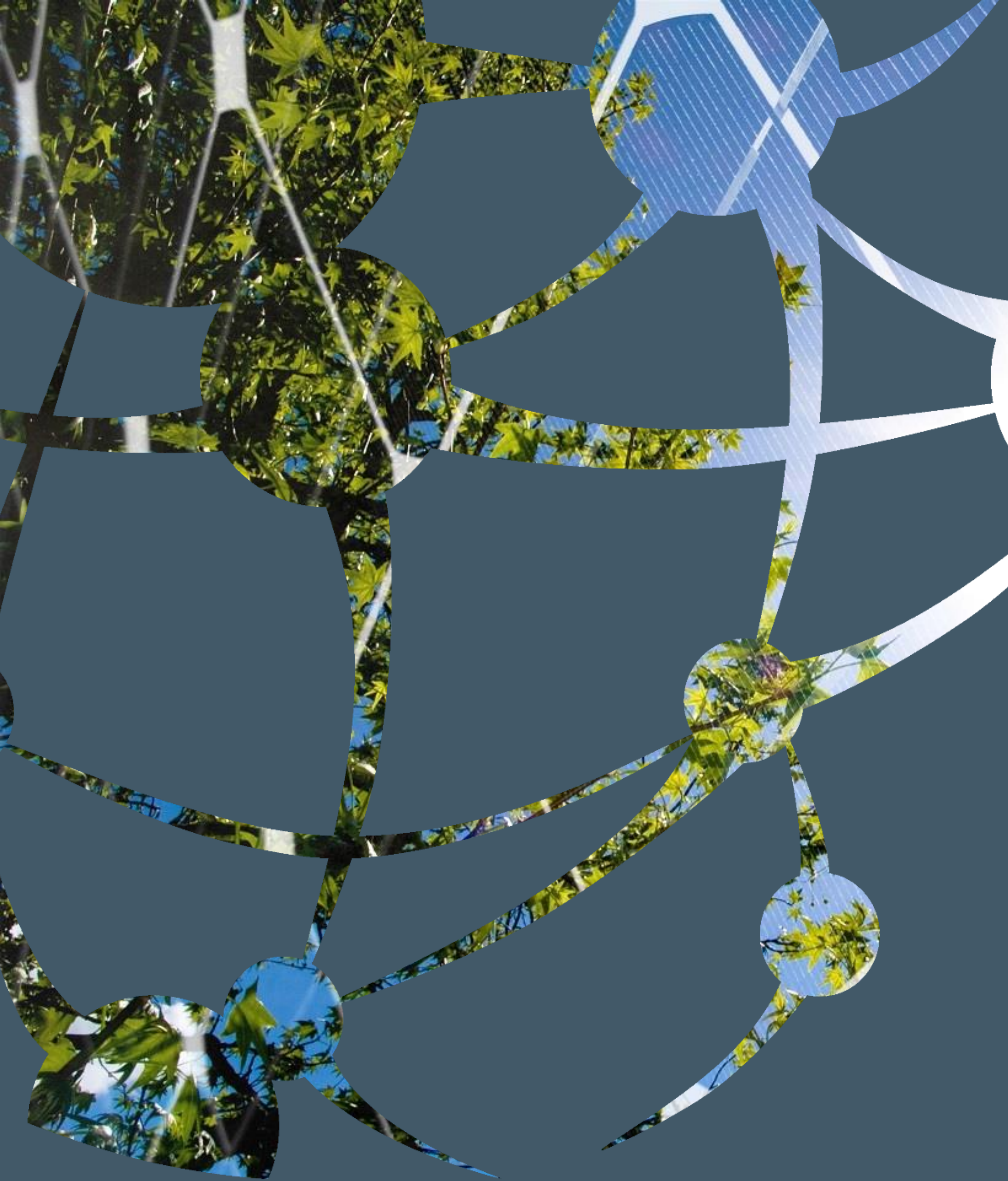

ATR HOTEL EXTENTION SUSTAINABILITY STATEMENT

JULY 2015

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DOCUMENT CONTROL

Issue	Description	Date	Prepared By	Signed Off
-	PRELIMINARY PLANNING	03.07.15	DG	DG
-	SUMMERY ADDED	13.07.15	DG	DG

SUMMARY

The following document provides an overview of the hotel extension sustainability features and inclusions. The extension to the existing hotel will take a holistic approach to the reduction of carbon and sustainability by ensuring a fabric first approach to reduce energy consumption prior to looking at how the remaining required energy is derived.

This approach has ensured that sustainability has been considered from the outset to integrate with the building to ensure that guest experience is not compromised.

SUSTAINABILITY STATEMENT

ATR Hotel Extension
Elementa Consulting are working with Alton Towers to provide the building services and sustainability design for the ATR Hotel Extentiont at Alton Towers.

Implementing renewable technology will obviously reduce the energy consumption of the development and impact on the overall carbon footprint. However reducing the energy requirement of the development through good design practices can be equally effective in reducing energy consumption (and overall carbon footprint). Addressing the efficient use of energy within the development holistically not only reduces energy consumption and therefore running costs but also reduces the carbon footprint of the development.
To this end the following energy hierarchy, was adopted to help guide decisions about which energy measures are appropriate, and in order to optimise design solutions to maximise carbon reductions:

Be Lean: using less energy and utilising sustainable design.
Be Clean: supplying energy efficiently, use of decentralised energy production
Be Green: using renewable energy where possible to reduce carbon emissions.

The building will also address the requirements of the Staffordshire moorlands adopted core strategy with particular reference to policy's SD1, SD2, SD3 and SD4.

1 ENERGY EFFICIENT BUILDING (BE LEAN)

The first stage in reducing CO2 emissions from the development is to reduce the energy required to service the building, through the implementation of passive design and energy efficient measures. This can be achieved in a number of ways, such as improving the thermal performance of the building fabric, providing energy efficient plant, providing adequate control of building services systems and lighting systems, and through providing training to building users to enable them to utilise the building efficiently.
The following tables indicate how this development will reduce the baseline energy consumption required, through the implementation of passive design and energy efficient measures (i.e. Be Lean):

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Table 1 – Architectural ‘Passive Design’ Parameters

Element	Part L2A Maxima (Limiting Values) (Non-domestic)	Value Proposed for Communal Areas, Retail and Office
Wall U-Value ($W/m^2.K$)	0.35	0.25
Ground Floor U-Value ($W/m^2.K$)	0.25	0.20
Roof U-Value ($W/m^2.K$)	0.25	0.20
External Door U-Value ($W/m^2.K$)	2.2	1.4
Window U-Value ($W/m^2.K$)	2.2	1.4
Glazing G-Value	-	0.4
Glazing Light Transmittance	-	70%
Building Air Permeability ($m^3/h.m^2$)	10	5
External Shading Measures	-	Local shading from roof terrace and existing planting

Table 2 – Mechanical Services ‘Energy Efficient’ Measures

Element	Description
Mechanical Ventilation	Mechanical ventilation to be utilised to serve the development. Duct sizes selected to reduce specific fan power and energy demand.
Mechanical Cooling	Cooling will be selected to have high coefficients of performance in excess of the minimum standards as set out within the Approved document L.
Pumps and Motors	Variable speed, variable frequency, variable voltage drives to be provided on all pumps and motors to reduce energy consumption to minimum on variable flow systems.
Metering and Sub-Metering	Use of water, gas and energy metering and direct sub-metering.

Table 3 – Assumed ASHP Performance Data

ASHP Performance Data	Part L2A Minimum Requirements	Value Proposed for Development
Heat Pump Efficiency – Heating Mode (COP / SCOP)	250% / -	>250%
Heat Pump Efficiency – Cooling Mode (EER / SEER)	260% / -	>260%

Table 4 – Electrical Services 'Energy Efficient' System Design Parameters

Element	Part L2A Minimum Requirements	Value Proposed for Development
High Frequency Compact Fluorescent Luminaires	None	**Provided throughout**
Use of Natural Daylight	None	**Average daylight factor to be maximised wherever possible**
Daylight Dimming	None	**Not provided**
Lighting Efficiencies – General Lighting	60 luminaire lumens per circuit Watt	**≥ 60 luminaire lumens per circuit Watt**
Lighting Efficiencies – Display Lighting	22 luminaire lumens per circuit Watt	**Not provided**
Display Lighting Control	None	**None**
Power Factor	None	**0.95 (to be achieved through use of power factor correction plant, if necessary)**
Lifts	None	**Lifts to incorporate energy efficient measures (including energy efficient motors, LED lighting and controls)**
Artificial Lighting Controls	None	**Luminance and presence detectors to generally be provided throughout.**

Other 'Energy Efficient' Design Measures

In addition to the above energy efficient measures, a comprehensive commissioning programme shall be carried out, and full user training provided to ensure the building users understand how to utilise the building in an energy efficient manner, in accordance with the design intent.

The guestrooms will make use of key card technology so that when rooms are not occupied the electrical supplies and lighting are powered down to reduce any wastage, and reduce power consumption of the rooms.

The building will make use of water efficient sanitary fittings to ensure that the minimum amount of water is used by the development. The hotel extension will consider aerated sanitaryware and waterless urinals to ensure that the guest experience is not compromised whilst maintaining high sustainable standards.

2 DISTRICT HEATING (BE CLEAN)

The site does not currently have a large district heating scheme to which the hotel can connect to. Should such a scheme be developed in the future then it would be possible to connect the hotel to a scheme to generate the domestic hot water which provides a large amount of heat demand due to the usage within the hotel.

3 LZC TECHNOLOGY OPTIONS (BE GREEN)

Low and Zero Carbon (LZC) technologies that could be used for this development were evaluated. In the evaluation, carbon dioxide emissions generated by or associated with unregulated uses have not been incorporated into the low or zero carbon (LZC) technology calculations within this report, as this is not a requirement of Part L2A of the Building Regulations.

It is also worth noting that the sizing of any potential LZC technology system needs to be carefully considered, particularly for heat generating technologies. Plant sizing effects energy efficiency, carbon emissions and system reliability for the following reasons:

- As with conventional plant, the efficiency and reliability of renewable energy plant is at its optimum when working at, or close to, its design capacity. For example, a biomass boiler of rated capacity 500kW will not function efficiently and can be expected to give operating problems if asked to work for 75% of the time at 50kW, similarly with CHP.
- The capital cost of renewable energy is generally considerably higher than that of conventional plant. Over-sizing will therefore lead to unnecessarily high capital cost. It is advisable to size heat generating renewable technology to undertake the base load of the building, and to use cheaper, conventional technologies to meet peak loads.

In view of the dangers of over-sizing as described above, it is better to size renewable energy plant so that it is running at or near to full capacity for the majority of the time, and therefore utilise the conventional plant to meet the fluctuating peak demand.

The following sections of this report highlight the project specific requirements for each LZC technology that could be used for this development.

Table 5 – Low and Zero Carbon (LZC) Technologies Considered

The following low and zero carbon technology options were considered and the resulting conclusions drawn:

Technology	Technically Feasible	Recommended	Notes
Hydrogen Technology	No	No	Technology not far enough advanced.
CHP	Yes	No	The initial concept does not support the financial viability of installing a Micro CHP. This will be reviewed as the design progresses this will be re assed and if possible incorporated into the design.
PV	Yes	No	It is our understanding that due to the potential reflection that would be generated by the panels that this would not be seen as a positive for the project. This can be reviewed along with the financial and carbon offsetting benefits as the project design progresses.
ASHP	Yes	Yes	Recommended for this site due to year round heating and cooling loads
GSHP	Yes	No	Higher cost and lower payback than other technologies available. Potential to result in significant programme implications.
Wind Power	No	No	Not viable due to height of installation required context read in line with surrounding buildings and developments.
Solar thermal	Yes	No	Very limited domestic hot water demand. Roof area utilised by solar thermal panels would be more effectively utilised by PV panels.
Biomass	Yes	No	Biomass is suited to large constant loads. Due to the predominant load being domestic hot water this does not have a smooth nature and tends to peak in line with the occupancy times meaning that this technology is not suited.

The results and conclusions documented above demonstrate that through the implementation of passive design and energy efficiency measures, the CO_2 reductions will enable the development to:

a) Meet the requirements of Part L2A of the Building Regulations (2010)
b) Satisfy the energy reduction local planning policy requirements

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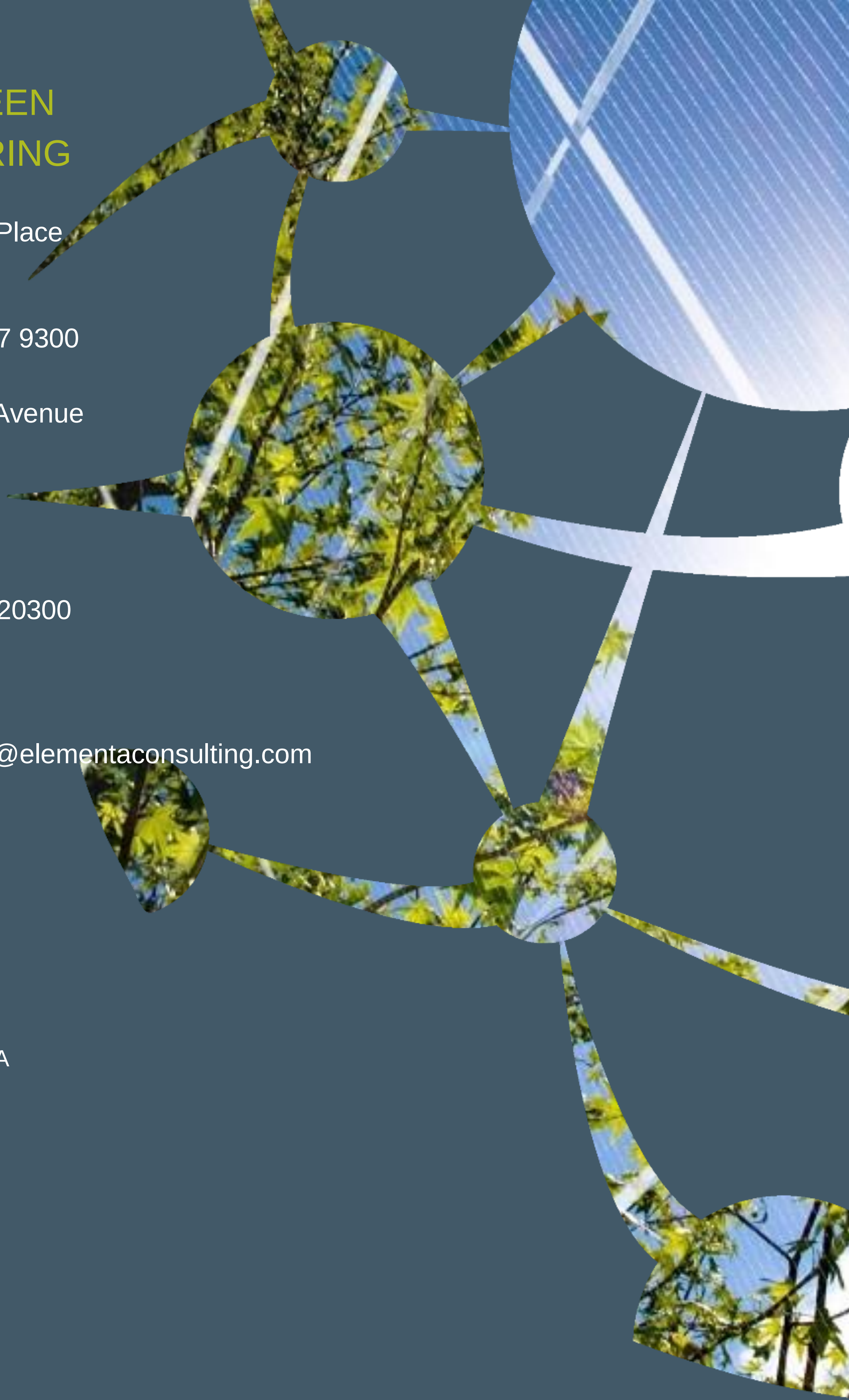

Elementa

One Valentine Place
London
SE1 8QH
T +44(0)203 697 9300
–
Unit 1, Library Avenue
Harwell Oxford
Didcot
Oxfordshire
OX11 0SG
T +44(0)1235 820300
–
Contact
David Glossop
David.Glossop@elementaconsulting.com

London, UK
Oxford, UK
San Francisco, CA
Oakland, CA
San Jose, CA
Los Angeles, CA
Seattle, WA
Washington, DC
Richmond, VA
Austin, TX
Atlanta, GA
Vancouver, BC
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