

Westerhill Masterplan

Environmental Sustainability Plan

Final Report for Approval

MARCH 2023

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Westerhill Masterplan

Sustainability Strategy

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Abbreviations & Definitions

The table below contains the abbreviations and definitions. These should be edited by the author to be relevant to the document in question.

Abbreviation	Description
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CHP	Combined Heat and Power
CESMP	Contractor Environmental and Social Management Plan
CO ₂	Carbon Dioxide
NO _x	Nitrogen Oxides
CO ₂ eq	Carbon Dioxide equivalent (GHG measure)
VOC	Volatile Organic Compound
DAS	Design and Access Statement
FRA	Flood Risk Assessment
EDC	East Dunbartonshire Council
ESP	Environment Sustainability Plan
EMP	Environment Management Plan
EMS	Environment Management System
GHG	Greenhouse Gas
SuDS	Sustainable Urban Drainage Systems
KPI	Key Performance Indicators
SWMP	Site Waste Management Plan
LBAP	(The East Dunbartonshire) Local Biodiversity Action Plan
LNCS	Local Nature Conservation Sites
LDP	Local Development Plan
HQM	Home Quality Mark
WSUD	Water Sensitive Urban Design
NPF 4	National Planning Framework 4
SPP	Scottish Planning Policy
EDLDP	East Dunbartonshire Local Development Plan
SCCF	Sustainability and Climate Change Framework
SEPA	Scottish Environment Protection Agency
WDR	Westerhill Development Road

1. Introduction to the Environmental Sustainability Plan

The purpose of this Environmental Sustainability Plan (ESP) is to set out a plan for the implementation of sustainability and net zero carbon initiatives to ensure that the Westerhill Masterplan is compatible with Scottish Government and East Dunbartonshire Council net zero targets and other relevant statutory legislation in areas including transport, heat decarbonisation, biodiversity and planning to help to safeguard and enhance the ecological value of the site.

The masterplan for Westerhill has evolved around a number of challenges and opportunities. The site is located within peat habitat areas, heritage and cultural sites and there are numerous protected species and sensitive ecological features around the masterplan.

However, it is important to note that the creation of the Westerhill Development Road is an emission intensive development that risks locking in carbon emissions by releasing latent demand for individual car use. Potential peatland disruption from the development could also be a significant source of additional emissions, whether due to peat being directly disturbed or indirectly from development at adjacent sites.

Offsetting the inevitable additional emissions from the new road and peat disturbance means that other facets of the project will have to be **carbon negative** as opposed to carbon neutral to ensure the programme as a whole is at least carbon neutral.

This means that the Environmental Sustainability Plan (ESP) recommends numerous additional measures that would be necessary to provide confidence that the proposed development will be carbon neutral, and thus compatible with Scottish Government and East Dunbartonshire Council net zero targets.

The Climate Change (Duties of Public Bodies: Reporting Requirements) Amendment Order 2020 sets out that, by November 2022, all public bodies must report on how the body will align its spending plans and use of resources to contribute to reducing emissions and delivering its emission reduction targets. It is key that in potentially securing funding from the City Deal, which is funded by UK Government, Scottish Government and local authorities across the Glasgow City Region, it is clear how the Masterplan is compliant with financial alignment with net zero targets.

While the recommendations within the ESP include means of reducing emissions, it is also recommended that net emissions from the Masterplan are estimated to demonstrate that the programme will lead to a net reduction in emissions or at least carbon neutrality. This is crucial to ensuring that the proposal for the WDR could not be seen as acting contrary to national policy.

In addition to being shaped by these pieces of legislation, this ESP is also driven by the Council's Local Development Plan (LDP) to consider and assess the environmental, social, and economic aspects of the development. Increasingly, policy including planning policy and building regulations are being aligned with net zero targets and there is therefore an imperative to show how the proposed development would be carbon neutral or better.

Since the Scottish Government and many local authorities across the Glasgow City Region have some of the most ambitious net zero targets in the world, capitalising on the emission reduction opportunities that the Masterplan could present offers a compelling opportunity to create a 21st century, net zero unique selling point through the establishment of innovative zero direct emission heating system(s) for buildings, prioritised and cutting-edge active travel infrastructure, local biodiversity support and local peat preservation initiatives.

More specifically, creating the active and sustainable transport infrastructure and zero-emission heating systems set out in the ESP presents the opportunity for East Dunbartonshire Council and the Glasgow City Region to bolster investment, leverage private sector investment and support companies and prospective investors in the area in achieving net zero targets while driving forward regionally-significant decarbonisation which would catalyse modal shift and heat decarbonisation above and beyond the Westerhill area.

Implementing cutting-edge environmental measures to drive modal shift and support extension of zero-emission heating would underscore delivery against the vision of the Westerhill Masterplan for *“A vibrant and sustainable development where innovative business opportunities meet well connected, socially and environmentally resilient communities”.*

To deliver on this vision, it is crucial that any road construction in the Westerhill Masterplan includes full coverage of high-quality, segregated, lit, maintained and prioritised active travel infrastructure that links up to other active travel infrastructure in surrounding areas in order to make cycling, walking and wheeling a safe and viable option, traffic easing measures, peatland habitat restoration, biodiversity protection, an ambitious heat decarbonisation programme and a series of studies demonstrating that the site as a whole will contribute to statutory environmental targets. A key recommendation of the Environmental Sustainability Plan is that these factors constitute core parts of the Masterplan rather than potential add-ons.

The impacts of climate change are also a key consideration.

Scotland’s ten hottest years have all occurred since 1997 despite record keeping beginning in 1884,¹ and Scotland’s highest ever temperature of 34.8°C registered in July 2022, almost 2°C higher than the previous record.²

A study published in December 2023 by the James Hutton Institute showed that Scotland’s climate is changing faster than scientists predicted with changes that were expected to occur over the next three decades already happening.³

This fits into a trend of increased average annual rainfall in Scotland in the past few decades, with an increasing proportion coming from heavy rainfall events.⁴

The atmospheric physics which underpins climate change means that the climate will continuously become more hostile to life until net zero is reached on a planetary level. A continuation of these record-breaking trends should therefore be anticipated at least throughout the 2030s, 2040s and the 2050s.

As a result, the infrastructure, material, drainage systems and land use in the Masterplan should all account for these changes and consider how to maximise resilience within the context of them.

¹ See Adaptation Scotland (2022) [Adaptation Scotland: Climate trends and projections](#)

² See Met Office (2022) [Record high temperatures verified - Met Office](#)

³ See [Scotland’s climate changing faster than predicted | The James Hutton Institute](#)

⁴ See [New Climate Projections Summary for Scotland \(historicenvironment.scot\)](#)

2. Scheme description

Building Activity	Comments	Quantity	Area (m ²) (units)
New Employment	Class 4 - Business - office, flexible co-working space,	Up to 10%	c.100,000 sqm
	Class 4 – Business - R&D, incubator space and light industrial	Up to 45%	
	Class 5 - General Industrial - high amenity manufacturing		
	Class 6 - Warehousing and logistics	Up to 45%	
Community and Leisure	Potential indoor and outdoor uses can be a community hub, visitors centre, public toilets, cafe, green grocers, and mobility hub.		10,000-11,000 sqm

3. Policy Review

The key policies and guidelines used to frame, define, and support the objectives of this Sustainability Statement are briefly summarised below.

3.1. National Policy

The Climate Change Act 2008 (2050 Target Amendment) Order 2019:

- Net Zero GHG Emissions by 2050

Climate Change (Emissions Reduction Targets) Act 2019 (Scotland)

- Net zero by 2045 with the latest and interim emissions reductions targets of 75% by 2030 and 90% by 2040 (including the buildings sector)

Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020

By November 2022, all public bodies must report on:

- the body's target date for achieving zero direct emissions of greenhouse gases, or such other targets that demonstrate how the body is contributing to Scotland achieving its emissions reduction targets;
- targets for reducing indirect emissions of greenhouse gases;
- how the body will align its spending plans and use of resources to contribute to reducing emissions and delivering its emission reduction targets;
- how the body will publish, or otherwise make available, its progress to achieving its emissions reduction targets; and what contribution the body has made

Update to the Climate Change Plan (2018-2032)

- Reduce car kilometres by 20% by 2030
- Petrol and diesel cars not to be needed by 2030
- Remove fossil fuelled HGVs by 2035
- Majority of new buses zero emission by 2024

Cleaner Air for Scotland 2 (2021)

- Introduce 20-minute neighbourhoods to encourage walking and cycling
- Create at least 20 electric towns and cities across Scotland by 2025

A long-term vision for active travel in Scotland 2030

- Cutting carbon emissions through a switch from motorised travel to walking and cycling

National Planning Framework (NPF4)

- The National Planning Framework 4 (NPF4) is a long-term plan for Scotland to 2045 which was published and adopted by the Scottish Government on 13 Feb 2023. The NPF4 plays a key role in developing and sustaining vibrant communities and ensuring a just transition to net zero.
- “NPF4 Policy 5 states that “*Development proposals on peatland, carbon rich soils and priority peatland habitat will only be supported for... Essential infrastructure and [where] there is a specific locational need and no other suitable site*”.
- Clarity will be required as to how WDR is considered essential infrastructure.
- NPF4 Policy 5 then states that: “*where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:*
 - *the baseline depth, habitat condition, quality and stability of carbon rich soils;*
 - *the likely effects of the development on peatland, including on soil disturbance;*
 - *and the likely net effects of the development on climate emissions and loss of carbon.*”

3.2. Local Policy / Guidance

East Dunbartonshire Council’s Climate Action Plan

- Council approved the CAP Evidence and Options Report on 28 September 2023 which included an agreement on a net zero target of 2036 for Council’s direct emissions (including emissions from the fleet of vehicles and buildings) and energy that the Council purchases (such as electricity), in addition to a target of 2045 for all other emissions including those in the East Dunbartonshire Area as a whole.⁵
- A Draft CAP, which will include further details on how to achieve these ambitious net zero targets, is due to be taken to Council in 2024 before going out for public consultation. The CAP will contain an action plan which is intended to supersede the existing climate change policies and actions contained in the SCCF and Action Plan. It will also encompass and extend the scope of the Carbon Management Plan (CMP). In the intervening period, the SCCF and CMP will continue to guide Council policy for working towards net zero emissions, sustainability, and climate change adaptation.
- As Transport is the highest emitting sector in Scotland and in East Dunbartonshire⁶, it will be a core focus of the emerging CAP.

East Dunbartonshire Sustainability and Climate Change Framework (SCCF) 2016 – 2023

- The SCCF has set the context for a strategic, cross-Council approach to sustainability since 2016 which builds on existing good practice achieved through a wide variety of past activities. It contains a wide range of strategic commitments beyond climate change mitigation and adaptation, such as targets to improve sustainable development and enhance biodiversity.
- The SCCF will be replaced with a 'Sustainability Framework' to cover non-climate change related aspects of sustainability once the CAP is approved. This will be the strategic driver of

⁵ Agenda for Place Neighbourhood & Corporate Assets Committee on Thursday, 25th January, 2024, 5.30 pm (moderngov.co.uk)

⁶ Scottish Greenhouse Gas Statistics 2021 - gov.scot (www.gov.scot)

sustainability ambitions while the CAP will set out actions on climate change mitigation and adaptation.

- An update on the SCCF was approved by PNCA Committee in January 2024⁷ which included updates on Sustainable Transport & Travel amongst other areas.

East Dunbartonshire Local Development Plan (LDP 2022)

- LDP2 sets out a long-term plan for development across East Dunbartonshire, including a spatial strategy, sustainable land use objectives and updated policies for planning in East Dunbartonshire over the next 10 years. The plan includes a planning policy framework for development at the Westerhill Regeneration Area to deliver a mix of land uses in order to regenerate brownfield land, deliver business and employment growth, provide a green network and transport network throughout the site and link Westerhill to the town centre and Auchinairn.
- Policy 3.R requires an Environmental Sustainability Plan which will identify opportunities to deliver health, carbon reduction, climate change adaptation and biodiversity benefits, ensure appropriate solutions relating to peat and hydrology and include opportunities for supporting renewable energy and heat as a key aspect of the site's development.

East Dunbartonshire Local Transport Strategy (2020-2025)

Key objectives include:

- Increase modal shift towards more sustainable modes of travel for both travel to work/study and leisure trips
- Reduce emissions through reduced vehicle mileage

East Dunbartonshire Council Active Travel Strategy (2015-2020)

- East Dunbartonshire Council's Active Travel Strategy was published in 2015 with the ambition of making East Dunbartonshire "a place where walking and cycling for everyday journeys is a convenient, safe and attractive choice for residents, commuters and visitors". It sets a framework for active travel projects in East Dunbartonshire and increasing participation in active travel across East Dunbartonshire.
- The Strategy has three aims which include increasing active travel mode share for everyday journeys, delivering a more connected active travel network and infrastructure, and facilitating behaviour change.
- The Active Travel Strategy 2015-20 lists A803 improvements as a key action which could help improve links between the Forth and Clyde Canal and Bishopbriggs Town Centre. It also sets out a commitment to "investigate the feasibility of providing cycleways and footways at the side of Phase 5 of the BRR carriageway."
- An updated ATS is in development with an evidence report and summary booklet being approved by PNCA Committee in January 2023.⁸

⁷ Agenda for Place Neighbourhood & Corporate Assets Committee on Thursday, 25th January, 2024, 5.30 pm (modern.gov.co.uk)

⁸ Agenda for Place Neighbourhood & Corporate Assets Committee on Thursday, 26th January, 2023, 5.30 pm (modern.gov.co.uk)

4. Sustainability Approach

Following the declaration of a global climate emergency by the Scottish Government in May 2019, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 considerably raised the ambition of the national emissions reduction targets set out in the 2009 Act. A legally-binding net zero target was set for all greenhouse gases by 2045, along with a series of interim targets including a 75% reduction in emissions by 2030.

In March 2021, Scottish Ministers wrote to Council Leaders and Chief Executives to highlight that public bodies form “*the frontline of our climate emergency response*” and the important leadership role that they fulfil. In October 2021, the Scottish Government published “Public Sector Leadership on the Global Climate Emergency” (the ‘Leadership Guidance’) setting out the leadership role that Councils and other public bodies are expected to play in responding to the climate emergency and detailing their expected action to rapidly reduce their emissions and build resilience to the effects of climate change.

In accordance with the principle of public sector leadership, the Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Amendment Order 2020 sets out that, by November 2022, all public bodies must report on:

- the body’s target date for achieving zero direct emissions of greenhouse gases, or such other targets that demonstrate how the body is contributing to Scotland achieving its emissions reduction targets;
- targets for reducing indirect emissions of greenhouse gases;
- **how the body will align its spending plans and use of resources to contribute to reducing emissions and delivering its emission reduction targets;**
- how the body will publish, or otherwise make available, its progress to achieving its emissions reduction targets; and
- what contribution the body has made to helping deliver Scotland’s Climate Change Adaptation Programme

Scotland’s updated Climate Change Plan projects **annual emissions from transport falling by 44% between 2021 and 2030**. Delivering on this target will need decisive action to achieve modal shift and the National Transport Strategy has “taking climate action” as a core aspect of its vision, with transport investments expected to “help deliver our net zero target”, “adapt to the effects of climate change” and “promote greener, cleaner choices”. The associated policies to achieve these outcomes include:

- Reduce emissions generated by the transport system to mitigate climate change
- Support management of demand to encourage more sustainable transport choices
- Facilitate a shift to more sustainable and space-efficient modes of transport for people and goods

To support this, the Scottish Government has published the 20% Car KM Reduction Route Map which commits **to reduce car kilometres driven in Scotland by 20% between 2019 and 2030**.

East Dunbartonshire Council has been developing its Climate Action Plan including a target for the East Dunbartonshire area to reach net zero greenhouse gas emissions by 2045, which was approved by Council in September 2023.

A specific pathway to achieving this and other targets is set out in the Climate Action Plan’s Options and Evidence report including the need to reduce transport emissions to contribute to the Scottish Government’s targets for a 20% reduction in vehicle KM by 2030.

Accordingly, this ESP sets out what is required to clearly evidence how the investment, including the investment in the road infrastructure, would support the national policy priority to reduce emissions from transport by 44% and reduce car kilometres by 20%.

To deliver improved sustainability performance, contribute to statutory net zero targets and other relevant environmental legislation while enhancing Westerhill's value during master planning stages, the ESP:

- Adopts a holistic approach to sustainability covering social, economic, and environmental factors
- Clearly defines a sustainability approach by identifying KPIs and net zero targets to ensure successful implementation
- Establishes a clear process for guiding, evaluating, and improving sustainability performance during the development of a masterplan
- Engages key stakeholders to ensure net zero targets are embedded in design decisions; and
- Helps define the most appropriate categories, aims, objectives, targets, and key performance indicators that will best serve Westerhill and East Dunbartonshire Council's objectives.

Ongoing reviews of performance to these objectives should be conducted as part of internal audits and progress meetings. To communicate progress against these objectives and targets effectively, they will be disseminated to the wider project teams and the construction workforce. As the project develops, the objectives and targets will help to set the KPIs that will inform the project approach. The KPIs help the project to deliver against the set objectives and provide an indication of the performance of the project against the sustainability goals. They will help identify where issues and problems are occurring on the project, providing time to address them.

The ESP recommends that the Masterplan accounts for the significant observed impact of climate change: June, July, August, September, October, November and December 2023 have all set record-breaking temperatures^{9 10 11 12}, with September being described as 'off-the charts' by the UN¹³ at 1.75°C hotter than pre-industrial levels – the hottest in 174 years of climate record keeping¹⁴. These observed temperatures led to 2023 becoming the hottest year on record¹⁵.

Moreover, the fact that the climate will continuously get more hostile until net zero is reached on a planetary level means that a continuation of these trends should be expected throughout the 2030s, 2040s, 2050s and beyond.

Scotland's ten hottest years have all occurred since 1997 despite record keeping beginning in 1884,¹⁶ and Scotland's highest ever temperature of 34.8°C was registered in July 2022, almost 2°C higher than the previous record.¹⁷ A study published in December 2023 by the James Hutton Institute showed that Scotland's climate is changing faster than scientists predicted with changes that were expected to occur over the next three decades already happening.¹⁸

⁹ Copernicus: 2023 is the hottest year on record, with global temperatures close to the 1.5°C limit | Copernicus

¹⁰ Warmest September on record as 'gobsmacking' data shocks scientists - BBC News

¹¹ Record warm November consolidates 2023 as the warmest year | Copernicus

¹² World had warmest October on record (wmo.int)

¹³ Temperatures off the charts, but more records imminent: WMO | UN News

¹⁴ September smashes monthly temperature record by record margin | World Meteorological Organization (wmo.int)

¹⁵ Copernicus: 2023 is the hottest year on record, with global temperatures close to the 1.5°C limit | Copernicus see also 2023 shatters climate records, with major impacts (wmo.int)

¹⁶ See Adaptation Scotland (2022) Adaptation Scotland: Climate trends and projections

¹⁷ See Met Office (2022) Record high temperatures verified - Met Office

¹⁸ See Scotland's climate changing faster than predicted | The James Hutton Institute

This fits into a trend of increased average annual rainfall in Scotland in the past few decades, with an increasing proportion coming from heavy rainfall events.¹⁹

The infrastructure, material and land use in the Masterplan should all account for these changes.

4.1. Energy and Carbon

The built environment is a significant contributor to carbon dioxide emissions (CO₂) in the UK, with buildings accounting for 37% of total greenhouse gas (GHG) emissions. There is significant opportunity for the emissions associated with new development to be mitigated through design and operation. Current and upcoming National and Local Government requirements for low and zero carbon developments are driving new development to reduce CO₂ emissions.

4.1.1. Construction Impact

In addition to climate change mitigation, it is increasingly recognised that action is required to ensure we can adapt to the predicted impacts of climate change as effectively as possible. This can include by exploring rain gardens, restrict non-permeable surfaces, orientation of buildings, canopy cover, green roofs/walls, greenspaces, creation of/enhancement of wetland habitats.

All Contractors shall minimise energy consumption and CO₂eq emissions during their works on the project. This could include the processes that are outlined below, but contractors are not to be limited to them if additional methods of efficient use of energy are identified.

Recommendation: The below actions should be considered a minimum standard during the construction phase of the development:

- Continue any assessment of energy consumption and CO₂eq emissions initiated at the design phase for buildings and infrastructure.
- Produce an Energy Management Plan to manage and reduce energy consumption and CO₂ emissions.
- Introduce smart energy monitoring and management to assess high impact activities on energy use and assess where energy misuse may be occurring.
- Achievement of ESOS compliance, where feasible.
- Develop a green travel plan for the construction staff
- Trial the use of a suitable carbon tool in agreement with EDC to assess the embodied carbon of the construction phase;
- Maximise the use of energy efficient lighting;
- The use of energy efficient plant and welfare facilities where appropriate.
- Maximise use of electric vehicles in the construction fleet
- Minimise the use of Portable Generators; and
- Maintenance schedule developed and implemented for plant to maintain energy efficiency.

Additionally, meeting PAS 2080 standard could be a very effective way of minimizing embodied carbon and reducing the environmental footprint of the Masterplan.

¹⁹ See [New Climate Projections Summary for Scotland \(historicenvironment.scot\)](https://www.historicenvironment.scot)

4.1.2. Peatland and Carbon rich soils

Peatlands are the largest stores of carbon, and they sequester carbon slowly but indefinitely. Once peatland habitats are disturbed for extraction, stored carbon becomes carbon dioxide (CO₂) and is lost to the atmosphere forever, contributing to climate change and directly impacting Net Zero targets.

Peatland habitats are also complex hydrological systems and vulnerable to activities occurring beyond the boundaries of individual habitat patches. Development on peatland can reduce stability of peat-based habitat on steep slopes, which in turn may have further impacts on habitat and species should a peat slide event occur.

Development on carbon rich soil and extraction of peat can have direct impact on the climate, biodiversity and the quality or quantity of surface and ground water.

East Dunbartonshire has a number of important lowlands raised bog peatlands at High Moss and Low Moss and Cadder Yard LNCS. These areas are biodiversity-rich, play a significant role in hydrology and flood management, perform a valuable carbon storage function, (helping to mitigate climate change), and provide crucial services to social and economic wellbeing.

A peat depth survey & assessment of the Westerhill area, on the north-eastern outskirts of Bishopbriggs, in East Dunbartonshire has been undertaken to identify potential peat-related constraints by verifying the areas of peat accumulation and pinpointing its depth and type with approximate baseline carbon calculations.

A typical road construction in the Westerhill Development, including an Active Travel Path (Footway and Cycleway/Footway) and a Carriageway would potentially be responsible of the emission of about 0.230 tCO₂e per meter of road. For example, the construction of 200m of road through deep peat-rich soil would emit about 46 tCO₂e (equivalent to heating about 17 households during a year or driving about than 270,000 km).²⁰ Commercial Building constructions over peatland would potentially result in the emission of about 213 tCO₂e/ha.

A desk study and field survey of the of Westerhill development area has been carried out to inform the results of this survey and form a Peat Depth Report. This report indicates minor areas of near-natural peatland. Moreover, peat in the absence of peatland habitat has been recorded in the south to southeast. Mineral soil is identified as being extensive across the east and non-soil substrate is identified along the southern fringes.

There are no nature conservation designations associated with the survey area according to this survey. The survey also concludes that the average depth of the peat is 229 cm.

According to this survey a total area of 13.3 ha is estimated to be associated with peat within the Westerhill Masterplan. This peat assessment has identified that the baseline carbon content of the study area is respectively about 3,315 tCO₂e and 97,262 tCO₂e, for a total of 100,578 tCO₂e (with an error margin)²¹. This total amount of carbon emitted in the atmosphere would be equivalent to heating about 36,640 households for a year²², or driving 590 million km²³. The distribution level of these soil types is demonstrated in figure 1, while figure 2 shows the depth.

²⁰ See East Dunbartonshire Council Technical Note: WESTERHILL REGENERATION AREA (WRA) MASTERPLAN, BASELINE CARBON CALCULATIONS NOTE, DOC NUMBER: 10058365-ARC-GEN-ZZ-TN-EA-00001

²¹ See East Dunbartonshire Council Technical Note: WESTERHILL REGENERATION AREA (WRA) MASTERPLAN, BASELINE CARBON CALCULATIONS NOTE, DOC NUMBER: 10058365-ARC-GEN-ZZ-TN-EA-00001

²² UK heating market to face changes - Energy Saving Trust

²³ Using the BEIS conversion factors set (2022), average size car emissions per km (unknown fuel)

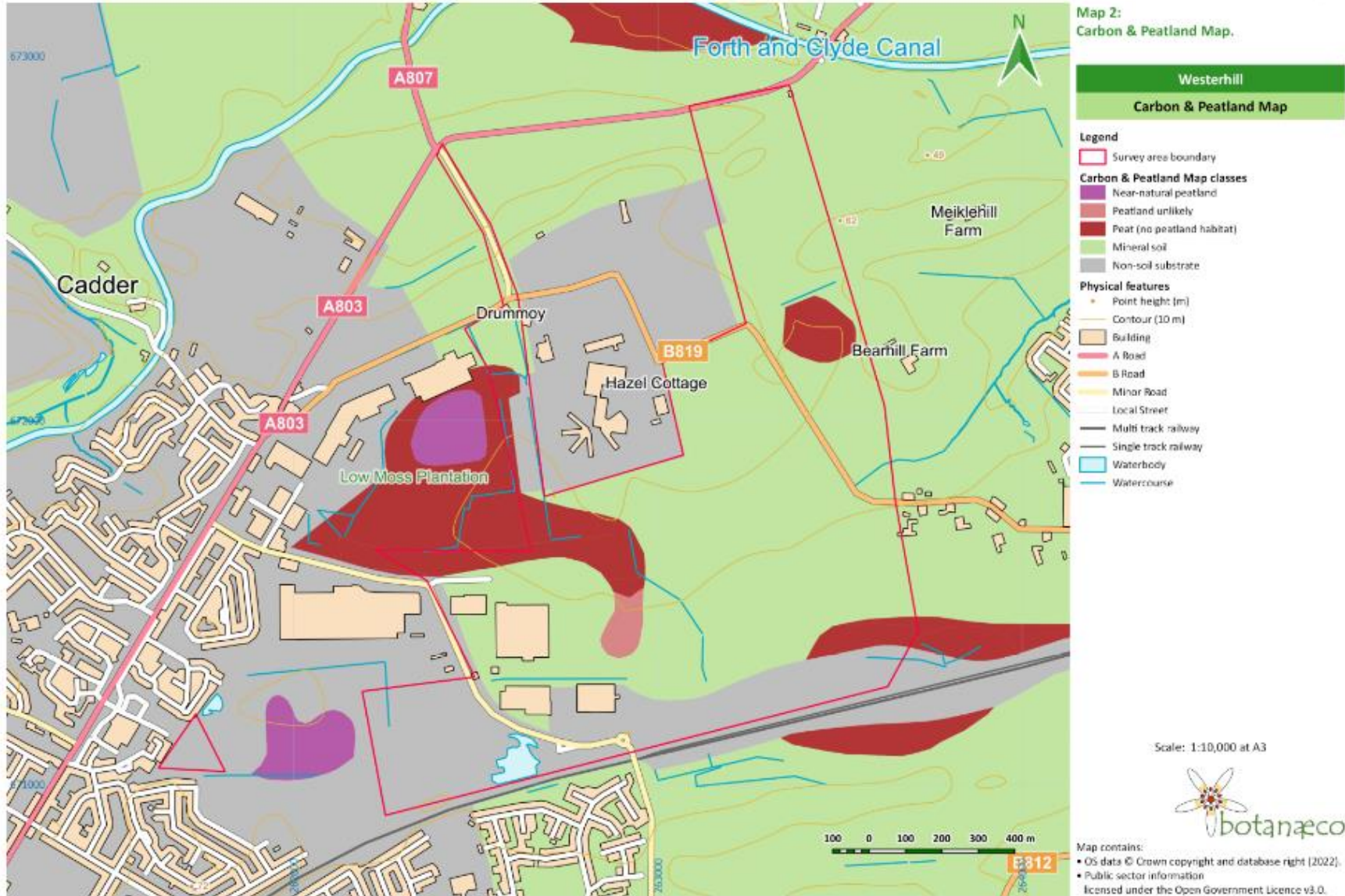


Figure 1. Westerhill Masterplan peat survey map

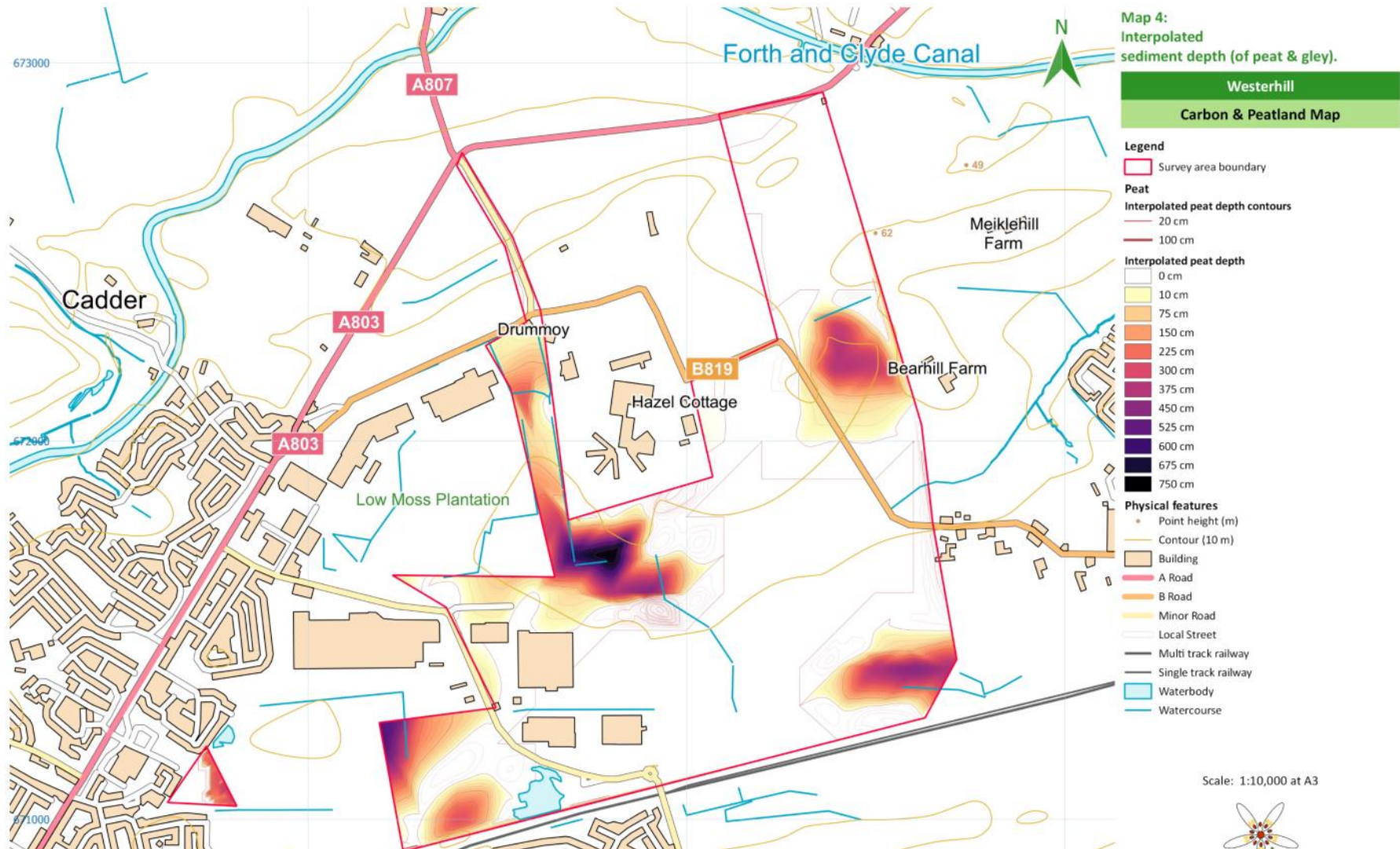


Figure 2. Westerhill Masterplan peat depth map

Scotland's National Peatland Plan recognises the value of healthy peatlands and commits to improving degraded areas:

- Avoid peat excavation.
- Managing the land to maintain existing peat deposits, and the extent and health of peat-forming habitats.
- Ensuring that land use and management limits loss of stored carbon and enhances the sequestration of new terrestrial carbon.
- Where possible carry out peatland restoration.

Increasingly, as per policy 5 of NPF4 'Local Development Plans should identify and protect locally, regionally, nationally and internationally valued soils.' And 'development proposals on peatland, carbon rich soils and priority peatland habitat should not be supported unless essential for:

- essential infrastructure where there is a specific locational need, and no other site is suitable; or
- the generation of energy from a renewable source, where the proposal supports a zero-carbon electricity system and will maximise the function of the peatland; or
- small scale development directly linked to a rural business, farm or croft; or
- supporting a fragile population in a rural or island area; or
- the restoration of peatland habitats.'

As such this ESP recommends that Westerhill Masterplan design should avoid development and construction on areas identified by the Peat Depth Survey as areas of significant peat accumulation. During the preliminary engagement and consultation on the masterplan and SEA, NatureScot, a statutory environmental body responsible for Scotland's natural capital, has advised that it is preferable that development is avoided in any areas of peat with 0.5m depth or more. As such this ESP recommends that Westerhill Masterplan design should avoid development and construction on areas identified by the Peat Depth Survey as areas of significant peat accumulation and within the LNCS.

For example, Parcel 3 is largely deep peat so a Peatland Management Plan should be required here. Parcel 1a is on deep peat and shouldn't be developed - OR in accordance with the recommendation on this page and NPF 4 justification should be provided as to why it needs to be developed.

Climate Change mitigation actions in the form of peat and carbon rich soil enhancement is recommended as part of the Westerhill Regeneration Area Masterplan. Restoring peatland to good status in the study area would potentially result in saving 2,280 to 22,002 tCO_{2e} over 55 to 60 years¹⁷. This is subject to further investigation on the current peat condition; thus considering this carbon reduction opportunity to help the masterplan, in parallel with other emission reduction activities, to help to align with the Scottish Climate Change Plan.

The following section discusses management and treatment options where excavation is essential as per policy 5 above.

Recommendation

The emissions that stem from peatland excavation outlined in the previous section combined with the Climate Emergency declared by the Scottish Government in 2019 and the local and national net zero targets set for 2045, mean that establishing a Peatland Management Plan to minimise disruption and support preservation of the peatland for any peat lower than 0.5m in depth will be crucial. Any disturbance of peat must also be fully justified against NPF 4 Policy 5.

Furthermore, a study on the overall emissions of the Masterplan will need to run in tandem with this to establish how the resulting emissions would be offset, whether and how this could be achieved

onsite and whether this would require acquisition of land offsite to achieve the necessary level of carbon sequestration. The study would need to account for the cost of any lost opportunities to local carbon offsetting to support net zero through peatland that could not be restored as a result of development.

Based on the results of the peatland survey and where it is essential to develop on peatland, in line with the policy 5 of NPF4 stated above the Masterplan and any future proposals must:

- a. Provide justification as to why it is not possible to avoid peat excavation.
- b. Assess the impacts of peat excavation on carbon emissions and the habitat.
- c. Carry out peatland restoration/treatment where possible.

Excavated peat, will typically lose some structural integrity upon excavation and subsequent handling (e.g., through double handling or haulage around the site) and therefore may require prior treatment to render its physical state into a form suitable for reuse on site.

The following table provides examples of treatment options that may be feasible, although it should be noted that in most cases a combination of options may be appropriate, and selection and viability of options will be dependent and justified based on the environmental impacts and carbon benefits for Westerhill Masterplan. Where restoration to open, peat forming habitats is not possible, the project should still aim to reduce loss of the carbon stock due to peat disturbance and maximise any potential for carbon sequestration. This may include various carbon offsetting and reduction measures in accordance with guidance published by Forestry Commission Scotland.

Reuse	Method
Blending	Unconsolidated and/or saturated peat may be blended with more consolidated peat or granular material (mineral soil or rock aggregate) to be used for reinstatement without any engineering or containment measures.
Dewatering	Unconsolidated and / or saturated peat can be dewatered by e.g., natural gravity and drainage, or mechanical pressing or filtration. Dewatered peat (where construction is unavoidable for mobility infrastructure) may be suitable as a horticultural product. However, to deliver such a product the peat will require to be milled to meet required product specifications and there are limits on particle size, moisture content, density, and contamination (e.g., seeds, stones, and other foreign matter). These complexities may preclude this option, although it is possible that on some sites it may be viable providing logistics are favourable. It is essential that the negative carbon impacts are evaluated and considered in the decision-making process.

4.1.3. Energy and Carbon Regulations

The Climate Change (Scotland) Act 2009 (the 2009 Act) and The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, which amends the 2009 Act, sets targets to reduce Scotland's emissions of all greenhouse gases to net-zero by 2045 at the latest, with interim targets for reductions of at least 75% by 2030 and 90% by 2040.

Scottish Building Regulations were updated on the 1st of February 2023 with Section covering energy performance regulations in addition to overheating and ventilation.

From 1st February 2023, a 32% reduction is required compared to Section 6 2015 for domestic new-builds, this will be met through tightening the standards of thermal elements, improved air tightness quality and testing through low-carbon heating options.

In 2024, significant changes are due to be implemented through the New Build Heat Standards. From 1 April 2024, new buildings applying for a building warrant will be prohibited from using direct emissions heating systems to meet their space and hot water heating and cooling demand. Instead, the use of zero direct emissions heating technologies (ZDEH) will be required. This will likely see an increase in the implementation of heat pumps and heat networks across Scotland.

The updated Section 6 and New Build Heat Standards will be in place for **when the development takes place so zero direct emission heating systems will be required in all building** which require a heating system.

Heat networks, which have an energy centre that provides heat to multiple buildings through pipes instead of using a single heating system for every building, could have significant cost advantages for the development, particularly for dense development areas. Utilising space for energy centres and heat network infrastructure, instead of allocating large amounts of spaces for parking, would support targets and legislation set out later in the ESP and ensure alignment with the New Build Heat Standards.

The Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023 include a heat networks duty on local authorities. This includes identifying potential areas for Heat Network Zones (HNZs) within East Dunbartonshire and this will be done through both the development of the LHEES and the production of the Heat Network Review Statement. The requirements of the Heat Networks Act, which include the production of our statutory Heat Network Review Statement in early 2024.

It is likely that the most cost-efficient for Westerhill will be a Heat Network Zone – as detailed in the Be Clean Opportunities section below. It is important to note that buildings will need to be designed to connect to a heat network and enabling infrastructure, including identifying areas for the energy centre.

Integrating a Heat Network into the development would also support the Council's LHEES and East Dunbartonshire's Local Housing Strategy, which includes the following targets:

Action 2.3 Reassess capital investment plans to work towards energy efficiency targets, ensure compatibility with net zero targets, and include retrofit of the following: energy efficiency measures, heating and ventilation systems and renewables while ensuring adherence to the New Build Heat Standard.

Action 2.7 Adopt joint working approaches with agencies and services to contribute to the delivery of statutory net zero targets, actions to be confirmed in the LHEES delivery plan and actions to promote climate resilience in the Climate Action Plan.

Action 2.21: Adopt joint working to ensure the early identification of potential areas for Heat Network Zones and the alignment of housing development with the LHEES delivery plan and the Heat Network Review Statement.

The ESP follows the energy hierarchy, making buildings energy efficient and generating heat and power through low and/or zero carbon technologies. The below figure summarises each stage of the energy hierarchy.

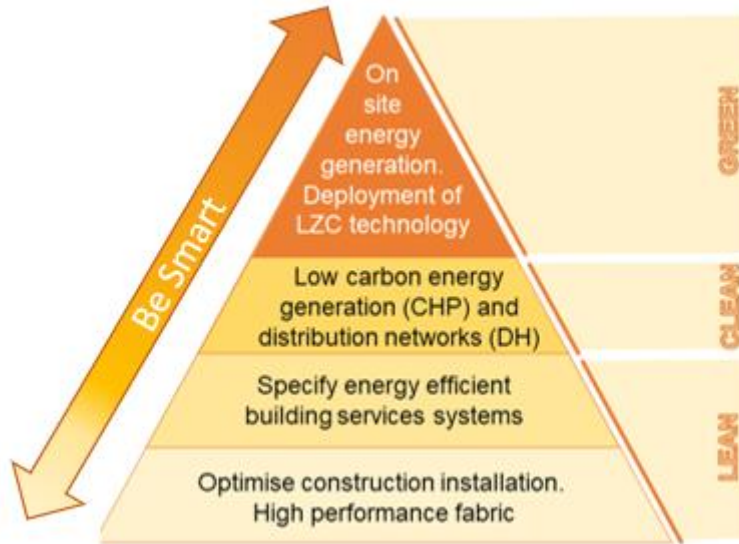


Figure 3. Energy Hierarchy

Below are the various solutions explored for Westerhill Regeneration Area with suitable recommendations for a diversified energy solution for the development:

4.1.3.1. Be Lean: Fabric First Approach

A ‘fabric first’ approach to building design involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems. This can help to reduce capital and operational costs, improve energy efficiency and reduce carbon emissions whilst reducing ongoing maintenance costs.

Based on the update for Section 6 in February 2023, the minimum standard of the thermal envelope used for non-residential properties shall be as follows, based on the specifications set in the building technical handbooks:

Table 1. Thermal envelope values as set out in Section 6 due to be implemented in 2023.

	Unit	Non-Residential
Wall U-value	W/m ² K	0.27
Floor U-value	W/m ² K	0.22
Roof U-value	W/m ² K	0.2
Windows U-value	W/m ² K	2.0

The aforementioned fabric standards are the minimum performance standard that should be achieved at Westerhill. It is proposed that Westerhill should strive for more progressive thermal standards, reducing the requirements for heating energy, reducing carbon emissions of the site, and reducing the energy bills for the end user. LETI have developed a specification for thermal envelopes for developments striving for net-zero and these should be used as a golden standard for the Westerhill development. These standards are as follows:

Table 2. LETI thermal envelope standards to be used as a desired thermal standard for Westerhill development.

	Unit	Residential	Non-Residential
Wall U-value	W/m ² K	0.15	0.15
Floor U-value	W/m ² K	0.10	0.12
Roof U-value	W/m ² K	0.12	0.12
Windows U-value	W/m ² K	1.0	1.2
Air Permeability	m ³ /m ² /h @50Pa	<1	<1

Additionally, the site should incorporate passive design throughout the design phase of the development.

4.1.3.2. Be Clean Opportunities

There is opportunity for Westerhill to incorporate multiple Be Clean opportunities in the form of heat networks. The Scottish Government passed the Heat Networks Act in 2021 to make provision for regulating the supply of thermal energy by a heat network, and for regulating the construction and operation of a heat network. This Act defines a district heat network as a network by which thermal energy is distributed from one or more sources of production to more than one building.

The New Build Heat Standard outlines that new buildings applying for a building warrant will be prohibited from using direct emissions heating systems to meet their space and hot water heating and cooling demand. Instead, the use of zero direct emissions heating (ZDEH) technologies will be required. This will result in an increase in the use of heat pump and heat network across new developments in Scotland.

The Masterplan's Regeneration and Planning Guidance notes: "In line with Sustainability and Climate Change Framework and LDP2 Policies 9 and 3.R, the proposed development should also explore the creation of a potential district heat network for the site carrying the heat generated from several alternative heat recovery technologies from a centralised energy centre. Individual development parcels should through their development seek to provide sustainable and green energy solutions to meet the electricity demand."

Therefore, an assessment of potential district heating options and network design should be conducted to inform the technical design, ensuring that the development can meet statutory net-zero targets in a cost-effective manner. The district heating analysis will include the sizing and location for a central energy centre as well as required electrical requirements for the heat source, if applicable.

This would be supported by the identification of Westerhill area as a designated Heat Network Zone through the production of East Dunbartonshire Council's LHEES and Heat Network Review Statement.

Broad outline of potential alternative (clean) heat sources explored for the site are as follows:

a. Geothermal District Heating: Mineworks Water

There is known to be disused mines within close proximity of Westerhill. This could be utilised as water is held naturally in rocks as groundwater flows continuously into active mine workings, requiring them to be pumped out. However, when mining ceases the pumping ceases and the abandoned mine workings become flooded. Mines can extend to relatively deep levels so, in some cases, abandoned mine workings can provide easy access to warm water. This warm mine water can be accessed by means of a borehole, and the heat can then be made available for space heating or domestic hot water heating.

Recommendation: Due to the requirements of developing a geothermal district heating network, the investment required to develop a geothermal site is too significant. This is also because of the additional pipework and therefore costs required to serve other properties in a wider area, which is required to justify the development.



Figure 4. Abandoned Coal works

b. Sewer Heat Recovery:

The water that leaves a building is at a higher temperature than the ground, because of the effect of heating in the home and because part of the flow is from domestic hot water (bath or shower water). From previous case studies, wastewater is typically available at temperatures between 14-22°C. Sewer water is therefore a potentially useful resource for a heat pump system as the temperature is higher than the air or ground, resulting in better heat pump system performance. There is also the added benefit as a new development will have newly laid sewage and storm water drains separated, which will minimise temperature reduction in the wastewater from rainwater. A maximum temperature drop of approximately 5°C is allowed to the wastewater so as to not impact the microbial processes at treatment works further along the sewage system. There are two types of sewage heat recovery technologies:

- **In Line Sewage Heat Recovery Technology:** There are products available that recover heat from the sewer without affecting flow (i.e., in-line technology), and these are best installed at the same time as the sewers. These either line the sewer or form part of it and contain pipes through which a liquid is pumped capturing heat from the sewer. A company has such an 'in-line' system, in which heat exchangers are laid within the bottom of the sewage pipe over a maximum of 200m length, and typically achieve heat outputs of around 1-2kW/m of

installation. There are only a few such installations in use at present, so the real performance is not yet known, and the costs of these systems are not well established.

- **Off-line sewage heat recovery technology:** In the UK a company called 'SHARC' have installed sewage heat recovery systems on several sites across the UK. This system is an off-line technology, in that the sewage water is taken from the sewage pipe to a separate heat exchanger and then returned to the sewage pipe and is usually used for individual buildings.

Recommendation: As with the ground source technologies, these technologies would not be viable on a district scale but could have a role on a building basis or group of buildings. Heat rejection from each building should be quantified to assess the heat recovery potential through these technologies.

c. Energy from Waste - Industrial Heat

Energy from waste is a key technology to drive district heating in the future as the heat is low carbon and can be competitively priced to make a heat network financially viable. A local wastewater treatment plant has been suggested on site, this provides a key opportunity and consultation should be conducted to quantify the energy impact for the Westerhill site.

Recommendation: As the site is predominantly industrial, there is potentially going to be a lot of heat rejection through industrial processes. Once building uses are determined, the heat rejection and recovery potential should be assessed to validate this option for heat.

d. Hydrogen Fuel

Hydrogen is an abundant element that produces no carbon emissions and when burned has a high energy density.

The UK Government announced a review into the use of hydrogen fuel cells in 2026, meaning it may be a suitable candidate once work commences, but currently is not a matured solution with strong market indicators.

However, in April 2022, UK Government's Energy Security Strategy doubled its ambition for low carbon hydrogen production capacity to 10GW by 2030. Similarly, the Scottish Government's Hydrogen Action Plan aims to create 5GW of hydrogen by 2030 and 25GW by 2045.

In Scotland, a feasibility study is ongoing for a 100-megawatt (MW) electrolyser at RWE's Markinch CHP biomass plant. This could produce green hydrogen from local and grid connected renewable energy, to connect into SGN's gas network in Fife. Additionally, many studies are being conducted across the UK to determine whether the UK's transmission networks can be repurposed for hydrogen gas. This includes SGN's Hydrogen Transmission and Storage Project, where SGN's project team will research, develop, test and evidence the compatibility with hydrogen of the Grangemouth pipeline in preparation for a first of its kind repurposing trial and demonstration in 2024. This study aims to inform future heat policy decisions and help determine the role of existing gas networks in the future delivery of heat.

Currently, there are two leading methods of producing hydrogen: electrolysis or Steam Methane Reforming (SMR).

- **Electrolysis:** works by splitting water molecules into two separate hydrogen molecules with the use of a high voltage current. When the electricity used is generated using renewable energy, this is the most eco-friendly method of producing hydrogen. This limits the on-site production of hydrogen in the future as there is little water resource on site.

- **Steam Methane Reforming:** which is the method of reacting steam with methane. A by-product of producing hydrogen this way is a carbon by-product. Although it isn't all negative, the carbon produced can be captured before it's released into the atmosphere.

Currently, both these methods are expensive and not mature for mass implementation.

Recommendation: For hydrogen, there are funding options, namely the Net Zero Hydrogen Fund, where this fund will support at-scale developments of low carbon hydrogen production during the 2020s. It is recommended that discussions with SGN are held to investigate the potential for funding options and whether this solution could be a more cost-effective solution to meet the future Building Regulations in Scotland.

4.1.3.3. Be Green Opportunities

Following are the alternative (green) heat technology solutions explored for the site:

a. Air-Source Heat Pumps

A key heating solution for the Westerhill development is through the utilisation of highly efficient Air Source Heat Pumps (ASHPs). With the New Build Heat Standards due for implementation in 2024, new buildings applying for a building warrant will be prohibited from using direct emissions heating systems to meet their space and hot water heating and cooling demand, heat pumps are expected to have a significant increase in deployment.

Air-Source Heat Pumps can be used at a building-level, where each building is provided with its own heat pump to provide heating and hot water, or on a district heating level. If part of a district heating network, an integrated strategy could be developed to determine the most cost-effective delivery of heat, using a multitude of available, renewable heat sources. A study should be conducted to determine the options for developing a multi-source heat network for Westerhill and compare the energy and cost performance against heat pumps on a building level.

Further advantages to ASHPs are as follows:

- Solution does not have to be tailored to the site's location and geography
- Aligned with current and future Building Regulations
- Trusted and proven technology across residential and non-residential developments and public has general awareness of their utilisation
- No fuel storage requirements
- Can work in conjunction with energy from sewers, mining, and other waste heat schemes.

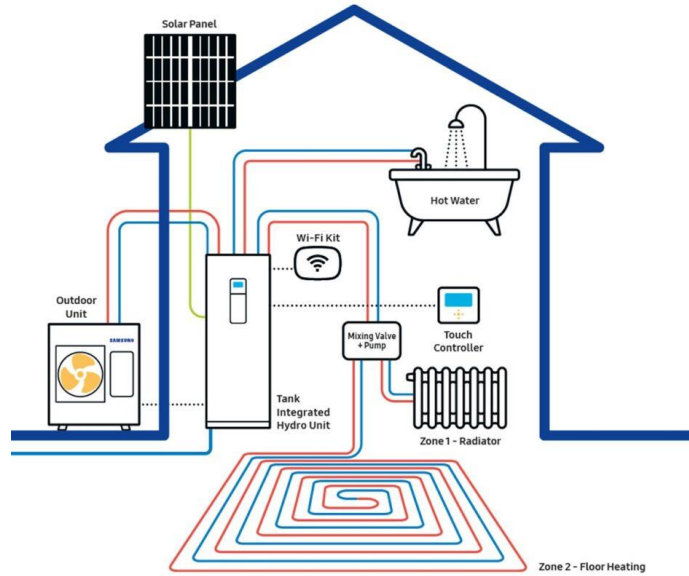


Figure 5. Example of an ASHP arrangement.

Recommendation: ASHPs should be seen as the ‘baseline’ heating technology for this development as it provides reliable, low-carbon energy and can be installed on a building-by-building level or as part of a centralised energy centre. A study should be conducted to determine the options for developing a multi-source heat network for Westerhill and compare the energy and cost performance against heat pumps at a building level.

b. Ground Source Heat Pumps

This system features individual heat pumps connect to communal borehole fields, which yield the following benefits:

- Fewer boreholes required, reducing the corresponding drilling cost
- Collective depth of boreholes is reduced
- No impact on building footprint – no requirements for a plantroom
- Distribution pipework links the borehole field to each property. All the district pipework is on the ‘cold’ side of the heat pump, operating in a temperature range of -2 to +10°C, meaning there is negligible distribution losses.
- In summer operation, there will be no heat lost to the risers, avoiding overheating issues.
- Can work in conjunction with energy from sewers, mining and other waste heat schemes.

The heat pump will serve a separate hot water cylinder in each dwelling and low temperature distribution system, likely to be either underfloor heating or radiators operating at around 40-50°C. GSHPs rely on the development’s characteristics and cannot be assumed to be suitable for the utilisation at Westerhill. Therefore, before GSHPs can become a matured solution, further analysis is required.

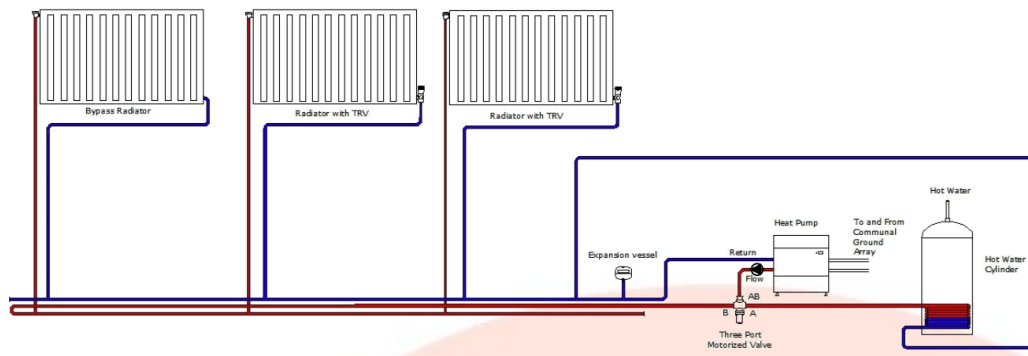


Figure 6 Shared GSHP arrangement with radiator emitters.

GSHPs provide highly efficient heat, with a shared ground array producing a COP of potentially around 3.5. A GSHP can provide a consistent year-round heat supply due to the stable ground temperature, which generally is between 8-10°C all year. This improves upon ASHPs, which are impacted by external fluctuating air temperatures, creating higher bills when heating is required the most.

The solution of a ground source heat pump with a shared ground array produces a COP of potentially around 3.5.

With abandoned mine workings around the Cadder Yard development, it could be possible to use GSHP in conjunction with geothermal energy production.

Recommendation: Similar to ASHPs, GSHP could be part of a multi-sourced heat network and the same study should be conducted as the ASHP, to determine the economical and energy performance of a ground-source heat network, alongside of heat sources.

c. Solar Energy

Photovoltaic cells can provide a clean and green energy source to reduce the consumption of fossil-fuels across site, and reduce the carbon produced through the operation of the built environment. Photovoltaic cells, along with maturing storage technologies, can reduce the peak demand from the grid and ensure the site remains highly energy and carbon friendly.

A key benefit that can be derived from the GSHP proposal, is that only a smaller array is required to meet the regulated energy use, which means there is potential for roof space to be utilised for installing larger PV arrays that could start meeting the requirements of unregulated electricity and EV charging.

Photovoltaics have the purpose of producing renewable electricity, which can be used directly, stored, or recirculated to the grid. This green production of electricity decarbonises electricity, meaning that the electricity used by the development will have less carbon intensity than previously. If the development were to be heated electronically, this has the benefit of further decarbonising the heat of the development. However, even if an alternative heat source is used, buildings still require significant electricity, through the means of cooling, lighting, auxiliary (pumps and fans) and unregulated energy, meaning the production of renewable electricity should be maximised onsite through the means of photovoltaic arrays.

Photovoltaics should be maximised both on buildings of the new development, and potentially small-scale solar farms could be installed within the development.

There is also the potential for solar hot water production onsite. However, considerations have to be made for storage facilities for each building, and as solar energy is not a consistent energy supply, the compatibility of the solar thermal system with the specified heating system must be assessed.

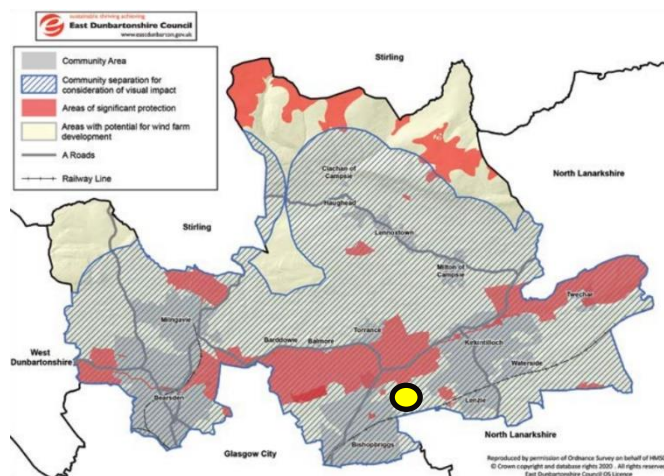
Recommendation: Solar renewable energy should be prioritised at Westerhill. An investigation to determine how to optimally use roof space, through the use of photovoltaics or solar thermal should be conducted to determine the implication on energy production and capital costs as well as the potential improved viability of all technologies supported by solar energy.

d. Wind Turbines

Building mounted turbines can be installed on roofs where there is a suitable wind resource. Often these are around 1kW to 2kW peak.

Greater certainty is found with larger wind turbines where wind speeds are more predictable. The energy generated can be significant and be a cost effective route to carbon reduction. With necessary commercial arrangements, the energy generated could be supplied to the proposed development or provide some community benefit.

The East Dunbartonshire Local Development Plan 2 (2022) provides a spatial framework map for windfarm developments. As shown below, the development is located in an area marked 'Community Separation for consideration of visual impact', meaning that wind farms may only be appropriate in limited circumstances. Further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design, or other mitigation.



The Scottish Government have developed the Onshore Wind Turbines: Planning Advice document (2014), which outlines planning consideration when specifying wind turbines. This document outlines how separation between each turbine must be 4x the rotor diameter and that the distance between the turbine and railway must be equivalent to the total height of the turbine. These factors, along with the East Dunbartonshire Local Development Plan 2, highly restricts the specification of a wind turbine(s).

turbine(s).

Scotland have schemes available to mitigate costs, such as the Community and Renewable Energy Scheme (CARES), which provides grants for local and small-scale renewable energy developments. Development loans of £150,000 are available through this scheme. A 10kW wind turbine instalment is generally around £45-55k.

Recommendation: The investment required for wind turbines tends to not be as favourable as solar photovoltaic cells and planning restrictions may limit the locations where wind turbines could be installed. Therefore, it is recommended to prioritise solar PV installation over wind turbines.

4.1.3.4. Be Smart

In order to achieve significant carbon reduction, the electricity sector is becoming decentralised whilst maintaining resilience by engaging with users and communities to develop more innovative and empowered energy systems. Through the provision of technology and tools the aim is that residents and communities will be able to generate and utilise energy as close to its use as possible.

This not only reduces inefficiencies but maximises the local benefit of the energy infrastructure and assets (e.g., solar power generation and energy storage) within the home or community, as opposed to it being taken away by third parties.

Recommendation: Achieving Energy Efficient, Smart Communities

Once the heating system design has been specified, a smart data monitoring system should be specified to determine performance of the system throughout the seasons. This would be highly valuable if a multi-sourced heat work were to be specified, as this can determine the optimum ratios of energy production for each time of year, improving energy performance and likely reducing the energy bills of the end-users.



Technologies, such as Building Energy Management Services (BEMS) allows effective control of a building's energy consumption. BEMS systems can communicate with heating systems to optimise building comfort, whilst limited energy consumption.

Other proposals in this Energy Strategy, such as photovoltaics, produce onsite electricity year-round. Smart technology could be implemented to ensure the community are the main benefactors of this energy, to ensure the energy is optimally stored and to reduce the distribution of energy to third parties. This ensures that the maximum amount of electricity used on site is also produced on site, reducing energy wastage and costs, whilst also allowing communities to engage with renewable energy solutions in their local area.

A key element will be to ensure energy efficiency is at the heart of the development and that the Fabric First and passive design approach continues to evolve and be integrated within the building designs.

Energy Storage may be important to enable businesses to exploit the benefit of the energy market. This could be through heat storage, home batteries, centralised battery storage or making use of the battery within electric vehicles.

Determining the most suitable approach is linked to cost of technology and the services specified for the commercial structures developed to exploit the benefits. Once design options are matured, smart solutions should be developed alongside to ensure the maximum benefits are achieved from these low-carbon technologies and to allow the site to further enhance its ability to be a net-zero development.

4.1.4. A Diversified Energy Solution for Westerhill

As part of the sustainability objective and net zero aspirations, the masterplan should promote energy usage that minimises carbon. This section provides high-level strategic guidance through a combination of ‘Be Lean’ - ‘Be Clean’-‘Be Green’ solutions.

Various energy saving measures and renewable technologies have been proposed for consideration for Westerhill Regeneration Area. To determine suitability, different aspects of each technology should be analysed and optimised, including financial, technical feasibility, carbon and energy metrics.

The solution for the development could be made up of a combination of the aforementioned technologies. However, to quantify the split of energy generation from each technology, the design of the development would have to be at a more mature stage. This energy strategy will develop alongside the detail of the design to provide an optimised solution for Westerhill.

The proposed steps for the implementation of a diversified solution are discussed below:

Step	Action
Determine Heat Loads	To determine the diversified energy solutions, the heating loads must be ascertained. This could then inform the amount of heat required and inform the design feasibility of a centralised district heat.
Assess Heat Sources	The diversified energy solution may be developed from several heat recovery technologies supporting the centralised energy centre. The heat available from the heat recovery technologies should be assessed in terms of energy savings and financial implications, along with technical feasibility. The technologies to be explored includes: <ul style="list-style-type: none"> • Sewer Heat Recovery • Energy From Waste – Industrial Heat
District Heating Analysis	An assessment of potential district heating options and network design should be conducted to inform the technical design, ensuring that the development can meet statutory net-zero targets in a cost-effective manner. The district heating analysis will include the sizing and location for a central energy centre as well as required electrical requirements for the heat source, if applicable. This would be complemented by the identification of Westerhill area as a designated Heat Network Zone through the production of East Dunbartonshire Council’s LHEES and Heat Network Review Statement.
Renewable Energy & Storage	It is recommended that solar energy production is maximised at Westerhill, with battery storage included to be able to add energy resilience in design and maximise the use of renewable energy onsite. It is recommended that battery storage is explored and located at the central energy centre or locally at each building. The feeding of the renewable energy into the energy centre, if electrically fuelled, should be assessed to maximise the utilisation of the solar energy.
Alternative Heating Options	If district heating is deemed unfeasible, ASHP and GSHP at a building level should be assessed as an alternative low-carbon heating system. Battery storage would have to be located at each building if this is the preferred option.

4.1.5. Transition to a Green Economy

The transition to a net zero economy in Scotland by 2045 provides several key challenges, including employment, skills, and economic implications. The Scottish Government produced the Route to 2045: Supporting the Green Economy and a Transition to Net Zero, where it outlines the forecasted investments to achieve the overall aims of the Scottish Government.

Furthermore, the Scottish Government set out their Climate Emergency Skills Action Plan 2020-2025 to address the key challenges to meet the sustainability targets of the Scottish Government and other local authorities. This plan outlines key skills and green jobs required to ensure that the transition towards technologies mentioned in this energy strategy is seamless. This includes:

- **New and Emerging Jobs and Skills** that relate to the transition to net zero. For example: hydrogen cell technicians, carbon monitoring technicians, heat pump trained installers and technicians for future businesses and industries in Westerhill.
- **Adjustments to Current Jobs and Professions:** This relates to enhancing the skills and knowledge across relevant sectors, such as architects, environment consultants, engineering teams, developers and contractors in the area and including the ones further involved in the design and delivery of the Masterplan and WDR.
- **Increased number of workers** in certain sectors, such as insulation installers, energy assessors, on-site operatives, ecology, environment and biodiversity related sectors.
- **Potential Local Outreach Activities**, including corporate representatives and community champions, with local schools and community as part of the ESG of future businesses and industries based within the proposed development.

This strategy outlines several new and novel technologies that are not yet mature in public knowledge and is low in terms of market maturity. Therefore, this development has potential to play a key part in the green economic growth outlined in the Skills Action Plan, creating green jobs, and having a positive skills implication, further contributing to the priorities and indicators in EDC Local Outcomes Improvement Plan.

4.1.6. Whole life Carbon

The environmental impact of materials and resources used during construction is significant to the whole life carbon performance of a development.

A Circular Economy Strategy for East Dunbartonshire was approved by the Council 23 March 2023 and sets out how the council as an organisation will make its own processes more circular and also how the council and its community partners will support businesses to become more circular. In October 2021, local businesses across East Dunbartonshire were asked to take part in a survey as research to inform Circular Economy Strategy.

Recommendation: The Westerhill development should ensure that it is compliant with the aims, objectives and outcomes of the Circular Economy Strategy. Early commitment to reducing the embodied carbon and environmental impact of materials and resources, and considering sourcing, conservation and re-use, should be adopted by all developers to contribute to a more sustainable outcome. Utilising materials that are also local and resilient should be ensured to reduce longer term negative environmental impacts. Framework contractors must be encouraged to upskill their subcontractors, within the local supply chain if possible, in relation to sustainability. Additionally, meeting PAS 2080 standard could be a very effective way of minimizing embodied carbon and reducing the environmental footprint. Specific targets from the Circular economy strategy that should be adhered to include:

Construction – Minimise Waste and Reuse Materials

A. Investigate research done on the ‘embodied carbon impact’ of different materials and construction processes to inform Council design specifications and stimulate the use of natural/ biodegradable construction materials.

B. Investigate the insurance and building standards implications of the reuse of materials and the use of low-carbon alternatives (for example, CLT – Cross-Laminated Timber – compared to steel).

C. Investigate opportunities and best practice in the reuse of surplus construction materials and excavated materials, either by saving them for use in future Council projects/construction, by returning them to the supplier or by finding a third party who could make use of them (such as a local business).

D. Use remanufactured materials in construction where locally available and where these meet the Council’s quality requirements for safety and longevity.

E. Undertake a baselining exercise for road resurfacing works to establish recycled content and carbon impacts over 2022/23. Alongside the online guidance for potential Council suppliers (Action 1.C), highlight the Council’s commitment to working towards circular construction.

F. Support the Circular Economy as part of the development of regeneration projects and major developments by researching opportunities to build remanufactured and/or reused materials into construction contracts.

4.2. Material and Waste

In addition to compliance with the aforementioned targets set out in the Circular Economy Strategy. To create a development that is committed to reducing construction and operational waste sent to landfill through reducing, reusing, recycling, and treatment; and which maximises the use of sustainable materials in construction:

- The waste hierarchy will be applied through guidance set by the Environmental Sustainability Plan. This will ensure the five key principles of waste minimisation will be applied at the early design stage to support the use of materials in a more efficient manner and to consider how reuse, recycling and recovery of materials can be incorporated and reduce waste to landfill.
- The design will identify the potential opportunities for reducing construction waste and seek to maximise opportunities for re-use, recycling and recovery of waste materials and thereby minimise the volume of waste to landfill. All Contractors shall comply with waste management legislation and produce a Site Waste Management Plan (SWMP).
- Five key principles of waste minimisation (design for reuse and recovery, off-site construction, materials optimisation, waste efficient procurement and deconstruction and flexibility) should be applied at the early design stage to support the use of materials in a more efficient manner and to consider how reuse, recycling and recovery of materials can be incorporated into the proposed development and reduce waste to landfill.

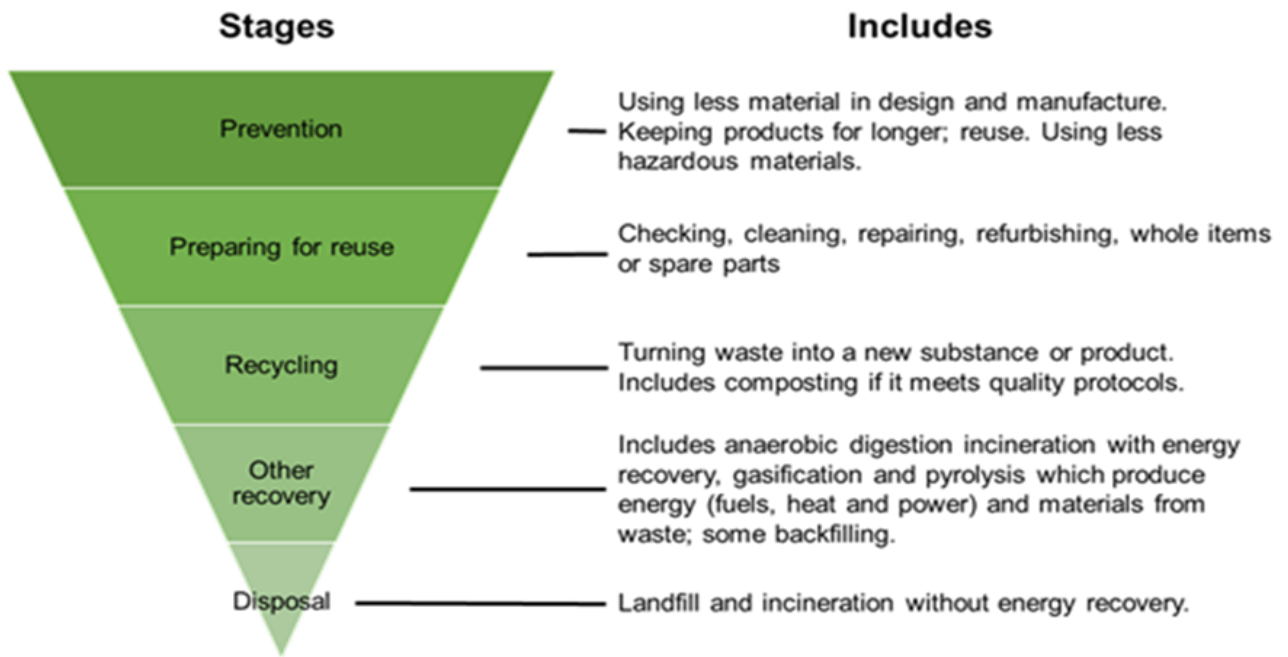


Figure 7. Waste hierarchy

Other key aspects of waste minimisation that have been considered during the design are:

- **Design complexity:** Reduce the complexity of the design to standardise the construction process and reduce the quantity of material resources required (e.g., ensure that floor to ceiling heights is consistent to encourage off-site fabrication, standardising room heights to match plasterboard dimensions and standard brick dimensions, etc.).
- **Specifications:** Avoid over specification and minimise variation in material resources, components, and joints; evaluate the reuse and recycling opportunities for the specified material resources before specification (e.g., specify windows that could be recycled in the future, etc.); and evaluate the use of materials with high recycled content (e.g., ceramic tiles, reconstituted faced stones and reconstituted slates, etc.); and
- **Alignment, location, level, and grading of the proposed development:** These have been designed to minimise excavation volumes. It has also been designed to enable flexibility in the landscaping, so that it can accommodate the changes in spoil volumes that may arise when site conditions differ from those assumed during the design. Both these approaches should enable all excavation waste (except where contaminated) to be reused onsite where conditions allow.
- **Excavation works and materials:** During excavation works, the material arising would be targeted for fill and landscaping where this is feasible, and the material is suitable. Excavated materials, such as soils, will be carefully stored in segregated piles for subsequent reuse on the site, where possible. If the material is contaminated then it will be kept separate from clean material and sent for either treatment, recycling, or recovery, where appropriate, or disposal at appropriately permitted facilities. Any surplus inert excavated materials (e.g., soils, stone, bricks, clay, rubble, rock) may be suitable for use in land reclamation projects.

Objective	Recommendations
Construction – Design out waste and minimise waste to landfill.	Specify reusable / recyclable and materials with high recycled content.

Objective	Recommendations
Operational – Maximise recycling levels and landfill avoidance.	<p>Divert 70% of construction waste by volume from landfill – following waste hierarchy and Waste & Resources Action Plan (WRAP) best practice.</p> <p>Minimise the amount of cut and fill on site, including buildings, the WDR and other site wide infrastructure.</p> <p>Develop a Code of Construction Practice for managing and monitoring construction activities.</p>
Materials – Minimise the use of natural resources and minimise embodied carbon of materials.	<p>Provision of adequate internal and external segregation and storage of waste to maximise recycling and avoidance to landfill.</p> <p>Design in suitable reuse/recycling centres and home recycling collect/bin storage.</p> <p>Maximise the use of sustainable materials in construction, including Forest Stewardship Council (FSC) certified wood for street furniture in public spaces.</p> <p>Utilise construction materials with low embodied carbon and / or internal building fixtures with verified Environmental Product Declarations.</p> <p>Explore meeting PAS 2080 standard to help to minimize embodied carbon.</p>

4.3. Water

To create a development that will be resilient to the on-going effects of climate change, ensuring it is safe from flood risk, controls surface water flows; improves water quality and has reduced water consumption. From the information provided by SEPA, a desktop assessment has been undertaken to assess the flood risk from all sources and has concluded that there is no risk of flooding from watercourses in and around the site. However, there is risk of surface flooding throughout the site.

It is crucial that developments accounts for the fact that precipitation patters have increased by about 20% in Scotland compared to pre-industrial levels and that more intensive rainfall is predicted in the coming decades as a result of on-going climate change.

Rather than increased rainfall being evenly spread across any given year, observed increases in rainfall have resulted in record-breaking intensive rainfall events, such as in Storm Babel in October 2023. Consequently, storms and rainfall-based flooding are predicted to get more intensive so the development will need to account for a continuously increasing flooding risk.

Moreover, the climate can be expected to become continuously more hostile until after net zero is reached on a global level – meaning the 2030s are expected to be more hostile than the 2020s

and the 2040s more hostile than the 2030s with a continuation of this trend until net zero is reached internationally.

Recommendation: Natural Flood Management and Sustainable Consumption

The Site would aim to be an exemplar regarding the provision of Sustainable Urban Drainage Systems (SuDS) and multi-functional green space, promoting Water Sensitive Urban Design (WSUD) principles. This would ensure that flood risk is mitigated during each development phase and cumulatively as the phases progress, whilst also reducing water demand and maximising overall environmental benefits.

- Some recommendations as part of the detailed drainage strategy preparation include.
 - Establish whether infiltration is possible across the site and undertake further infiltration testing.
 - Adoption and maintenance requirements for specific SuDS components to ensure the site drainage is sufficiently designed so as not to cause any flooding during a 1 in 30-year event and to determine appropriate exceedance routes.
 - Manage potential construction impacts such as dealing with additional polluted runoff from bare, compacted, or muddy surfaces during construction phases.
 - To provide other SuDS components (e.g., swales, raingardens, soakaways, and permeable paving) in development parcel areas outside of the allocated Green Infrastructure (GI), to manage surface water on a more local level and increase long-term attenuation storage.
- Other technologies that can be potentially used at Westerhill include:
 - Rainwater harvesting at property level or community level for non-potable usage can be considered but the limitations and practical considerations should be established to understand the effectiveness and viability of delivering such measures at Westerhill.
 - Rainwater harvesting from the strategic SuDS facilities to be further explored.
- Water strategy will have an impact on Biodiversity, Buildings and Waste Strategies and accessibility and will be key to ensure enhanced experiences and quality of blue and green infrastructure for the residents and limiting water consumption and pollution. Water consumption should be limited to 110 litres/person/day.
- By monitoring and managing water sources, the residents can be made aware of risks due to pollution during operational phases of the Development. Further, a regional Flood Risk Assessment must be undertaken to assess future flood risk in the region from the proposed development in Westerhill.

4.4. Biodiversity

The proposed development in Westerhill will impact on local biodiversity and peatland habitat, and decisions made at the masterplanning stage will have a significant bearing on the extent to which this impact is positive or negative. A Preliminary Ecological Appraisal (PEA) was undertaken at the site of the proposed Westerhill Masterplan Area in East Dunbartonshire to identify the likely key ecological constraints and opportunities for the project and highlight mitigation or further data collection requirements for progression with the proposals.

The PEA consists of recommendation for general biodiversity enhancement of the site which include installation of hedgehog boxes within the landscaping to encourage uptake of the site by hedgehogs. Installation of livestock fencing to keep livestock away from areas inhabited by water voles to increase chances of burrowing. Log piles / Hibernacula and more ponds could be instated within the site to provide suitable habitat for amphibians.

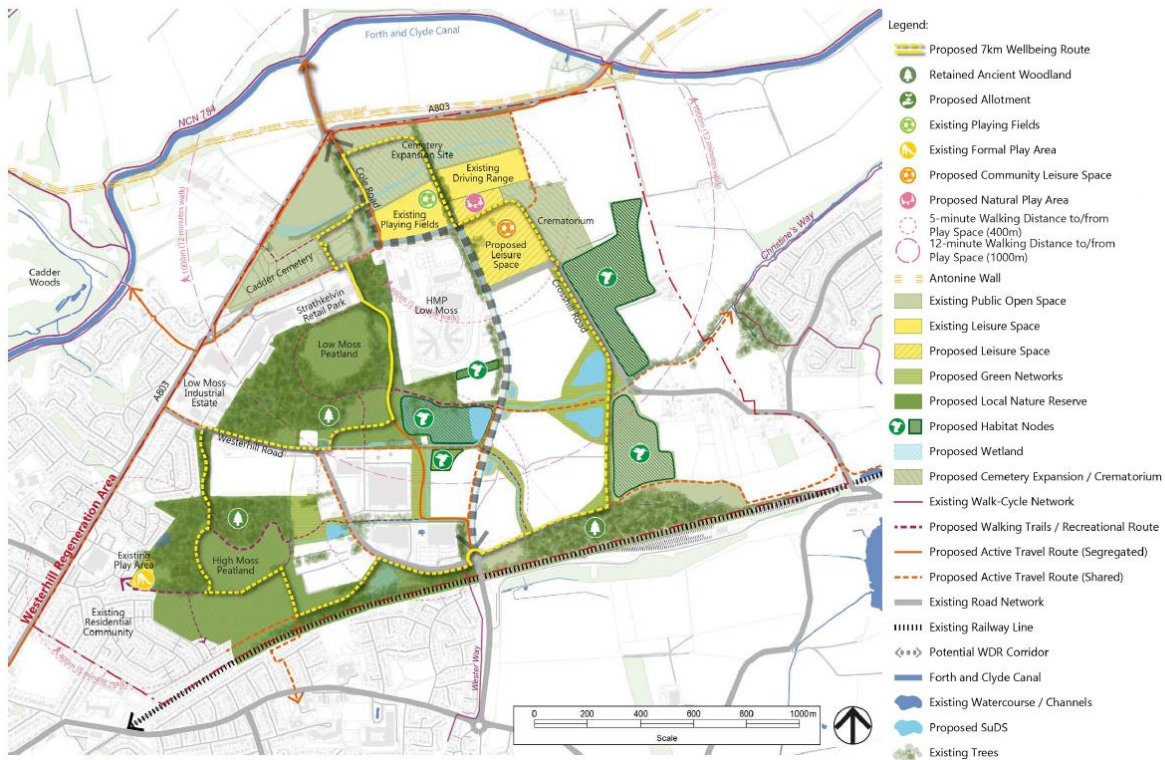
Westerhill Regeneration Area should be a place where biodiverse landscape is integral to the form and structure of the development; and which provides a place for people to work, enjoy and relax. The masterplan and SEA will help identify opportunities in more targeted detail regarding peat habitat restoration and contribute to the enhancement of biodiversity. In addition, a Habitat Management Plan should be prepared to protect and enhance the ecology and biodiversity throughout the Masterplan area

To conform to LDP Policies 3.NE, 3.R and 17, the following are essential:

- Protection and enhancement of Local Nature Conservation Sites (LNCS) such as High and Low Moss Plantation Sites and Cadder Yard and high-quality peat areas.
- Creation of potential habitat nodes to link existing habitats together, and to protect and improve ecological conditions of the site.
- Support the promotion of local and regional nature-based tourism at Westerhill with links to Antonine Wall and Forth and Clyde Canal in line with Policy 16 and Policy 3 designations WH1, GN2.

The Masterplan proposes the creation of a Local Nature Reserve (LNR) extending to 67.3ha which will help support establishment of a greater area of designated green habitat with retained ancient woodland, benefiting surrounding communities. Preservation and enhancement of Low Moss and High Moss Plantation Sites, retained ancient woodland, and high-risk peat areas as part of the proposed LNR to serve as key lung space for communities”

The proposed development of habitat nodes at Westerhill must conserve and enhance landscape character, biodiversity, good quality soils and peat and carbon rich soils in adherence to the LDP2, Policies 3.NE and 17.



The proposed development of habitat nodes at Westerhill must conserve and enhance landscape character, biodiversity, good quality soils and peat and carbon rich soils in adherence to the LDP2, Policies 3.NE and 17. Further details are outlined below and in the subsequent image.

Riparian Wetland

- **HN1:** Biodiversity rich area including an attenuation pond and permanent water feature. Protective measures should be employed to ensure that the peatland would not be damaged. SuDS attenuation pond is outwith the wetland area and must not be located in areas of deep peat, and should not be considered as a part of peatland restoration.

Orchards / Woodlands

- **HN2:** A variety of fruit and flowering species as an addition to the allotment and community hub area. Tree planting and high-quality landscaping as part of all individual developments in the masterplan area.

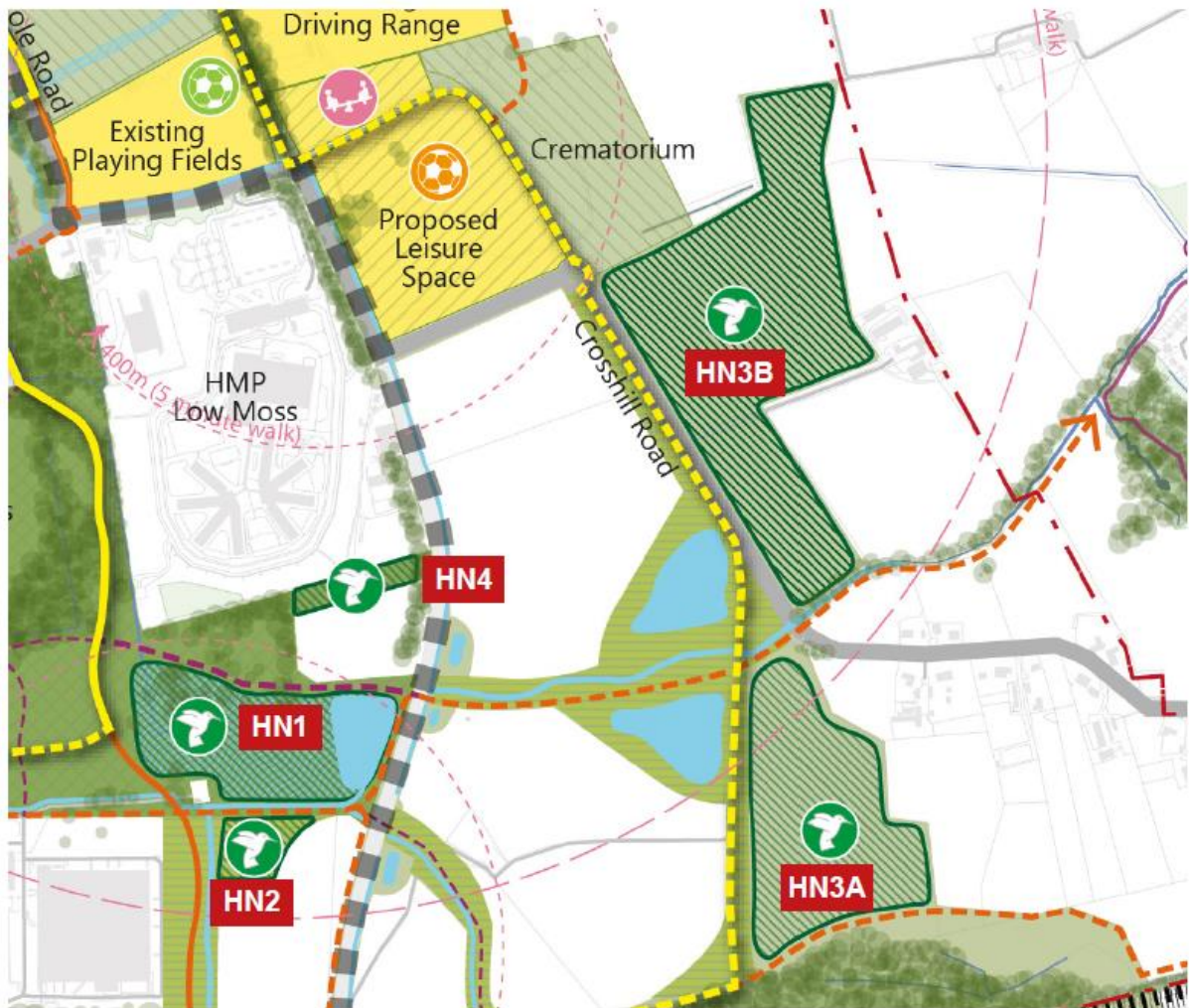
Peatland Restoration and Woodland Creation

- **HN3A:** Protection and enhancement of the recently planted broad-leaved plantation woodland and semi natural woodland, and extension of woodland planting to create a habitat edge along the eastern boundary of the site.
- **HN3B:** Ensure positive impact on carbon rich soils and hydrology, no detriment to restored peatland habitats and potential enhancement through planting peatland plant communities such as peat grasses and very short woody shrubs.

Hedgerow Habitat

- HN4 Species rich grassland with hedges and intermittent trees.

It is recommended that a Habitat Management Plan is prepared to provide necessary guidance to maximise the impact of protecting and enhancing the ecology and biodiversity at these sites and throughout the Masterplan area through various measures such as creation of wetland, habitat nodes comprising new woodland, hedgerows, orchards, biodiverse planting, corridors for habitats, green networks, management and enhancement of LNCS and WHS Buffer Zone areas within Westerhill Regeneration Area.



Objective	Target
<p>Protect and enhance habitat; provide green corridors that link spaces across the site and promote healthy lifestyles.</p>	<p>Use landscape and green infrastructure elements as one of the key design principles to inform layout.</p> <p>Retain, protect, and enhance existing habitat through use of Habitat Management Plans.</p>

<p>Protect, minimise, and mitigate impact to the environment.</p>	<p>The most up-to-date Management prescriptions for LNCS should be followed and developed further as necessary.</p> <p>Protection of existing green spaces and green networks, and provision of multi-functional open spaces in the masterplan design for nature conservation, leisure and recreation.</p> <p>Integrate green infrastructure strategy with water management to create green and blue corridors to facilitate natural flood management.</p>
<p>Avoid development on peat and peatland habitats</p>	<p>Minimise environmental impact of construction to green infrastructure via air, noise, vibration, light, soil, and water. Longer term considerations (e.g. effect of lighting on nocturnal species like bats) should be properly considered and advised upon by a qualified ecologist.</p> <p>Conduct detailed peat habitat surveys and peat depth surveys during construction.</p>
<p>Where avoidance of peat is not possible, minimise impact on peat and peatland habitats and encourage restoration.</p>	<p>Adopt alternative construction techniques such as floating roads and piled turbine foundations to avoid peat disturbance.</p> <p>Carefully plan drainage on the site and ensure good maintenance of mitigation measures on peatland.</p> <p>The emissions that stem from peatland excavation outlined in the previous section combined with the Climate Emergency declared by the Scottish Government in 2019 and the local and national net zero targets set for 2045, mean that establishing a Peatland Management Plan to minimise disruption and support preservation of the peatland for any peat lower than 0.5m in depth will be crucial.</p> <p>Any disturbance of peat must also be fully justified against NPF 4 Policy 5.</p> <p>Enhance Westerhill's capabilities to restore peatland where necessary to maintain and improve carbon storage within the site.</p> <p>Ensure peatland habitat values are reflected in the support given to those who manage and restore them.</p> <p>Section 5.1.2 Peatland and Carbon Rich Soils in this report also includes recommendations for Peatland Management for carbon storage which will in turn contribute to enhance the biodiversity of the site.</p>

4.5. Buildings

To create a net zero carbon development that delivers buildings that people want to use; set within attractive spaces that respond to their environment and are adaptable to future use and climate change. The following targets help with holistic sustainable building design:

New build housing will be subject to the New Build Heat Standard from 2024 through the Building (Scotland) Amendment Regulations 2023. The NBHS will prohibit the use of direct emissions heating systems in new buildings applying for a building warrant from 1 April 2024 onwards. All new installed heating systems must be zero direct emissions heating systems from that date and this will directly impact provision of all housing including affordable housing.

The Heat Networks (Heat Network Zones and Building Assessment Reports) (Scotland) Regulations 2023 include a heat networks duty on local authorities. This includes identifying potential areas for Heat Network Zones (HNZs) within East Dunbartonshire and this will be done through both the development of the LHEES and the production of the Heat Network Review Statement. The requirements of the Heat Networks Act, which include the production of our statutory Heat Network Review Statement in early 2024.

East Dunbartonshire’s Local Housing Strategy incorporated the following targets to deliver on this legislation:

Action 2.3 Reassess capital investment plans to work towards energy efficiency targets, ensure compatibility with net zero targets, and include retrofit of the following: energy efficiency measures, heating and ventilation systems and renewables while ensuring adherence to the New Build Heat Standard.

Action 2.7 Adopt joint working approaches with agencies and services to contribute to the delivery of statutory net zero targets, actions to be confirmed in the LHEES delivery plan and actions to promote climate resilience in the Climate Action Plan.

Additional Action 2.21: Adopt joint working to ensure the early identification of potential areas for Heat Network Zones and the alignment of housing development with the LHEES delivery plan and the Heat Network Review Statement.

Additionally, Policy 9 of LDP2 (Climate Change, Sustainability and Energy Infrastructure) sets out quite specific requirements for new development based on the energy hierarchy in addition to details and expectations relating to climate change adaptation, use of materials and water consumption.

LDP2 Westerhill policy requires that future development must adhere to a *“design criteria which will ensure that all development on site is of high design quality, sustainable and energy and heat efficient, inclusive and set within the green and active travel networks.”*

Objective	Target
Buildings that are integrated into their environment, are accessible and feel safe.	A cutting-edge, net zero development focussed on maximising economic impacts with integration of social and community facilities and exploiting the net zero USP with accessible connections to surrounding communities. Adopt Secure by Design standards.
Buildings that are resilient to the on-going impacts of climate change, including flood risk, storms, and extreme temperatures.	Locate buildings outside areas of flood risk, including mitigation of flooding from surface water within the context of increasing precipitation. Dynamic thermal simulation is undertaken on all buildings to demonstrate they do not overheat. This must include a scenario for climate change.

Buildings that use less energy, have net zero heating systems and are economic to run, with access to active travel and efficient future-ready public transport systems.

Integration of landscape places within individual plots, including trees, planting and SuDS.

Buildings are accessible for all abilities and lifestyles.

Non-residential buildings should achieve BREEAM 'Very Good' and aim for 'Excellent.' Utilise Green Build specifications.

All homes should be certified under Home Quality Mark (HQM).

Integrated, well-lit, maintained, segregated and safe walking and cycling network to and from plots and to the surrounding communities.

Integrated public transport network to enable modal shift.

Enable electric vehicle charging with potential mobility hub.

Buildings should be equipped with technology for data analysis and monitoring of energy, waste, and water.

Provision for biosolar green roofs should be considered.

4.6. Community and Culture

To create a healthy and vibrant community that is empowered, self-resilient and takes responsibility for its interaction with the environment and successfully integrates with neighbouring communities.

LDP2 Westerhill policy also requires protection and enhancement of Antonine Wall World Heritage Site and its buffer zone

Objective	Target
Provide space that promotes social interaction.	<p>Provide space for formal and informal community use.</p> <p>Create 'walkable neighbourhoods' adopting the principles of 20-minute communities.</p>
Provision of appropriate social infrastructure.	<p>Protection and enhancement of Antonine Wall World Heritage Site and its buffer zone should be included in line with LDP policy 2.</p> <p>Provide adequate access to local, walkable services and facilities in Strathkelvin Retail Park, Bishopbriggs and surrounding communities that can be accessed by future businesses.</p>
Promote a sense of sustainable identity as a clear USB to investors and source of pride for residents conducive to wellbeing through promote to green spaces, safe active travel routes and flourishing biodiversity.	<p>Provide as appropriate and applicable, community facilities with creche, gymnasium, visitors information point, toilets and others to support the businesses in Westerhill and visitors.</p> <p>Conveniently locate community and social infrastructure facilities along safe walking and cycling routes and ensure they are served by buses.</p>

Embed a sense of sustainable identity and understanding of collective responsibility with landowners, developers, future businesses and residents of the surrounding communities towards the nurturing the ecological value of the site and cherishing the shared environment. Learning programmes for the local community and in local schools can be delivered to foster community stewardship.

4.7. Sustainable Transport

Policy Context and Recent Trends

Transport is Scotland's largest sectoral emitter, accounting for 10.9 millions of tonnes of carbon dioxide equivalent (MtCO₂e) or 26% of Scottish emissions in 2021 (excluding shipping and aviation) and 24.4% of overall emissions in East Dunbartonshire, or approximately 113,400 tonnes of CO₂e.²⁴

Recent changes to national government policy has led to the introduction of low emission zones, climate adaptation initiatives and to elevate the placemaking agenda. Similarly, East Dunbartonshire Council has been strengthening environmental policies by approving the Climate Action Plan's Evidence and Options Report on 28th September 2023, which included an agreement on a net zero target of 2036 for Council's direct emissions (including emissions from the fleet of vehicles and buildings) and energy that the Council purchases (such as electricity). This is in addition to a target of 2045 for all other emissions, including those in the East Dunbartonshire Area as a whole.²⁵ As Transport is the highest emitting sector in Scotland and in East Dunbartonshire, it will be a core focus of the Council's emerging Climate Action Plan.

The National Audit Office underscores the significance of transport emissions in their 2022 report on addressing climate change in Scotland: *"Travel and transport emissions will need to be radically reduced to allow Scotland to meet its net zero targets and mitigate the impacts of climate change."*²⁶

Additionally, the Scottish Government's independent report on delivering Environmental Strategy Outcomes notes that strengthening measures to promote reduced car-use, including re-prioritising transport spend towards public transport and 20-minute neighbourhoods will be key to Scotland delivering on its net zero targets.²⁷

The sustainable transport hierarchy highlight the different modes of transport with the least emission intensive at the top of the pyramid.²⁸

²⁴ Scottish Greenhouse Gas Statistics 2021 - gov.scot (www.gov.scot)

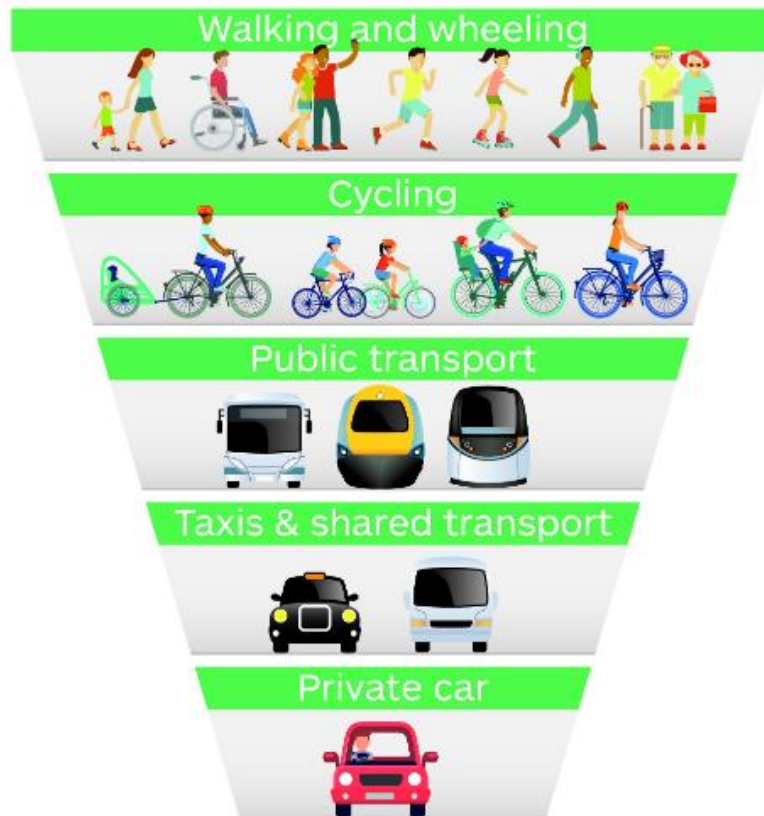
²⁵ Agenda for Council on Thursday, 28th September, 2023, 5.30 pm (modern.gov.co.uk)

²⁶ Audit Scotland (2022) Addressing climate change in Scotland A summary of key recommendations for public bodies, <https://www.audit-scotland.gov.uk/publications/addressing-climate-change-in-scotland>

²⁷ Scottish Government (2024) The Environmental Strategy for Scotland: Delivering the Environmental Strategy Outcome on Scotland's Economy: Evidence Base and Policy Levers <https://www.gov.scot/publications/environment-strategy-scotland-delivering-environment-strategy-outcome-scotlands-economy-evidence-base-policy-levers/documents/>

²⁸ Scottish Government (2021) National Transport Strategy2 <https://www.transport.gov.scot/publication/national-transport-strategy-2/>

Prioritising Sustainable Transport



Reaching net zero targets is only possible with a move away from transport on the lower end of the diagram, such as the private car, to more sustainable modes that are higher up the sustainable transport hierarchy – known as modal shift. This is a significant challenge since cars account for an estimated 38% of all transport emissions²⁹ and approximately 48.7 billion vehicle kilometres were driven by motor vehicles on Scottish roads in 2019, an increase of 1% on 2018, 8% over five years and 10% higher than in 2009.³⁰

The Scottish Government has therefore set targets in line with modal shift such as a reduction in car kilometres by 20% by 2030 as part of a drive to deliver on their net zero target. While there is a role for electric and hydrogen vehicles in reducing emissions, the emission-intensive manufacturing process combined with the fact that individual vehicles still contribute toward congestion and poor air quality through particulate matter from their tyres and brakes means that a transport-based model of private vehicles is sub-optimal from a health, social and environmental perspective even when vehicles are electric or hydrogen powered.

²⁹ Scottish Government (2022) Climate Change Plan: Monitoring Reports 2022 [Supporting documents - Climate Change Plan: monitoring reports 2022 - gov.scot \(www.gov.scot\)](#)

³⁰ *Transport Network* (2021) Scotland losing the battle on sustainable transport [Scotland losing the battle on sustainable transport - The Transport Network \(transport-network.co.uk\)](#)

Furthermore, walking, wheeling and cycling (active travel) is associated with significant improvements in the traveller's physical health and^{31 32 33} mental health^{34 35} in to reducing detrimental health impacts for other people^{36 37} while providing benefits to local economies.^{38 39}

The health and economic dimensions are significant with physical inactivity costing the NHS around £91 million annually. Physical inactivity also results in approximately 2,500 premature deaths in Scotland each year, and is the second biggest cause of mortality (joint with smoking).⁴⁰ It is not just those travelling actively who benefit from an increase of the proportion of a community travelling actively: there are also health-based implications for all residents from a low proportion of people using active and public transport since motorised transport can increase risk of accidental injury and disrupt communities⁴¹ with potential implications for well-being through reducing levels of physical activity and social interactions.⁴² The volume and speed of traffic and long commutes can also be detrimental to health.⁴³ Therefore, barriers to active travel, particularly safety concerns, also hamper health and economic outcomes.

Public transport also has the potential to encourage active travel,⁴⁴ improve health outcomes⁴⁵ while reducing carbon emissions⁴⁶ and improving access to services and facilities and connect communities.⁴⁷ There is a strong equalities dimension to this with certain groups in the population being disproportionately affected by the lack of available and affordable public transport⁴⁸ while some people find it necessary to purchase a car even when they cannot afford it⁴⁹ which is a growing issue

³¹ Department for Transport (2014) Claiming the Health Dividend: A summary and discussion of value for money estimates from studies of investment in walking and cycling [DfT publications template - colour \(Word 2013\) \(publishing.service.gov.uk\)](#)

³² Department for Transport (2019) *Future of Mobility: Urban Strategy Moving Britain Ahead* [Future of mobility: urban strategy - GOV.UK \(www.gov.uk\)](#)

³³ Rissel C, Curac N, Greenaway M, et al. (2012) Physical Activity Associated with Public Transport Use - A Review and Modelling of Potential Benefits. *International Journal of Environmental Research and Public Health* 9: 2454-2478

³⁴ Sustrans (2016) The Role of Active Travel in Improving Health Toolkit Part 3: The role of active travel in improving mental health [4464.pdf \(sustrans.org.uk\)](#)

³⁵ See [Cycling to work linked with better mental health | The University of Edinburgh](#)

³⁶ Staatsen B et al. (2017) INHERIT: exploring triple-win solutions for living, moving and consuming that encourage behavioural change, protect the environment, promote health and health equity. Brussels: EuroHealthNet; [www.inherit.eu/wp-content/uploads/2017/06/INHERIT-Report-A4-Low-res_s.pdf](#)

³⁷ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport__health_and_wellbeing.pdf](#)

³⁸ Living Strattes (2014) The business case for better streets and places [www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf](#)

³⁹ See [Walking and cycling: the economic benefits \(tfl.gov.uk\)](#)

⁴⁰ Scottish Government (2014) *A More Active Scotland - building a legacy from the Commonwealth Games* [A More Active Scotland - building a legacy from the Commonwealth Games - gov.scot \(www.gov.scot\)](#)

⁴¹ Cooper E, Gates S, Grollman C, et al. Transport, health, and wellbeing: an evidence review for the Department for Transport. London: NatCen; 2019. [Transport, health and wellbeing \(publishing.service.gov.uk\)](#)

⁴² Mueller N, Rojas-Rueda D, Cole-Hunter T, et al. (2015) Health impact assessment of active transportation: A systematic review. *Preventative Medicine* ;76:103–114.

⁴³ Beute F, Davies Z, de Vries S, et al. (2020) Types and characteristics of urban and peri-urban blue spaces having an impact on human mental health and wellbeing. EKLIPSE Expert Working Group, UK Centre for Ecology & Hydrology, Wallingford, United Kingdom

⁴⁴ Gates, S. et al. (2019). Transport and inequality: An evidence review for the Department for Transport. NatCen [Transport and inequality \(publishing.service.gov.uk\)](#)

⁴⁵ Patterson R, Webb E, Hone T, et al. (2019) Associations of Public Transportation Use with Cardiometabolic Health: A Systematic Review and Meta-Analysis. *American Journal of Epidemiology* 188(4):785-795

⁴⁶ Report to the Scottish Government (2017) Aether Evidence Review of the Potential Wider Impacts of Climate Change Mitigation options: Transport sector [https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2017/01/evidence-review-potential-wider-impacts-climate-change-mitigation-options-transport/documents/00513155-pdf/00513155-pdf/govscot%3Adocument/00513155.pdf](#)

⁴⁷ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport__health_and_wellbeing.pdf](#)

⁴⁸ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport__health_and_wellbeing.pdf](#)

⁴⁹ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport__health_and_wellbeing.pdf](#)

with average cost of comprehensive car insurance costs rising an estimated 58% to £995 in 2024⁵⁰ and a significant increase in the cost of second hand car (see table 1).

Table 1 – average asking price of second-hand cars in the UK⁵¹



This increase has led to the ONS to significantly increase the weighting of second-hand cars.⁵²

Period (Feb-Dec)	Owner-occupiers' housing costs	Actual rentals for housing	Second-hand cars
2018	16.9%	6.9%	1.4%
2019	16.5%	6.9%	1.4%
2020	16.3%	6.8%	1.4%
2021	18.5%	7.4%	1.2%
2022	17.3%	6.9%	2.0%
2023	16.0%	6.4%	2.1%

Source: Consumer price inflation, updating weights, from the Office for National Statistics

Consequently, there is a clear financial case for facilitating access to active transport for residents and businesses in East Dunbartonshire in order to make living car-free a more viable option for households.

⁵⁰ Car Insurance Price Index (2024) retrieved from [Has car insurance gone up? - Confused.com](https://www.confused.com/news/has-car-insurance-gone-up/)

⁵¹ Fleetnews (2024) [December marks fourth consecutive month of decline for used car prices \(fleetnews.co.uk\)](https://www.fleetnews.co.uk/news/used-car-prices-decline/)

⁵² Office of National Statistics (2024) [Impact analysis on transformation of UK consumer price statistics - Office for National Statistics](https://www.ons.gov.uk/indicesandprices/indicesandprices/weightsforconsumerpricesindexincludingowneroccupiershousingcosts) - Weights for Consumer Prices Index including owner occupiers' housing costs (CPIH)

However, across the west of Scotland, there has been a long-term decline in patronage on public transport, with patronage reducing by 32% between 2009/10 and 2019/20. This fits into a wider trend of bus patronage declining across Scotland since the late 1990s.⁵³ Patronage reduced further during the pandemic, decreasing by 34% between 2019/20 and 2021/22.⁵⁴ This has led to East Dunbartonshire Council passing a motion in December 2023 that recognises “existing bus services in East Dunbartonshire and across the wider region is not delivering for passengers or wider society within Strathclyde.”

Key challenges cited include:

- Above inflation increases to bus fares.
- Sustained patronage decline
- Shrinking network coverage.
- Congestion induced delays

The Climate Change Committee is clear that it is not possible to reach net zero emissions through technological solutions alone and that over 60% of the measures needed to reach net zero emissions will require some degree of behavioural or societal change⁵⁵.

Scotland's updated Climate Change Plan projects annual emissions from transport falling by 44% between 2021 and 2030. This will need decisive action to achieve modal shift and the National Transport Strategy has “taking climate action” as a core aspect of its vision, with transport investments expected to “help deliver our net zero target”, “adapt to the effects of climate change” and “promote greener, cleaner choices”. The associated policies to achieve these outcomes include:

- Reduce emissions generated by the transport system to mitigate climate change
- Support management of demand to encourage more sustainable transport choices
- Facilitate a shift to more sustainable and space-efficient modes of transport for people and goods

Reducing car use is essential for the transport system to be decarbonised at a pace that meets the statutory emissions targets set by the Scottish Parliament. This may require Council to make tough decisions and reject unsustainable development.

Westerhill Masterplan Transport Infrastructure

Significant investment in major road projects has been found to release induced demand where the investment results in additional trips by car rather than redirecting existing traffic or reducing congestion on existing roads.⁵⁶ In addition to generating significant emissions during construction, car-orientated transport locks in higher emission travel choices for years to come.⁵⁷

As a result, the Westerhill Development Road will clearly have a detrimental impact on net zero targets. Numerous additional initiatives will need to accompany the masterplan to ensure that it leads

⁵³ Scottish Parliament Information Centre (2019) [You get what you pay for – 20 years of devolved transport policy – SPICe Spotlight | Solas air SPICe \(spice-spotlight.scot\)](#)

⁵⁴ SPT (2023) Strathclyde Regional Bus Strategy and Delivery Plan: Case for Change [REPORT \(spt.co.uk\)](#)

⁵⁵ Climate Change Committee (2019) Net Zero – The UK's contribution to stopping global warming <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

⁵⁶ Department for Transport (2018) LATEST EVIDENCE ON INDUCED TRAVEL DEMAND: AN EVIDENCE REVIEW An Evidence Review [Latest evidence on induced travel demand: an evidence review \(publishing.service.gov.uk\)](#)

⁵⁷ Scottish Parliament Information Centre (2019) [You get what you pay for – 20 years of devolved transport policy – SPICe Spotlight | Solas air SPICe \(spice-spotlight.scot\)](#)

to the overall reduction in transport emissions that is required to be compatible with Scottish Government policy.

More specifically, the masterplan would need to result in modal shift **above and beyond the Masterplan area** to help to offset the inevitable increase in emissions that the Westerhill Development Road would create.

The Westerhill Masterplan should therefore consist of infrastructure-based incentives that prioritise the most sustainable forms of transport on the sustainable transport hierarchy while creating disincentives for the least sustainable, such as the private car.

For example, it crucial that any road construction in the Westerhill Masterplan is accompanied by full coverage of high-quality, segregated, and prioritised active travel infrastructure with lighting that links up to other active travel infrastructure in surrounding areas to make cycling, walking and wheeling a safe and viable option.

Safety is consistently cited in transport surveys as the number one barrier to people cycling, therefore, ensuring that safe active travel options are lit in winter months and maintained all year could both, help to drive modal shift and help to make living car-free a more viable option for households thus supporting the poverty alleviation potential of reduced car dependency within the context of recent increases in costs of second hand cars, insurance and fuel. Active travel infrastructure having zebra-crossing based priority over road-based transport is also key to driving modal shift.

It is also important to recognise that electric bikes and scooters are making active travel much more accessible, including to new demographics, and that safe, encased storage should be a priority at key sites in the masterplans, such as employment sites and the active travel hubs and major employment sites so that these newer and often more expensive bikes and scooters can be stored safely.

Building the Westerhill Development Road unaccompanied by sustainable transport infrastructure in the initial stages of the masterplan will lock in additional emissions from the by making private car one of few viable travel options and could be seen as acting against Scottish government policy on modal shift and emissions reductions. It is therefore key that at the very least, active travel infrastructure is treated as having parity of esteem with private car-based infrastructure and by extension the masterplan ensures that this infrastructure is delivered in the early stages. This is crucial to reduce the risk that the road is built but active travel routes are not.

Additionally, smaller areas of land should be allocated for parking to ensure that the incentives for active travel and public transport are stronger than for the private car.

Existing modal share in the Transport Strategy is summarised below.

Table 5.4 2011 External to Internal Mode Share

Mode	2011 Mode Share (2011 census data)
Train/metro	0%
Bus/coach	9%
Car (driving)	67%
Car (passenger)	4%
Bicycle	0%
On Foot	20%
Other	0%

The fact that the data indicates that 0% of people traveling by bikes in the area (albeit with old data from the 2011 census) suggests that significant coordinated network improvements will be necessary to make bikes a viable form of transport.

Furthermore, specific problem cited for active travel in the Sustainable Transport Strategy included:

- Lack of segregated footways alongside carriageways
- Lack of safe crossing points
- Gaps in existing cycling network – No connectivity between site and surrounding network, demonstrated
- Lack of cycling facilities including cycleways, cycle storage and wayfinding

This underscores how a new road in a highly car-dependent area is unlikely to release active travel in isolation: the Westerhill masterplan's high standard, segregated, prioritised, maintained and lit active travel infrastructure would therefore need to act as a catalyst for wider-active travel infrastructure development in the area.

This will only be possible if the active travel infrastructure links to key sites and routes around the Masterplan areas, including two railway stations, Lenzie and Bishopbriggs, which offer journeys to/from Glasgow, Edinburgh, Alloa and Dunblane, and to the frequent bus services at the boundary of the site and to the National Cycle Route 754.

Parking and encased, secure bike-storage at key sites such as bus stops and train stations, would also be key for giving people confidence that their bikes / scooters are safe, especially for e-bikes, in a coordinated network. This could include establishing mobility hubs and mini hubs at key work sites and key public transport sites.

The mobility hub would comprise facilities such as: bus stop, secure bike parking, docked cycle/e-bike/e-scooter hire, car club hire, community facilities, and delivery hub, while mini mobility hubs/cycle hubs are also proposed as points of connectivity and would comprise of facilities such as docked cycle / e-bike / e-scooter hire, secure encased cycle parking, bus stops with shelter and ticketing facility.

Moreover, the allocation of large areas of land for parking is likely to be sub-optimal from both an environmental and economic point of view. Environmentally, as it will incentivise additional car usage instead of sustainable transport and introduce additional non-permeable surfacing. Economically because it will create dead-weight in terms of space allocation which could have accommodated greater density of buildings, which would support the case for lower-cost heat through a heat network.

Grey fleet and employee commuting are included in many organisations' net zero targets. Westerhill must provide viable options for these targets to exploit the unique net zero USP, particularly given the growing number of globally significant companies that are setting net zero targets.⁵⁸

Investment in electric vehicle infrastructure/charging points could also create the potential to significantly reduce emissions from transport. Given the projected shift from direct fossil fuel emitting vehicles to electric vehicles, the Westerhill Masterplan must have infrastructure that accounts for this shift.

However, while there is clearly a role for electric and hydrogen vehicles in reducing emissions, the emission-intensive manufacturing process combined with the fact that individual vehicles still contribute toward congestion and poor air quality through particulate matter from their tyres and brakes means that a transport-based model of private vehicles is inherently sub-optimal from a health, social and environmental lens even when vehicles are electric or hydrogen powered.

Equally, permitting car parking within the development parcels at or above parking standard levels may, in combination with the proposed new road infrastructure, be seen as acting contrary to national transport policy and a commitment should therefore be made to discourage this and avoid the masterplan being seen as a car-centric development. Reduced parking places would also help to increase demand for active and sustainable travel.

As noted in the Westerhill Regeneration Area Masterplan: *“Allocated car parking should be integrated into the landscape. Provision for the number of parking required may be decreased provided that the development is supported by good connections to the public transport network and the proposed active travel network.”*

It is therefore important that the parking areas that are proposed to be located within each development parcel, reflect national transport policies for reduced car use in addition to including integrated SuDS in the form of swales and tree planting, further contributing to the Biodiversity Net Gain.

Other compelling opportunities for the site to promote sustainability include:

- Investigation of the feasibility of and potentially deliver a bus-based Park and Ride facility.
- Safeguarding of land for a potential rail station, working with Network Rail and North Lanarkshire Council.
- Traffic calming measures to ensure that active travel and sustainable travel have priority.

In order to ensure that there is not a lag between the high-carbon infrastructure such as the roads, and the low carbon infrastructure, it is recommended that the cycle routes are funded at the same time as the initial developments and mandatory planning contributions from developers are used to expand additional active travel infrastructure above and beyond these core requirements. The project leveraging funding or active travel infrastructure above and beyond the development could be an effective way of taking cars off the road by creating more viable alternatives for drivers and therefore offsetting emissions that will be unlocked from the creation of new roads.

⁵⁸ See ["Corporate net zero" "climate commitments" "Paris..." | Net Zero Tracker](#)

Primary active travel route proposed separate to the WDR, including a 4m wide segregated bi-directional cycleway with 2m wide footpath, to serve as a primary north-south route for travel connecting the National Cycle Network along the Forth and Clyde Canal, Strathkelvin Retail Park, proposed Local Nature Reserve, proposed Westerhill community and existing Industrial Estate, and proposed Lenzie- Bishopbriggs active travel route along the railway line to the south.

Additionally, incentivising public transport options, including with bus prioritisation, could help to reduce the quantity of additional emissions that would stem from building a major road.

Within the context of increasing costs of second-hand cars and car insurance, there is a strong poverty-alleviation based argument for prioritising active transport and sustainable transport in addition to the health and environmental arguments. More specifically, reducing the need for households to have cars could help to reduce exposure to future increases in these costs. This is only possible with, safe, well-maintained, lit and fully connected cycle infrastructure.

Reducing reliance on private cars can also reduce localised congestion which supports local air quality; reduces traffic noise; promotes healthy lifestyles and supports connectivity to the wider area. Accessibility can also significantly influence user perception of development quality.

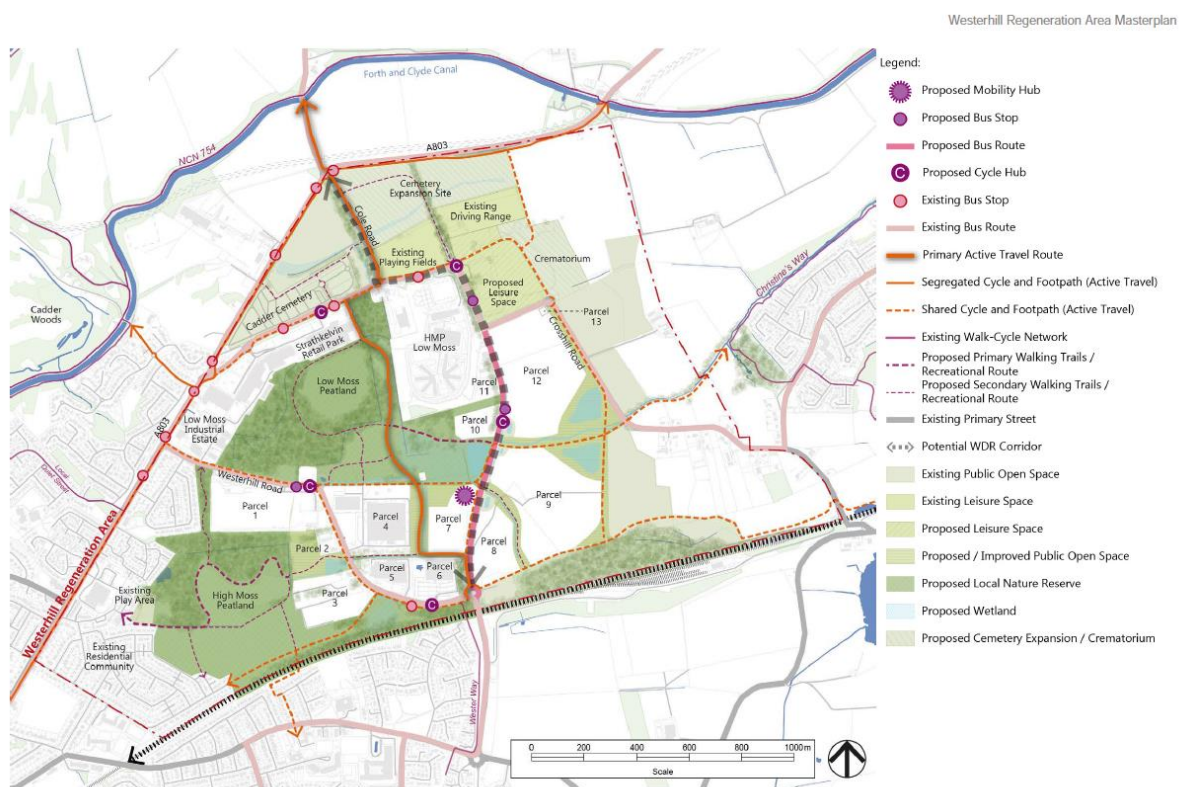


Figure 14. Sustainable Transport Strategy Plan

The Masterplan's Framework cites LDP2, Policies 3.R, 3.TR, 11 and 24 should guide:

- Improvements to existing bus services, new active travel routes and a potential central mobility hub to enable sustainable travel.
- Creation of an interconnected active travel network within the site, Bishopbriggs and Lenzie railway stations and to Bishopbriggs and Kirkintilloch communities with potential connections

to the National Cycle Network Route 754 and surrounding (existing and planned) local cycle routes and footpaths.

- Creation of a defensible boundary to the east of the Westerhill Regeneration Area through the development of an active travel route or a combination of habitat nodes and active travel route.

A key recommendation of the Environmental Sustainability Plan is that these factors constitute key parts of the Masterplan rather than potential add-ons. Furthermore, infrastructure prioritisation should reflect the sustainable transport hierarchy to demonstrate compatibility with Scottish Government Transport targets. This includes pedestrian crossing which cyclists will be able to use as opposed for cycle lanes being given lower priority than cars in addition to traffic easing measures.

- High quality, segregated, lit and well-maintained cycle lanes linking to schools, Bishopbriggs and Lenzie Train stations and encased, secured cycle storage near major bus and train links
- Extensive network of EV charge points

It is also important to note that even with high quality active travel and sustainable transport options in place, the creation of a large road is likely would still increase greenhouse gas emissions.

Consequently, a quantification of any negative emission projects outwith the transport elements of this scheme, such as peatland restoration, improvements to active travel infrastructure outwith the development area as a result of the Masterplan, and scope for the heat network to expand beyond the initial boundaries of the project should all be estimated and formalised to ensure that the masterplan positively contributes to statutory net zero targets.

Westerhill Masterplan aims to deliver green networks across the site to provide attractive, habitat integrated, economic, and safe alternative forms of transport and mitigate the impact of the new development on surrounding highway network.

Objective	Recommendations
Reduce the need to travel by private car.	Deliver on the unique opportunity to pioneer high-quality, interconnected, segregated, lit, maintained and accessible active transport routes ensuring that these high-quality routes link to Bishopbriggs and Lenzie train stations, key bus routes and are accompanied by high quality, secure, and encased padlock-able bike, scooter and electric bike storage.
Provide attractive, economic, and safe alternative forms of transport.	Achieve a significant modal shift from private car by enabling walking, cycling and bus use, especially through giving active transport infrastructure priority over cars such as through use of zebra crossings. Achieve modal shift above and beyond the Masterplan area to help to offset the inevitable increase in emissions that the Westerhill

Mitigate impact to surrounding highway network.

Development Road would create and to fit into the trend of active travel expansion as a result of greater funding from the Scottish Government.

Provide safe, encased storage should be a priority at key sites in the masterplans, such as employment sites, mobility hub, mini hubs and by key public transport infrastructure so that these newer and often more expensive bikes and scooters can be stored safely. Provision for future requirements at these sites should be assessed and flexibility to adapt to innovative transport solutions such as new forms of active travel and autonomous vehicles.

Ensure that there is not significant space allocated for parking, as this could be seen as running contrary to Scottish government targets on reducing vehicle miles, driving modal shift and statutory targets to reach net zero. It should instead capitalise on the economic opportunity that a more densely populated business district with comprehensive active travel access would offer in terms of both GVA and heat network potential. Reduced parking places would also help to increase demand for active and sustainable travel while supporting opportunities for local biodiversity through tree planting and green spaces providing multiple co-benefits including: reducing the heat island effect, increasing canopy cover, providing additional permeable surfaces to reduce surface water issues and enhancing biodiversity value.

Include significant electric vehicle infrastructure, within the context of the sustainable transport hierarchy, to ensure that the anticipated movement from ICE vehicles to ULEV over the coming decades can be accommodated.

Integrated walking and cycling network – create a network of safe, segregated, prioritised, lit, maintained and convenient routes to businesses in Westerhill and through open spaces and ensure all key social infrastructure (schools etc) and transport infrastructure (railway station) are within 10-15 minutes walking and less than 6 minutes cycling distances.

Provide for public transport, including increase to bus routes and frequencies to enable modal shift.

Provide bus stops, with shelters within 400m walking distance of majority of employment plots.

	<p>Explore opportunities for electric vehicles and integrate electric charging into the design of reach plot and consider provision for a mobility hub in Westerhill (and be aware of future electrical capacity issues and future emerging technologies).</p> <p>Include secure encased cycle storage areas in employment buildings and cycle parking close to bus stops and areas of high footfall near open spaces.</p> <p>Design the WDR to help divert the private car traffic from the A803 whilst ensuring speed restraint, traffic easing and active travel prioritisation measures are in place as appropriate for safety and accessibility.</p> <p>Restrict number of vehicular access points in favour of active travel modes such as cycle/pedestrian routes.</p> <p>Design junctions such that they operate within capacity (or at least mitigate impact) and implement safe and inclusive crossings for pedestrians and cyclists.</p>
<p>Create transport infrastructure for a 21st century net zero Unique Selling Point to bolster investment and allow companies to demonstrate their net zero credentials.</p>	<p>The Scottish Government and many local authorities across the Glasgow City Region have some of the most ambitious net zero targets in the world. Capitalising on this Unique Selling Point is crucial to maximise the economic impact of the masterplan for East Dunbartonshire and the wider area.</p> <p>Companies are increasingly including grey fleet as part of their corporate carbon footprint, ensuing the site has viable, safe, interconnected lit and maintained active travel infrastructure in addition to sustainable transport options will allow businesses to demonstrate success in their own net zero targets and significantly boost Westerhill's Unique Selling Point. https://zerotracker.net/analysis/new-analysis-half-of-worlds-largest-companies-are-committed-to-net-zero</p>

4.8. Health and Well-being

The design of a new development can have direct and indirect impacts on the health and well-being of the community and development users. Promoting healthy lifestyles and providing infrastructure that supports this can support the long-term strategic goal of improving the health and well-being of Westerhill residents.

Taking a landscape-led approach, the masterplan will utilise the green network as a framework for development, influencing its location and form and creates attractive views. Through its location, green infrastructure, and green networks, including active travel, Westerhill has the potential to

support an improved lifestyle by bringing people closer to nature and provide businesses integrated into the natural environment.

The Green Infrastructure will be designed to encourage active, healthy lifestyles through active transport modes (walking and cycling), sports and active recreation. The Green Infrastructure will perform multiple functions of benefit to human health and wellbeing such as reducing air pollution and providing shade and shelter. The benefits of access to nature to human health are well documented; the masterplan seeks to maximise these benefits by providing access to nature as part of residents' everyday experience. The networked Green Infrastructure will provide pleasant walking and cycling routes via green corridors that link the various assets (parks, play areas, allotments, sports etc.), communities and local centres to homes and to each other.

There is overwhelming evidence that comprehensive active and sustainable transport options contribute to physical and mental health benefits: walking, wheeling and cycling (active travel) is associated with significant improvements in the traveller's physical health and^{59 60 61} mental health^{62 63} in to reducing detrimental health impacts for other people^{64 65} while providing benefits to local economies.^{66 67}

The health and economic dimensions are significant with physical inactivity costs the NHS around £91 million annually. Physical inactivity also results in approximately 2,500 premature deaths in Scotland each year, and is the second biggest cause of mortality (joint with smoking).⁶⁸ It is not just those travelling actively who benefit from an increase of the proportion of a community travelling actively: there are also health-based implications for all residents from a low proportion of people using active and public transport since motorised transport can increase risk of accidental injury and disrupt communities⁶⁹ with potential implication for well-being through reducing levels of physical activity and social interactions.⁷⁰ The volume and speed of traffic and long commutes can also be detrimental to

⁵⁹ Department for Transport (2014) *Claiming the Health Dividend: A summary and discussion of value for money estimates from studies of investment in walking and cycling* [DfT publications template - colour \(Word 2013\) \(publishing.service.gov.uk\)](#)

⁶⁰ Department for Transport (2019) *Future of Mobility: Urban Strategy Moving Britain Ahead* [Future of mobility: urban strategy - GOV.UK \(www.gov.uk\)](#)

⁶¹ Rissel C, Curac N, Greenaway M, et al. (2012) Physical Activity Associated with Public Transport Use - A Review and Modelling of Potential Benefits. *International Journal of Environmental Research and Public Health* 9: 2454-2478

⁶² Sustrans (2016) *The Role of Active Travel in Improving Health Toolkit Part 3: The role of active travel in improving mental health* [4464.pdf \(sustrans.org.uk\)](#)

⁶³ See [Cycling to work linked with better mental health | The University of Edinburgh](#)

⁶⁴ Staatsen B et al. (2017) INHERIT: exploring triple-win solutions for living, moving and consuming that encourage behavioural change, protect the environment, promote health and health equity. Brussels: EuroHealthNet; [www.inherit.eu/wp-content/uploads/2017/06/INHERIT-Report-A4-Low-res_s.pdf](#)

⁶⁵ Natcen (2019) *Transport, health, and wellbeing: An evidence review for the Department for Transport* [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport_health_and_wellbeing.pdf](#)

⁶⁶ Living Streets (2014) *The business case for better streets and places* [www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf](#)

⁶⁷ See [Walking and cycling: the economic benefits \(tfl.gov.uk\)](#)

⁶⁸ Scottish Government (2014) *A More Active Scotland - building a legacy from the Commonwealth Games* [A More Active Scotland - building a legacy from the Commonwealth Games - gov.scot \(www.gov.scot\)](#)

⁶⁹ Cooper E, Gates S, Grollman C, et al. *Transport, health, and wellbeing: an evidence review for the Department for Transport*. London: NatCen; 2019. [Transport, health and wellbeing \(publishing.service.gov.uk\)](#)

⁷⁰ Mueller N, Rojas-Rueda D, Cole-Hunter T, et al. (2015) Health impact assessment of active transportation: A systematic review. *Preventative Medicine* ;76:103–114.

health.⁷¹ Therefore, barriers to active travel, particularly safety concerns, also hamper health and economic outcomes.

Public transport also has the potential to encourage active travel,⁷² improve health outcomes⁷³ while reducing carbon emissions⁷⁴ and improving access to services and facilities and connect communities.⁷⁵ There is a strong equalities dimension to this with certain groups in the population being disproportionately affected by the lack of available and affordable public transport⁷⁶ while some people find it necessary to purchase a car even when they cannot afford it,⁷⁷ which is a growing issue with average cost of comprehensive car insurance costs rising an estimated 58% to £995 in 2024⁷⁸ and a significant increase in the cost of second hand car (see table 1)

Therefore, if the masterplan create infrastructure in line with the sustainable transport hierarchy, as recommended by the ESP, significant additional benefits could be realised.

The following targets help reinforce the creation of a development that delivers amenities that encourage active and social lifestyles and promote health wellbeing.

Objective	Target
Provision of health and welfare services.	Deliver on the unique opportunity to pioneer high-quality, interconnected, segregated, lit, maintained and accessible active transport routes ensuring that these high-quality routes link to Bishopbriggs and Lenzie train stations, key bus routes and are accompanied by high quality, secure, and encased padlock-able bike, scooter and electric bike storage to make active travel and its health benefits more viable. Achieve modal shift above and beyond the Masterplan area to help to offset the inevitable
Provision of space and facilities for recreation and fitness.	

⁷¹ Beute F, Davies Z, de Vries S, et al. (2020) Types and characteristics of urban and peri-urban blue spaces having an impact on human mental health and wellbeing. EKLIPSE Expert Working Group, UK Centre for Ecology & Hydrology, Wallingford, United Kingdom

⁷² Gates, S. et al. (2019). Transport and inequality: An evidence review for the Department for Transport. NatCen [Transport and inequality \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport_and_inequality.pdf)

⁷³ Patterson R, Webb E, Hone T, et al. (2019) Associations of Public Transportation Use with Cardiometabolic Health: A Systematic Review and Meta-Analysis. American Journal of Epidemiology 188(4):785-795

⁷⁴ Report to the Scottish Government (2017) Aether Evidence Review of the Potential Wider Impacts of Climate Change Mitigation options: Transport sector <https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2017/01/evidence-review-potential-wider-impacts-climate-change-mitigation-options-transport/documents/00513155-pdf/00513155-pdf/govscot%3Adocument/00513155.pdf>

⁷⁵ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport_health_and_wellbeing.pdf

⁷⁶ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport_health_and_wellbeing.pdf

⁷⁷ Natcen (2019) Transport, health, and wellbeing: An evidence review for the Department for Transport https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847884/Transport_health_and_wellbeing.pdf

⁷⁸ Car Insurance Price Index (2024) retrieved from [Has car insurance gone up? - Confused.com](https://www.confused.com)

Reduce sources of pollution.

increase in emissions that the Westerhill Development Road would create and to fit into the trend of active travel expansion as a result of greater funding from the Scottish Government.

Provide safe, encased storage should be a priority at key sites in the masterplans, such as employment sites, mobility hub, mini hubs and by key public transport infrastructure so that these newer and often more expensive bikes and scooters can be stored safely. Provision for future requirements at these sites should be assessed and flexibility to adapt to innovative transport solutions such as new forms of active travel and autonomous vehicles.

Provide space and facilities for a range of formal and informal recreation, sports and play activities.

Priorities infrastructure in line with the sustainable transport hierarchy to catalyse modal shift.

Nitrogen Oxide (NO_x), particulate and Volatile Organic Compound (VOC) levels should not exceed those stated in BREEAM 2018 POL02 (2 credits) where applicable.

Ensure that the proposed development does not contribute to the extension of the Air Quality Management Area to the west of the site.

Background noise levels should not be raised by more than 5dB compared to the pre-developed site.

External lighting should be designed in accordance with the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, to reduce night-time light pollution and avoid disruption to habitats.

External lighting should be designed in accordance BS 5489-1:2013 for the design of road lighting and BS EN 12464-2:2014 for outdoor lighting of workplaces.

Watercourse pollution protection measures should be installed in areas of high risk.

5. Conclusion and Recommendations

The creation of the Westerhill Development Road is an emission intensive development that risks locking in carbon emissions by releasing latent demand for individual car use. Potential peatland disruption from the development could also be a significant source of additional emissions, whether due to peat being directly disturbed or indirectly from development at adjacent sites.

The risks of additional emissions from disturbance of the peatland habitats, above and beyond those from the construction of the development and the transport emissions from the new roads, have meant that the ESP recommends numerous additional measures that would be necessary to provide confidence that the proposed development will be carbon neutral, and thus compatible with Scottish Government and East Dunbartonshire Council net zero targets, while safeguarding and enhancing the ecological value of the site.

Offsetting the inevitable additional emissions from the new road and peat disturbance means that other facets of the project will have to be **carbon negative** as opposed to carbon neutral to ensure the programme as a whole is at least carbon neutral.

Since the Scottish Government and many local authorities across the Glasgow City Region have some of the most ambitious net zero targets in the world, capitalising on the emission reduction opportunities that the Masterplan could present offers a compelling opportunity to create a 21st century, net zero unique selling point through the establishment of innovative zero direct emission heating system(s) for buildings, prioritised active travel infrastructure, local biodiversity support and local peat preservation/restoration initiatives that are substantiated through a Peatland Management Plan and a Habitat Management Plan.

To deliver on the vision of the Westerhill Masterplan for *“A vibrant and sustainable development where innovative business opportunities meet well connected, socially and environmentally resilient communities”*, it is crucial that any road construction is accompanied by full coverage of high-quality, segregated, lit, maintained and prioritised active travel infrastructure that links up to other active travel infrastructure in surrounding areas in order to make cycling, walking and wheeling a safe and viable option in the Westerhill area and drive modal shift in the surrounding areas.

The development would also need to include peatland habitat restoration, biodiversity protection, an ambitious zero direct emission heating system for buildings (individually and as part of a heat network) and a series of studies quantifying overall emissions from the masterplan to demonstrate that the site as a whole will contribute to statutory environmental targets.

A key recommendation of the Environmental Sustainability Plan is that these factors constitute core parts of the Masterplan rather than potential add-ons in order to comply with the Climate Change (Duties of Public Bodies: Reporting Requirements) Amendment Order 2020 on how public bodies align their spending plans and use of resources to contribute to reducing emissions and delivering on emission reduction targets. It is key that in potentially securing funding from the City Deal, which is funded by UK Government, Scottish Government and local authorities across the Glasgow City Region, it is clear how the Masterplan is compliant with financial alignment with net zero targets.

Moreover, Scotland’s ten hottest years have all occurred since 1997 despite record keeping beginning in 1884,⁷⁹ and Scotland’s highest ever temperature of 34.8°C registered in July 2022, almost 2°C higher than the previous record.⁸⁰

⁷⁹ See Adaptation Scotland (2022) [Adaptation Scotland:: Climate trends and projections](#)

⁸⁰ See Met Office (2022) [Record high temperatures verified - Met Office](#)

A study published in December 2023 by the James Hutton Institute showed that Scotland's climate is changing faster than scientists predicted with changes that were expected to occur over the next three decades already happening.⁸¹

This fits into a trend of increased average annual rainfall in Scotland in the past few decades, with an increasing proportion coming from heavy rainfall events.⁸²

The atmospheric physics which underpins climate change means that the climate will continue to become more hostile to life until net zero is reached on a planetary level. A continuation of these record-breaking trends should therefore be anticipated throughout the 2030s, 2040s, 2050s and beyond.

As a result, the infrastructure, material, drainage systems and land use in the Masterplan should all account for these changes and consider how to maximise resilience within the context of them.

Following these recommendations could position the Westerhill Masterplan as a pioneering 21st century model of economic development which catalyses modal shift and sustainable heat generation while bolstering investment in East Dunbartonshire and the Glasgow City Region by exploiting its unique selling points as a leading site in the race to net zero.

Policy

- UK Government, Scottish Government, East Dunbartonshire Council, and other partner Councils from across the Glasgow City Region all have net zero targets. Meeting these targets will require a presumption against high-carbon infrastructure.
- This means that the Westerhill Masterplan will have to drive modal shift as opposed to locking-in a continuation of car use to be compatible with net zero legislation, the Scottish Government's targets for a 20% reduction in vehicle KM by 2030 and the Scottish Government's national policy priority to reduce emissions from transport by 44%.
- While a study has been undertaken on the peatland elements of the Masterplan, further study on carbon calculations will be required for the site to clarify the likely net effects of the development on carbon emissions including from the transport infrastructure and construction itself.
- Very high confidence that the additional active travel infrastructure, the heat network, the peat habitat maintenance and the biodiversity work would lead to enough reduced emissions to comfortably offset the additional emissions from the construction of the new road and subsequent increase in vehicle miles needs to be established.
- Establishing the baseline carbon on the site and forecasting the carbon emissions for buildings, open space and infrastructure proposed is recommended to measure and monitor Westerhill Masterplan's contributions to East Dunbartonshire's net zero targets carbon emissions for the development.
- The Climate Change (Duties of Public Bodies: Reporting Requirements) Amendment Order 2020 sets out that, by November 2022, all public bodies must report on how the body will align its spending plans and use of resources to contribute to reducing emissions and delivering its emission reduction targets. It is key that in potentially securing funding from the City Deal, which is funded by UK Government, Scottish Government and local authorities across the Glasgow City Region, it is clear how the Masterplan is compliant with financial alignment with net zero targets.
- The Heat Networks Act requires local authorities to identify potential areas for Heat Network Zones (HNZs) within East Dunbartonshire and the production of the Council's statutory Heat Network Review Statement in early 2024. The LHEES can identify the Westerhill area as part

⁸¹ See [Scotland's climate changing faster than predicted | The James Hutton Institute](#)

⁸² See [New Climate Projections Summary for Scotland \(historicenvironment.scot\)](#)

of a heat network zone. However, heat networks are most effective in areas of greater building density which means leaving large spaces of parking in the Westerhill Masterplan would both weaken the case for a lower cost and more efficient system of zero carbon heat and miss an opportunity to support Scottish Government policy on modal shift.

- The planning framework for the proposed development consists of the National Planning Framework 4 (NPF4), Scottish Planning Policy, Climate Change (Scotland) Act 2019 and Local Development Plan.
- “NPF4 Policy 5 states that “*Development proposals on peatland, carbon rich soils and priority peatland habitat will only be supported for... Essential infrastructure and [where] there is a specific locational need and no other suitable site...where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site-specific assessment will be required to identify:*
 - *the baseline depth, habitat condition, quality and stability of carbon rich soils;*
 - *the likely effects of the development on peatland, including on soil disturbance;*
 - *and the likely net effects of the development on climate emissions and loss of carbon.*”

Energy and Carbon

- An assessment of potential district heating options and network design should be conducted to inform the technical design, ensuring that the development can meet statutory net-zero targets in a cost-effective manner. The district heating analysis will include the sizing and location for a central energy centre as well as required electrical requirements for the heat source, if applicable. This would be supported by the identification of Westerhill area as a designated Heat Network Zone through the production of East Dunbartonshire Council's LHEES and Heat Network Review Statement.
- Establishing a Peatland Management Plan to minimise disruption, support preservation and enhancement of the peatland (and habitat) for any peat lower than 0.5m in depth will be crucial. Any disturbance of peat must also be fully justified against NPF 4 Policy 5.
- Westerhill must comply with both local and national policies and regulations. This mainly includes the changes to Section 6 of the Building Regulations, due for implementation in February 2023, and the New Build Heat Standards, Heat Networks Act and the potential for Westerhill to be designated a Heat Network Zone.
- At Westerhill, a 'fabric first' approach is proposed to reduce the energy demand of the site, whilst a diversified energy solution has been proposed to provide the development with low-carbon heating and maximising renewable energy production onsite.

Material and Waste

- The Westerhill development should ensure that it is compliant with the aims, objectives and outcomes of East Dunbartonshire Council's Circular Economy Strategy. Early commitment to reducing the embodied carbon and environmental impact of materials and resources, and considering sourcing, conservation and re-use, should be adopted by all developers to contribute to a more sustainable outcome. Utilising materials that are also local and resilient should be ensured to reduce longer term negative environmental impacts. Framework contractors must be encouraged to upskill their subcontractors, within the local supply chain if possible, in relation to sustainability. Meeting PAS 2080 standard could be a very effective way of minimizing embodied carbon and reducing the environmental footprint of the Masterplan. Specific targets from the Circular economy strategy that should be adhered to include:
- At least 70% of construction waste by volume must be diverted from landfill by either reusing or recycling on or off site.

Water

- A desktop FRA has been prepared and identifies no risk of flooding from watercourses sources. However, surface water flooding issues are noted throughout the site. SuDS techniques as specified in the Drainage Strategy to attenuate run off and alleviate any potential flooding should be accommodated for natural flood management (incorporating nature-based solutions) and future resilience of the site. SuDS proposals in areas of ecological sensitivity and constraints must be further assessed in terms of deliverability and any negative ecological impacts should be avoided if possible or mitigated against.
- Consumption of potable water should be restricted to 110ltrs per person per day. This can be achieved by specifying and using water efficient components at building level.

Buildings

- A BREEAM Excellent rating, or at least Very Good, should be targeted for commercial buildings to advise and quantify the objectives and commitments set within this Plan through various measures on energy efficiency, orientation (to take advantage or solar gain and shading), materiality and built form.
- It is likely to be more cost-efficient for Westerhill to be a Heat Network Zone – as detailed in the Be Clean Opportunities section. It is important to note that buildings will need to be designed to connect to a heat network and land identified and safeguarded for the enabling infrastructure such as system pipework and required onsite energy centre.
- Building an infrastructure will have to be designed to be more resilient to the impact of a more hostile climate, with the atmospheric physics that underpins climate change making it clear that the 2030s will be more hostile than the 2020s, the 2040s more hostile than the 2030 with a continuation of this trend until net zero is reached on a planetary level.
- Protection and enhancement of Antonine Wall World Heritage Site and its buffer zone should be included in line with LDP policy 2.

Biodiversity

- To comply with the UK Peatland Strategy and the National Planning Framework 4 (NPF4), it is recommended that Westerhill Masterplan design should avoid development and construction on areas identified by the Peat Depth Survey as areas of significant peat accumulation. During the preliminary engagement and consultation on the masterplan and SEA, NatureScot, a statutory environmental body responsible for Scotland's natural capital, has advised that it is preferable that development is avoided in any areas of peat with 0.5m depth or more. As such this ESP recommends that Westerhill Masterplan design should avoid development and construction on areas identified by the Peat Depth Survey as areas of significant peat accumulation and within the LNCS.
- A peatland management plan for key sites, should be developed to maximise the protection of key areas of peat and peatland habitat. For example, Parcel 3 is largely deep peat, so a Peatland Management Plan should be required here while Parcel 1a is on deep peat and shouldn't be developed.
- Where peatland is spoiled, due to essential construction as per policy 5, restoration and reuse can help reduce the carbon loss. The peat depth study of Westerhill Masterplan suggests that the area could have a considerable amount of excellent quality peat with high concentration of carbon up to 100,578 tCo_{2e} outside Low Moss and High Moss Plantation Sites and Cadder Yard LNCSs.
- It is recommended that a Habitat Management Plan is prepared to provide necessary guidance alongside the Masterplan to maximise the protection and enhancement of

biodiversity through various measures such as creation of wetland, habitat nodes comprising new woodland, hedgerows, orchards, biodiverse planting, corridors for habitats, green networks, management and enhancement of LNCS and WHS Buffer Zone areas within Westerhill Regeneration Area.

Sustainable Transport

- Construction of the WDR will lead to additional greenhouse gas emissions through releasing latent demand for car use, in an area where car use is by far the most common mode of transport in addition to the emission from the construction phase of the road itself. To ensure that the development is compatible with East Dunbartonshire Council, neighbouring Council, Scottish Government and UK Government net zero targets, additional recommendations will be required to be delivered, at the same time as the WDR.
- It is crucial that the Masterplan capitalises on the unique opportunity to pioneer high-quality, interconnected, segregated, lit, maintained and accessible active transport routes across the Masterplan area and ensuring that these high-quality routes link to Bishopbriggs and Lenzie train stations, key bus routes and are accompanied by high quality, secure, and encased padlock-able bike, scooter and electric bike storage.
- The masterplan would need to result in modal shift above and beyond the Masterplan area to help to offset the inevitable increase in emissions that the Westerhill Development Road would create and to fit into the trend of active travel expansion as a result of greater funding from the Scottish Government.
- Active transport infrastructure must have priority over cars such as through use of zebra crossings if it is to support modal shift.
- Building the Westerhill Development Road unaccompanied by sustainable transport infrastructure in the initial stages of the masterplan will lock in additional emissions from the by making private car one of few viable travel options and could be seen as acting against Scottish government policy on modal shift and emissions reductions. It is therefore key that at the very least, active travel infrastructure is treated as having parity of esteem with private car-based infrastructure and by extension the masterplan ensures that this infrastructure is delivered in the early stages. This is crucial to reduce the risk that the road is built but active travel routes are not.
- It is also important to recognise that electric bikes and scooters are making active travel much more accessible, including to new demographics, and that safe, encased storage should be a priority at key sites in the masterplans, such as employment sites, mobility hub, mini hubs and by key public transport infrastructure so that these newer and often more expensive bikes and scooters can be stored safely. Provision for future requirements at these sites should be assessed and flexibility to adapt to innovative transport solutions such as new forms of active travel and autonomous vehicles.
- Other compelling opportunities for the site to promote sustainability that should be explored include:
 - Investigation of the feasibility of and potentially deliver a bus-based Park and Ride facility.
 - Safeguarding of land for a potential rail station, working with Network Rail and North Lanarkshire Council.
 - Traffic calming measures to ensure that active travel and sustainable travel have priority
- The design should not have significant space allocated for parking, as this could be seen as running contrary to Scottish government targets on reducing vehicle miles, driving modal shift and statutory targets to reach net zero. It should instead capitalise on the economic opportunity that a more densely populated business district with comprehensive active travel access would offer in terms of both GVA and heat network potential. Reduced parking places

would also help to increase demand for active and sustainable travel while supporting opportunities for local biodiversity through tree planting and green spaces providing multiple co-benefits including: reducing the heat island effect, increasing canopy cover, providing additional permeable surfaces to reduce surface water issues and enhancing biodiversity value.

- The Masterplan would also need to include significant electric vehicle infrastructure, within the context of the sustainable transport hierarchy, to ensure that the anticipated movement from ICE vehicles to ULEV over the coming decades can be accommodated.

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