Kirkliston High School

Brief

Working brief

+ Community consultation held in response to future capacity issues at Queensferry High School has identified a preference for a new secondary school to serve Kirkliston.
+ ADP have been commissioned to test the viability of the current Kirkliston Leisure Centre site as the location for a new secondary school.
+ The school will have capacity for 600 pupils with the potential to extend to serve 1200 pupils.
+ The site will also provide shared community facilities. These will include sports facilities and flexible community space and could also extend to a community library, cafe and/or other facilities identified through the consultation process.
+ Due to the area available on the site, options are being explored for the location of off site playing fields. It should be noted that these sites are not currently in council ownership
+ The proposals will be designed based on Passivhaus principles with the possiblity of achieving full Passivhaus certification.
+ Provision of outdoor learning has been identified as a key aspiration for the school.

	Phase 1 - 600 pupils	Phase 2 - 1200 pupils
Teaching area (sqm)	4660	7218
Integrated Support area (sqm)	801	801
Shared spaces area (sqm)	791	961
Leadership and Administration area (sqm)	357	555
Ancillary area (sqm)	493	663
Plant, circulation and partitions area (sqm)	2762	3973
Total area (sqm)	**9864**	**14190**

Flexible learning space - Castlebrae Community Campus, JMarchitects for CEC

Social/assembly spaces - Boroughmuir High School, Alan Murray Architects for CEC

Community hub - The Forum, ADP

Outdoor learning - Cringleford Primary School, ADP

Outdoor sports facilities - The Swan School, ADP

Indoor sports facilities - Eden Girls School, ADP

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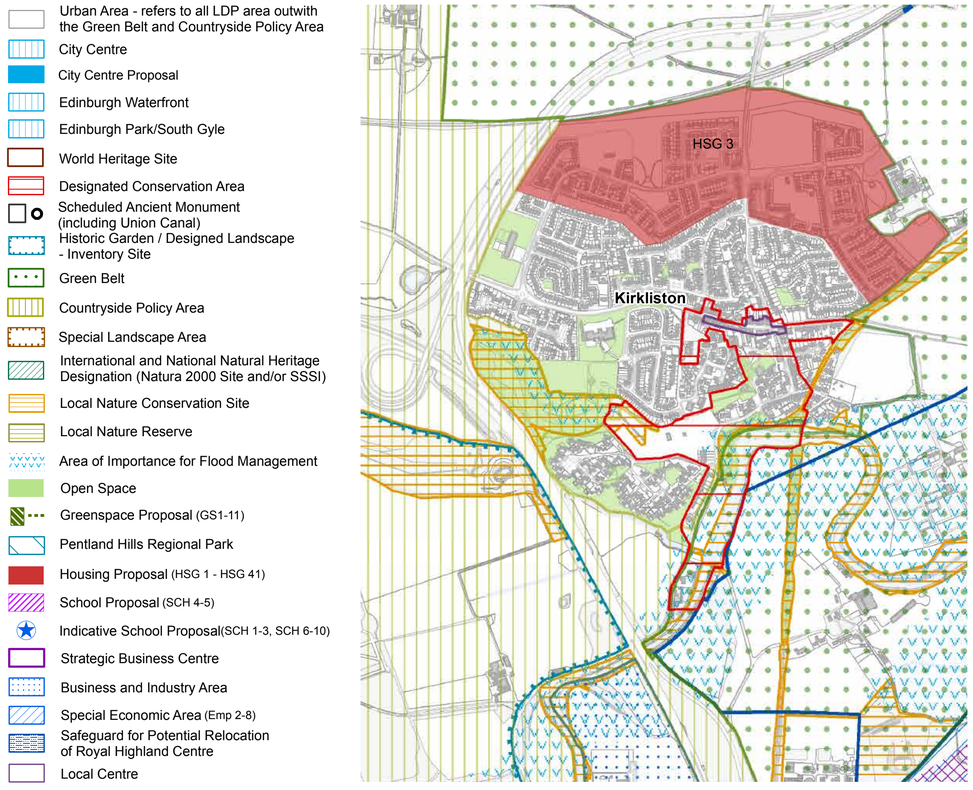
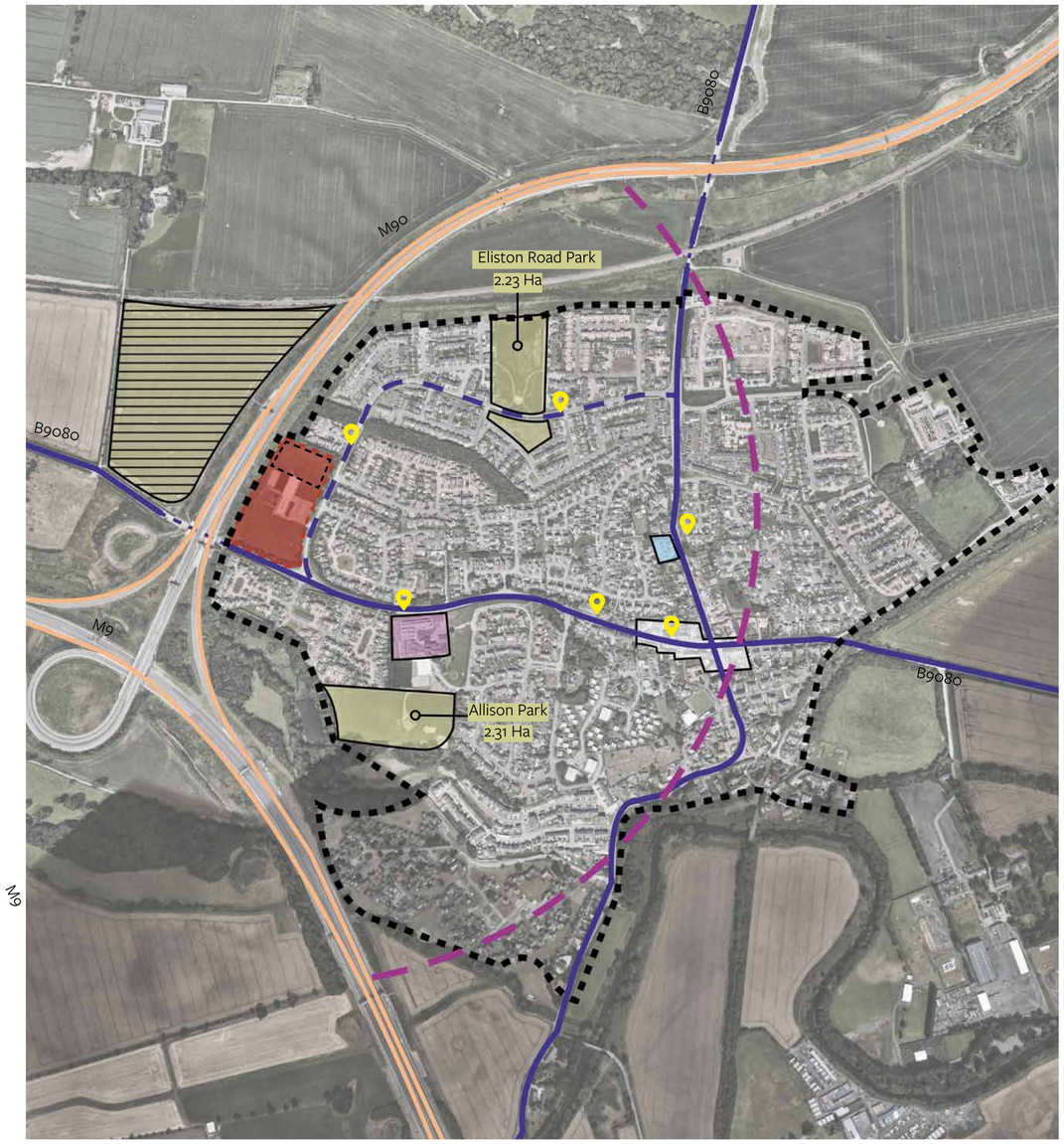
The site - town context

Why this site?

+ The site is in council ownership so can be developed without further land purchase required
+ The land surrounding Kirkliston, outside of the settlement boundary, is designated as either green belt or within the Countryside Policy Area, restricting potential for development
+ Locating the school within the settlement boundary keeps travel distances to school short and opens up opportunities to create a civic heart to the town.
+ Co-locating the high school with the primary school will enable interaction between the two schools, with the potential for this to assist with the P7 transitioning process.





Extract from Edinburgh Local Development Plan, North West Proposals Map

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Kirkliston High School

Site analysis

High risk area - limited visibilty for traffic/ busy junction

Acoustic impact from motorway - mitigation required

Area at risk of surface water flooding

Existing mature trees - to be retained wherever possible

Steep bank - provides some protection from motorway

Site frontage facing town

Optimum orientation of buildings on site for thermal performance - roughly east/ west.

Pedestrian Route to Site

Car Traffic to Site

Track

Farm Land

Total Site

Primary School Site

Primary school footprint

Existing leisure centre footprint

Total Site = **28,200 m²**
Primary School Site= **11,000 m²**
Remaining Site = **17,200 m²**

1. Approach to site from Stirling Road Roundabout

2. View looking south down Kirklands Park Street

3. Motorway underpass and high hedges to residential boundary to south of site

4. Track along western boundary of site at base of motorway embankment

5. Neighbouring housing on Kirklands Park Road

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Site analysis - retention of leisure centre appraisal

Retain existing leisure centre?

The sketches to the left illustrate layout options explored to allow the retention of the existing leisure centre. Reuse and refurbishment is a key principle of sustainable development, however in this case, reusing the existing buildings on site presents significant issues both in design and in use

+ The existing fabric of the building is dated and energy inefficient. The building would need significant refurbishment to bring it up to modern standards
+ The cost of running an older building would be higher than a new, energy efficient building
+ While the sports hall could contribute to indoor sports provision for the new school, the other facilities within the existing leisure centre are not suitable and would require replacement.
+ The location of the existing leisure centre in the center of the site places constraints on the design of the new school and the surrounding outdoor spaces meaning that the design would not be as successful as it could be were the existing building to be demolished.

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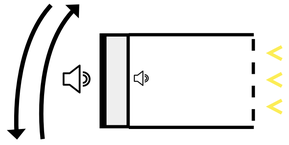
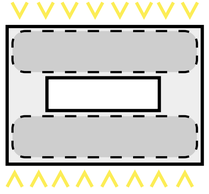
Design opportunities

On top of providing the school places needed in the area, with the added potential to expand in the future, the construction of a new high school presents opportunities for the enhancement of the proposed site and the town as a whole.

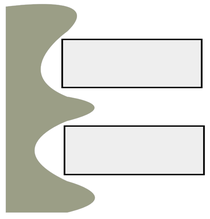
+ The school would provide additional facilities for the use of local people and would become an open and inclusive place that sits at the heart of the community .
+ The new building would be designed to the latest sustainability standards and would be sized and orientated on the site to maximise views, improve acoustics and optimise thermal and energy efficiency.
+ The outdoor space on the site would be developed to increase biodiversity and to provide safe green space for children and the community.



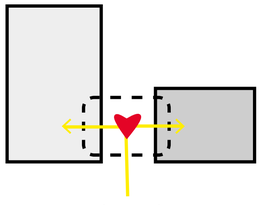
Acoustic Orientation



Maximising Elevations



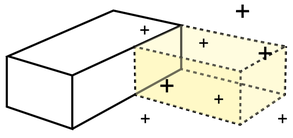
Enhanced Green Space



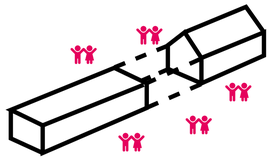
Shared Use

Hard Side - Soft Side

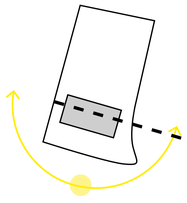
Connection to Community



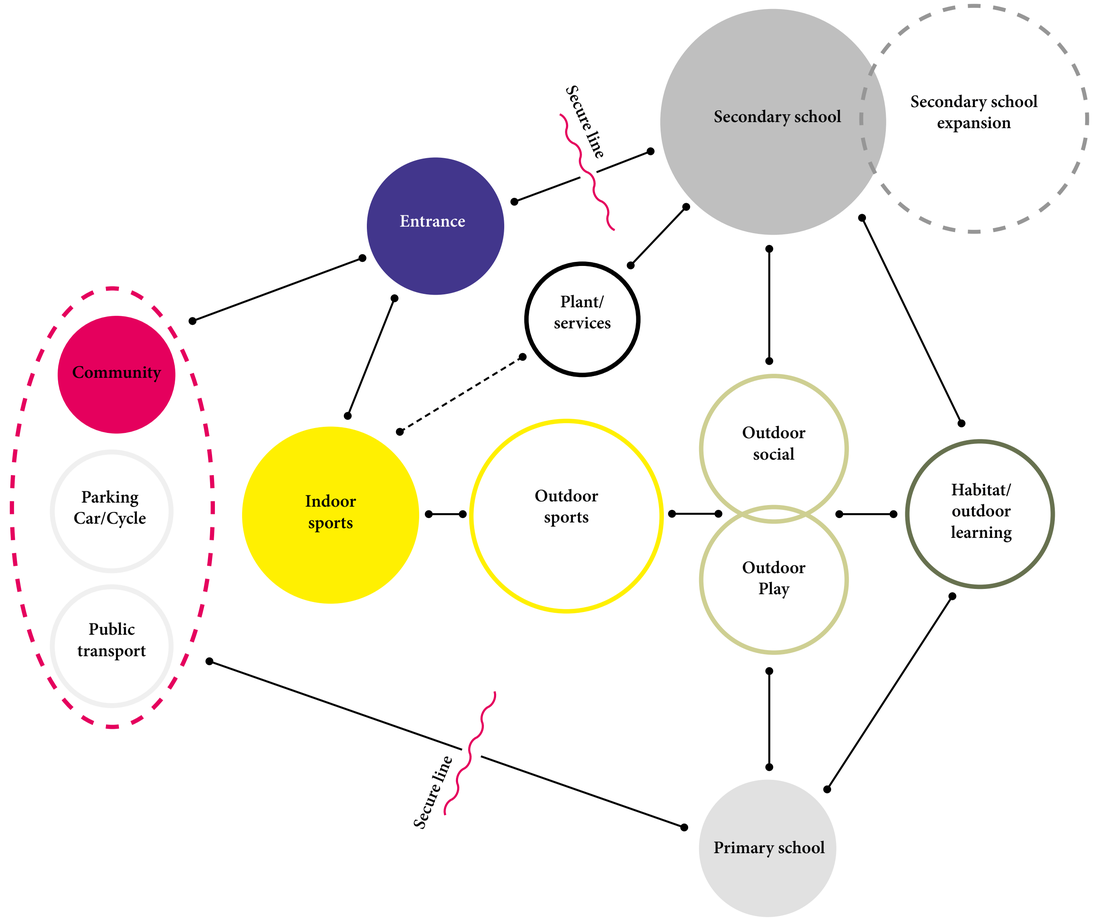
Ability to Extend



Co-Location



Orientation



Connections

+ Shared community entrance between secondary school and sports centre
+ Connection between primary and secondary school could be provided via shared outdoor space
+ Potential for shared outdoor learning space
+ Aim for plant and services to be shared between secondary school and sports centre

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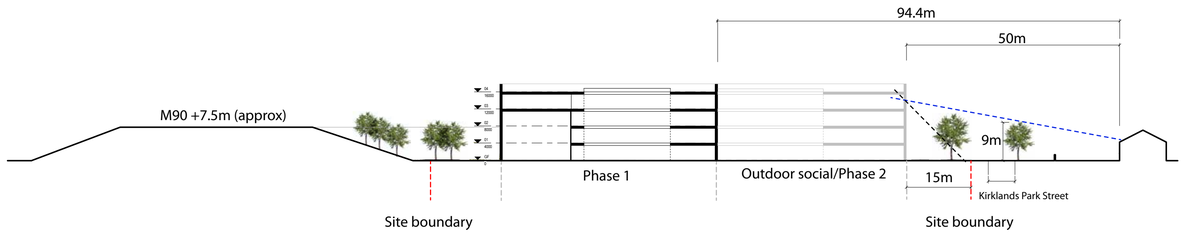
Site approach - Alternative 1

Site plan



Short section through site

1. Shared Public Realm
2. Shared Spaces
3. Social / Assembly Spaces (Less Noise Sensitive)
4. Teaching Spaces
5. Future Extension
6. Pedestrian Crossing
7. Cycle Storage
8. Sports Centre
9. Service / Emergency w/ Reversing Head
10. MUGAs
11. Social Spaces Outdoor Spillout
12. South Facing Outdoor Space

View from Stirling Road roundabout

View from Kirklands Park Street looking south

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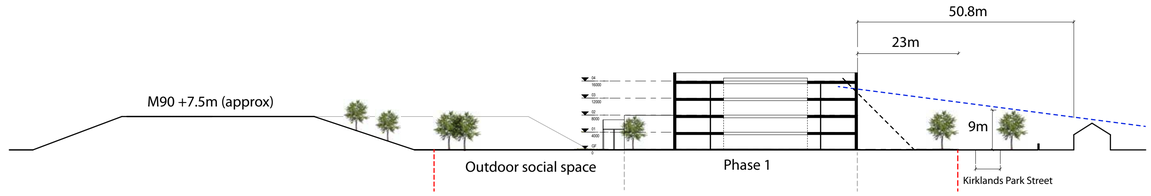
Site approach - Alternative 2

Site plan



Short section through site

1. Shared Public Realm
2. Cycle Storage
3. Social / Assembly Spaces
4. Teaching Spaces
5. Future Extension
6. Pedestrian Crossing
7. Pedestrian Entrance
8. New linear car park
9. Sports Centre
10. Alternative Pedestrian Entrance for Stu dents
11. Small 3G Pitch (Not Sports Scotland Compliant)

View from Stirling Road roundabout

View from Kirklands Park Street looking south

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Layouts to support a Sport Scotland Pitch

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Sustainability - Passivhaus

Passivhaus Principles

Passivhaus is a fabric first, whole-building approach to delivering net-zero buildings. It provides clear, measured targets and is certified through an exacting quality assurance process. Its key principles are as follows and as illustrated below:

+ Orientation - optimisation of solar gain and balance of heat loss through windows against heat gains and daylighting.
+ Simple form - reduces heat loss and embodied carbon. The relative simplicity of a building form is known as it's form factor. Passivhaus buildings aim to achieve a form factor of 3 or less.
+ Airtight - keeps in heat, avoids interstitial condensation. No draughts.
+ Super insulation - for high thermal comfort. Continuous layer of insulation and triple glazing required.
+ Minimise thermal bridging - robust detailing and minimal thermal bridging reduces condensation risk and heat loss. Keep form simple to reduce junctions and so reduce opportunities for thermal bridging.
+ Use of MVHR - whole building mechanical ventilation recovers heat from extracted air and filters incoming air to remove pollutants.

At this early stage, prior to detailed design and input from other disciplines, the proposals have been developed taking into consideration the two key principles of orientation and simple form.

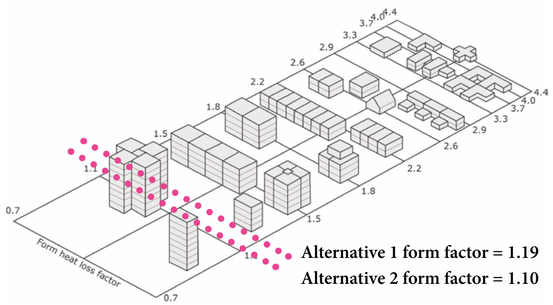


Diagram illustrating from factor

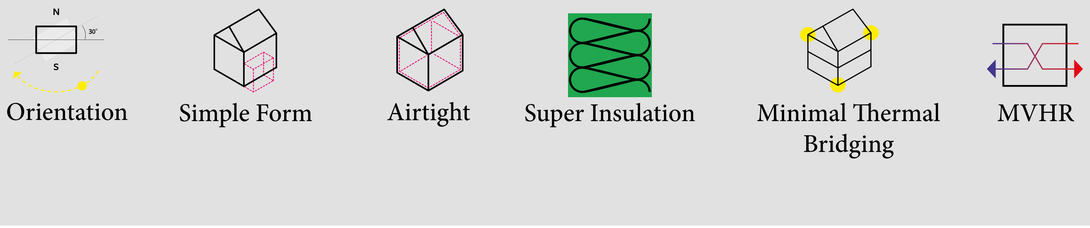


Diagram illustrating key Passivhaus priciples

Building Performance Modelling

In order to get an early understanding of how the proposed alternative layouts will perform in terms of thermal and energy efficiency, concept stage Passivhaus modelling has been carried out using DesignPH software.

The modelling has been based on the early stage design information available and will require further development as the design evolves and more information is available. Once more data is added to the model, the calculated annual heat demand is likely to increase.

Indicative performance

Alternative 1

Annual heat demand = 8.5 kWh/m²a (target less than 15 kWh/m²a)
Heat loss form factor = 1.19 kWh/m²a (target less than 3)

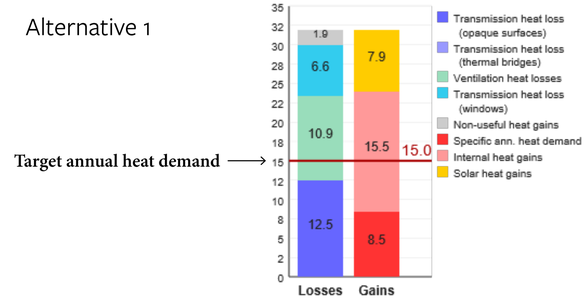
Alternative 2

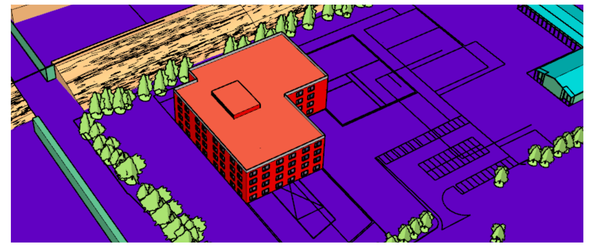
Annual heat demand = 7.3 kWh/m²a (target less than 15 kWh/m²a)
Heat loss form factor = 1.10 kWh/m²a (target less than 3)

Summary of results

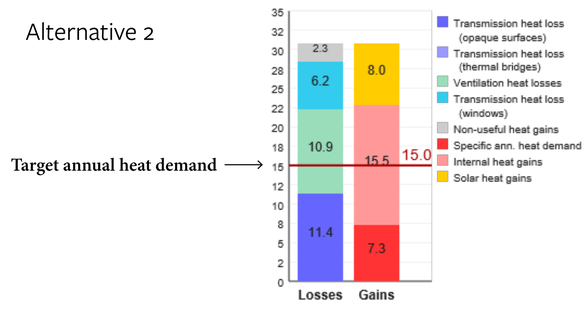
+ Both alternatives perform well for both annual heat demand and heat loss form factor with figures well below the targets.
+ Alternative 2 performs slightly better than alternative 1 because it has a simpler, more compact form
+ Both options will require shading to the glazing on the southern and eastern façades

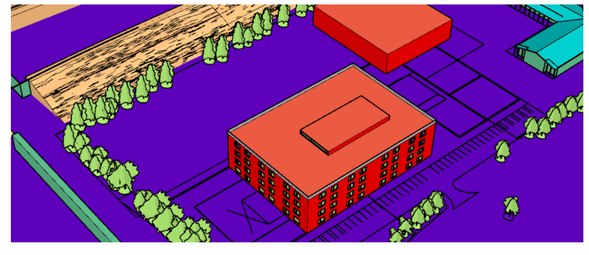
Alternative 1





Alternative 2





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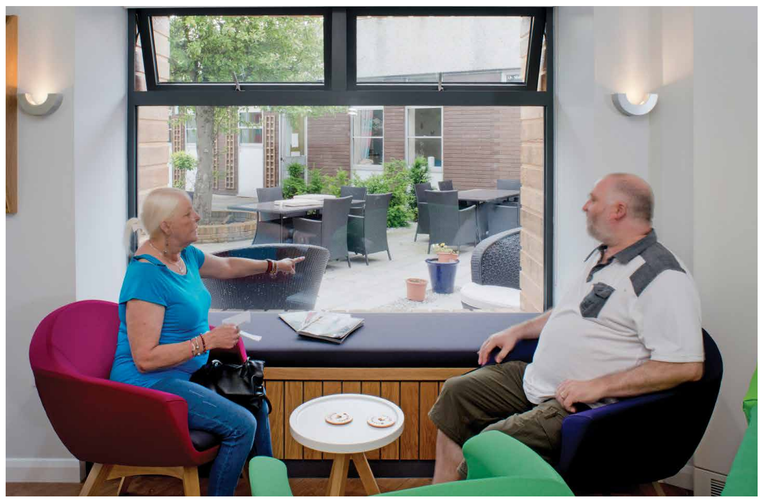
Sustainability - an holistic approach

Sustainable development goes further than building performance. The new secondary school would encompass many different aspects of sustainable design

Community

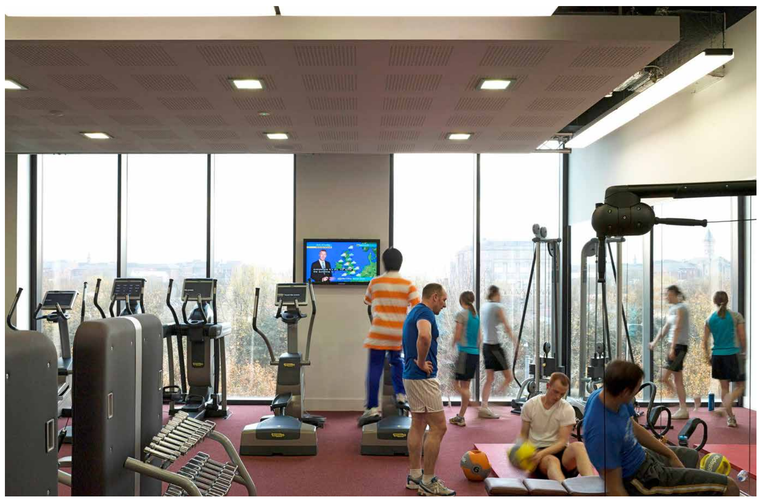
Sustainable transport

Connectivity to nature



Connection and collaboration

Indoor environment



Lifestyle