SCIENCE COMMONS SUSTAINABILTY TOUR GUIDE

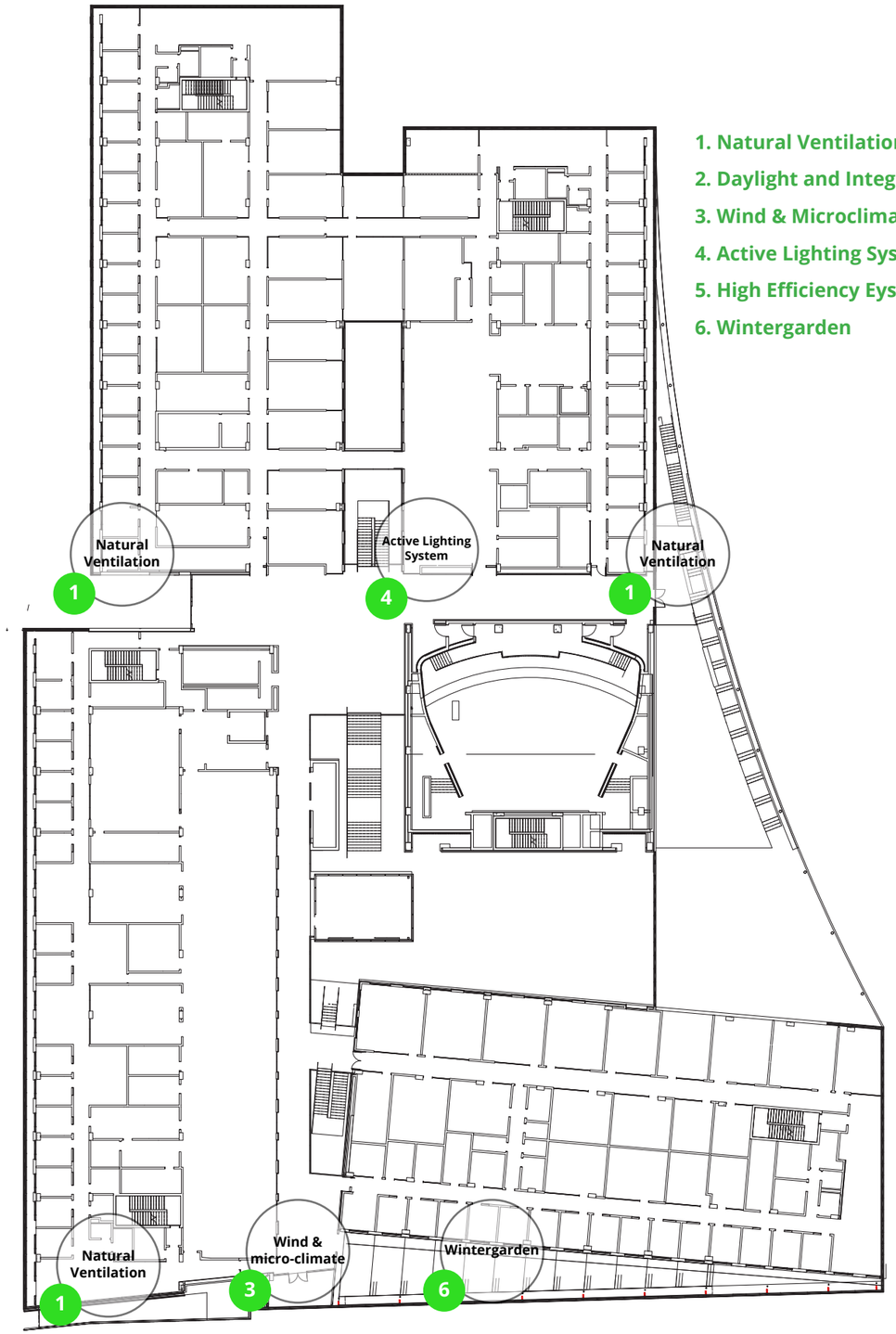
BOOKLET

SUSTAINABILITY TOURS:

The University of Lethbridge is committed to the planning, design and implementation of sustainable facilities. The Science Commons is an example of how we leveraged the unique climate of Lethbridge to deliver one of the most sustainable buildings of its type in Canada.

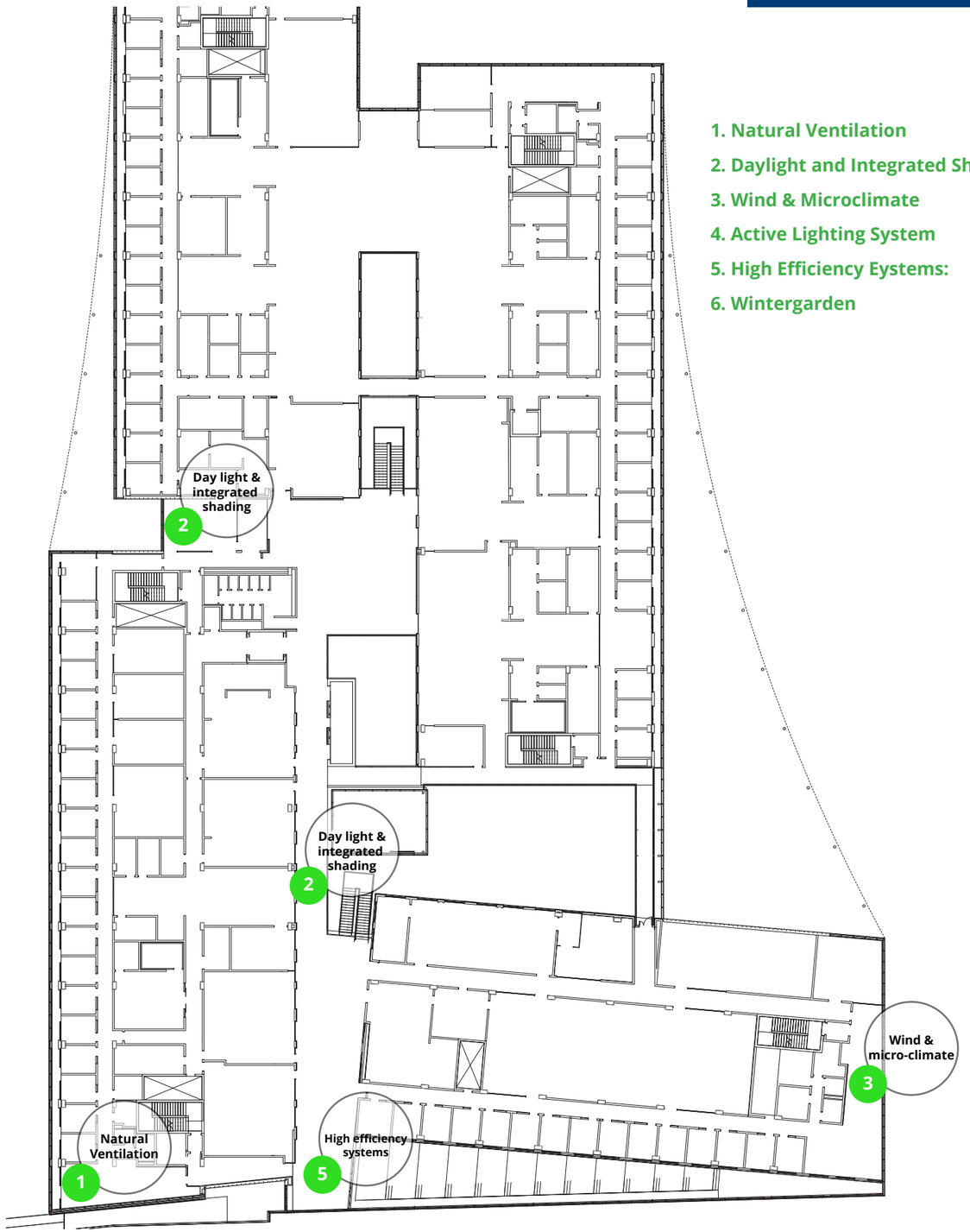
If you would like to be part of the next tour of the Science Commons please contact **Gene Lublinkhof**, Director Campus Development at **gene.lublinkhof@uleth.ca**

LEVEL 8



1. Natural Ventilation
2. Daylight and Integrated Shaing
3. Wind & Microclimate
4. Active Lighting System
5. High Efficiency Eystems:
6. Wintergarden

LEVEL 9



1. Natural Ventilation
2. Daylight and Integrated Shaing
3. Wind & Microclimate
4. Active Lighting System
5. High Efficiency Eystems:
6. Wintergarden

LEVEL 6

LEVEL 7

1.Natural Ventilation

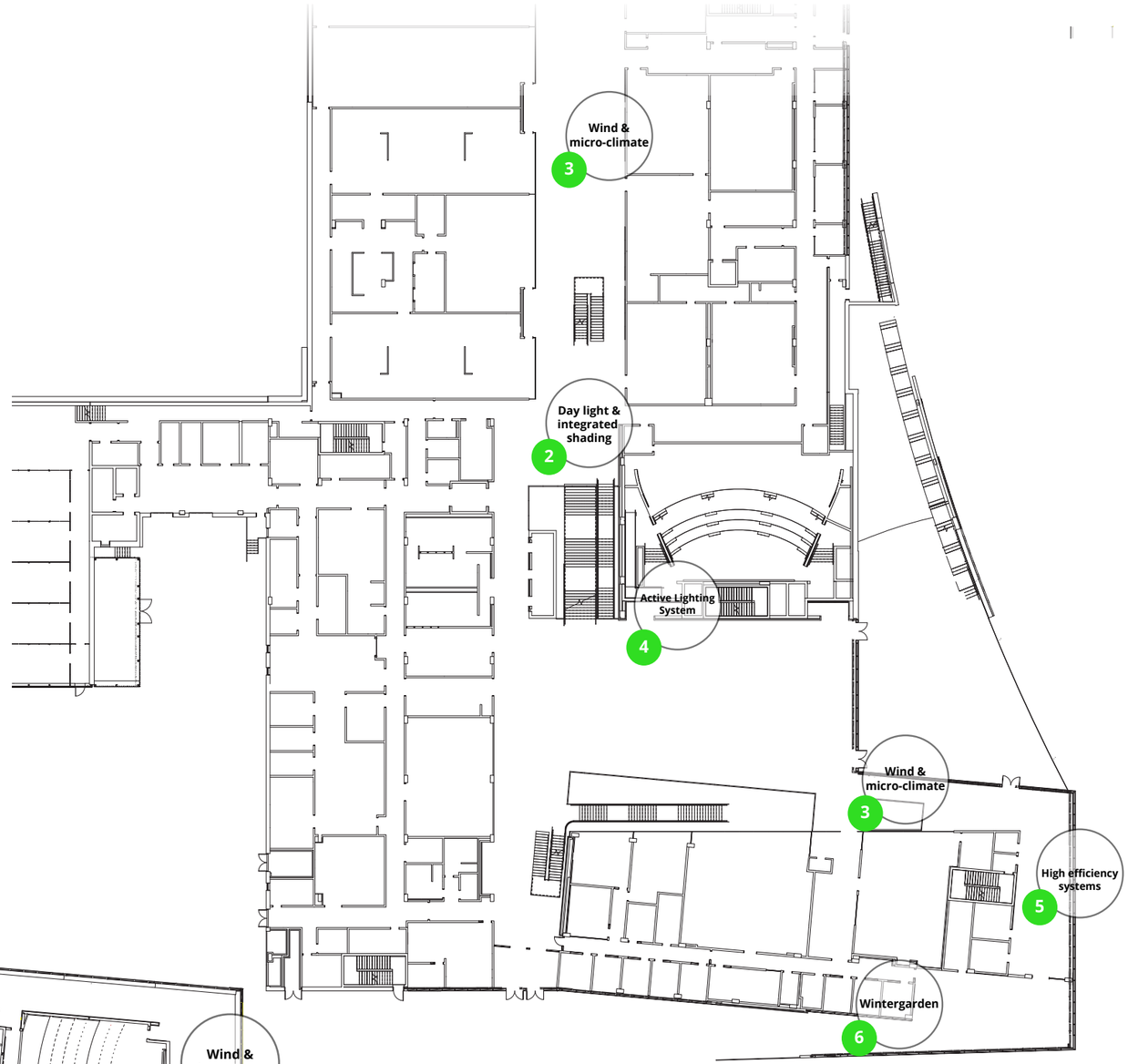
2. Daylight and Integrated Shaing

3. Wind & Microclimate

4. Active Lighting System

5. High Efficiency Eystems:

6. Wintergarden



Welcome to the Science Commons. This is the most advanced facility for science education and research in Canada – and it's right here in southern Alberta at the University of Lethbridge.

Science Commons is home to the departments of Biological Sciences, Chemistry & Biochemistry, Neuroscience, Physics & Astronomy, and Psychology. The name was chosen to reflect the fact the building brings together different departments in an environment that stimulates collaboration and brings a multidisciplinary approach to solving the complex problems of today and tomorrow.

The main idea behind using the word "commons" reflects the fact that this facility is inviting, not to only our scientists, but to everyone across campus and the community.

This is a science centre for all of southern Alberta. Students from Kindergarden to PhD, faculty and community members have boundless opportunities for hands-on learning, collaboratio and discovery at Science Commons

The Science Commons was intentionally designed to enhance the University's sustainability. The facility demonstrates Leadership in Energy and Environmental Design (LEED) and aims for Gold LEED Certification.

The sustainable design of the Science Commons enables it to be 40% more efficient than a comparable science facility. This self-guided tour guide will take you through the building to see how we are taking advantage of these advanced technologies and techniques.

SUSTAINABILITY POINTS

1. Natural Ventilation & Double Facade:

- The Science Commons is designed with an innovative double façade system. Air enters the building through exterior windows that are controlled by the Building Management System.
- The percentage of windows open is altered to suit exposure, time of day, wind speed/ direction, and interior temperature/humidity. Radiant Heating/Cooling is integrated into the concrete floor slabs and perimeter radiators further condition the air to provide a comfortable office environment.
- Based on the local weather data, natural ventilation is possible at least 50 % of the time with some preconditioning through the building's natural ventilation instruments.
- Interior Blinds and user operable windows into the double façade can be controlled by the occupants to tailor their individual environmental requirements.
- By integrating natural ventilation into our sustainability strategies, the science commons is anticipated to be 50% more energy-efficient than a conventionally designed facility. Figure.1

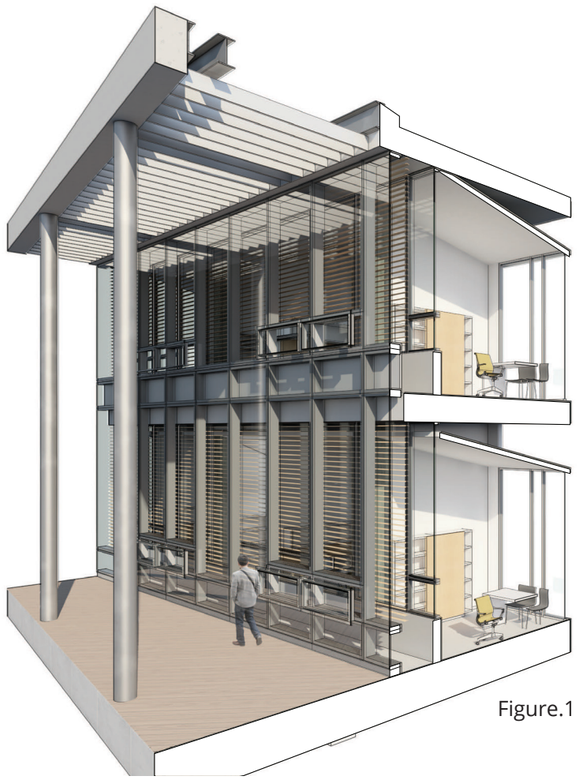


Figure.1

2. Daylight and Integrated Shading:

- Daylighting is an essential component of the Science Commons. In order to bring light as far into the footprint as possible innovative "light scoops" have been introduced into the space between each lab block, directly above the building's public spaces.
- Each light scoop consists of clerestory glazing that reflects and diffuses light downward into the public space.
- Clerestory glazing is more economical to build and maintain than skylights and the quality of the light is softer and more uniform.
- As the sun moves over the course of the day, light conditions will subtly change, animating the building interior.

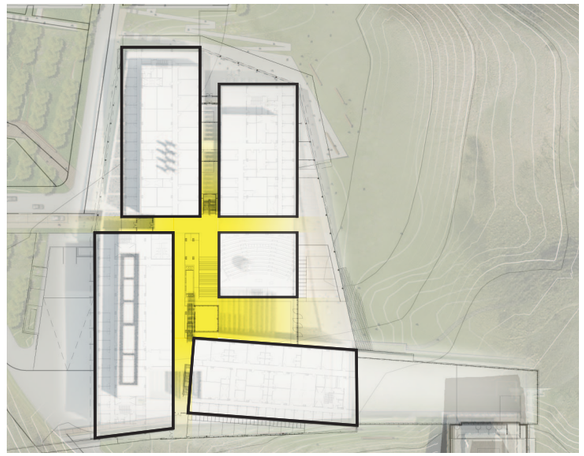


Figure.2

- Approximately 80% of the spaces in the Science Commons receive some level of natural light via floor to ceiling exterior windows, interior glass partition walls, and light scoops.
- This strategy enables up to 50% of the spaces in the science commons to be naturally lit during available daylight hours.
- Connecting building occupants to exterior views and sunlight increases productivity, creativity and general well-being as well as a decreased reliance on artificial lighting (Figure.2&3)

3. Wind & Microclimate:

- In order to investigate the impact of the strong Lethbridge winds on pedestrian comfort and safety, a wind and microclimate engineer analyzed the effect the design of the building has on the surrounding area.
- A scale model of the Science Commons and its immediate environment was constructed and tested in a wind tunnel. Sensors were placed on the model at primary building entrances, walkways, outdoor terraces, parking lot and roofs to determine conditions at various times of year.
- Wind conditions that exceed the established criteria were identified and control measures incorporated into the design.

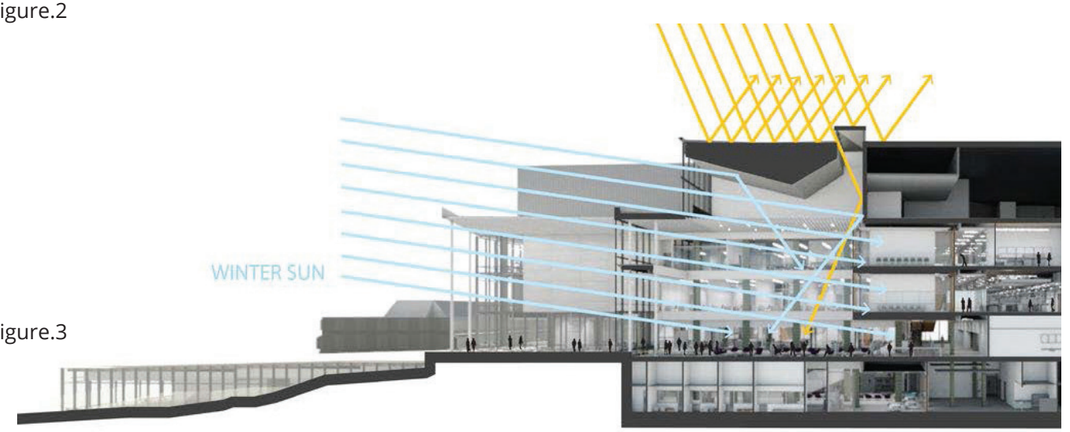


Figure.3

- In addition, the wind tunnel was used to identify and provide recommendations for efficient air intake positioning, analyse potential effects of idling vehicles at the loading dock, optimised placement of cooling towers and mechanical equipment to mitigate any potential re-entrainment of exhaust air into adjacent buildings.
  Figure.4

4. Active Lighting System:

- The Science Commons is equipped with a distributed digital lighting (DDS) control system to provide maximum control and flexibility.
- The lighting system was designed taking into account natural lighting cycles both daily and seasonally, occupancy, reflectivity of interior walls and ceilings, transparency of partition assemblies, and access to exterior light (daylight autonomy).
- Integration of the lighting control system with light level sensors and lighting schedule is intended to make the maximum use of natural light and reduce electrical consumption.

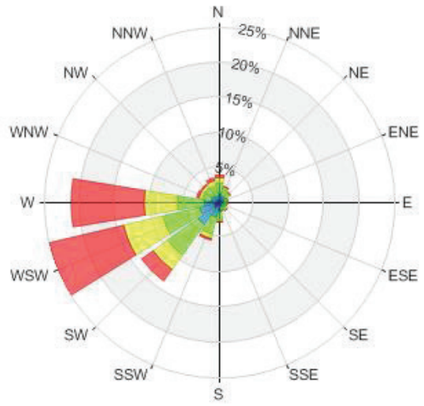
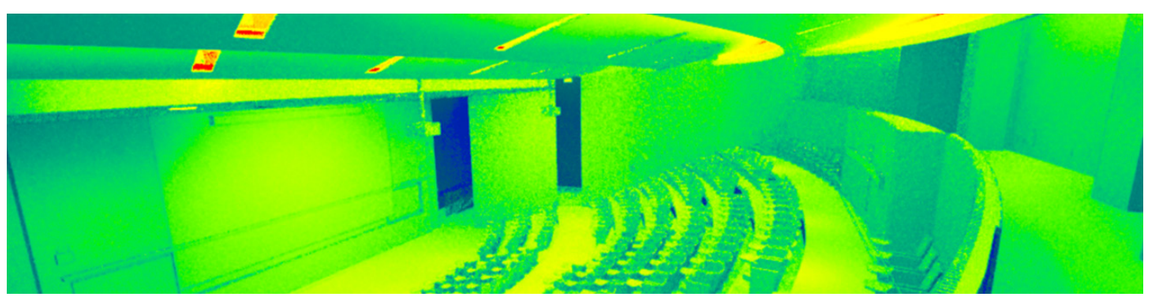


Figure.4

- Facility Managers are able to monitor energy usage and occupancy to tailor light settings to meet the user's needs seamlessly.
- The lighting fixtures selected for the Science Commons are all state of the art low energy LED. Many of the LED fixtures are equipped with motion sensors and are programmed to provide the most appropriate light levels without wasting energy. The longevity of LED fixtures is anticipated to reduce maintenance costs dramatically. Figure.5

Figure.5



5. High Efficiency Eystems:

- The Science Commons is equipped with a state of the art digital building management and control system (BMS) that is used to monitor and automate all mechanical and ventilation systems.
- The BMS consists of a network of input and output devices that enable precise control over the active mechanical systems and allow an innovative integration of passive solar and ventilation strategies.
- The Science Commons also uses a series of heat transfer technologies that harvest heat/ cooling from outgoing ventilation air to be transferred into the incoming air. This strategy "recycles" energy and significantly reduces overall heating and cooling costs.
- These actively monitored systems are integrated into a whole building design that incorporates passive natural ventilation and active mechanical heating, ventilation and air conditioning systems.
- The integrated energy model of the Science Commons is anticipated to result in a 40% reduction in energy consumption compared to a conventionally designed facility. Figure.6.

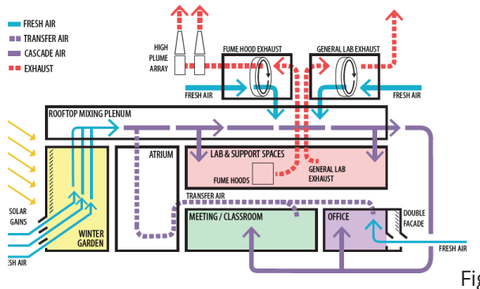


Figure.6

6. Wintergarden:

- The Wintergarden takes advantage of the south facing sun exposure to pre-heat the air entering the building ventilation system. The temperature in this space is regulated by Venetian blinds and opening windows that are linked to sun tracking sensors. Depending on conditions, the Wintergarden uses incoming fresh air and/or recirculated air from the main atrium as a preheating strategy before the air is drawn into the ventilation system on level 10.
- This space also serves as an informal gathering and social space for building users to enjoy the sunshine and fresh air between classes. Figure.7

Figure.7