

LEED

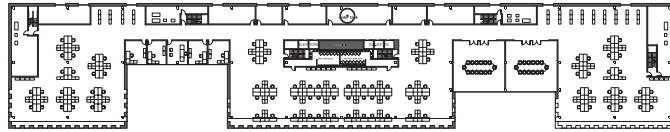
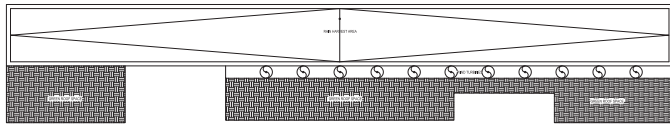
The building was designed to achieve LEED platinum certification. This was achieved through such amenities as renewable energy through photovoltaic panels and wind turbines, geothermal energy, and reuse of rain water.



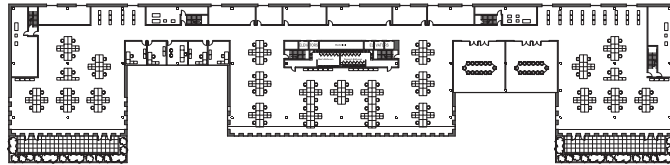
live green

IPRO 335

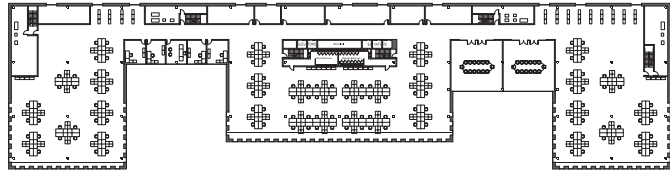
green building design concept + integration



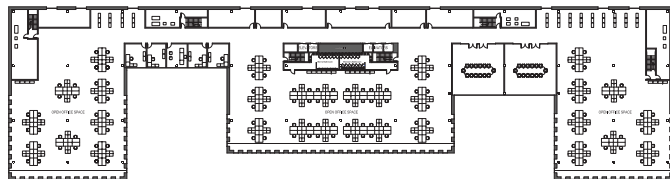
FIFTH FLOOR PLAN



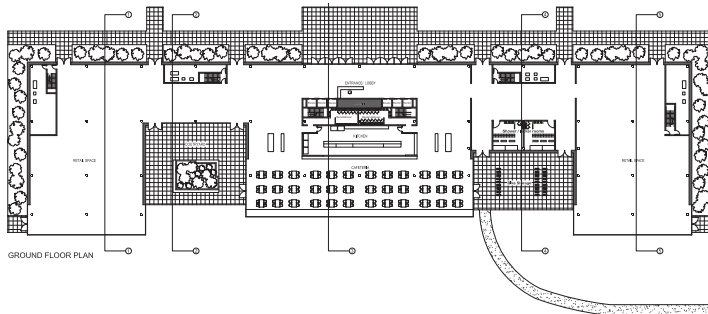
FOURTH FLOOR PLAN



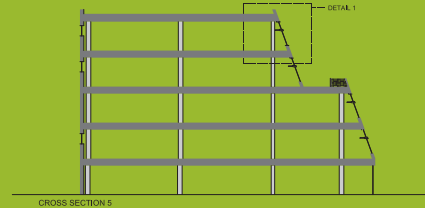
THIRD FLOOR PLAN



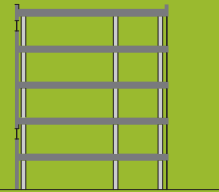
SECOND FLOOR PLAN



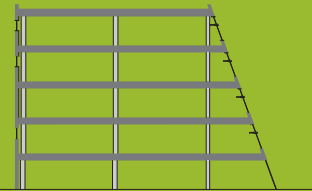
GROUND FLOOR PLAN



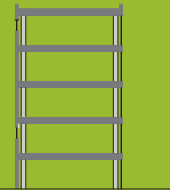
CROSS SECTION 5



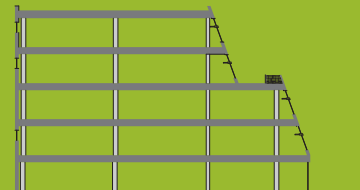
CROSS SECTION 4



CROSS SECTION 3



CROSS SECTION 2



CROSS SECTION 1



IPRO day
12.04.09



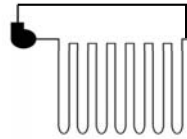
structure

The structure of the building is predominantly concrete precast construction. Research on the sizing of the beams, columns, and floor slabs was done using the D/E (Design and Engineering) handbook provided on the Spancrete website. Some changes to the building were made in order to decrease the overall cost.

architecture

The building was designed to be a LEED platinum rated building. It was oriented to the south for increased solar gain. Heavy walls were used on the south facade to demote heat gain, and those walls were covered in photovoltaic panels for renewable energy. The south facade was also angled for increased surface area for solar panels. The punched opening windows feature a light shelf to control the light that enters the interior space. The building also features green roofs, that also help to combat heat gain on the south facade while making a pleasant environment in which to work.

geothermal



The Geothermal System group was in charge of designing a system, which utilizes the earth's core temperature to decrease the energy consumption required to condition the air in the building. The software called Ground Loop Design 2009 was used to derive a basic geothermal design. The second software that was incorporated was System Analyzer by Trane; it was used to calculate the heating and cooling loads for a building based on several factors including building occupancy and factors related to occupancy, location and climate, building materials and enclosure, and preliminary system information.

photovoltaic



The photovoltaic system group was responsible for designing a photovoltaic system which would supplement the energy systems already in place and lessen the amount of power that would have to be pulled from the grid. The 1125 units of the Sunmodule 230 will allow us to gain 47% of our energy through photovoltaic panels. The cost is about \$892,000 for the panels, but there are government incentives available that will reimburse for 30% of overall costs.

water reuse



The Chicago average annual precipitation is 38.01 in/year. Of our 37,000 SF area roof, 18,700 SF is used for Rain water harvesting. We are able to collect 35,900 Gal/month. We are able to save 430,800 Gal of rain water/ year. The grey water system will be used for toilets and to water vegetation on the grounds, and the green roof.

wind turbines



Wind data available online was gathered to determine the average wind speed for the site. After some preliminary calculations, assuming the average to be 4 m/s, it was determined that using wind as a main source of energy was not practical with our site conditions and current technology. Despite these facts we concluded wind energy could still provide a small portion of our energy demand as well as be a highly visible display of our desire to build a "green" and efficient building. The final building design features; (11) Urban Green Energy 4 kW vertical axis wind turbines mounted on the roof.