

Maplefield School

**M&E Environmental Impact  
Statement**

**Building Services Design**

1 Brisbane House  
Corbygate Business Park  
Priors Haw Road  
Corby  
Northamptonshire NN17 5JG

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## 1.0 Introduction

This report identifies the environmental impact of the building services for this project on the site.

The present site address is **ARCHITECT INPUT** Corby, Northamptonshire and is bounded by lines between the following OS grid references.

The present site is an area of urban wasteland which is covered with grasses and low grade foliage. There is a culvert present and natural gas main which dissects the site.

The natural gas main is proposed to be redirected before the start of main site works or early on in the contract to allow for the development. The culvert shall be retained in position.

## 2.0 Executive Summary

- The project is proposed to be served by natural gas fired CHP, Bio oil fired boiler(s), solar thermal systems, and PV systems in proportions and quantities to achieve the 60% carbon dioxide emissions reduction stated below.
- A full prediction of both energy and CO<sub>2</sub> has been carried out for both buildings, with the monitored level being the combined emissions for the site.
- The overall impact of the building services will be a net reduction in CO<sub>2</sub> emissions over the county of Northamptonshire as these buildings shall be replacing two existing less efficient buildings.
- A BREEAM Education 2008 Pre-Assessment Estimate has been made which indicates that a 'Very Good' rating will be achievable. This will ensure that the buildings impact on the environment is reduced compared to statutory minimum requirements.

### **3.0 Environmental Impact – M&E Services**

#### **External Lighting**

##### *Operation / Visibility*

External lighting shall be designed in accordance with CIBSE and ILE guidelines (restricting Obtrusive light 2005 to minimise external light pollution. Street Lighting, facade lighting and other external Luminaires / fittings shall not direct light off site, only directly illuminating areas offsite.

Security Lighting shall operate under control of presence detection and shall only operate during hours of darkness.

#### **Internal Lighting**

##### *Operation / Visibility*

Internal lighting shall be designed in accordance with CIBSE and ILE guidelines to minimise external light pollution, the luminaires shall be controlled to prevent out of hours use, other than under fire conditions / power failure when the emergency systems shall operate.

The installation shall not direct light off site, with rooms visible during external darkness.

Security Lighting shall operate under control of presence detection and shall only operate during hours of darkness.

#### **Heating Systems**

##### **Natural Gas CHP (Heat & Electricity Production)**

##### *Pollution*

These systems shall produce significant local pollution, producing CO<sub>2</sub>, NO<sub>x</sub>, Sulphur Dioxide and ash. The sulphur dioxide levels would be expected to be less significant as fuels shall be generally sulphur free, however plant shall emit high levels of NO<sub>x</sub> compared to natural gas fuelled plant.

All emissions shall be directed away from the building by installation of exhaust system compliant with manufacturer's recommendations.

The design life for this equipment is nominally 10 years.

##### *Visibility*

The systems shall be at first floor level with products of combustion, discharged at high level with a vertical or horizontal exhaust pipe.

##### *Noise*

The exhaust system shall be fitted with silencers to reduce noise levels within the building and external to the building.

##### **Biomass Boiler**

##### *Pollution*

These systems shall produce significant local pollution, producing CO<sub>2</sub>, NO<sub>x</sub>, Sulphur Dioxide and ash. The sulphur dioxide levels would be expected to be less significant as fuels shall be generally sulphur free, however plant shall emit high levels of NO<sub>x</sub> compared to natural gas fuelled plant.

All emissions shall be directed away from the building and surrounding areas by means of a suitably sized stack of suitable height to prevent emissions from polluting the site or neighbouring buildings. The design life for this equipment is nominally 15 to 20 years, with pipework lasting potentially up to 35 years.

#### *Visibility*

The systems shall be at first floor level with flue to high level. Products of combustion shall be discharged at high level with a vertical stack

### **Solar Thermal Systems**

#### *Pollution*

These systems shall be used to reduce energy used in providing heat for hot water production and heating. This shall reduce the emissions from oil fired boiler plant and CHP plant to be located on site.

This will reduce effects of pollution and emissions from such plant, especially during warmer periods of weather. The design life for this equipment is nominally 20 to 25 years.

#### *Visibility*

The systems shall be located on roof space and shall be angles at nominally 40 degrees to the horizontal to maximise spring and autumn heat gains available. The units shall face due south where practical or south west / south east if not available.

The angle of inclination should not cause any light reflection to properties or road and therefore should cause no nuisance off site.

### **Photo Voltaic Arrays**

#### *Pollution*

These systems shall be used to reduce electrical energy used in operation of the building. This shall reduce the emissions from oil fired boiler plant and CHP plant to be located on site.

This will reduce effects of pollution and emissions from central power stations remote from the site, and shall be replaceable as the systems become less effective / deteriorate. The design life is nominally 20 years.

#### *Visibility*

The systems shall be located on roof space and shall be angles at nominally 35 degrees to the horizontal to maximise annual electrical energy production. The units shall face due south where practical or south west / south east if not available.

The angle of inclination should not cause any light reflection to properties or road and therefore should cause no nuisance off site.

### **Rain Water Harvesting**

The rain water harvesting system shall be used to provide a minimum of 50% of water used for flushing toilets / urinals. This system shall also have the potential to assist in site surface water run off as some water from roof spaces which would normally enter the surface water drainage system.

## **Utilities**

### *Electrical*

A new electrical power feed shall supply the building. This shall be run below ground level and shall cause some minor disruption off site disruption when the cables are installed. This would be expected to last less than one month and would involve some disruption to local road, path and grass land surfaces which shall be reinstated after completion of the installation / connection.

A transformer building may be located on or off site which would possibly be visible located at the site boundary if required.

### *Natural Gas*

There is an existing natural gas main running across the site, which shall be redirected on site, causing disruption to site activities but having no additional disruption of site over and above the normal site movements / noise level.

A new natural gas system shall be connected on the school site to serve new CHP plant which shall be integral to the building. The connection shall be fitted with a visible gas meter house located at the site boundary.

### *Water*

Two new water mains shall be provided to the site, which will cause some off site disruption when the connection is made. This would be expected to last less than three weeks and involve some disruption to local road, path and grass land surfaces which shall be reinstated after completion of the connection.

These mains water connections shall serve water services to the building and the sprinkler system.

### *Fuel Oil (Bio)*

The new school shall utilise a 'natural' bio oil based fuel system serving new boiler plant. This shall require deliveries of fuels during operation of the building.

Peak deliveries would be expected to be once every fortnight during winter conditions, reducing with warmer periods of weather.

## **Noise from plant / systems**

### *Operation*

An acoustician has been appointed to survey the existing site. The building services shall be designed to operate within existing noise levels and shall not increase the noise level beyond the site boundary.

The CHP Plant, boilers and associated plant shall be attenuated to reduce noise levels within the site boundary and shall be located within the main building roof plant area. The plant room shall be located a minimum of 40 metres from nearest residential buildings.

## **General Energy**

The building shall produce 60% lower carbon dioxide emissions compared to a similar building designed under 2002 building Regulations. This is significantly better than current maximum levels for new buildings and existing building stock.