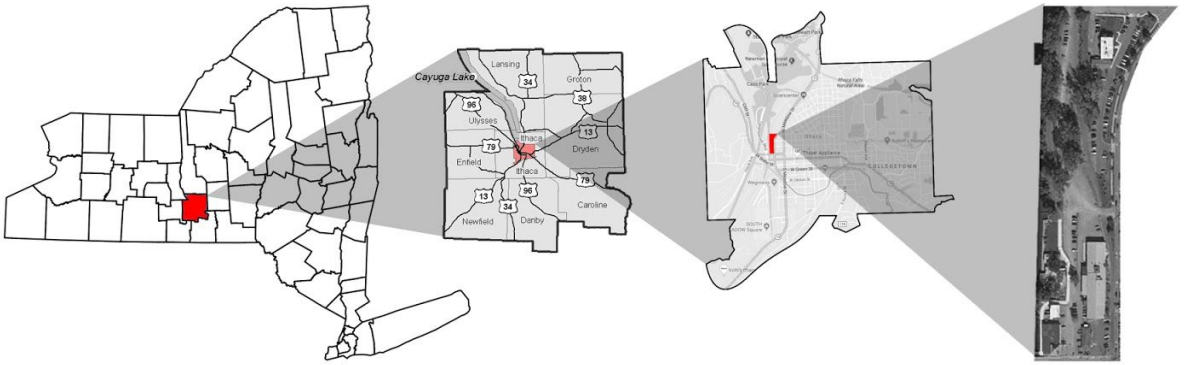
INLET ISLAND AND THE PODCAR

Ithaca, NY



Inlet Island Team

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Video: https://vimeo.com/390702521/1dbe9ffdac

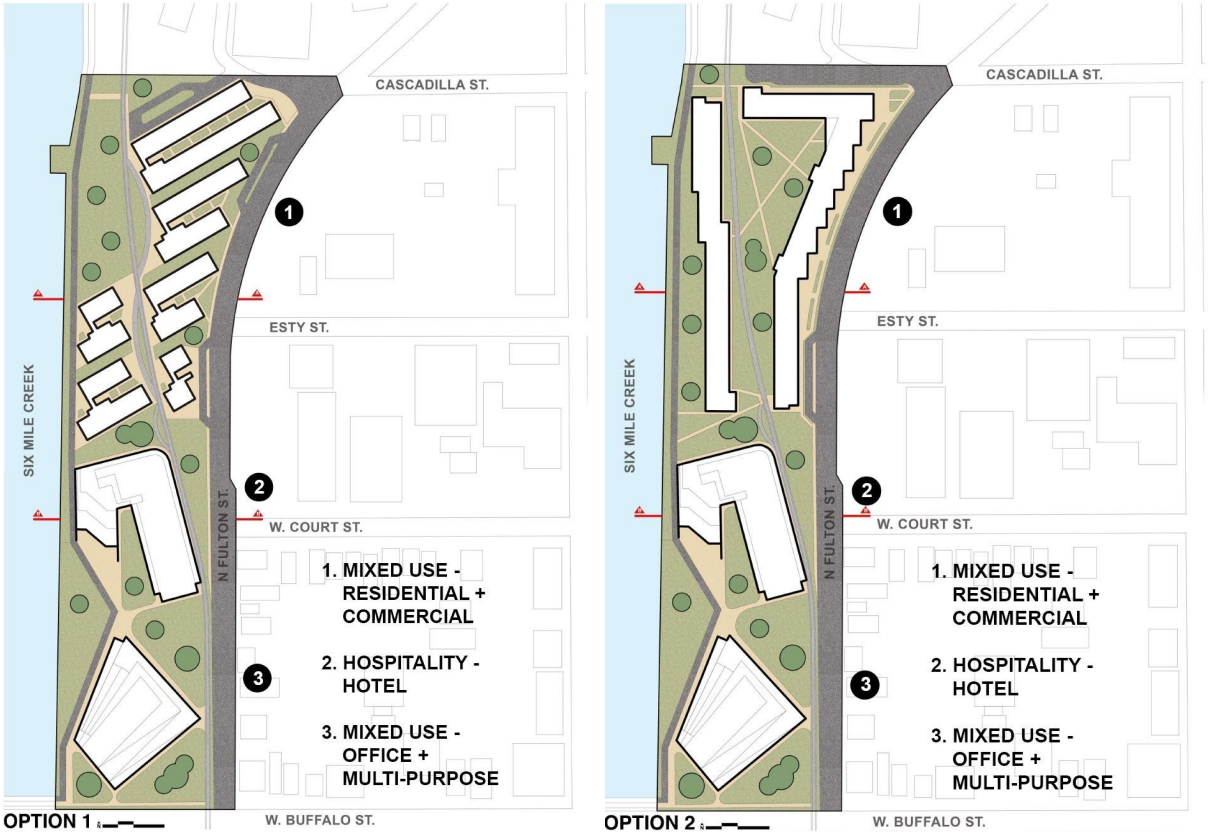
Table of Contents

ABSTRACT

This report will detail an urban design and transportation project in Ithaca, New York, a city that is striving for a no-car future. The goal is to create a live-work community on an area of land next to Ithaca's Inlet Island. The project requirements include the development of a master plan, implementation of the PodCar or PRT System, and carefully design architectural structures of at least 130,000 square feet. Our team has paid special attention to these parameters, as well as to the environmental impact that our buildings and site development will have. We also collaborated with several professionals at 4Dialog to develop a 3D model of the development. Through the PRT system, sustainable design, and incorporation of the natural beauty of the area, our proposal offers great social and environmental benefits that complement Ithaca's vision for the future.

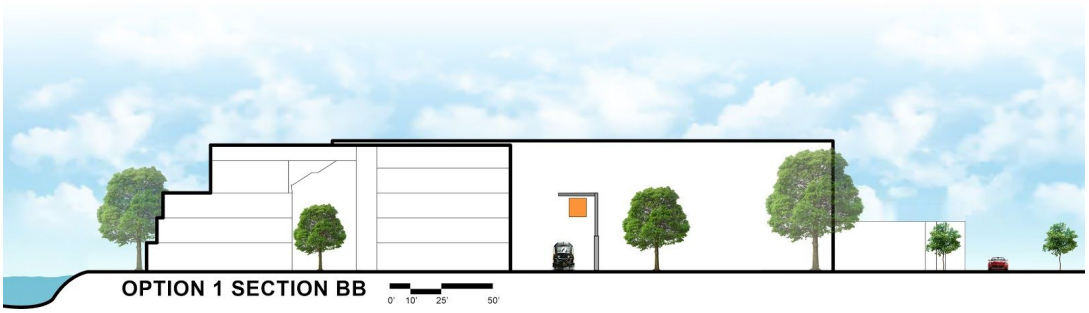
Project and Purpose Description

This project will explore the creation of a master plan for the Inlet Island area of Ithaca, New York. In order to propose a proper solution for the area, our team has visited the site and researched the surrounding area. The task at hand is to create a master plan that incorporates structures of at least 130,000 square feet and the PodCar System in an effort to explore alternative transportation options in the area. Ithaca is striving for a no-car and sustainable future, which requires careful consideration of the environmental impact of the project and structures. It is also important in this project to incorporate the natural beauty and opportunities that Ithaca has to offer, such as it's various trails and water features. Additionally, our team developed detailed architectural elements of the potential structures (including plans, elevations, sections, systems, landscaping, etc.) The master plan options below demonstrate two solutions to the area as proposed by our group.

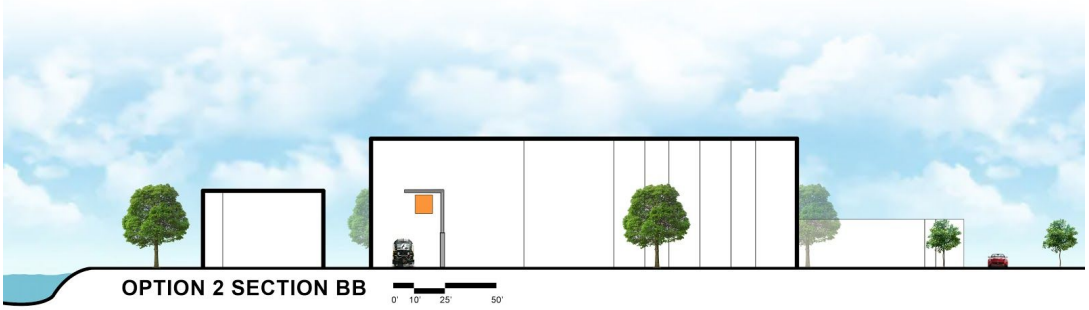


Our plans include two mixed-used facilities, one with residential and commercial use and the other with office and multi-purpose use, and a hospitality-hotel structure. The idea behind these types of structures is to create a community where the people of ithaca can live and work in to minimize transportation cost and emissions. Providing shopping and office areas will also draw others to the area and increase its financial potential, increasing the success of the project.

Section drawings help explain the relationship of site elements in a graphic and visual way of understanding.



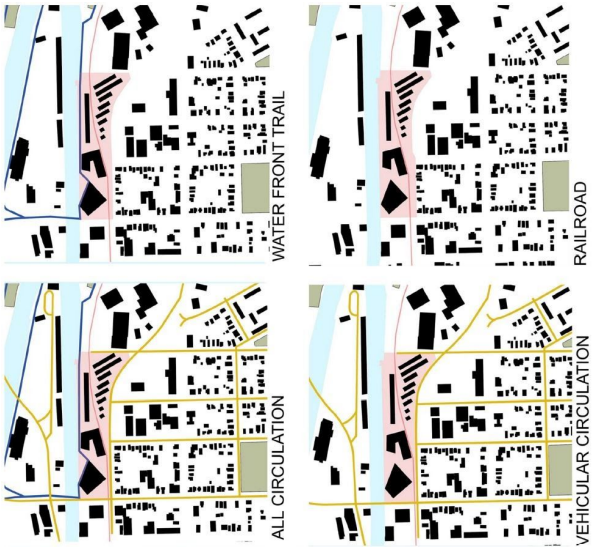
The sections for “Option 1” depict the podcar orientation to the street, buildings and river. This emphasizes the relations between the podcar line and buildings and reinforces the idea of a community built around a central circulation point.

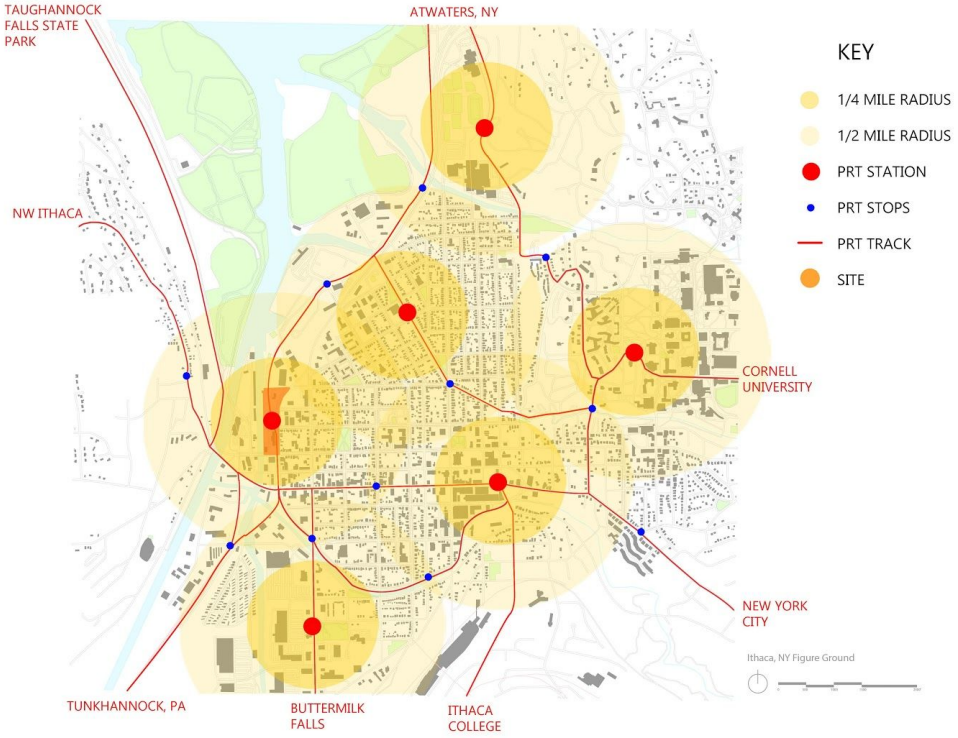


“Option 2” similarly depicts the relation of the podcar, train, river and street. These were all very important elements to take into consideration when making design decisions about how best to create a community.

Motivation - Why This Project Was Chosen

We chose this project and its location because of the dense traffic conditions in this area of Ithaca, NY. The site was actually proposed to us by a developer in the area, Frost Travis. For the size requirements of this project, we extended the site to the north for more building area. We also wanted to explore how to reach their goals of a no-car future, which includes cutting back on parking within the city. This can be challenging due to the mountainous range making travel and vehicle repairs difficult.





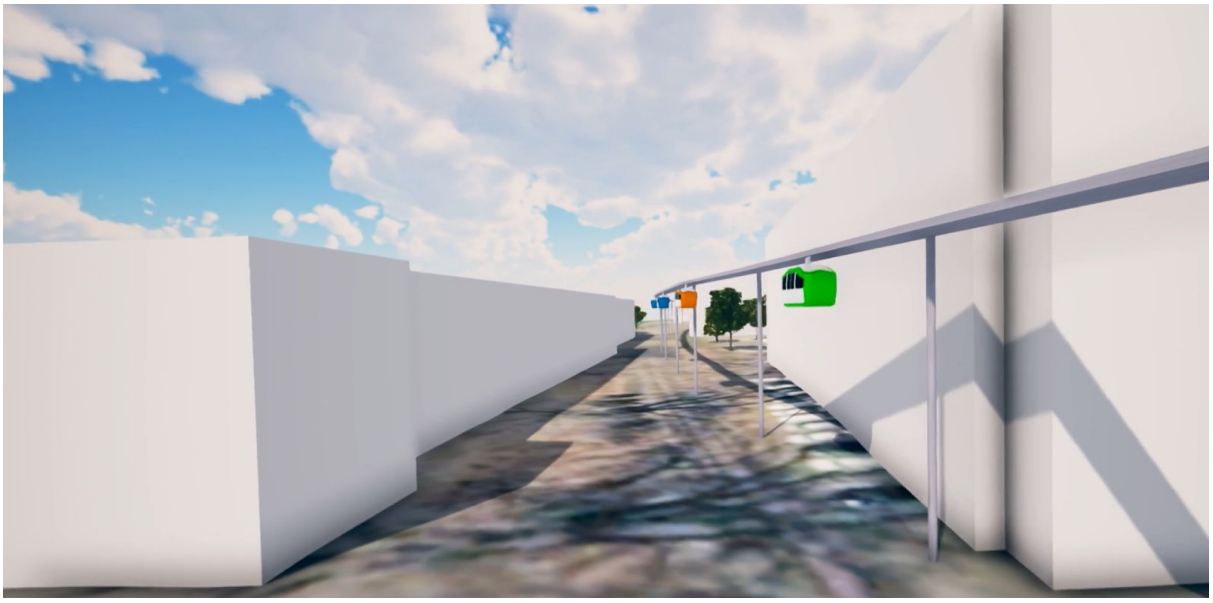
Above, we have developed a new transportation proposal that would utilize the PodCar System (PRT). As noted, there would be several main stations with accommodations and even more stops throughout the city. Each stop has been placed based off of the walkability of a quarter to a half mile walking distance. The system would also provide transportation to all different locations within the city, like universities, work places, parks, and the downtown, faster and easier. Moreover, transportation to nearby cities becomes an opportunity. A raised track could provide opportunities for more green spaces as well.

Images from the 4D model/video

In this image, you can see the PodCar track entering our site from the south end. Our architectural solutions and the surrounding structures are represented by white massings.

You can see that the track is suspended over the existing Ithaca Central RailRoad track. This is to utilize the infrastructure already in place. This saves space in the dense Ithaca downtown.

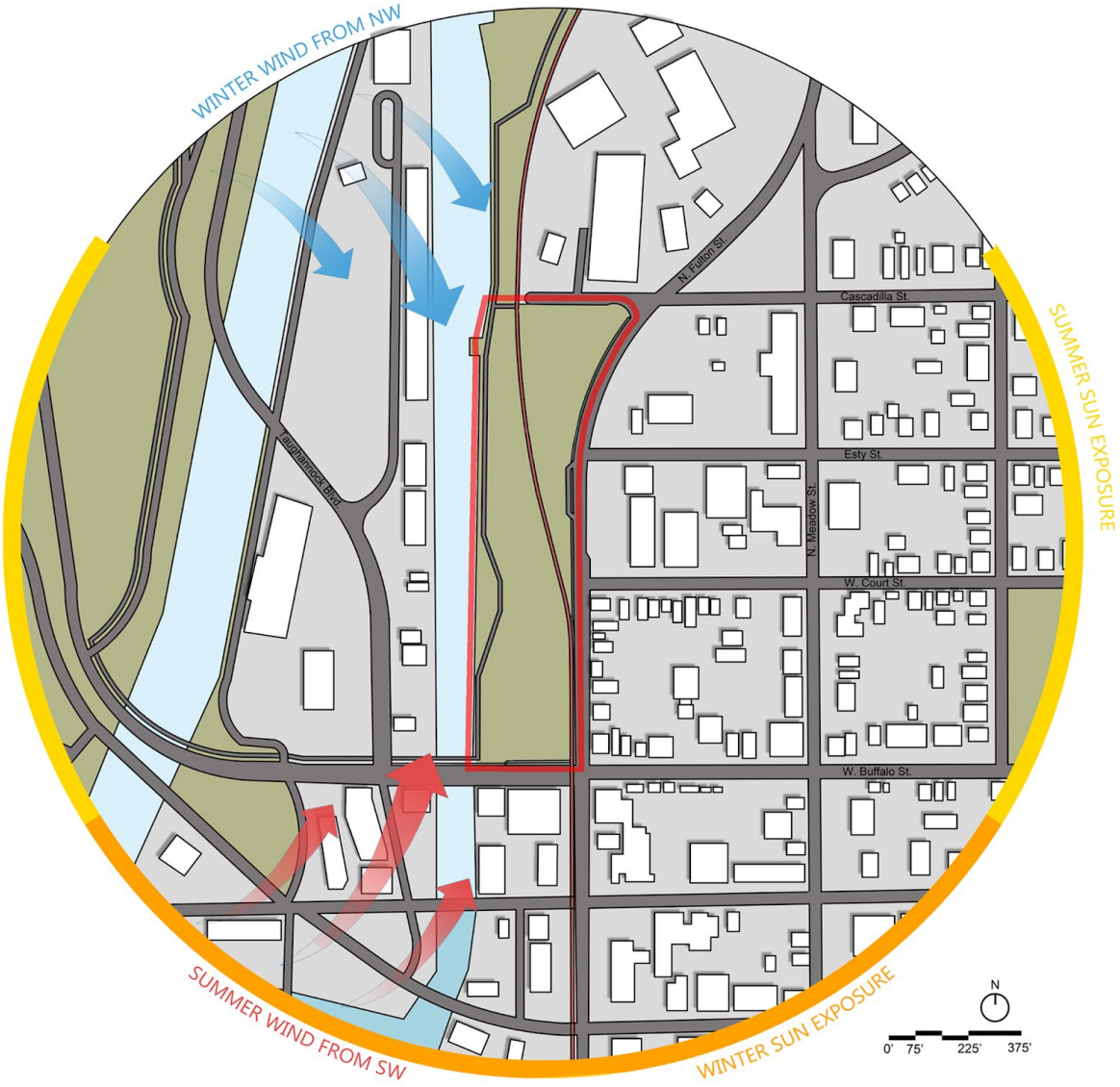
In this image, you can see how the PodCar track is now interacting with the proposed structures, weaving behind and in between. This photo is looking south, as the PodCar enters the southern side of the northern-most proposed structure.

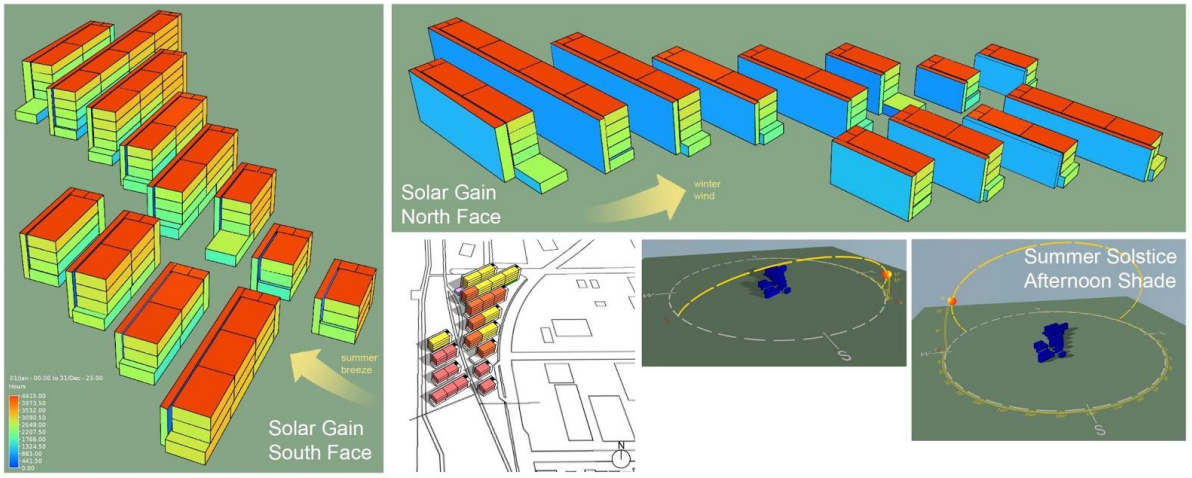


This method of weaving the track between structures is to not only encourage those living in the mixed-use structure (residential and commercial) to use the podcar, but also to educate them on real action they can take as individuals to reduce their carbon footprint. Shared transportation systems are a great way to reduce emissions.

Energy Analysis

Before we started designing our master plan, we did a detailed energy analysis of the site. Knowing where the sun is going to rise/set and where the wind is coming from at various times of the year is extremely important in energy analysis. This is because these elements determine the best orientation and systems that can be used in design for optimal energy savings. As described by the graphic below, the sun during the summer solstice will rise in the north east and set in the north west, with primary southern exposure. During the winter solstice, there is still primary southern exposure, however the sun will rise more in the south east and set in the south west. This tells us that the north will give great ambient light and the southern side of our structure can provide ample opportunity for solar gain. We also learned that in the summer, you will have a cool breeze from the south west and in the winter, a cold wind from the north west. This tells us that we want a design to capture that cool summer breeze while blocking or screening that harsh winter wind.



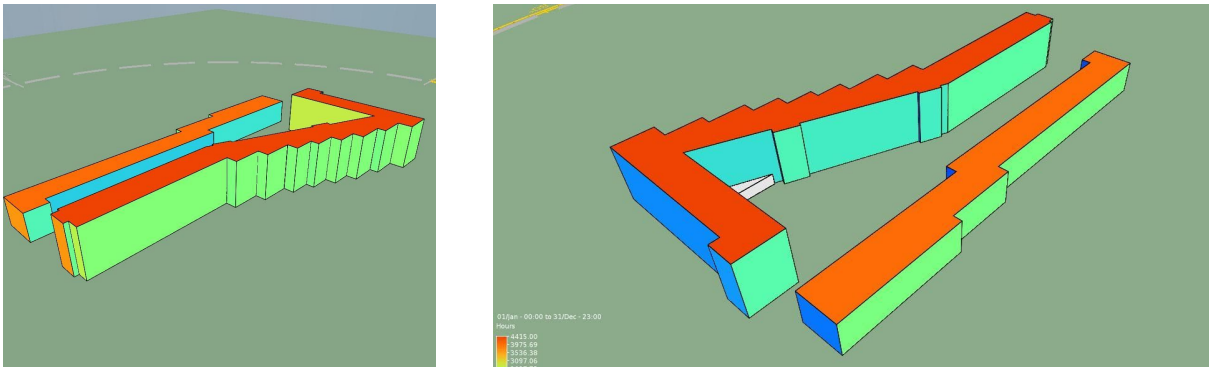


Option #1 (Northern Buildings)

Solar: Ideal southern sun in winter months on the south side of the building. Circulation areas on the north side with less solar gain in winter. This orientation allows for maximum comfort with minimal use of systems to keep apartments warm in winter months.

Shadows: Sun on the south side (apartment windows) during cold months and on the north side, leaving living areas in shadow during warmest months. This results in energy savings.

Wind: Wind is prominent from the south in the summer, allowing the winds to hit the faces of the structures. Winds come from the north during the summer, which would hit areas of circulation. Wind patterns are ideal in this massing.



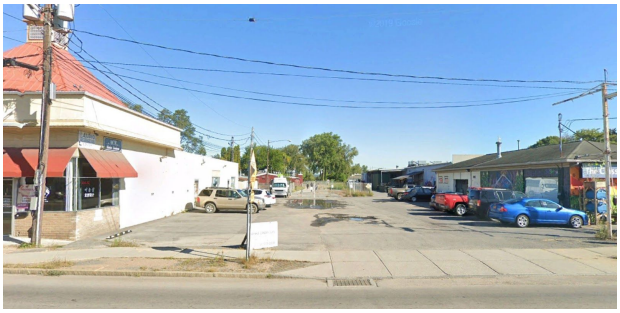
Option #2 (Northern Buildings)

Solar: To provide residential units with different views of the city, the sun would hit on the east, south, and west sides where solar gain is higher. Circulation areas would be placed on the sides where there is less solar gain, such as the north side.

Effects on the built environment

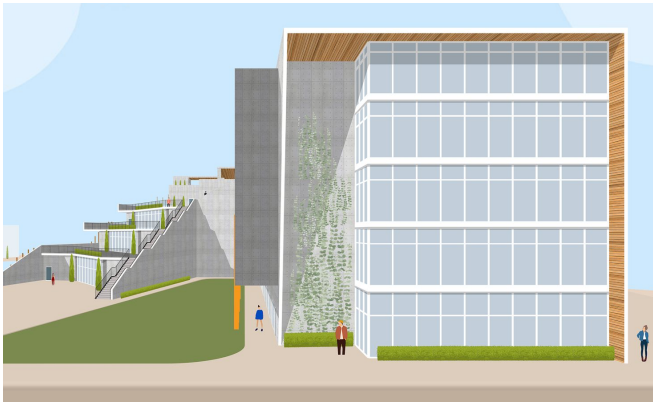
The existing site has a few small businesses that would be demolished and relocated in the mixed-use commercial area of the new design. These buildings do not have any historic or heritage significance and would require minimal work for demolition because of their size. Below indicates the buildings that would be demolished and offers some views of the existing site.

AREAS OF DEMOLITION

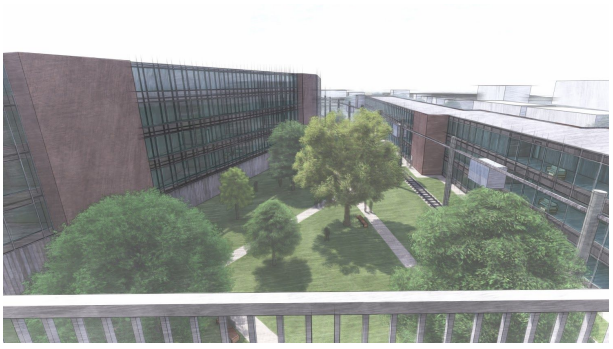


We can see that we could potentially minimize the amount of pavement on the site and replace it with green space. The building materials that are salvaged during the demolition of the existing buildings can be used to commission local artists for public art displays. This is another great way to draw people to the area and respect the artist culture that is prevalent in Ithaca.

These renderings from the northern portion of Master Plan Option #1 shows the integration of a live-work community and the PodCar System. In the left image, you can see the retention of a water-front park that overlooks the existing natural waterway. The right image shows the first floor of the structures, which offer shopping centers and residential units on the upper floors.



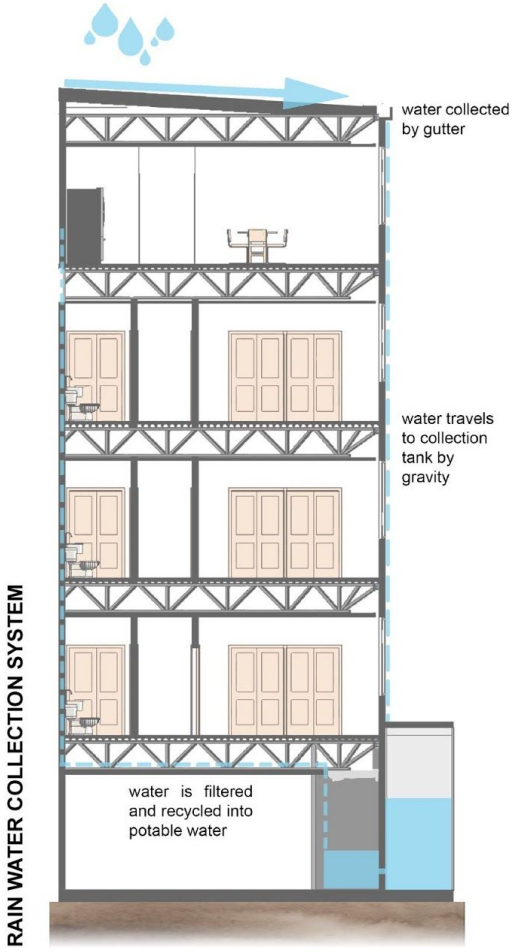
The renders above are showing the two buildings that are located on the lower half of the site. These buildings are examples of how a community can benefit from such a close proximity to a podcar line. By reducing the amount of parking needed on the site, it allowed us to open the site to more green space and community development areas. The lack of cars going through the site also helps build a sense of ownership and place for the human scale without being disrupted by vehicles.

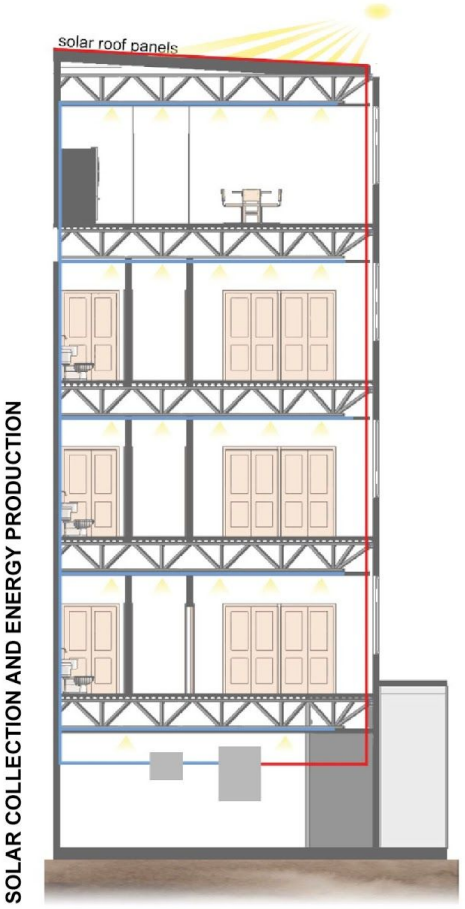


These renderings from the northern portion of Master Plan Option #2 shows the integration of mixed use residential complexes and the PodCar System. In the left image, you can see the private courtyard that showcases the hanging podcar system that provides more space for people to gather and enjoy the outdoors. The right image shows just a portion of the riverwalk that is accessible by anyone on non-motorized vehicles.

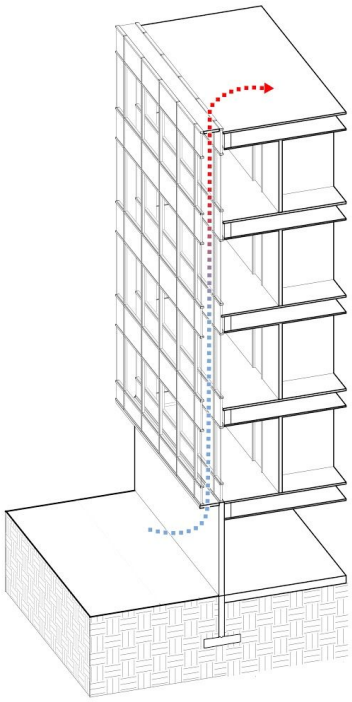
Effects on social and environmental sustainability

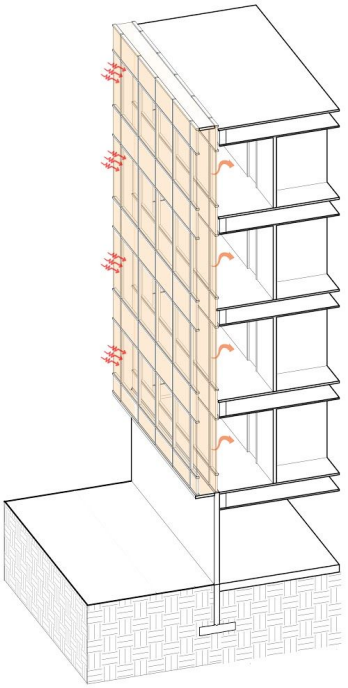
Our master plan solution offers several ways of improving the social and physical environment. The implementation of the PodCar System lower emissions by less car traffic. The structures that have been proposed offer great improvements in living conditions, health, safety, wellness, diversity, equity, and work-life balance. Another way we strove to improve social and environmental sustainability was the passive design strategies in our structures. Solutions include water retention and recycling, solar energy, geothermal energy, double-skin facades, green roofs, lighting control, natural ventilation, and landscaping.



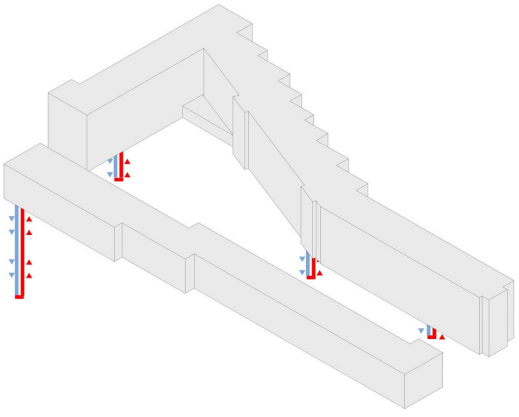


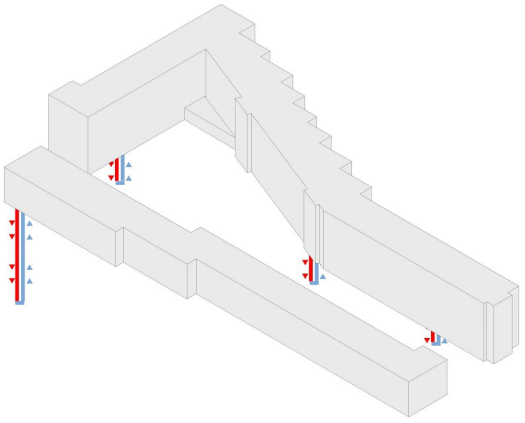
Rainwater could be collected from sloped roofs. The water slopes to a drain that leads to a water tank. The water is then filtered and recycled into potable water that can be used again in landscape irrigation, flushing toilets, doing laundry, and even drinking water when using the best systems. Solar energy can also be collected from the rooftop using panels or new technologies that are less of an eye-sore. The energy is collected and redistributed to the apartments and retail spaces for overhead lighting and to power outlets.





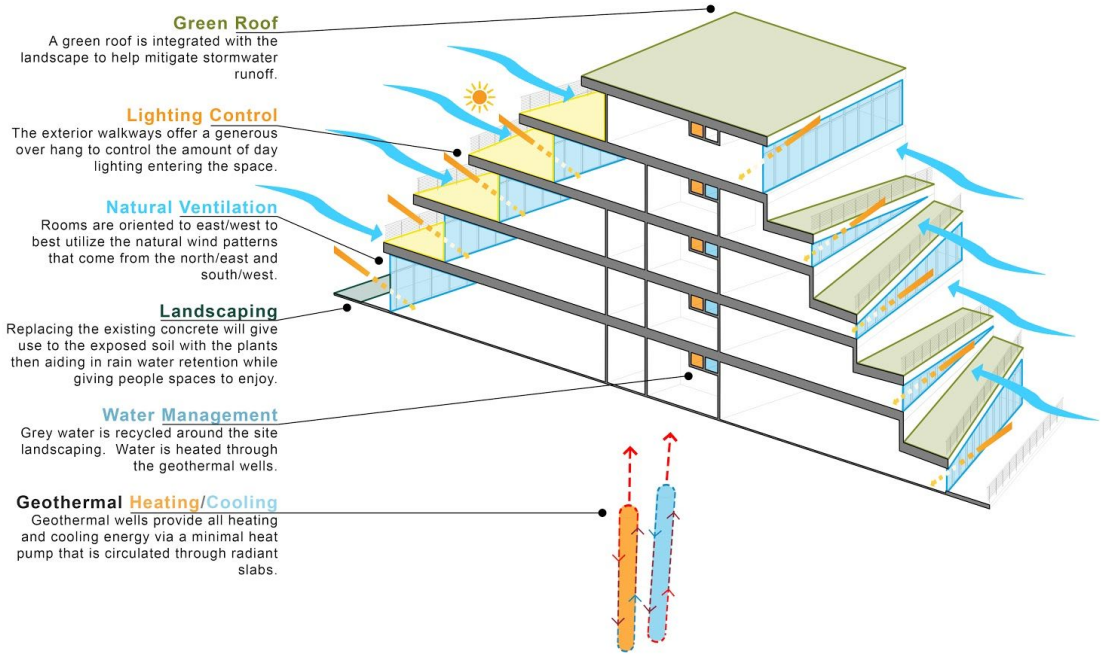
A double skin facade with a ventilated cavity will reduce the influence of the outside climate. Shown in the top left, during the summer this can provide ventilation through the buildings as well as pushing the warm air out. While in the winter the vents would be closed to create an area where warm air is produced by the sun, that slowly flows into the building. During the winter, the double skin also acts as a barrier for the interior spaces from cold outside, as shown in the top right.

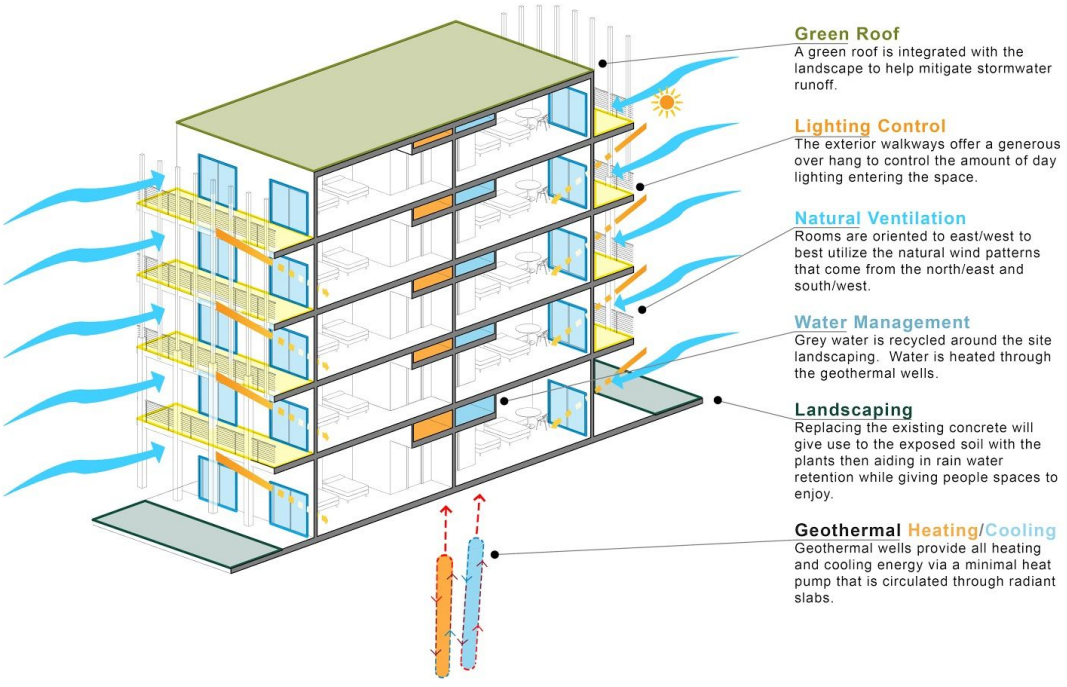




A geothermal design will help provide heating and cooling throughout the building that is produced by the internal heat of the earth. On the left displays the winter months where the heat from the earth is brought up into the building. In the summer, the earth provides a cooler temperature that is distributed throughout the building.

The two diagrams below show the passive design considerations and opportunities for the two buildings on the lower half of the site. These categories deal with how the building can reduce its carbon emissions by harnessing environmental characteristics such as wind, sun and geothermal potential.





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