



12 APPENDIX E: CORRESPONDENCE WITH CAMDEN COUNCIL ON FEASIBILITY OF CONNECTING THE DEVELOPMENT TO A DISTRICT HEATING NETWORK

Makantasi, Areti

From: Davies, James <James.Davies@camden.gov.uk>
Sent: 15 July 2019 12:32
To: Martoo, Joshua
Cc: Makantasi, Areti; Sargent, Terry; Castle, Ben; Makrodimetri, Lina
Subject: RE: District Heating Connection for Proposed Development

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Hi Josh,

We don't have any information regarding expansion timeline yet. All policy requirements are within our planning documents on the Camden website.

We welcome the fact that you are looking at a low-temp heat pump solutions. As mentioned, we have no concrete plans about expansion of the network it is just something we are exploring. As such I don't have any details on temperatures, but I imagine low temperature connections would be considered as part of the plans.

Thanks for the GFA information.

James

-

James Davies
Senior Sustainability Officer (Low Carbon)

Telephone: 020 7974 6892



From: Martoo, Joshua <J.Martoo@ndy.com>
Sent: 10 July 2019 15:36
To: Davies, James <James.Davies@camden.gov.uk>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>; Sargent, Terry <T.Sargent@ndy.com>; Castle, Ben <B.Castle@ndy.com>; Makrodimetri, Lina <M.Makrodimetri@ndy.com>
Subject: RE: District Heating Connection for Proposed Development

Hi James,

Thank you for getting back to me – great that this is in your demise.

A few questions:

- Would you be able to provide some insight into timeframes for the expansion of this network?
- Can you provide the policy requirements for the future connection?

As we currently do not have the opportunity to connect, the heating for the buildings is proposed to be by heat pumps (45°C/40°C). These temperatures are considered low grade and future connection into a current generation network may not be suitable due to the differences in temperatures. But, if the network were to be 5th generation (ambient temperature) the system will be perfectly compatible. Do you know if the future expansion could be 5th generation type? Are there policy requirements available for this type of connection?

See below for the information you requested regarding the site:

- Approx. GFA: (Sorry, only have the GIA figures at this time)
 - Office: 19,576m² (GIA)
 - Residential 1: 1,919m² (GIA)
 - Residential 2: 2,653m² (GIA)
- Typology: The site will have 1 office tower and 2 residential buildings with separate DH connections.
- Annual heat demand:
 - Office: 93.4MWh
 - Residential (total of two buildings): 4600kWh
- Peak heat requirement:
 - Office: 700kW
 - Residential (total of two buildings): 152kW

Cheers,
Josh



Joshua Martoo | Project Engineer
T +44 20 7553 9494
E j.martoo@ndy.com | www.ndy.com
Norman Disney & Young A Tetra Tech Company
4 Chiswell Street, London EC1Y 4UP, United Kingdom
TETRA TECH HIGH PERFORMANCE BUILDING GROUP

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From: Davies, James <James.Davies@camden.gov.uk>
Sent: 10 July 2019 11:57
To: Martoo, Joshua <J.Martoo@ndy.com>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>
Subject: RE: District Heating Connection for Proposed Development

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Sorry I forgot to add.

Can you let me know a bit more about the development so we can consider for our network planning. Info below would be really useful.

- Approx. GFA
- Typology
- Annual heat demand
- Peak heat requirement

Cheers,

James

James Davies
Senior Sustainability Officer (Low Carbon)

Telephone: 020 7974 6892



From: Davies, James
Sent: 10 July 2019 11:56
To: Martoo, Joshua <J.Martoo@ndy.com>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>
Subject: RE: District Heating Connection for Proposed Development

Hi Joshua,

The nearest heat network is Somers Town Energy which I manage here at Camden.

The nearest pipework to your site is in Chalton street which is over 600m away as the crow flies so it is not likely to be feasible to connect at this stage. There is an ambition to expand the network northwards at some point, so the development should ensure it is DH ready (in line with policy requirements) but as of today there is no network to connect to.

Many thanks,

James

James Davies
Senior Sustainability Officer (Low Carbon)

Telephone: 020 7974 6892



From: Martoo, Joshua <J.Martoo@ndy.com>
Sent: 09 July 2019 17:54
To: Davies, James <James.Davies@camden.gov.uk>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>
Subject: RE: District Heating Connection for Proposed Development

Hi James,

We are nearing deadlines for local approval and require this information as soon as possible – did you have any luck finding the relevant contact?

Cheers,
Josh



Joshua Martoo | Project Engineer
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4 Chiswell Street, London EC1Y 4UP, United Kingdom
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From: Martoo, Joshua
Sent: 08 July 2019 09:33
To: Davies, James <James.Davies@camden.gov.uk>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>
Subject: RE: District Heating Connection for Proposed Development

Hi James,

Thanks for getting back to me – the proposed new building is the whole block on NW1 0BY:
<https://goo.gl/maps/y3ZK6bzonAWTfdv67>

Cheers,
Josh



Joshua Martoo | Project Engineer
T +44 20 7553 9494
E j.martoo@ndy.com | www.ndy.com
Norman Disney & Young A Tetra Tech Company
4 Chiswell Street, London EC1Y 4UP, United Kingdom
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From: Davies, James <James.Davies@camden.gov.uk>
Sent: 04 July 2019 17:42
To: Martoo, Joshua <J.Martoo@ndy.com>
Cc: Makantasi, Areti <A.Makantasi@ndy.com>
Subject: Re: District Heating Connection for Proposed Development

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Hi Josh.

Where is the new development then I can direct you to the relevant person?

Cheers

James

Get [Outlook for Android](#)

From: Martoo, Joshua <J.Martoo@ndy.com>
Sent: Thursday, July 4, 2019 5:11:42 PM
To: Davies, James
Cc: Makantasi, Areti
Subject: District Heating Connection for Proposed Development

Hi James,

I am currently investigating the opportunity to connect a new proposed development in Camden to a District Heating (DH) network.

Are you able to provide me with a contact for DH network suppliers in the area, or are you aware of any future schemes that we should be considering?

Feel free to call to discuss.

Cheers,
Josh



Joshua Martoo | Project Engineer
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13 APPENDIX F: BRUKL OUTPUTS

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



Project name

St Pancras Commercial Centre-LIGHT INDUSTRIAL UNITS- BE GREEN As designed

Date: Mon Jul 15 12:43:57 2019

Administrative information

Building Details

Address: St Pancras Way, London, GVQ 7QH

Owner Details

Name: Camden Property Holdings Limited

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.10

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.10

BRUKL compliance check version: v5.4.b.0

Certifier details

Name: NDY

Telephone number: +44 20 7553 9494

Address: 4 Chiswell Street,, London, EC1Y 4UP

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	10.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	10.8
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.2
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	SP000001:Surf[4]
Floor	0.25	0.16	0.16	00000011:Surf[0]
Roof	0.25	0.16	0.16	00000016:Surf[11]
Windows***, roof windows, and rooflights	2.2	1.37	1.37	SP000001:Surf[0]
Personnel doors	2.2	2.03	2.03	SP000001:Surf[5]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]

U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- 3.2 St Pancras Campus-Light Industrial-BE GREEN

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3	0	0	0.75
Standard value	2.5*	3.2	N/A	N/A	0.5

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard	
00-Light Industry Unit 1	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 2	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 3	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 3	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 4	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 4	-	1.6	0	-	-	-	-	-	-	-	N/A	
00-Light Industry Unit 5	-	1.6	0	-	-	-	-	-	-	-	N/A	
B1-Light Industry Unit 1	-	1.6	0	-	-	-	-	-	-	-	N/A	
B1-Light Industry Unit 2	-	1.6	0	-	-	-	-	-	-	-	N/A	
B1-Light Industry Unit 3	-	1.6	0	-	-	-	-	-	-	-	N/A	
B1-Light Industry Unit 4	-	1.6	0	-	-	-	-	-	-	-	N/A	
B1-Light Industry Unit 5	-	1.6	0	-	-	-	-	-	-	-	N/A	
M-Light Industry Unit 3	-	1.6	0	-	-	-	-	-	-	-	N/A	
M-Light Industry Unit 4	-	1.6	0	-	-	-	-	-	-	-	N/A	

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value		60	60	22
00-Light Industry Unit 1	100	-	-	834

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire 60	Lamp 60	Display lamp 22	
00-Light Industry Unit 1 - Cupboard		100	-	-	16
00-Light Industry Unit 1 - Stairs		-	100	-	58
00-Light Industry Unit 2		100	-	-	747
00-Light Industry Unit 2 - Stairs		-	100	-	57
00-Light Industry Unit 3		100	-	-	692
00-Light Industry Unit 3		100	-	-	538
00-Light Industry Unit 3 - Stairs		-	100	-	58
00-Light Industry Unit 4		100	-	-	610
00-Light Industry Unit 4		100	-	-	389
00-Light Industry Unit 4 - Stairs		-	100	-	58
00-Light Industry Unit 5		100	-	-	742
B1-Light Industry Unit 1		100	-	-	1453
B1-Light Industry Unit 1 - Cupboard		100	-	-	15
B1-Light Industry Unit 1 - WC		-	100	-	81
B1-Light Industry Unit 2		100	-	-	1017
B1-Light Industry Unit 2 - Stairs		-	100	-	51
B1-Light Industry Unit 2 - WC		-	100	-	91
B1-Light Industry Unit 3		100	-	-	1615
B1-Light Industry Unit 3 - Stairs		-	100	-	52
B1-Light Industry Unit 3 - Stairs		-	100	-	46
B1-Light Industry Unit 3 - WC		-	100	-	121
B1-Light Industry Unit 4		100	-	-	1186
B1-Light Industry Unit 4 - Stairs		-	100	-	52
B1-Light Industry Unit 4 - WC		-	100	-	127
B1-Light Industry Unit 5		100	-	-	1552
B1-Light Industry Unit 5 - Stairs		-	100	-	45
B1-Light Industry Unit 5 - WC		-	100	-	96
M-Light Industry Unit 3		100	-	-	694
M-Light Industry Unit 4		100	-	-	613

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-Light Industry Unit 1	NO (-91.8%)	NO
00-Light Industry Unit 2	NO (-93.4%)	NO
00-Light Industry Unit 3	NO (-97.9%)	NO
00-Light Industry Unit 3	NO (-87.7%)	NO
00-Light Industry Unit 4	NO (-96.9%)	NO
00-Light Industry Unit 4	NO (-77.5%)	NO
00-Light Industry Unit 5	NO (-71%)	NO
B1-Light Industry Unit 1	N/A	N/A
B1-Light Industry Unit 2	N/A	N/A
B1-Light Industry Unit 3	N/A	N/A
B1-Light Industry Unit 4	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B1-Light Industry Unit 5	N/A	N/A
M-Light Industry Unit 3	NO (-91%)	NO
M-Light Industry Unit 4	NO (-75.5%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	2947.9	2947.9	100	A1/A2 Retail/Financial and Professional services
External area [m ²]	4135	4135		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	5		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	968.49	0		B8 Storage or Distribution
Average U-value [W/m ² K]	0.23	0		C1 Hotels
Alpha value* [%]	10.04	10		C2 Residential Institutions: Hospitals and Care Homes
				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 General Assembly and Leisure, Night Clubs, and Theatres
				Others: Passenger terminals
				Others: Emergency services
				Others: Miscellaneous 24hr activities
				Others: Car Parks 24 hrs
				Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.11	3.32
Cooling	0.66	0.38
Auxiliary	1.67	0.89
Lighting	13.27	16.16
Hot water	0.53	0.56
Equipment*	17.04	17.04
TOTAL**	18.24	21.31

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
 ** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	31.19	35.76
Primary energy* [kWh/m ²]	62.5	75.41
Total emissions [kg/m ²]	9.2	10.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	24.4	9.7	2.3	0.7	1.8	2.94	3.74	3	5
Notional	0	0	0	0	0	0	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	33.4	5.6	3.6	0.4	0.9	2.56	3.79	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	SP000001:Surf[4]
Floor	0.2	0.16	00000011:Surf[0]
Roof	0.15	0.16	00000016:Surf[11]
Windows, roof windows, and rooflights	1.5	1.37	SP000001:Surf[0]
Personnel doors	1.5	2.03	SP000001:Surf[5]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



Project name

St Pancras Commercial Centre-OFFICE - BE GREEN As designed

Date: Mon Jul 15 12:07:33 2019

Administrative information

Building Details

Address: St Pancras Way, London, GVQ 7QH

Owner Details

Name: Camden Property Holdings Limited

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.10

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.10

BRUKL compliance check version: v5.4.b.0

Certifier details

Name: NDY

Telephone number: +44 20 7553 9494

Address: 4 Chiswell Street,, London, EC1Y 4UP

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.3
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	15
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	SP000003:Surf[2]
Floor	0.25	0.16	0.16	SP000009:Surf[0]
Roof	0.25	0.16	0.16	02000016:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.32	1.33	01000017:Surf[0]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- 1.2 St Pancras Campus-Offices-FCUs-BE GREEN

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.58	3.03	0	1.6	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.5

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system

YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- 1.2 St Pancras Campus-Offices-Radiators - BE GREEN

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.58	-	0.2	0	0.75
Standard value	2.5*	N/A	N/A	N/A	0.5

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system

YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

3- 1.2 St Pancras Campus-Offices-Radiators-plantrooms - BE GREEN

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.58	-	-	0	0.75
Standard value	2.5*	N/A	N/A	N/A	0.5

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system

YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
00-Office Perimeter N	-	-	-	-	-	-	-	0.2	-	-	-	N/A
00-Office Perimeter W	-	-	-	-	-	-	-	0.2	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type Standard value	A 0.3	B 1.1	C 0.5	D 1.9	E 1.6	F 0.5	G 1.1	H 0.5	I 1	Zone	Standard
00-Office Internal	-	-	-	-	-	-	-	-	0.2	-	-	N/A
00-Toilets	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-UKPN substation	-	-	-	1.6	-	-	-	-	-	-	-	N/A
01-Disabled WC N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
01-Disabled WC S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
01-Offices Internal N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Offices Internal S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Offices Perimeter E	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Offices Perimeter N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Offices Perimeter S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Offices Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A
01-Toilets N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
01-Toilets S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
02-Disabled WC N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
02-Disabled WC S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
02-Offices Internal N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Offices Internal S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Offices Perimeter E	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Offices Perimeter N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Offices Perimeter S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Offices Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A
02-Toilets N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
02-Toilets S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
03-Disabled WC N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
03-Disabled WC S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
03-Offices Internal N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Offices Internal S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Offices Perimeter E	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Offices Perimeter N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Offices Perimeter S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Offices Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A
03-Toilets N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
03-Toilets S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
04-Disabled WC N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
04-Disabled WC S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
04-Offices Internal S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Offices Internal S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Offices Perimeter E	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Offices Perimeter N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Offices Perimeter S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Offices Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A
04-Toilets N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
04-Toilets S	-	-	0.5	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type Standard value	A 0.3	B 1.1	C 0.5	D 1.9	E 1.6	F 0.5	G 1.1	H 0.5	I 1	Zone	Standard
05-Disabled WC N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
05-Disabled WC S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
05-Offices Internal	-	-	-	-	-	-	-	-	0.2	-	-	N/A
05-Offices Perimeter E	-	-	-	-	-	-	-	-	0.2	-	-	N/A
05-Offices Perimeter N	-	-	-	-	-	-	-	-	0.2	-	-	N/A
05-Offices Perimeter S	-	-	-	-	-	-	-	-	0.2	-	-	N/A
05-Offices Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A
05-Toilets N	-	-	0.5	-	-	-	-	-	-	-	-	N/A
05-Toilets S	-	-	0.5	-	-	-	-	-	-	-	-	N/A
06-Amenity Space	-	-	0.5	-	-	-	-	-	-	-	-	N/A
06-Office Plantroom	-	-	-	1.6	-	-	-	-	-	-	-	N/A
06-Toilets	-	-	0.5	-	-	-	-	-	-	-	-	N/A
B1-Office Plantroom	-	-	-	1.6	-	-	-	-	-	-	-	N/A
B1-Office Plantroom	-	-	-	1.6	-	-	-	-	-	-	-	N/A
B1-Office Plantroom	-	-	-	1.6	-	-	-	-	-	-	-	N/A
B1-Office Plantroom	-	-	-	1.6	-	-	-	-	-	-	-	N/A
B1-Showers	-	-	-	-	-	-	-	-	0.2	-	-	N/A
B1-Showers	-	-	-	-	-	-	-	-	0.2	-	-	N/A
00-Reception	-	-	-	-	-	-	-	-	0.2	-	-	N/A
00-Reception Perimeter W	-	-	-	-	-	-	-	-	0.2	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
00-Circulation area	-	100	-	58
00-Circulation area	-	100	-	170
00-Circulation area	-	100	-	99
00-Circulation area	-	100	-	68
00-Circulation area	-	100	-	51
00-Circulation area	-	100	-	85
00-Office Perimeter N	90	-	-	634
00-Office Perimeter W	90	-	-	626
00-Office Internal	90	-	-	966
00-Refuse area	100	-	-	49
00-Stairs	-	100	-	85
00-Stairs	-	100	-	110
00-Stairs	-	100	-	40
00-Toilets	-	100	-	99
00-UKPN substation	100	-	-	209
01-Corridor-Main Core	-	100	-	143
01-Disabled WC N	-	100	-	32
01-Disabled WC S	-	100	-	37
01-Offices Internal N	90	-	-	3507

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire 60	Lamp 60	Display lamp 22	
01-Offices Internal S		90	-	-	4724
01-Offices Perimeter E		90	-	-	1430
01-Offices Perimeter N		90	-	-	2136
01-Offices Perimeter S		90	-	-	2339
01-Offices Perimeter W		90	-	-	1644
01-Stairs		-	100	-	64
01-Stairs		-	100	-	64
01-Stairs Lobby N		-	100	-	49
01-Stairs Lobby S		-	100	-	49
01-Toilet Lobby N		-	100	-	19
01-Toilet Lobby S		-	100	-	21
01-Toilets N		-	100	-	98
01-Toilets S		-	100	-	100
02-Corridor-Main Core		-	100	-	143
02-Disabled WC N		-	100	-	32
02-Disabled WC S		-	100	-	37
02-Offices Internal N		90	-	-	3507
02-Offices Internal S		90	-	-	4724
02-Offices Perimeter E		90	-	-	1430
02-Offices Perimeter N		90	-	-	2136
02-Offices Perimeter S		90	-	-	2339
02-Offices Perimeter W		90	-	-	1644
02-Stairs		-	100	-	64
02-Stairs Lobby N		-	100	-	49
02-Stairs Lobby S		-	100	-	49
02-Toilet Lobby N		-	100	-	19
02-Toilet Lobby S		-	100	-	21
02-Toilets N		-	100	-	98
02-Toilets S		-	100	-	100
03-Corridor-Main Core		-	100	-	143
03-Disabled WC N		-	100	-	32
03-Disabled WC S		-	100	-	37
03-Offices Internal N		90	-	-	3507
03-Offices Internal S		90	-	-	4724
03-Offices Perimeter E		90	-	-	1430
03-Offices Perimeter N		90	-	-	2136
03-Offices Perimeter S		90	-	-	2339
03-Offices Perimeter W		90	-	-	1644
03-Stairs		-	100	-	64
03-Stairs		-	100	-	64
03-Stairs Lobby N		-	100	-	49
03-Stairs Lobby S		-	100	-	49
03-Toilet Lobby N		-	100	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire 60	Lamp 60	Display lamp 22	
03-Toilet Lobby S		-	100	-	21
03-Toilets N		-	100	-	98
03-Toilets S		-	100	-	100
04-Corridor-Main Core		-	100	-	139
04-Disabled WC N		-	100	-	32
04-Disabled WC S		-	100	-	37
04-Offices Internal S		90	-	-	3395
04-Offices Internal S		90	-	-	2423
04-Offices Perimeter E		90	-	-	1473
04-Offices Perimeter N		90	-	-	1671
04-Offices Perimeter S		90	-	-	1874
04-Offices Perimeter W		90	-	-	1593
04-Stairs		-	100	-	64
04-Stairs		-	100	-	64
04-Stairs Lobby N		-	100	-	49
04-Stairs Lobby S		-	100	-	49
04-Toilet Lobby N		-	100	-	19
04-Toilet Lobby S		-	100	-	21
04-Toilets N		-	100	-	90
04-Toilets S		-	100	-	90
05-Corridor-Main Core		-	100	-	139
05-Disabled WC N		-	100	-	32
05-Disabled WC S		-	100	-	37
05-Offices Internal		90	-	-	2764
05-Offices Perimeter E		90	-	-	1008
05-Offices Perimeter N		90	-	-	1818
05-Offices Perimeter S		90	-	-	1856
05-Offices Perimeter W		90	-	-	1151
05-Stairs		-	100	-	64
05-Stairs		-	100	-	64
05-Stairs Lobby N		-	100	-	49
05-Stairs Lobby S		-	100	-	49
05-Toilet Lobby N		-	100	-	19
05-Toilet Lobby S		-	100	-	21
05-Toilets N		-	100	-	90
05-Toilets S		-	100	-	90
06-Amenity Space		100	-	-	235
06-Entrance Lobby		-	100	-	36
06-Office Plantroom		100	-	-	535
06-Plantroom Lobby		-	100	-	16
06-Stairs		-	100	-	38
06-Stairs		-	100	-	60
06-Stairs Lobby		-	100	-	41

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire 60	Lamp 60	Display lamp 22	
06-Toilets		-	100	-	76
B1- Storage		100	-	-	59
B1- Storage		100	-	-	22
B1-Changing rooms		100	-	-	51
B1-Circulation area		-	100	-	312
B1-Circulation area		-	100	-	356
B1-Circulation area		-	100	-	125
B1-Circulation area		-	100	-	107
B1-Cycle storage		100	-	-	331
B1-Office Plantroom		100	-	-	241
B1-Office Plantroom		100	-	-	162
B1-Office Plantroom		100	-	-	595
B1-Office Plantroom		100	-	-	1302
B1-Showers		-	100	-	119
B1-Showers		-	100	-	116
B1-Stairs		-	100	-	78
B1-Stairs		-	100	-	53
B1-Stairs lobby		-	100	-	60
00-Reception		-	90	30	445
00-Reception Perimeter W		-	90	30	187

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-Office Perimeter N	NO (-65.4%)	NO
00-Office Perimeter W	NO (-46.8%)	NO
00-Office Internal	NO (-80.4%)	NO
01-Offices Internal N	NO (-88.4%)	NO
01-Offices Internal S	NO (-87.2%)	NO
01-Offices Perimeter E	NO (-68.1%)	NO
01-Offices Perimeter N	NO (-70.1%)	NO
01-Offices Perimeter S	NO (-39.1%)	NO
01-Offices Perimeter W	NO (-35.2%)	NO
02-Offices Internal N	NO (-87%)	NO
02-Offices Internal S	NO (-86.1%)	NO
02-Offices Perimeter E	NO (-61.6%)	NO
02-Offices Perimeter N	NO (-65.3%)	NO
02-Offices Perimeter S	NO (-34.5%)	NO
02-Offices Perimeter W	NO (-33%)	NO
03-Offices Internal N	NO (-84.7%)	NO
03-Offices Internal S	NO (-84.9%)	NO
03-Offices Perimeter E	NO (-52.5%)	NO
03-Offices Perimeter N	NO (-58.6%)	NO
03-Offices Perimeter S	NO (-31.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03-Offices Perimeter W	NO (-32.1%)	NO
04-Offices Internal S	NO (-80.6%)	NO
04-Offices Internal S	NO (-78.8%)	NO
04-Offices Perimeter E	NO (-41.2%)	NO
04-Offices Perimeter N	NO (-51.6%)	NO
04-Offices Perimeter S	NO (-28.8%)	NO
04-Offices Perimeter W	NO (-30.9%)	NO
05-Offices Internal	NO (-71.7%)	NO
05-Offices Perimeter E	NO (-38.5%)	NO
05-Offices Perimeter N	NO (-40.7%)	NO
05-Offices Perimeter S	NO (-21.8%)	NO
05-Offices Perimeter W	NO (-30.2%)	NO
06-Amenity Space	N/A	N/A
B1-Showers	N/A	N/A
B1-Showers	N/A	N/A
00-Reception	NO (-80.8%)	NO
00-Reception Perimeter W	NO (-46.4%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	14779	14779
External area [m²]	11325.8	11325.8
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	4900.1	4829.4
Average U-value [W/m²K]	0.43	0.43
Alpha value* [%]	10.22	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
100	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	1.67	1.45
Cooling	5.69	6.86
Auxiliary	9.52	9.81
Lighting	9.78	19.63
Hot water	3.79	4.37
Equipment*	45.45	45.45
TOTAL **	30.44	42.12

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
 ** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0.83	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.86	106.96
Primary energy* [kWh/m ²]	107.48	143.53
Total emissions [kg/m ²]	15	21.3

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	25.2	89	2.1	7.5	12.5	3.29	3.27	3.58	4.11
Notional	0	0	0	0	0	0	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	35.6	0	2.9	0	3	3.36	0	3.58	0
Notional	16.5	124.2	1.8	9.1	12.9	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	0	0	0	0	0	3.36	0	3.58	0
Notional	41.3	0	4.5	0	2.6	2.56	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	2.56	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	SP000003:Surf[2]
Floor	0.2	0.16	SP000009:Surf[0]
Roof	0.15	0.16	02000016:Surf[0]
Windows, roof windows, and rooflights	1.5	1.27	SP000003:Surf[0]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



Project name

St Pancras Commercial Centre-RETAIL - BE GREEN As designed

Date: Mon Jul 15 11:26:53 2019

Administrative information

Building Details

Address: St Pancras Way, London, GVQ 7QH

Owner Details

Name: Camden Property Holdings Limited

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.10

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.10

BRUKL compliance check version: v5.4.b.0

Certifier details

Name: NDY

Telephone number: +44 20 7553 9494

Address: 4 Chiswell Street,, London, EC1Y 4UP

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	61.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	61.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	60.6
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	SP000016:Surf[1]
Floor	0.25	0.16	0.16	SP000016:Surf[0]
Roof	0.25	0.16	0.16	00000019:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.27	1.27	00000019:Surf[2]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- 2.2 St Pancras Campus-Retail-BE GREEN

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3	0	0	0.75
Standard value	2.5*	3.2	N/A	N/A	0.5

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
00-Retail Unit 1 - Office		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 2		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 3		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 1 - Food preparation area		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 1 Internal		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 1 Perimeter S		-	1.6	0	-	-	-	-	-	-	-	N/A
00-Retail Unit 1 Perimeter W		-	1.6	0	-	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
00-Retail Unit 1 - Office	90	-	-	153
00-Retail Unit 1 - Toilets	-	90	-	158
00-Retail Unit 3 - Cupboard	100	-	-	11
00-Retail Unit 2 - WC	-	100	-	50
00-Retail Unit 2 - Cupboard	100	-	-	10
00-Retail Unit 2	-	90	30	1290
00-Retail Unit 3 - WC	-	100	-	66

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire 60	Lamp 60	Display lamp 22	
00-Retail Unit 3	-	-	90	30	2371
00-Retail Unit 1 - Circulation area	-	-	90	-	24
00-Retail Unit 1 - Food preparation area	-	-	90	-	601
00-Retail Unit 1 Internal	-	-	90	30	320
00-Retail Unit 1 Perimeter S	-	-	90	30	238
00-Retail Unit 1 Perimeter W	-	-	90	30	226

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-Retail Unit 1 - Office	N/A	N/A
00-Retail Unit 2	NO (-77.4%)	NO
00-Retail Unit 3	NO (-70.8%)	NO
00-Retail Unit 1 - Food preparation area	N/A	N/A
00-Retail Unit 1 Internal	NO (-68.4%)	NO
00-Retail Unit 1 Perimeter S	NO (-14.3%)	NO
00-Retail Unit 1 Perimeter W	NO (-23.6%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	777.5	777.5	50	A1/A2 Retail/Financial and Professional services
External area [m ²]	710.5	710.5	50	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	3		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	368.45	0		B8 Storage or Distribution
Average U-value [W/m ² K]	0.52	0		C1 Hotels
Alpha value* [%]	10	10		C2 Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 General Assembly and Leisure, Night Clubs, and Theatres
				Others: Passenger terminals
				Others: Emergency services
				Others: Miscellaneous 24hr activities
				Others: Car Parks 24 hrs
				Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.52	1.12
Cooling	13.37	16.71
Auxiliary	9.19	4.93
Lighting	42.77	64.82
Hot water	51.96	54.24
Equipment*	73.19	73.19
TOTAL**	119.81	141.82

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	206.62	238.26
Primary energy* [kWh/m ²]	366.17	325.15
Total emissions [kg/m ²]	60.6	61.6

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance									
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	28.9	194.1	2.7	14.4	9.9	2.94	3.74	3	5
Notional	0	0	0	0	0	0	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	11.1	245.9	1.2	18	5.3	2.56	3.79	----	----

Key to terms	
Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	SP000016:Surf[1]
Floor	0.2	0.16	SP000016:Surf[0]
Roof	0.15	0.16	00000019:Surf[1]
Windows, roof windows, and rooflights	1.5	1.27	00000019:Surf[2]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3



14 APPENDIX G: SAP REPORTS

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Reference	14103-001_Final Green	Issued on Date	12/07/2019
Block Name	St Pancras Campus - Final Green		

Assessor Details	Miss Areti Maria Makantasi, Areti Makantasi, Tel: 020 755 39494, a.makantasi@ndy.com	Assessor ID	T465-0001
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Block Compliance Report - DER

Block Reference: 14103-001_Final Green		Block Name: St Pancras Campus - Final Green		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DER (kgCO₂/m²)	TER (kgCO₂/m²)
M_01-05_Option 2-003-Green	1	87.4	17.84	24.34
M_01-04_Option 2-003_Green	1	60.8	16.79	26.06
M_01-01_Option 2-003_Green	1	81.1	17.29	23.10
M_01-03_Option 2-003_Green	1	81.1	15.36	23.85
M_01-02_Option 2-003_Green	1	55.1	17.79	27.04
A-01-01_Option 2-003-Green	1	69.2	16.89	26.50
A-01-02_Option 2-003-Green	1	89.3	14.73	22.54
A-01-03_Option 2-003-Green	1	50.7	16.09	26.78
M-02-01_Option 2-003_Green	1	81.1	14.84	20.67
M-02-02_Option 2-003_Green	1	55.1	15.12	24.49
M-02-03_Option 2-003_Green	2	81.1	13.18	21.08
M-02-04_Option 2-003_Green	2	60.8	13.94	23.38
M-02-05_Option 2-003-Green	2	87.4	15.18	21.64
A-02-01_Option 2-003-Green	2	69.2	13.97	23.99
A-02-02_Option 2-003-Green	2	89.3	12.02	20.18
A-02-03_Option 2-003-Green	2	50.7	14.82	24.47
M-04-02_Option 2-003_Green	2	60.8	18.52	26.06
M-04-03_Option 2-003-Green	2	87.4	19.20	24.34
M-04-01_Option 2-003_Green	2	209.7	10.88	19.58
A-05-01_Option 2-003-Green	2	90.4	18.89	24.31
A-05-02_Option 2-003-Green	2	122.3	14.00	19.06
Totals:	32	2729.1	327.34	493.46
Average DER = 14.89 kgCO₂/m²			PASS	
Average TER = 22.49 kgCO₂/m²				

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Compliance Report - DFEE

Block Reference: 14103-001_Final Green		Block Name: St Pancras Campus - Final Green		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DFEE (kWh/m²/yr)	TFEE (kWh/m²/yr)
M_01-05_Option 2-003-Green	1	87.4	40.38	45.56
M_01-04_Option 2-003_Green	1	60.8	33.80	42.31
M_01-01_Option 2-003_Green	1	81.1	38.52	41.06
M_01-03_Option 2-003_Green	1	81.1	38.54	41.93
M_01-02_Option 2-003_Green	1	55.1	35.49	43.93
A-01-01_Option 2-003-Green	1	69.2	44.40	48.67
A-01-02_Option 2-003-Green	1	89.3	39.87	42.19
A-01-03_Option 2-003-Green	1	50.7	38.39	40.71
M-02-01_Option 2-003_Green	1	81.1	29.49	32.98
M-02-02_Option 2-003_Green	1	55.1	26.22	35.38
M-02-03_Option 2-003_Green	2	81.1	28.77	32.71
M-02-04_Option 2-003_Green	2	60.8	24.17	33.33
M-02-05_Option 2-003-Green	2	87.4	30.79	36.65
A-02-01_Option 2-003-Green	2	69.2	35.30	40.35
A-02-02_Option 2-003-Green	2	89.3	31.15	34.33
A-02-03_Option 2-003-Green	2	50.7	29.50	32.84
M-04-02_Option 2-003_Green	2	60.8	40.34	42.31
M-04-03_Option 2-003-Green	2	87.4	46.82	45.56
M-04-01_Option 2-003_Green	2	209.7	52.37	48.49
A-05-01_Option 2-003-Green	2	90.4	47.70	48.34
A-05-02_Option 2-003-Green	2	122.3	41.61	37.58
Totals:	32	2729.1	773.61	847.23
Average DFEE = 39.02 kWh/m²/yr			PASS	
Average TFEE = 40.94 kWh/m²/yr				

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Reference	St Pancras Campus - Final Lean	Issued on Date	12/07/2019
Block Name	St Pancras Campus - Final Lean		

Assessor Details	Miss Areti Maria Makantasi, Areti Makantasi, Tel: 020 755 39494, a.makantasi@ndy.com	Assessor ID	T465-0001
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Client	
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Block Compliance Report - DER

Block Reference: St Pancras Campus - Final Lean		Block Name: St Pancras Campus - Final Lean		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DER (kgCO ₂ /m²)	TER (kgCO ₂ /m²)
000027-003-Green	1	87.4	13.65	16.96
000028-003_Green	1	60.8	13.76	17.99
000029-003_Green	1	81.1	13.04	16.03
000030-003_Green	1	81.1	14.38	16.94
000031-003_Green	1	55.1	14.35	18.47
000032-003-Green	1	69.2	15.27	18.24
000033-003-Green	1	89.3	13.07	15.65
000034-003-Green	1	50.7	14.86	18.07
000035-003_Green	1	81.1	11.36	14.43
000036-003_Green	1	55.1	12.56	16.78
000037-003_Green	2	81.1	11.92	15.13
000038-003_Green	2	60.8	11.93	16.21
000039-003-Green	2	87.4	11.63	15.20
000040-003-Green	2	69.2	13.34	16.59
000041-003-Green	2	89.3	11.27	14.10
000042-003-Green	2	50.7	13.17	16.51
000043-003_Green	2	60.8	15.17	17.99
000044-003-Green	2	87.4	15.10	16.96
000045-003_Green	2	209.7	12.72	13.40
000046-003-Green	2	90.4	15.56	16.83
000047-003-Green	2	122.3	11.96	13.29
Totals:	32	2729.1	280.07	341.76
Average DER = 13.12 kgCO ₂ /m²			PASS	
Average TER = 15.60 kgCO ₂ /m²				

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)



Block Compliance Report - DFEE

Block Reference: St Pancras Campus - Final Lean		Block Name: St Pancras Campus - Final Lean		
Property-Assessment Reference	Multiplier	Floor Area (m²)	DFEE (kWh/m²/yr)	TFEE (kWh/m²/yr)
000027-003-Green	1	87.4	37.50	45.56
000028-003_Green	1	60.8	32.08	42.31
000029-003_Green	1	81.1	33.98	41.06
000030-003_Green	1	81.1	38.54	41.93
000031-003_Green	1	55.1	33.51	43.93
000032-003-Green	1	69.2	41.14	48.67
000033-003-Green	1	89.3	35.51	42.19
000034-003-Green	1	50.7	33.48	40.71
000035-003_Green	1	81.1	25.73	32.98
000036-003_Green	1	55.1	23.56	35.38
000037-003_Green	2	81.1	27.50	32.71
000038-003_Green	2	60.8	21.96	33.33
000039-003-Green	2	87.4	28.31	36.65
000040-003-Green	2	69.2	32.57	40.35
000041-003-Green	2	89.3	27.55	34.33
000042-003-Green	2	50.7	25.48	32.84
000043-003_Green	2	60.8	38.40	42.31
000044-003-Green	2	87.4	43.75	45.56
000045-003_Green	2	209.7	48.69	48.49
000046-003-Green	2	90.4	47.16	48.34
000047-003-Green	2	122.3	36.94	37.58
Totals:	32	2729.1	713.36	847.23
Average DFEE = 36.07 kWh/m²/yr			PASS	
Average TFEE = 40.94 kWh/m²/yr				



15 APPENDIX H: GLA SPREADSHEET

GLA spreadsheet- Baseline: Part L 2013 of the Building regulations Compliant Development

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFE.										SAP 2012 CO2 PERFORMANCE								SAP10 CO2 PERFORMANCE								
DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																										
Use	Area per unit (m²)	Number of units	REGULATED ENERGY CONSUMPTION (TER WORKSHEET) PER UNIT PER ANNUM							REGULATED CO2 EMISSIONS PER UNIT								REGULATED CO2 EMISSIONS PER UNIT							Fabric Energy Efficiency (FEE)	
			Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated TER 2012 (kgCO2 / m2)	TER Worksheet TER 2012 (kgCO2 / m2)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated TER SAP10 (kgCO2 / m2)	Target Fabric Energy Efficiency (TFEE) (kWh/m²)	
M-01-03	81	2	2798.8057	Natural Gas	2394.1476	Natural Gas	410.1093	75	0	605	517	213	39	0	1,373	17.0		588	503	96	17	0	1,204	14.9		
A-02-03	122	3	3645.2217	Natural Gas	2603.4902	Natural Gas	456.2478	75	0	787	562	237	39	0	1,625	13.3		765	547	106	17	0	1,436	11.8		
M-01-01	81	3	2595.6623	Natural Gas	2403.3068	Natural Gas	349.3557	75	0	561	519	181	39	0	1,300	16.0		545	505	81	17	0	1,149	14.2		
M-01-04	61	3	2065.6745	Natural Gas	2112.9153	Natural Gas	293.9798	75	0	446	456	153	39	0	1,094	17.9		434	444	68	17	0	963	15.8		
M-01-02	55	3	1903.1556	Natural Gas	2014.9318	Natural Gas	254.8994	75	0	411	435	132	39	0	1,018	18.5		400	423	59	17	0	900	16.4		
A-05-01	90	3	3484.3796	Natural Gas	2473.5111	Natural Gas	377.5667	75	0	753	534	196	39	0	1,522	16.9		732	519	88	17	0	1,357	15.1		
M-04-01	210	3	8734.8322	Natural Gas	2634.5982	Natural Gas	606.1486	75	0	1,887	569	315	39	0	2,809	13.4		1,834	553	141	17	0	2,546	12.1		
M-02-05	87	3	3283.473	Natural Gas	2448.7984	Natural Gas	395.2232	75	0	709	529	205	39	0	1,482	17.0		690	514	92	17	0	1,313	15.1		
M-04-02	61	3	2065.6745	Natural Gas	2112.9153	Natural Gas	293.9798	75	0	446	456	153	39	0	1,094	17.9		434	444	68	17	0	963	15.8		
A-02-03	51	3	1176.3209	Natural Gas	1955.5756	Natural Gas	234.6717	75	0	254	422	122	39	0	837	16.4		247	411	55	17	0	730	14.3		
A-02-02	89	3	2260.7683	Natural Gas	2489.6578	Natural Gas	374.3742	75	0	488	538	194	39	0	1,259	14.1		475	523	87	17	0	1,102	12.4		
Sum	2,883	32	99,243	N/A	74,537	N/A	11,730	2,400	0	21,437	16,100	6,088	1,246	0	44,870	15.6	-	20,841	15,653	2,733	559	0	39,786	13.8		0
NON-DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																										
Use	Area per unit (m²)	Number of units	REGULATED ENERGY CONSUMPTION PER UNIT PER SQM PER ANNUM							REGULATED CO2 EMISSIONS PER UNIT							REGULATED CO2 EMISSIONS PER UNIT									
			Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated TER 2012 (kgCO2 / m2)	BRUKL TER 2012 (kgCO2 / m2)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	BRUKL TER SAP10 (kgCO2 / m2)		
OFFICES	14,779.00	1	4.311	Natural Gas	12.978	Natural Gas	19.6297	9.80834	6.85968	13,762	41,429	150,566	75,233	52,616	333,605	22.6	22.1	13,380	40,278	67,595	33,775	23,621	178,649	12.1		
RETAIL	777.507	1	3.32404	Natural Gas	54.2421	Natural Gas	64.8179	4.92662	16.7088	558	9,110	26,156	1,988	6,742	44,554	57.3	56.2	543	8,856	11,742	893	3,027	25,061	32.2		
LIGHT INDUSTRY U	2947.9	1	9.85546	Natural Gas	1.66486	Natural Gas	16.1606	0.891323	0.379032	6,275	1,060	24,725	1,364	580	34,004	11.5	11.3	6,101	1,031	11,100	612	260	19,104	6.5		
Sum	18,504		95,350	N/A	238,883	N/A	388,144	151,415	115,488	20,596	51,599	201,446	78,585	59,938	412,164	22.3	-	20,023	50,165	90,437	35,280	26,909	222,815	12.0		
SITE-WIDE ENERGY CONSUMPTION AND CO 2 ANALYSIS																										
Use	Total Area (m²)	Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated TER 2012 (kgCO2 / m2)	-	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated TER SAP10 (kgCO2 / m2)			
Sum	21,387	194,593		313,421		399,873	153,815	115,488	42,032	67,699	207,534	79,830	59,938	457,033	21.4	-	40,864	65,818	93,170	35,839	26,909	262,601	12.3			



GLA spreadsheet – Be Lean

The applicant should complete all the light blue cells including information on the 'be clean' energy consumption figures and the 'be clean' DER.												SAP 2012 CO2 PERFORMANCE										SAP10 CO2 PERFORMANCE	
DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																							
Use	Area per flat (m²)	Number of units	REGULATED ENERGY CONSUMPTION ('BE CLEAN' DER WORKSHEET) PER UNIT PER ANNUM										REGULATED CO2 EMISSIONS PER UNIT										REGULATED CO2 EMISSIONS PER UNIT
			Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP (kWh p.a.)	Fuel type CHP	Electricity generated by CHP (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Space Heating and DHW from CHP CO2 emissions (kgCO2 p.a.)	Electricity generated by CHP CO2 savings (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated DER 2012 (kgCO2 / m2)	DER Worksheet DER 2012 (kgCO2 / m2)	Calculated DER SAP10 (kgCO2 / m2)
M-01-03	81	2	1659.7436	Natural Gas	2222.5068	Natural Gas	0	0	408.9311	221.7001	0	359	480		0	212	115	0	1,166	14.4		11.9	
A-02-03	122	3	2451.9581	Natural Gas	2417.096	Natural Gas	0	0	456.2478	319.0866	0	530	522		0	237	166	0	1,454	11.9		9.9	
M-01-01	81	3	1302.2278	Natural Gas	2222.5068	Natural Gas	0	0	349.3557	221.7001	0	281	480		0	181	115	0	1,058	13.1		10.8	
M-01-04	61	3	794.8974	Natural Gas	1953.4863	Natural Gas	0	0	293.9798	173.716	0	172	422		0	153	90	0	836	13.7		11.2	
M-01-02	55	3	802.1128	Natural Gas	1860.5401	Natural Gas	0	0	254.8994	160.2426	0	173	402		0	132	83	0	791	14.4		11.9	
A-05-01	90	3	2718.1201	Natural Gas	2299.3781	Natural Gas	0	0	377.5667	243.683	0	587	497		0	196	126	0	1,406	15.6		13.3	
M-04-01	210	3	7142.3687	Natural Gas	2482.6494	Natural Gas	0	0	606.1486	525.6784	0	1,543	536		0	315	273	0	2,666	12.7		10.9	
M-02-05	87	3	2315.9316	Natural Gas	2277.5234	Natural Gas	0	0	236.5918	395.2232	0	500	492		0	123	205	0	1,320	15.2		12.8	
M-04-02	61	3	1194.0222	Natural Gas	1953.4863	Natural Gas	0	0	293.9798	173.716	0	258	422		0	153	90	0	923	15.1		12.6	
A-02-03	51	3	379.9283	Natural Gas	1787.0529	Natural Gas	0	0	234.6717	149.8421	0	82	386		0	122	78	0	668	13.1		10.7	
A-02-02	89	3	890.2491	Natural Gas	2291.6339	Natural Gas	0	0	374.3742	241.0829	0	192	495		0	194	125	0	1,007	11.3		9.1	
Sum	2,883	32	63,295	N/A	69,081	N/A	0	N/A	0	11,251	8,255	0	13,672	14,922	0	0	5,839	4,285	0	38,717	13.4	-	11.2
NON-DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																							
Use	Area per unit (m²)	Number of units	REGULATED ENERGY CONSUMPTION PER UNIT PER SQM PER ANNUM										REGULATED CO2 EMISSIONS PER UNIT										REGULATED CO2 EMISSIONS PER UNIT
			Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water			Electricity generated by CHP (kWh/m² p.a.) if applicable	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)		Electricity generated by CHP CO2 savings (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated BER 2012 (kgCO2 / m2)	BRUKL BER 2012 (kgCO2 / m2)	BRUKL BER SAP10 (kgCO2 / m2)
OFFICES	14779	1	6.58519	Natural Gas	13.9168	Natural Gas	N/A	N/A	0	9.77561	9.51628	5.68749	21,022	44,426	N/A	0	74,982	72,993	43,625	257,047	17.4	20.1	10.1
RETAIL	777.507	1	8.32156	Natural Gas	57.0974	Natural Gas			0	42.7662	9.18805	13.3712	1,398	9,589		0	17,257	3,708	5,396	37,347	48.0	54.0	29.0
LIGHT INDUSTI	2947.9	1	6.94944	Natural Gas	1.75248	Natural Gas			0	13.2747	1.66891	0.658676	4,425	1,116		0	20,310	2,553	1,008	29,412	10.0		5.5
Sum	18,504		124,279	N/A	255,236	N/A			0	216,857	152,705	96,393	26,844	55,131		0	112,549	79,254	50,028	323,806	17.5	-	10.2
SITE-WIDE ENERGY CONSUMPTION AND CO 2 ANALYSIS																							
Use	Total Area (m²)	REGULATED ENERGY CONSUMPTION										REGULATED CO2 EMISSIONS										REGULATED CO2 EMISSIONS PER UNIT	
		Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Space and Domestic Hot Water from CHP (kWh p.a.)	N/A	Electricity generated by CHP (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Space Heating and DHW from CHP CO2 emissions (kgCO2 p.a.)	Electricity generated by CHP CO2 savings (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated BER 2012 (kgCO2 / m2)	-	Calculated BER SAP10 (kgCO2 / m2)	
Sum	21,387	187,574		324,317		0		0	228,109	160,960	96,393	40,516	70,053	0	0	118,388	83,538	50,028	362,523	17.0	-	10.3	



GLA spreadsheet – Be Clean

										2012 CO2 PERFORMANCE		2019 CO2 PERFORMANCE																					
										SAP 2012 CO2 PERFORMANCE		SAP10 CO2 PERFORMANCE																					
The applicant should complete all the light blue cells including information on the 'be lean' energy consumption figures, the 'be lean' DER, the DFEE and the regulated energy demand of the 'be lean' scenario.																																	
DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																																	
Use	Area per flat (m²)	Number of units	REGULATED ENERGY CONSUMPTION ('BE LEAN' DER WORKSHEET) PER UNIT PER ANNUM							REGULATED CO2 EMISSIONS PER UNIT		REGULATED CO2 EMISSIONS PER UNIT							Fabric Energy Efficiency (FEE)		REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)												
			Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Calculated DER 2012 (kgCO2 / m2)	DER Worksheet DER 2012 (kgCO2 / m2)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated DER SAP10 (kgCO2 / m2)	Dwelling Fabric Energy Efficiency (DFEE) (kWh/m²)	Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)									
M-01-03	81	2	1659.7436	Natural Gas	2222.5068	Natural Gas	408.9311	221.7001	0	14.4		349	467	95	52	0	962	11.9															
A-02-03	122	3	2451.9581	Natural Gas	2417.096	Natural Gas	456.2478	319.0866	0	11.9		515	508	106	74	0	1,203	9.9															
M-01-01	81	3	1302.2278	Natural Gas	2222.5068	Natural Gas	349.3557	221.7001	0	13.1		273	467	81	52	0	873	10.8															
M-01-04	61	3	794.8974	Natural Gas	1953.4863	Natural Gas	293.9798	173.716	0	13.7		167	410	68	40	0	686	11.2															
M-01-02	55	3	802.1128	Natural Gas	1860.5401	Natural Gas	254.8994	160.2426	0	14.4		168	391	59	37	0	656	11.9															
A-05-01	90	3	2718.1201	Natural Gas	2299.3781	Natural Gas	377.5667	243.683	0	15.6		571	483	88	57	0	1,198	13.3															
M-04-01	210	3	7142.3687	Natural Gas	2482.6494	Natural Gas	606.1486	525.6784	0	12.7		1,500	521	141	122	0	2,285	10.9															
M-02-05	87	3	2315.9316	Natural Gas	2277.5234	Natural Gas	236.5918	395.2232	0	15.2		486	478	55	92	0	1,112	12.8															
M-04-02	61	3	1194.0222	Natural Gas	1953.4863	Natural Gas	293.9798	173.716	0	15.1		251	410	68	40	0	770	12.6															
A-02-03	51	3	379.9283	Natural Gas	1787.0529	Natural Gas	234.6717	149.8421	0	13.1		80	375	55	35	0	545	10.7															
A-02-02	89	3	890.2491	Natural Gas	2291.6339	Natural Gas	374.3742	241.0829	0	11.3		187	481	87	56	0	812	9.1															
Sum	2,883	32	63,295	N/A	69,081	N/A	11,251	8,255	0	13.4	-	13,292	14,507	2,622	1,923	0	32,344	11.2	0	0	0	0	0	0									
NON-DOMESTIC ENERGY CONSUMPTION AND CO 2 ANALYSIS																																	
Use	Area per unit (m²)	Number of units	REGULATED ENERGY CONSUMPTION PER UNIT PER SQM PER ANNUM							REGULATED CO2 EMISSIONS PER UNIT		REGULATED CO2 EMISSIONS PER UNIT								REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)													
			Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Calculated BER 2012 (kgCO2 / m2)	BRUKL BER 2012 (kgCO2 / m2)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	BRUKL BER SAP10 (kgCO2 / m2)		Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)									
OFFICES	14779	1	6.58519	Natural Gas	13.9168	Natural Gas	9.77561	9.51628	5.68749	17.4	17.4	20,438	43,192	33,662	32,769	19,585	149,646	10.1	N/A														
RETAIL	777.507	1	8.32156	Natural Gas	57.0974	Natural Gas	42.7662	9.18805	13.3712	48.0	47.2	1,359	9,323	7,747	1,664	2,422	22,516	29.0															
LIGHT INDUSTRY	2947.9	1	6.94944	Natural Gas	1.75248	Natural Gas	13.2747	1.66891	0.658676	10.0	9.8	4,302	1,085	9,118	1,146	452	16,104	5.5															
Sum	18,504		124,279	N/A	255,236	N/A	216,857	152,705	96,393	17.5	-	26,099	53,600	50,528	35,580	22,460	188,266	10.2		0	0	0	0	0									
SITE-WIDE ENERGY CONSUMPTION AND CO 2 ANALYSIS																																	
Use	Total Area (m²)	REGULATED ENERGY CONSUMPTION							REGULATED CO2 EMISSIONS		REGULATED CO2 EMISSIONS PER UNIT								REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.)														
		Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Calculated BER 2012 (kgCO2 / m2)	-	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	SAP10 CO2 emissions (kgCO2 p.a.)	Calculated BER SAP10 (kgCO2 / m2)		Space Heating (kWh p.a.)	Domestic Hot Water (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)										
Sum	21,387	187,574		324,317		228,109	160,960	96,393	17.0	-	39,390	68,107	53,149	37,504	22,460	220,610	10.3		0	0	0	0	0										



GLA spreadsheet – Be Green

The applicant should complete all the light blue cells including information on the 'be green' energy consumption figures and the 'be green' DER.													SAP 2012 CO2 PERFORMANCE										SAP10 CO2 PERFORMANCE		
DOMESTIC ENERGY CONSUMPTION AND CO2 ANALYSIS																									
Use	Area per flat (m²)	Number of units	REGULATED ENERGY CONSUMPTION ('BE GREEN' DER WORKSHEET) PER UNIT PER ANNUM										REGULATED CO2 EMISSIONS PER UNIT										REGULATED CO2 EMISSIONS PER UNIT		
			Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP (kWh p.a.) if applicable	Fuel type CHP if applicable	Electricity generated by CHP (kWh p.a.) if applicable	Electricity generated by renewable (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Space Heating and DHW from CHP CO2 emissions (kgCO2 p.a.) if applicable	Electricity generated by CHP CO2 savings (kgCO2 p.a.) if applicable	Electricity generated by renewable (kWh p.a.) if applicable	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated DER 2012 (kgCO2 / m2)	DER Worksheet DER 2012 (kgCO2 / m2)	Calculated DER SAP10 (kgCO2 / m2)
M-01-03	81	2	840.8915	Grid Electricity	908.581	Grid Electricity	0		0	0	408.9311	241.7001	0	436	472		0	0	212	125	0	1,246	15.4		6.9
A-02-03	122	3	1015.1105	Grid Electricity	17.86	Grid Electricity	0		0	0	234.6717	169.8421	0	527	9		0	0	122	88	0	746	6.1		2.7
M-01-01	81	3	1138.6587	Grid Electricity	971.9038	Grid Electricity	0		0	0	349.1795	241.7001	0	591	504		0	0	181	125	0	1,402	17.3		7.8
M-01-04	61	3	561.8555	Grid Electricity	918.1196	Grid Electricity	0		0	0	293.0867	193.716	0	292	477		0	0	152	101	0	1,021	16.7		7.5
M-01-02	55	3	573.0758	Grid Electricity	881.3602	Grid Electricity	0		0	0	254.4971	180.2426	0	297	457		0	0	132	94	0	980	17.8		8.0
A-05-01	90	3	2575.4699	Grid Electricity	45.3283	Grid Electricity	0		0	0	377.5667	263.683	0	1,337	24		0	0	196	137	0	1,693	18.8		8.4
M-04-01	210	3	2146.2006	Grid Electricity	1097.5514	Grid Electricity	0		0	0	605.0482	545.6784	0	1,114	570		0	0	314	283	0	2,281	10.9		4.9
M-02-05	87	3	909.3209	Grid Electricity	996.1498	Grid Electricity	0		0	0	394.0112	256.5918	0	472	517		0	0	204	133	0	1,327	15.2		6.8
M-04-02	61	3	764.0816	Grid Electricity	918.1196	Grid Electricity	0		0	0	293.0867	193.716	0	397	477		0	0	152	101	0	1,126	18.5		8.3
A-02-03	51	3	1015.1105	Grid Electricity	17.86	Grid Electricity	0		0	0	234.6717	169.8421	0	527	9		0	0	122	88	0	746	14.6		6.6
A-02-02	89	3	1394.2293	Grid Electricity	24.5384	Grid Electricity	0		0	0	374.3742	261.0829	0	724	13		0	0	194	136	0	1,066	12.0		5.4
Sum	2,883	32	37,961	N/A	19,484	N/A	0	N/A	0	0	11,048	7,912	0	19,702	10,112	0	0	0	5,734	4,106	0	39,654	13.8	-	6.2
NON-DOMESTIC ENERGY CONSUMPTION AND CO2 ANALYSIS																									
Use	Area per unit (m²)	Number of units	REGULATED ENERGY CONSUMPTION PER UNIT PER SQM PER ANNUM										REGULATED CO2 EMISSIONS PER UNIT										REGULATED CO2 EMISSIONS PER UNIT		
			Space Heating (kWh/m² p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh/m² p.a.)	Fuel type Domestic Hot Water			Electricity generated by CHP (kWh/m² p.a.) if applicable	Electricity generated by renewable (kWh/m² p.a.) if applicable	Lighting (kWh/m² p.a.)	Auxiliary (kWh/m² p.a.)	Cooling (kWh/m² p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)		Electricity generated by CHP CO2 savings (kgCO2 p.a.) if applicable	Electricity generated by renewable CO2 savings (kgCO2 p.a.) if applicable	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated BER 2012 (kgCO2 / m2)	BRUKL BER 2012 (kgCO2 / m2)	BRUKL BER SAP10 (kgCO2 / m2)
OFFICES	14779	1	1.67388	Grid Electricity	3.79154	Grid Electricity				-0.826984	9.77561	9.51628	5.68749	12,839	29,082			-6,343	74,982	72,993	43,625	#VALUE!			6.9
RETAIL	777.507	1	2.52424	Grid Electricity	51.9582	Grid Electricity					42.7662	9.18805	13.3712	1,019	20,966				17,257	3,708	5,396	#VALUE!			27.9
LIGHT INDUST	2947.9	1	2.10802	Grid Electricity	1.59477	Grid Electricity					13.2747	1.66891	0.658676	3,225	2,440				20,310	2,553	1,008	#VALUE!			4.5
Sum	18,504		32,915	N/A	101,134	N/A			0	-12,222	216,857	152,705	96,393	17,083	52,489		0	-6,343	112,549	79,254	50,028	#VALUE!	#VALUE!	-	7.4
SITE-WIDE ENERGY CONSUMPTION AND CO2 ANALYSIS																									
Use	Total Area (m²)	REGULATED CO2 EMISSIONS										REGULATED CO2 EMISSIONS										REGULATED CO2 EMISSIONS PER			
		Space Heating (kWh p.a.)	N/A	Domestic Hot Water (kWh p.a.)	N/A	Space and Domestic Hot Water from CHP (kWh p.a.)	N/A	Electricity generated by CHP (kWh p.a.) if applicable	Electricity generated by renewable (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	Space Heating CO2 emissions (kgCO2 p.a.)	Domestic Hot Water CO2 emissions (kgCO2 p.a.)	Space Heating and DHW from CHP CO2 emissions (domestic) (kgCO2 p.a.) if applicable	Electricity generated by CHP CO2 savings (kgCO2 p.a.) if applicable	Electricity generated by renewable CO2 savings (kgCO2 p.a.) if applicable	Lighting CO2 emissions (kgCO2 p.a.)	Auxiliary CO2 emissions (kgCO2 p.a.)	Cooling CO2 emissions (kgCO2 p.a.)	2012 CO2 emissions (kgCO2 p.a.)	Calculated BER 2012 (kgCO2 / m2)	-	Calculated BER SAP10 (kgCO2 / m2)	
Sum	21,387	70,876		120,618		0		0	-12,222	227,906	160,616	96,393	36,785	62,601	0	0	-6,343	118,283	83,360	50,028	#VALUE!	#VALUE!	-	7.2	



SAP 2012 PERFORMANCE

DOMESTIC

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	45	
After energy demand reduction	39	
After heat network / CHP	39	
After renewable energy	40	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO2 per annum)	(%)
Savings from energy demand reduction	6	14%
Savings from heat network / CHP	0	0%
Savings from renewable energy	-1	-2%
Cumulative on site savings	5	12%
Annual savings from off-set payment	40	-
	(Tonnes CO2)	
Cumulative savings for off-set payment	1,190	-
Cash in-lieu contribution (£)	71,377	

SAP10 PERFORMANCE

DOMESTIC

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	40	1
After energy demand reduction	32	1
After heat network / CHP	32	1
After renewable energy	18	1

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO2 per annum)	(%)
Savings from energy demand reduction	7	19%
Savings from heat network / CHP	0	0%
Savings from renewable energy	15	37%
Cumulative on site savings	22	55%
Annual savings from off-set payment	18	-
	(Tonnes CO2)	
Cumulative savings for off-set payment	534	-
Cash in-lieu contribution (£)	32,044	



NON-DOMESTIC

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	412	
After energy demand reduction	324	
After heat network / CHP	324	
After renewable energy	#VALUE!	

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO2 per annum)	(%)
Savings from energy demand reduction	88	21%
Savings from heat network / CHP	0	0%
Savings from renewable energy	#VALUE!	#VALUE!
Total Cumulative Savings	#VALUE!	#VALUE!

Table 5: Shortfall in regulated carbon dioxide savings

	Annual Shortfall (Tonnes CO2)	Cumulative Shortfall (Tonnes CO2)
Total Target Savings	144	-
Shortfall	#VALUE!	#VALUE!
Cash-in lieu contribution	#VALUE!	-

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	223	181
After energy demand reduction	188	181
After heat network / CHP	188	181
After renewable energy	137	181

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO2 per annum)	(%)
Savings from energy demand reduction	35	16%
Savings from heat network / CHP	0	0%
Savings from renewable energy	51	23%
Total Cumulative Savings	86	39%

Table 5: Shortfall in regulated carbon dioxide savings

	Annual Shortfall (Tonnes CO2)	Cumulative Shortfall (Tonnes CO2)
Total Target Savings	78	-
Shortfall	-8	-236
Cash-in lieu contribution	-14,177	-

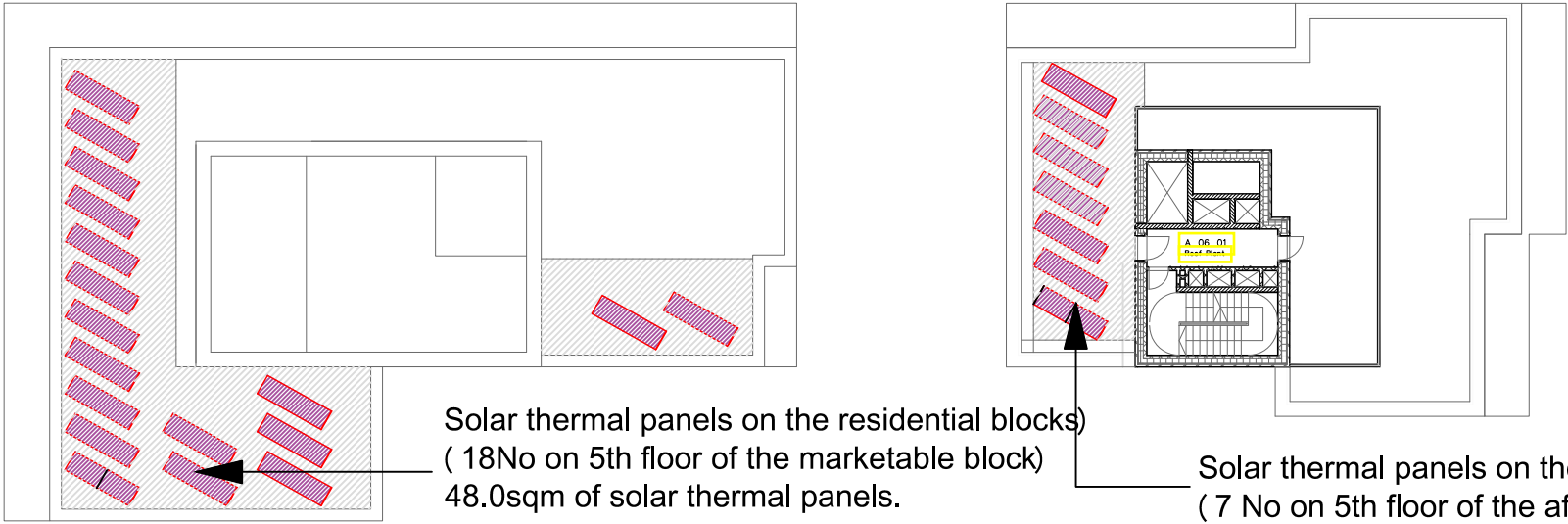
SITE-WIDE

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	437		
Be lean	363	95	21%
Be clean	363	0	0%
Be green	#VALUE!	#VALUE!	#VALUE!
	-	CO2 savings off-set (Tonnes CO2)	-
Off-set	-	#VALUE!	-

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Part L 2013 baseline	263		
Be lean	221	42	16%
Be clean	221	0	0%
Be green	135	66	25%
	-	CO2 savings off-set (Tonnes CO2)	-
Off-set	-	298	-

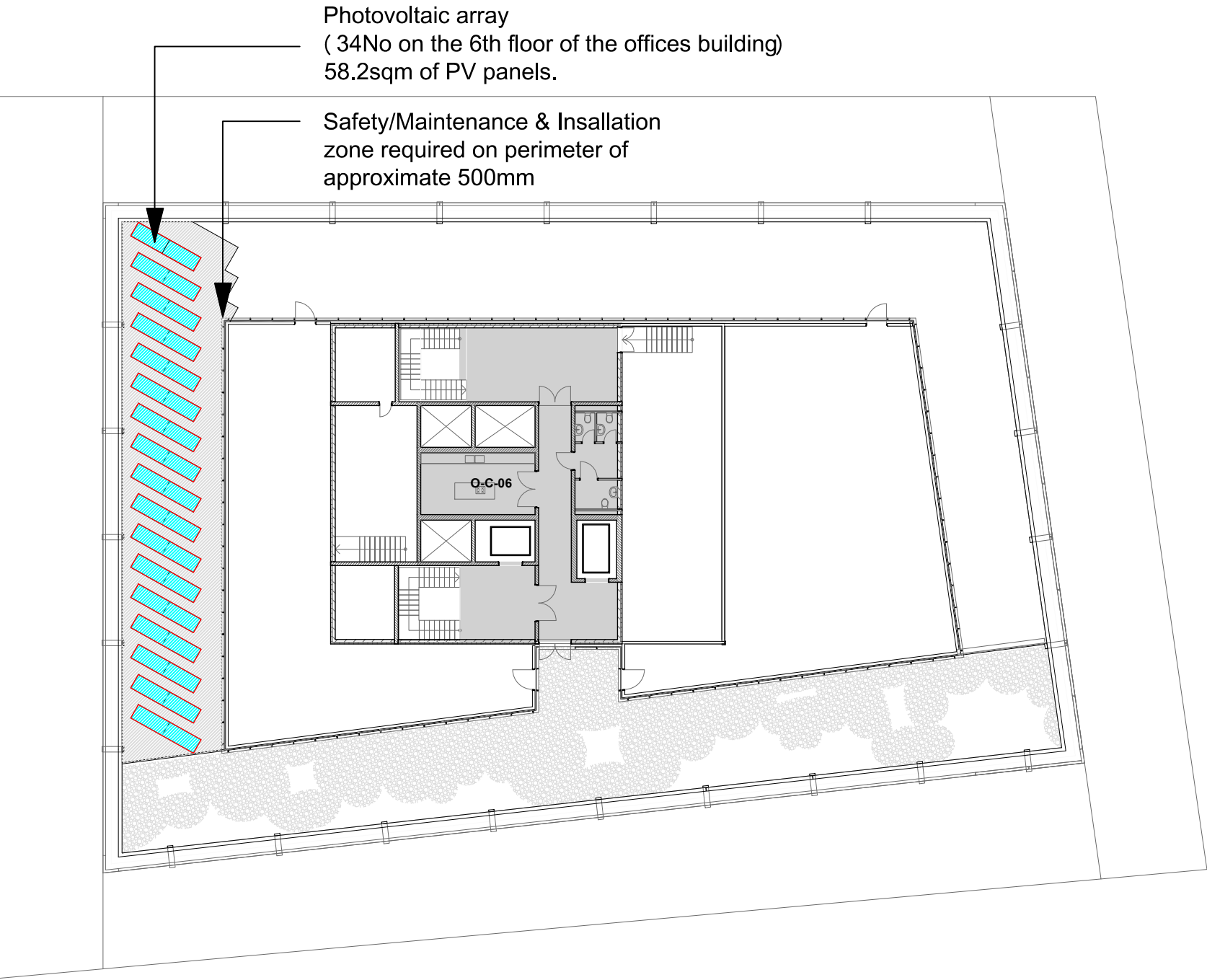


16 APPENDIX I: DRAWINGS SHOWING LOCATION OF PROPOSED PHOTOVOLTAIC PANELS AND SOLAR THERMAL



Solar thermal panels on the residential blocks)
(18No on 5th floor of the marketable block)
48.0sqm of solar thermal panels.

Solar thermal panels on the residential blocks)
(7 No on 5th floor of the afortable block
18.7 sqm of solar thermal panels.



Photovoltaic array
(34No on the 6th floor of the offices building)
58.2sqm of PV panels.

Safety/Maintenance & Insallation
zone required on perimeter of
approximate 500mm

NDY-Marked up drawing showing the indicative
areas for PVs and solar thermal panels

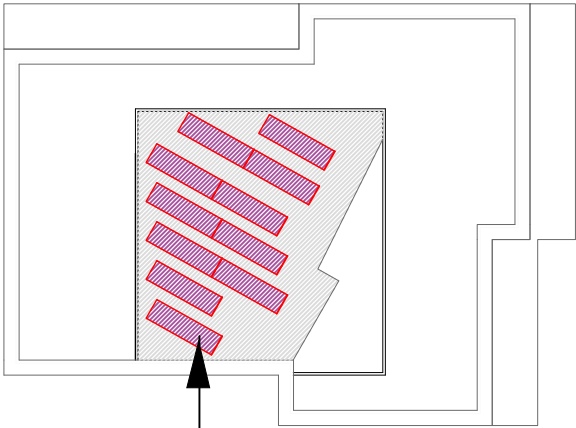
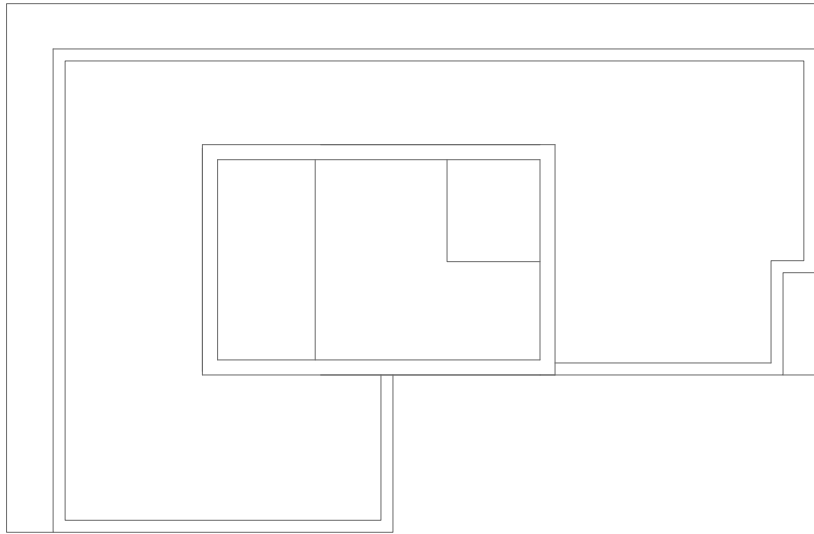
INDEX	INDEX	REVISION	NAME
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477 St Pancras Campus
Plan - Plant

477	CSJ				A	SK127		B
Project Nr.	Author	Unit	Level	Type	Discipline	Number	Status	Revision
1:200	841 x 594				03.04.19	JH		RH
Scale	Size W x H (mm)		Date		Revised	Drawn		Checked
Stage 02							±0.00	
Project phase							Project datum	
Architect: Caruso St John Architects LLP 1 Coate Street, London E2 9AG, UK, +44 (0)20 7613 3161, london@carusostjohn.com								



1:200



Solar thermal panels on the residential blocks)
(11 No on 5th floor of the afortable block)
29.3sqm of solar thermal panels.

NDY-Marked up drawing showing the indicative areas for PVs and solar thermal panels



Photovoltaic array
(35No PV panels on the 7th floor above the plantroom)
59.8sqm of PVs.

Safety/Maintenance & Installation
zone required on perimeter of
approximate 500mm

INDEX	INDEX	REVISION	NAME
a			
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477 St Pancras Campus
Plan - Plant

477	CSJ					A	SK127		B
Project Nr.	Author	Unit	Level	Type	Discipline	Number	Status	Revision	
1:200	841 x 594				03.04.19	JH	RH		
Scale	Size W x H (mm)	Date	Revised	Drawn	Checked				
Stage 02							±0.00		
Project phase							Project datum		

Architect:
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