
ECS Case Study #3

— Ryker Belnap and Kira Langer —

Site Description

- Used to function as the student union building, now it is mainly administration.
- Built next to the Sixth Street gold parking lot.



Air, Water, & Food



- Pollutes Air - Cleans Air
 - The building has a furnace system that pollutes the air. There are plants that clean the air.
 - Score= -50
- Pollutes Water - Cleans Water
 - The water from the site runs into the sewer or flower beds, except the small green roof. The site doesn't have a retention pond, a substantial green roof, or a living machine system.
 - Score= -50
- Wastes Rainwater - Stores Rainwater
 - Rainwater on areas other than the green roof runs into flower beds or the stormwater drain. This site doesn't collect or reuse rainwater.
 - Score= -50
- Consumes Food - Produces Food
 - There is no food produced on this site. Any food consumed is either brought in or bought from expensive vending machines.
 - Score= -100

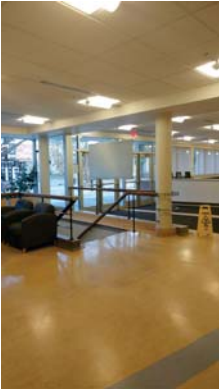


Soil, Waste, Habitat, & Energy

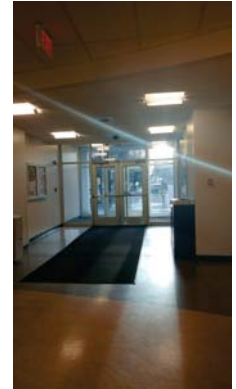
- Destroys Rich Soil - Create Rich Soil
 - There are a couple flower beds on site surrounding the parking lot. They aren't enough to keep the soil nutrient rich, or create a better environment for the bugs living in it.
 - Score= -50
- Dumps Wastes - Consumes Wastes
 - All waste is dumped. Water isn't recycled, pollutants are thrown out or enter the atmosphere, and all garbage is thrown into the dumpster. There is a recycling bin near the site, but it looks like it is for the Greek house behind the building.
 - Score= -75
- Destroys Habitat - Provides Habitat
 - There is no area on the site that provides habitat. There are no trees, bird houses, or various other areas for wild creatures to feel welcome.
 - Score= -50
- Imports Energy - Exports Energy
 - The site imports all its energy and creates no energy.
 - Score= -100



Transportation, Weather, & Daylight



- Fuel-Powered Transportation - Human Powered Transportation
 - There are bike racks on site, and is within walking distance from the school. But most people drive to the school because they don't live within walking distance.
 - Score= -50
- Intensifies Local Weather - Moderates Local Weather
 - The building is made of concrete in some areas and brick in others which can add to the heat gain but it is light in color. The surrounding area is concrete sidewalks or asphalt. The green roof on top helps combat some of the heat gain.
 - Score= -25
- Electric - Natural Lighting
 - The building has some good natural lighting, there isn't enough of it though. There is also a lot of glare.
 - Score= 25



Heating, Cooling, Repair, & Comfort

- Uses Mechanical Heating - Uses Passive Heating
 - The heating system is forced air through the steam plant. There are no other systems in the building that allow heating to happen.
 - Score= -100
- Uses Mechanical Cooling - Uses Passive Cooling
 - The cooling system is forced air with an air conditioning unit. There are no other systems that allow cooling to happen. There are very few windows that can open in the building, they are manual.
 - Score= -100
- Needs Cleaning and Repair - Maintains Itself
 - The building is exposed to the elements. There are mechanical elements being used to keep occupants comfortable as well. There aren't any systems implemented to help the building clean itself.
 - Score= -100
- Human Discomfort - Human Comfort
 - There isn't contact with the outdoors through air circulation since the air enters through HVAC systems. Windows produce high amounts of glare.
 - Score= -50



Circulation, Air, Materials, & Recycle



- Fuel-Powered - Human Powered
 - The only fuel powered circulation is the elevator. The rest of the circulation is by foot.
 - Score= -25
- Pollutes Indoor Air - Creates Pure Air
 - There aren't very many plants to produce clean air. The majority of the air is through HVAC which need filters changed to keep the air clean.
 - Score= -75
- Virgin Materials - Recycled Materials
 - The building doesn't seem to have recycled materials in the building. It all looks like virgin materials.
 - Score= -100
- Cannot be Recycled - Can Recycle
 - The materials in this building can be reused on other buildings. Glass, concrete, and brick are the main materials.
 - Score= 50



Icon, Neighborly, & Beauty



- Apocalypse - Regeneration Icon
 - This building isn't a great example for regeneration. It does show an attempt with the green roof though.
 - Score= -50
- Bad Neighbor - Good Neighbor
 - This building isn't a bad neighbor, but it doesn't do anything that really benefits its neighbors either.
 - Score= 0
- Is Ugly - Is Beautiful
 - This building isn't the prettiest building, but it isn't a complete eyesore either.
 - Score= 0



Regeneration-Based Checklist for Design and Construction

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Project:		degeneration					sustainability					regeneration					
		-100 always	-75 usually	-50 sometimes	-25 a bit	0 balances	25 a bit	50 sometimes	75 usually	100 always							
the site	pollutes air																cleans air
	pollutes water																cleans water
	wastes rainwater																stores rainwater
	consumes food																produces food
	destroys rich soil																creates rich soil
	dumps wastes unused																consumes wastes
	destroys wildlife habitat																provides wildlife habitat
	imports energy																exports energy
	requires fuel-powered transportation																requires human-powered transportation
	intensifies local weather																moderates local weather
	excludes daylight																uses daylight
	uses mechanical heating																uses passive heating
	uses mechanical cooling																uses passive cooling
	needs cleaning and repair																maintains itself
	produces human discomfort																provides human comfort
the building	uses fuel-powered circulation															uses human-powered circulation	
	pollutes indoor air															creates pure indoor air	
	is built of virgin materials															is built of recycled materials	
	cannot be recycled															can be recycled	
	serves as an icon for the apocalypse															serves as an icon for regeneration	
	is a bad neighbor															is a good neighbor	
	is ugly															is beautiful	
			negative score 2200 possible					positive score 2200 possible									
			1,200					75									
			final score:										1,125				

L.E.E.D.

LEED 2009 for New Construction and Major Renovations		Project Checklist		Project Name	
				Date	
13	12 Sustainable Sites	Possible Points: 26		Materials and Resources, Continued	
Y	Prereq 1 Construction Activity Pollution Prevention		1	Y	Credit 4 Recycled Content 1 to 2
5	Credit 1 Site Selection		1	2	Credit 5 Regional Materials 1 to 2
5	Credit 2 Development Density and Community Connectivity		5	1	Credit 6 Rapidly Renewable Materials 1
6	Credit 3 Brownfield Redevelopment		1	1	Credit 7 Certified Wood 1
6	Credit 4.1 Alternative Transportation—Public Transportation Access		6		
1	Credit 4.2 Alternative Transportation—Bicycle Storage and Changing Rooms		1		
3	Credit 4.3 Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles		3		
2	Credit 4.4 Alternative Transportation—Parking Capacity		2		
1	Credit 5.1 Site Development—Protect or Restore Habitat		1		
1	Credit 5.2 Site Development—Maximize Open Space		1		
1	Credit 6.1 Stormwater Design—Quality Control		1		
1	Credit 6.2 Stormwater Design—Quality Control		1		
1	Credit 7.1 Heat Island Effect—Non-roof		1		
1	Credit 7.2 Heat Island Effect—Roof		1		
1	Credit 8 Light Pollution Reduction		1		
20	6 Water Efficiency	Possible Points: 10		3	
Y	Prereq 1 Water Use Reduction—20% Reduction		2 to 4		
2	Credit 1 Water Efficient Landscaping		2		
4	Credit 2 Innovative Wastewater Technologies		2		
4	Credit 3 Water Use Reduction		2 to 4		
00	23 Energy and Atmosphere	Possible Points: 35		12	
Y	Prereq 1 Fundamental Commissioning of Building Energy Systems				
Y	Prereq 2 Minimum Energy Performance				
Y	Prereq 3 Fundamental Refrigerant Management				
10	Credit 1 Optimize Energy Performance		1 to 19		
4	Credit 2 On-Site Renewable Energy		1 to 7		
2	Credit 3 Enhanced Commissioning		2		
2	Credit 4 Enhanced Refrigerant Management		2		
3	Credit 5 Measurement and Verification		3		
2	Credit 6 Green Power		2		
20	12 Materials and Resources	Possible Points: 14		15	
Y	Prereq 1 Storage and Collection of Recyclables				
3	Credit 1.1 Building Reuse—Maintain Existing Walls, Floors, and Roof		1 to 3		
1	Credit 1.2 Building Reuse—Maintain 50% of Interior Non-Structural Elements		1		
2	Credit 2 Construction Waste Management		1 to 2		
2	Credit 3 Materials Reuse		1 to 2		
				15	
				5	
				15	
				6	
				4	
				110	
				Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110	

Score: 20-2-74

Proposed Redesign Elements

- Expansion of green roof system
- Mounted Photovoltaic panel roof system
- Two-story green atrium space

Expanded Green Roofs

- Expanded green roof surface area by approximately 2200%
- Improves site and building performance
- Would be one of the largest campus green roof systems in the US

Proposed Green Roof Spaces

Current Green Roof



Expanded Green Roofs



- Cleans Air
 - Local vegetation on roof cleans the air and offsets air pollution from heating and cooling systems with a surplus of air purification.
 - Score= 75
- Cleans Water
 - Roof stormwater is directed into soil beds where vegetation treats and purifies the water over time. All roof water can be directed into soil beds (roughly 75% of site)
 - Score= 75
- Stores Rainwater
 - Roof stormwater is directed into soil beds. Soil holds the moisture on site to be used by vegetation. Water runoff from the site is heavily minimized
 - Score= 100
- Produces Food
 - Green roof space on southern half can be accessed from building. Potential for local garden growth provides opportunity for community farm space.
 - Score= 100



Expanded Green Roofs

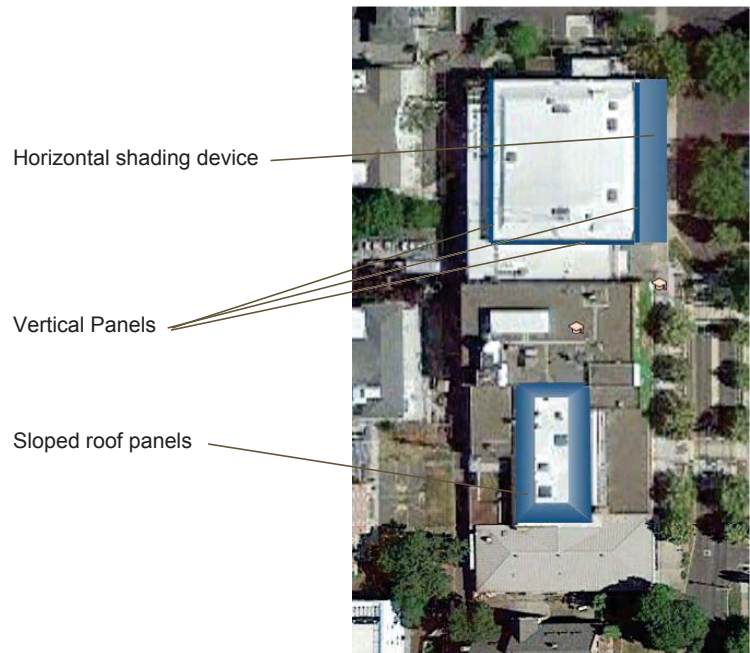


- Creates Rich Soil
 - Roof soil beds counteract the effects of primarily paved or covered ground topsoil. Vegetation growth keeps soil healthy and strong.
 - Score= 75
- Consumes Wastes
 - Stormwater runoff and building gray water used to water the green roofs with recycled water. Composting opportunities are also available from organic waste.
 - Score= 75
- Provides Wildlife Habitat
 - Green roof provides some habitat for birds and insects, especially local bee populations
 - Score= 75
- Maintains Itself
 - Vegetation grows and dies naturally. Gardens protect roof surface and primarily maintain themselves.
 - Score= 25
- Icon for Regeneration
 - Very large green roof becomes campus icon for sustainability and regeneration. Record size helps spread benefits of regeneration to other campuses
 - Score= 100



Mounted PV panels

- Panels along sloped roofs, vertical envelope, and NE corner horizontal shading device
- Allows first case of on-site energy generation on the site
- Assists green roof as symbol for sustainable design



Mounted PV roof panels



- Exports Energy
 - PV Systems allow on-site energy creation. Energy production will still probably not cover the needs of the heavily programmed building year-round however.
 - Score= 0
- Moderates Local Weather
 - PV shading device helps moderate and control temperatures, sunlight, and moisture under overhang area.
 - Score= 50
- Provides Human Comfort
 - PV shading device provides covered outdoor space with adjustable levels of light and sun
 - Score= 25



Two-Story Green Atrium space

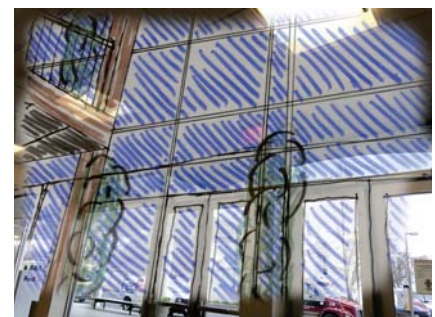
- Gap between floor plate and glazing allows greater light penetration
- Makes space feel bigger, more connected
- Allows growth of plants near glazing wall



Two story green atrium space



- Uses Daylight
 - Increased glazing and wall gap means stronger daylight penetration into the space.
 - Score= 75
- Uses Passive Cooling
 - Gap between wall and floor plate allows heat to move upwards and provide a bit of passive vertical air circulation.
 - Score= -50
- Provides human comfort
 - Lighter, more open zones connect the public spaces in the building and make the space seem more open and inviting.
 - Score= 100
- Creates pure indoor air
 - Plant life near the glazing wall has plenty of absorbable sunlight and helps to purify the indoor air environment.
 - Score= 50
- Is beautiful
 - The glazing wall opens up the Pitman center to the street front and welcomes in light and guests into the bigger, more open common spaces.
 - Score= 75



New Regeneration based Checklist

- Final score of 800 points
- A difference of 1925 points
- Dramatic performance increase, particularly at a site level

	degeneration			sustainability			regeneration		
	-100 always	-75 usually	-50 sometimes	-25 a bit	0 balances	25 a bit	50 sometimes	75 usually	100 always
the site	pollutes air								
	pollutes water								
	wastes rainwater								
	consumes food								
	destroys rich soil								
	dumps wastes unused								
	destroys wildlife habitat								
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	is a bad neighbor								
	is ugly								
	cleans air								
	cleans water								
	stores rainwater								
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uses human-powered circulation									
creates pure indoor air									
is built of recycled materials									
can be recycled									
serves as an icon for regeneration									
is a good neighbor									
is beautiful									

negative score 2200 possible -300	positive score 2200 possible 1100
final score: +800	

Conclusion

Additional green roofing, PV panel installation, and multi-floor daylighting are all effective ways to help a primarily building-filled site and older building become examples of restorative and sustainable design for our campus. While certain areas are more difficult to improve upon due to the building's age and program, huge strides can be made with relatively minor renovations.