Chesterton Interchange Station
Sustainability and Energy Statement
Cambridge County Council / Network Rail

2 July 2015
Notice

This document and its contents have been prepared and are intended solely for Cambridge County Council / Network Rail’s information and use in relation to Cambridge Science Park Station development.

Atkins assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 35 pages including the cover.

Document history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Purpose description</th>
<th>Originated</th>
<th>Checked</th>
<th>Reviewed</th>
<th>Authorised</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev 1.0</td>
<td>For comment</td>
<td>SD</td>
<td>JC</td>
<td>AM</td>
<td>SD</td>
<td>21/03/13</td>
</tr>
<tr>
<td>Rev 2.1</td>
<td>For comment</td>
<td>QD</td>
<td>JD</td>
<td>JD</td>
<td>SD</td>
<td>22/04/13</td>
</tr>
<tr>
<td>Rev 3.0</td>
<td>For comment</td>
<td>SD</td>
<td>QD</td>
<td>JD</td>
<td>JD</td>
<td>01/05/15</td>
</tr>
<tr>
<td>Rev 4.0</td>
<td>For comment</td>
<td>DC</td>
<td>QD</td>
<td>SD</td>
<td>SD</td>
<td>02/07/15</td>
</tr>
</tbody>
</table>

Client signoff

<table>
<thead>
<tr>
<th>Client</th>
<th>Cambridge County Council / Network Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>Chesterton Interchange Station</td>
</tr>
<tr>
<td>Document title</td>
<td>CSP - Sustainability &amp; Energy Statement</td>
</tr>
<tr>
<td>Job no.</td>
<td>5134906</td>
</tr>
<tr>
<td>Copy no.</td>
<td></td>
</tr>
<tr>
<td>Document reference</td>
<td>5134906/51.11/REP/001</td>
</tr>
</tbody>
</table>
# Table of contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>5</td>
</tr>
<tr>
<td>1.1. Background</td>
<td>5</td>
</tr>
<tr>
<td>1.2. The Site</td>
<td>5</td>
</tr>
<tr>
<td>1.3. Sustainability Guidance</td>
<td>5</td>
</tr>
<tr>
<td>2. Energy and CO2 emissions</td>
<td>6</td>
</tr>
<tr>
<td>2.1. Reduce demand</td>
<td>6</td>
</tr>
<tr>
<td>2.2. Meet End Use Demand Efficiently</td>
<td>6</td>
</tr>
<tr>
<td>2.3. Supply from Low Carbon and Renewable Sources</td>
<td>6</td>
</tr>
<tr>
<td>2.4. Enable energy management</td>
<td>7</td>
</tr>
<tr>
<td>2.5. Compliance</td>
<td>7</td>
</tr>
<tr>
<td>3. Water Use</td>
<td>8</td>
</tr>
<tr>
<td>3.1. Reduce demand &amp; meet demand efficiently</td>
<td>8</td>
</tr>
<tr>
<td>3.2. Recycled Water</td>
<td>8</td>
</tr>
<tr>
<td>3.3. Recycle black water</td>
<td>8</td>
</tr>
<tr>
<td>4. Adapting buildings for climate change</td>
<td>9</td>
</tr>
<tr>
<td>4.1. Reduce unnecessary heat gains</td>
<td>9</td>
</tr>
<tr>
<td>4.2. Meet end use demand efficiently</td>
<td>9</td>
</tr>
<tr>
<td>4.3. Apply an appropriate ventilation strategy</td>
<td>9</td>
</tr>
<tr>
<td>4.4. Apply active cooling</td>
<td>9</td>
</tr>
<tr>
<td>5. Flood Risk</td>
<td>10</td>
</tr>
<tr>
<td>5.1. Avoid locations at higher risk of flooding</td>
<td>10</td>
</tr>
<tr>
<td>5.2. Reduce the risk of flooding</td>
<td>10</td>
</tr>
<tr>
<td>5.3. Avoid increasing off site risk</td>
<td>10</td>
</tr>
<tr>
<td>5.4. Design for flood resilience where necessary.</td>
<td>11</td>
</tr>
<tr>
<td>5.5. Summary</td>
<td>11</td>
</tr>
<tr>
<td>6. Sustainable drainage systems</td>
<td>12</td>
</tr>
<tr>
<td>6.1. Reduce run-off from the site</td>
<td>12</td>
</tr>
<tr>
<td>6.2. Attenuate run-off from the site</td>
<td>12</td>
</tr>
<tr>
<td>6.3. Use or Enhance natural drainage systems</td>
<td>12</td>
</tr>
<tr>
<td>6.4. Provide additional benefits</td>
<td>13</td>
</tr>
<tr>
<td>7. Transport</td>
<td>14</td>
</tr>
<tr>
<td>7.1. Reduce use of private cars</td>
<td>14</td>
</tr>
<tr>
<td>7.2. Enable walking and cycling</td>
<td>14</td>
</tr>
<tr>
<td>7.3. Enable use of public transport</td>
<td>14</td>
</tr>
<tr>
<td>7.4. Enable provision of information on sustainable modes of transport</td>
<td>15</td>
</tr>
<tr>
<td>8. Ecology and biodiversity</td>
<td>16</td>
</tr>
<tr>
<td>8.1. Conserve, protect and enhance site ecology</td>
<td>16</td>
</tr>
<tr>
<td>8.2. Provide new and enhanced habitats</td>
<td>16</td>
</tr>
<tr>
<td>8.3. Increase the number of appropriate species and their populations</td>
<td>17</td>
</tr>
<tr>
<td>8.4. Compensate for any unavoidable ecological damage or loss of biodiversity</td>
<td>17</td>
</tr>
<tr>
<td>9. Pollution</td>
<td>18</td>
</tr>
<tr>
<td>9.1. Water pollution</td>
<td>18</td>
</tr>
<tr>
<td>9.2. Air pollution</td>
<td>18</td>
</tr>
<tr>
<td>9.3. Noise &amp; vibration pollution</td>
<td>19</td>
</tr>
<tr>
<td>9.4. Lighting pollution</td>
<td>20</td>
</tr>
<tr>
<td>10. Health and wellbeing</td>
<td>23</td>
</tr>
</tbody>
</table>
10.1. Discharge all statutory health and safety obligations
10.2. Accessibility Needs
10.3. Avoid/Reduce Health Risks
10.4. Provide Comfortable Internal Conditions

11. **Waste**
11.1. Reduce waste
11.2. Reuse materials and equipment (and facilitate future re-use)
11.3. Recycle waste (and facilitate recycling)
11.4. Compost biodegradable waste
11.5. Recover energy from waste (and facilitate energy recovery from waste)

12. **Lifecycle impacts of materials and equipment**
12.1. Select of materials
12.2. Selection of equipment
12.3. Recycled content

13. **Local environment and economy**
13.1. Engage with the local community throughout the building lifecycle
13.2. Maintain and Enhance Environmental Quality
13.3. Avoid nuisance pollution levels (including noise)

14. **Conclusion**
14.1. Baseline BREEAM rating
14.2. Increase to ‘Very Good’
1. Introduction

1.1. Background
This report outlines how the design and procurement of the building addresses the issues of sustainability, addressing climate change, sustainable use of water, energy efficiency, ecology, construction waste and sustainable building materials. The report also discusses the early stages of BREEAM assessment which are being undertaken in support of the design process.

1.2. The Site
The proposed Cambridge Science Park station will be located on Network Rail land adjacent to the existing north-south main line running through Cambridge. The site in north-east Cambridge, known as Chesterton Sidings, is adjacent to the now redundant Chesterton Junction, where the former St Ives line joined the main line. Situated to the north of Cambridgeshire, Chesterton Interchange would be close to local developments such as Cambridge Science Park and St John’s Business Park as well as the A14 trunk road.

This new station will serve the local residential area and the nearby Cambridge Science Park. The station will be serviced by new access routes; cycle path, public vehicular access road, guided bus route; car parking for 450 cars & cycle parking for 1000 bicycles.

1.3. Sustainability Guidance
The contents and structure of this report are based on the guidance given in the Chartered Institute of Building Services Engineers (CIBSE) Guide L – Sustainability.

<table>
<thead>
<tr>
<th>Sustainability Topic</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy and CO$_2$ emissions</td>
<td>2.0</td>
</tr>
<tr>
<td>Water Use</td>
<td>4.0</td>
</tr>
<tr>
<td>Adapting buildings for climate change</td>
<td>5.0</td>
</tr>
<tr>
<td>Flood risk</td>
<td>6.0</td>
</tr>
<tr>
<td>Sustainable drainage systems</td>
<td>7.0</td>
</tr>
<tr>
<td>Transport</td>
<td>8.0</td>
</tr>
<tr>
<td>Ecology and biodiversity</td>
<td>9.0</td>
</tr>
<tr>
<td>Pollution</td>
<td>10.0</td>
</tr>
<tr>
<td>Health and Wellbeing</td>
<td>11.0</td>
</tr>
<tr>
<td>Waste</td>
<td>12.0</td>
</tr>
<tr>
<td>Lifecycle impacts of materials and equipment</td>
<td>13.0</td>
</tr>
<tr>
<td>Local environment and economy</td>
<td>14.0</td>
</tr>
</tbody>
</table>
2. Energy and CO₂ emissions

CIBSE identifies the following principles to be applied:

- Reduce demand
- Meet end use demand efficiently
- Supply from low carbon sources
- Supply from renewable sources
- Enable energy management

2.1. Reduce demand
The fundamental design of the building envelope and internal layout shall be optimised to reduce asset energy and CO₂ emissions significantly.

A highly insulated (0.1 U-value target) and air-tight façade (<2.5m³/m²@50Pa) shall reduce convective and conductive heat losses from the heated accommodation areas.

Glazing ratios shall be optimised for carbon emission reduction.

ETFE roof lights and perforated cladding panels shall provide high levels of natural daylight thus reducing the demand for lighting.

Shading systems shall be tuned for the building orientation – external shading to south and west.

2.2. Meet End Use Demand Efficiently
Having established the optimum passive strategy, highly efficient mechanical and electrical building services systems shall be integrated into the building to fine tune the energy performance.

Low pressure drop mechanical ventilation systems with thermal recovery shall be employed within the accommodation area.

Lighting shall be provided by high efficient fittings using exclusively LED technology. Lighting controls shall include presence detection and daylight linked controls.

All pumps and fans shall have energy saving inverter variable speed drives.

The lifts shall incorporate the latest energy saving features such as an energy accumulation facility.

2.3. Supply from Low Carbon and Renewable Sources
There is a statutory requirement to provide at least 10% of the developments total predicted energy requirement from renewable sources. The following are classed as renewable technology as defined in the Cambridge City Council Supplementary Planning Document – Sustainable Design and Construction:

- Solar thermal hot water systems
- Photovoltaic cells (PV)
- Wind Turbines
- Heat Pumps (ground/air/water source)
- Geothermal
- Biomass (boilers/stoves/community heating/CHP)
- Anaerobic digestion

Solar thermal, Biomass and Geothermal were rejected on the grounds of insufficient demand versus the cost of implementation.
Wind turbines were rejected due to the proximity of residential properties and the potential for noise issues, etc. The potential for further high level buildings to be developed within the science park cast doubt on the long term availability of the wind speeds required to make a wind turbine system viable.

Anaerobic digestion is not suited to this application due to the lack of a suitable fuel supply to maintain the anaerobic process.

Two technologies were identified as being suitable for the Cambridge Science Park, an air source heat pump and solar PV. Together these technologies shall provide at least 10% of the sites predicted energy consumption.

Air Source Heat Pump

An air source heat pump shall provide the heating requirements. This is a low carbon technology which runs on electricity but also makes use of ‘free’ heat from the atmosphere.

An air source heat pump can provide the following typical savings over conventional gas and electric heating systems:

<table>
<thead>
<tr>
<th></th>
<th>Compared to gas boiler system</th>
<th>Compared to electric heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Cost saving</td>
<td>17%</td>
<td>66%</td>
</tr>
<tr>
<td>CO₂ Saving</td>
<td>24%</td>
<td>67%</td>
</tr>
</tbody>
</table>

The heat pump shall be located outside the main station building with pipe work connections to the mechanical plant room on the first floor. The hot water provided by the heat pump shall be used to heat the radiator heating system.

Solar PV

Solar photovoltaic panels shall be mounted on the roof of the proposed cycle shelter with the generated electricity feeding into the main station switch panel. Any electricity generated which is not offset by the station demand will be exported into the national grid. The electricity export will result in a payment based on a feed-in tariff.

At present it is proposed that the pv installation shall be installed to provide 50kWp (peak) electrical power. It is anticipated that over the period of a year this will generate 42,000kWh at the station. This equates to approximately 12% of the overall electricity consumption.

2.4. Enable energy management

To enable future energy management electricity meters shall be installed on all major items of equipment including the main electrical switch panel, the solar PV cells, the heat pump and the lighting and small power distribution boards.

This will allow the facilities staff to log and record energy consumption and identify areas where controls can be implemented to reduce consumption further.

2.5. Compliance

By implementing the above measures the Cambridge Science Park Station will comply with the statutory planning requirements as well as meeting the requirements of the Building Regulations Part L SBEM calculation.

It is also anticipated that the above energy strategy will make a significant contribution to the energy credits as part of the BREEAM assessment process.
3. Water Use

The station shall require water supplies to the staff and public toilets, the staff messing facility and to retail facilities.

CIBSE identifies the following principles to be applied:

- Reduce demand (and waste)
- Meet demand efficiently
- Supply collected rainwater or recycled grey water
- Recycle black water close to the point of use, if appropriate

3.1. Reduce demand & meet demand efficiently

To minimise water use and meet demand efficiently, the following water saving measures shall be implemented:

- Urinals shall have Passive Infra-Red (PIR) controls so that urinal are only flushed when necessary.
- Percussion taps shall be installed in the toilets so that only the necessary amount of water is delivered for hand washing.
- The public toilets shall have a water shut off valve on the main supply pipe which will only allow the flow of water when occupants are detected. This system uses PIR detection to limit the use of water and is particularly useful against malicious interference with the water systems.

3.2. Recycled Water

The use of a water recycling facility such as rainwater harvesting or grey water recycling was considered. However the limited number of water outlets and minimal water use renders the necessary investment to be not economically viable.

3.3. Recycle black water

The size of the development and minimal amount of waste generated make the prospect of black water recycling generally uneconomic and impractical to manage and maintain.
4. Adapting buildings for climate change

CIBSE identifies the following principles to be applied:

- Reduce unnecessary heat gains
- Meet end use demand efficiently
- Apply an appropriate ventilation strategy
- Apply active cooling

4.1. Reduce unnecessary heat gains
There are unavoidable heat gains from building occupants and necessary operational equipment. Otherwise the building glazing ratios have been optimised in order to reduce unnecessary solar heat gains.

4.2. Meet end use demand efficiently
The methods employed to meet end use energy demand efficiently are already detailed in section 2.2

4.3. Apply an appropriate ventilation strategy
Natural ventilation shall be used wherever possible. There are few staff accommodation areas within the station building and those which are not internal rooms are ventilated by openable windows

Mechanical ventilation shall be provided to areas which cannot be naturally ventilated and where regulations require mechanical ventilation such as toilets and internal rooms.

4.4. Apply active cooling
Cooling and air conditioning of spaces is kept to a minimum and only affects the staff ticket office space and the communications equipment room. The cooling shall be provided by a high efficiency refrigerant cooling unit.
5. Flood Risk

CIBSE identifies the following principles to be applied:

- Avoid locations at higher risk of flooding
- Reduce the risk of flooding
- Avoid increasing off site flood risks
- Design for flood resilience where necessary

5.1. Avoid locations at higher risk of flooding

A key requirement of the NPPF is that development is located where possible in areas free from flooding. The site is located in flood zone 1, outside of the fluvial flood zone as determined by the Environment Agency. There is no historical evidence of pluvial or groundwater flooding at this site.

A Flood Risk and Drainage assessment has been conducted directed by consultation with the Environment Agency and South Cambridgeshire District Council.

It is known that the First Public Drain running adjacent to the site is at capacity.

It is known that in parts of the site ground water levels are within 1m of the surface.

5.2. Reduce the risk of flooding

The key risk of flooding from the scheme is related to pluvial flooding or flooding related to rain falling on the ground or developed sites. If new impermeable surfaces are proposed this can increase run-off of water to rivers or drains and increase flooding.

The best way to prevent an increase in pluvial flood risk is to limit increase in impermeable areas and to mimic the ground conditions without development and allow infiltration.

5.3. Avoid increasing off site risk

After reduction of risk of flooding there are two key measures that should be applied to avoid increasing off site flood risk. The first is called providing source control. Source control ensures that the first 5-15mm of rainfall, typically the rainfall that will fall in a 1 yr rainfall event, will not leave the development site. It will be taken up by the ground or evaporated. The second measure is to provide attenuation for an extreme event, usually 1 in 100 yrs + 30% climate change allowance and reduce water runoff from the attenuation to a rate which would have been experienced in the environment without the development, in the 1 year event. –

The new areas of site include, car parking, station building, access roads and if these areas discharged directly to water courses like the First Public Drain without attenuation it is likely they could cause flooding.

Ground investigations have shown that it will not be possible to discharge to full infiltration on parts of the site but discharge to ground may be possible in other parts of the site.

Following guidance in the SUDS manual, CCC design and adoption guide, NPPF and draft National Standards for SUDS, discharge has been considered to ground as first priority although there may be some locations where high groundwater prevents this.

Source control has been provided at the site in the following ways

Station building (green roof)
Car park (permeable paving), and

Public Space between car park and rail station (bioretention areas).

In areas where discharge to ground is not possible due to ground water level and ground contamination, piped or tank storage will be provided.

Attenuation has been provided at the site in the following ways.

Storage voids under the car park will be used to attenuate flow to restricted run-off rates required by the Environment Agency and Lead Local Flood Authority by using hydraulic controls. Further attenuation is provided in tank and pipe storage before discharge to surface waters.

### 5.4. Design for flood resilience where necessary.

Due to the location of the scheme and the measures taken to reduce and avoid flood risk there is no residual requirement for flood resilience.

Consideration within the FRA has been given to identify potential flow paths for an event in excess of the 1 in 100 yr + 30% (for climate change) extreme event considered in this assessment to identify the parts of the site and adjacent development could receive flood water. This has shown that there would be no further requirement for provision of flood resilience related to flood risk.

Levels of buildings have been based above the 1 in 100 yr plus 30% event.

### 5.5. Summary

The approach to flood risk for the scheme has a positive sustainability impact providing development in a suitable location with low flood risk and where possible removing and reducing flood risk by use of sustainable drainage techniques including source control which will better the existing flood risk from this existing Brownfield site.
6. **Sustainable drainage systems**

CIBSE identifies the following principles to be applied:

- Reduce run-off from the site
- Attenuate run-off from the site
- Use or enhance natural drainage systems and/or techniques modelled on them
- Provide additional benefits (amenity, habitats, etc.)

6.1. **Reduce run-off from the site**

It is proposed to discharge surface water from the site at a reduced rate of 2 l/s/ha, i.e. lower than pre-development runoff. Attenuation of flows will be achieved by the use of bio retention areas and permeable pavements providing source control. Infiltration to reduce runoff will only be permitted should the results of the Detailed Quantitative Risk Assessment be favourable (see 6.2) and with the permission of the Environment Agency (EA) and if ground water levels allow.

6.2. **Attenuate run-off from the site**

Surface water run-off will be restricted to the equivalent rate of 2 l/s/ha as imposed by the EA and Cambridge City Council. This will be achieved through vortex control devices at the outfall(s) with the surplus flows being retained in underground storage with a pervious paving system and enlarged pipes below ground. To minimise the volume of the storage required it is proposed to allow infiltration (subject to 6.1) if conditions permit.

Assessment of the soil leachate and groundwater samples from the GRIP 4 and GRIP 5 Site investigations identified some exceedances of the generic assessment criteria protective of both groundwater and surface water receptors. However, these were localised and not generally considered to be significant. The 2015 results indicate that generally across the site levels of contamination are low with some organic contamination generally limited to the area around the 2014 fuel spill.

Whilst a potential impact on the groundwater receptor was identified from individual monitoring wells across the site, this was not considered to affect the whole site and as no groundwater abstractions have been identified within 250m of the site. Also, given the site setting of the aquifer within an urban industrial area, future abstraction of this water as a potable resource is unlikely and so it is considered that there is currently no pollutant linkage present.

However as there is a theoretical risk to the surface water receptor and the chalk aquifer, a Detailed Quantitative Risk Assessment is being undertaken to further assess the available data for risks to controlled waters from various potential contamination to provide re-use criteria for material at the site that is protective of the off-site water receptors. This assessment will be incorporating infiltration through the unsaturated zone.

As yet this approach has not been agreed by the EA, however, it has been undertaken following the same requirements that the EA had for the guided busway. If this approach was acceptable then material could be left in-situ, assuming it meets the agreed re-use criteria developed in the Tier 3 Risk Assessment.

The ground investigation report states that a number of contaminants exceed the current standards for ground water; these include cyanide, cadmium, chromium, zinc and mercury. The testing indicates that whilst the amounts of contaminants vary across the site all areas have some level of contaminant that exceeds standards.

Should it not be possible to remove all the contaminated soils infiltration drainage in those areas will not be permitted by the EA. An impermeable membrane will be placed under the pavement construction to prevent any water that penetrates the pavement construction entering the contaminated soils below.

Once all the contaminated soils that can be recovered are removed from site clean soils will be imported into the site to provide the site levels required. Sufficient attenuation storage will be provided to prevent surface...
flooding in the 1 in 100 year storm event plus an allowance for climate change. This will be in the form of storage within a pervious paving system where possible and be complemented by underground online storage where required.

6.3. **Use or Enhance natural drainage systems**

Measures will be undertaken to provide pollution controls over the surface water discharge from the site into the River Cam. These will take the form of bio-retention areas and permeable paving and where required, silt traps and oil separators should the layout provide sufficient space. Both pervious paving and bio retention are recognised by the CIRIA SUDS Manual as appropriate levels of treatment for runoff prior to discharge.

Provide additional benefits

6.4. **Provide additional benefits**

An ecological and landscape mitigation plan has been co-ordinated with the drainage strategy to include bio-retention areas and the incorporation of a green roof on the station building.
7. Transport

CIBSE identifies the following principles to be applied:

- Reduce use of private cars
- Enable walking and cycling
- Enable use of public transport
- Enable provision of information on sustainable modes of transport

7.1. Reduce use of private cars

In order to reduce the use of the private car the provision of and easy access to other sustainable transport options is essential.

The following measures are being incorporated as part of the design to reduce the use of private cars:

- The site will promote sustainable modes of travel by its location and very nature of being a rail station and interchange.
- The car park size has been benchmarked and optimised to encourage travel by sustainable modes
- Direct access to the Cambridgeshire Guided Busway.
- Provision of 1,000 cycle parking spaces.
- Provision of safe and convenient cycle and pedestrian access.

Taking into account the above measures the proposal offers a significant positive effect on the reduction of private cars.

7.2. Enable walking and cycling

In order to enable the walking and cycling to / from the site the provision of and easy access to existing walking and cycling routes is essential.

To promote walking and cycling or travel to and from CSI, the design process has taken into account the following:

- The car park size has been optimised to encourage sustainable travel.
- Direct access to the Cambridgeshire Guided Busway which offers safe and convenient facilities for pedestrians and cyclists.
- Provision of 1,000 cycle parking spaces.
- Provision of safe and convenient cycle and pedestrian access to the local cycle network.

Taking into account the above measures the proposal offers a significant positive effect in terms of enabling walking and cycling and a travel option.

7.3. Enable use of public transport

In order to enable and encourage the use of public transport the interchangeable access between all sustainable travel options with public transport infrastructure is essential.

To promote the use of public transport as a travel option to and from CSI, the design process has taken into account the following:

- Direct access to the Cambridgeshire Guided Busway.
- Appropriate bus interchange infrastructure to enable access for non-guideway bus services.
Taking into account the above measures the proposal offers a significant positive effect in terms of enabling the use of public transport.

### 7.4. Enable provision of information on sustainable modes of transport

In order to enable and make the most of information on existing and proposed sustainable modes of transport liaison between all team members and existing service providers is essential.

To enable the provision of information on sustainable modes of transport, the design process has taken into account the following:

- As a rail station and public transport interchange, information on public transport services and facilities, as well as real time passenger information will be publicly available via various agency websites including National Rail, train operators, local bus operators and Traveline.
- In addition, information on sustainable modes of travel will be provided locally within the station and on platforms as well as high quality directional signage on the local highway and walking / cycle network.

Taking into account the above measures CSI offers a significant positive effect in terms of enabling the provision of information on sustainable modes of transport.
8. Ecology and biodiversity

CIBSE identifies the following principles to be applied:

- Conserve, protect, and enhance site ecology
- Provide new and enhanced habitats
- Increase the number of appropriate species and their populations
- Compensate for any unavoidable ecological damage or loss of biodiversity

8.1. Conserve, protect and enhance site ecology

The ecological resources of the site have been assessed as part of the Environmental Impact Assessment, which has enabled an understanding of the baseline ecology of the Site and the wider area.

The combination of the habitats present (including: Broadleaved plantation/semi-natural woodland; Dense/continuous scrub; Ephemeral/short perennial; Poor semi-improved neutral grassland; Scattered trees/scrub; Tall ruderal; and, Bare ground) indicates that the Site is of some biodiversity value and of district importance, providing breeding and foraging habitat for a range of species and supporting assemblages of invertebrates and plants. Due to its location between the edge of residential areas and the wider rural environment the Sidings could be considered to act as a linkage between these areas and provide a valuable biodiversity commuting route to the wider environment to the east beyond the main railway line. They could also be considered to provide an extended safe-haven for wildlife in the nearby Bramblefields local nature reserve (LNR).

Due to the nature of the Development, it is inevitable that it will result in a loss of existing habitat, mainly the dense scrub that covers the majority of the Site. Vegetation will be retained, where possible and not required for construction purposes, in order to minimise these impacts.

8.2. Provide new and enhanced habitats

This loss of habitat is to be mitigated and offset through the creation of new habitat and enhancement of Bramblefields LNR. New habitat areas include the reptile/invertebrate habitat areas in the Station/Interchange Area and at Nuffield Road, provision of green roofs, species rich grassland, native hedgerow and trees, and creation of wetland/pond areas. Although habitat will be lost, the habitat created/retained and the production of EMPs for the Station/Interchange Area and Bramblefields LNR will ensure that these habitats are managed and permanent.

The effects of the Development on ecological resources have been evaluated and a range of mitigation measures proposed. In addition, measures have been proposed to maintain and enhance the biodiversity value of the Site as a result of the Development. The ecological mitigation and enhancement measures have been designed to ensure legal compliance and help minimise negative effects of the Development in order to maintain its importance locally. These include:

- Maintaining and enhancing Bramblefields LNR,
- Translocation of reptiles and plants of county significance to suitable receptor areas,
- Maintaining the value of the Site for its breeding and foraging habitat, and the range of species and assemblages of invertebrates and plants it supports,
- Creating new habitat areas for reptiles, invertebrates and birds which will be designed, through agreement with the LPA ecologists, to offset areas of habitat loss,
- Enhancing the Site to encourage species not currently present,
- Contributing to production of Management Plans for the Station/Interchange Area and for Bramblefields LNR.
Measures incorporated into the design of the Development also aim to maintain the overall ecological value of the area through:

- Retaining, where possible, suitable habitat and features of ecological value
- Restoration of all temporary working areas on completion of construction works to replace existing habitat
- Maintaining a network of corridors that link habitats across the Site and provide connectivity to the wider environment.

A Landscape scheme has been developed for the site in order to support the ecological mitigation and enhancement measures identified above.

The Landscape Proposals would tie in to the existing vegetation areas and be used to create wildlife links in and around the Site. This would be principally facilitated by a network of native hedgerows, which will run alongside the access roads and across the car park to link Bramblefields to other wildlife sites to the north and east via the wider Chesterton Sidings area. Native species of trees and shrubs which are locally occurring would be selected for the soft landscaping, which would include specimen Birch trees and Hawthorn hedges.

The existing pond within Bramblefields LNR would be retained, enlarged and managed as appropriate. A new pond /wetland area is also proposed. This will be allied with the application of a Sustainable Urban Drainage System for access roads, car parks etc, including Swale creation and contouring of drainage ditches to allow plant colonisation.

8.3. **Increase the number of appropriate species and their populations**

Invertebrate habitats (consisting of bare earth bunds with south-facing slopes) will be provided within the car parking area and along verges and access roads where appropriate, and nest box installation (for birds such as Kingfisher) will be undertaken in the bank along the existing engineered channel on Cowley Road.

Habitat creation would also include provision of green roofs on the station building, as well as an increase in the size of Bramblefields LNR via the provision of an additional strip of land to the south of the allotments. Improved signage, footpaths and fencing within Bramblefields would enhance and protect its LNR status.

8.4. **Compensate for any unavoidable ecological damage or loss of biodiversity**

As a consequence of the above, the ecological assessment has concluded that the Development is unlikely to have any negative effects, and that the successful application of the mitigation measures will ensure no loss of biodiversity and overtime should enhance the value of the Site.
9. Pollution

CIBSE identifies the following principles to be applied:

- Prevent or reduce pollution at source
- Treat unpreventable pollution in an environmentally safe manner
- Undertake disposal of pollutants as a last resort and in an environmentally safe manner

9.1. Water pollution

9.1.1. Prevent or reduce pollution at source
Tests developed by the Highways Agency in HD45/09 ‘Road drainage and the water environment’ have been applied to the access roads to the scheme.

These tests show that the pollutant loading from traffic likely to use the scheme is negligible and requires no further mitigation.

Ground investigations have identified areas of contaminated land and groundwaters. The design of scheme drainage has ensured these areas of contamination have been avoided.

9.1.2. Treat unpreventable pollution in an environmentally safe manner
Residual low levels of pollution are treated at the site using Sustainable Drainage Principles outlined in section 6.

9.1.3. Undertake disposal of pollutants as a last resort and in an environmentally safe manner
Due to measures taken to prevent or reduce pollution at source and to treat pollution there is no further requirement to dispose of pollutants.

9.1.4. Summary
The scheme itself has a low polluting impact to the water environment.

The approach to water pollution for the scheme has a positive sustainability impact by identifying and avoiding existing pollution and removing the potential for remobilisation by the use of sustainable drainage systems.

9.2. Air pollution

The scheme has the potential to impact on air quality in terms of dust emissions associated with construction areas and activities, and changes in road vehicle emissions of oxides of nitrogen and fine particulates once the scheme is operational.

An air quality assessment of the scheme has been undertaken as part of the formal EIA process. This has determined that:

- In the absence of appropriate mitigation, dust emissions associated with construction have high risk potential in terms of adverse effect at residential premises in the area surrounding the site. Dust also poses a moderate risk to ecological resources within Bramblefields LNR. As recommended in the ES, appropriate mitigation is required to prevent or reduce emissions at source.

- Changes in road vehicles emissions of oxides of nitrogen and fine particulates will generally be imperceptible. Along some routes where a reduction in traffic is expected there may be very slight
improvement in near road air quality; conversely, along routes with an increase in traffic there may be very slight worsening.

It can therefore be concluded that:

- With appropriate mitigation, a significantly negative effect during construction would be unlikely.
- No mitigation is required in terms of operational emissions to air and the development has a neutral overall effect.

9.3. **Noise & vibration pollution**

9.3.1. **Prevent or reduce at source**

The proposed station development is located adjacent to existing noise sensitive properties. A noise survey has been carried out at six of the nearest noise sensitive properties. The survey included measurements during the day and night.

The noise and vibration impacts from the station development have been assessed for the construction and operational phase of the works, using the appropriate standards and methodologies. The data used for the assessment has been taken from appropriate standards or gathered by the project team.

A significant negative impact is predicted during the construction works at the closest residential properties, due to the proximity of the works. The impact will be minimised using noise screening, and by substituting for quieter construction equipment, where possible. This impact will be temporary, and is not expected to exceed 2 days and 5 nights. No properties are expected to qualify for noise insulation.

With the scheme in place, it is expected that the impact from changes in traffic on the road network will result in a negligible change in noise at all properties. The additional trains are unlikely to significantly increase the noise or vibration levels at the nearest noise sensitive receptors. The reduced speed of the stopping trains reduces the associated noise and vibration levels.

The noise and vibration from the operation of the station, including the station buildings, buses and car park have been assessed at a number of representative residential properties using noise modelling software. The noise and vibration impact from the operation of the proposed station is predicted to be negligible to slight.

9.3.2. **Treat unpreventable pollution in an environmentally safe manner**

The construction noise impact will be minimised through the use of noise barriers and good working practices. Temporary construction noise barriers are reusable and well maintained construction equipment is not only quieter, but can be less polluting.

The operation of the proposed station is expected to have a negligible to slight noise impact at the nearest noise sensitive properties. The scheme includes some noise mitigation measures:

- The predicted impacts from the operation of the proposed station include restrictions on the operating hours of the PA system. It will not operate between 23:00 and 05:45.
- The guided buses use the new euro v standard engines, which are quieter than standard buses, and have wider environmental benefits.
- A 270m long, 19cm thick, precast concrete barrier, 3m above existing ground (2.5m above the platform height), has been proposed along the length of Platform 1, next to the caravan park.
- A 115m long woven willow, 2.5m above existing ground, has been proposed between the gardens of the properties on Long Reach Road and the site.
- The Air Handling Units for the station buildings will have inline noise attenuators

9.3.3. **Summary**

During the construction of the scheme there is predicted to be a significant noise impact. This impact will be minimised through the use of noise barriers and good working practices.
The operation of the scheme itself has a negligible noise impact, measures such as controlling the operational hours, noise barriers and reducing the noise at source have been included as part of the scheme.

9.4. Lighting pollution

9.4.1. Prevent or reduce at source
There are no options to treat unpreventable or undertake disposal of light pollution. If there should be any light pollution beyond prevention or reduction at source, the remaining light overspill just is and cannot be further treated.

9.4.1.1. Need for lighting
Lighting is required at the development in accordance with relevant and current regulations in order to provide lighting for security and safe travel and access for passengers and staff. The lighting shall be provided between dusk and dawn via photocell switching with further timer controls to switch the lights during the night when the station is not in use. It is anticipated this will be over 365 days per year excluding holidays when the rail network is not operational.

9.4.1.2. Site
The existing site is currently a yard with a number of rail sidings and a live rail route running through the site. There is currently no lighting in the area other than a few bulkheads on the exterior of existing unoccupied rail buildings which will only be lit intermittently when NR maintenance is being carried out in the buildings during hours of darkness.

In terms of lighting the site is best identified by table 1 from the Guidance Notes for the Reduction of Obtrusive Light, 2011 as issued by the Institution of Lighting Professionals (below).

<table>
<thead>
<tr>
<th>Zone</th>
<th>Surrounding</th>
<th>Lighting Environment</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0</td>
<td>Protected</td>
<td>Dark</td>
<td>UNESCO Starlight Reserves, IDA Dark Sky Parks</td>
</tr>
<tr>
<td>E1</td>
<td>Natural</td>
<td>Intrinsically dark</td>
<td>National Parks, Areas of Outstanding Natural Beauty etc</td>
</tr>
<tr>
<td>E2</td>
<td>Rural</td>
<td>Low district brightness</td>
<td>Village or relatively dark outer suburban locations</td>
</tr>
<tr>
<td>E3</td>
<td>Suburban</td>
<td>Medium district brightness</td>
<td>Small town centres or suburban locations</td>
</tr>
<tr>
<td>E4</td>
<td>Urban</td>
<td>High district brightness</td>
<td>Town/city centres with high levels of night-time activity</td>
</tr>
</tbody>
</table>

The table breaks down environmental areas into different zone categories. The environmental zone of areas surrounding the new Chesterton Interchange station caries between E2 & E3. The areas to the west of the station can be categorised as E3: Medium district brightness area, an urban location. The areas to the east of the station can be categorised as E2: Low district brightness area, a relatively dark outer suburban location.

The ILP guidance document recommends that in such a location on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.

The lighting shall be designed such that sky glow, light trespass, source intensity and building luminance are within the parameters set out for an E2 area as detailed in table 2 of the ILP guidance document.
The lighting design is currently at the initial outline stage of design with illuminance calculations completed for the area within the boundaries of the site itself. This shall be developed further at detail design stage taking into account lighting regulations and the above mentioned light pollution levels in section 9.4.1.2.

The external lighting is limited to the area lighting of the car park, cycle park, exterior station concourse and station platforms. The table below indicates the areas to be lit and the illuminance levels the lighting shall ultimately be designed to along with the main standards and guidance documents which need to be followed by the designer.

<table>
<thead>
<tr>
<th>Area to be lit</th>
<th>Regulations</th>
<th>Illuminance (lux)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car park</td>
<td>BS 5489-1 Code of practice for the design of road lighting; Greater Anglia specification; NR standard RT/ENGP/06/22 Lighting of railway premises</td>
<td>20 (ave); 10 (min)</td>
</tr>
<tr>
<td>Cycle park</td>
<td>BS EN 12464-2 Light and lighting – Lighting of work places Part 1: Indoor work places (table</td>
<td>75 (ave)</td>
</tr>
<tr>
<td>Exterior concourse</td>
<td>Greater Anglia specification; NR standard RT/ENGP/06/22 Lighting of railway premises</td>
<td>50 (ave)</td>
</tr>
<tr>
<td>Platforms (open)</td>
<td>Greater Anglia specification; NR standard RT/ENGP/06/22 Lighting of railway premises</td>
<td>50-80 (ave)</td>
</tr>
<tr>
<td>Platforms (covered)</td>
<td>Greater Anglia specification; NR standard RT/ENGP/06/22 Lighting of railway premises</td>
<td>150 (ave)</td>
</tr>
</tbody>
</table>
It is also proposed to backlight the semi-opaque panels of the building structure using single coloured LED lighting to provide a perceptible glow behind the cladding panels.

Among the considerations for exterior light sources, the main drivers are the efficacy of the light source and the quality of colour rendering of the light source. Recent and continuing development of LED light sources mean that LED’s are currently of a similar efficacy to discharge lamps (such as SON and metal halide). The projections for white light LED’s are an improvement of 20% per year for the next ten years. Following this projection, LED’s will perform with greater efficacy than discharge lamps when the station is built and the lighting installed in 2015.

The colour rendering capabilities of LED lights are excellent producing a crisp white light. White light and good colour rendering has been identified in recent years as important factors in feeling safe in an outdoor environment, offering easier facial recognition.

A further advantage of LED luminaires is that the light distribution from small point sources is much more easily controlled than a larger discharge lamp source. Thus with good product selection to suit the installation and the task it becomes easier for the designer to avoid light spill into neighbouring properties.

The outline design recommends using LED sources throughout as far as practical.

9.4.1.4. Reducing light spill

Sky glow is a form of light pollution which causes unnecessary illumination of the night sky. The most intrusive effect of sky glow is perceived by observatories. In built up areas it is much more difficult to observe the contents of the night sky with a proliferation of full spectrum lighting spilling into the sky. Some methods of mitigating this is to direct all exterior light downwards and to use a monochromatic light source such as low pressure sodium lights. As stated above, a white light source is preferred for safety and security, therefore a white LED source has been selected. The luminaires however shall all be downward directional in order minimise sky glow.

For the backlighting of the station building cladding panels, the design illuminance shall be less than $5 \text{ cd/m}^2$ as recommended in the ILP’s Guidance Notes for the Reduction of Obtrusive Light, 2011.

At detail design stage it is anticipated that the light spill shall be accurately calculated by the lighting designer at key points such as the perspective of nearby residential properties and local sites of ecological importance. The design shall seek to minimise any light spill to these areas to at least those levels recommended in the ILP Guidance Notes for the Reduction of Obtrusive Light, 2011.
10. Health and wellbeing

CIBSE identifies the following principles to be applied:

- Discharge all statutory health and safety obligations
- Apply good practice in providing for the widest practical range of accessibility needs
- Avoid or reduce health risk factors
- Provide comfortable internal conditions

10.1. Discharge all statutory health and safety obligations

The station design takes cognisance of all relevant health and safety legislation including:

- The Health and Safety at Work, etc Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Workplace (Health, Safety and Welfare) Regulations 1992
- The Control of Asbestos at Work Regulations 2012 (asbestos in soil etc)
- The Health and Safety (Display Screen Equipment) Regulations 1992
- The Electricity at Work Regulations 1989
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
- The Control of Substances Hazardous to Health Regulations 2002
- The Provision and Use of Work Equipment Regulations 1998
- The Construction (Design and Management) Regulations 2015
- The Equality Act 2010 (Formerly Disability Discrimination Act 1995)
- The Health and Safety (First Aid) Regulations 1981
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)

10.2. Accessibility Needs

The provision of an accessible and welcoming environment for all is a key component of the station design. On arrival at the station passengers are presented with clearly defined routes into the ticket hall and onwards through to the platforms. This is achieved by the careful consideration of sight lines, glazing, paving, planting and building materials.

CCoC are committed to a policy of equality, inclusion and accessibility in the delivery of its services to members of the public. Access for mobility impaired passengers shall be such that they will have unrestricted access from their arrival point to the station concourse/ticket office and beyond to their chosen platform. Similarly, the many cyclists in the Cambridge area will enjoy enhanced access with regard to cycle provision. This includes a large amount of cycle spaces, wide corridors and specifically designed lifts to accommodate 2 bicycles plus riders.

The project team have clear objectives and aspire to achieve compliance with the following documents:

- BS 8300:2009 Design of Buildings and their approaches to meet the needs of disabled people – Code of Practice, British Standards Institution, 2009,
10.3. Avoid/Reduce Health Risks
By following the above design guidance and statutory legislation the station will be a safe environment for both the train staff and the passengers.

Additionally the design takes account of the needs of the maintainers. Roof access is provided for the cleaning of gutters etc with roof parapets and/or fall arrest safety systems to ensure a safe system of working. Lifting systems are provided to allow the safe manoeuvring of equipment to and from the plant rooms on the first floor.

10.4. Provide Comfortable Internal Conditions
The design is such that all areas of the station will be well lit with a view to creating a welcoming and safe environment.

The staff accommodation, retail and public toilets will be conditioned areas with heating, ventilation and cooling where required. Hot and cold water facilities are included in the staff messing area and the toilets.

The controls system shall be such that the environment is maintained within the desired parameters during the occupied ours while also being energy efficient.
11. Waste

The generation of waste in one form or another is an inevitable consequence of all forms of development and the sustainable management of waste is an important issue. Construction projects generate waste through the demolition of existing structures, excavation works, and through wastage of construction materials.

The UK generated 200.0 million tonnes of total waste in 2012. Half of this (50%) was generated by Construction. The generation of such waste materials has significant environmental impacts, compounded by factors such as the vehicle movements associated with the transport of materials and waste.

Sustainable waste management is embedded within the principles of the waste hierarchy as outlined in the diagram below. The waste hierarchy places waste prevention as the priority in terms of how waste should be managed, followed by re-use, recycling and other forms of recovery, disposal to landfill or incineration without energy recovery are considered the least favourable solutions.

Waste Hierarchy

![Waste Hierarchy Diagram](https://www.defra.gov.uk)

The Site Waste Management Plan Regulations 2008 were revoked in December 2013, as part of the Government’s Red Tape Challenge. This removed the requirement for large scale projects to have a site waste management plan (SWMP). However, their production is still considered best practice.

The SWMP documents serve to demonstrate how the design process has been used to minimise the amount of waste that may be generated. The documents set out an estimate of how much waste will be generated and how that waste will be managed e.g. re-used on or off-site, recycled on or off-site, recovered or disposed to landfill. The principles of the waste hierarchy and sustainable waste management are key to the development of the SWMP. The SWMP is a ‘living’ document which will evolve with the development through

---

the design and construction process. A SWMP has been prepared for the proposed development and accompanies the Environmental Statement (ES).

Waste arisings associated with the proposed development have been quantified/estimated within the SWMP and the ES and are also presented in the table below. The waste arisings will be minimised as far as possible through the implementation of good management practices and key mitigation strategies as outlined within the SWMP.

**Estimated Waste Arisings Associated with the Proposed Development.**

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Quantity (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition Waste</td>
<td>8,823</td>
</tr>
<tr>
<td>Excavation Waste</td>
<td>7,402</td>
</tr>
<tr>
<td>Construction Waste</td>
<td>262</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>16,487</strong></td>
</tr>
</tbody>
</table>

The Chartered Institute of Building Services engineers (CIBSE) identifies the following principles outlined within their Sustainability Tool.

- Reduce waste
- Reuse materials and equipment (and facilitate future re-use)
- Recycle waste (and facilitate recycling)
- Compost biodegradable waste
- Recover energy from waste (and facilitate energy recovery from waste)

These key principles are broadly in line with the principles of the waste hierarchy. The application of these principles to the proposed development are outlined in the following sections.

### 11.1. Reduce waste

The reduction or minimisation of waste arising from the proposed development is a key priority. It is of particular significance at the design stage, where opportunities exist to improve material resource efficiency in construction projects through optimisation of materials and reducing associated waste. This process is known as ‘designing out waste’. The government funded organisation, Waste and Resources Action Plan (WRAP) identifies five key principles that design teams can use during the design process to reduce waste:

- Design for Reuse and Recovery;
- Design for Off Site Construction;
- Design for Materials Optimisation;
- Design for Waste Efficient Procurement; and
- Design for Deconstruction and Flexibility.

The SWMP plays a key role in recording the actions taken to design out waste.

The following measures have been identified at the design stage of the proposed development in order to reduce waste arisings:

- Encourage use of non-primary materials over primary materials
- Support for waste minimisation and recycling initiatives – setting key performance indicators (KPIs)
- Preference given to renewable materials, materials with low(er) environmental impacts and towards components with high(er) proportions of recycled material;
11.2. **Reuse materials and equipment (and facilitate future re-use)**

Significant quantities of materials arising as waste during a construction project have the potential for re-use either on site or off site at another construction project. Potential waste streams may include; excavation waste which may be suitable for use as a fill or landscaping material, demolition waste comprising concrete and brick which may be re-used as aggregate, or track components which have the potential for direct re-lay or refurbishment prior to re-use. Re-use of such material moves the waste up the waste hierarchy and provides a significant improvement in terms of environmental impact/ sustainability.

The SWMP provides the forum for planning and recording the re-use of waste arisings.

The following measures have been identified to ensure that waste arisings associated with the development will be re-used on or off site wherever practicable.

- Waste arisings will be segregated on site to enable the allocation of materials for re-use within the proposed development, re-use off site, and those requiring off site treatment (e.g. decontamination, recycling and recovery).
- Excavated materials will be re-used on site where it meets design specifications, for levelling, infilling and landscape proposals.
- Throughout the demolition phase materials will be recovered where possible for re-use in the construction phase or off site re-use. It is anticipated that this may include steel track or the segregation of timber sleepers for which there is a strong re-use market off site.

11.3. **Recycle waste (and facilitate recycling)**

Not all waste materials arising through a construction project are suitable for direct re-use on or off site; there may be a need for further processing to produce a useable product. Construction, demolition and excavation waste comprises significant quantities of materials suitable for recycling, re-processing or treatment. These may include; metals, wood, glass, plastic, brick/ concrete and soils.

It is anticipated that the proposed development will generate significant quantities of contaminated ballast in the removal of redundant track. While this material is not suitable for direct re-use on site, it can be treated off site to remove the contamination and will then be suitable for further use. In addition any brick/ concrete arising from the demolition works can be removed from site and re-processed to produce a recycled aggregate. Requirements and recommendations for this are further enhanced in the SWMP.

Waste arisings generated by the proposed development will segregate on site in accordance with the SWMP to enable the allocation of materials for recycling and those requiring off site treatment (e.g. decontamination, recycling and recovery).

11.4. **Compost biodegradable waste**

Many construction projects involve significant ground clearance works which can generate green biodegradable waste such as trees, shrubs and grass. This material can diverted from landfill through segregation and composting at open windrow composting sites and in vessel composting sites. The quality protocol PAS 100 demonstrates the compost has been produced to a quality specification and therefore is no longer considered a waste.

Any green biodegradable waste generated by the proposed development will be segregated on site and sent for composting.

11.5. **Recover energy from waste (and facilitate energy recovery from waste)**

Inevitably construction projects will generate some waste will be generated which is unsuitable for re-use or recycling/ composting. Such residual waste will require some form of treatment/ disposal. There are numerous waste management technologies in operation which provide a treatment solution which generates energy, or a Solid Recovered Fuel (SRF) which can then be further treated/ processed to recover energy. Such treatment processes provide considerable environmental benefits when compared to conventional landfill disposal and are therefore significantly more sustainable.
At this stage the quantity of residual waste generated by the development is envisaged to be low. Further to this the proportion of residual waste sent directly for treatment/disposal from the proposed development is very small. The majority of residual waste is forecast to arise as output from recycling and treatment facilities and is likely to be unsuitable for residual waste treatment. However, all residual waste arising from the development will be assessed and managed in line with the principles of the waste hierarchy.

**Residual Impacts**

Following the implementation of the sustainable waste management strategies outlined above a residual amount of waste will require some kind of treatment/disposal. This has been estimated in the SWMP and is set out in the table below.

**Estimated Total Waste Arisings and Management Method (tonnes)**

<table>
<thead>
<tr>
<th>Total Waste Generated</th>
<th>Onsite Reuse</th>
<th>Off Site Reuse/Recycling/Treatment</th>
<th>Diversion from landfill</th>
<th>Residual Waste Treatment/Landfill</th>
</tr>
</thead>
<tbody>
<tr>
<td>--</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>16,487</td>
<td>40.6%</td>
<td>57.6%</td>
<td>98.3%</td>
<td>1.7%</td>
</tr>
<tr>
<td></td>
<td>6,695</td>
<td>9,503</td>
<td>16,198</td>
<td>288</td>
</tr>
</tbody>
</table>

As can be seen though the implementation of proposed sustainable waste management strategies, the waste arisings generated through the proposed development can be re-used and recycled to divert 98% of waste from landfill/disposal. Further to this where possible the residual waste will be diverted to a residual waste treatment facility with energy recovery in order to minimise the environmental impacts of the proposed development.

**Conclusion**

The waste management measures described above effectively divert an estimated 98% of the waste arisings generated by the proposed development from landfill/disposal. The sustainable waste management measures detailed will be implemented through the SWMP which provides a living document to plan, track and record the management of waste arisings. With these measures in place this assessment concludes that the waste management methods accord with the principles of the waste hierarchy and the CIBSE Sustainability Tool and that the overall impact of waste generated by the proposed development will be insignificant and may therefore be categorised as '0 – neutral'.
12. Lifecycle impacts of materials and equipment

CIBSE identifies the following principles to be applied:

- Select materials and equipment from sustainable sources
- Select materials and equipment with the lowest in-use environmental impacts
- Select materials and equipment with the lowest embodied environmental impacts
- Select materials and equipment with high recycled content

12.1. Select of materials

The abstraction, processing, transportation and disposal of materials and equipment are very energy intensive processes. However careful selection of materials at the design stage can minimise the overall carbon impact imposed by a new building.

It is proposed to evaluate the station design using the Building Research Establishment Environmental Assessment Method (BREEAM). A key part of the assessment is the selection of materials. This uses the BRE Green Guide to Specification to rate the proposed construction systems and products based on their overall environmental impacts using a life cycle assessment approach.

In simple terms the more sustainable the materials selected the more credits are awarded in the BREEAM assessment.

Where possible Modern Methods of Construction (MMC) will be used which will minimise on site construction waste. For example, pre-fabricated steel work and panels to form the structure and cladding of the building.

12.2. Selection of equipment

In-use environmental impacts typically refer to energy use in the form of fuels such as gas or electricity. See section 2 for details of the equipment selected to optimise the station energy performance.

12.3. Recycled content

Reusing materials or selecting those with high recycled content will reduce the depletion of natural resources and help create markets for waste materials. See section 11 for further details.
13. Local environment and economy

CIBSE identifies the following principles to be applied:

- Engage with the local community throughout the building lifecycle
- Maintain and enhance environmental quality
- Avoid nuisance pollution levels (including noise)
- Avoid causing other nuisances to neighbourhood building users

13.1. Engage with the local community throughout the building lifecycle

CCC has actively engaged the local community and relevant stakeholders in two way consultation from the outset of the project.

A Statement of Community Involvement (SCI) which summarises the pre-planning application consultation activity undertaken by CCC for the development proposal has also been prepared and has been submitted as part of the planning application for the scheme.

In line with best practice, its wish to better understand the views of local residents, and to meet the requirements of the Localism Act and South Cambridgeshire’s Statement of Community Involvement, Cambridgeshire County Council organised a pre-application public consultation programme.

The County Council’s Community Engagement team worked to ensure that consultations took place with identified stakeholders, and that the outcomes of those consultations were recorded. The aim was to identify the key sensitivities and drivers of the various stakeholders and allow the Project Team to address, and where appropriate and/or possible, incorporate the aspirations/requirements of the various consultees and others. The objectives were to:

- Promote the opportunities of the station to the community and key stakeholders, and involve them at every stage.
- To create opportunities for open two-way dialogue and engagement with stakeholders and the community and ensure that the feedback received has informed the decision-making process.
- Keep the community, media, partners and other key stakeholders informed of development throughout the project.
- Continue to grow support for the scheme.

13.2. Maintain and Enhance Environmental Quality

CCC is committed to providing a safe and secure development for all users of the proposed transport interchange. While the proposals are not currently seeking Secured by Design accreditation they have been designed in accordance with the key principles:

Design

- Good lighting and secure fencing in station, car parks and approaches
- Up-to-date information and clear signs have been co-ordinated early with the Comms engineers
- Clear lines of vision are inherent in the design of the building and site

Management
Security staff presence has been passively provided to platform areas / CCTV surveillance has been co-ordinated with the comms engineer to enhance passenger safety
Rapid response in emergencies facilitated through landscape design and building layout
Regular inspection and maintenance is a core design principle for any Network Rail asset and we are working closely with them to remove safety and security risks from the design. Access to plant rooms is through staff controlled access routes

Early engagement with British Transport Police has ensured potential areas of risk within and surrounding the site have been identified and addressed in the proposals. The building design has also been positively reviewed by BTP to ensure no security issues for the building users.

13.3. **Avoid nuisance pollution levels (including noise)**

During the construction of the scheme there is predicted to be a significant noise impact. This impact will be minimised through the use of noise barriers and good working practices. The operation of the scheme itself has a negligible noise impact, measures such as controlling the operational hours and reducing the noise at source have been included as part of the scheme.

At detail design stage it is anticipated that the light spill shall be accurately calculated by the lighting designer at key points such as nearby residential properties and local sites of ecological importance. The design shall seek to minimise any light spill to these areas to at least those levels recommended in the ILP Guidance Notes for the Reduction of Obtrusive Light, 2011. It is anticipated that there will not be a significant impact created by the proposals.
14. Conclusion

It is the intention of Cambridge County Council and Network Rail that the Cambridge Science Park will be a sustainable development in terms of construction and operation. This report demonstrates how sustainability has been considered and incorporated into the station design.

To objectively measure the level of sustainability a full BREEAM assessment will need to be carried out and a rating awarded.

The BREEAM ratings are awarded on achieving a selection of minimum criteria, and on achieving an overall score of all relevant BREEAM measures, resulting in scores as follows:

<table>
<thead>
<tr>
<th>BREEAM Rating</th>
<th>% score</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSTANDING</td>
<td>≥ 85</td>
</tr>
<tr>
<td>EXCELLENT</td>
<td>≥ 70</td>
</tr>
<tr>
<td>VERY GOOD</td>
<td>≥ 55</td>
</tr>
<tr>
<td>GOOD</td>
<td>≥ 45</td>
</tr>
<tr>
<td>PASS</td>
<td>≥ 30</td>
</tr>
<tr>
<td>UNCLASSIFIED</td>
<td>&lt; 30</td>
</tr>
</tbody>
</table>

A desktop BREEAM pre-assessment exercise has been carried out on the design to date which indicates a GOOD rating. The checklist created by this pre-assessment is included in the following pages of the report. It is entirely feasible that following a detailed review of the BREEAM assessment by the design team and that with the incorporation of a number of changes in the next design stage this can upgraded to VERY GOOD.
14.1. **Baseline BREEAM rating**

The following spreadsheet holds the pre-assessment desktop scoring for the project.
14.2. Increase to ‘Very Good’
The following spreadsheet shows how the preceding score could be increased to achieve a ‘Very Good’ rating.