

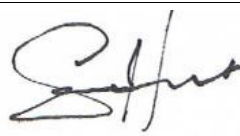
## **SUSTAINABILITY STATEMENT**

Mixed-Use Development  
**Carrow Works**  
**NORWICH**

Prepared for:  
**Constructive PM**

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## EXECUTIVE SUMMARY

This report has been compiled by Sol Environment in order to provide a Sustainability Statement for the hybrid planning application for the proposed mixed-use development at the Carrow Works site in Norwich, Norfolk. The report intends to provide a sustainable solution for the proposed site in accordance with the Greater Norwich Local Plan (Regulation 19 Publication 2021) and the Joint Core Strategy for Broadland, Norwich and South Norfolk (Adopted March 2011, amendments adopted January 2014).

The sustainability statement includes a review of the sustainability measures that impact the development with particular reference to energy and water use, climate change adaptation, sustainable transportation, landscape and ecology, materials and waste.

In addition to the sustainability measures outlined within this report, a separate Energy Assessment has also been prepared to specifically address the energy use of the development such that it is aligned with the Energy Hierarchy.

## 1. INTRODUCTION

### 1.1 Background

Sol Environment Ltd ('Sol' hereafter) were engaged by Constructive PM to undertake a sustainability assessment to support the proposed hybrid planning application for a mixed-use development located at the Carrow Works site in Norwich, Norfolk.

### 1.2 Proposed Development

The development has the following project description.

A Hybrid planning application (part full, part outline), alongside Listed Building Consent and Demolition within a Conservation Area for the following:

Detailed (Full) Component:

"Full application comprising the construction of the principal means of access, the primary internal road and associated public spaces and public realm, including restoration and change of use of Carrow Abbey to former use as residential (Use Class C3), alteration and extension and conversion to residential use (Use Class C3) of the Lodge, Garage and Gardener's Cottage and the Stable Cottages, development of the former Abbey Dining Room for residential use (Use Class C3), adaptation and conversion for flexible uses (Class E and/or and/or C2 and/or and/C1 and/or C3 and/or F1 and/or F2 and/or B2 and/or B8 and/or Sui Generis) for buildings 207, 92, 206, 7 (7a, 8 and 8a), 209, 35, the Chimney and Class E and/or B2 and/or B8 for the retained Workshop (Block 258), enhanced access to Carrow Abbey and Scheduled Ancient Monument and associated ancillary works".

Outline Component:

"Demolition of existing buildings and replacement with phased residential-led (Use Class C3 and/or Class E and/or F1 and/or F2 and/or C1 and/or C2 and/or B2 and/or B8 and/or Sui Generis), landscaping, open space, new and modified access, car parking and ancillary works."

A schedule of the overall site use relevant to this report is provided in Table 1.1 below.

Table 1.1: Masterplan Site Schedule

Phase	No. of Dwellings / Units
<i>Detailed Application</i>	
- Refurbished Dwellings in Lodge	3
- Refurbished Dwellings in Abbey	3

<b>Total Detailed Application (Residential)</b>	<b>6</b>
<i>Outline Application</i>	
- New Flats (1 & 2 Bed)	1,339
- New Houses (2, 3, 4 & 5 Bed)	386
- Refurbished Flats	125
<b>Total Outline Application (Residential)</b>	<b>1,850</b>
Commercial (new)	7,184m <sup>2</sup>
Commercial (refurb)	16,443m <sup>2</sup>
Industrial (new)	1,821m <sup>2</sup>
Industrial (refurb)	1,182m <sup>2</sup>
<b>Total Outline Application (Non-Residential)</b>	<b>26,630 m<sup>2</sup></b>

A site illustrative masterplan prepared by JTP Architects showing the proposed development is provided below.



Fig 1.1: Proposed Illustrative Masterplan of the Carrow Works development prepared by JTP Architects.



### 1.3 Relevant Planning Policy & Legislation

There are a number of international and national policy drivers for sustainability, increased energy efficiency and reduced Carbon Dioxide (CO<sub>2</sub>) emissions, which have been introduced to address the issue of global warming and the implications of climate change. On an international level this includes the Kyoto Protocol, to which the UK government has made a commitment and developed national policies such as the UK Climate Change Act and the NPPF.

At the local level, the current Local Plan in particular remains a material consideration. These policies and documents are described in further detail within the section below.

### 1.4 Climate Change Act 2008

The Climate Change Act came into force on 26th November 2008 and was the world's first long-term legally binding framework to mitigate against climate change. Within this framework, the Act sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target to 80% by 2050. In addition, there is an interim target stating the carbon budget (i.e. the CO<sub>2</sub> emissions) must be at least 26% lower than the 1990 baseline.

### 1.5 National Planning Policy Framework

The National Planning Policy Framework ('NPPF') was published in July 2021, replacing the previous NPPF that was adopted in February 2019. The revised NPPF sets out the Government's planning policies for England and how they are expected to be applied. It sets out a framework that aims to achieve sustainable development throughout the planning system with three overarching objectives – economic, social and environmental.

At the heart of the NPPF is a 'presumption in favour of sustainable development', which requires Local Authorities as part of any plan-making or decision-making, to provide clear guidance on how the presumption should be applied locally.

The NPPF sets out how to deliver sustainable development under 17 subheadings. Subheading 14 of the NPPF outlines how the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

## 1.6 Building Regulations (England & Wales)

Part L of the Building Regulations came into force on 1st April 2002, with a view to reducing heating costs, conserving fuel and protecting the environment from the effects of climate change. To ensure that Part L of the Building Regulations were in line with the commitments made in the Energy White Paper (2003) of reducing CO<sub>2</sub> emissions from buildings, and to implement the Energy Performance of Buildings Directive (EPBD), Part L is typically updated on a three-year basis with the latest edition, Part L 2021, coming into force in June 2022.

### Building Regulations Part L 2021 Changes

The current Building Regulations (2021) document published by the Government in January 2021 and adopted in June 2022. Within this document were the interim Part L regulations as a step towards the aim to deliver Zero Carbon ready homes by 2025.

At the time of preparation of this report the current Part L 2021 documents have only just come into force (June 2022). As such modelling software has not yet been issued to allow accurate energy modelling to be undertaken. The government confirmed that the energy performance for Part L 2021 is expected that all new development will be required to produce 31% less carbon emissions for domestic and 27% less carbon emissions for non-domestic than is acceptable by the Part L 2013 minimum standards. Therefore, for the sake of this report a 31% target over and above the minimum required by Part L 2013 has been established as the equivalent of meeting Part L 2021. It is recommended that further calculations are conducted once the modelling software is published to provide more accurate energy performance data for the development.

## 1.7 Local Planning Policy

The Joint Core Strategy for Broadland, Norwich and South Norfolk (Adopted March 2011, amendments adopted January 2014) is the current adopted Local Plan and the Greater Norwich Local Plan (Regulation 19 Publication 2021) is the emerging planning policy. Both policy documents have been considered. The following policies are relevant to the proposed energy and sustainability criteria of the development.

### Greater Norwich Local Plan (Regulation 19 Publication 2021)

- **Policy 2: Sustainable Communities**  
Development must be high quality, contributing to delivering inclusive growth in mixed, resilient and sustainable communities, to enhancing the environment, and to mitigating and adapting to climate change, assisting in meeting national greenhouse gas emissions targets. To achieve this, development proposals are required, as appropriate, to:



1. Ensure safe, convenient and sustainable access to on site and local services and facilities including schools, health care, shops, recreation/ leisure/community/faith facilities and libraries;
2. Make provision for delivery of new and changing technologies (including broadband, fibre optic networks, telecommunications, construction methods and electric vehicles);
3. Contribute to multi-functional green infrastructure links, including through landscaping, to make best use of site characteristics and integrate into the surroundings, having regard to relevant green infrastructure strategies and delivery plans;
4. Make efficient use of land with densities dependent on site characteristics, with higher densities and car free housing in the most sustainably accessible locations in Norwich. Indicative minimum net densities are 25 dwellings per hectare across the plan area and 40 in Norwich.
5. Respect, protect and enhance local character and aesthetic quality (including landscape, townscape, and the historic environment), taking account of landscape or historic character assessments, design guides and codes, and maintain strategic gaps and landscape settings, including river valleys, undeveloped approaches and the character and setting of the Broads;
6. Provide safe and suitable access for all users, manage travel demand and promote public transport and active travel within a clearly legible public realm including public art where appropriate, with layouts that encourage walking and cycling, whilst also integrating parking in a manner that does not dominate the streetscape and providing a high standard of amenity through planting and the careful choice of materials;
7. Create inclusive, resilient and safe communities in which people of all ages have good access to services and local job opportunities, can interact socially, be independent and have the opportunity for healthy and active lifestyles;
8. Be resource efficient, support sustainable waste management, reduce overheating, protect air quality, minimise pollution and take account of ground conditions;
9. Support efficient water management. Flood risk should be minimised, including avoiding inappropriate development in areas at significant risk of flooding, reducing the causes and impacts of flooding, supporting a catchment approach to water management and using sustainable drainage. Development must protect water quality, both surface and groundwater, and be water efficient. To achieve the latter:
  - o Housing development will meet the Building Regulations part G (amended 2016) water efficiency higher optional standard;
  - o Non-housing development will meet the BREEAM “Very Good” water efficiency standard, or any equivalent successor;
10. Minimise energy demand through the design and orientation of development and maximise the use of sustainable energy, local energy networks and battery storage to assist growth delivery. This will include:
  - o All new development will provide a 19% reduction against Part L of the 2013 Building Regulations (amended 2016);

- Appropriate non-housing development of 500 square metres or above will meet the BREEAM “Very Good” energy efficiency standard, or any equivalent successor; except where a lower provision is justified because the requirement would make the development unviable.

**Joint Core Strategy for Broadland, Norwich and South Norfolk** (Adopted March 2011, amendments adopted January 2014)

- Policy 3: Energy and water

Energy

- Development in the area will, where possible, aim to minimise reliance on non-renewable high-carbon energy sources and maximise the use of decentralised and renewable or low-carbon energy sources and sustainable construction technologies. To help achieve this:
- all development proposals of a minimum of 10 dwellings or 1,000m<sup>2</sup> of non-residential floorspace will be required (a) to include sources of ‘decentralised and renewable or low-carbon energy’ (as defined in the glossary) providing at least 10% of the scheme’s expected energy requirements and (b) to demonstrate through the Design and Access Statement for the scheme whether or not there is viable and practicable scope for exceeding that minimum percentage provision
- in addition to the above requirement, detailed proposals for major developments (minimum of 500 dwellings or 50,000m<sup>2</sup> of non-residential floorspace) will be required to demonstrate through the Design and Access Statement that the scheme has seized opportunities to make the most of any available local economies of scale to maximise provision of energy from sources of ‘decentralised and renewable or low carbon energy sources’
- all development proposals of a minimum of 10 dwellings or 1,000m<sup>2</sup> of non-residential floorspace will be required to demonstrate, through the Design and Access Statement, that all viable and practicable steps have been taken to maximise opportunities for sustainable construction

Water

- The release of land for development will be dependent on there being sufficient water infrastructure to meet the additional requirements arising from the new development and to ensure that water quality is protected or improved, with no significant detriment to areas of environmental importance. This will be achieved by greater efficiency and by providing infrastructure, including strategic interceptor sewers, to address environmental and capacity constraints at the strategic wastewater treatment works at Whitlingham and at local works. This water infrastructure will be upgraded as required and be operational in time to meet the demands of any development.
- To ensure all housing is water efficient, new housing development must reach Code for Sustainable Homes level 4 for water on adoption of this document and developments of over 500 dwellings must reach code level 6 by 2015.

## 1.8 Summary of relevant policy requirements

In accordance with the current JCS **Policy 3**, the following targets must be met:

- decentralised and renewable or low-carbon energy is required to generate 10% of the scheme's expected energy requirements.
- developments of over 500 dwellings must reach code level 6 for water efficiency (this is the equivalent of a water consumption of <80l/p/day)

In accordance with the emerging GNLP **Policy 2**, the following targets must be met:

- For energy consumption, All new development will provide a 19% reduction against Part L of the 2013 Building Regulations (amended 2016).
- For water consumption Housing development will meet the Building Regulations part G (amended 2016) water efficiency higher optional standard; and Non-housing development will meet the BREEAM "Very Good" water efficiency standard, or any equivalent successor (this is the equivalent of a water consumption of 12.5% improvement on baseline)

This **Sustainability Statement** has been prepared for the development to show compliance with the above policy requirements.

## 2. Sustainability Assessment

This section comprises the Energy Assessment to accompany the proposed Detailed Planning Application, in accordance with the local authority policy requirements.

### 2.1 Energy

In accordance with planning policy including the current JCS and the emerging GNLP, the development shall reduce greenhouse gas emissions and the impact of climate change through low carbon development.

The energy assessment and subsequent energy strategy has been prepared such that it is aligned with the Energy Hierarchy (see Section 2.1), with focus on sustainable building design (reduction of energy consumption at source) and provision of energy efficiency measures; and to also assess the viability of including building integrated LZC technologies.

To meet current policy requirements, the following strategies are proposed:

Detailed Application: For the refurbished dwellings located in the listed buildings it is proposed that new building fabric will meet the Future Homes Standard as a minimum and within the constraints of the heritage listing existing fabric will be enhanced where feasible. Heating systems will consist of high efficiency gas fired boilers.

Outline Application: The energy strategy for the refurbished and new dwellings and commercial/industrial units included in outline will be based on a fabric first approach utilising passive design measures, well insulated and airtight building fabric (Future Homes Standard as a minimum) and electrically sources heating systems such as air sourced heat pumps.

To achieve the 10% required through low carbon or renewable technologies this will be achieved through a site wide approach utilising measures such as PV, solar thermal and heat pumps.

For more details, please refer to the Energy Strategy included as part of this application.

### 2.2 Water

In accordance with planning policy, the development shall seek to reduce potable water demand by minimising the requirements for mains water and waste water treatment, for example incorporating water conservation/efficiency measures such as flow restrictors, sensor taps, dual flush WCs, water leak detection systems (in commercial elements), as well as rainwater recovery systems.

In order to limit water consumption on a domestic (CSH Level 6 which requires <80l/p/day as required by Joint Core Strategy Policy 3) and commercial scale (BREEAM Very Good target Of 12.5% improvement over baseline as required by Policy 2 of the Greater Norwich Local Plan), it is recommended that the following water using features are installed with similar or better flow rates.

<i>Residential Components</i>	<i>Rate</i>	<i>Units</i>
<i>Taps (flow rate)</i>	4.5	litres/min
<i>Bath (volume to overflow)</i>	140	litres
<i>Showers (flow rate)</i>	6	litres/min
<i>Dishwasher</i>	1	litres/place setting
<i>Washing Machine</i>	6	litres/kg
<i>WC (dual flush volume)</i>	3 / 4.5	litres
<i>Kitchen Sink Taps (flow rate)</i>	4.5	litres/min

<i>Non-residential Components</i>	<i>Rate</i>	<i>Units</i>
<i>Taps (flow rate)</i>	4.5	litres/min
<i>WC (dual flush volume)</i>	3 / 4.5	litres
<i>Urinals</i>	3	Litres/bowl/hour
<i>Showers (flow rate)</i>	6	litres/min
<i>Bath (volume to overflow)</i>	140	litres
<i>Kitchenette Sink Taps (flow rate)</i>	5	litres/min
<i>Restaurant (pre-rinse nozzle) Sink Taps (flow rate)</i>	7.3	litres/min
<i>Dishwasher (domestic sized)</i>	12	litres/cycle
<i>Washing Machine (domestic sized)</i>	40	litres/use
<i>Waste Disposal Unit</i>	0	Litres/min
<i>Dishwasher (commercial sized)</i>	5	litres/rack
<i>Washing Machine (commercial sized)</i>	7.5	litres/kg

## 2.3 Flood Risk

Due to climate change, the risk of flooding is likely to become greater as extreme weather events become more sever. An initial review of the existing site identifies it to be mostly within flood zones 1 with a small area in the north east of the site on the banks of the River Wensum in flood zone 2.

A Flood Risk Assessment shall be prepared as part of the planning application to take all current and future sources of flooding into consideration, and development proposals should ensure

that the buildings are designed to be flood compatible or incorporate flood resilient measures to mitigate flood risk.

## 2.4 Adaptation to Climate Change

Measures to adapt to mitigation against climate change have been considered throughout the energy and sustainability statements. Measures include but are not limited to the following:

- The buildings will include renewable technologies such as a solar PV array;
- Existing building with high architectural qualities are to be retained;
- Bicycle storage spaces and EV charging points are proposed;
- Lighting shall consist of high-efficient LEDs with PIR and photometric sensing;
- Domestic hot water and heating provided by high-efficiency heating systems.

## 2.5 Landscape and Biodiversity

The north and the east of the existing site consists of a number of industrial buildings that form part of the original Colmans mustard site. The Carrow Abbey at the centre of the site is surrounded by existing landscaping with some ecological value. All features of ecological value that are being retained within the site, surrounding the site and within the wider construction zone will be protected during construction.

To meet the requirements of the local planning policy, the new landscaped elements should be designed to provide a structured, robust, attractive, long term, easily maintainable environment including quality open spaces, vistas, and views. Where possible, existing landscape features including trees and hedgerows shall be maintained, and wildlife shall be supported by the creation or enhancement of semi-natural habitats and the use of indigenous plant material where appropriate.

A detailed landscape proposal shall be submitted to ensure ecological benefits and quality of outside spaces is thoughtfully achieved and in accordance with the local policy requirements.

## 2.6 Sustainable Transportation

The site is located approximately 1500m from the centre of Norwich, and less than 1000m from Norwich Train Station. There is a dedicated cycle routes to the south of the site, and good pedestrian routes from the site to the train station and centre of Norwich. The proposal will create pedestrian linkages through the site providing better connection with the centre of Norwich for properties to the South of the site.

The site has several bus stops in close proximity, located on the on the A147 that runs along the southern boundary of the site. There are several bus routes that stop at these locations to connect the site with the centre of Norwich and the wider Norfolk area including coastal towns such as Lowerstoft and Great Yarmouth.

The proposals indicate there shall be cycle storage facilities provided, and the potential to reduce the number of car parking spaces given the site's town centre location and sustainability benefits that can be gained through reduced car usage. Consideration should also be given to allocating a proportion of the proposed car parking spaces to electric vehicle charging.

Please refer to the transport statement included as part of the planning application for details regarding the sustainable transport strategy.

## 2.7 Materials

All new materials associated with the development shall be sourced in consideration of embodied construction impacts. Additionally, the site and buildings shall comprise, where possible, of local sustainably sourced materials of a sufficiently robust construction to ensure a long life without the need for regular maintenance or replacement.

In selecting construction (and other) materials, the following shall be considered by the design and construction team:

- Preferentially select materials with a lesser environmental impact
- Review alternative materials that have a lower environmental impact when developing material specification, including recycled materials
- Review the embodied energy within potential building materials and reduction of embodied energy where feasible.

The following targets are recommended for the design team:

- 100% of timber and timber-based products to be legally harvested and traded timber, and be from suppliers who are able to provide evidence of responsible sourcing via chain of custody certification through the following schemes: Forestry Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC)
- At least 50% of materials will be sourced from suppliers or manufacturers who implement an Environmental Management System (EMS). Selection will be based on the following hierarchy:
  - BES 6001 or industry equivalent
  - ISO 14001 for key processes and supply chain
  - ISO 14001 for key processes only
  - Local supplier or manufacturer with no EMS



- National supplier with no EMS
- The use of local suppliers and manufacturers is encourage and will form part of the selection process
- 15% of total material value will derive from reused and recycled content, additional to the building form retained on site
- At least 25% of high-grade aggregate will be recycled or secondary aggregate

## 2.8 Waste Management

Sustainable design and construction methods will be used to minimise the impact the building has on the environment. Good site practices will be employed during the construction phase in order to minimise waste during construction and operation.

An operational waste management system should be implemented to account for waste streams from both residential and commercial sources. A dedicated waste storage area should allow for segregation of waste on site including general/household waste, dry recyclables, and food waste.

## 2.9 Construction Management

The development site will utilise sustainable design and construction methods to minimise the impact the building has on the environment. Good site practices will be employed during the construction phase to minimise potential impacts, such as noise and dust nuisances.

During the construction phase, adequate space will be provided for the separation, storage, collection, and recycling of waste. Effective site waste management will be implemented through the use of a Site Waste Management Plan (SWMP) that has been designed to comply with the WRAP guidelines. The SWMP will meet all regulatory requirements and:

- Set actions to prevent, reduce and recover waste
- Identify waste reductions at the design stage
- Forecast the waste arisings
- Record waste carriers and waste management facilities
- Prepare waste management actions
- Record actual waste movements
- Benchmark against standard, good, and best practice.