West Northamptonshire Council

Construction & Maintenance Climate Strategy

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2. Introduction

West Northamptonshire Council's Corporate Plan: Fresh Start Bright Future 2021-2025 provides the vision for making West Northamptonshire a great place to live, work, visit and thrive. The Corporate Plan sets out six priorities that will make West Northamptonshire a place to thrive. The priority Green and Clean, Environment & Wellbeing commits to the following objectives.

- Net zero by 2030
- Climate summit in first few months
- Increased wildlife species & more trees
- Increased electric charging & energy efficiency
- Vibrant towns & villages
- High quality parks
- Accessible green space for all

The Council declared a climate emergency and has pledged, as part of the UK100, to focus on tackling the climate emergency and reducing its carbon emissions. The pledge commits the Council to cutting its own carbon emissions to net zero by 2030 and those of residents and businesses to net zero by 2045. In delivering this objective the Council will deliver economic, and social benefits to residents, employees, and visitors.

The Council has also adopted the United Nations Sustainable Development Goals (SDGs) to provide a wider context to its sustainability efforts. The SDGs help shape the way the Council responds to the climate challenge and thus this Strategy.

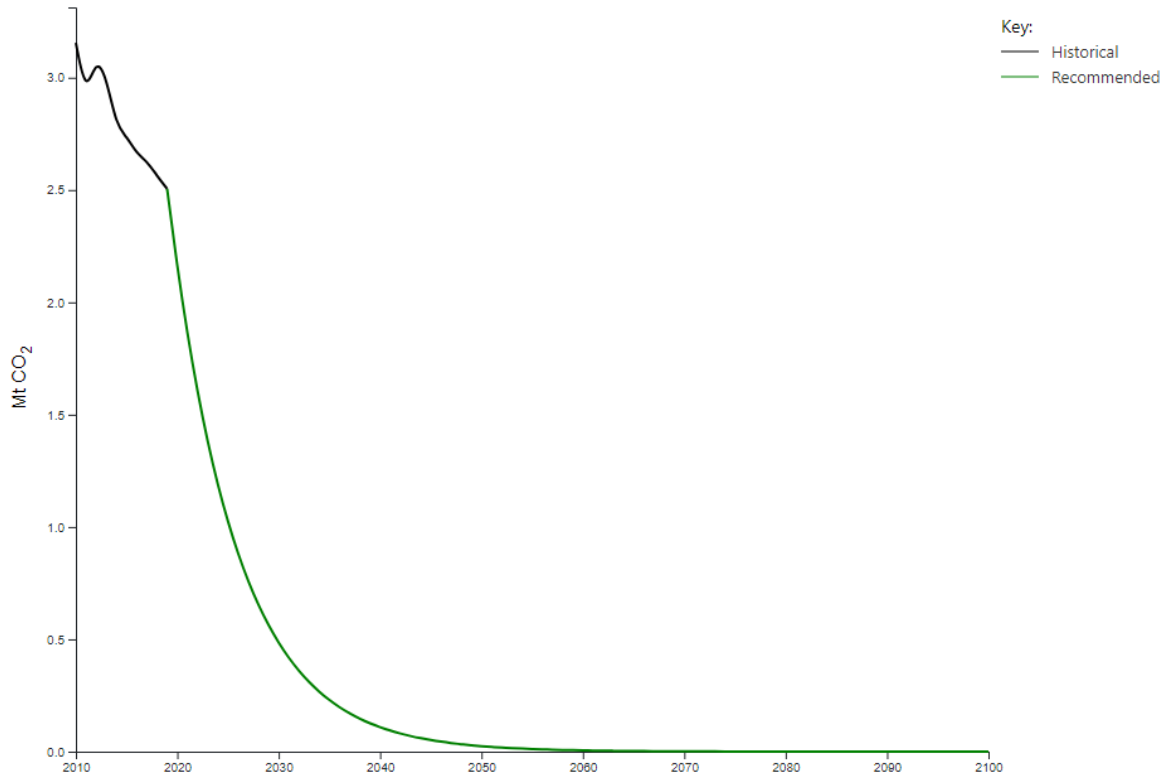
In order to deliver its legal obligations and policy goals, WNC has a significant programme of construction and maintenance work (for convenience the term 'construction' is used hereafter in this document to cover both construction and maintenance). Achieving net zero necessarily include construction and maintenance activities. The Council also benefits from continuous improvement in the cost-effectiveness of its construction operations, and in a significant number of cases, solutions will support both financial and carbon outcomes. As with other initiatives, such as our aspirations for large scale solar energy, these opportunities will be important for the Council to achieve both its sustainability and its financial objectives.

Achieving net zero is not merely about nil net emissions of greenhouse gases by a certain date; it is also about the trajectory to reach net zero; if emissions continue at a high level and then suddenly drop, more emissions will have occurred than if they are reduced over time. The International Committee on Climate Change (IPCC) stated that "In the scenarios we assessed, limiting warming to around 1.5°C requires global greenhouse gas emissions to peak before 2025 at the latest, and be reduced by 43% by 2030…"[1]. The impact is illustrated for West Northamptonshire by recommended local CO_2 budgets[2] prepared in 2020 by the Tyndall Centre for Climate Change Research at Manchester University, as shown in Figure 1.

[1] https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/

[2] The Tyndall Centre figures are for CO_2 from energy use. Impacts from land use, land use change and forestry (LULUCF) and non-CO_2 emissions are considered separately. The CO_2 figures are a useful guide for this strategy.

Figure 1: Tyndall Centre CO_2 budget for West Northamptonshire



As Figure 1 shows, if West Northamptonshire is to contribute its 'fair' share of the UK meeting Paris Agreement targets, levels of CO2 emissions will need to fall sharply. The Council's own targets of net zero in its own operations by 2030 and net zero for West Northamptonshire as a whole by 2045 support this approach. It is thus urgent to develop a coherent strategy to achieve carbon net zero in the Council's construction activities. That is the purpose of this document.

3. Scope and definitions

3.1 Scope of the strategy

This strategy identifies how the Council should achieve net zero carbon in its construction activities or, where this is not practical, minimising the net carbon impact, whilst pursuing savings.

For these purposes:

'Carbon' means carbon dioxide and other gases implicated in climate change, measured as equivalent tonnage of carbon dioxide (CO_2e).

'Scope 1' emissions – direct carbon emissions, such as heating and ventilation of WNC buildings and use of fleet vehicles.

'Scope 2' emissions – indirect carbon emissions, such as grid electricity use for power and lighting (including street lighting), where the carbon is largely emitted at power stations.

'Scope 3' emissions – carbon emissions from WNC's supply chains, including the production of goods and services used by WNC, waste, cloud computing, and water use.

'Emissions' means all (scopes 1, 2 and 3) carbon emissions within the following headings:

a. Carbon emitted in the production of construction materials, including transport between manufacturing sites.
b. Carbon emitted in the transport of construction materials to the site where they are used.
c. Carbon emitted in construction processes, including wastage.
d. Release of carbon from land due to construction and maintenance operations (where not covered by the Estate Climate Strategy).

'Capture' means the long-term net removal of carbon from the atmosphere by biological or technical means. Specifically in the context of construction this includes the use of construction materials (such as timber) which sequester carbon taken from the atmosphere.

'Net zero' means that the direct and indirect carbon emissions from WNC's construction activities less carbon capture in or through WNC's construction activities is zero or less.

The purchase of 'green' energy for use in construction activities is ignored, as it does not reflect the reality of the energy supplied. Thus, the average UK gas and electricity mix, and fuel mix, are assumed for calculations of construction carbon. The exceptions to this are where WNC or its suppliers or contractors are themselves generating renewable energy, directly receiving renewable energy from a local facility, or using sustainable biofuel in vehicles and construction plant.

This strategy does not manage in-use emissions of carbon (which are covered by the Estate Climate Strategy) but does take into account the need to minimise in-use emissions in design and construction of buildings and other works.

3.2 Other definitions

The following terms are also used in the strategy as defined below:

'Embedded' carbon is the carbon which will be, is being, or has been generated in the construction of a building or other works, or in their demolition and removal.

'Operational' carbon is carbon emitted in the use and maintenance of a building or other works.

'Whole life' carbon is the total of embedded and operational carbon.

'Offsetting' is the use of carbon capture to balance emissions of carbon that WNC produces.

4. Current situation

4.1 Construction activity

As noted above, WNC has to carry out construction in order to deliver its legal obligations and policy goals. Several units of the Council undertake different types of construction work, as shown in the matrix below:

	Major construction	Minor construction	Maintenance
Assets & Environment (A&E)			
Place Shaping (PS)			
Highways (HW)			

	Major construction	Minor construction	Maintenance
Care & Repair (C&R)			
Northamptonshire Partnership Homes (NPH)*			

Note: * NPH is the Council's arms' length management organisation (ALMO), which manages the Council's housing stock on its behalf.

The nature of construction activity carried out by the teams varies. Notably, the Highways service is largely concerned with civil engineering whereas the other services are, to a greater or lesser extent, focused on buildings and their immediate surroundings. However, there are also important overlaps and areas of common interest.

The Council has major programmes of construction work including:

- Delivery of new schools and school extensions and adaptions.
- Reshaping the Council's corporate estate to meet its service needs and objectives (including achieving net zero in operation).
- Highway improvements and maintenance.
- Regeneration schemes.
- Flood management and mitigation.
- Property maintenance and improvement.
- Delivery of new housing stock and improving existing housing stock (including measures to improve energy efficiency)

4.2 Addressing carbon in construction

The Council does not currently calculate or assess the carbon impacts of its construction activities. Whilst it does increasingly seek to minimise construction carbon it does not yet have a formal framework to take decisions against.

The Council procurement social value policy identifies progress in carbon reduction as one of the aspects of social value which should be considered in procurement decisions. This typically comes in the form of either carbon-related specification or contractual requirements, of assessment of carbon outcomes as part of the 'quality' scoring of bids.

The Council's Highway Services contract, with Keir, contains commitments to move to net zero under scopes 1 and 2, and to make significant progress under scope 3, by 2030. This includes obligations to calculate carbon emissions across the scope of the contract. Other contracts the Council holds which relate to construction activity typically pre-date the Council's net zero commitment or were otherwise not designed to expressly deliver low-carbon outcomes.

NPH manages a stock of about 12,000 existing Council homes and also has plans to build over a thousand new homes up to 2030. For the existing stock NPH has commissioned Parity Projects to help it develop a plan to achieve net zero emissions in operation by 2045. NPH is not currently developing a specific net zero strategy for construction.

WNC's construction supply chain is at varying levels of maturity in its ability to understand carbon impacts of design and construction choices and likewise to propose and implement low-carbon solutions. Smaller businesses are typically – but not always – less able to do this, as it requires a degree of specialist knowledge and specialisation within a business.

The Council is developing a Sustainability Strategy, which includes considering how the Council can achieve its 2030 and 2045 goals. This strategy will form part of that work.

5. Objective, aims, and approach

5.1 Overview

The Council's aim is to achieve net zero in its own operations by 2030. However, this does not require each one of its activities by itself to achieve net zero. Doing so may be uneconomic or miss benefits which could be gained from an integrated approach. Therefore, the objective and aims of the Construction & Maintenance Climate Strategy are as follows:

Objective: To achieve net zero construction which delivers good quality, attractive, economical, and functional buildings and other construction works.

Aims: To…

a) Maximise overall benefits, by seeking solutions which deliver against WNC's wider objectives including those defined in its social value policy.
b) Maximise efficiency, by developing knowledge and skills which enable economical and effective design and construction choices, and using the challenge of low-carbon construction to open up assumptions which may otherwise prevent efficiency gains.
c) Use offsetting to achieve net zero only where there is not a practical or economic solution within construction, or the offsetting delivers wider benefits (such as biodiversity gain).
d) Develop the supply chain, particularly locally, in the knowledge, skills, and systems needed to routinely deliver efficient low carbon construction.
e) Support the delivery of net zero in operation.

5.2 Integrated working

The future is carbon net zero – in both retrofit of existing building stock and new construction. Any building not either operating at net zero or designed to be capable of this becomes an expensive liability for future generations. Therefore, this strategy, as per aim (e), seeks to deliver construction which supports net zero in operation.

Across government there is an increasing emphasis on business cases that promote carbon reduction.

5.3 Achieving net zero construction

This strategy pulls together key findings and recommendations from numerous publications, covering the ways in which the processes of briefing, design, procurement, construction, occupation, management, and valuing of building development must change to fulfil the net zero vision.

Due to the different types of construction and organisational arrangements the Council has – including its ALMO, Northamptonshire Partnership Homes (NPH) – the detailed approach to achieving the objective and aims set out in 5.1 varies, within a coherent overall approach. The main blocks are:

- Highways
- NPH
- All other WNC construction activity.

The strategy also divides into two main thrusts: a general low-carbon approach to construction in the light of net zero, and the main steps the Council will take over time to achieve net zero in construction by 2030. (As noted in the aims, where practical, economic, and appropriate, net zero will be achieved within construction, but it is highly likely that offsetting will be required. This is addressed below.)

6. A low-carbon approach

6.1 Key questions

The following questions will be used to inform the design and construction process. Whilst focused on buildings, the same principles apply to other types of construction works.

Build less	• Is a new building necessary to meet the brief? Has retrofit been considered? • Can existing materials on or near the site be used? • Has the brief been interrogated against actual WNC need and represents the most efficient solution? • Can uses be shared or spaces be multi-functional? • If the use is temporary, can a relocatable option be used? • Carry out a material efficiency review – are all materials proposed necessary? • Seek to simplify the design – simple designs usually mean less embodied carbon.
Build light	• Reduce the weight of the dead loads where possible. • What loadings are really required to meet the brief? • Can shorter spans be used?

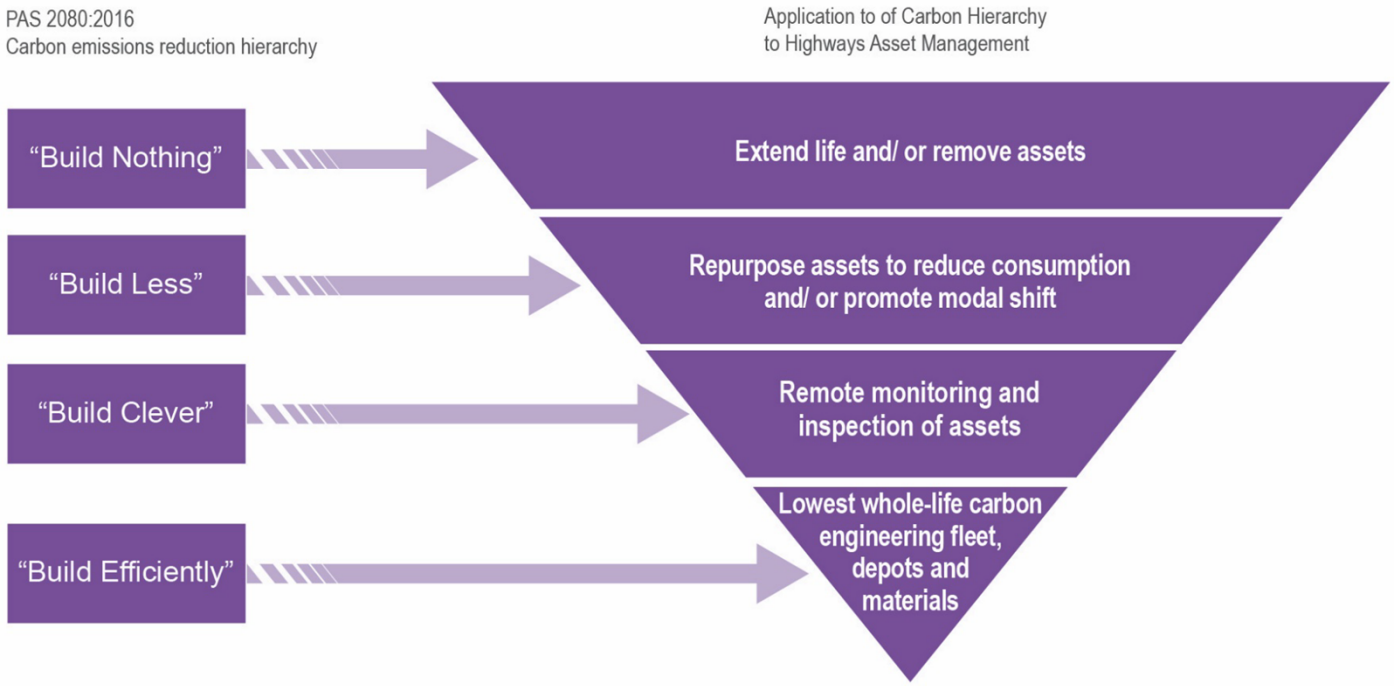
Build wise	• Ensure longevity and robustness of material and systems specifications, as appropriate to the intended use.
	• Review material efficiency options like designing to standard building sizes or for a repeating module.
	• Structural members should be designed for 100% utilisation rate where possible providing this does not compromise reasonable future adaptation.
	• Analysing a site is an important activity at the start of a project and this can be extended to the identification of ways of reducing embodied carbon. Possible opportunities include:
	  ○ There may be existing structures or buildings that can be reused or become a source of recycled materials.
	  ○ There may be locally sourced material options, reducing transport to site while allowing architectural expression of the context.
	  ○ Designing a project around a site topography, reusing excavated soil and reducing the amount removed from site.
	  ○ Minimise the need for future maintenance and adaptation for climate change and ensure maintenance can be easily carried out.

Build low carbon	• Reduce the use of high embodied carbon materials. • Identify 'big ticket items' and focus on the big wins first including mass earthworks, structure, and envelope. • Use natural and renewable materials where practical. • Explore design for manufacture and assembly (DfMA) solutions if this reduces embodied carbon or wastage.
Build for the future	• Ensure future uses and end of life are considered and adaptability is designed in. • Where a building is to be designed for long life, make it attractive, so in the future there will be a desire to re-use it rather than replace it (and so waste the embodied carbon). • Consider regular structural grid and future-proofed risers and central plant space. • Mechanically fix systems rather than adhesive fix so they can be demounted and reused or recycled, supporting a circular economy.

	• Explore methods of creating longevity for materials without additional coatings, as they can reduce the recyclability of the material.
Build collaboratively	• Solutions must involve the whole design team and intended end-users. • Use 'rules of thumb' data to drive decision making in meetings, especially in the early stages of design.

A complementary approach, mapped specifically for highways activities, is shown in Figure 2.

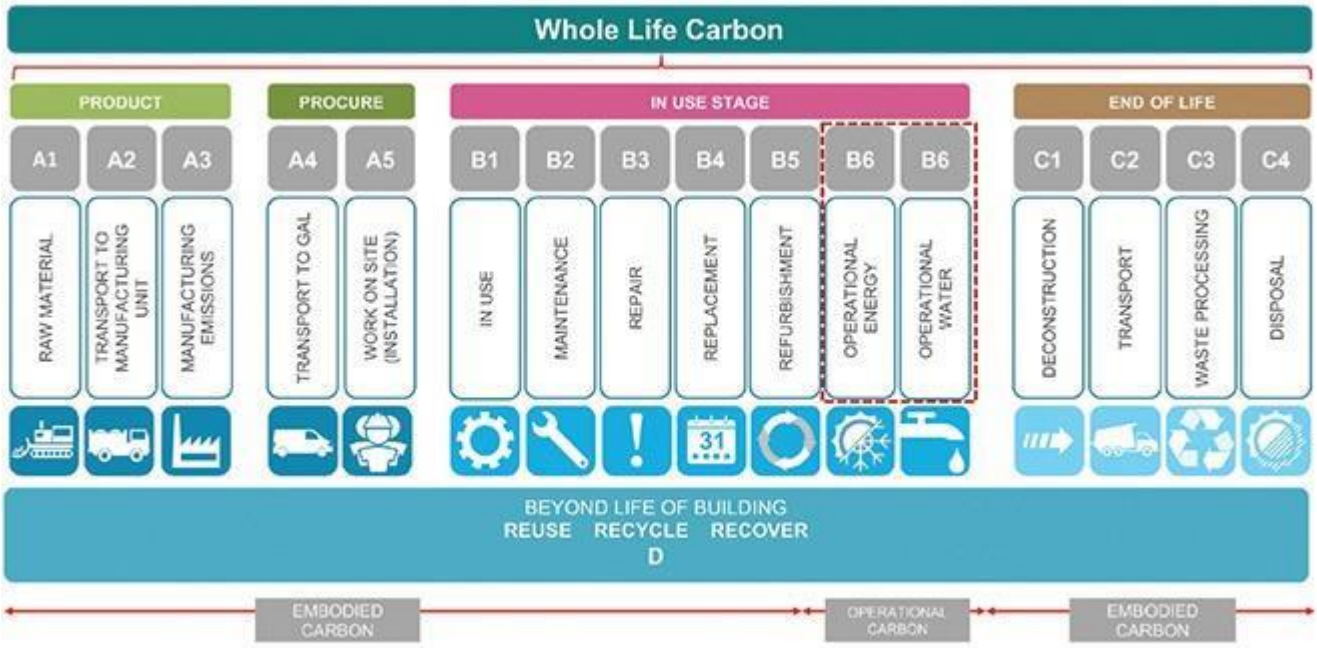
Figure 2: PAS2080 emissions hierarchy applied to highway asset management



6.2 Low carbon through design and delivery

The Council will consider procurement of net zero buildings at the start of a project, and throughout the relevant RIBA Stages, as the project develops. This is illustrated in Figure 3. Whilst RIBA stages are not typically used for civil engineering works, and are only partly relevant to maintenance works, the same overall approach should be applied in such cases.

Figure 3: Carbon considerations through building or other works life cycle



Operational carbon should also be considered in the design stages. The outputs, in time (see 7), will form part of the life cycle carbon assessment and thus guide design choices.

RIBA Stage 0 – Strategic definition and RIBA Stage 1 – Preparation & briefing

Whole life carbon thinking should start at the outset of a project at the RIBA Stages 0 and Stage 1. The Council will create clear project briefs which identify the requirements the building or other works needs to meet, so the design team can optimise the design including in respect of carbon. Briefs should also identify any particular opportunities or constraints in relation to carbon.

RIBA Stage 2 – Concept design

RIBA Stage 2 sets a project's architectural concept in line with the site information and the project brief, including the spatial requirements. During this stage, regular design reviews are used to obtain comments from project stakeholders and the design is iterated in response. Any project brief derogations are agreed, or the project brief is adjusted to align with the emerging architectural concept.

At this stage, the design team should ensure that both embedded and operational carbon are addressed in design thinking, and any significant challenges or opportunities highlighted. Consideration should be given to choices of low-carbon materials and how these may affect the design concepts being developed, so the building or other works are not set on a high-carbon path.

RIBA Stage 3 – Spatial coordination

RIBA Stage 3 is fundamentally about testing and validating the architectural concept, to make sure that the architectural and engineering information prepared at Stage 2 is spatially coordinated before the detailed information required to manufacture and construct the building is produced at Stage 4.

At this stage, more information about embedded and operational carbon will be available, allowing refinements to design to be made to optimise outcomes. Any significant issues which are now identified should be highlighted so that informed decisions can be made before the design is further crystallised and it becomes harder and more expensive to make significant changes.

RIBA Stage 4 – Technical design

RIBA Stage 4 incorporates design details and all the key sustainability strategies into the project's drawings and specifications, for tender and procurement. It is important for the tender documentation to ensure that the competing contractors understand the project's whole life carbon requirements, the goals, as well as the process for delivering and monitoring carbon reduction during construction.

If any new issues arise these should be highlighted so informed decisions can be made about whether any changes in strategy are called for. Whilst such changes are less desirable at this stage, informed decisions are still possible.

RIBA Stage 5 – Manufacturing & construction

RIBA Stage 5 is when the actual carbon impacts of the construction process need to be monitored against intentions, taking into account any evolution of the scheme during tender and procurement. Contractor's proposals including sources of key materials will need to be evaluated as part of tender assessment, and then monitored during construction.

RIBA Stage 6 – Handover

RIBA Stage 6 should include a post-practical completion final review of the building information, with a final assessment of the embedded and the anticipated whole life carbon impacts of the completed project. This, together with information on how to manage the building efficiently and effectively – and therefore in a low-carbon way – should be included within the building operation and maintenance manual.

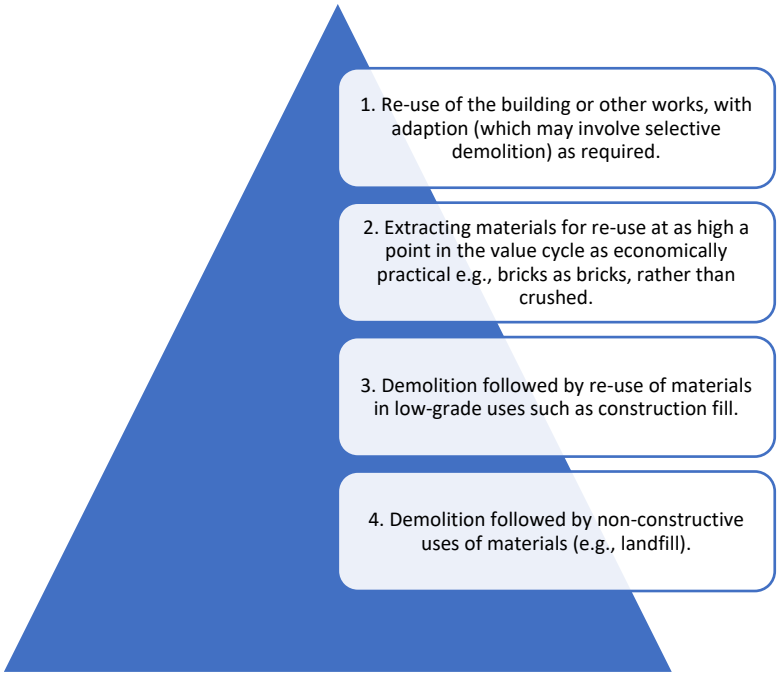
RIBA Stage 7 – Use

RIBA Stage 7 should include a post occupancy evaluation (POE) process, which takes into account of all whole life carbon impacts. This should include the actual performance of the building's environmental systems; the fabric's physical performance with respect to durability and fitness for purpose and an assessment of the maintenance regimes for both.

Re-use and demolition

When a building or other constructed item reaches the end of its useful life for its original purpose, and no other purpose naturally arises without significant change, a decision needs to be taken about its future. At that point an assessment should be made of options, with a focus on retaining benefit from the embedded carbon as far as practical. In accordance with the waste hierarchy, consideration should be given in the following order of priority shown in Figure 3.

Figure 3: Hierarchy of options at end-of-life



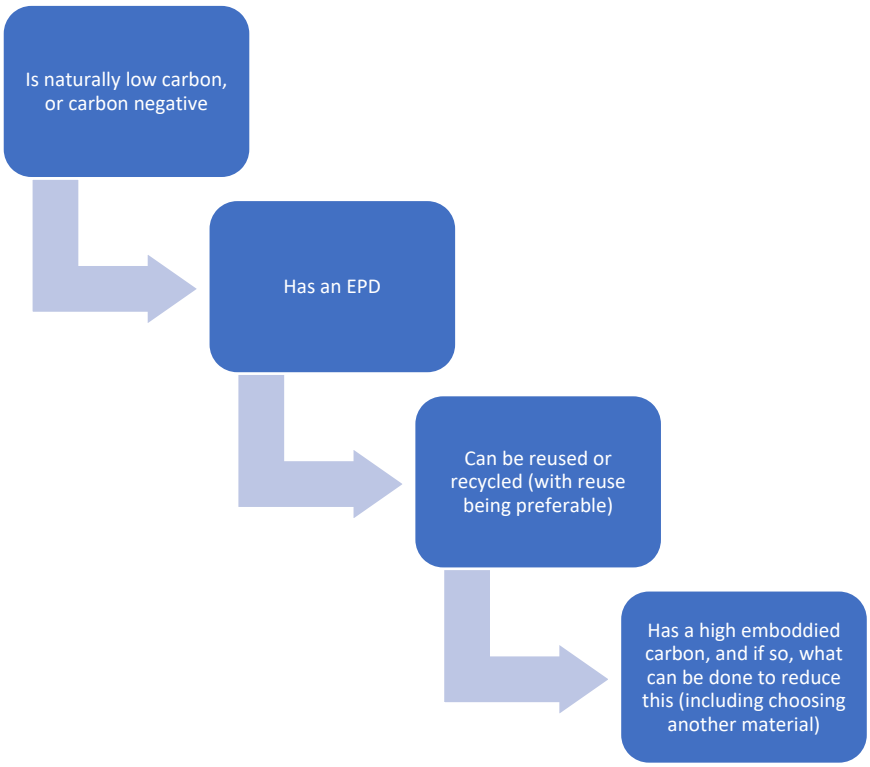
6.3 Selection of materials

There is no single solution that suits all low embodied carbon construction. Each material should be chosen to have the best performance compared to other materials including the lowest whole life carbon impact. Materials with higher embodied carbon should be considered only if a sufficient reduction of the operational carbon over the lifetime of a building or other works is likely to be achieved. Even then, consideration needs to be given to the need to reduce carbon emissions quickly, it may be preferable to use materials with lower embodied carbon. Achieving a net carbon benefit from, say, 2080 would be of limited value given the available global carbon budget to 2050[3].

Wherever possible, locally sourced or reclaimed materials should be used to minimise delivery distances and packaging. The environmental product declaration (EPD), obtained via thorough life cycle analysis (LCA), details the environmental impact of a material or component. The recyclability of the material at the end of the building's life expectancy should also be considered.

For any material specified in a building, designers should consider if the product:

[3] The IPCC identifies the global 'carbon budget' for the period between 2018 and 2050 as "about 420 GtCO2 for a two-thirds chance of limiting warming to 1.5°C" whilst acknowledging a significant degree of uncertainty about the number (in either direction) (https://www.ipcc.ch/sr15/chapter/chapter-2/). The point stands, however, irrespective of the number; there is a total amount of carbon which can be emitted prior to 2050 whilst being reasonably likely to remain within the 1.5°C or 2.0°C limits.



6.4 Low carbon and carbon beneficial materials

Natural materials – that is, materials which can be used in construction with limited processing – are beneficial in terms of embedded carbon. Whilst this is particularly true of wood, as this 'locks up' carbon removed from the atmosphere (and is thus potentially carbon beneficial) it is also true of stone and soil as well. Where such materials can be obtained locally this also reduces transport carbon emissions and may also enhance local character in what is built.

Therefore, WNC will, where economically practical and achieves the required performance and durability, use wood, stone, earth, and organic-derived materials in its construction projects.

Wood

The growth of trees naturally removes carbon from the atmosphere and can provide attractive and durable buildings and other structures. Carbon sequestration rates are dependent on many variables, e.g., maturity, forest type, local climate, soil, and forest management. The optimum sequestration rate is reached by felling trees as they reach maturity, as the carbon sequestration rate then reduces considerably, starting the process again by planting new trees. Using the felled timber in long life harvested wood products such as construction products provides the additional benefit of delaying any re-emissions.

Structural timber can also often be recycled into further useful building components or other items. At the end of its useful life, timber retains a calorific value and can be used as a fuel, displacing the need for further fossil fuel use.

In order to ensure the harvested wood used for any timber products is replaced by a new sapling, wood and timber products should always be sourced from sustainably managed forests.

Stone

Like wood, stone is an ancient construction material. Buildings constructed of stone can last for thousands of years and are typically attractive, supporting retention and re-use. Whilst the use of stone does not remove carbon from the atmosphere in the way the use of wood can, stone is typically a low-carbon material. This is especially the case where the stone does not need to be moved long distances; due to its weight, moving stone long distances is likely to emit significant levels of carbon.

Earth

The use of mass earthworks is also an ancient practice. Earth is an excellent heat store, allowing buildings to remain cooler in summer and warmer in winter. The volume needed, however, does limit potential uses. Reinforced earth is now widely used in civil engineering works, as is earth which has been treated to improve its engineering properties. Where practical, consideration should be given to using cob or adobe for walling for example.

Earth is intrinsically low carbon. However, simply because of their scale, mass earthworks are significant emitters of carbon from construction plant. This needs to be allowed for in making decisions on its use.

Once in place Earth can be planted and provides an attractive environment for users and those passing by, and which can support biodiversity and reduction in flood risk.

Other organic based products

Consideration should be given to the use of other organic based products such as hemp blocks for walling and wool insulation. Like wood, these also have the potential to be carbon negative – that is, to sequester carbon from the atmosphere – and as such assist in achieving net zero construction.

6.5 Other materials

Where naturally low-carbon materials are not practical solutions, other materials will be used. The Council will focus on the major areas of carbon production first. In making choices, consideration needs to be given to both the inherent embodied carbon in the material and the transport carbon in moving it to the construction site.

Concrete

Concrete is the most used material in the building sector. It is used for foundations, floors, walls, and framing. It is very carbon intensive, as the process of heating limestone to create 'standard' Ordinary Portland Cement typically uses fossil fuels and also the heated limestone directly gives off CO_2.

The Council will therefore seek to minimise the use of concrete, and where it does need to be used will seek to use emerging lower-carbon concretes.

Brick

Brick is a popular choice for walls, façades, and paving, as well as some foundations. In the UK, red brick is probably the most trusted building material. Its production is the largest sector in the UK clay construction products market. Brick is produced by cutting a piece of clay into units which are fired at around 2,000^{o}C. Emissions come from clay extraction, fossil fuels used in the heating, and from wider manufacturing processes.

Due to the heat needed for production, bricks have a relatively high embodied carbon. Whilst still likely to be used because of their practicality and attractiveness, this should be minimised. Increasingly, stone

producers are providing stone cut into brick sizes, which can be a useful alternative with a much lower embodied carbon. In some cases, unfired bricks can also be used; these also have much lower embodied carbon.

Where brick is used, designs should, where practical, support re-use, notably by using lime rather than cement mortar.

On larger scale buildings, brick slips are often used to save time and costs. Brick slips are mounted on steel fixings and used as a rainscreen. This increases embodied carbon on a weight basis and also sacrifices the thermal mass benefits. Therefore, it is unlikely brick slips will represent an appropriate choice on WNC construction projects.

Steel

51% of global steel is used for construction[4]. Steel is used in a wide range of construction projects, ranging from single dwellings to large scale infrastructure. It is flexible and capable of supporting a wide range of structural forms. It is energy intensive in extraction and refining but is capable of being recycled.

WNC will use steel where it is the most appropriate form of construction. Designs should seek to maximise the efficiency of use and support re-use and recycling once the building or other structure is no longer needed.

Aluminium

The production of primary aluminium requires a very high consumption of electricity, almost ten times that of steel. Due to the energy intensive primary production process, the embodied carbon is very high, especially if aluminium is used in large volumes.

By contrast, aluminium is highly recyclable, with properties that do not deteriorate as the material is re-used. Worldwide, around 75% of all aluminium produced is still in use. Recycling uses only around 5% of the energy needed to produce primary aluminium. The recycled material supply chain is, however, not enough to cover the current demand.

In order to reduce the embodied carbon as much as possible, where aluminium is unavoidable, it should either be recycled material or, if primary, it should have been produced using electricity from renewable sources. To support the reclaiming of aluminium at the end-of-life, inventories of aluminium components should be kept. Designs should also seek to enable aluminium to be easily removed for re-use or recycling.

Glass

Soda-lime glass accounts for 90% of all the manufactured glass. It is made up of 70-74% silica, along with sodium carbonate, lime, magnesium oxide and aluminium oxide to enhance its performance. Glass production is energy intensive but, unlike concrete, the process does not also result in the direct emission of CO_2. Glass is also highly recyclable.

With its unique translucent properties, glass is used for curtain walls, façades, windows, skylights, partitions, bulbs, and tubes. It is thus unavoidable in most building projects. However, architectural fashions have also resulted in its use in unsuitable locations, such as glass curtain walls where in practice it is undesirable to have complete transparency and excessive heat gain and loss occur. This makes it harder to achieve net zero in operation.

Designs should only use glass where its particular properties are actually beneficial. Where possible designs should support the re-use of glass components when no longer required in that building or other structure,

[4] World Steel Association

or if this is not possible the easy and safe removal for recycling. As a last resort (but above landfill), secondary glass can have a second use as insulation or aggregate.

Bitumen

A range of bituminous binders are used to create bound surfaces for roads, paths, car parks, playgrounds and so on. Bitumen is based on a fossil fuel (oil) but as long as it remains in use in surfacing, its carbon content is not released into the atmosphere. Production of bitumen from crude oil is, however, an energy-intensive process. It is also normal to heat the bitumen-containing materials when laying them to support achieving the required degree of compaction and smoothness. In recent times, 'warm' and 'cool' mix bitumen-containing mixes have been devised, which use chemical alterations to reduce the degree of heating required when laying.

As with other materials, the use of bitumen should be minimised where realistically possible (e.g., ensuring road widths are not excessive). Cool or warm mixes should be used where these achieve the required level of performance. Once in situ, planned maintenance such as surface dressing will assist in extending the lifespan of the material and thus reducing the need for replacement.

When it is necessary to replace them, bituminous mixes should be reused with fresh binder or recycled and used as aggregate where practical.

7. The path to 2030

7.1 Overall considerations

Whilst in theory it would be desirable to move immediately to net zero construction, neither the Council nor its supply chain is able to deliver this yet. Nor can the Council or the construction industry stop construction for a period to redesign systems and products; construction most go on, for social, economic, financial, and in some cases, environmental reasons. Therefore, it is unavoidable that change will be incremental. The Council will also need to develop both its own capacity and help its supply chain develop capacity to build in low-carbon ways.

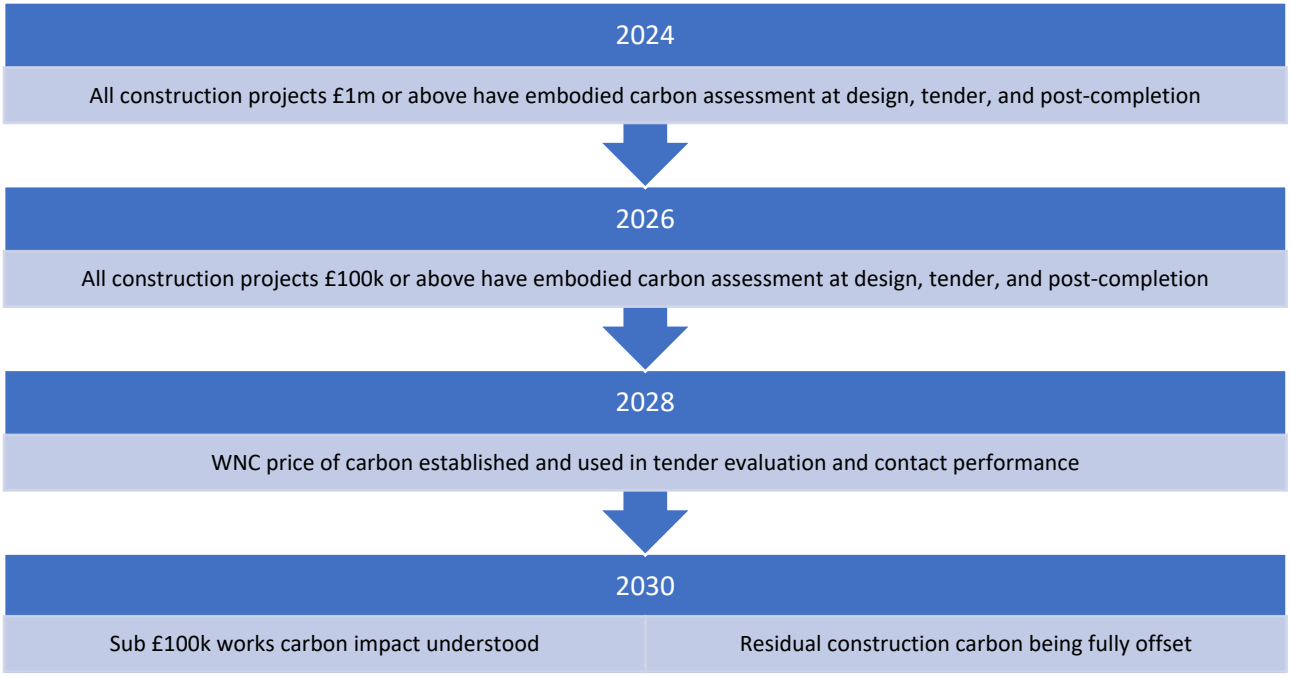
In order to achieve net zero, the Council needs to be able to measure the carbon impact of its construction operations. This will be easier to achieve in large projects and may never be practical or cost-effective for smaller ones. There is also a need to keep assessment and measurement proportionate, even on larger projects; expending a high degree of effort measuring, say, 2% of emissions is likely to distract from the steps needed to achieve meaningful reductions in major sources of emissions.

The actions set out below reflect these considerations.

7.2 Understanding and pricing carbon in construction

(For works under the Highway Services Contract, different arrangements will apply, see Section 10.)

The steps below show the key steps the Council will take in understanding and applying its construction carbon emissions:



The WNC carbon price would be based on the cost to WNC to fully offset each tonne of CO_2e emitted. Where the carbon price is used in:

- Tender evaluation, each tender price would be adjusted by the projected carbon emissions multiplied by the WNC carbon price.
- Contract performance, actual payments to contractors would be reduced by the amount of additional carbon emitted exceeds the tendered value, multiplied by the WNC carbon price.

Arrangements for offsetting are described further in section 8.

7.3 Efficient assessment

Assessing the carbon impact of every material and operation in construction is likely to be impracticable and would certainly be disproportionate, as the effort involved would exceed the value when small impacts are subject to detailed examination. It is also likely to be particularly challenging for smaller businesses to calculate the carbon impacts of their activities or the materials they propose to use.

Therefore:

a) The Council will prepare or adopt a published inventory of commonly used significant materials together with their expected carbon impacts. Contractors would be free to propose different values with evidence to justify them but could otherwise use those provided or adopted by the Council unless it was clear this was not applicable to the particular material or process used.

b) The use of fuel and energy on construction sites would be measured and used in carbon assessments. This should be relatively straightforward to capture, and will reflect the carbon impacts of, for example, large scale earthworks. However, the fuel used by workers travelling to and from construction sites would not be included, as it is impractical to measure in a meaningful way and is unlikely to be material on the scale of projects undertaken by the Council.

c) Fuel and energy used in material production and transport to the construction site would be considered in carbon assessments.

d) Where EPDs are available, they will be accepted unless there is a clear reason that they are not applicable or valid.

7.4 Skills and abilities

Delivery of effective low-carbon construction requires ongoing development of skills and knowledge, both within the Council and within its supply chain.

Accordingly, the Council will:

a) Make low carbon design and construction a key element of staff continuing professional development (CPD).
b) Hold an annual WNC Construction Conference (see Section 7.5) and develop a Construction Manual (see Section 7.6), to share and embed low-carbon knowledge and skills.
c) Reward competence on low carbon design and delivery in assessing applications to be on frameworks and similar arrangements organised by the Council, and where using frameworks arranged by others, seek where practical to choose those which do the same.
d) Work with its supply chain to help it access training and resources to develop skills, knowledge, and systems to deliver low carbon designs and construction practices.

7.5 WNC construction conference

Delivering sustainable, low carbon construction requires sustained effort from all involved, leadership, and processes for checking on progress and, if necessary, taking corrective action to ensure the goals are met. It also requires, as noted above, professional development in the new knowledge and skills needed.

To help achieve this, as well as continuous improvement of design and construction in all its aspects, the Council will hold a WNC Construction Conference each year. This will engage all those in the WNC group[5] who are involved in business cases, procurement, design, and delivery of construction works. In addition to its wider functions, it will be a focus for reviewing progress on delivery of this Strategy and provide professional development in low carbon construction.

7.6 WNC Construction Manual

WNC is developing a Construction Manual, to capture good practice and provide guidance on the best ways of managing the conception, design, and delivery of construction projects. This will include further guidance on low-carbon design and the implementation of this strategy.

The Manual is unlikely to apply directly to Highways schemes, although some of its content should still be useful in that context.

7.7 Local material supply

The supply of suitable materials, ideally locally, will be important to successful delivery of net zero construction. Therefore, the Council will explore options for local supply of construction materials, especially low-carbon and carbon negative materials. This will include:

a) Exploring potential existing local sources of construction materials and whether the Council can secure access to these.
b) Exploring whether it can, through its minerals and waste planning function, and in conjunction with neighbouring authorities enable greater local provision of stone, sand, and aggregates. This should benefit both the Council and other local construction activity (thus assisting with both the 2030 and

[5] WNC staff, those of NPH, and of any other arm's length or subsidiary bodies.

2045 targets). Such minerals sites should be designed with a view to restoration and biodiversity value on completion.

c) Developing an internal function mapping the anticipated use and production of construction materials (notably from demolition and dismantling), aiming to maximise potential for re-use at the highest point in the value chain. If practical, this activity would be extended to other organisations involved in construction and demolition/dismantling locally.

d) Exploring potential for local timber production – see item 7.8.

7.8 Local timber supply – West Northamptonshire productive woodland

As noted above, one of the key materials for achieving net zero construction is timber. As the growth of wood extracts carbon from the atmosphere, there is potential for the carbon locked into timber construction to balance carbon emissions from other aspects of construction.

Practically, different forms of timber will be needed, and in many cases established forestry operations will be the best sources of such timber. However, there may also be the potential to develop local supply, and in so doing, to create multiple benefits. It is, therefore, proposed to investigate the potential of creating productive woodland in West Northamptonshire, with the aim being to secure as many as possible of the following benefits:

- Production of wood for use in construction. Whilst it is likely to be some decades before trees are ready for use in structural components, smaller elements such as shingles or fence posts may be available sooner.
- Carbon capture.
- Biodiversity gain. This would include potentially allowing the Council to sell biodiversity net gain credits.
- Public access and enjoyment. Whilst public access needs to be managed, the Forestry Commission has shown it is possible to combine public access with productive woodland.
- Flood risk mitigation. Suitable location(s) may allow the woodland to slow the passage of water and cause some of it be to absorbed into the land or be taken up by the trees, thus reducing flood risk downstream.

Creation of local productive woodland will need its own business case, demonstrating that it is viable and cost-effective. This work will be done in alignment with work on the Council's Tree Policy & Strategy and Local Nature Recovery Strategy.

7.9 Procurement

Key steps relating to procurement in delivering net zero construction are set out in Section 7.2 and items (c) and (d) of Section 7.3. Alongside these carbon-specific measures, it will be important to ensure that wider sustainability issues continue to be addressed, through specification and contractual requirements, and social value scoring, as appropriate.

Additionally, where practical the Council will use partnering approaches which support early engagement of the wider construction supply chain. This maximises the potential to identify and use the best solutions, for carbon and more widely.

8. Offsetting

It is almost certain that offsetting will be needed to achieve net zero across WNC's construction works. The nature of these, involving the use of large amounts of materials, transport, and use of heavy plant, means

even with full use of low-carbon and carbon negative materials, it is likely a residual amount of carbon will be emitted. Nor would it necessarily be in the interests of the residents of West Northamptonshire to seek to achieve net zero within each sector of WNC's operations, when it could be achieved more efficiently taking them as a whole.

The WNC internal carbon price, being the cost to WNC of offsetting each tonne of CO_2e emitted, will therefore be critical in making balanced judgements about when to prevent carbon emissions and when to offset them. The price's function in tender evaluation and contract management set out in 7.2 is an example of the function it will perform.

As noted in the definitions (sections 3.1 and 3.2) offsetting is taken to mean removing carbon from the atmosphere. Whilst both biological and technological methods are permitted under the definition, it is likely biological methods will be the main or only means actually available to WNC in the period to 2030. Where possible, offsetting measures will be designed to also provide other benefits (e.g., as proposed to be explored in 7.8).

9. Northamptonshire Partnership Homes

WNC and NPH have shared aspirations for achieving net zero. This strategy is designed to be applicable to NPH operations as it is to WNC in-house projects. It has been shared with, and agreed by, NPH.

NPH will in particular collaborate with WNC on issues such as the carbon price and delivering offsetting measures.

10. Specific issues for highways

10.1 Highways contract

WNC has procured the bulk of its routine highway operations, including maintenance and smaller schemes, via a single contract. This is currently held by Keir. The contract contains extensive decarbonisation commitments. These require that by 2030 the Highways service will be net zero for scopes 1 and 2 and will have made substantial progress in removing carbon from scope 3 (which is the largest source of emissions).

10.2 Highways approach

Much of the approach set out in this Strategy is applicable to works under the Highway Service Contract (HSC), and indeed is aligned with what the contract provides. The approach to be taken will be as follows:

a) The provisions of the HSC relating to decarbonisation will be applied.

b) Information on net carbon emissions under the HSC will be calculated.

c) Offsetting will be applied to net carbon emissions under the HSC as it is applied to other construction works.

d) A low carbon palette of materials and specifications will be devised and applied.

e) The Highways & Transport service will be an integral part of arrangements such as developing skills and ability (section 7.3), the Construction Conference (section 7.5) and local material supply (section 7.7).

10.3 Major highways projects

Major highways projects, outside of the Highway Services Contract, will be subject to the same processes and approach as for other construction works (as set out in Section 7.2).

11. Conclusions

The main outcomes of this strategy should be:

- The ability of the WNC group to deliver on the 2030 net zero target in practical and cost-effective ways.
- Maximised wider benefits from carbon reduction and offsetting work.
- Enhanced capability to deliver net zero both within WNC and NPH, but also the supply chain – helping to drive wider change and thus supporting the 2045 target.
- Enhanced awareness and cultural change in which everyone takes responsibility for decarbonisation.

12. Review

This strategy and action plan, and the Construction Manual, will be subject to annual review at the WNC Construction Conference. If changes to the Strategy appear to be merited, they will be prepared and submitted for approval in the usual way.

Appendix A: Construction & Maintenance Climate Strategy Action Plan

This section sets out our ongoing carbon reduction activities for WNC. This plan will undergo regular review and refinement as part of the overall management review cycle. In addition to the abbreviations given in 4.1, 'Proc' is Procurement, 'ED' is economic development, 'Fin' is Finance, and 'PL' is Planning.

No.	Service areas	Source	Action	Target delivery date	Resources
1.	A&E, PS, HW, NPH	7.2	All construction projects £1m or above have embodied carbon assessment at design, tender, and post-completion.	2024	Staff and consultant time
2.	A&E, PS, HW, C&R, NPH	7.2	All construction projects £100k or above have embodied carbon assessment at design, tender, and post-completion.	2026	Staff and consultant time
3.	A&E	7.2, 8	WNC price of carbon established.	2028	Staff time
4.	A&E, PS, HW, C&R, NPH	7.2	WNC price of carbon used in tender evaluation and contact performance.	2028	Staff time
5.	A&E, PS, HW, C&R, NPH	7.2	Overall carbon impact of sub-£100k works understood.	2030	Staff time, potential consultancy costs
6.	A&E, NPH	7.2, 8	Residual construction carbon being fully offset.	2030	Offsetting costs, staff time
7.	A&E	7.3(a)	Preparation or adoption of inventory of commonly used significant materials with their expected carbon impacts ('carbon toolkit')	2025	Staff time
8.	A&E, PS, HW, C&R, NPH	7.4(a)	Low carbon design and construction made a key element of staff continuing professional development (CPD).	2024 and ongoing	Staff time, training costs
9.	A&E, PS, HW, C&R, NPH	7.4(c)	Competence on low carbon design and deliver in assessing applications to be on frameworks and similar arrangements organised by the Council rewarded, and where using frameworks arranged by others, seek where practical to choose those which do the same.	2024 and ongoing	Staff time
10.	A&E, PS, HW, C&R, NPH, Proc, ED	7.4(d)	Work with the supply chain to help it access training and resources to develop skills, knowledge, and systems to deliver low carbon designs and construction practices.	2024 and ongoing	Staff time
11.	A&E	7.5	Organise WNC Construction Conference.	2024 and annually thereafter	Staff time, minor costs

12.	A&E, PS, HW, C&R, NPH, Proc, Fin	7.5	Participate in WNC Construction Conference.	2024 and annually thereafter	Staff time
13.	A&E	7.6	Prepare and keep updated WNC Construction Manual.	2023 and ongoing	Staff time
14.	A&E, HW	7.7(a)	Exploring potential existing local sources of construction materials and whether the Council can secure access to these.	2024	Staff time
15.	PL, A&E	7.7(b)	Exploring greater local provision of stone, sand, and aggregates.	2024 and ongoing	Staff time
16.	A&E	7.7(c)	Developing an internal function mapping the anticipated use and production of construction materials.	2024 and ongoing	Staff time
17.	A&E	7.8	Developing business case for West Northamptonshire productive woodland.	2025	Staff time, potential consultancy costs
18.	HW	10.2(d)	Developing low-carbon palette of materials and specifications for highway use.	2025 and ongoing	Staff time, potential consultancy costs