0.0 SUSTAINABLITY STATEMENT

0.1 INTRODUCTION

The purpose of this statement is to provide a summary of key features within the Redwell Infants and Junior School extension and alteration which are relevant to sustainable design.

The key considerations of the statement are as follows:

- Energy
  - Efficiency/life cycle of building materials
  - Details of new/replacement plant and controls associated

- Adaptation
  - Passive solar shading
  - Passive ventilation and improved mechanical cooling

- Materials
  - Proportionate response to BRE Green Guide
  - Approach to construction waste recycling options

The report outlines the key sustainability aims and targets of the project together with the particular engineering design proposals which incorporate the sustainability requirements and considerations.

1.0 KEY TARGETS

1.1 LIFE CYCLE

Analysis of Building Services Life Cycle has been considered during the design process to date and has had a direct bearing on the validity of the proposals.

The factors which affect the life cycle replacement include the following:

- Brief review of existing systems that require replacement
- Configuration
- Cost of disposal
- Cost of replacement plant, materials, etc.
- Initial selection of components
- Intensity of use and hours of operation
- Planned preventative maintenance regime etc.

Expected life cycle of mechanical building services equipment shall be as detailed within CIBSE Guide M Maintenance (Feb 2008) Engineering and Management, Section 13-16.

1.2 METERING

Good metering is a fundamental energy monitoring and targeting tool and an essential part of energy management.

Provision shall be made to ensure all of the new plant shall be supplied via energy meters to enable at least 90% of the entire building's estimated annual energy consumption. This shall use one or a combination of the following techniques:

- Direct metering
- Measuring of run hours for a piece of equipment
- Measuring of flow rates and temperature differences
- Estimating consumption by difference (not preferred)
- Estimation of non-constant small loads in accordance with CIBSE Guide F, chapter 11.

Sub-metering shall be provided to enable the energy for all fuels to be directly measured, as follows:

- Lighting installations
- Small power installations

1.3 ENERGY STANDARDS

The outline design proposals for the mechanical and electrical services installation has been reviewed and considered in accordance CIBSE Guidance and Industry Best Practice.

The following services have been considered in accordance with the Energy Standards and comply as applicable:-

- Water Installations
- New insulation
- Hot Water Distribution
- Low Temperature Hot Water (LTHW) Heating
- Low Energy Mechanical Supply / Extract Ventilation
- Local cooling installations
- Lighting

- Building Services Energy Management and Controls System
- Sub Metering
- Legionella

1.4 LOW AND ZERO CARBON (LZC) TECHNOLOGIES AND SUSTAINABILITY MEASURES

The floor area of the proposed new build elements of the project take the project into a category where Northamptonshire County Council require 10% of the on site energy to be generated from renewable sources.

Within this project air source heat pumps provide the heating for the new build which accounts for approximately 40-50% of the energy and therefore satisfy this criteria.

Materials and plant shall be selected to operate to minimise energy use and final design shall be undertaken, to ensure systems are designed, constructed and commissioned to minimise energy use.

1.5 IMPACT OF THE BUILDING REGULATIONS – PART L

The new build elements of the building are required to be assessed under current legislation (Building Regulations Part L2A)

A computer building model will be constructed to confirm compliance with the Building Regulations.

1.6 ENERGY AND CARBON EMISSIONS

Energy consumption and carbon emissions from the site are to be considered during the design to minimise their impact in line with industry best practice.

There is however no set target for reduction.

The following will be considered as means to reduce Carbon emissions:

- Improved facade performance: thermal air-tightness, solar protection, roof. (equal or better than the 2013 Part L elemental U-values/g-values/air tightness).
- Use of natural ventilation.
- Exposed thermal mass, cooled over night to improve comfort and minimise the use of active cooling.
- Range of acceptable internal temperatures from an occupied minimum air temperature of 18°C to a maximum internal environmental temperature of no more than 3°C higher than the external air temperature.
- Daylight linked lighting control.
- Presence and absence detection lighting control.
- An artificial lighting energy consumption of no more than 8.5W/m2.
- Small power heat gains into the occupied areas of no more than 5W/m2. This will need to be reviewed and agreed with the users.

1.7 PURCHASING AND PROCUREMENT

All suppliers and installers will be ISO14001 accredited, or have an equivalent and acceptable practice in place.

The specifications will be developed in the next design stages to provide further detailed requirements with regards to a chain of custody or similar environmental friendly manufacturing strategies.

1.8 WASTE

All contractors will provide a site waste management plan and comply with WRAP's policy of halving waste to landfill. Additionally, using WRAP as a monitoring tool, Contractors will ensure that a minimum of 60% of the overall site waste is recycled, including the enabling/strip out works. For example, the use of prefabricated components, such as for the toilet facilities will be maximised.

1.9 WATER CONSUMPTION

Appliance selection and systems design will target to achieve a potable water consumption of 25% or less than the requirements set by the Building Regulations, Part G. This target can be significantly bettered should the system design include some form of water re-use, either through rain or grey water collection.

1.10 EMISSIONS TO AIR AND WATER

Noxious emissions to atmosphere or to the drainage are not anticipated for this project.

Exhaust outlets from ventilation systems or heat rejection units will be located at least 5 metres away from any opening or intake point.

1.11 NOISE

Any potential plant noise will be attenuated and set on anti-vibration mountings to ensure there is no increase in background noise levels to the adjacent occupied areas.

2.0 ENVIRONMENTAL, ENERGY AND WATER DESIGN STRATEGY

2.1 SUMMARY

It is proposed that through this project the overall building energy efficiency will be increased.

The new lighting will comprise of efficient LED or T5 fluorescent lamp sources and not the existing mixture of old style fluorescent and tungsten halogen lamps.

Automatic control systems with time, zone and user control facilities will ensure that the operation of the cooling, ventilation and lighting systems matches the space and occupant requirements and automatically defaults to 'off' or set-back mode when not required.

Sub-metering will be provided to each zone of the cooling, heating and power systems including separate metering to the kitchen/server area. The sub-meters will be remotely monitored on the central BMS system.

Water saving devices such as low-flush cisterns, water efficient taps and water shut-off valves will be provided to the sanitary appliances within the new WC areas.

2.2 EXISTING BUILDING SERVICES

The existing spaces within the Redwell Infants & Junior Schools consist of a mixture of different types of spaces and associated fixed building services.

The Infants school is served from one main plantroom incorporating the boiler plant for heating of the building.

The junior school boiler plant is split between three separate plantrooms feeding separate heating zones.

The main electrical incoming service for the schools is located within a dedicated cupboard adjacent to the office in the infant school building.

A sub main is run from the main incoming position within the infants across to a main distribution board within the electrical cupboard in the junior school. From this position the LV distribution is carried throughout the junior school.

Ventilation throughout the school is provided by openable window at low level or at high level within the hall area.

Toilet ventilation is generally provided via through wall fans.

A dedicated air handling unit is provided for the existing kitchen/server within the junior school.

All hot water usage is provided from local electric hot water heaters.

The lighting to the existing spaces varies by area of the building. This variation covers luminaire type, age, condition and control method.

2.3 PROPOSED ENVIRONMENTAL DESIGN STRATEGY

The environmental strategy has been developed during the project by close coordination with the design team. A robust low carbon services strategy is adopted to provide satisfactory environmental conditions to the extended Redwell School. Centrally generated heating services from the new air source heat pumps are used to serve the new build areas.

Heating and cooling strategy varies by areas throughout the building with a number of different approaches applied as follows:

- Natural ventilation with with wall mounted radiators for heating.
- Natural ventilation with underfloor heating.
- Mechanical supply and extract heat recovery ventilation with underfloor heating.

Cooling is only provided to those areas considered to have heat gains that cannot be dealt with by ventilation alone such as PC labs or high heat gain staff areas. The cooling to these areas is provided from individual cooling systems.

2.4 SOLAR CONTROL AND THERMAL ANALYSIS

Solar gain to the space is to be minimised by the use of high performance solar control glazing and blinds to windows. The resulting glare from the sun and in particular low angle sun is to be controlled in particular in areas where use of PC's or laptops is envisaged.

2.5 WATER SERVICES

Domestic water supplies will be provided to the toilet areas, classrooms and cleaner's stores. Hot water services to these areas will be provided from local point of use electric hot water heaters.

Low flow sanitary appliances to limit water discharge and to prevent wastage of water are to be specified throughout the building. Water discharge will be controlled as below:

WC Flushing	Dual Flush 6/4 litres
Wash Hand Basins	4 litres / minute
Sink	9 litres / minute

2.6 LIGHTING DESIGN STRATEGY

The lighting design throughout will be designed to achieve the specific requirements for each space while maximising energy efficiency. Summary of the proposals as follows:

General teaching areas
T5 fluorescent luminaires controlled via daylight / absence detection control.

Common / circulation areas
T5 fluorescent luminaires controlled via presence detection control.

Toilet areas
LED luminaires controlled via presence detection control.

Staff/office areas
T5 fluorescent or LED luminaires controlled via daylight / absence detection control.

For full details of lighting layouts and control strategy, please refer to Rolton Group Ltd proposed drawings and individual project reports.