Jesse Chesnutt, Jake Culkin, Ethan Zelinsky

Dr. Wunderlich

Green Architectural Engineering

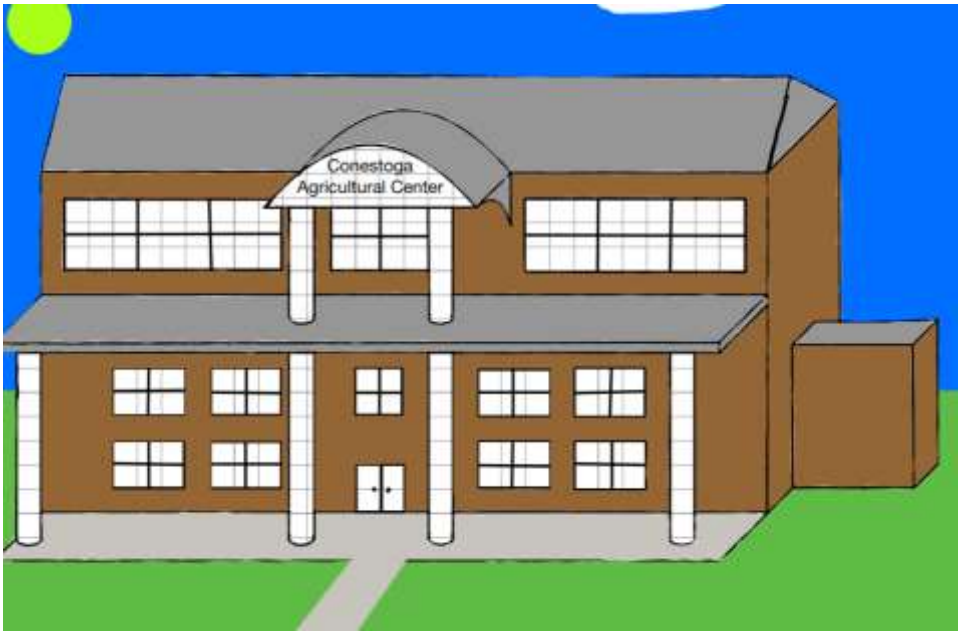
4/27/24

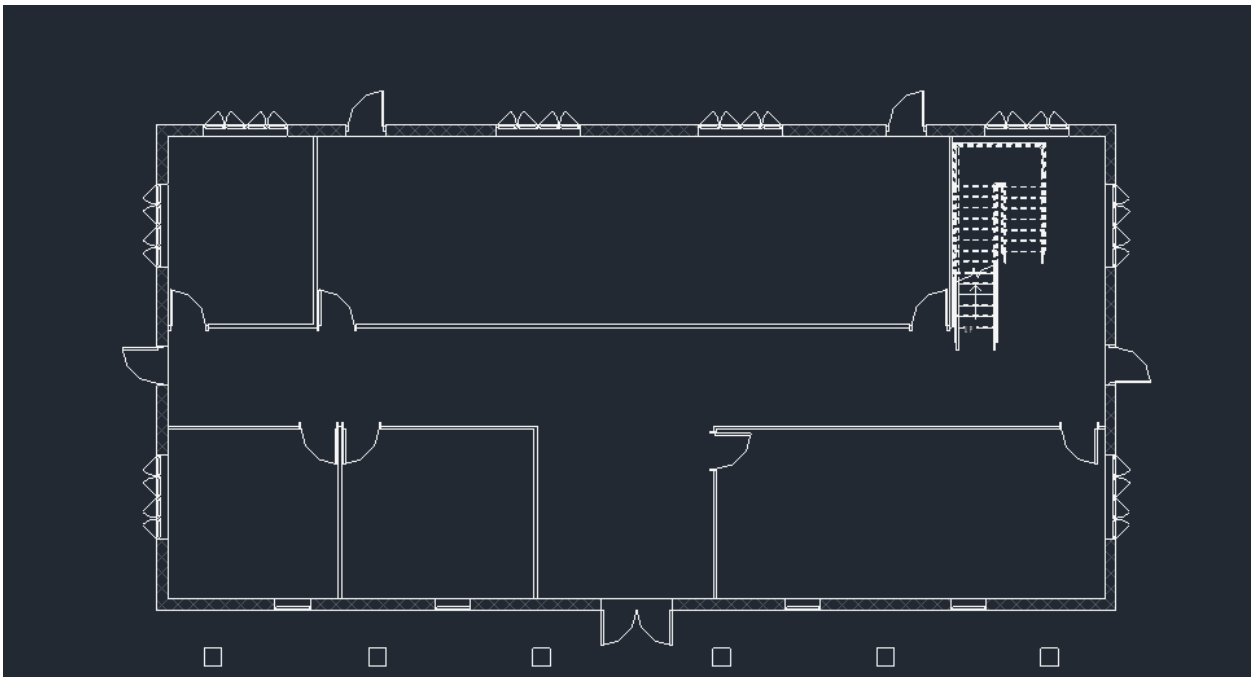
Project 2 LEED Platinum Development

From our first LEED project, we wanted to take away some key components from our first designs. Firstly, taking our project to be climate and environmentally conscientious will go into our detailed design of the Conestoga Center for Agriculture. Promoting climate awareness, clever building designs by making the most of our environment, and making a walkable and intuitive addition to Elizabethtown College is our goal for this school of Agriculture. Building off these key ideas, we plan to incorporate the following features from each lecture into our school of agriculture:

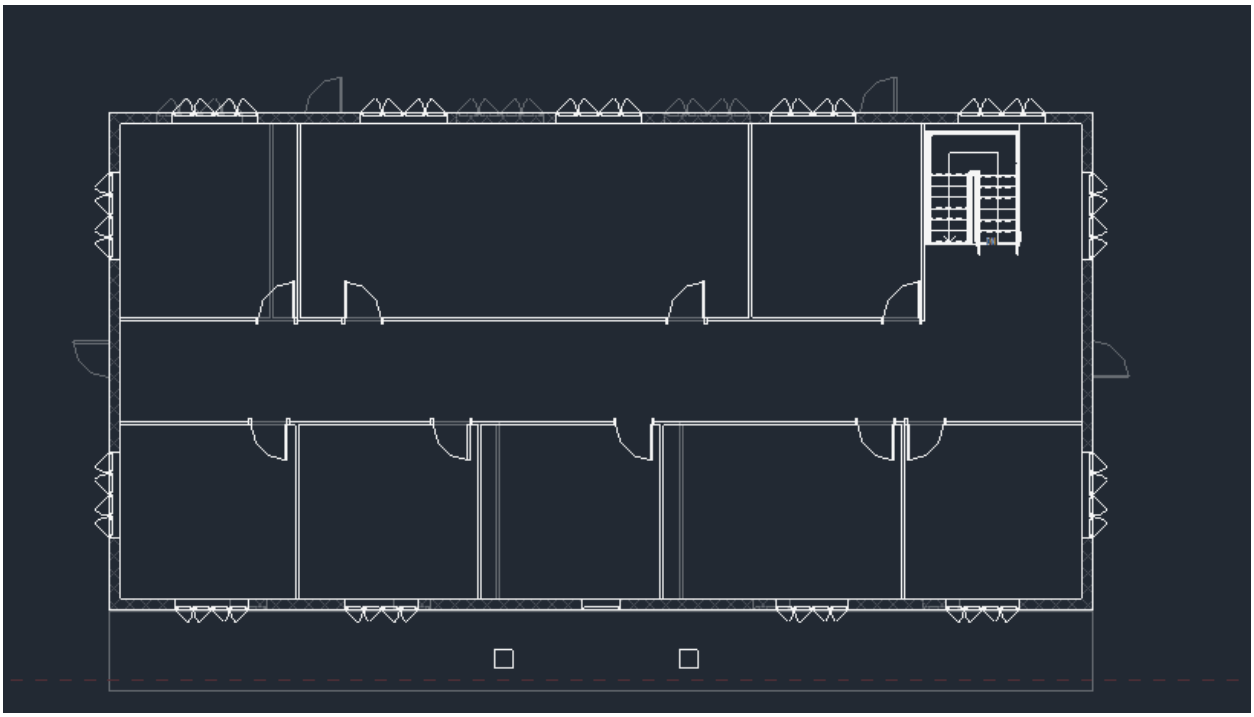
1. Heat Transfer: Having weather stripping along doors and windows to keep heat inside will help significantly during winter months when less natural heat is coming in. Air exchanges are an important but challenging problem to overcome, especially since it's a very large, very populated location. Having a centralized HVAC system would be the standard for airflow and filtration, to fight against mold and particulates spreading and harming the building or people in it.
2. Prioritizing health and safety can come from systems not directly in the building's architectural features. However, we did learn of incorporating UV-C disinfection into the HVAC system to kill airborne pathogens while keeping airflow clean and clear of chemicals.
3. Using natural sunlight throughout the day and differing temperatures annually, we can cut back on energy consumption and cooling through window placement making the most of sunlight coming in, facing the southern side with our solar panels.
4. In the northern hemisphere, the sunlight brings in the most light on the southern side of buildings, so windows can bring in the most heat and solar panels the most energy.

5. Passive solar heating is an implement that can be developed not only using windows and spacing, but interior design, such as darker colors like black, blue, and grey carpeting to soak in heat and release it into the room. Interior design can have warmer natural heat alongside one part of the building and dedicate more warm air circulation into places with less exposure to the sun.
6. As mentioned before, active solar heating can come from southern-facing solar panels, collecting energy during the day and either storing it or implementing it into the school's needs, like heating and airflow.
7. The way we are implementing passive heating and cooling is through our roof and overhang design allowing shielding from the harsh summer light and allow the lower winter sun to shine through and provide radiant heating.
8. Through our use of skylights, we aim to illuminate the second floor as well as the large lecture hall. For the first floor with our south face, we want to have a large auditorium with its primary light brought in through the windows.
9. With the use of automated window and controls during the evening when less power is being taken from the grid the windows on the top floor can open as well as the skylights allowing for the Venturi effect to occur and pass hot air to be replaced with cooler air cooling the building and reducing the energy consumption.
10. With proper insulation our thermal envelope should be high. The method we aim to use expanding foam, to offer the highest R per inch resulting in the lowest heat lost.
11. We aim to use water heating throughout our building due to it being the most comfortable, having the best MRT, can be integrated to a hot water system for floor heating and built into walls for cooling, and finally its quiet so it should cause no disturbance in classrooms.
12. By adding acoustic paneling to Celling's and selecting walls we can lower our STI making it, so professors have a more intelligible voice from more spots in the classroom.

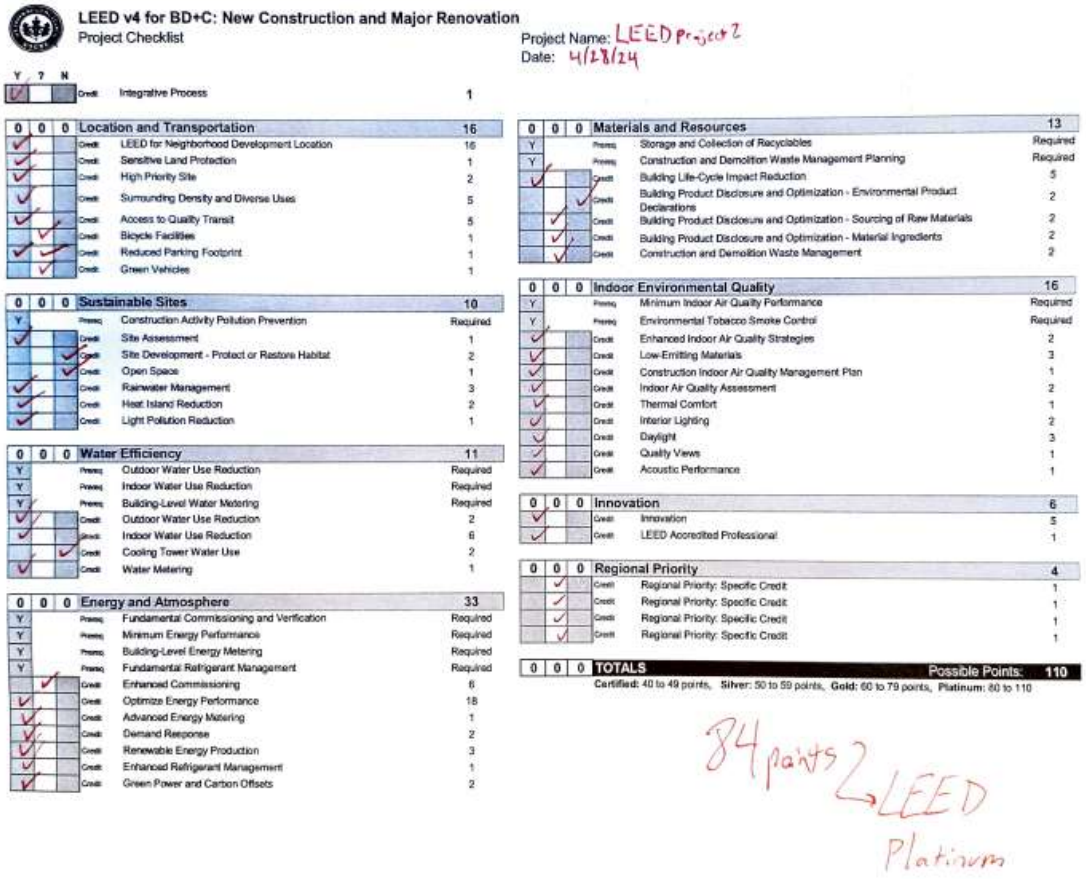

Conestoga
Agricultural Center



Floor 1



Floor 2



LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

Project Name: LEED Project 2
Date: 4/28/24

Y	?	N			
✓			Credit	Integrative Process	1

0	0	0	Location and Transportation	16
✓			Credit	LEED for Neighborhood Development Location	16
✓			Credit	Sensitive Land Protection	1
✓			Credit	High Priority Site	2
✓			Credit	Surrounding Density and Diverse Uses	5
✓			Credit	Access to Quality Transit	5
✓			Credit	Bicycle Facilities	1
✓			Credit	Reduced Parking Footprint	1
	✓		Credit	Green Vehicles	1

0	0	0	Sustainable Sites	10
Y			Prereq	Construction Activity Pollution Prevention	Required
✓			Credit	Site Assessment	1
		✓	Credit	Site Development - Protect or Restore Habitat	2
		✓	Credit	Open Space	1
✓			Credit	Rainwater Management	3
✓			Credit	Heat Island Reduction	2
✓			Credit	Light Pollution Reduction	1

0	0	0	Water Efficiency	11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
✓			Credit	Outdoor Water Use Reduction	2
✓			Credit	Indoor Water Use Reduction	6
		✓	Credit	Cooling Tower Water Use	2
✓			Credit	Water Metering	1

0	0	0	Energy and Atmosphere	33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
	✓		Credit	Enhanced Commissioning	6
✓			Credit	Optimize Energy Performance	18
✓			Credit	Advanced Energy Metering	1
✓			Credit	Demand Response	2
✓			Credit	Renewable Energy Production	3
✓			Credit	Enhanced Refrigerant Management	1
✓			Credit	Green Power and Carbon Offsets	2

0	0	0	Materials and Resources	13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
✓			Credit	Building Life-Cycle Impact Reduction	5
		✓	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
	✓		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
	✓		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
	✓		Credit	Construction and Demolition Waste Management	2

0	0	0	Indoor Environmental Quality	16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
✓			Credit	Enhanced Indoor Air Quality Strategies	2
✓			Credit	Low-Emitting Materials	3
✓			Credit	Construction Indoor Air Quality Management Plan	1
✓			Credit	Indoor Air Quality Assessment	2
✓			Credit	Thermal Comfort	1
✓			Credit	Interior Lighting	2
✓			Credit	Daylight	3
✓			Credit	Quality Views	1
✓			Credit	Acoustic Performance	1

0	0	0	Innovation	6
✓			Credit	Innovation	5
✓			Credit	LEED Accredited Professional	1

0	0	0	Regional Priority	4
	✓		Credit	Regional Priority: Specific Credit	1
	✓		Credit	Regional Priority: Specific Credit	1
	✓		Credit	Regional Priority: Specific Credit	1
	✓		Credit	Regional Priority: Specific Credit	1

0	0	0	TOTALS	Possible Points:	110

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

84 points → LEED Platinum

Going through LEED criteria, our site for the Conestoga Center for Agriculture would be placed on surveyed ground, ensuring a clear, safe zone that avoids serious environmental impact, most especially for protected wildlife. Sustainable site design can come from gardens sprinkled around the perimeter of the school, to counteract the decrease in grass space. Utilizing the same water system as around campus to be both easy to integrate and follow the same plan to efficiently use and save water. Utilizing solar panels and the solar farm on campus are the best way to be self-sufficient on campus, though external energy use is likely needed due to sheer size. Waste management through trash and recycling areas seems to go hand in hand with an agriculture school, where food waste can be decomposed, and plastics can be sorted and recycled. Having a centralized HVAC system and making the most of sunlight to both provide warm and cool temperatures can keep the building comfortable all year long. Overall, an

agricultural school can shine as a strong example of what it means to build sustainably and teach others how to work and design for a better future.