Electricity Northwest
Whitebirk Depot
Proposed New Training Centre

Part L2A Assessment
&

Energy Statement
## Revision Record

<table>
<thead>
<tr>
<th>Date</th>
<th>Reference</th>
<th>Revision</th>
<th>Prepared By</th>
<th>Checked By</th>
</tr>
</thead>
<tbody>
<tr>
<td>03.09.12</td>
<td>893-R001</td>
<td>0</td>
<td>CPW</td>
<td>DW</td>
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<td>05.09.12</td>
<td>893-R001</td>
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1.0 Introduction

Crookes Walker Consulting Limited (CWC) have been commissioned by Electricity Northwest Limited MEPC to undertake an assessment of the Proposed New Training Centre at Whitebirk Depot, to determine compliance with the Building Regulations Part L2A (2010) and satisfy the planning requirements.

In all respects, The Proposed Training Centre satisfies the requirements of the current Building Regulations.
2.0 Building Fabric Overview

The proposed Training Centre is a 2 storey structure with a ground level plant compound. The building is generally a steel frame construction with an insulated cladding system incorporating glazing and roof lights to maximise the use of natural daylight, whilst minimising solar gain and the requirements for mechanical cooling.

The following building U Values have been employed during in the Part L Assessment;

<table>
<thead>
<tr>
<th>Element</th>
<th>U Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Floor</td>
<td>0.16 W/m²K</td>
</tr>
<tr>
<td>Walls (Cladding)</td>
<td>0.17 W/m²K</td>
</tr>
<tr>
<td>Roof</td>
<td>0.14 W/m²K</td>
</tr>
<tr>
<td>Rooflights</td>
<td>1.30 W/m²K</td>
</tr>
<tr>
<td>Glazing*</td>
<td>1.50 W/m²K</td>
</tr>
<tr>
<td>Glazed Entrance Doors</td>
<td>1.70 W/m²K</td>
</tr>
<tr>
<td>Fire Escape Doors</td>
<td>1.90 W/m²K</td>
</tr>
<tr>
<td>Roller Shutter Doors</td>
<td>1.0 W/m²K</td>
</tr>
<tr>
<td>Air Permeability</td>
<td>5 m³/hr/m²</td>
</tr>
</tbody>
</table>

* Glazing specification assumes the following performance characteristics:
  - Shading co-efficient: 0.44 (44%)
  - Light Transmission: 0.66 (66%)
3.0 Building Services Overview

For the purposes of the assessment the building services strategy have been assumed to be as follows:

Heating will be provided by electric air source heat pumps serving wet radiant panel heaters and refrigerant based heating and cooling fan coil units and room heating generally as outlined below.

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Ventilation</th>
<th>Heating Provision</th>
<th>Mechanical Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply (lt/s/person)</td>
<td>Extract</td>
<td>Other</td>
</tr>
<tr>
<td><strong>Ground Floor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance Foyer/Reception</td>
<td>Natural ventilation</td>
<td>Fan Coil Units (VRV) / Overdoor Heater</td>
<td>Fan Coil Units (VRV)</td>
</tr>
<tr>
<td>Meeting Room</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Male WC</td>
<td>5 AC/Hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female WC</td>
<td>5 AC/Hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acc. WC</td>
<td>5 AC/Hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Aid Room</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comms Room</td>
<td>Natural ventilation</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Cleaner</td>
<td>Natural ventilation</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Female Changing</td>
<td>n/a</td>
<td>6 - 10 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
</tr>
<tr>
<td>Drying Room</td>
<td>n/a</td>
<td>6 - 10 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
</tr>
<tr>
<td>Male Changing</td>
<td>n/a</td>
<td>6 - 10 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
</tr>
<tr>
<td>Trainer’s Room</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

893 - R001 Rev 1
<table>
<thead>
<tr>
<th>Floor</th>
<th>Location</th>
<th>Natural Ventilation</th>
<th>Mechanical Supply &amp; Extract Ventilation</th>
<th>Fan Coil Units (VRV)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Store</td>
<td>Natural ventilation</td>
<td>n/a</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Fitting Workshop</td>
<td>locally operated extract ventilation for fume removal</td>
<td>Natural ventilation</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Overhead Workshop</td>
<td>Natural ventilation</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jointing Workshop</td>
<td>Natural ventilation</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Ops</td>
<td>Natural ventilation</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apprentices Workshop</td>
<td>Natural ventilation</td>
<td>High Level Radiant Panel</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corridor</td>
<td>Natural ventilation</td>
<td>Air Source Heat Pump</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**First Floor**

<table>
<thead>
<tr>
<th>Classroom</th>
<th>Mechanical Supply &amp; Extract Ventilation</th>
<th>Fan Coil Units (VRV)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom 1</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>Classroom 2</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>Classroom 3</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>Classroom 04</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>Classroom 05</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>CAG Suite</td>
<td>10 lt/s/person 10 lt/s/person</td>
<td>Fan Coil Units (VRV)</td>
<td></td>
</tr>
<tr>
<td>Mess Room</td>
<td>0 0</td>
<td>Natural Ventilation</td>
<td>Air Source Heat Pump</td>
</tr>
<tr>
<td>Dining / Breakout</td>
<td>0</td>
<td>0</td>
<td>Natural Ventilation</td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
<td>---</td>
<td>---------------------</td>
</tr>
<tr>
<td>Offices</td>
<td></td>
<td></td>
<td>Natural Ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fan Coil Units (VRV)</td>
</tr>
<tr>
<td>Male WC</td>
<td>5 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
<td>Air Source Heat Pump</td>
</tr>
<tr>
<td>Female WC</td>
<td>5 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
<td>Air Source Heat Pump</td>
</tr>
<tr>
<td>Dis. WC</td>
<td>5 AC/Hr</td>
<td>Mechanical Extract Ventilation</td>
<td>Air Source Heat Pump</td>
</tr>
<tr>
<td>Corridor</td>
<td></td>
<td></td>
<td>Natural ventilation</td>
</tr>
<tr>
<td>Store</td>
<td></td>
<td></td>
<td>Natural ventilation</td>
</tr>
</tbody>
</table>

**Domestic Hot Water**

A central domestic hot water system has been assumed operating from the air source heat pump(s) with a Generator Seasonal Efficiency of 600%.

**General Lighting**

The general lighting installation will generally comprise low energy fluorescent lighting throughout the premises.

All lighting levels will be in accordance with CIBSE Guidelines and all light fittings will be selected to satisfy the technical and/or aesthetic requirements of each room and its intended purpose.

The lighting installation will be manually controlled.
4.0 Part L 2010 Results

A Part L 2A 2010 Pass is awarded whereby the Actual Emission Rate (BER) is less than or equal to the Target Emission Rate (TER).

TER (Target Emission Rate): 22.10  
BER (Actual Emission Rate): 22.10  
CO₂ Emission Compliance Result: PASS

Part L 2010 Results Screen
5.0 Sustainability Options

The following sustainable options are being considered for the project and are not currently included for within the current Part L assessment.

The feasibility of these options will be developed throughout the design stage.

**Low and Zero Carbon Energy Sources**

*Solar Hot Water*

The domestic hot water services could be provided with a solar hot water pre-heat section utilising solar hot water panels located on the south facing roof pitches to maximise solar heat absorption.

*Solar Photovoltaic Panels*

A further option to consider is the potential for Solar Photovoltaic (PV) panels located on the roof to maximise energy yield and produce electricity for use within the building or exported back into the electricity network.

**Sustainability**

*Rainwater Harvesting*

Rainwater Harvesting could be provided as an option to recycle rainwater collected from the roof of the Training Centre for storage within an underground storage tank and used for flushing WC’s.
6.0 Appendices

Appendix 1 – BRUKL Output Document

<table>
<thead>
<tr>
<th>Project name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENW Training Centre</td>
</tr>
<tr>
<td>As built</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Date: Wed Sep 05 13:11:18 2012</th>
</tr>
</thead>
</table>

**Administrative information**

<table>
<thead>
<tr>
<th>Building Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address: Whitfield Industrial Park, Blackburn,</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Certification tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation engine: SBEM</td>
</tr>
<tr>
<td>Calculation engine version: v4.1.d.0</td>
</tr>
<tr>
<td>Interface to calculation engine: Design Database</td>
</tr>
<tr>
<td>Interface to calculation engine version: v25.05</td>
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<tr>
<td>BRUKL compliance check version: v4.1.d.0</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Owner Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Information not provided by the user</td>
</tr>
<tr>
<td>Telephone number: Information not provided by the user</td>
</tr>
<tr>
<td>Address: Information not provided by the user, Information not provided by the user, Information not provided by the user</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Certifier details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Craig Paul Woods</td>
</tr>
<tr>
<td>Telephone number: 0161 834 9999</td>
</tr>
<tr>
<td>Address: Crookes Walker Consulting Ltd, Alberton House, 30 St Mary's Parsnipsge, Manchester, M3 2WJ</td>
</tr>
</tbody>
</table>

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

1.1 CO₂ emission rate from the notional building, kgCO₂/m².year

22.1

1.2 Target CO₂ emission rate (TER), kgCO₂/m².year

22.1

1.3 Building CO₂ emission rate (BER), kgCO₂/m².year

22.1

1.4 Are emissions from the building less than or equal to the target?

BER ≤ TER

1.5 Are as built details the same as used in the BER calculations?

Separate submission

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

2.a Building fabric

<table>
<thead>
<tr>
<th>Element</th>
<th><strong>U</strong>&lt;sub&gt;lim&lt;/sub&gt;</th>
<th><strong>U</strong>&lt;sub&gt;calc&lt;/sub&gt;</th>
<th><strong>U</strong>&lt;sub&gt;cal&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall**</td>
<td>0.35</td>
<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td>Floor</td>
<td>0.25</td>
<td>0.16</td>
<td>0.16</td>
</tr>
<tr>
<td>Roof</td>
<td>0.25</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Windows***, roof windows, and rooflights</td>
<td>2.2</td>
<td>1.59</td>
<td>1.7</td>
</tr>
<tr>
<td>Personnel doors</td>
<td>2.2</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Vehicle access &amp; similar large doors</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>High usage entrance doors</td>
<td>3.5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Surface where the maximum value occurs**

<table>
<thead>
<tr>
<th></th>
<th>01 Wall 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Exposed Floor 1</td>
<td></td>
</tr>
<tr>
<td>01 Exposed Roof 1</td>
<td></td>
</tr>
<tr>
<td>01 Roof 3</td>
<td></td>
</tr>
<tr>
<td>01 Door 1 (Personnel Door)</td>
<td></td>
</tr>
<tr>
<td>01 Door 2 (Vehicle Access Door)</td>
<td></td>
</tr>
</tbody>
</table>

**U**<sub>lim</sub> = Limiting area-weighted average U-values [W/(m²K)]

**U**<sub>calc</sub> = Calculated area-weighted average U-values [W/(m²K)]

**U**<sub>cal</sub> = Calculated maximum individual element U-values [W/(m²K)]

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

** 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**

<table>
<thead>
<tr>
<th>m³/(h.m²) at 50 Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worst acceptable standard</th>
<th>This building</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Page 1 of 8
2. Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

<table>
<thead>
<tr>
<th></th>
<th>Whole building lighting automatic monitoring &amp; targeting with alarms for out-of-range values</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole building electric power factor achieved by power factor correction</td>
<td>&gt;0.95</td>
</tr>
</tbody>
</table>

### 1. HVAC 1

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 2. HVAC 2

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5.25</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 3. HVAC 9

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4.95</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 4. HVAC 3

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>4.95</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 5. HVAC 9

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5.25</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 7. HVAC 8

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Cooling nominal efficiency</th>
<th>SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4.95</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO |

### 1. Default DHW

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Hot water storage loss factor [kWh/litre per day]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.143</td>
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</tbody>
</table>

### 2. Heat Pump System

<table>
<thead>
<tr>
<th>Heating seasonal efficiency</th>
<th>Hot water storage loss factor [kWh/litre per day]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.01</td>
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</table>

### Local mechanical ventilation and exhaust

<table>
<thead>
<tr>
<th>Zone</th>
<th>Supply/extract SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
<th>Exhaust SFP [W/(l/s)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
</tr>
<tr>
<td>04</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
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</table>
### Local mechanical ventilation and exhaust

<table>
<thead>
<tr>
<th>Zone</th>
<th>Supply/extract SFP [W/(l/s)]</th>
<th>HR seasonal efficiency</th>
<th>Exhaust SFP [W/(l/s)]</th>
</tr>
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<tbody>
<tr>
<td>05</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
</tr>
<tr>
<td>07</td>
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<td>-</td>
<td>0.9</td>
</tr>
<tr>
<td>25</td>
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<td>-</td>
<td>0.9</td>
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<tr>
<td>08</td>
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### General lighting and display lighting

<table>
<thead>
<tr>
<th>Zone</th>
<th>General lighting [W]</th>
<th>Display lamps efficacy [lm/W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
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<tr>
<td>02</td>
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<tr>
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<td>160</td>
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<tr>
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<td>18B</td>
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### General lighting and display lighting

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<th>Display lamps efficacy [lm/W]</th>
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<tr>
<td>37</td>
<td>390</td>
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</table>

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

<table>
<thead>
<tr>
<th>Zone</th>
<th>Solar gain limit exceeded? (%)</th>
<th>Internal blinds used?</th>
</tr>
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<tbody>
<tr>
<td>01</td>
<td>NO (-24.7%)</td>
<td>NO</td>
</tr>
<tr>
<td>02</td>
<td>NO (-12.9%)</td>
<td>NO</td>
</tr>
<tr>
<td>03A</td>
<td>NO (-3%)</td>
<td>NO</td>
</tr>
<tr>
<td>03B</td>
<td>NO (-80.9%)</td>
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</tr>
<tr>
<td>17A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>17B</td>
<td>NO (-84.5%)</td>
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</tr>
<tr>
<td>18A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>18B</td>
<td>YES (+10.5%)</td>
<td>NO</td>
</tr>
<tr>
<td>09</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>08</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>23</td>
<td>NO (-34.6%)</td>
<td>NO</td>
</tr>
<tr>
<td>24</td>
<td>NO (-63.5%)</td>
<td>NO</td>
</tr>
<tr>
<td>26</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>27</td>
<td>N/A</td>
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<tr>
<td>28</td>
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<tr>
<td>29</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12</td>
<td>NO (-36.7%)</td>
<td>NO</td>
</tr>
<tr>
<td>30</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>31</td>
<td>NO (-63.1%)</td>
<td>NO</td>
</tr>
<tr>
<td>36</td>
<td>NO (-74.2%)</td>
<td>NO</td>
</tr>
<tr>
<td>37</td>
<td>NO (-71.8%)</td>
<td>NO</td>
</tr>
</tbody>
</table>
Criterion 4: The performance of the building, as built, should be consistent with the BER
Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place
Separate submission
Technical Data Sheet (Actual vs. Notional Building)

### Building Global Parameters

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Notional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area [m²]</td>
<td>1858.3</td>
<td>1858.3</td>
</tr>
<tr>
<td>External area [m²]</td>
<td>3264.4</td>
<td>3264.4</td>
</tr>
<tr>
<td>Weather</td>
<td>MAN</td>
<td>MAN</td>
</tr>
<tr>
<td>Infiltration [m³/h·m²@50Pa]</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Average conductance [W/K]</td>
<td>916.67</td>
<td>1160.96</td>
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<tr>
<td>Average U-value [W/m²K]</td>
<td>0.28</td>
<td>0.36</td>
</tr>
<tr>
<td>Alpha value* [%]</td>
<td>134.75</td>
<td>31.66</td>
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</tbody>
</table>

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

### Building Use

<table>
<thead>
<tr>
<th>% Area Building Type</th>
<th>Actual</th>
<th>Notional</th>
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</thead>
<tbody>
<tr>
<td>A1/A2 Retail/Financial and Professional services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 B1 Offices and Workshop businesses</td>
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<td></td>
</tr>
<tr>
<td>58 B2 to B7 General Industrial and Special Industrial Groups</td>
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<td></td>
</tr>
<tr>
<td>S8 Storage or Distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1 Hotels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 Residential Inst.: Hospitals and Care Homes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 Residential Inst.: Residential schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 Residential Inst.: Universities and colleges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2A Secure Residential Inst.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 Non-residential Inst.: Community/Day Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 Non-residential Inst.: Libraries, Museums, and Galleries</td>
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<td></td>
</tr>
<tr>
<td>D1 Non-residential Inst.: Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 Non-residential Inst.: Primary Health Care Building</td>
<td></td>
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</tr>
<tr>
<td>D1 Non-residential Inst.: Crown and County Courts</td>
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</tr>
<tr>
<td>D2 General Assembly and Leisure, Night Clubs and Theatres</td>
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<td></td>
</tr>
<tr>
<td>Others: Passenger terminals</td>
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<tr>
<td>Others: Emergency services</td>
<td></td>
<td></td>
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<tr>
<td>Others: Telephone exchanges</td>
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<td></td>
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<tr>
<td>Others: Miscellaneous 24hr activities</td>
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<td></td>
</tr>
<tr>
<td>Others: Car Parks 24 hr</td>
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<td></td>
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<tr>
<td>Others - Stand alone utility block</td>
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### Energy Consumption by End Use [kWh/m²]

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<tbody>
<tr>
<td>Heating</td>
<td>8.33</td>
<td>8.44</td>
</tr>
<tr>
<td>Cooling</td>
<td>4.22</td>
<td>5.88</td>
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<tr>
<td>Auxiliary</td>
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<tr>
<td>Lighting</td>
<td>19.28</td>
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<tr>
<td>Hot water</td>
<td>0.44</td>
<td>0.75</td>
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<tr>
<td>Equipment*</td>
<td>31.8</td>
<td>31.8</td>
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<tr>
<td>TOTAL</td>
<td>42.67</td>
<td>42.77</td>
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</table>

*Energy used by equipment does not count towards the total for calculating emissions.

### Energy Production by Technology [kWh/m²]

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<th>Notional</th>
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</thead>
<tbody>
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<td>0</td>
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<tr>
<td>Wind turbines</td>
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<td>0</td>
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<tr>
<td>Solar thermal systems</td>
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### Energy & CO₂ Emissions Summary

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<th>Indicative Target</th>
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<tbody>
<tr>
<td>Heating + cooling demand [MJ/m²]</td>
<td>229.16</td>
<td>172.38</td>
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<tr>
<td>Total consumption [kWh/m²]</td>
<td>42.67</td>
<td>42.77</td>
</tr>
<tr>
<td>Total emissions [kg/m²]</td>
<td>22.1</td>
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# HVAC Systems Performance

<table>
<thead>
<tr>
<th>System Type</th>
<th>Heat dem [MJ/m²]</th>
<th>Cool dem [MJ/m²]</th>
<th>Heat con [kWh/m²]</th>
<th>Cool con [kWh/m²]</th>
<th>Aux con [kWh/m²]</th>
<th>Heat SSEEF</th>
<th>Cool SSEER</th>
<th>Heat gen SEFF</th>
<th>Cool gen SEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ST] Central heating using water, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
<td>Actual</td>
<td>223.9</td>
<td>23.3</td>
<td>14.2</td>
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<td>4.28</td>
<td>0</td>
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<tr>
<td></td>
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<td>23.7</td>
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<td>2.2</td>
<td>2.43</td>
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<tr>
<td>[ST] No Heating or Cooling</td>
<td>Actual</td>
<td>0</td>
<td>32.1</td>
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<td>34.7</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
<td>Actual</td>
<td>57.6</td>
<td>148.5</td>
<td>3.3</td>
<td>11.4</td>
<td>18.8</td>
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<td>3.52</td>
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<td></td>
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<td>27.3</td>
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<td>9.9</td>
<td>2.43</td>
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<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
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<td>3.6</td>
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<tr>
<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
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<td>96</td>
<td>15.7</td>
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<td>3.73</td>
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<td>5.25</td>
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<td>34.4</td>
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<td>3.6</td>
<td>0</td>
</tr>
<tr>
<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
<td>Actual</td>
<td>6.9</td>
<td>209.7</td>
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<td>16.2</td>
<td>20.3</td>
<td>4.66</td>
<td>3.52</td>
<td>5</td>
</tr>
<tr>
<td></td>
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<td>228.9</td>
<td>0.4</td>
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<td>2.43</td>
<td>3.6</td>
<td>0</td>
</tr>
<tr>
<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
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<td>148</td>
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<td>10.8</td>
<td>0</td>
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<td>3.73</td>
<td>5</td>
</tr>
<tr>
<td></td>
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<td>15.8</td>
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<td>2.43</td>
<td>2.7</td>
<td>0</td>
</tr>
<tr>
<td>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</td>
<td>Actual</td>
<td>210.1</td>
<td>111.3</td>
<td>12.2</td>
<td>8.1</td>
<td>0</td>
<td>4.66</td>
<td>3.73</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Notional</td>
<td>137.3</td>
<td>181.1</td>
<td>15.3</td>
<td>13.6</td>
<td>0</td>
<td>2.43</td>
<td>3.6</td>
<td>0</td>
</tr>
</tbody>
</table>

### 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 SSEEF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
- Cool SSEER = Cooling system seasonal energy efficiency ratio
- Heat gen SEFF = 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 BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

<table>
<thead>
<tr>
<th>Element</th>
<th>U_{typ}</th>
<th>U_{min}</th>
<th>Surface where the minimum value occurs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall</td>
<td>0.23</td>
<td>0.17</td>
<td>01 Wall 1</td>
</tr>
<tr>
<td>Floor</td>
<td>0.2</td>
<td>0.16</td>
<td>01 Exposed Floor 1</td>
</tr>
<tr>
<td>Roof</td>
<td>0.15</td>
<td>0.1</td>
<td>01 Rooflight container 1</td>
</tr>
<tr>
<td>Windows, roof windows, and rooflights</td>
<td>1.5</td>
<td>1.5</td>
<td>01 Window 2</td>
</tr>
<tr>
<td>Personnel doors</td>
<td>1.5</td>
<td>1.9</td>
<td>01 Door 1 (Personnel Door)</td>
</tr>
<tr>
<td>Vehicle access &amp; similar large doors</td>
<td>1.5</td>
<td>1</td>
<td>01 Door 2 (Vehicle Access Door)</td>
</tr>
<tr>
<td>High usage entrance doors</td>
<td>1.5</td>
<td>-</td>
<td>“No heat loss high usage entrance doors”</td>
</tr>
</tbody>
</table>

U_{typ} = Typical individual element U-values [W/(m²K)]  
U_{min} = Minimum individual element U-values [W/(m²K)]  
* There might be more than one surface where the minimum U-value occurs.

<table>
<thead>
<tr>
<th>Air Permeability</th>
<th>Typical value</th>
<th>This building</th>
</tr>
</thead>
<tbody>
<tr>
<td>m³/(h·m²) at 50 Pa</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Thermal bridges

There is at least one junction in the project whose linear thermal transmittance has been defined as having been calculated following a quality-assured accredited construction details approach in accordance with a scheme approved by the Secretary of State.
Appendix 2 – SBEM Output Document

SBEM Main Calculation Output Document
Wed Sep 05 13:11:13 2012 v4.1.d.0

Building name

ENW Training Centre

Building type: B1 Offices and Workshop businesses

SBEM is an energy calculation tool for the purpose of assessing and demonstrating compliance with Building Regulations (Part L for England and Wales, Section 6 for Scotland, Part F for Northern Ireland, Part L for Republic of Ireland and Building Bye-laws Jersey Part 11) and to produce Energy Performance Certificates and Building Energy Ratings. Although the data produced by the tool may be of use in the design process, SBEM is not intended as a building design tool.

Building Energy Performance and CO2 emissions

0 kgCO2/m² displaced by the use of renewable sources.

Building area is 1858.31 m²

Annual Energy Consumption

(Pie chart including Equipment end-use)

---

(Pie chart excluding Equipment end-use)

(*) Although energy consumption by equipment is shown in the graphs, the CO2 emissions associated with this end-use have not been taken into account when producing the site.

Page 1 of 2
Annual Heating Demand

Annual Cooling Demand
Appendix 3 – Draft Energy Performance Certificate

Energy Performance Certificate
Non-Domestic Building

Whitebirk Industrial Park
Blackburn

Certificate Reference Number:
0280-0900-0302-0100-0004

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government’s website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+ 0-25
A 26-50
B 51-75
C 76-100
D 101-125
E 126-150
G Over 150

Less energy efficient

Net zero CO₂ emissions

This is how energy efficient the building is.

Technical information

Main heating fuel: Grid Supplied Electricity
Building environment: Air Conditioning
Total useful floor area (m²): 1858
Building complexity (NOS level): 4
Building emission rate (kgCO₂/m²): 22.06

Benchmarks

Buildings similar to this one could have ratings as follows:
35 If newly built
92 If typical of the existing stock
Administrative information

This is an Energy Performance Certificate as defined in SI2007:991 as amended

Assessment Software: Design Database v25.05 using calculation engine SBEM v4.1.d.0

Property Reference: 00000000000000

Assessor Name: Craig Paul Woods

Assessor Number: LCEA006783

Accreditation Scheme: CIBSE Certification Ltd

Employer/Trading Name: Crookes Walker Consulting

Employer/Trading Address: Crookes Walker Consulting, Alberton House, 30 St Mary’s Passage, Manchester, M3 2WJ

Issue Date: 05 Sep 2012

Valid Until: 04 Sep 2022 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the property are contained in Report Reference Number: 9008-4003-0020-4060-1025

If you have a complaint or wish to confirm that the certificate is genuine

Details of the assessor and the relevant accreditation scheme are on the certificate. You can get contact details of the accreditation scheme from the Government’s website at www.communities.gov.uk/epicd, together with details of the procedures for confirming authenticity of a certificate and for making a complaint.

For advice on how to take action and to find out about technical and financial assistance schemes to help make buildings more energy efficient visit www.carbontrust.co.uk or call us on 0800 085 2005.