PROJECT BACKGROUND

JANELIA FARM RESEARCH CAMPUS

Figure 1

Janelia Farm Campus is designed to be a world-class biomedical research facility to achieve the long-term goal of promoting unconstrained scientific research. It is located on the outskirts of the Washington Metropolitan Area in Ashburn, VA. Howard Hughes Medical Research Medical Institute was chartered in Delaware on December 17, 1953. The charter states: "The primary purpose and objective of the HHMI shall be the promotion human knowledge within the field of the basic sciences (principally the field within the field of medical research and medical education) and the effective application thereof the benefit of mankind." The institute provides grants for international research scholars world-wide. $49.7 million in grants to strengthen education programs were awarded to colleges and medical schools, as well as to public schools, grades K-12. After 52 years of conducting research on over 70 university campuses across the United States, HHMI decided to build its own facility. The design is guided by four principles:

- Understand the researchers' needs versus their preferences
- Focus the planning effort on what will or could happen versus what is happening today
- Keep work spaces standardized and rational
- Make the work spaces adaptable over time to accommodate changes in research

In order to realize these goals, HHMI conceptualized a facility where scientists, engineers, and information technology professions from all over the world could gather and reside. There are three buildings on campus, the Landscape Building, the short-term stay Conference Center, and Long-term housing townhouses, all of which are located surrounding a pond. The focus of this thesis project will be the Landscape Building.

The Landscape Building is the laboratory/office building. The first floor contains office space, conference rooms, auditoriums, dinning facilities, a vivarium, and mechanical equipment rooms. The second and third floors are dedicated to laboratory space and adjacent offices.

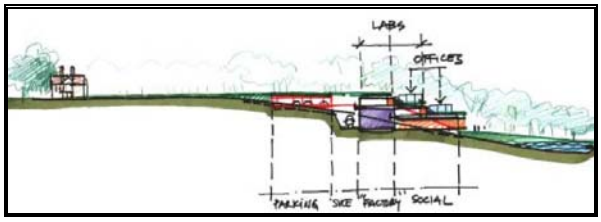
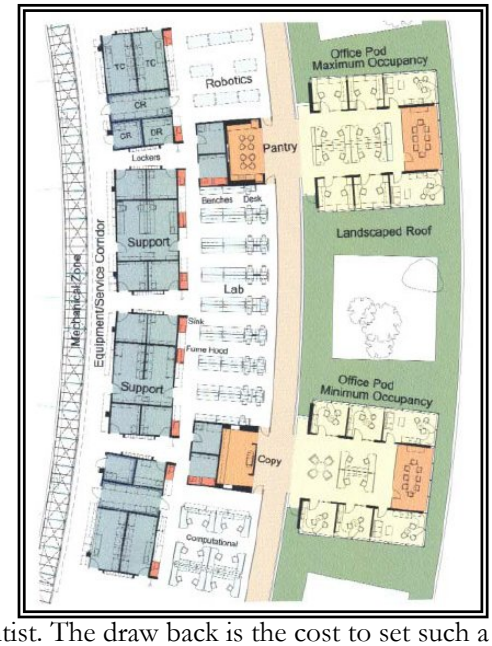


Figure 2

ARCHITECTURE

Janeilia Farm is a 281 acre farm which features a "modified French-style manor" built in 1936 by Philip Smith from Smith and Walker of Boston. It is one of Virginia's last country estates based on European country manors. The house is protected by the National Trust for Historic Preservation. In addition, the view from the dinning room window of Sugarloaf Mountain in Fredrick County, Maryland is also protected. Therefore, any building on this site needed to preserve both the house and the view.

As a result of the historic requirements for the site, the architect RVA designed the building to be an extension of the hill on which the Mansion is built. This prevents the protected view of Sugar Loaf Mountain to be maintained and essentially put the building completely underground from all but the south perspective. The view of the mountain is framed by the 4 exhaust stacks.
It is a three-story structure with two upper lab floors and a meeting-service floor at the bottom level. The lab floors are stepped back creating terrace space where the office pods are located. Two glass-encased stairs radially cross the building connecting the ground floor to the roof terrace. There is also a 300 car-parking garage located behind the labs on the third floor.



The entire length of the 900ft façade runs a glass corridor giving daylighting and picturesque views to the labs spaces opposite the corridor. The building is based on the idea of the strong relationship between lab and office space. Vinoly placed the office pods on the terraced roofs, each one having three exterior glass walls. Behind these pods are large lab spaces designed to be common space for the different research groups to share. The biochemistry lab spaces are designed to be extremely flexible, with lab equipment and chemical and gas connections easily moved around without costly renovations. Adjacent to the labs are smaller support rooms such as cold rooms, dark rooms, isotope labs, chemical storage space, along with general rooms of various sizes. Behind this support belt is the equipment service corridor that runs the length of the building. Along this corridor is a 6ft band housing all MEP equipment. It was designed so that when maintenance is necessary; all work can be done outside the lab space. This is beneficial for both the maintenance crew and scientist. The draw back is the cost to set such a great amount of space aside for MEP services. There are also large areas that will be used as future expansion space.

BUILDING SYSTEMS

STRUCTURAL

The structural system for the Landscape Building is a combination of reinforced concrete, reinforced masonry walls, structural steel, and post-tensioned steel. The foundation is comprised of trellis post footings ranging in bearing pressure from 4KSF up to 40 KSF. The slab on grade rangers from 6" to 24." For example, slab 4, zone C on the foundation level has a thickness of 2'. The majority of columns on level 1 are concrete columns with a few composite columns. The second level floor system is concrete, with radial beams primarily 18x44 and 20x42, and longitudinal beams are 16x24 with few major exceptions. A combination of steel and concrete is used in the third and fourth floor systems. The radial concrete beams as either 20x56 towards the inner area of the building and 18x44 in the outer area. There are four rows of longitudinal columns consisting of 24x56, 20x36, and 20x44 beams. All radial steel beams are 60 psi W36x135 and smaller W14x22 both 14' o.c. The longitudinal beams on the outer edge are W12x19. 45k/ft tendons are located between column lines C and E for the entire length of the building. Steel columns range in size from W14 to W30 of varying strengths.

Concrete shear walls are typically normal weight concrete wit f'c = 5000psi and are 1' thick. Typical reinforcement is #4@12. The Pod structural system is all steel. Beams range from W8x15 to W14x 53 and HSS 5x5x5/8 to HHS 10x5x5/8. There are four cantilevers in each pod roof. The auditorium has 2' thick concrete walls. For the tier construction, 1-1/2" MD + 2-1/2" concrete supported on 8" thick reinforced block wall is used. The four mechanical shafts are made with 9" thick concrete walls on the third level. On the fourth 8x8x3/8 tubular steel with HHS 8x8x1/2 columns are added.

TELECOMMUNICATIONS

The Landscape Building has a EIA/TA 568-B compliant cabling system to support high speed data applications up to and in excess of 1000Mbs including IEEE system standards+ based on TPDDI, Ethernet, Fast Ethernet, Gigabit Ethernet and ATM. Each office pod has raised access floor for the routing of cables. There are two category 6 4-pair cables to each telecommunications outlet at each workstation in the office spaces.

TRANSPORTATION

There are 6 standard elevators for human transport and one clean elevator and 1one dirty elevator for substances and animals. There is also a freight elevator. The building is divided into three equal sections by two feature staircases that go from ground level to the root-top terrace. In addition there are five service stairwells throughout the building. On the third floor there is a 300 car parking garage behind the lab spaces.

ACOUSTICS

HHMI specified three spaces types that have required NC ratings. Auditoriums need to be NC-25 and seminar rooms need to be NC-30. This is achieved by 1" thick internal acoustical lining on all low pressure ductwork (full extent downstream of terminal unit) and ½" thick internal acoustical lining on all diffuser plenums. Additionally, all ductwork in and around the space has been lined with dry wall. Conference rooms and private offices are required to be NC-35. This ductwork has 1" this internal acoustical lining, and either a) if less than 1200CFM, there is a minimum distance of 10 FT between downstream outlet of terminal unit and each diffuser or b) if greater than or equal to 1200 CFM, there is a minimum distance of 15 FT.