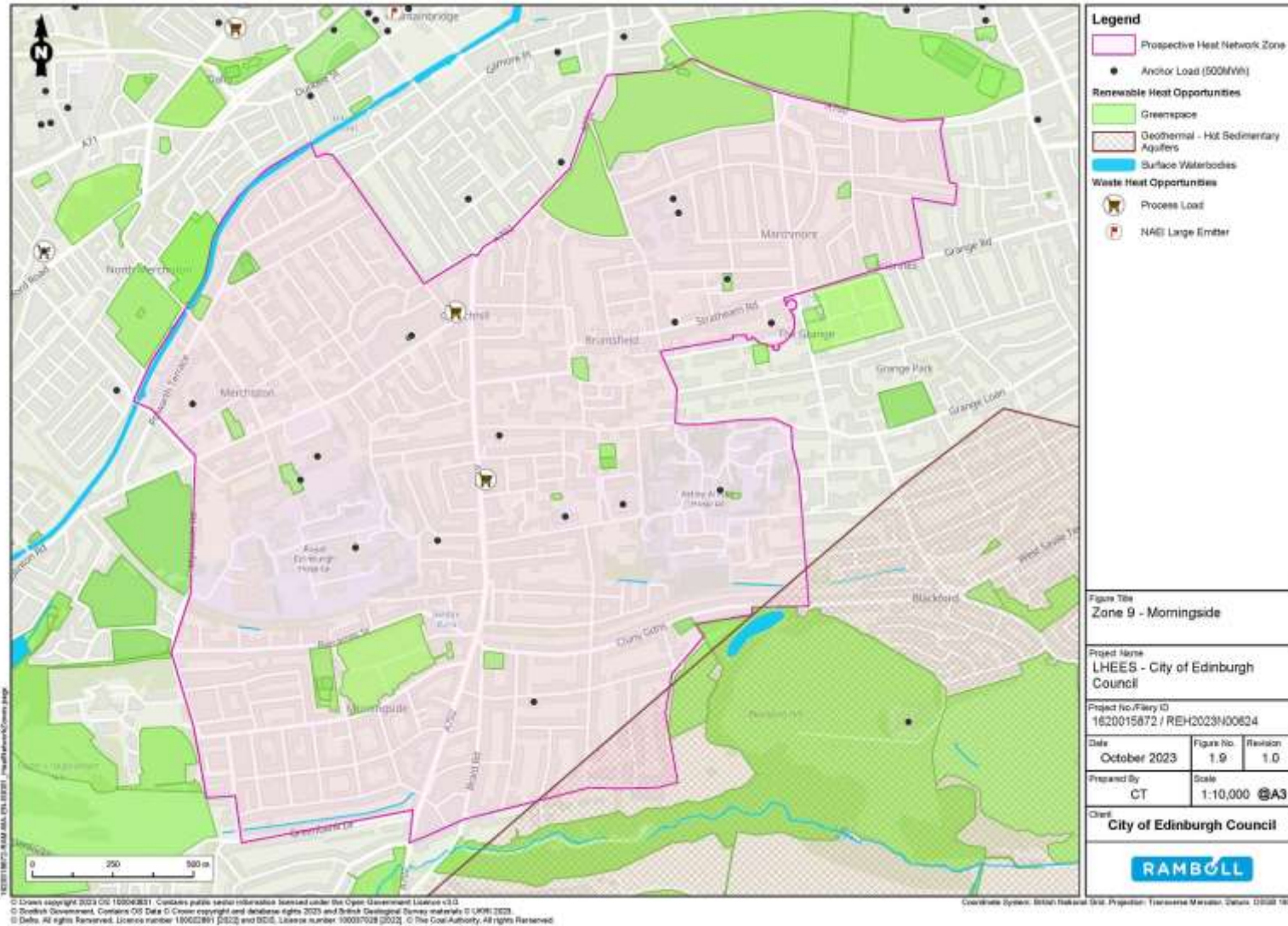
5.28. Heat Network Zone 09: Morningside

- 5.28.1. Headline information on the ninth prospective Heat Network Zone, “Morningside”, is set out in the below table:

Table 49: Headline information on Heat Network Zone 09: Morningside

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	283,938
Total loads	7,306
Anchor loads	17
Area	373 hectares

- 5.28.2. This Heat Network Zone encompasses suburban neighbourhoods such as Bruntsfield, Marchmont, Merchiston, and Morningside to the east and west of Morningside Road. It is primarily residential, with ground-floor commercial uses.
- 5.28.3. The anchor loads in this Heat Network Zone include the Royal Edinburgh Hospital, the Merchiston campus of Edinburgh Napier University, and George Watson’s College. Key Council ownerships include James Gillespie's High School. The Astley Ainslie Hospital is earmarked for closure and represents a redevelopment opportunity.
- 5.28.4. Potential heat sources within this Heat Network Zone include a major sewer and supermarkets, with geothermal potential identified to the south of the Zone.
- 5.28.5. Engagement with NHS Lothian, Edinburgh Napier University, and other key stakeholders would be essential in bringing forward a heat network in this area.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

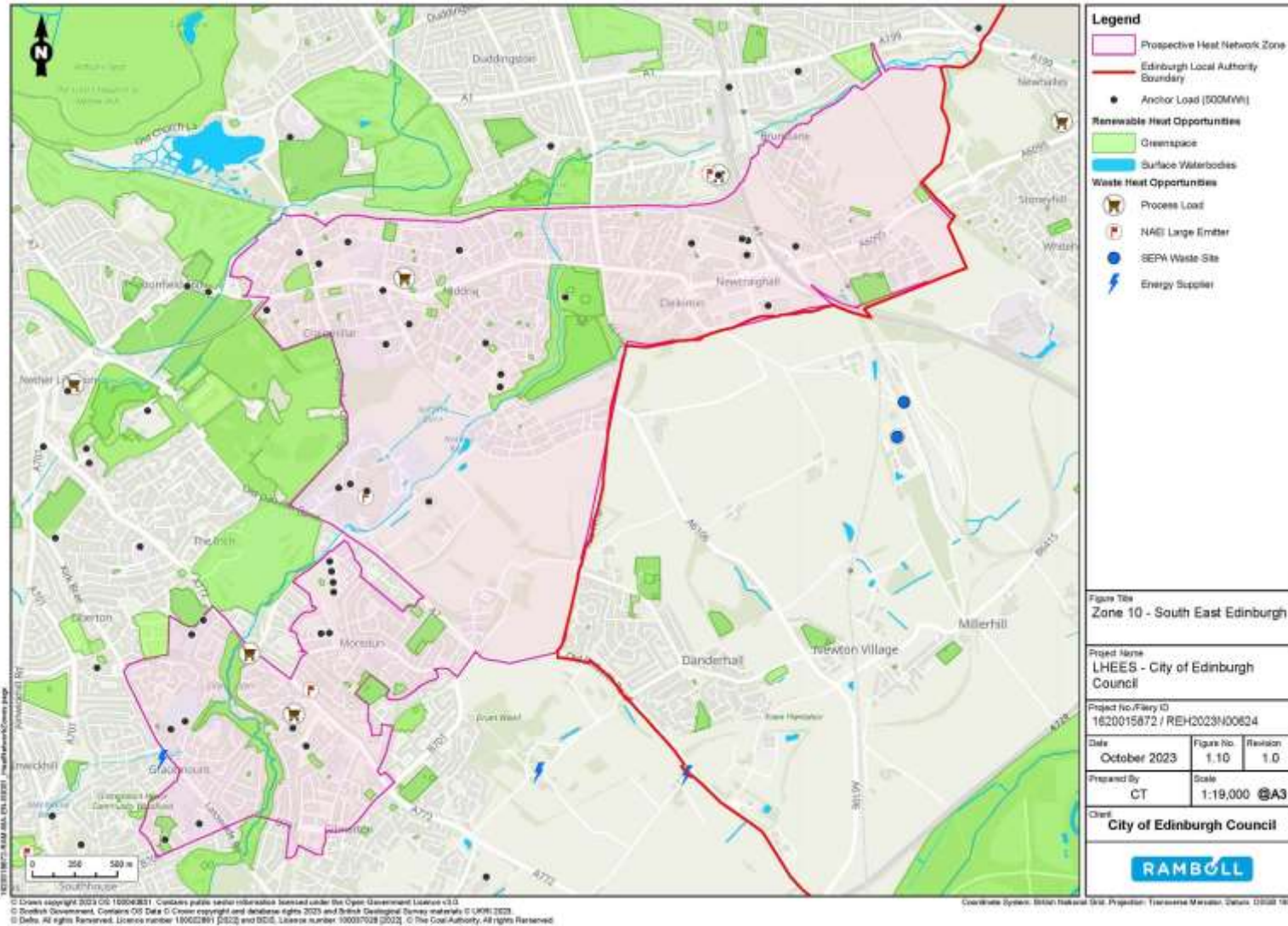
5.29. Heat Network Zone 10: South East Edinburgh

- 5.29.1. Headline information on the tenth prospective Heat Network Zone, “South East Edinburgh”, is set out in the below table:

Table 50: Headline information on Heat Network Zone 10: South East Edinburgh

LHD level	4,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	187,528
Total loads	8,422
Anchor loads	38
Area	809 hectares

- 5.29.2. This Heat Network Zone encompasses land in southeast Edinburgh, including the suburbs of Gracemount and Moredun; Edinburgh BioQuarter; the residential neighbourhoods of Craigmillar, Greendykes, and Niddrie; and Fort Kinnaird retail park. It includes major development areas such as Edinburgh BioQuarter and Brunstane.
- 5.29.3. There are a large number of anchor loads in this Heat Network Zone with multiple small clusters including Council buildings at Gracemount and Craigmillar, Edinburgh BioQuarter (particularly the Royal Infirmary of Edinburgh), and Fort Kinnaird.
- 5.29.4. Potential heat sources within this Heat Network Zone include supermarkets and water courses along with the Millerhill Recycling and Energy Recovery Centre (MRERC) to the southeast.
- 5.29.5. Significant work has been undertaken to date around the prospect for a heat network in this area. The Council has worked with NHS Lothian and the University of Edinburgh to explore the scope for a heat network operated by Midlothian Energy Limited and fed by the MRERC to serve Edinburgh BioQuarter and the surrounding area. Separately, the Council has previously explored the scope for a heat network serving a cluster of Council and NHS Lothian-owned buildings in Gracemount using a closed loop 750-kilowatt ground source heat pump with a 2,300-kilowatt electric boiler top-up.
- 5.29.6. This Heat Network Zone may offer potential for a cross-boundary Heat Network Zone as it abuts both Midlothian and East Lothian.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

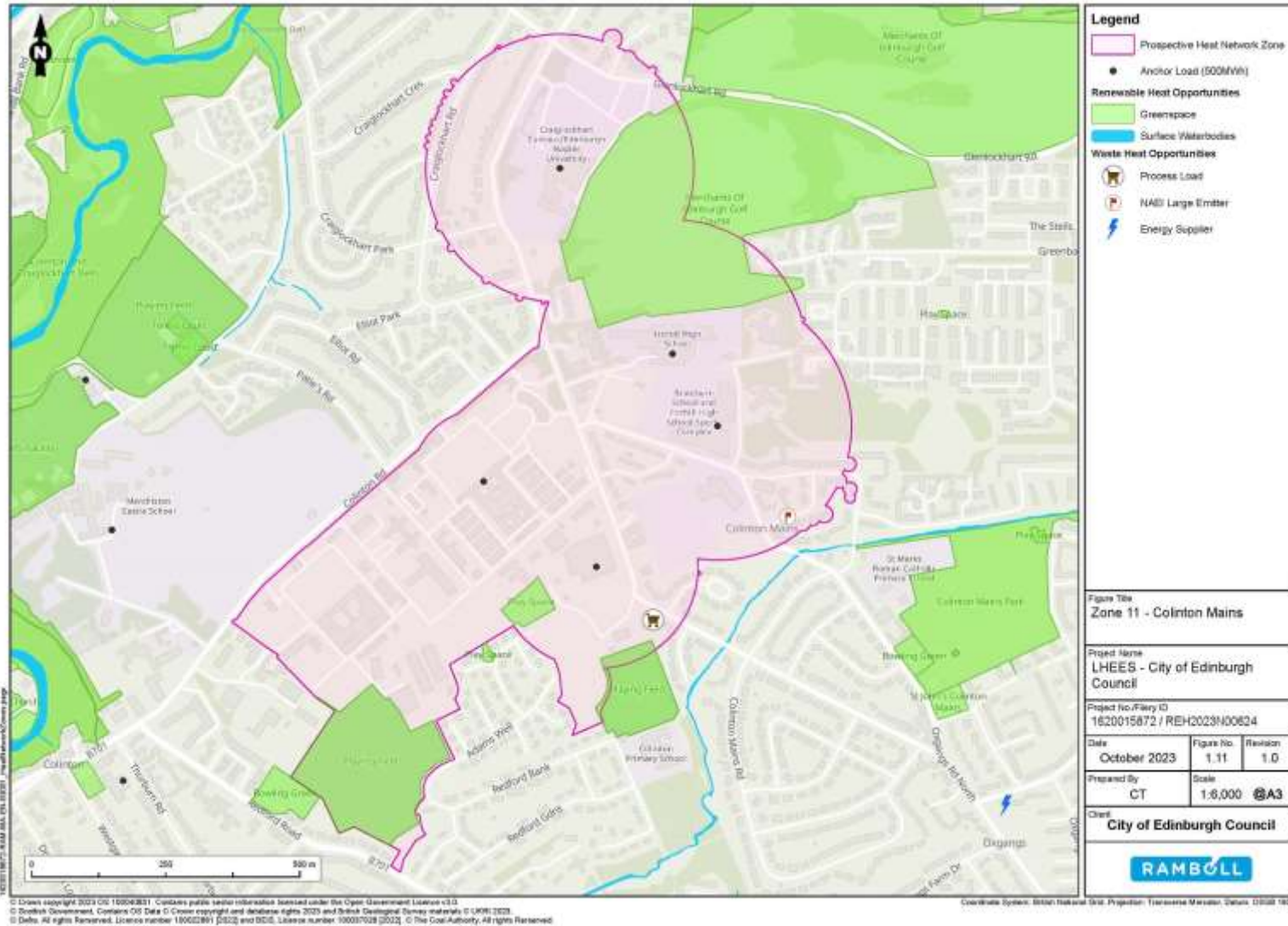
5.30. Heat Network Zone 11: Colinton Mains

- 5.30.1. Headline information on the eleventh prospective Heat Network Zone, “Colinton Mains”, is set out in the below table:

Table 51: Headline information on Heat Network Zone 11: Colinton Mains

LHD level	4,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	11,675
Total loads	312
Anchor loads	5
Area	81 hectares

- 5.30.2. This Heat Network Zone encompasses land in southwest Edinburgh. It is based upon a cluster of five anchor loads: Redford Barracks, a Tesco supermarket at Colinton Mains Drive, the Craiglockhart campus of Edinburgh Napier University, Firrhill School, and Braidburn School.
- 5.30.3. Relatively few potential heat sources have been identified within this Heat Network Zone.
- 5.30.4. Given the low number of anchor loads within this Heat Network Zone, buy-in from all anchor loads will likely be necessary to take forward delivery of a heat network here. Consideration would also require to be given to the heat source for any network.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

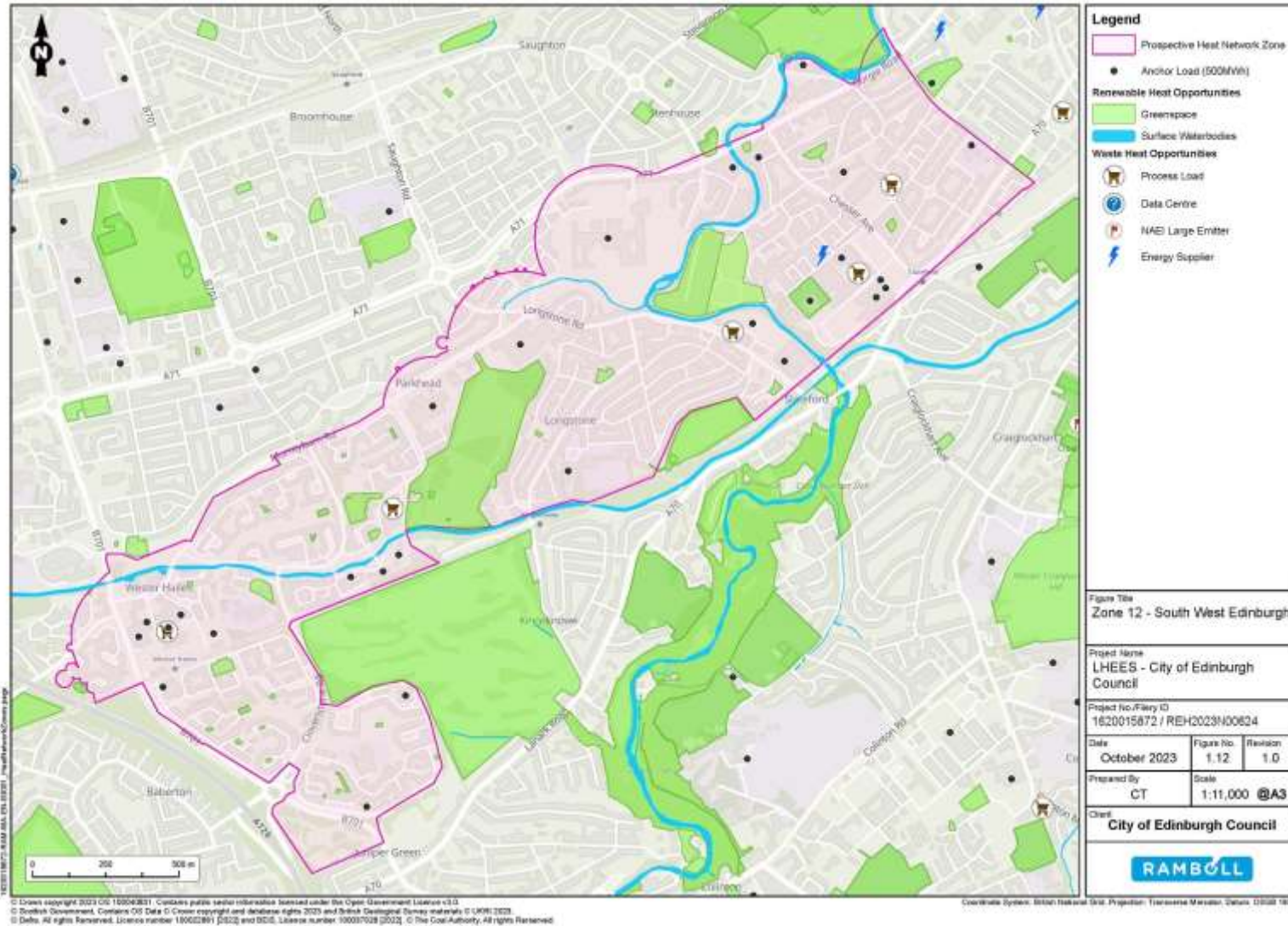
5.31. Heat Network Zone 12: South West Edinburgh

- 5.31.1. Headline information on the twelfth prospective Heat Network Zone, “South West Edinburgh”, is set out in the below table:

Table 52: Headline information on Heat Network Zone 12: South West Edinburgh

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	119,474
Total loads	4,214
Anchor loads	27
Area	276 hectares

- 5.31.2. This Heat Network Zone encompasses a wedge of land in southwest Edinburgh stretching from Wester Hailes to Slateford. This area is primarily residential but also includes Westside Plaza shopping centre, industrial units at Murrayburn, HMP Edinburgh, and a cluster of retail and leisure units in Slateford.
- 5.31.3. The anchor loads in this Heat Network Zone are relatively scattered with multiple small clusters. Council ownerships include Longstone Primary School.
- 5.31.4. Potential heat sources within this Heat Network Zone include supermarkets and potentially also the Union Canal and Water of Leith.
- 5.31.5. A preliminary assessment of this Heat Network Zone suggests that it may have lesser potential than other Zones given the scattered distribution of anchor loads.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

5.32. Heat Network Zone 13: Heriot-Watt

5.32.1. Headline information on the thirteenth prospective Heat Network Zone, “Heriot-Watt”, is set out in the below table:

Table 53: Headline information on Heat Network Zone 13: Heriot-Watt

LHD level	4,000 kWh / metre /year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	68,751
Total loads	80
Anchor loads	17
Area	153 hectares

- 5.32.2. This Heat Network Zone encompasses Heriot-Watt University’s campus at Riccarton, Edinburgh. The land includes various teaching and research buildings, along with student accommodation, commercial buildings within Heriot-Watt Research Park, and the Oriam sports facility. The Zone includes significant amounts of land earmarked for future development.
- 5.32.3. Potential heat sources within this Heat Network Zone include green spaces, watercourses, and a major sewer to the east. The quantum of land may also create opportunities for large-scale solar installations.
- 5.32.4. Any development of a heat network in this Zone will be at the discretion of Heriot-Watt University, with the Council supporting as required.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

5.33. Heat Network Zone 14: Sighthill & Gyle

5.33.1. Information on the fourteenth prospective Heat Network Zone, “Sighthill & Gyle”, is set out in the below table:

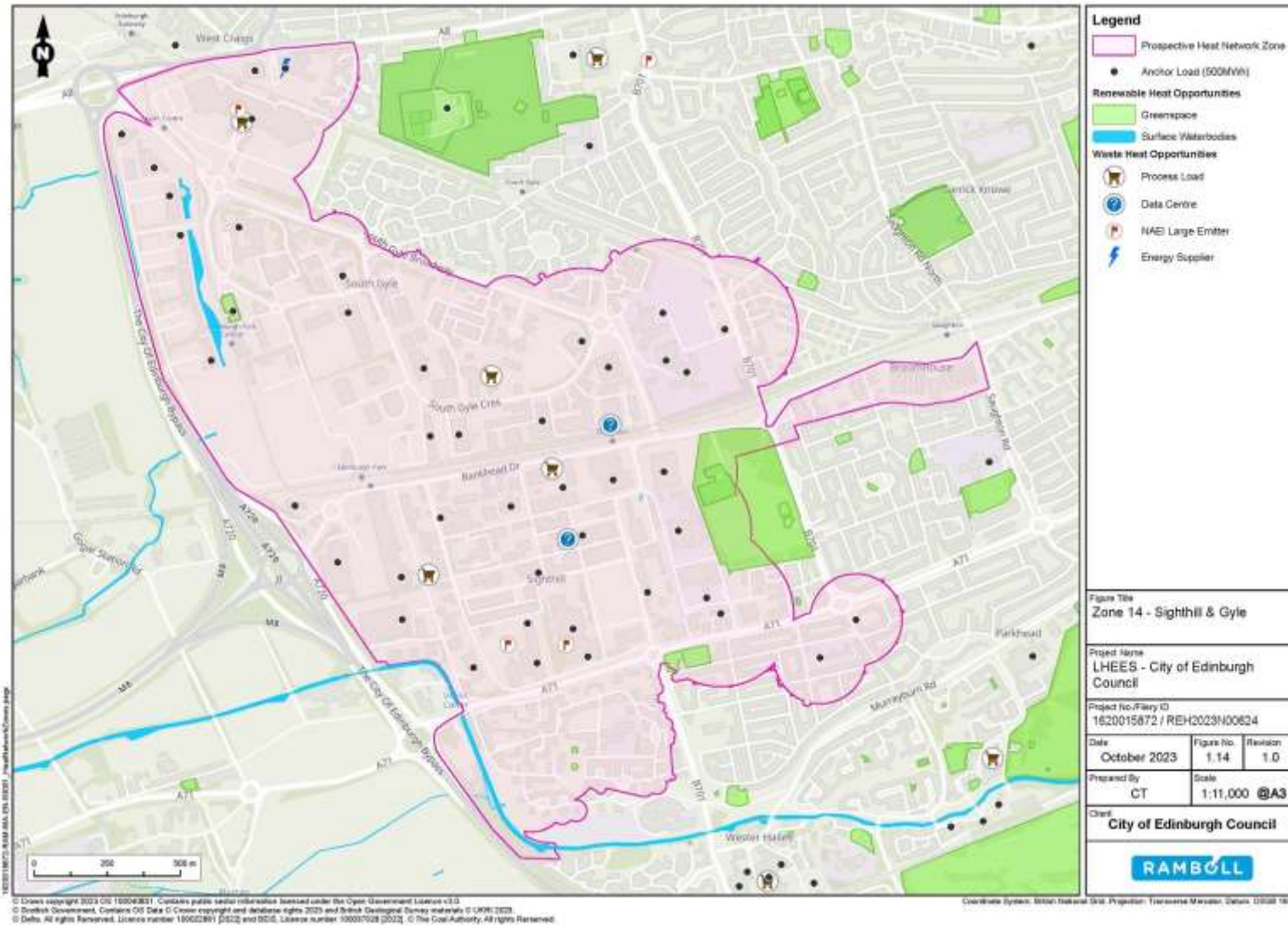
Table 54: Headline information on Heat Network Zone 14: Sighthill & Gyle

LHD level	4,000 kWh / metre /year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	138,136
Total loads	2,148
Anchor loads	45
Area	369 hectares

5.33.2. This Heat Network Zone encompasses the Sighthill and South Gyle areas of Edinburgh. It includes a variety of different areas, including industrial units, large office buildings, housing estates, a cluster of public sector buildings in the southeast, the Gyle shopping centre, Hermiston Gait retail park, and hotels. The Zone is relatively densely populated with anchor loads, with a number of smaller clusters. Significant new development is planned for the southern phase of Edinburgh Park.

5.33.3. Potential heat sources within this Heat Network Zone include data centres, supermarkets, major sewers, industrial buildings, and watercourses.

5.33.4. A preliminary assessment of this Heat Network Zone suggests that it has strong potential given the number and variety of anchor loads and the range of potential heat sources.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

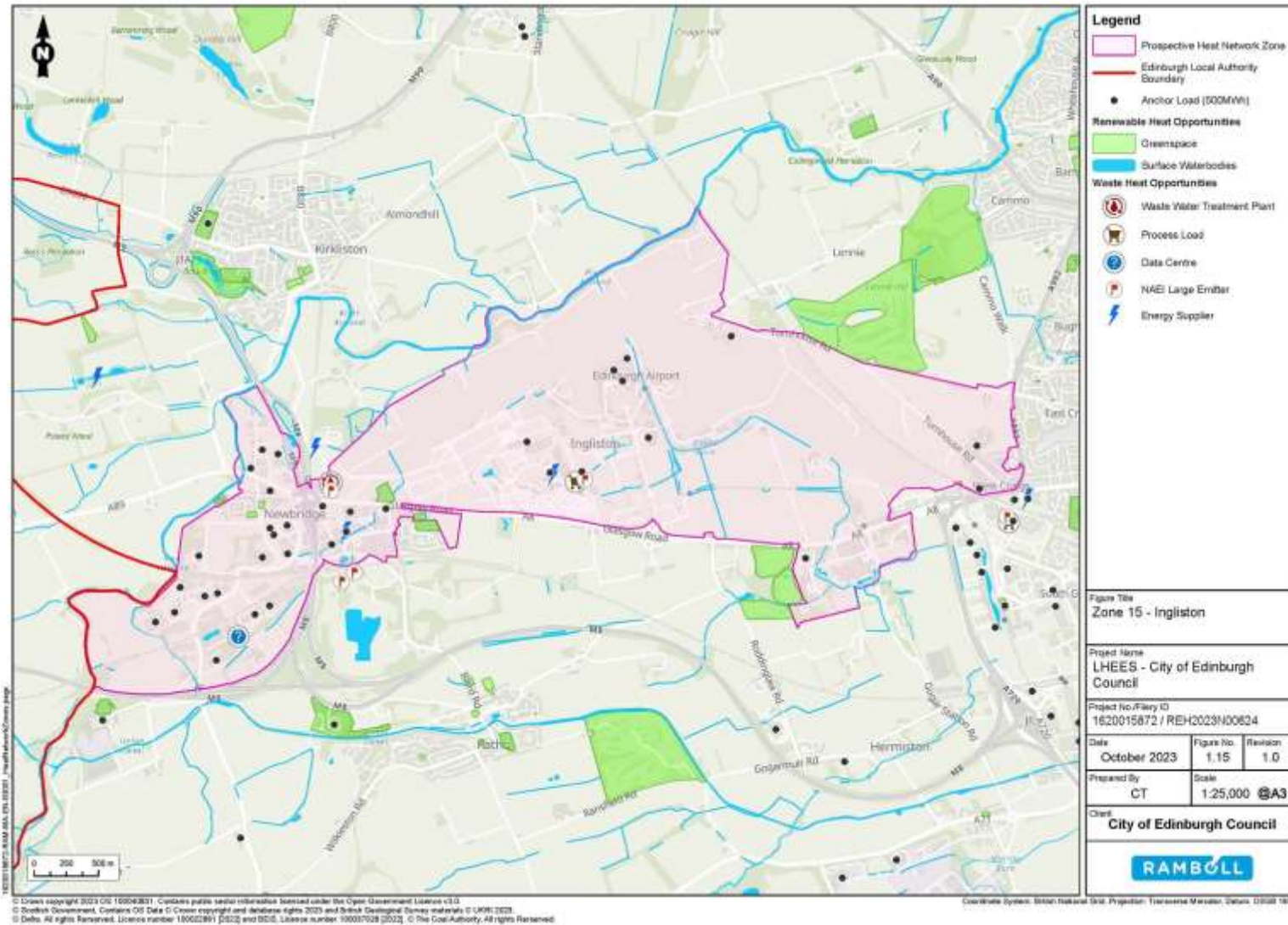
5.34. Heat Network Zone 15: Ingliston

- 5.34.1. Headline information on the fifteenth prospective Heat Network Zone, “Ingliston”, is set out in the below table:

Table 55: Headline information on Heat Network Zone 15: Ingliston

LHD level	4,000 kWh / metre /year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	90,287
Total loads	614
Anchor loads	34
Area	1,049 hectares

- 5.34.2. This Heat Network Zone is centred on Edinburgh Airport; it also includes the Royal Highland Showground, large areas of residential development land, the Gogarburn office complex, and the village of Newbridge, which includes a significant quantum of industrial space along with residential areas.
- 5.34.3. The anchor loads in this Heat Network Zone include the Airport itself along with Gogarburn and multiple industrial properties in Newbridge.
- 5.34.4. Potential heat sources within this Heat Network Zone include watercourses and various industrial uses and data centres in Newbridge. The quantum of land may also create opportunities for large-scale solar installations.
- 5.34.5. Edinburgh Airport is currently exploring the development of a heat network that would initially serve the Airport, but with scope for future expansion.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

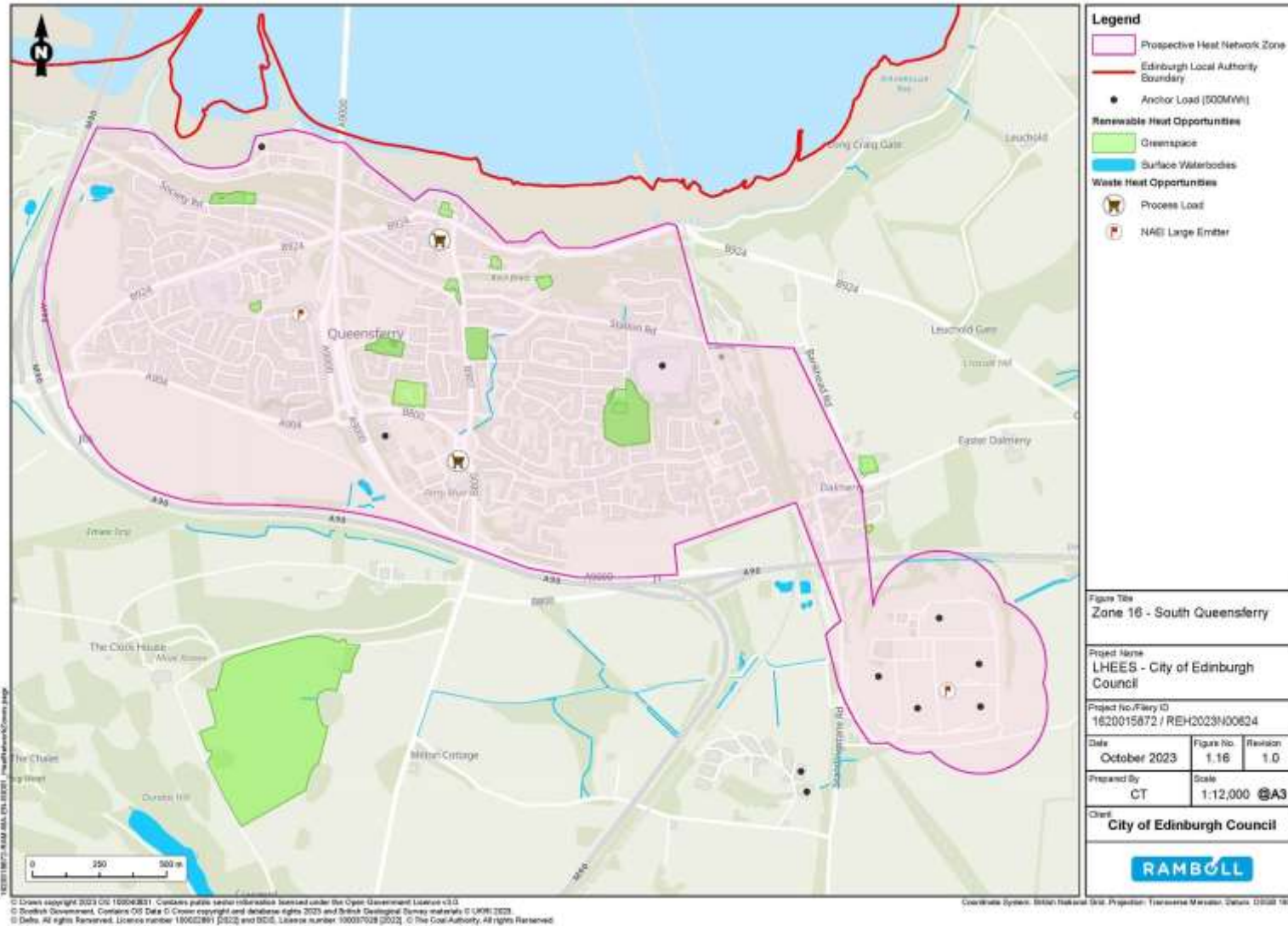
5.35. Heat Network Zone 16: South Queensferry

- 5.35.1. Headline information on the sixteenth prospective Heat Network Zone, “South Queensferry”, is set out in the below table:

Table 56: Headline information on Heat Network Zone 16: South Queensferry

LHD level	4,000 kWh / metre /year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	75,742
Total loads	4,253
Anchor loads	8
Area	389 hectares

- 5.35.2. This Heat Network Zone encompasses the town of South Queensferry along with the adjacent village of Dalmeny. The area is primarily residential.
- 5.35.3. Anchor loads in this Heat Network Zone are concentrated in the Dalmeny Tank Farm in the southeast of the site, a facility owned by INEOS used for oil storage. Other anchor loads include Queensferry High School.
- 5.35.4. Potential heat sources within this Heat Network Zone include the Firth of Forth along with waste heat sources such as the Dalmeny Tank Farm.
- 5.35.5. Any development of a heat network in this area will require engagement with INEOS given the importance of the Dalmeny Tank Farm.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

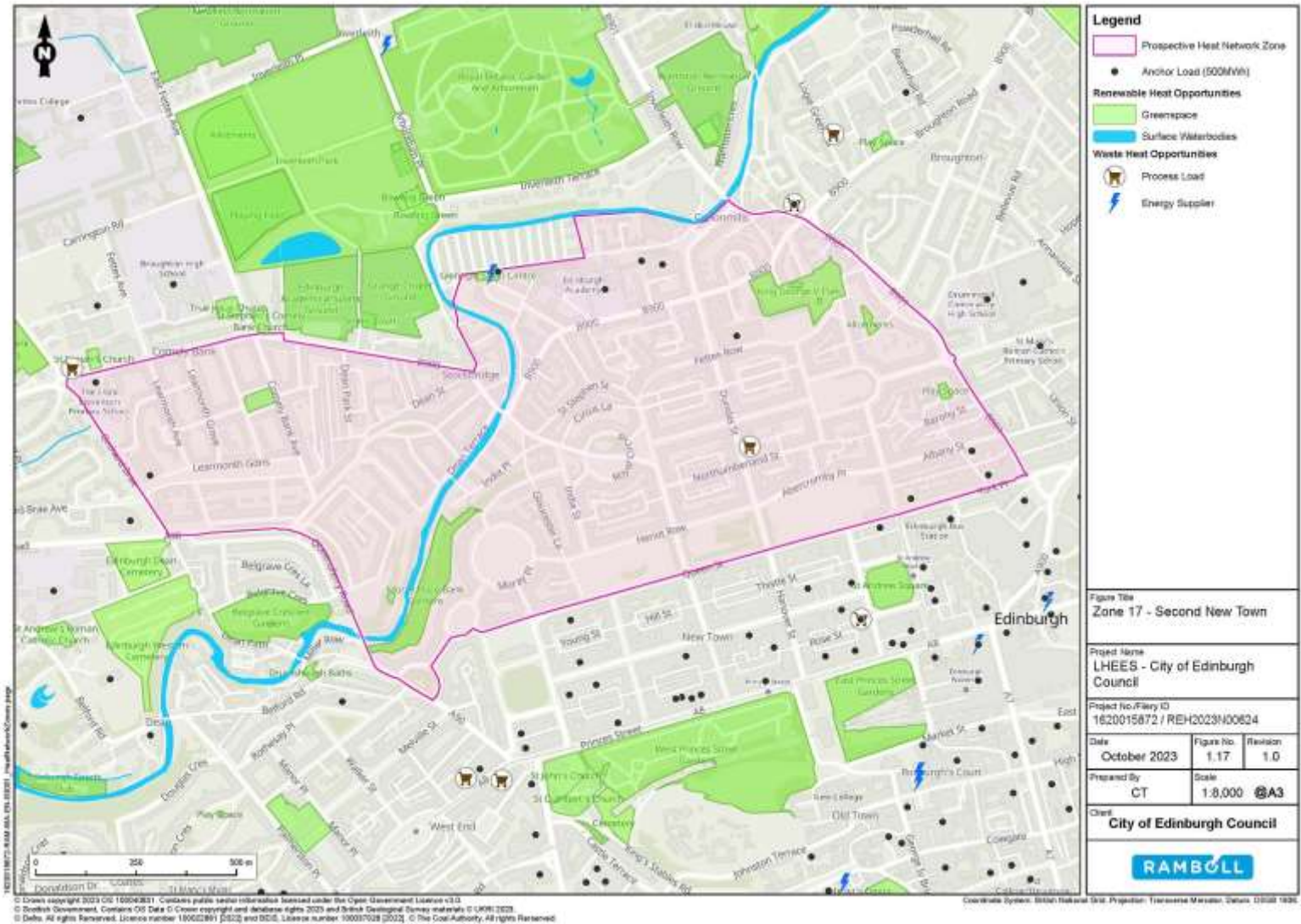
5.36. Heat Network Zone 17: Second New Town

- 5.36.1. Headline information on the seventeenth and final prospective Heat Network Zone, “Second New Town”, is set out in the below table:

Table 57: Headline information on Heat Network Zone 17: Second New Town

LHD level	8,000 kWh / metre / year
LHD anchor load prioritisation count	≥ 2
Anchor load definition	500 MWh / year
Annual heat demand (MWh / year)	185,446
Total loads	6,284
Anchor loads	10
Area	150 hectares

- 5.36.2. This Heat Network Zone includes Edinburgh’s Second New Town, as developed in the early 19th century, and surrounding areas. The Water of Leith runs diagonally through the site.
- 5.36.3. The anchor loads in this Heat Network Zone are somewhat fragmented with no clear pipe route presenting itself.
- 5.36.4. Potential heat sources within this Heat Network Zone include a major sewer that runs under the Zone and, potentially, the Water of Leith.
- 5.36.5. The key challenge associated with the delivery of a heat network in this area concern its historical character coupled with the physical barrier of the Water of Leith.
- 5.36.6. A preliminary assessment of this Heat Network Zone suggests that it may have lesser potential than other Zones due primarily to scattered nature of the anchor loads coupled with practical difficulties associated with the historicity of the area and the Water of Leith.



Contains Ordnance Survey AddressBase Plus data. © Improvement and Development Agency for Local Government copyright and database rights 2023. This product contains data created and maintained by Scottish Local Government. Use of this data is subject to [terms and conditions](#).

6. Monitoring of actions

Table 58: Schedule of actions

#	Action	Lead Council service	Key partners	Deadline	Considerations
1	Update and revise the Delivery Plan as required.	LHEES Office	N/A	Ongoing	1,2,3,4,5,6
2	Publish the outputs from the Edinburgh LHEES and Delivery Plan in a map-based format.	LHEES Office	N/A	Q4 2024	1,2,3,4,5,6
3	Integrate data from the Edinburgh LHEES with other Council datasets.	LHEES Office	N/A	Ongoing	1,2,3,4,5,6
4	Publish a second iteration of the Edinburgh LHEES and the Delivery Plan by the statutory deadline of December 2028.	LHEES Office	N/A	Q4 2028	1,2,3,4,5,6
5	Establish an LHEES Office on a skeleton basis.	Housing & Regeneration	N/A	Q2 2024	1,2,3,4,5,6
6	Engage with the Scottish Government around the case for revenue funding for the full establishment of an LHEES Office.	Housing & Regeneration	Scottish Government	Q2 2024	1,2,3,4,5,6
7	Develop appropriate governance structures for the delivery, monitoring, and evaluation of the Edinburgh LHEES and Delivery Plan.	LHEES Office	N/A	Q1 2024	1,2,3,4,5,6
8	Assess the potential role of Energy for Edinburgh Limited – the Council's energy services company – as part of the LHEES Office.	LHEES Office	Energy for Edinburgh Limited	Q2 2024	1,2,3,4,5,6
9	Maintain an up-to-date register of key stakeholders.	LHEES Office	Various	Ongoing	1,2,3,4,5,6
10	Establish and/or develop relationships with key stakeholders.	LHEES Office	Various	Ongoing	1,2,3,4,5,6
11	Develop a stakeholder engagement plan.	LHEES Office	Various	Q2 2024	1,2,3,4,5,6
12	Develop proposals for communications activity around the Edinburgh LHEES.	LHEES Office	N/A	Q2 2024	1,2,3,4,5,6
13	Produce a People Strategy and Strategic Workforce Plan to support the recruitment, retention, and development/training of staff for delivery of retrofit works.	Housing and Homelessness	N/A	Ongoing	4,5
14	Conduct an audit of the market in Edinburgh in terms of heat pump installers.	LHEES Office	N/A	Q3 2024	1,2
15	Engage with Scottish Enterprise around the scope to stage “meet the buyer” events to stimulate the supply chain for zero direct emissions heating solutions.	LHEES Office	Scottish Enterprise	Q3 2024	1,2,3

16	Assess the scope to pilot demand aggregation schemes for retrofit works.	LHEES Office	N/A	Q2 2026	1,2,4,5,6
17	Maintain a watching brief on the outputs of the Green Heat Finance Taskforce.	LHEES Office	Green Heat Finance Taskforce	Ongoing	1,2,3,4,5,6
18	Engage with financial providers with a presence in Edinburgh to better understand their products with respect to retrofit and energy efficiency, for example green mortgages.	LHEES Office	Various	Ongoing	1,2,3,4,5,6
19	Engage with potential investors to help them understand the nature and scale of opportunity associated with the Edinburgh LHEES.	LHEES Office	Various	Ongoing	1,2,3,4,5,6
20	Engage with Home Energy Scotland, Business Energy Scotland, and Local Energy Scotland to identify opportunities to jointly increase awareness in Edinburgh of the advice and resources these services can offer.	LHEES Office	Business Energy Scotland; Home Energy Scotland; Local Energy Scotland	Q2 2024	1,2,4,5,6
21	Engage with the Scottish Government around the scope to migrate capital funding for Council projects away from grants towards a contractual model providing greater certainty.	LHEES Office	Scottish Government	Q2 2024	1,2,3,4,5,6
22	Develop the heat network delivery framework as resources permit.	LHEES Office	Heat Network Support Unit	Ongoing	3
23	Develop the heat network delivery programme as resources permit.	LHEES Office	Heat Network Support Unit	Ongoing	3
24	Identify and progress retrofit projects for the energy efficiency Delivery Areas.	Housing and Homelessness	N/A	Ongoing	4,5
25	Produce a Retrofitting Strategy to steer the retrofit of the Council's housing estate.	Housing and Homelessness	N/A	Ongoing	4,5
26	Make the case to Scottish Government for additional resources to support the WHR programme, MTIS programme, and other retrofit works.	Housing and Homelessness	Scottish Government	Ongoing	4,5
27	Maintain a watching brief on the ESSH2 review.	Housing and Homelessness	Scottish Government	Ongoing	4,5
28	Assess the scale of any upgrades required for the electricity grid to be able to accommodate heat pumps in the Delivery Areas.	LHEES Office	Scottish Power Energy Networks	Q2 2025	1,2

29	Assess the scope to offset the running costs of heat pumps within the Delivery Areas via the installation of solar panels.	LHEES Office	N/A	Q2 2025	1,2
30	Assess the scope for heat pump retrofit pilot projects on Council-owned homes within the Delivery Areas.	LHEES Office	N/A	Q4 2025	1,2
31	Engage with Home Energy Scotland to discuss the scope for instigating heat pump retrofit projects on homes owned by third parties within the Delivery Areas.	LHEES Office	Home Energy Scotland	Q4 2025	1,2
32	Maintain a watching brief on the ban of replacement gas boilers.	LHEES Office	Scottish Government	Ongoing	1,2,3
33	Maintain a watching brief on the electricity pricing regime in view of the UK Government pledge to “rebalance” gas and electricity costs.	LHEES Office	UK Government	Ongoing	1,2,3
34	Publish a Heat Network Zone review statement in line with legislation to support the designation of statutory Heat Network Zones.	LHEES Office	Heat Networks & Non-Domestic Regulations Unit	Q4 2024	3
35	Engage with neighbouring local authorities around the scope for cross-boundary Heat Network Zones.	LHEES Office	Other local authorities	Q1 2024	3
36	Prepare a Strategic Environmental Assessment to support the review statement.	LHEES Office	SEA Gateway	Q2 2024	3
37	Work with the Scottish Government to develop a consenting regime for Edinburgh, including making a case for fees for heat network consents being set on a full cost recovery basis and for provision to be made for developer contributions.	LHEES Office	Heat Networks & Non-Domestic Regulations Unit	Q3 2024	3
38	Compile data from Building Assessment Reports received by the Council and develop a process for sharing these with prospective developers.	LHEES Office	Property owners	Ongoing	3
39	Engage with the Scottish Government around the strategy for resourcing the costs associated with the Council’s duties under the Act.	LHEES Office	Heat Networks & Non-Domestic Regulations Unit	Q3 2024	3
40	Publish, consult on, and adopt updates to the Edinburgh Design Guidance containing information relating to the development of heat networks.	Planning	N/A	Q4 2024	3
41	Seek to coordinate excavation works for heat networks with other utility works, travel infrastructure works, and other relevant works to maximise efficiencies and minimise disruption.	LHEES Office	N/A	Ongoing	3

42	Participate in the Danish-Scottish District Heating Mentoring Programme.	LHEES Office	Heat Network Support Unit	Ongoing	3
43	Prepare Building Assessment Reports for all eligible Council buildings.	Strategic Asset Planning	Heat Networks & Non-Domestic Regulations Unit	Ongoing	3
44	Appoint a concessionaire to deliver the Granton Waterfront heat network.	Edinburgh Waterfront	N/A	Q1 2025	3
45	Produce a business case looking at the scope to connect Council buildings to a proposed southeast Edinburgh heat network.	LHEES Office	Midlothian Energy Limited	Q2 2024	3
46	Identify a preferred model for supporting the roll-out of future Council-led heat networks in Edinburgh.	LHEES Office	Heat Network Support Unit	Q3 2024	3
47	Develop a business case looking at the scope for Energy for Edinburgh Limited to deliver heat network projects on a joint venture approach, to include exploration of embedding cooperative principles and community wealth building.	LHEES Office	Energy for Edinburgh Limited	Q2 2024	3
48	Develop and support proposals for heat networks in further Heat Network Zones where resources permit.	LHEES Office	Heat Network Support Unit	Ongoing	3
49	Promote the integration of heat network suitability analysis with all new construction and development proposals.	LHEES Office	N/A	Ongoing	3
50	Develop a more detailed database of existing heat networks in Edinburgh and engage with operators around their future plans in terms of overhaul and/or expansion and/or integration into/with other existing or new heat networks.	LHEES Office	Heat network operators	Q4 2024	3
51	Maintain a watching brief on proposals for mandatory connections to heat networks.	LHEES Office	Heat Networks & Non-Domestic Regulations Unit	Ongoing	3
52	Deliver a programme of retrofit works to the first tranche of high-rise housing blocks in Edinburgh, beginning with Craigmillar Court and Peffermill Court, followed by Inchmickery Court and Oxcars Court.	Housing and Homelessness	Council tenants	Ongoing	4,5
53	Deliver the Enerphit-informed retrofit pilot of Council operational buildings.	Strategic Asset Planning; Sustainable Construction Delivery	Scottish Government	TBD	1,2,3,4,6

54	Prepare improvement plans to identify the necessary measures to improve the sustainability of the Council's Investment portfolio.	Estates	N/A	Ongoing	1,2,3,4,6
55	Prepare a schedule of 100 of the most complex non-domestic buildings in Edinburgh and engage with owners about future plans for each.	LHEES Office	Various building owners	Q2 2024	1,2,3,4,6
56	Participate in the consultation on the Heat in Buildings Bill.	LHEES Office	Scottish Government	Ongoing	1,2,3,4,5,6
57	Work with Edinburgh World Heritage to take forward a pilot project looking at a whole house retrofit approach to "hard-to-treat" historic homes.	LHEES Office	Edinburgh World Heritage	Q3 2024	6
58	Maintain a watching brief on work by the Edinburgh Climate Change Institute to develop building archetypes to inform retrofit.	LHEES Office	Edinburgh Climate Change Institute	Ongoing	6
59	Engage with the Scottish Government around the scope to amend the Tenements (Scotland) Act 2004 to make it easier for residents to agree to instruct energy efficiency upgrades and changes to heating systems within tenements.	LHEES Office	Scottish Government	Ongoing	6
60	Work with Edinburgh World Heritage, Historic Environment Scotland, and the University of Edinburgh to consider how to effectively communicate the information on the net zero retrofit of historical properties to the public.	Planning	Edinburgh World Heritage; Historic Environment Scotland; University of Edinburgh	TBD	6
61	Publish a refreshed version of the "Guidance for Listed Buildings and Conservation Areas", including a specific focus on net zero retrofit works.	Planning	Edinburgh World Heritage; Historic Environment Scotland; University of Edinburgh	TBD	6
62	Support work by the City Heat & Energy Partnership to develop a city-wide Heat and Energy Masterplan.	Policy and Insight	City Heat & Energy Partnership	Ongoing	1,2,3,4,5,6
63	Further develop the ParkPower project looking at the potential to export heat from green and blue spaces in Edinburgh.	LHEES Office	Greenspace Scotland	Ongoing	1,2,3
64	Engage with waste heat sources in Edinburgh to improve understanding of the scope to utilise their waste heat for heating buildings.	LHEES Office	Various waste heat sources	Ongoing	1,2,3
65	Engage with Scottish Water Horizons to improve understanding of the scope to utilise wastewater heat for heating buildings.	LHEES Office	Scottish Water Horizons	Ongoing	1,2,3

66	Engage with The Coal Authority to improve understanding of the scope to utilise mine water for heating buildings (and heat storage).	LHEES Office	The Coal Authority	Ongoing	1,2,3
67	Explore opportunities to increase solar installations as a means of offsetting electricity costs associated with heat decarbonisation.	LHEES Office	Edinburgh Community Solar Co-operative	Ongoing	1,2,3
68	Maintain a watching brief on the H100 pilot and on hydrogen policy.	LHEES Office	Scotia Gas Networks Limited	Ongoing	1,2,3
69	Maintain a watching brief on proposals to extend Permitted Development Rights for micro-renewable technologies.	Planning	N/A	Ongoing	1,2
70	Via City Plan 2030 and subsequent policy and guidance documents, set increasingly rigorous net zero standards for new developments in Edinburgh.	Planning	N/A	Ongoing	1,2,3,4,5,6
71	Ensure where possible that all new Council developments utilise zero direct emissions heating sources and are designed on a fabric first basis.	Strategic Asset Planning; Sustainable Construction Delivery	N/A	Ongoing	1,2,3,4
72	Ensure where possible that all new buildings developed by the Council are designed to operate with a maximum supply/flow temperature of 55°C.	Strategic Asset Planning; Sustainable Construction Delivery	N/A	Ongoing	1,2,3
73	Deliver phase two of the Net Zero Communities pilot, providing detailed archetype modelling of measures and costs of net zero interventions including evaluation of community energy generation potential and deep modelling of “comfort as a service” potential.	Policy and Insight	Changeworks	TBD	1,2,3,4,5,6
74	Support the installation of smart meters in all Council-owned homes in Edinburgh.	Housing and Homelessness	Utilita Energy Limited	Ongoing	4,5
75	Explore with partners the scope to create a Net Zero Community Hub as a means of educating residents of Edinburgh about decarbonisation and energy efficiency.	LHEES Office	Heriot-Watt University	Ongoing	1,2,3,4,5,6
76	Explore with partners the scope to take forward low-cost interventions with disproportionately great impacts on energy efficiency, e.g. carpeting uncarpeted floors to reduce air leakage.	LHEES Office	Various	Ongoing	4,5,6

7. Financial resources

Grant funding

Energy Efficient Scotland: Area Based Scheme (EES:ABS)

Administered by:	Scottish Government.
Who can apply:	Local authorities.
What is it:	Funding awarded to local authorities to deliver energy efficiency upgrades (primarily solid wall insulation) to private households in areas with high levels of fuel poverty.
How much:	The City of Edinburgh Council received £5.16 million for 2022/23.
When:	Funding is announced annually.
Notes:	The management of the City of Edinburgh Council's EES:ABS works are carried out on its behalf by Changeworks.
Link:	https://www.gov.scot/publications/area-based-schemes https://www.changeworks.org.uk/projects/energy-efficient-scotland-area-based-schemes

Social Housing Net Zero Heat Fund

Administered by:	Scottish Government.
Who can apply:	Local authorities; registered social landlords; ESCOs.
What is it:	Funding for social housing projects delivering zero emission heating systems such as heat pumps and heat networks and energy efficiency works.
How much:	Grant funding equivalent to 45%-50% of eligible costs is available. A total of £200 million is available over five years.
When:	Invitations for bids will be announced annually with quarterly deadlines.
Notes:	N/A.
Link:	https://www.gov.scot/publications/social-housing-net-zero-heat-fund---call-for-funding-applications/pages/overview

Scotland's Public Sector Heat Decarbonisation Fund

Administered by:	Salix Finance.
Who can apply:	Local authorities; universities; arm's-length external organisations.
What is it:	Funding for energy efficiency measures and the installation of zero-emissions heating systems in public sector buildings.
How much:	Grant funding equivalent to 80% of eligible costs is available. A total of £20 million is available.
When:	The first round of applications was held in November – December 2023.
Notes:	N/A.
Link:	https://www.gov.scot/news/new-grant-funding-to-decarbonise-public-sector-buildings/

Home Energy Scotland Grant and Loan (grant element)

Administered by:	Home Energy Scotland.
Who can apply:	Homeowners.
What is it:	Funding for homeowners for energy efficiency improvements and the installation of renewable technologies.
How much:	Grant funding for energy efficiency improvements equivalent to 75% of eligible costs (capped at £7,500); for heat pumps of up to £7,500; and for high heat retention storage heaters of up to £2,500.
When:	Applications can be made at any time.
Notes:	Households in rural areas can access additional funding.
Link:	https://www.homeenergyscotland.org/funding/grants-loans

Warmer Homes Scotland

Administered by:	Local Energy Scotland / Warmworks Scotland.
Who can apply:	Homeowners and tenants of privately-owned properties living in homes with a poor energy rating who are either aged 75+ with no working heating system or 16+ and in receipt of a passport benefit or income-related benefit.
What is it:	Funding for home improvements associated with warming covering 40 measures including insulation, draught-proofing, and heating systems, based upon the recommendations of an assessor.
How much:	Applicants typically receive works to the value of £5,000.
When:	Applications can be made at any time.
Notes:	For more expensive improvements, such as solid wall insulation, the applicant is required to make a contribution; the applicant can access an interest free loan towards this.
Link:	https://www.homeenergyscotland.org/funding/warmer-homes-scotland

ECO4

Administered by:	Large UK energy suppliers.
Who can apply:	Homeowners and tenants who are in receipt of certain benefits and live in properties with an EPC rating of 'D' or below.
What is it:	Support for "fabric first" energy upgrades to homes (e.g. insulation and replacement boilers) that will reduce energy bills for people who are in greatest need, e.g. social housing tenants; people on low incomes; and people in fuel poverty.
How much:	Variable. Typical values are up to £14,000 for external wall insulation and up to £7,000 for first-time central heating.
When:	The fund will run from 1 April 2022 until 31 March 2026.
Notes:	Applications are made via energy suppliers. Local authorities can identify households outwith the national criteria via the "ECO4 Flex" mechanism.
Link:	https://www.ofgem.gov.uk/publications/eco4-guidance-local-authority-administration

Great British Insulation Scheme

Administered by:	Large UK energy suppliers.
Who can apply:	Homeowners. 80% of funding is ring-fenced for households in homes with an EPC rating of D or below and in homes in Council Tax bands A to E. 20% is ring-fenced for the most vulnerable households, e.g. those on means-tested benefits or in fuel poverty.
What is it:	Support for energy upgrades to homes (e.g. insulation) for people who do not currently benefit from other government support. The focus will be on lower cost measures such as loft insulation and cavity wall insulation.
How much:	The fund has been capitalised with £1 billion. The average expenditure per home is expected to be approximately £1,500. Applicants may be required to make a contribution for more expensive measures.
When:	The fund will run from April 2023 until March 2026.
Notes:	Applications are expected to be made via energy suppliers. ECO+ is intended to meet a wider customer base than ECO4.
Link:	https://energysavingtrust.org.uk/what-is-the-uk-governments-eco-scheme

Energy Redress Scheme

Administered by:	Energy Saving Trust.
Who can apply:	Registered charities; community benefit societies; community interest companies; co-operative societies.
What is it:	A grant fund to support vulnerable energy consumers, including via the Carbon Emissions Reduction Fund aimed at reducing households' carbon emissions.
How much:	Variable by funding stream, but up to £200,000.
When:	Future application deadlines are to be confirmed. The scheme will run until 2024.
Notes:	N/A.
Link:	https://energyredress.org.uk

Let's Do Net Zero Community Buildings Fund

Administered by:	Local Energy Scotland.
Who can apply:	Constituted non-profit distributing community organisations who own or lease community buildings.
What is it:	Funding towards the installation of renewable technologies such as heat pumps in community buildings.
How much:	Applicants can receive up to 80% of eligible costs to a maximum of £80,000.
When:	The fund will run until 31 March 2025, subject to funding availability.
Notes:	N/A.
Link:	https://localenergy.scot/funding/lets-do-net-zero-community-buildings-fund

Let's Do Net Zero: Off Electricity Grid Communities Fund

Administered by:	Local Energy Scotland.
Who can apply:	Community organisations who operate independent electricity grids.
What is it:	Funding to decarbonise and futureproof existing local independent electrical grids not connected to the National Grid.
How much:	Capital funding of up to 90% of costs. A total of £4,000,000 is available for 2023/24.
When:	Capital funding is available until March 2023.
Notes:	N/A.
Link:	https://localenergy.scot/funding/lets-do-net-zero-off-electricity-grid-communities-fund

Community Heat Development Programme

Administered by:	Local Energy Scotland.
Who can apply:	Constituted non-profit distributing community organisations; groups of householders. Housing associations, local authorities, and businesses cannot lead bids but can join consortiums.
What is it:	Funding to help develop ideas for locally-generated, low/zero carbon heat project ideas, for example communal heating systems.
How much:	Local Energy Scotland will provide expert advice.
When:	Applications can be made at any time.
Notes:	N/A.
Link:	https://localenergy.scot/funding/community-heat-development-programme

Climate Action Fund – Energy and Climate

Administered by:	National Lottery Community Fund.
Who can apply:	Various community organisations (including charities and SCIOs); schools; universities; community councils; partnerships.
What is it:	Funding to encourage people to use energy in an environmentally friendly way, bring communities together to explore ways to promote energy efficiency, and enable communities to engage with opportunities for clean energy generation. Funding is mainly revenue.
How much:	£500,000 to £1.5 million.
When:	Applications can be made at any time until December 2023.
Notes:	N/A.
Link:	https://www.tnlcommunityfund.org.uk/funding/programmes/climate-action-fund-energy .

Heat Network Fund

Administered by:	Scottish Government.
Who can apply:	Heat network developers.
What is it:	Grant funding for large-scale heat network projects (including communal heating systems) that can demonstrate a funding gap and that also deliver social benefits. Projects must have an investment-grade business case.
How much:	Up to 50% of eligible costs.
When:	Applications can be made at any time. Projects must be capable of being commissioned by March 2026.
Notes:	N/A.
Link:	https://www.gov.scot/publications/heat-network-fund-application-guidance

Strategic Heat Network Support for Local Authorities

Administered by:	Heat Network Support Unit.
Who can apply:	Local authorities.
What is it:	Grant funding for the pre-capital stages of projects, including commissioning external support for developing feasibility studies, outline business cases, and tasks linked to commercialisation.
How much:	Up to 90% of eligible costs, capped at £150,000.
When:	“Throughout the year on a first come, first served basis”.
Notes:	Local authorities must have consulted upon, or be consulted upon, their LHEES
Link:	N/A.

Green Growth Accelerator

Administered by:	Scottish Government.
Who can apply:	Local authorities.
What is it:	Grant funding for the delivery of low carbon infrastructure projects, for example local hydrogen hubs; nature-based carbon sequestration solutions; and renewables-based local energy networks.
How much:	Funding of up to £10 million, payable to the local authority over a set period (typically 25 years), subject to the local authority achieving agreed economic, environmental, and social outcomes.
When:	Timescales for future rounds are to be confirmed.
Notes:	Funding for the first tranche of Green Growth Accelerator projects was paused in November 2023.
Link:	https://www.gov.scot/news/accelerating-green-growth

Scottish Central Government Energy Efficiency Grant Fund

Administered by:	Scottish Government.
Who can apply:	Scottish central government organisations.
What is it:	Capital grant funding support towards heat decarbonisation and energy efficiency retrofit projects for Scottish central government bodies with no access to borrowing powers, including Scottish health bodies and further education colleges.
How much:	Applicants can bid for up to £2 million per annum.
When:	Applications are considered quarterly. The fund will be open until 2025/26.
Notes:	N/A.
Link:	https://www.gov.scot/publications/scottish-central-government-energy-efficiency-grant-scheme-form-and-guidance

Green Hydrogen Fund

Administered by:	Scottish Government.
Who can apply:	To be confirmed.
What is it:	A grant fund to support renewable hydrogen projects.
How much:	The fund will be capitalised with £90 million. Further information is to be confirmed.
When:	To be confirmed.
Notes:	Very little information on this fund has been published to date. It is yet to be confirmed to what extent it is relevant to the Edinburgh LHEES.
Link:	https://www.gov.scot/publications/hydrogen-action-plan

Scottish Industrial Energy Transformation Fund

Administered by:	Scottish Government.
Who can apply:	Scottish manufacturing sites.
What is it:	Grant support for decarbonising energy intensive industrial activities.
How much:	Awards are variable but capped at up to 50% for energy efficiency deployment and up to 75% for deep decarbonisation deployment depending on the size of the organisation. The fund has been capitalised with £34 million over the period 2020 to 2025.
When:	Three calls for projects have been held to date.
Notes:	The fund can support both feasibility studies and deployment.
Link:	https://www.gov.scot/policies/energy-efficiency/scottish-industrial-energy-transformation-fund/

Loans

Private Rented Sector Landlord Loan

Administered by:	Home Energy Scotland.
Who can apply:	Registered private landlords of tenanted dwellings appearing on the Scottish Landlord Register.
What is it:	Loans to private landlords to help them improve the energy efficiency of their properties and meet minimum standards.
How much:	Variable, but broadly £15,000 for energy efficiency improvements and £17,500 for renewable systems (plus up to £6,000 for an energy storage system) per eligible property.
When:	Ongoing.
Terms:	Landlords with five or fewer properties can access interest free loans. Landlords with six or more properties can access loans at 3.5% APR. An administrative fee of 1.5% (capped at £250) applies.
Notes:	N/A.
Link:	www.homeenergyscotland.org/funding/private-landlord-loans

SME Loan Scheme

Administered by:	Business Energy Scotland.
Who can apply:	Small and medium-sized enterprise; not-for-profit organisations; charities.
What is it:	Loans to finance the installation of energy efficient systems, equipment and/or building fabric, e.g. insulation; solar panels; etc.
How much:	Up to £100,000, along with a cashback grant of up to £30,000.
When:	Ongoing.
Terms:	Interest-free loans with an eight-year repayment period.
Notes:	N/A.
Link:	https://businessenergyscotland.org/smeloan

Home Energy Scotland Grant and Loan (loan element)

Administered by:	Home Energy Scotland.
Who can apply:	Homeowners.
What is it:	Funding for homeowners for energy efficiency improvements and the installation of renewable technologies.
How much:	Variable, ranging from £500 for loft/floor/cavity wall insulation to £2,500 for solid wall insulation.
When:	Applications can be made at any time.
Terms:	Loans are interest free with terms of 5-12 years. An administration fee of 1.5% (capped at £150) applies.
Notes:	Households in rural areas can access additional funding. Loans can be combined with grants.
Link:	https://www.homeenergyscotland.org/funding/grants-loans

District Heating Loan Fund

Administered by:	Energy Saving Trust.
Who can apply:	Local authorities; registered social landlords; small and medium sized enterprises; and energy services companies with <250 employees.
What is it:	Unsecured loans to assist with the financial and technical barriers to district heating projects an alternative to commercial borrowing.
How much:	Loans of £1 million+.
When:	Applications can be made at any time.
Terms:	The typical interest rate is 3.5% for low-risk projects. The typical term is 10-15 years.
Notes:	N/A.
Link:	https://energysavingtrust.org.uk/programme/district-heating-loan-fund

Scottish Public Sector Energy Efficiency Loan Scheme

Administered by:	Salix Finance.
Who can apply:	All Scottish public sector bodies subject to the Public Bodies Duties in the Climate Change (Scotland) Act 2009, including local authorities; universities; and some non-departmental public bodies.
What is it:	Loans for “spend to save” retrofit energy efficiency improvement projects to help achieve net zero carbon in public sector estates.
How much:	Loans equivalent to 75% of total compliant project value.
When:	Applications can be made at any time.
Terms:	Loans are interest free, with a term of up to 12 years.
Notes:	The scheme is funded by the Scottish Government.
Link:	https://www.salixfinance.co.uk/loans/scotland-loans

Scotland Recycling Fund

Administered by:	Salix Finance.
Who can apply:	Scottish local authorities and universities.
What is it:	A fund created jointly by the applicant and Salix Finance which makes investments in the applicant’s estate to improve energy efficiency. Of the financial savings delivered by these improvements, up to 25% can be retained by the applicant as immediate savings, with the remaining 75%+ retained in the fund and “recycled”. Once the fund is closed the initial capital provided by Salix Finance is repaid.
How much:	£100,000 to £1.6 million.
When:	Applications can be made at any time.
Terms:	“A long-term 100% interest-free repayable grant”.
Notes:	The Council has an existing recycling fund in place.
Link:	https://www.salixfinance.co.uk/recycling-fund/scotland-recycling-fund

Social Enterprise Net Zero Transition Fund

Administered by:	Social Investment Scotland.
Who can apply:	Charities and social enterprises.
What is it:	Loans to help social enterprises and the wider third sector transition to net zero, including improving energy efficiency and moving to renewable energy sources.
How much:	Loans of £10,000 to £1,500,000.
When:	Applications can be made at any time.
Terms:	Unsecured loans at a fixed interest rate of 3%. Loans must be settled by 31 st March 2031.
Notes:	Applicants with a circular economy focus may also be able to access grants worth up to 20% of the total funding.
Link:	https://www.socialinvestmentscotland.com/learning-hub/social-enterprise-net-zero-transition-fund

Income streams

Smart Export Guarantee

Administered by:	OFGEM.
Who can apply:	Households and organisations generating electricity from small-scale renewable installations.
What is it:	Guaranteed payments for electricity generated via anaerobic digestion; hydro; onshore wind turbines; and/or solar PV (with a total installed capacity up to 5 MW) or micro-combined heat and power (up to 50 kW) that is exported to electricity suppliers via the National Grid.
How much:	Different tariff rates are offered by different electricity suppliers, but they must be above zero pence per kilowatt hour.
When:	Ongoing.
Notes:	The Smart Export Guarantee is the successor to the Feed-in Tariff scheme. Installed technologies require to hold an MCS certificate.
Link:	https://www.ofgem.gov.uk/environmental-and-social-schemes/smart-export-guarantee-seg