ARUP

Milton Keynes City Council

# Carbon & Climate Study

## Policy Recommendations

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# Contents

# 1. Introduction

This report will present Arup's policy recommendations for Milton Keynes' emerging New City Plan, informed by the technical analysis undertaken in the Baseline Report and Analysis Report.

These recommendations will be set out in two parts:

- General policy recommendations: Accounting for the carbon and climate challenges across the MKCC administrative area, these recommendations will inform the Council's spatial strategy for growth and development requirements.
- Central Milton Keynes Policy recommendations: Given Central Milton Keynes' distinct character, contrasting with the wider MKCC administrative area, we will set out tailored analysis and policy recommendations for Central Milton Keynes.

# 2. General Policy Recommendations

## 2.1 Spatial Options Analysis

This section provides a recommended Spatial Option from each of the thematic analyses, namely on carbon, transport and logistics, climate risk and air quality. It does not attempt to provide an overall recommended Spatial Option.

The thematic analyses will form part of the evidence for determining Milton Keynes' future spatial strategy. Alongside this, the Council will consider various other evidence base documents, and undertake a Sustainability Appraisal, to determine the preferred spatial strategy.

### 2.1.1 Recommended spatial option: Carbon analysis

For emissions arising from new growth, Spatial Option 1 (Densification) results in the lowest annual and cumulative emissions of all spatial options (see Table 1). This is a result of the lower gross floor area and higher density of residential development, in comparison with the other Spatial Options, which reduces building heating demand and creates opportunities for low carbon heat networks. The lower demand for land also results in a lower impact on the carbon sequestration potential of the MKCC administrative area. Spatial Option 1 can also make use of existing infrastructure, thereby reducing carbon emissions associated with construction and more extensive transport and utility networks.

| Spatial Option | Emissions in 2050 | | Cumulative emissions by 2050 | |
|---|---|---|---|---|
| | Thousands of tonnes $CO_2e$ | Ranking | Thousands of tonnes $CO_2e$ | Ranking |
| 1. Densification | 12.6 | 1 | 466.9 | 1 |
| 2. Strategic Urban Extension | 13.9 | 2 | 548.1 | 2 |
| 3. New Settlement | 14.2 | 3 | 569.2 | 3 |
| 4. Rural approach | 15.1 | 4 | 676.9 | 4 |

**Table 1 Comparison of Spatial Options' projected Building emissions**

Spatial Option 1 is therefore recommended as the preferred spatial option for growth, from a cross-sectoral carbon reduction perspective.

If Spatial Option 1 is taken forward, we would recommend:

- Focusing on installation of roof-based solar PV, battery storage and district heat networks in the initial years of the New City Plan period. These interventions would help plug the gap in reducing building emissions, while the anticipated measures for grid decarbonisation are implemented.

  *To develop policy wording, refer to recommended policy requirements and rationale for renewable and low carbon energy matters are detailed in section 2.2.1.*

- Highlighting the opportunities for carbon sequestration in New City Plan policy and as a material consideration for Officers, when considering planning applications involving the development of brownfield land, densification of urban centres and preservation of existing habitats and vegetation.

  *To develop policy wording, refer to example policies on carbon sequestration and integration of green infrastructure are included in Table 31 of the best practice policy review (see section 6.4 of Baseline chapter). Example policies on densification and enabling development on brownfield land may also be relevant (see Table 25 of best practice policy review).*

### 2.1.2 Recommended spatial option: Transport & Logistics analysis

Spatial Option 1 (Densification) results in the lowest cumulative emissions of all spatial options. It also reaches the lowest annual emissions by 2050, namely 1.3 $tCO_2e$. In contrast, Spatial Option 4 has the greatest annual emissions by 2050, namely 2.7 $tCO_2e$.

The lower emissions of Spatial Option 1 arises from lesser dependence on cars, the greater number of trips made by sustainable modes and significantly lower journey distances. One of the strengths of Spatial Option 1 is that it broadens the sustainable mode options to assist with decarbonisation, rather than relying on increasing the proportion of Electric Vehicle (EVs) (such as in the Spatial Option 4 results). There is also a greater potential to influence travel behaviours in urban areas, which would be facilitated in the Densification option.

| Spatial Option | Emissions in 2050 | | Cumulative emissions by 2050 | |
|---|---|---|---|---|
| | Thousands of tonnes $CO_2e$ | Ranking | Thousands of tonnes $CO_2e$ | Ranking |
| 1. Densification | 1.3 | 1 | 143.6 | 1 |
| 2. Strategic Urban Extension | 1.8 | 2 | 200.2 | 2 |
| 3. New Settlement | 2.2 | 3 | 225.1 | 3 |
| 4. Rural approach | 2.7 | 4 | 313.5 | 4 |

**Table 2 Comparison of Spatial Options' projected transport emissions**

Spatial Option 1 is therefore recommended as the preferred spatial option for growth, from a transport and logistics perspective.

If Spatial Option 1 is taken forward, we would recommend:

- Delivering densification in conjunction with the ambitious interventions and policy changes put forward in the MKCC strategic vision for sustainable transport. It is considered that the Spatial Option 1 emissions trajectory could not otherwise be realised. This would involve improving the sustainable transport network, with a comprehensive understanding of local travel behaviours and patterns and how these can be influenced.

  *To develop policy wording, refer to example policies included in Tables 25 – 27 of the best practice policy review (see section 6.4 of Baseline chapter).*

- Reviewing the grid road network, and reallocating part of this network to sustainable modes including MRT routes, bus lanes and segregated cycle routes (including, but not limited to,

expansion of the Redway network). This will help create an appealing, convenient and direct network of sustainable transport for residents.

In support of enhancing the sustainable transport network, the ongoing MRT commission is proposing innovative complementary measures including emerging and shared micro-mobility transport options, EV and autonomous vehicles as public vehicle fleets and other emerging vehicle technologies.

*To develop policy wording, refer to the 'People-centred mobility' element of the Sustainable Design Framework developed in section 8.2.2 of Baseline chapter.*

- Reducing overall travel demand, decreasing the average distance travelled per trip, and providing convenient, affordable, and safe alternatives to the private car, in order to achieve existing mode share targets and to minimise transport emissions from future development.

  *To develop policy wording, refer to example policies included in Tables 25 – 27 of the best practice policy review (see section 6.4 of Baseline chapter).*

- Accelerating the roll out of EV infrastructure, alongside the electrification of other transport modes, given private car use will still be a significant mode of transport (especially for blue badge users).

  *To develop policy wording, refer to recommended policy requirements and rationale for EV infrastructure in residential developments are included in section 2.2.3. Refer to these for non-residential development too, as the best practice review found limited planning policies from other Local Authorities on this topic.*

### 2.1.3 Recommended spatial option: Climate Risk analysis

Spatial Option 2 (Strategic Urban Extension) poses relatively lower risk than seen in the other three Spatial Options, in respect of exposure of new development to climate hazards (see Figures 16 to 27 in Analysis Report). This is a result of Spatial Option 2 being situated in areas at relatively low risk from various types of flooding. This Option can also better accommodate interventions to adapt to climate change, in comparison to Spatial Option 1 (Densification), given that development would be allocated on greenfield sites with greater capacity to incorporate green infrastructure solutions, and where infrastructure can be built to modern specifications.

Spatial Option 2 is therefore recommended as the preferred spatial option for growth, from a climate risk perspective.

If Spatial Option 2 is taken forward, we would recommend:

- Setting ambitious design codes and criteria for climate resilient buildings and infrastructure.

  *To develop policy wording, refer to recommended policy requirements and rationale for climate resilience in section 2.2.3 of this chapter. Additionally, refer to example policies in Table 34 of the best practice policy review (see section 6.4 of Baseline chapter).*

- Promoting effective green spaces that are adapted to anticipated changes in climate, including alleviating overheating and promoting community resilience.

  *To develop policy wording, refer to example policies in Tables 31 and 34 of the best practice policy review (see section 6.4 of Baseline chapter). Additionally, refer to the 'Green, blue and nature-based solutions' and the 'Resilient and distinctive places' elements of the Sustainable Design Framework developed in section 8.2.2 of Baseline chapter.*

- Upgrading existing infrastructure, connected with the Strategic Urban Extension, to reduce associated climate risks.

  *The best practice review did not identify any existing example policies which directly link climate resilience objectives with upgrading the resilience of existing infrastructure.*

*As such, to develop policy wording, refer to our climate risk findings (sections 4 and 2.5 of the Baseline and Analysis chapters respectively) with the Infrastructure Delivery Plan (or similar) for the New City Plan (when produced) to identify existing infrastructure vulnerable to climate risks, with support from statutory consultees (e.g. Lead Local Flood Authority).*

- Ensuring that all new developments within the Strategic Urban Extension are built to the same ambitious benchmark of climate adaptation and resilience, so as not to create any disadvantage between communities of different socio-economic backgrounds.

  *Policies should be written to ensure that they are applied uniformly by Officers across the MKCC administrative area.*

### 2.1.4 Recommended spatial option: Air quality analysis

Spatial Option 1 (Densification) displays the lowest levels of $NO_x$, $PM_{10}$ and $PM_{2.5}$ emissions from total transport and building sources, in comparison to the other three Spatial Options. This is predominantly due to the lower overall number of vehicle trips and gas use associated with Spatial Option 1, which results in lower overall levels of the three pollutants.

Despite the increase in modal share of Electric Vehicles (EV), the $PM_{2.5}$ and $PM_{10}$ pollutants in Spatial Option 1 (arising from EV tyre and brake wear emissions) show a relatively low increase to 2050. This is likely due to a greater share of sustainable transport modes in this Option. In contrast, there is a striking increase in $PM_{2.5}$ and $PM_{10}$ pollutants in Spatial Options 3 (New settlement) and 4 (Rural approach), where transport decarbonisation is more dependent on EV rollout. $NO_x$ emissions from transport reduce in all Spatial Options due to the increased use of EV.

Spatial Option 1 (Densification) is therefore recommended as the preferred spatial option for growth, from an air quality perspective.

If Spatial Option 1 is taken forward, we would recommend:

- Stipulating that developers must assess the impact of major development on air quality and public health at a local level, through an Air Quality Assessment, from outline application stage onwards, in line with national planning policy and environmental legislation. This is particularly where there are sensitive receptors such as residential properties and schools, and existing pollution hotspots.

  As Spatial Option 1 occurs in the area with the greatest population density, the concentration of, and human exposure to, pollutants may be greater than in less populated areas. As such, it is important that developers assess the additional impacts on air quality of their development and integrate design approaches that mitigate these impacts as much as practicable. This is with the intention of mitigating the projected air quality impacts of new development at an MKCC administrative area level.

- For all development, stipulate that developers must integrate design approaches to mitigate air quality impacts. These approaches may include measures to encourage active travel and sustainable transport, discourage car use, encourage low emission buildings, require best practice to reduce emissions from construction activities, and limit exposure of residents and occupiers to poor air quality.

  It is recommended that these design approaches are included in a specific air quality policy. They should also be integrated across the New City Plan policies on transport, public health, and climate.

  *To develop policy wording, refer to Brent's Local Plan Policy BSU12: Air Quality, as identified in the best practice policy review (see section 6.4 of Baseline chapter). The associated guidance,*

*namely Brent's Sustainable Environment & Development Supplementary Planning Document 2023*[1] *and the London Plan Air Quality Neutral Guidance 2023*[2]*, may also be of assistance.*

## 2.2 New Development Analysis

This section will present policy opportunities for renewable energy capacity. It will also bring together policy recommendations on net zero carbon buildings, sustainable design feature policy options and green infrastructure, based on our analysis and discussion with MKCC Officers.

### 2.2.1 Renewable energy capacity

In Section 3.2 of the Analysis Report, a strategic capacity assessment was undertaken of land-based and roof-based renewable energy capacity, namely for future wind and solar PV installations. This section highlights where the greatest renewable generation capacity exists in the MKCC administrative area, as identified through high-level geospatial analysis.

It is noted that other renewable and low carbon technologies may also be considered by Milton Keynes. These are outside the scope of this study.

#### Land opportunities for medium and large-scale renewable schemes

At an MKCC administrative area level, our analysis identified that there is an estimated 3.9km$^2$ suitable land available for ground-mounted solar PV in a conservative scenario, and 107km$^2$ suitable land available in a less conservative scenario (see Figure 1). These scenarios could allow generation for 211GWh per year and 5,810GWh per year respectively, constituting 12% and 344% of Milton Keynes' total energy demand by 2031 respectively.

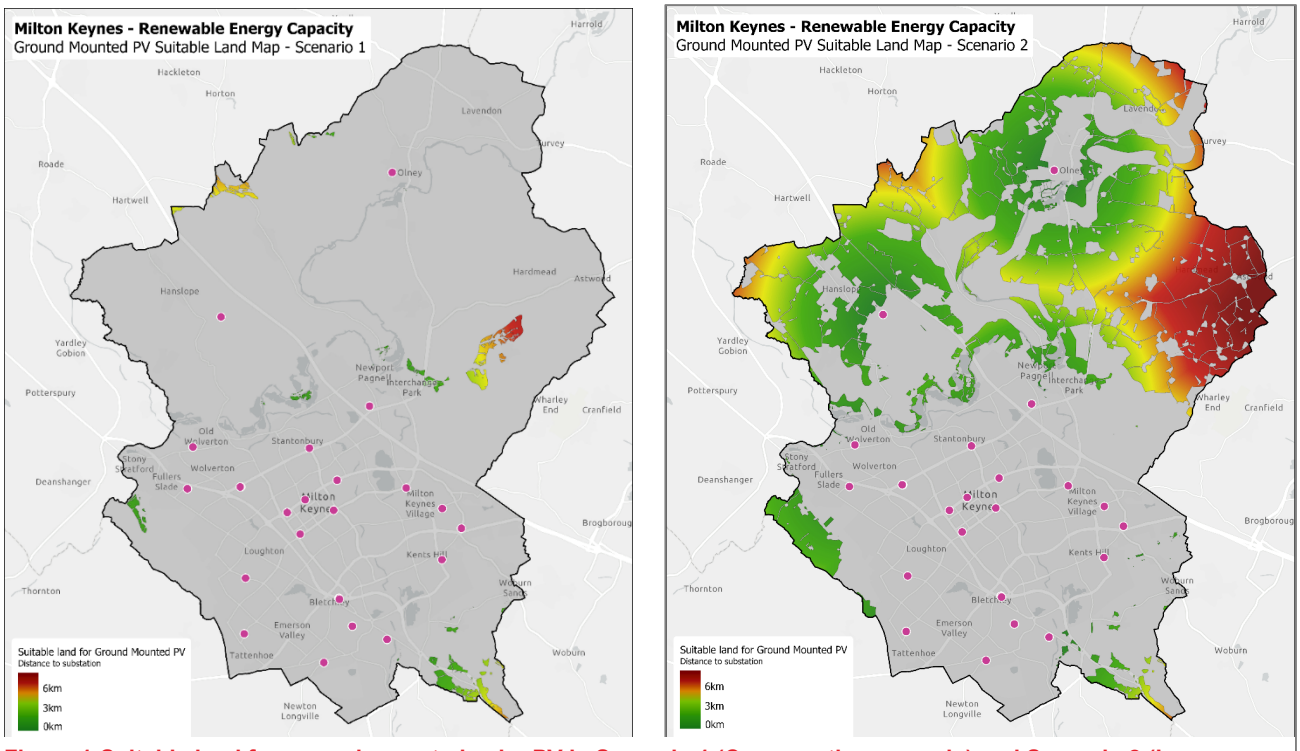


**Figure 1 Suitable land for ground-mounted solar PV in Scenario 1 (Conservative scenario) and Scenario 2 (Less conservative scenario). Copied from Analysis Report, namely Figures 44 and 45.**

[1] Brent Council (2023) Sustainable Environment & Development. Available at: https://democracy.brent.gov.uk/documents/s133333/Appendix%20B.pdf [Accessed on 18/03/24]

[2] Greater London Authority (2023) Air Quality Neutral (AQN) guidance. Available at: https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/air-quality-neutral-aqn-guidance [Accessed on 18/03/24]

Wind generation is only possible in a less conservative scenario, where river and surface water flood zones and Agricultural Land Category 3 are included in the suitable land search area. In this less conservative scenario, wind generation is estimated at 190 GWh per year. This relatively lower generation capacity (in comparison to ground-mounted solar PV) is partly due to the greater buffer distances from settlements required for wind turbines. However it is acknowledged that energy infrastructure is classed as 'essential' from a flood risk perspective. As such an exception test is not required for schemes in Flood Risk Zone 2 and areas of surface water flood risk. It is also noted that Agricultural Land Category 3 is split into two categories (Grades 3a and 3b), it may be possible for some of the Category 3 land to come forward for wind and solar development when more detailed information is known.

A combination of solar PV and wind generation is possible in a less conservative scenario, generating 5,980 GWh per year.

From a land potential and energy generation capacity perspective, it is recommended that the Council focus on progressing ground-mounted solar PV in allocations in the New City Plan.

Applicants for ground-mounted solar PV must prepare a Renewable Energy Statement, including information on the site selection process as part of their application documents. Sites must be selected land from the 'potentially suitable areas' identified by the Council [see below] and low susceptibility landscapes (as identified in the 2024 Landscape Assessment Update 2024, 2022 Landscape Character Assessment and 2022 Landscape Sensitivity Assessment). They must also apply a 20 metre exclusion buffer around other development allocations in the New City Plan, as well as existing development.

With two to three potentially suitable sites, applicants must evaluate these sites in respect of:

- Technical considerations including solar gain, economic feasibility, on neighbouring uses, aircraft safety, grid connection and other factors;
- Landscape and Visual Impact Assessment including presence of designated landscapes (such as the proposed Areas of Attractive Landscape, potential visual impacts such as effect of glint and glare on the landscape and required mitigation; and
- Consideration for coordination of grid connections and other delivery factors to facilitate viable installation.

If allocations for ground-mounted solar PV are taken forward, we would recommend:

- Preparing a 'statement of forthcoming renewable and low carbon development' in the MKCC administrative area. This should set out the area's total energy demand (see section 3.2.3.5 of the Analysis Report); and the anticipated contribution from each development to decarbonising the MKCC administrative area's energy demand including ground-mounted solar PV and, as discussed in the next sub-section, roof-based solar PV.
- Allocating 'potentially suitable areas' for ground-mounted solar PV in the New City Plan policy map, based on the land identified in Figure 1.
- Facilitating delivery of battery storage through the New City Plan, supported by the Infrastructure Delivery Plan (or similar evidence) and relevant stakeholders (e.g. National Grid and District Network Operators).

  *To develop policy wording, refer to advice in Section 3.4 of the Analysis Report. Additionally, refer to Central Lincolnshire Local Plan Policy S16, as identified in the best practice policy review (see section 6.4 of the Baseline Report).*

Roof-based opportunities for solar PV

This study has shown that there is very good potential for rooftop solar PV capacity in non-domestic buildings, both existing and planned buildings. When planned development buildings are considered at a 20% building-to-site ratio, 2.25m$^2$ roof space is available for solar PV, generating 387 GWh per year. When planned development buildings are considered at a 40% building-to-site ratio, 11.3m$^2$ roof space is available for solar PV, generating 545 GWh per year. In relation to Milton Keynes' 2031 total energy demand, the 20% building-to-site scenario would meet 23% of this demand; the 40% building-to-site scenario would meet 32% of this demand.

However, from a delivery perspective, there is significant uncertainty in delivering on this roof-based solar PV potential, given that it will be dependent on the actual building-to-site ratio of the planned development, actual building roof capacity, actual orientation for solar gain and other site-specific factors. This translates to uncertainty for decarbonising the MKCC administrative area's energy supply, albeit it is noted that the Council is involved in rolling out other renewable technologies within the MKCC administrative area. Additionally, this study has separately evaluated options for delivering green roofs, placing another potential demand on roof space.

To balance these two competing uses, it is proposed that opportunities for roof-based solar PV are maximised for building typologies where this is most likely to be deliverable and able to contribute to decarbonising energy demand, and where green roofs are least likely to be appropriate, for example, residential properties with pitched roofs and industrial buildings in Use Class B2 (General industrial) and B8 (Storage or distribution).

All residential and non-residential typologies considered in this study could accommodate roof-based PV, if certain design criteria are met. For example, a building roof will need to have a clear area for installation of at least 1.7m$^2$ or higher to be able to accommodate a single solar panel of this size, if it is of appropriate orientation and solar exposure.

In contrast, only some typologies considered in this study would be appropriate for green roofs with multi-functional value (see 'Green Roof & Wall' recommendations below for further details). There are limited options for multi-functional green roofs on detached and semi-detached residential properties with pitched roofs. They are also unlikely to be appropriate on industrial buildings in Use Class B2 (General industrial) or a sui generis use involved in one or more industrial processes[3]. Conversely, multi-functional green roofs can effectively be achieved on flat roofs – these would typically include apartment blocks, office and industrial buildings in Use Class B2, Use Class B8 and sui generis uses that do not involve industrial processes. This is with the caveat that structural loading feasibility would need to be verified for a green roof to be installed.

[3] Industrial process is defined in Article 2 of The Town and Country Planning (Use Classes) Order 1987 (as amended).

For major residential development with pitched roof properties, it is recommended that the Council develops policy that stipulates roof-based solar PV.

For major development with flat roofed buildings, it is recommended that the Council stipulate pre-application engagement with the applicant to discuss the use of the roof space, alongside any other material matters. The purpose of this engagement would be to:

a) Establish if the roof space is sufficient in area and in structural loading capacity to accommodate roof-based solar PV or a green roof;

b) Weigh up the proposal's estimated generation capacity for roof-based solar PV and contribution to the MKCC administrative area's energy demand*, against its potential performance against the multi-functional value goals for green roofs (see 'Green Roof & Wall' recommendations).

If it is agreed that roof-based solar PV is taken forward in a proposal, the developer would need to demonstrate exceptional circumstances on the basis of viability, if they considered it unfeasible. This is in light of the scale of roof-based solar PV required to decarbonise the MKCC administrative area's energy demand, based on the findings of this study.

*Formula to calculate roof-based solar PV generation potential

The contribution to the Borough's energy demand can be estimated using the equation below, which calculates the total PV power on a flat roof *($P_{PV}$)* and the annual electricity generation of the PV system installed *($E_{PV}$)*

$$P_{PV}\ (MW) = \frac{c_1 \cdot c_2 \cdot (1 - c_3) \cdot A_R \cdot P_P}{A_P \cdot 10^6}$$

$$E_{PV}\ (GWh) = \frac{E_P \cdot P_{PV}}{10^3}$$

$c_1 = roof\ area\ available\ for\ PV\ (70\%)$

$c_2 = roof\ area\ reduction\ due\ to\ shading\ (50\%)$

$c_3 = roof\ area\ optimism\ bias\ reductio (20\%)$

$A_R = total\ flat\ roof\ area\ (m^2)$

$P_P = PV\ panel\ peak\ power\ (W)$

$A_P = PV\ panel\ area\ (m^2)$

$E_P = annual\ specific\ PV\ panel\ electricity\ generation\ (863\ kWh/kWp)$

If a requirement for roof-based solar PV is taken forward, we would recommend:

- Preparing masterplans for strategic development allocations with requirements for roof-based solar PV and associated site-wide decentralised grids, EV chargers connected in smart networks and battery storage.
- Requiring applicants to quantify the scale of contribution of roof-based solar PV to decarbonising the MKCC administrative area's energy demand (as part of their application documents). This should be set in the context of the MKCC administrative area's total energy demand, drawing on the

'statement of forthcoming renewable and low carbon development' recommended in the previous sub-section.

- Requiring applicants to indicate the proposed building systems that prioritise local electricity use before battery storage and export to the grid, as part of their Energy Statement (see recommendations on 'On-site energy efficiency and carbon reduction' for further details).

### 2.2.2 Net zero carbon buildings

In this section, the policy thresholds and requirements were developed based on the analysis in Section 3.3 of the Analysis Report on Net Zero Carbon Buildings.

These thresholds and requirements were tested through online stakeholder engagement workshops in November 2023, including with Officers, Councillors and other interested parties. Stakeholders were provided with minimum, medium and maximum policy options – the tiers indicated requirements of increasing stringency.

The maximum policy option was selected for residential and non-residential development, with the exception of carbon offsetting where the medium policy option was chosen.

#### On-site energy efficiency and carbon reduction

As context, these recommendations include an Energy Use Intensity (EUI) target. It is acknowledged that this differs from the % Target Emissions Rate (TER) uplift target metric referenced in the Written Ministerial Statement (WMS) on Local Energy Efficiency Standards, published on 13 December 2023. As the WMS was published after our stakeholder engagement workshops, it was considered appropriate to maintain our recommendations for the purposes of this study. It is understood that Council will seek legal advice on this matter and review the policy recommendations at a later date, as appropriate.

For the avoidance of doubt, it is not possible to convert the EUI target to a % TER uplift target, without undertaking building modelling – this sits outside the scope of this study.

To achieve net zero carbon buildings, it is recommended that all developments are designed in line with the Energy Hierarchy and so take a 'fabric first' approach.

Major developments must meet the following on-site targets:

- Major residential development
    - Total Energy Use Intensity (EUI) of 35 kWh/$m^2$ /yr (GIA) for operational energy, excluding renewable generation.
    - < 625 $kgCO_2e/m^2$ as whole lifecycle carbon requirement
    - 4-star HQM score for new build development.
- Major non-residential development
    - Total Energy Use Intensity (EUI) of 55 kWh/$m^2$ /yr (GIA) for operational energy, excluding renewable generation.
    - < 750 $kgCO_2e/m^2$ as whole lifecycle carbon requirement
    - BREEAM Outstanding score for new build development.

After fully appraising fabric improvement options, applicants may accommodate up to 25% of electricity demand by on-site renewable generation. This generation must be supported by high efficiency electric heating systems, such as low carbon district heating.

It is recommended that applicants evidence the design approach in a detailed Energy Statement, including the results of appraising and modelling different interventions to reduce regulated and unregulated emissions. These interventions should consider the latest net zero technology, such as for energy generation and smart demand control measures.

For developments of more than 100 dwellings or 100 sqm (GIA) non-residential floorspace, applicants must also detail their approach to reducing whole life-cycle carbon emissions, such as by applying circular economy principles.

In setting planning conditions, we recommend that the Council stipulates EUI monitoring by building archetype for the first five years of occupation of a development to gauge any disparity with the policy EUI target and actual carbon emissions arising from new developments brought forward by the New City Plan.

To accompany these requirements, we would recommend:

- Preparing supporting policy text that clearly defines the Energy Hierarchy, a fabric first approach to building design and any other key terminology.
- Preparing a Supplementary Planning Document that provides advice on preparing a detailed Energy Statement, and case study examples of successful net zero developments, and smart demand control measures.

### Carbon offsetting provision

From discussion with Officers, we understand that the Council would prefer to retain a policy provision for carbon offsetting, if developers find that it is demonstrably infeasible to achieve design that meets the net zero carbon requirement. By maintaining Milton Keynes' Carbon Offset Fund (COF), the Council is also keen to continue delivering decarbonisation projects that also achieve multiple benefits for sustainable development, including social value for communities. For example, these projects includes retrofit of social housing, with benefits for tenants to save on their

domestic energy bills, as well as installation of renewable energy sources by local town and parish councils within the Milton Keynes area.

We understand that Milton Keynes was the first Local Authority to establish a carbon neutrality policy requirement in 2005, with the COF instigated to take commuted payments from developers to compensate for any shortfall in the carbon neutrality target.

Since Milton Keynes' early adoption of a Fund, the options for carbon offsetting have expanded into more mature voluntary carbon markets where carbon credits can be created and sold. We would recommend that the Council consider adapting the COF, so that a carbon credit approach is taken.

If taken forward, we would advise that this takes the form of 'responsible offsetting' where the value of carbon credits is verified by reputable and well-established industry organisations. For example, we would consider Verra as one of these organisations, as the host of the global Verified Carbon Standard Program.

As one option, the Council could register a long list of decarbonisation projects in the MKCC administrative area (such as retrofit of public buildings or green infrastructure upgrades) with a carbon credits verification organisation. When developers contribute to the COF, their payment would contribute to these projects, allowing greater transparency on how the offset fund is managed and how it benefits residents.

Alternatively, the Council could seek agreement from developers to deliver verified carbon reduction projects in the MKCC administrative area. If there are any verified projects close to the application site, co-delivery may be possible, as well as opportunities for design integration. This option may also be appealing for developers who are keen to demonstrate social value benefits of their development.

We recommend that the following approach is taken to carbon offsetting:

> If, through the preparation of a detailed Energy Statement, the applicant finds that the net zero carbon target cannot be fully achieved on-site, the shortfall must be provided through either:
>
> a) Payment to the MKCC administrative area's Carbon Offset Fund, which will contribute to verified decarbonisation projects; or
>
> b) Delivering one of the MKCC administrative area's verified decarbonisation projects, preferably in geographic proximity to the application site.
>
> The contributions (whether through option a) or b) will be secured through a s.106 agreement.

To accompany these requirements, we would recommend:

- Seeking independent advice on setting the price of a tonne of carbon for the MKCC administrative area. We advise that pricing should be tailored, according to the end-to-end cost of designing and delivering decarbonisation projects within Milton Keynes, including appropriate community engagement.

  *To develop the price of carbon for policy, from the best practice policy review, refer to:*

  - *London Plan Policy SI2. Uses a £95 per tonne contribution for 30 years (equating to a total contribution of £2,850 per tonne).*

*Sourced price per tonne as nationally recognised non-traded price of carbon. GLA intend to regularly review price, and recommend that London Boroughs set their own local price.*

*30 year period is applied on assumption that this equates to lifetime of the development's services*[4].

- *Reading Borough Local Plan Policy CC4. Uses a £60 per tonne contribution for 30 years (equating to a total contribution of £1,800 per tonne).*

  *Sourced price per tonne from a 2013 DCLG consultation, and benchmarked as below the price per tonne identified for The London Plan*[5].

- Demonstrating social value of the verified decarbonisation projects, by adopting best practice metrics (such as those hosted by the UK Social Value Bank) to measure positive social impacts.

### 2.2.3 Residential Sustainable Design Feature Policy Options

In this section, sustainable design feature requirements for residential development were developed based on a best practice review of Local Plan policies and the climate risk analyses in the Analysis Report.

These requirements were tested through online stakeholder engagement workshops in November 2023, including with Officers, Councillors and other interested parties. Stakeholders were provided with minimum, medium and maximum policy options – the tiers indicated requirements of increasing stringency. The maximum policy option was selected for all sustainable design feature requirements.

In developing the policy recommendations, the following matters were brought into consideration:

- Mitigating overheating: These requirements are based on the findings of Arup's 2022 report to the Climate Change Committee, 'Addressing overheating risk in existing UK Homes'[6]. Interventions were selected to strike the balance between lower typical costs and lower typical embodied carbon. Our Building specialists also reviewed the selected interventions to check their applicability to new build schemes, given the 2022 report advised on existing homes.

- Water scarcity: This requirement is written to align with the Anglian Water 'Water Efficiency Joint Protocol'[7], alongside best practice in other Local Plans.

- Flood resilience: These requirements are based on best practice from other Local Plans and key flood risks identified in our climate risk analysis, along with reference to Milton Keynes' Strategic Flood Risk Assessment (2023).

- Public Health and Biodiversity Net Gain: These requirements accounted for Natural England's Urban Greening Factor for England (2023)[8], the Milton Keynes Nature, Green and Blue Infrastructure (NGBI) Strategy (2023) and the percentage Biodiversity Net Gain requirement from the Environment Act 2021[9].

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[4] Greater London Authority (2022) Carbon Offset Funds, p5. Available at: https://www.london.gov.uk/sites/default/files/gla_carbon_offsetting_guidance_2022.pdf [Accessed on 18/03/24]

[5] Reading Borough Council (2019) Sustainable Design and Construction Supplementary Planning Document, p13. Available at: https://images.reading.gov.uk/2019/12/Sustainable-Design-and-Construction-SPD-Adopted-December-19.pdf [Accessed on 18/03/24]

[6] Arup (2022) Addressing overheating risk in existing UK homes. Available at: https://www.theccc.org.uk/publication/addressing-overheating-risk-in-existing-uk-homes-arup/ [Accessed on 07/02/24]

[7] Draft version shared with Arup as reference for the study.

[8] Natural England (2023) Urban Greening Factor for England – Summary Report (NERR131). Available at: https://publications.naturalengland.org.uk/publication/4842738632884224 [Accessed on 07/02/24]

[9] See Schedule 7A, Part 1, Paragraph 2 of The Environment Act 2021. Available at: https://www.legislation.gov.uk/ukpga/2021/30 [Accessed on 07/02/24]

- Electric Vehicle Charging: This requirement expands on the Council's adopted Parking Standards Supplementary Planning Document (2023), in light of the cost estimate evidence in Section 3.4 of the Analysis Report.
- Biodiversity Net Gain planning practice guidance (PPG)[10] which was updated following commencement of the requirement for new developments to provide a 10% gain in biodiversity as set out in the Environment Act 2021 and amended by the Levelling Up and Regeneration Act 2023. Paragraph 006 of the PPG states: *Plan-makers should not seek a higher percentage than the statutory objective of 10% biodiversity net gain, either on an area-wide basis or for specific allocations for development unless justified. To justify such policies they will need to be evidenced including as to local need for a higher percentage, local opportunities for a higher percentage and any impacts on viability for development. Consideration will also need to be given to how the policy will be implemented.*

[10] Department for Levelling Up, Housing and Communities (Updated 14 February 2024) Biodiversity Net Gain PPG. Available at: Biodiversity net gain - GOV.UK (www.gov.uk)

We would recommend the following approach:

**Mitigating overheating**

- Design and position dwellings to take advantage of solar shading, thermal mass, heating and ventilation. Internally, dwellings should include cross-ventilation, through situating windows on at least two elevations. Externally, developments should include tree planting to create external natural shading of dwellings in summer and/or make use of existing tree canopies where possible.
- Integrate external blinds or shutters to windows of each habitable room. Windows should be integrated with a blind or shutter so that they open and close together. Alternatively, sash windows or inward opening casement windows should be installed so as not to conflict with the blind or shutter.
- Consider use of appropriately coloured materials in areas exposed to direct sunlight.
- For the avoidance of doubt, these requirements should be read in conjunction with Approved Document F (Volume 1), which sets the legal ventilation requirements for dwellings.

**Water scarcity**

- Achieve an estimated water consumption of a minimum of 110 litres/person/day on all residential proposals, and 80 litres/person/day in major and strategic residential proposals.
- With the predicted increase in water demand arising from major residential development, a proportionate contribution should be made to offset demand in the same water catchment zone.
- Mandate rainwater harvesting from all impermeable surfaces larger than 1 hectare.

**Flood resilience**

Development proposed in an area at risk of flooding should:

- Ensure finished floor levels are the highest of either:
    - 300mm above estimated flood level, accounting for climate change, based on the latest Strategic Flood Risk Assessment for Milton Keynes and the site-specific Flood Risk Assessment prepared for the proposal;
    - 300mm above average ground level of the site; or
    - 300mm above the adjacent road level to the building.
- Consider building layout and number of storeys to increase flood resilience. Single storey buildings (e.g. ground floor flats, bungalows) are at particular risk of flooding and have limited opportunities for safe escape. Risk can be reduced through use of multiple storey construction and raised areas that provide an escape route.
- Avoid use of basements, especially habitable uses of basements. Access should be situated 300mm above the design flood level and waterproof construction techniques used.
- Ensure doors, windows and other openings are at least flood resistant to 600mm above estimated flood level, accounting for climate change, based on the latest Strategic Flood Risk Assessment for Milton Keynes and the site-specific Flood Risk Assessment prepared for the proposal.
- Fluvial flood resilience:
    - Maintain requirements for development in areas at risk of flooding, as per adopted Plan: MK Policy FR1.
    - Where required, a site-specific Flood Risk Assessment should demonstrate how design has addressed and appropriately mitigated against current and future fluvial flood risk (including climate change) from the River Great Ouse and its tributaries, the canals and any interaction between the watercourses, as assessed in the Strategic Flood Risk Assessment. It is also important to understand site-specific flood risk from smaller watercourses (those with catchment area <3km$^2$), which are not shown in the

- Surface water and sewer flood resilience:
    - Maintain requirements for development in areas at risk of flooding, as per adopted Plan: MK Policy FR1.
    - Developments should achieve greenfield runoff rates, with green drainage features being utilised over grey.
- Groundwater flood resilience:
    - Maintain requirements for development in areas at risk of flooding, as per adopted Plan: MK Policy FR1.

**Public health & Biodiversity Net Gain**

- Public Health:
    - Provide a minimum of 40% Green Infrastructure on new residential development, as a percentage of the overall site area, accessible by sustainable modes of travel.
    - Where proposals are located on or close to the NGBI Framework action locations, Recommended Growth Options or Potential Intensification Areas, developers should adopt the NGBI Framework recommendations insofar as they relate to their proposal.
- Biodiversity Net Gain:
    - Deliver Green Infrastructure requirement (above) in conjunction with delivering a minimum of 10% Biodiversity Net Gain on major residential sites, and 20% Biodiversity Net Gain on strategic residential sites and previously developed land.

**Electric Vehicle Charging**

- For all residential development, at minimum, provide Electric Vehicle charger(s) in line with Approved Document S and the Council's adopted Parking Standards Supplementary Planning Document (2023).
- For major and strategic residential development, integrate Electric Vehicle charging facilities in local and town centres and car parks. The location (e.g. on-street, hub charging, petrol stations) and the charging capacity (standard, fast or rapid charging) should be determined by application evidence on the proposed function and level of demand of the charging facilities.
- Long-term maintenance and management plans should be agreed with the LPA for Electric Vehicle chargers provided by new developments. This should be secured via condition or legal agreement.

To accompany these requirements, we would recommend:

- Consider how the sustainable design features could be appropriately adapted to non-residential development. It is anticipated that many of the features could apply to both residential and non-residential developments.
- Support the majority of the sustainable design feature policy requirements with an update to Milton Keynes' Sustainable Construction Supplementary Planning Document. We would suggest that this entails advice on:
    - Mitigating overheating: This would include best practice on blind and shutter design. We would suggest referring to the 'Shading for housing design guide for a changing climate' document[11], as a starting point. Additionally, on the natural shading requirement, we would

[11] Good Homes Alliance and British Blind and Shutter Association (2023) Shading for housing Design guide for a changing climate. Available at: https://kb.goodhomes.org.uk/wp-content/uploads/2023/11/Shading-for-housing-Design-guide_FINAL.pdf [Accessed on 05/02/24]

suggest referring to the Council's Urban Tree Strategy, which advises on tree planting within the highway boundary.

  - Flood resilience and Water scarcity: This would include guidance required for water offsetting, in conjunction with Anglian Water and signatory Authorities of the Water Efficiency Joint Protocol.

  - Public health: We would advise that this refers to Natural England's Green Infrastructure Framework (2023) (as detailed in the Analysis Report, Section 2.5) and best practice urban design approaches including the integration of street trees (including reference to the Council's Urban Tree Strategy).

- Support the Biodiversity Net Gain requirement with an update to Milton Keynes' Biodiversity Supplementary Planning Document.

  - We would advise that this refers to the NGBI Strategy 2023 and Local Nature Recovery Strategy.

  - As a related matter, if the Council wishes to consider expanding 20% BNG requirement to all major development proposals, we would advise that the NGBI Strategy 2023, Whole Plan Viability Study and Local Nature Recovery Strategy are considered together.

- Electric Vehicle charging: We would advise that this includes different specifications of electric vehicle charging facilities and associated infrastructure, for example as shown in the Council's Parking Standards SPD (2023), or as updated through best practice. Further consideration could also be given to explore, identify and promote emerging opportunities to deliver group discounts for EVs and support resident-led EV rollout, by sharing experiences and information on EV adoption.

### 2.2.4 Green Infrastructure: Green Roofs & Walls

We conducted a qualitative appraisal of four green roof options and three green wall options, guided by factors including climate resilience, whole-life cost, biodiversity and water management. This can be found in Section 3.5 of the Analysis Report.

Our green roof and wall options were tested through an online stakeholder engagement workshop in November 2023, including with Officers, Councillors and other interested parties. Stakeholders were provided with an appraisal of benefits and drawbacks of different green roof and wall interventions. It was determined that a flexible policy approach would be appropriate, in order to select the optimal green roof and/or wall intervention, depending on site-specific circumstances.

We recommend that the Council seeks green roof and/or walls on new buildings where they deliver multi-functional value across the following three domains:

- Public health & microclimate value
  - Example interventions: Positioning green roof or wall for optimal solar gain, integrating rainwater collection for irrigation, incorporating a variety of plant species and/or enabling public access and participation.
- Climate Resilience & Biodiversity
  - Example interventions: Incorporating drought resistant plant species, maximising habitats and food source pollinators, integrating bat and bird boxes and/or arranging ecological monitoring.
- Whole Life cost effectiveness
  - Example interventions: Incorporating low maintenance plants, automated irrigation to reduce labour costs and/or simple hardscape materials.

To accompany these requirements, we would recommend:

- Including advice on green roof and walls in the update to Milton Keynes' Sustainable Construction Supplementary Planning Document, as proposed above. This advice should make use of our green roof and wall appraisal and best practice examples (in Section 3.5 of the Analysis Report) as the basis for this.

- Considering opportunities for a neighbourhood scale approach to green roof/walls which draws on the findings of the NGBI Strategy 2023.

  *Refer to Salford Development Management Policies and Designations Policy G11, as identified in the best practice policy review (see section 6.4 of Baseline chapter).*

# 3. Central Milton Keynes Policy Recommendations

### 3.1.1 Introduction

This qualitative appraisal will first consider the existing and future context for Central Milton Keynes (CMK) and its climate risk profile. Each component of the appraisal will conclude with a summary of key features distinct to CMK, in comparison to the rest of the MKCC administrative area.

With these characteristics identified, we will use these as the basis for formulating CMK specific policy recommendations.

### 3.1.2 Character of Central Milton Keynes

#### Overview

MKCC is preparing a Central Milton Keynes Growth Opportunity Study which will set out recommendations on topics relevant to this study, such as green infrastructure, Sustainable Drainage Systems (SuDs) and district heating. Recommendations from this study should therefore be considered alongside that commission.

CMK is located in the heart of Milton Keynes' city centre. As shown in Figure 2, CMK is constrained within an area of approx. 313 hectares, demarcated by highways to the north-west and south-east (A509/ Portway and Childs Way respectively), a railway to the south-east (including the West Coast Mainline) and the Grand Union Canal to the west.

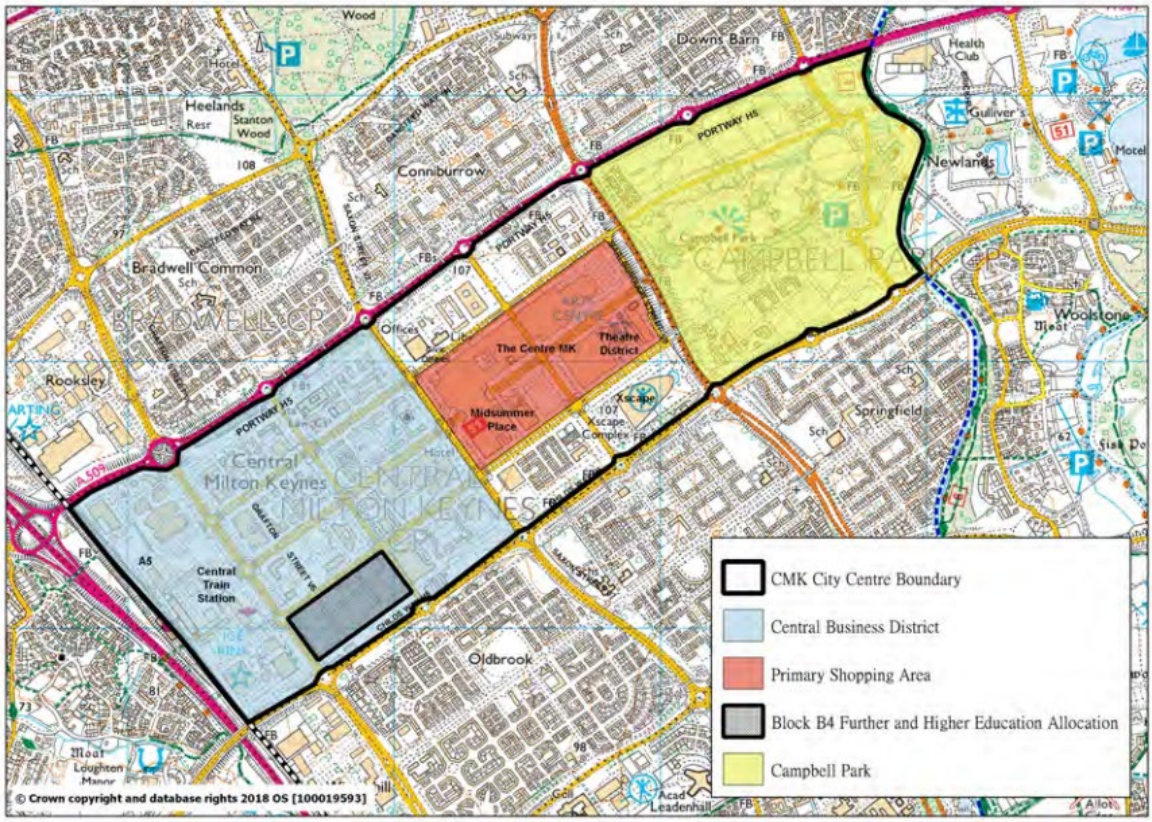


**Figure 2 CMK boundary map (Plan: MK, p35)**

Development is arranged within a grid street pattern, a historic feature of Milton Keynes' masterplan when it was established as a new town in 1967[12]. The layout of CMK itself is predominantly structured around three boulevards intersected perpendicularly by roads known as 'Gates'. Within the grid pattern, there are generous plots, some with internal roads and large car parks. Buildings typically display large footprints and are of 3 to 6 storeys in height.

In terms of transport connections, CMK is situated adjacent to Milton Keynes Central rail station, strategic highways including the A509 (Kettering-Northamptonshire) and A5 (London-Holyhead) and accommodates various bus routes from within and outside Milton Keynes.

The central third of CMK contains the Primary Shopping Area (PSA), as defined in the Plan:MK Retail Hierarchy (see Figure 2 for location). This includes major retail hubs including 'the centre:MK' and Midsummer Place, along with some restaurant uses. Adjacent to the PSA, there are local services and Milton Keynes Central Library in the residential area to the north and notable leisure/ cultural facilities (namely, XScape and MK Gallery) to the south. The centre: MK and Central Library are Listed buildings, and this should be considered in the context of any retrofit proposals.

CMK's designated Central Business District adjoins the PSA to the south-west and comprises various large office buildings. These businesses are supported by complementary uses including hotels and supermarkets.

Campbell Park is located to the north-east of the PSA, a Grade II Registered Park and Garden (opened in 1984)[13] with links to the Grand Union Canal further to the east. To the north and south, there is some limited business and residential development (and allocated but as of yet undeveloped future residential sites).

Extensive green infrastructure was integral to Milton Keynes' original design. This is reflected in the green buffers, often referred to as the 'green frame' along the Boulevards and Gates of CMK, as well as around its boundaries[14]. The green frame's primary purpose relates to landscaping rather than providing amenity space residents. In terms of public green spaces, CMK comprises Fred Roche Gardens (in the Central Business District) and Campbell Park to the north-east.

### Summary of key features

In comparison to the wider MKCC administrative area, existing development in CMK is distinguished by:

- Dominance of office uses, and ancillary services, providing significant employment for the MKCC administrative area and wider region;
- Relatively small residential population;
- Large building footprints set within large plots and boulevards;
- High levels of surface level car parking;
- Relatively low provision of green space and community facilities;
- Proximity to strategic road and rail routes;

[12] TCPA (2020) Milton Keynes. Available at: https://www.tcpa.org.uk/new-town/milton-keynes/ [Accessed on 29/01/24]

[13] Historic England (2020) Campbell Park. Available at: https://historicengland.org.uk/listing/the-list/list-entry/1467405?section=official-list-entry [Accessed on 29/01/24]

[14] TCPA (2020) Milton Keynes. Available at: https://www.tcpa.org.uk/new-town/milton-keynes/ [Accessed on 29/01/24]

- Retail and leisure facilities of MKCC administrative area importance; and
- Usable green space is concentrated one large public green space (Campbell Park).

### 3.1.3 Council's aspirations for Central Milton Keynes

Based on Plan:MK's strategic objectives and development strategy, MKCC consider Central Milton Keynes as pivotal to maintaining and enhancing the MKCC administrative area's business, retail and cultural activities. There is a 'strong concentration' of Knowledge Intensive Business Services, forming the cornerstone of the Council's employment strategy. This is complemented by CMK's growing reputation as 'the vibrant cultural centre'. At a regional level, the Council consider that CMK has potential to contribute to the strategic 'knowledge corridor' between Oxford and Cambridge. This position is supported by Government's 2021 policy paper on the Oxford-Cambridge Arc[15].

On employment development, Policy DS2 in Plan:MK promotes the continued development and promotion of CMK 'as a hub for business-related knowledge based activity'. To achieve this, the Council seeks to increase the amount of high quality office floorspace and the number of businesses. They anticipate that the old and outdated office facilities will need to be redeveloped to encourage this growth, alongside overcoming issues of building ownership and low rental levels.

On retail and leisure development, Policy DS4 in Plan:MK sets a bold approach for future development, by stipulating that international design competitions will be hosted for major strategic development sites. This is with the intention for CMK's groundbreaking 20th century civic design to be recognised and enhanced by innovative design of the present century.

On strategic site allocations, the Council seeks to promote a vibrant mix of uses, enhancing the visitor experience through high quality public realm and new leisure uses, continuing to support the critical mass of CMK's businesses and provide a high quality living environment for residents. For CMK to succeed in this as a regional centre, it will need to achieve significant levels of new growth, across residential, office and retail development, as well as allowing for biodiversity, green infrastructure and potentially new further and higher education institutions. New development will be achieved through redevelopment of vacant, underdeveloped and under-performing sites, supported by Supplementary Planning Documents and Development Briefs, as appropriate.

On connectivity, Policy SD4 in Plan:MK supports measures to promote smart, shared, sustainable mobility, as recommended by the MK Futures 2050 Commission. This entails creating a high quality network for pedestrian and cycle modes. Building on this, Policy CT1 also highlights the goal to minimise private car travel and dependence, and Policy CT2 encourages development that more easily facilitates walking and cycling journeys to essential services. Additionally, Policy SD4 encourages the integration of public transport. This is intended to take the form of high capacity, fast and frequent services along arterial corridors through the city (Policy CT5), while preserving the historic grid pattern (Policy CT8).

In CMK, there are plans for a public transit hub in the retail area, along with an intra-Central Milton Keynes shuttle transit network to connect all areas of CMK and Campbell Park. MKCC are progressing plans for the MRT – to date, the Strategic Outline Business Case has been prepared and the Outline Business Case is in progress. Additionally, Policy CT6 stipulates the deployment of fast EV charging points at key locations in CMK.

The Council has also set objectives to connect CMK with major development sites in the MKCC administrative area, including the aspiration to create a rail link between Bletchley and Milton

[15] Oxford-Cambridge Arc - GOV.UK (www.gov.uk)

Keynes (see Policy CT1). There is also consideration for connections to new nationally significant infrastructure, including East West Rail.

On residential development, Policy HN1 sets a dwelling density range, intended to increase the activity of housing and people in CMK. This is considered key to achieving the Council's wider strategy and vision for CMK. Additionally, in relation to Policy HN7, Plan:MK notes the MK Futures 2050 Commission's recommendation for an undergraduate university in CMK, and reiterates this in Policy EH4. A university would elicit the need for purpose-built student accommodation.

On other types of development, the Council highlight their support of community facilities in CMK. They also recognise significant opportunity for low carbon and renewable energy provision. This may involve expanding the existing Thameswey Combined Heat and Power (CHP) network, although this is not confirmed.

#### Summary of key features

In comparison to the wider MKCC administrative area, future development in CMK is distinguished by:

- Significant scale and densification of growth, including residential, office and retail development;
- Aspirations for high quality and innovative growth;
- Specific transport interventions, including a public transit hub and an intra-Central Milton Keynes shuttle transit network;
- Fast EV charging in key locations;
- New university and associated student accommodation;
- Provision of on-site low carbon and renewable generation; and
- Potential new rail connections from CMK to Bletchley and East West Rail.

### 3.1.4 Climate vulnerability profile of Central Milton Keynes

#### Central Milton Keynes: Climate risk profile

Drawing on the baseline analysis for current and future climate risk, this sub-section provides a summary of key risks for CMK.

On flood risk, CMK is located in an area currently at low probability of flooding from rivers, groundwater and reservoirs. Surface water flood risk is more elevated - as identified in the Baseline Report, the city centre has been affected by historic surface water flooding events. This risk is anticipated to worsen in future scenarios accounting for climate change.

On water scarcity and drought risk, the climate risk assessment considered this risk by sector at a MKCC administrative area level in the baseline analysis. In CMK, the 'Business & Industry' and 'Natural Environment & Assets' sectors predominate – these were assessed to be at low and very high risk of water scarcity and drought respectively.

On extreme heat risk, the Urban Heat Island Assessment noted that the urban area of Milton Keynes has low vegetation, high paving and higher building densities in comparison to rural parts of the MKCC administrative area.

In considering the maximum temperature of a recent 'extreme summer day', parts of the central and south-west areas of CMK were amongst the highest in the MKCC administrative area, within the

temperature band of 38.7°C to 39.3°C. In contrast, much of the north-east area of CMK (corresponding with Campbell Park) lay within the 36°C - 36.7°C temperature band.

On a typical summer day, most of the central and south-west areas of CMK were amongst the highest in the MKCC administrative area, within the temperature bands of 21.3°C to 21.4°C and 21.6°C to 21.7°C. In contrast, much of the north-east area of CMK (corresponding with Campbell Park) lay within temperatures ranging from 20.8°C – 21.1°C.

On extreme wind, this was also assessed by sector at a MKCC administrative area level in the baseline analysis. Future risk was assessed to be similar to present day, and so this is not considered a notable risk for CMK. Plan: MK already has a requirement for a microclimate assessment to be undertaken for certain developments, and it is expected that this requirement would continue in the New City Plan.

### Central Milton Keynes: Vulnerable neighbourhoods

From the vulnerable neighbourhood analysis set out in the Analysis Report, this sub-section summarises the key areas of vulnerability for CMK.

On critical infrastructure, CMK does not accommodate any ofthi the education and health facilities considered in the vulnerability assessment, however it does accommodate MK Central railway station and a hub of bus stops. As described above, CMK has limited exposure to climate hazards.

On critical infrastructure close to CMK which CMK residents, workers and visitors may use, there is some intersection with climate hazards. For example, the A509/ Portway Road passes over the River Ouzel flood risk area to the north-east, while the A5 and railway run adjacent to another fluvial flood area to the south-west. Two important medical facilities also lie close to, or within, the same fluvial flood areas. Additionally, a few education facilities (including two nurseries) lie in areas at elevated risk of groundwater flooding.

On socio-economic vulnerability, CMK has a small residential population with more concentrated deprivation than the rest of the MKCC administrative area. Map-based analysis identified the central third of CMK (including the PSA) being in the second deprivation decile of the Index of Multiple Deprivation 2019. This area is therefore in the 20% most deprived areas in England. Additionally, the Central Business District (to the south-west) and the Campbell Park area (to the north-east) are notably less deprived, lying within the sixth and fifth deprivation deciles respectively. New development in CMK has the potential to change the socio-economic profile of CMK residents.

On comments from the public consultation, CMK was identified as an area exposed to extreme heat. This was observed in summer 2022 due to a lack of shading and outdoor seating for residents in public spaces. Consultees recommended looking at the potential to plant additional trees. Additionally, residents recognised the link between air pollution and climate change (which particularly relates to heat). Concerns were raised about schools and parts of the Redway system (i.e. shared pedestrian/ cycle routes) located near main roads.

### Summary of key features

In comparison to the wider MKCC administrative area, climate hazard exposure and vulnerability in CMK is distinguished by:

- Risk of surface water flooding, including in an area of high deprivation;
- Exposure of Natural Environment and Assets to water scarcity and drought;

- More limited range of vegetation species, for example London Planes and Horse Chestnut trees, making them more vulnerable to diseases and pests;
- Exposure of transport links and nearby critical social infrastructure to areas of fluvial and groundwater flood risk;
- Extreme heat, arising from CMK's characteristically lower levels of vegetation, higher proportion of hard surfacing and greater densities of buildings; and
- Exposure of sensitive receptors (such as education facilities and Redways) to higher temperatures and air pollution concentrations.

### 3.1.5 Public Health Impacts

Guided by the climate risk hazards relevant to CMK, this section considers recent literature on the public health impacts of these hazards for consideration in the policy recommendations. This includes potential public health impacts of flooding, extreme heat and water scarcity.

**Table 3: Summary of climate change impacts on public health**

| Climate Impact | Impact on Public Health |
|---|---|
| Fluvial flooding<br>Reservoir flooding<br>Surface water flooding<br>Groundwater flooding | • Risk to critical infrastructure, particularly if it is not built to modern specification<br>• Long term impact on the mental health of people whose homes are flooded |
| Drought/water scarcity | • Water scarcity<br>• Negative impact on agriculture, causing food chain and supply issues, and exacerbating food insecurities |
| Extreme heat | • Water scarcity<br>• Increased risk of heat stroke<br>• Exhaustion<br>• Worsening of existing chronic health conditions<br>• More favourable environment for the spread of diseases<br>• Increased vector-borne diseases due to expanded range and survival of ticks and biting mosquitoes<br>• Increased risk of wildfires with potential to result in increased risk of death and loss of habitat and species<br>• Reduced air quality potentially leading to reduced life expectancy, largely due to cardiovascular and respiratory diseases, and lung cancer<br>• Impacts on allergies, from higher pollen concentrations and longer fungal spore seasons |
| Extreme wind | • Potential closure of schools and other community facilities<br>• Risk of injury from falling debris |

#### Exemplar public health case studies

Considering the potential public health impacts, two exemplar case studies which could help mitigate these impacts are set out below.

The Wild West End project demonstrates the benefits of partnership working and the promotion of green infrastructure to deliver shared outcomes including improving the wellbeing of users.

The Cool Spaces project demonstrates how the Mayor of London is trying to support Londoners deal with a changing climate. By mapping the location of facilities such as water fountains and cool open spaces, areas lacking provision can be identified.

## Wild West End


**Figure 3: Schematic of Wild West End project**

The Wild West End project in London was an initiative between large property owners in London (The Crown Estate, Great Portland Estates, Grosvenor Britian and Ireland, The Howard de Walden Estate and The Portman Estate).

The vision is for the West End to be home to green stepping stones between the existing areas of surrounding parkland, through a combination of green roofs and walls, planters and flower boxes, street trees and pop-up spaces. This green urban infrastructure will create a habitat for birds, bees and bats, and fill the air with the sounds and smells of nature. People will be encouraged to walk outside and spend more time in green spaces. This will result in lower stress levels, and higher levels of satisfaction and wellbeing, ultimately creating a better environment for people to live, work, and visit.

With Arup as Technical Partner, the project was started in 2015 and was the first city centre ecology driven project by an industry partnership of this kind in the world. There was a large communication strategy to inform and discuss the proposals with the local community, which successfully reached of 5,000 people.

It aimed to:

- Improve the wellbeing of users of the area, by increasing the sense of connection to nature and contributing to improvements in local air quality;
- Enhance biodiversity and ecological connectivity; and
- Raise awareness and promote the benefits of green infrastructure to inspire others.

The project has tracked progress against three main objectives.

Improving wellbeing of residents, workers, and visitors: Wild West End is succeeding in its aims to improve wellbeing through increased connections to greenspace and nature. Wild West End partners have hosted multiple community events including Bees Needs Week and Regent's Park Allotment Club. These events allow the wider community to come together and engage in social activity whilst spending time in green spaces.

Since the inception of Wild West End, there has also been a 13% increase in area of accessible green space within the Wild West End study area, making green space more inclusive and valuable to more members of the community.

Enhancing biodiversity and Ecological Connectivity: Wild West End aims to increase green space, encourage biodiversity and increase habitat connectivity. Monitoring results from 2021 showed a 33%[16] increase in areas of green space over 100m$^2$ compared to the baseline 2016 surveys now within the Wild West End network. There has also been a 16.6% increase in area of green roof coverage compared to 2018, and 13.75% increase in water attenuated on roofs within the Wild West End network.

Raise awareness and promote the benefits of green infrastructure: Wild West End and partners have successfully been promoting the importance of green spaces and infrastructure, working to inspire others to

16 Area statistics are due to a combination of new space installation and new partners joining Wild West End.

follow in the direction of a greener London. This has included press promotion, an interactive website, social media, the Wild West End Film, case studies, the development of guidance and engagement at events.

Wild West End also hosted a number of partner and community events in 2020/21 to raise awareness of the benefits of urban greening on biodiversity, visitors, workers and residents.

By encouraging multi-functional green spaces, and promoting biodiversity and ecological connectivity several of the recommendations in this study align with the principles of the Wild West End project and create a planning policy foundation from which other Council departments can build. To take this further the Council could initiate a similar scheme by working with key landowners to create green stepping stones across CMK to strengthen linkages with the green frame. Alongside this a communication strategy could be used to promote the good work and encourage new residents to feel connected to their green spaces.

## Cool Spaces

The Mayor of London has recognised the increasing challenges Londoners face to keep cool on hot days and the impacts hot weather can have on health. Cool Spaces[17] is an online platform hosted by the Greater London Authority which identifies spaces for people in London to find shelter from the sun, cool down and rest on hot days, with the aim of reducing risks to health that derive from hot weather. The website allows people to identify and register cool spaces around London.

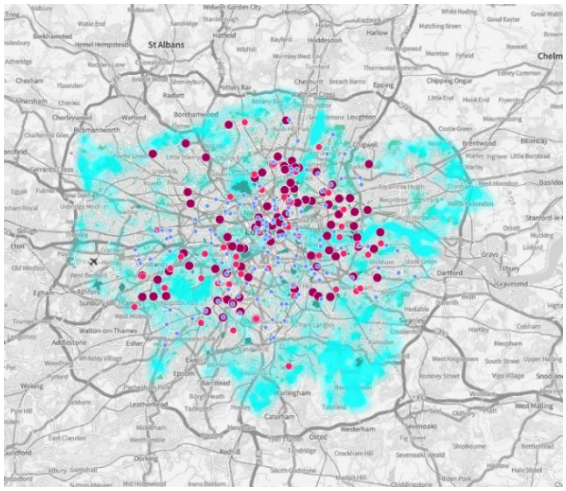


**Figure 4: Map of the Cool Spaces in London**

The interactive map pinpoints the location of drinking water fountains, 'tier 1' spaces that have more amenities for cooling and longer opening hours (e.g. libraries and community centres), 'tier 2' spaces which have fewer cooling amenities and shorter opening hours (e.g. more local libraries or shops), green spaces that have facilities to keep people cool and areas that have an average lower land surface temperate. These areas are not designed to support vulnerable individuals and are not medical centres.

This study has identified the climate risks the population of Milton Keynes are expected to experience in the future. It has also identified the important role that the MKCC administrative area's green spaces play in cooling the urban environment and made recommendations for other heat mitigation measures which could be incorporated into policy for example encouraging water fountains. These recommendations will support the delivery of places and facilities which can help residents on hot days. To build on planning policy, the wider Council could consider presenting information to residents in a similar way to the Cool Spaces project. This would make residents aware of places they can go to on hot days and have the added benefit of raising the profile of the importance that MKCC is placing on climate change adaptation.

[17] Mayor of London (2023) Cool Spaces. Available at: https://www.london.gov.uk/programmes-strategies/environment-and-climate-change/climate-change/climate-adaptation/cool-spaces [01/02/24]

## Policy recommendations

### Central Milton Keynes: Policy areas

With the appraisal of CMK's existing and future development, alongside its climate and public health risk profile, we have identified seven potential policy areas. These have been synthesised by linking key synergies and challenges for CMK.

| | **Key features of CMK** |
|---|---|
| Existing development | Dominance of office uses |
| | Large building footprints |
| | Proximity to strategic road and rail routes |
| | Retail and leisure facilities of MKCC administrative area importance |
| | Large public green space (Campbell Park). |
| Future growth | Significant scale and densification of growth, including residential, office and retail development |
| | Aspirations for high quality and innovative growth |
| | Specific transport interventions, including a public transit hub and an intra-Central Milton Keynes shuttle transit network |
| | Fast EV charging in key locations |
| | New university and associated student accommodation |
| | Expansion of CHP networks, and other low carbon and renewable generation |
| | Potential new rail connections to Bletchley and East West Rail; and a potential new road connection to the Oxford to Cambridge Expressway |
| Climate risk | Risk of surface water flooding, including an area of deprivation |
| | Exposure of Natural Environment and Assets to water scarcity and drought |
| | Exposure of transport links and nearby critical social infrastructure to areas of fluvial and groundwater flood risk |
| | Extreme heat, due to low vegetation levels, higher proportion of hard surfacing and greater building densities |
| | Exposure of sensitive receptors to higher temperatures and air pollution concentrations |
| Public health impacts | Mental health impacts, if communities and homes affected by flooding or wildfires |
| | Risk of illness arising from extreme heat and water scarcity |

*Green Infrastructure*

Integrate a greater density of blue and green spaces (such as parklets, rain gardens and wildflower reserves) to create ecological linkages and places for shade and rest.

Integrate community facilities in new developments, such as community growing spaces.

Stipulate SuDs for new developments to manage surface water, instead of connecting to sewers, as part of wider city centre SuD strategy.

*Renewable Energy*

Secure developer contributions for new transit and low carbon & renewable energy infrastructure.

For major development sites containing a car park and/or roof space, integrate solar PV panels into proposal, to require optimization of generation capacity.

*Residential Sustainable Design Features*

Secure developer contributions to distribute fast EV chargers (see MKCC administrative area level policy).

For all new developments, provide water fountains, tree shading and other heat mitigation measures for public use.

### 3.1.6 Green Infrastructure

#### Density of blue and green spaces

CMK has a lower proportion of easily accessible blue and green spaces than the rest of the MKCC administrative area. Campbell Park plays an important role in providing amenity space, however it has does not have a lot of shaded areas and as such plays a limited role in providing refuge during hot weather. To improve liveability as the CMK population grows, residents should have access to a multifunctional network of blue and green spaces of a variety of types and sizes, including spaces which offer cooler environments.

The provision of blue and green spaces will help address the challenges of climate change in CMK, as well as creating ecological linkages and improved health and wellbeing. There is a vast array of design options which should be considered. Increasing tree coverage and green space reduces the higher temperatures in built up areas compared with rural areas. These new blue and green spaces can also provide respite during heatwaves, which are projected to increase in frequency and intensity.

It is recommended that the New City Plan promotes a greater density of blue and green spaces in CMK by taking forward the recommendations in the Nature, Green and Blue Infrastructre Strategy.

The New City Plan should encourage applicants to consider a variety of blue and green spaces, including for example, parklets, rain gardens and wildflower reserves.

To accompany these requirements, we would recommend:

- That requirements are integrated into the Design Code MKCC are preparing to accompany the New City Plan. The Design Code should promote the proliferation of a varied and attractive network of green and blue spaces in CMK.

  This would include integrating green spaces in a way that carries forward the ambition of Milton Keynes' extensive historic green infrastructure network, from its inception as a new town.

  Local Plans with similar policies include Welwyn Hatfield Local Plan 2023 (Policy SP12 Green Infrastructure) and Brent Local Plan 2022 (Policy BGI1: Green and Blue Infrastructure in Brent). Any such policy in Milton Keynes should recognise the city's specific urban form, for example opportunities to connect to the green frame and recognising that CMK developments are often set within large plots in the grid structure which creates opportunities for green infrastructure provision.

#### Integration of community facilities, including food growing

CMK currently has limited community facilities serving its relatively modest population. As the population of CMK increases, so too should the number of community facilities available to support new and existing communities in order to create a thriving, resilient community. These will include community centres, schools, children's centres, meeting venues for the public or voluntary organisations, public halls, places of worship, leisure and indoor sports centres and recreational facilities, pavilions, stadiums, public houses, club premises or arts buildings, performance venues and libraries.

Community and cultural facilities help foster a sense of community and belonging, enhancing health and wellbeing and social resilience. Facilities can be creatively delivered to create a sense of place and fun. By providing community facilities in accessible locations, journey times can be reduced and active and sustainable modes of travel encouraged. Community facilities can also play an increasingly important role in a changing climate, for example by offering places of refuge in storms or heatwaves. The exact nature and number of community facilities required to serve the

CMK population should be developed as part of MKCC's work on its Milton Keynes Infrastructure Study and Strategy.

Spaces for urban agriculture/food growing are a specific type of community facility that can play an important role in CMK's sustainable future, particularly because the optimal development density for CMK may limit the opportunity for private gardens. They also offer benefits for public health outcomes, food poverty and natural habitats. The New City Plan should therefore create alternative opportunities for food growing, for example through allotments and community gardens.

The New City Plan should require community facilities to be provided to meet the needs of a growing population. These facilities should be accessible to all and in locations which are accessible by sustainable transport modes.

In developing plans for community facilities, MKCC should have regard to the important and increasing role that these facilities can play in a changing climate, for example by designing them so that they can function as cooling centres during a heatwave.

To encourage access to fresh, healthy and locally produced food, it is recommended that the New City Plan encourages provision of space for food growing, including allotments, community gardening, orchards, food growing areas within new developments and as a meanwhile use on vacant or under-utilised sites.

It is recommended that the New City Plan identifies potential sites that can be used for food production.

### Sustainable Drainage Systems (SuDS)

The New City Plan should require new developments to deal with water in an integrated way which considers surface water as an asset. Sustainable Drainage Systems (SuDS) is a term that refers to various measures aimed at controlling surface water runoff, and associated flooding and pollution problems from urban catchments. Examples of SuDS that could be incorporated in the built-up area of CMK include green roofs and soakaways, subject to particular site conditions. There is also potential for new developments to connect to larger scale SuDs such as swales, infiltration trenches, ponds and wetlands located on the CMK perimeter.

Incorporating SuDs into new developments offers multiple benefits in respect of climate change mitigation and adaptation. One of the primary benefits is their role in slowing the rate of water run-off reducing the risk of flooding. SuDs can have a positive impact on the urban microclimate, reducing temperatures and improving comfort, contributing to climate change mitigation. By replacing some of the evaporative cooling lost through urbanisation, SuDs can help to reduce Urban Heat Island effects if implemented at sufficient scale. SuDs can also deliver wider benefits in respect of biodiversity, amenity, carbon sequestration and air quality.

The land use pattern of CMK creates opportunities to incorporate SuDs into new developments, in particular by making use of the green grid network and connecting to the green frame that borders CMK. SuDs have the potential to reimagine the layout of CMK, using the grid network to create visual interest and amenity value[18].

[18] Case studies of SuDs serving a variety of purposes in a variety of settings can be found in the Mayor of London (2016) SuDs in London – a guide. Available at: SuDS in London – a guide (tfl.gov.uk)

**Figure 5 Images from recent Arup project in Sheffield. Aimed to renew urban realm with multi-functional SuDs incorporating spaces to move and dwell in. SuDs promoted drainage, biodiversity, climate adaptation, improved air quality and urban cooling. Image credits: Upper two images - Nigel Dunnett (2023); Lower image - Arup (2023).**

It is recommended that new developments in CMK are required to manage surface water as far as possible on-site using sustainable drainage systems, instead of connecting to sewers. SuDs should meet the four pillars of water quantity, water quality, biodiversity, and amenity.

Policy should encourage SuDs to be multi-functional providing additional benefits in respect of biodiversity, amenity and air quality. SuDS tree pits should be incorporated where street trees are proposed.

To accompany these requirements, we would recommend:

- That the CMK Growth Opportunity Study include a SuDs Strategy building on the Milton Keynes' NGBI Strategy (2023) and BNG study. This should identify the locations where SuDs have the greatest potential to deliver multiple benefits, and where developers can contribute to this strategy;
- That planning policy requires applications to demonstrate how SuDs and green and blue infrastructure can contribute to leisure and cultural opportunities in the context of Milton Keynes' Retail and Leisure Study, and Cultural Strategy; and
- Preparing an environmental management strategy for the grid roads which considers their role in respect of SuDs and other blue/green space provision. This is outside the remit of MKCC as Local Planning Authority and should be considered by the wider Council.

### 3.1.7 Renewable Energy

#### Developer contributions for new transit and low carbon & renewable infrastructure

Milton Keynes has a Planning Obligations SPD (2021), as a guide on the Council's approach to identifying infrastructure requirements and how these feed into planning obligations. This study has identified that, to meet MKCC's carbon and climate change ambition, new transit and low carbon and renewable energy infrastructure will be needed. New developments in Milton Keynes should provide renewables on site as part of meeting the policy requirements in the New City Plan or contribute their fair share to the cost of delivering these.

The transport analysis in this study has shown that without modal shift from private cars to more sustainable modes, there are fewer mechanisms to progress transport decarbonisation. There are two specific proposals for CMK identified in Plan: MK - a public transit hub in the retail core, and an intra-Central Milton Keynes shuttle transit network that will connect all areas of CMK and Campbell Park. New development proposals in CMK should contribute to the provision of these interventions. Since Plan: MK was adopted MKCC has further developed proposals for the MRT which could play a significant role in encouraging public transport use across the MKCC administrative area. MKCC has also identified that there is potential for expansion of the Redway network in CMK where it is less extensive than in other parts of the MKCC administrative area. Where developers in CMK get a benefit from these interventions they should contribute to their provision.

Developments in CMK will be subject to the renewables policy applicable across the MKCC administrative area as described in the policy recommendations for the MKCC administrative area above. Where renewables cannot be provided on site they should contribute to the generation of renewable energy through the provision of contributions.

It is recommended that the New City Plan includes a policy to secure developer contributions from major developments in CMK towards a public transit hub, intra-CMK shuttle transit network, expansion of the Redway network and MRT. Contributions could also be used to fund off-site renewables where the applicant has demonstrated that they cannot be provided on-site.

Given MKCC's existing COF cannot currently accept significant transport interventions (such as MRT), this may be administered through the MK Tariff Agreement which provides a framework for seeking developer contributions in a structured way. For schemes where the Tariff does not apply, Section 106 agreements provide an additional method of securing contributions.

The level of contribution will be subject to viability testing.

To accompany these requirements we would recommend:

- Updating the Planning Obligations SPD.

#### Solar PV potential of car parks

CMK has a high concentration of car parks which have the potential to better contribute to tackling climate change. The large, flat, open and often under-utilised surfaces of car parks make them ideal locations for solar power generation. Solar car parks or car ports in CMK will enable electricity production in open spaces that are located adjacent to CMK's high energy consuming facilities such as the shopping centre and offices. Solar panels in car parks can also power EV charging. The canopies have additional benefits in that they protect cars from rain and snow, or hot sun in the summer.

In drafting policy requirements, MKCC should give consideration to the cost of building the frame, canopy and PV apparatus, as well as the potential for loss of car parking spaces. They should also consider the need for efficient under-canopy lighting to avoid potentially dark spaces at night.

It is recommended that where major development sites in CMK include car parking, this should be provided as solar car parks to generate renewable energy, where it is feasible and viable to do so.

The formula to calculate solar PV generation capacity is provided in the 'Roof-based opportunities for solar PV' policy recommendations above.

Where it is identified that solar PV car parks are not suitable applicants should consider opportunities to use green surfacing or green paving grids.

### 3.1.8 Residential Sustainable Design Features

#### Heat mitigation measures

This study has identified that climate change is expected to lead to hotter summers and more extreme heat events in Milton Keynes. Several of the policy areas described above will help Milton Keynes adapt to a changing climate and reduce the Urban Heat Island effect, including Blue and Green Infrastructure, climate resilient buildings, green roofs and walls, and SuDs. Section 2.2.3 above sets out the important role of building scale interventions to mitigate overheating, and these are particularly important in built up areas such as CMK.

Notwithstanding these policies, the New City Plan should go further in ensuring that new development incorporates measures to support residents' health and wellbeing in a changing climate. In CMK the Urban Heat Island effects and the density of development justify a requirement for developments to incorporate additional heat mitigation measures, such as water fountains, shaded seating, shaded walkways and misting systems.

For CMK, it is recommended that all new developments should demonstrate how they have been designed to support the health and wellbeing of occupants and visitors in the context of a changing climate. This may include shaded seating, shaded walkways and misting systems.

All major developments in CMK must provide an external water fountain available for all to use.

Similar to the 'Residential Sustainable Design Feature' policy recommendations, trees and other planting, where appropriate as part of a landscape scheme, must be incorporated into all new development to provide shading of amenity areas, buildings and streets.

Heat mitigation should be considered as part of the Health Impact Assessment (HIA) submitted with planning applications new major developments, or where a HIA is not a validation requirement as part of the Design and Access Statement.