BATTLE McCARTHY©
Consulting Engineers & Landscape Architects

PROJECT:
Bartholomew Central Middle School, Indiana, USA

CLIENT:
Bartholomew School Board

ARCHITECTS:
Perkins & Will

BM SERVICES:
Schematic Building Services (MEP) Engineering, Sustainable Design & Landscape Architecture

VALUE:
$40million (approx)

DESIGN BRIEF

To create a demonstration sustainable school design for the new Middle School for Bartholomew School Board, Columbus, Indiana. The design team wanted to deliver a school design that not only met best sustainable practice, but also provided a didactic teaching tool for students and teachers to interact with alike, either on an informal (by assimilation) or formal (classes) basis.

DESIGN INITIATIVES/ACTIONS UNDERTAKEN

The design combines a series of sustainable technologies and systems and was informed by the following key objectives:

- The building should be day lit.
- The building must be climate responsive.
- It should be ultra low energy.
- MEP systems should be easy to install and run, have low running costs and be flexible to future needs and demands.
- Renewable energy systems should be integrated wherever possible.
- The landscape should be natural, a learning tool, and environmentally responsive.

Battle McCarthy worked closely with the architectural team and CSO Engineers to develop an integrated design that matched building form, massing, orientation and layout to climate.

Detailed climate analysis was carried out which indicated that cold winters and hot, humid summers characterise the climate. Winds are fairly constant and prevailing from the south west in summer and the north west in winter. There is plentiful daylight all year round and strong sun in summer.

In response, a main street running north-south was designed to pick -up eastern sun and provide passive solar heating in winter. This area employs displacement ventilation for summer cooling and winter heating, and natural ventilation during the midseason period when large rotating wind towers are used to capture the power of the prevailing winds. The west side is protected from excess solar gain but a bank of classrooms and the east side has external shading set to allow winter solar heating but to deflect summer solar gain.

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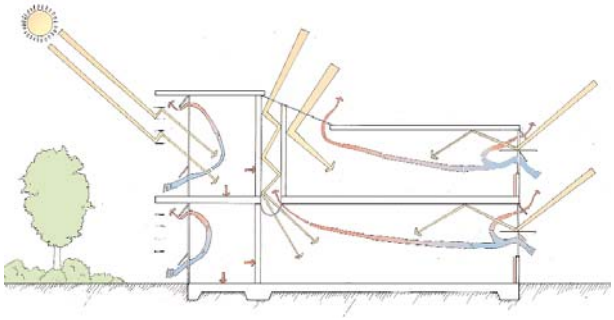


Mid-season Operational Section

The main form classrooms were positioned off the main street on an east-west axis with the classrooms facing north to maximise the benefit of daylighting, with little need for solar heating in these spaces even in mid winter due to the high concentration of children. Each class has a social and meeting space/corridor, which is placed on the south side to act as a solar buffer. This also allows direct access to a garden space. Planting in this area reduces the impact of solar gain and provides passive landscape cooling.

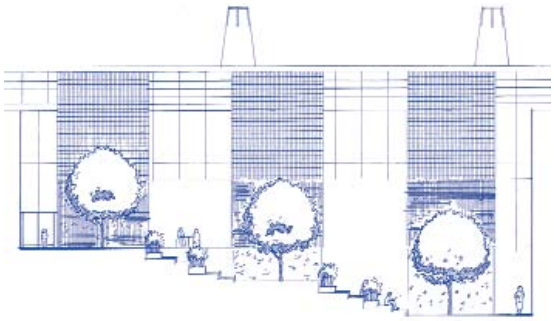
The science blocks face west with a saw tooth façade, which effectively orientates the whole façade to the northwest. This, in combination with vertical shading, effectively neutralises the impact of solar gain except at the end of the day on a summers evening.

Much care was taken over developing a daylight strategy that ensures good daylight to all occupied spaces including the sports hall, swimming pool and dining facilities.

Part of Landscape Masterplan

The landscape was designed to ensure a seamless progression between the internal and external spaces of the school, creating a high quality environment that responds to the needs of its users, provides flexibility and is a resource for the school and the community.

Outdoor Classroom

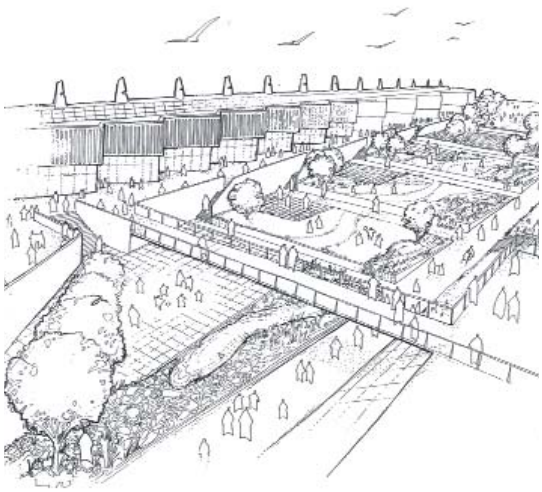


Entrance Area

The structured landscape design consisted of:

- Multi-use entrance area enabling formal and informal play.
- 3 outdoor classrooms.
- Dynamic and exciting outdoor art room.
- Secluded sunken garden.
- Sports area with running track and pitches.
- Central open space with seasonal river system and science pond.

Native planting, habitat creation, rainwater collection and recycled materials were combined to create a learning landscape with areas of formal play and education as well as exploration and excitement.



Concept Drawing

These elements all combine to create a holistic, integrated and sustainable architectural solution that will deliver a school that not only stimulates the children and teachers but also delivers a way forward for a sustainable future.