development plan

Introduction

Part One of the Master Plan briefly documented Fermilab's beginnings and evolution over its nearly 50-year history. It then presented guiding principles and laboratory strategic themes for the goals and aspirations for future campus design and development. A 20-years-from-now vision described a state-of-the-art, open and green, consolidated and integrated, connected and engaged international research community.

Part Two laid out the foundational initiatives to create a campus with the organization and features envisioned for a 21st-century international research center. As a group, these principle-based initiatives provide the lab with "connective tissue," resulting in a functionally and visually unified campus and setting the stage for future development projects.

Part Three builds on this foundation, describing proposed future development projects for the next 20 years. The development projects are categorized on three fronts: international research community, the tools for science and Infrastructure support. While the three fronts are interrelated and mutually supportive, the proposed development projects form easily into the three thematic categories.

Completion of these strategic developments projects will culminate in the transformation of the laboratory that serves as the centerpiece of a global program in accelerator-based neutrino science and enables the next generation of world-leading research.

Research community

Here the term research community refers to the places where people work, visit, study and collaborate. The core campus region map on page 67 indicates the location of these six projects creating the envisioned global research community:

- The Integrated Engineering Research Center (IERC),
- Wilson Hall 2.0
- The Scientific Hostel
- The Global Accelerator Center
- The Next Generation Computing Center
- The Gate, Visitor Information, Education and Welcome Center

Tools for science

A second project grouping includes the accelerators and beamlines, adding to laboratory system of Tools for Science. Two projects are anticipated in the 20-year planning horizon.

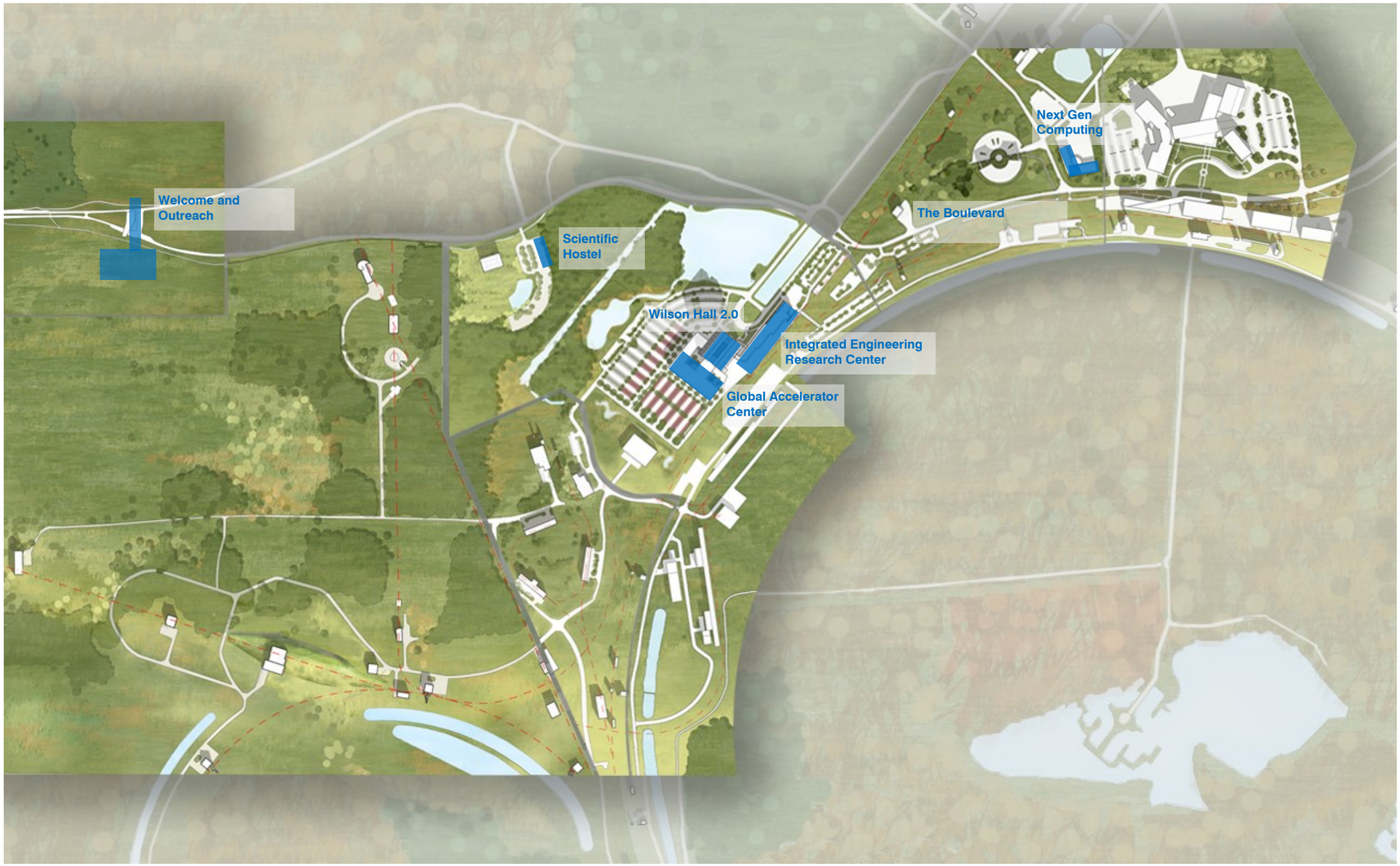
- The Long Baseline Neutrino Facility (LBNF)
- The Superconducting Linac Complex

Infrastructure and Support

The third group address needed utility and infrastructure support projects for the laboratory generally. Four infrastructure support Projects are proposed:

- Industrial Center Building Addition
- Central Utility Building Expansion
- Industrial District Renewal
- Utility Upgrade Projects

research community



Integrated Engineering Research Center

Bringing people together is a vital feature of a collaborative international research community.

Bringing people together is a vital feature of a collaborative international research community. The Integrated Engineering Research Center (IERC) creates a 93,000-square-foot facility promoting interdisciplinary collaboration and greater efficiency in designing, developing, building, commissioning and operating particle physics accelerator and detector facilities and equipment.

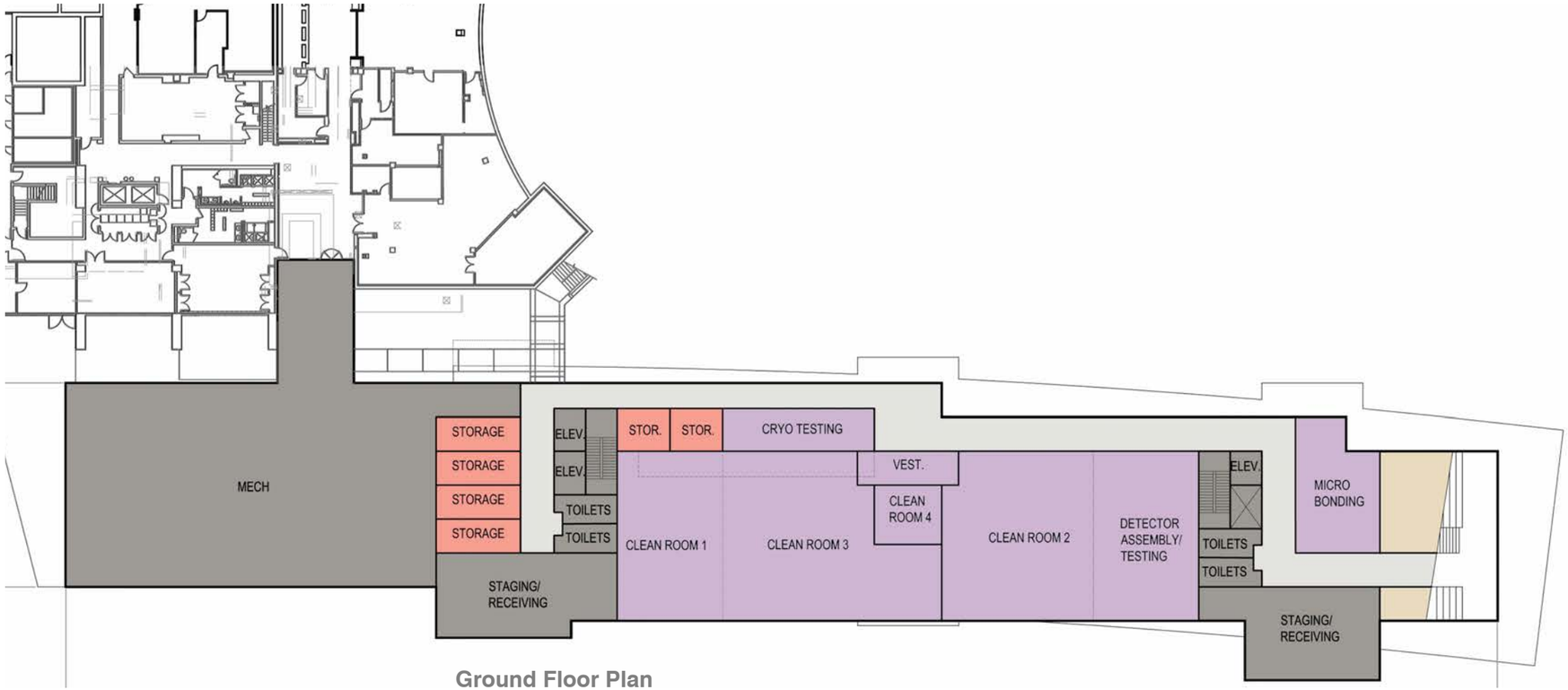
Replacing outdated laboratory space and obsolete facilities, the IERC will revitalize and streamline research in particle physics for the benefit of the particle physics community and the DOE Office of Science. The IERC will consolidate engineering and technical teams in a collaborative environment, bringing together engineering disciplines from Fermilab's Accelerator Division, Particle Physics Division and Scientific Computing Division. The result will be interdisciplinary collaboration built on existing laboratory capabilities and expertise, which are currently dispersed across the Fermilab site.

The IERC is a four-level structure with direct indoor connections to Wilson Hall at the ground level and the atrium level, integrating staff directly in the vibrant center of Fermilab. The ground floor contains flexible high-bay space for state-of-the-art cleanrooms. The concourse level flows from the Wilson Hall atrium, connecting all the IERC via its two vertical collaboration zones. The concourse also accesses the Wilson Hall entrance plaza, invigorating and connecting the exterior spaces. The two upper floors contain flexible and reconfigurable space for engineers and staff.

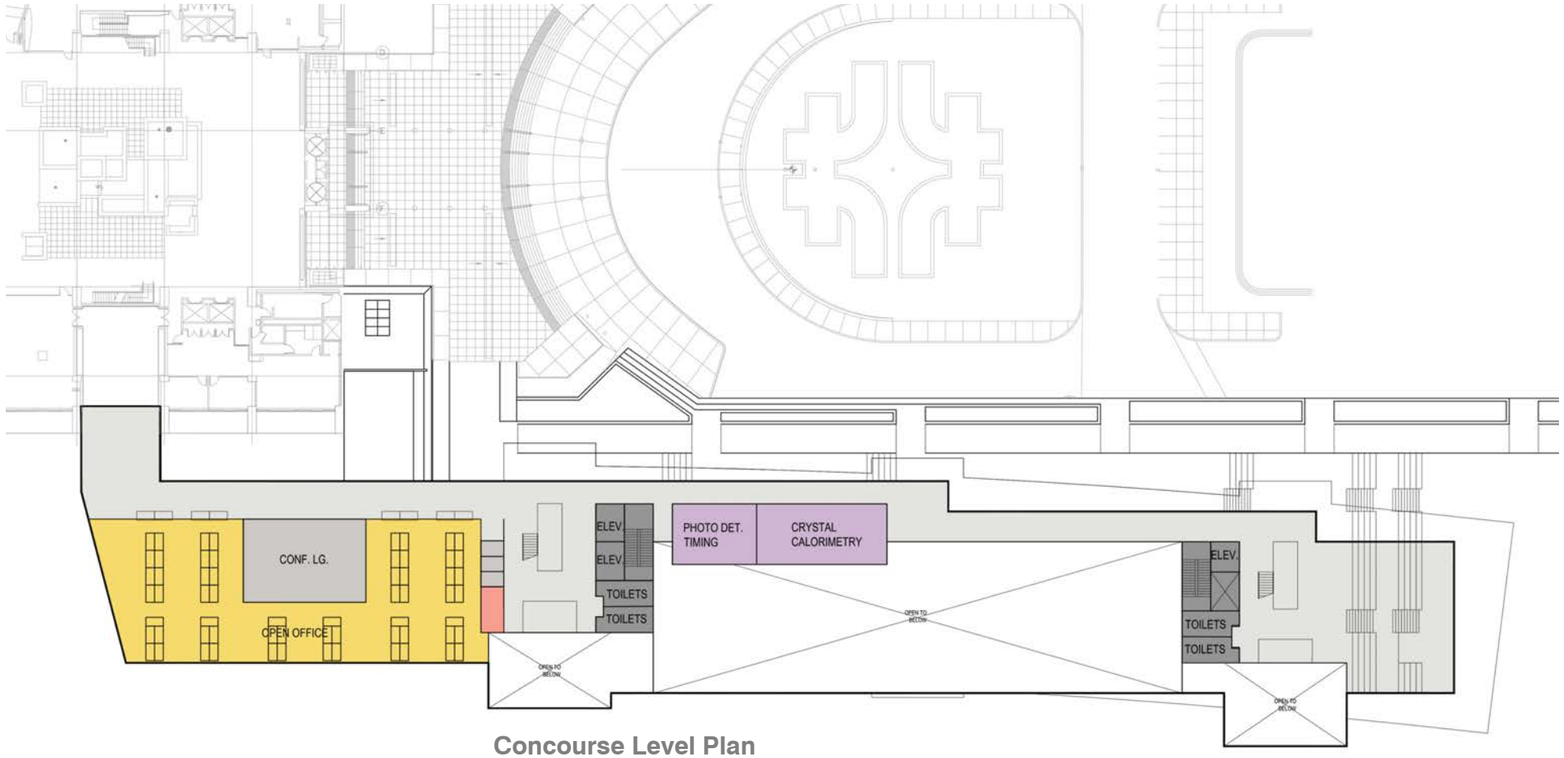

BIOSWALE, TYP.
PARKING AREA
SERVICE DRIVE
PARKING AREA 2
BIOSWALE, TYP.
MONOLITHIC BENCH, TYP
BOLLARDS
TERRACED PLANTERS
PLAZA/ DROP-OFF COURT
BRIDGE STAIRS
PLAZA PLANTERS WITH SCULPTURAL SCREEN WALL FEATURE
BRIDGE STAIRS
BRIDGE RAMP
PEDESTRIAN BRIDGE
PARKING AREA 3
BRIDGE STAIRS
BRIDGE RAMP
BIOSWALE, TYP.
TERRACED PLANTERS

Site Plan

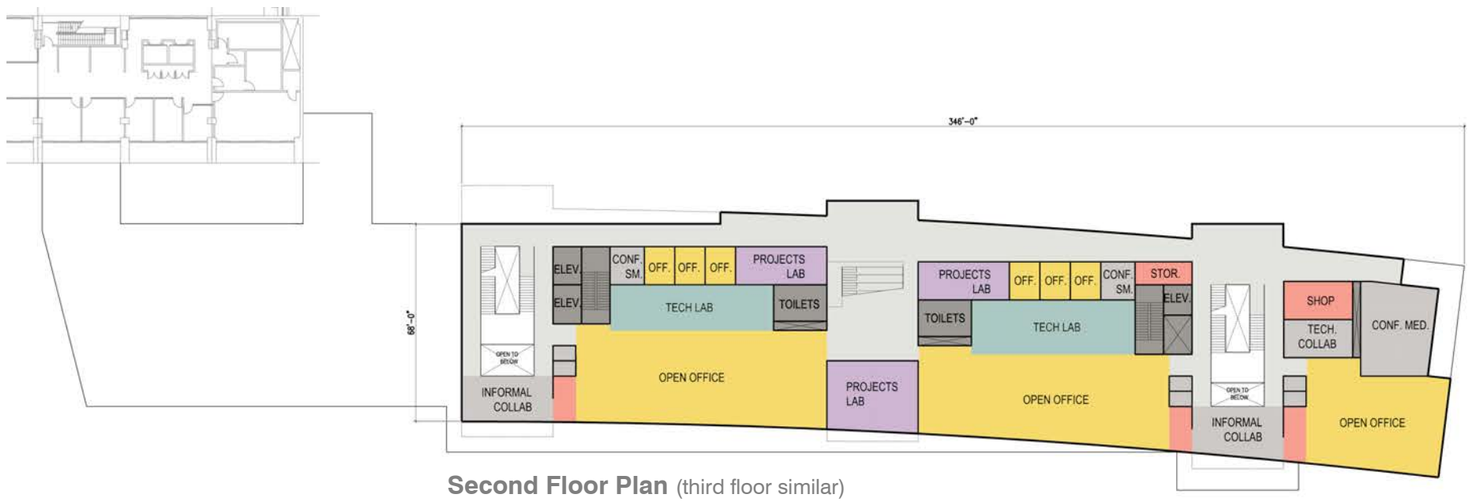
Aerial from north



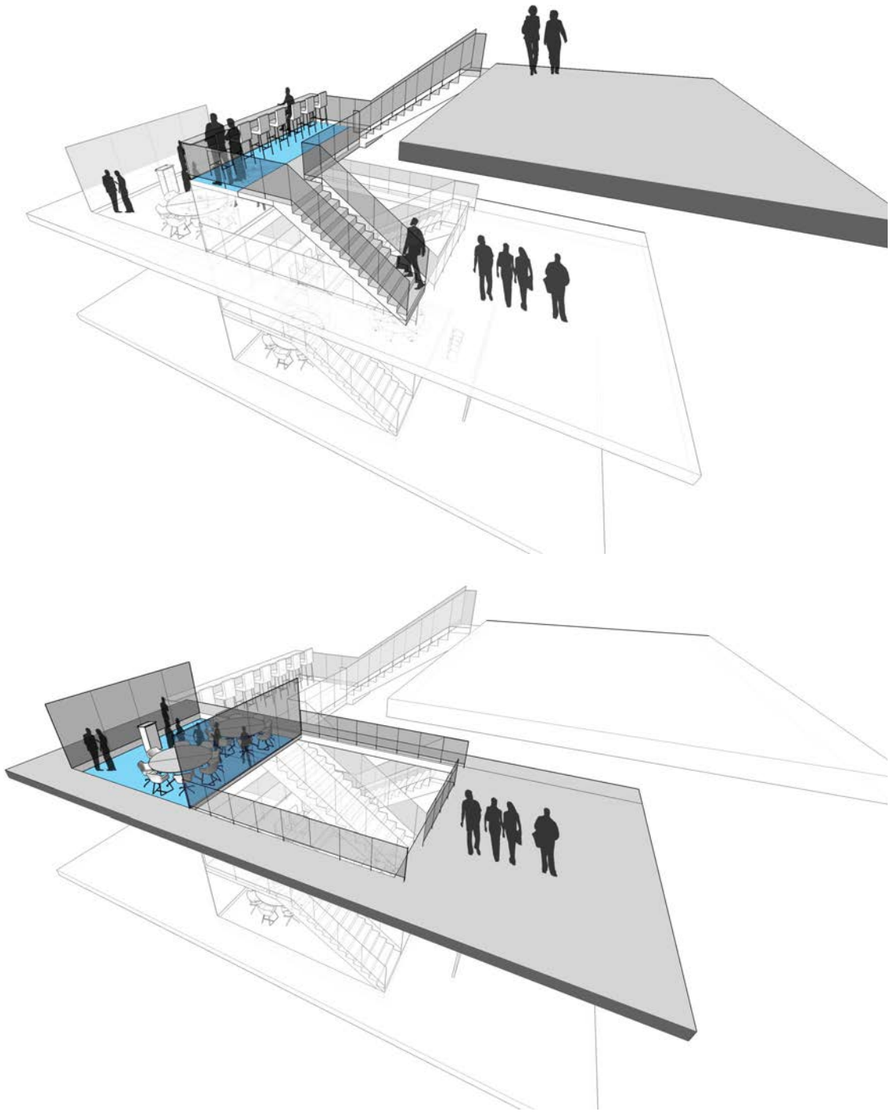
Ground Floor Plan



Concourse Level Plan



Second Floor Plan (third floor similar)

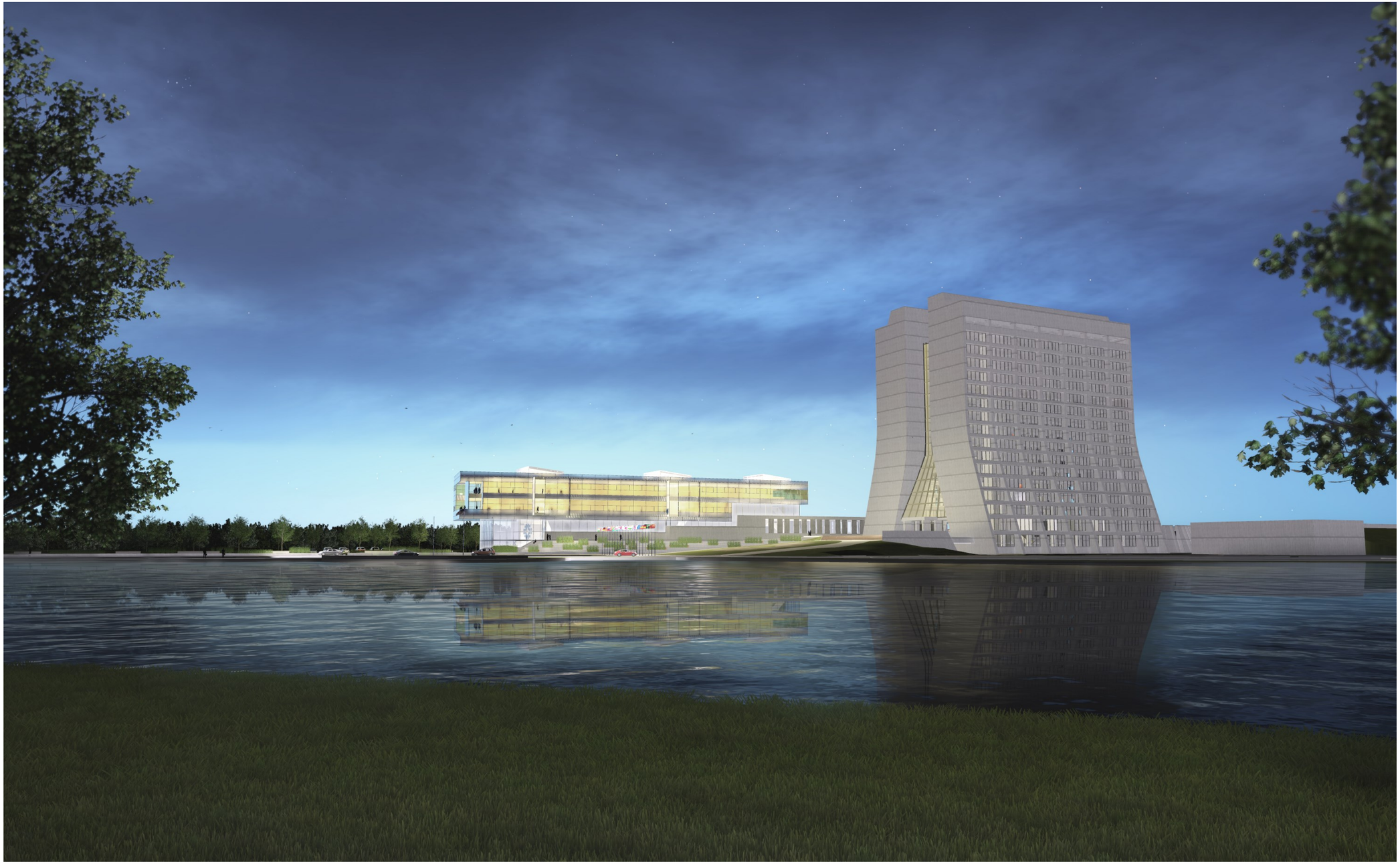


North Elevation

East Elevation

West Elevation

Vignettes



Workplace design is more important than ever before. A fundamental shift has occurred in the ways we work. Younger generations and recent graduates expect multiple possible types of workspaces, including ones that are more casual and open than the office or the cubicle.

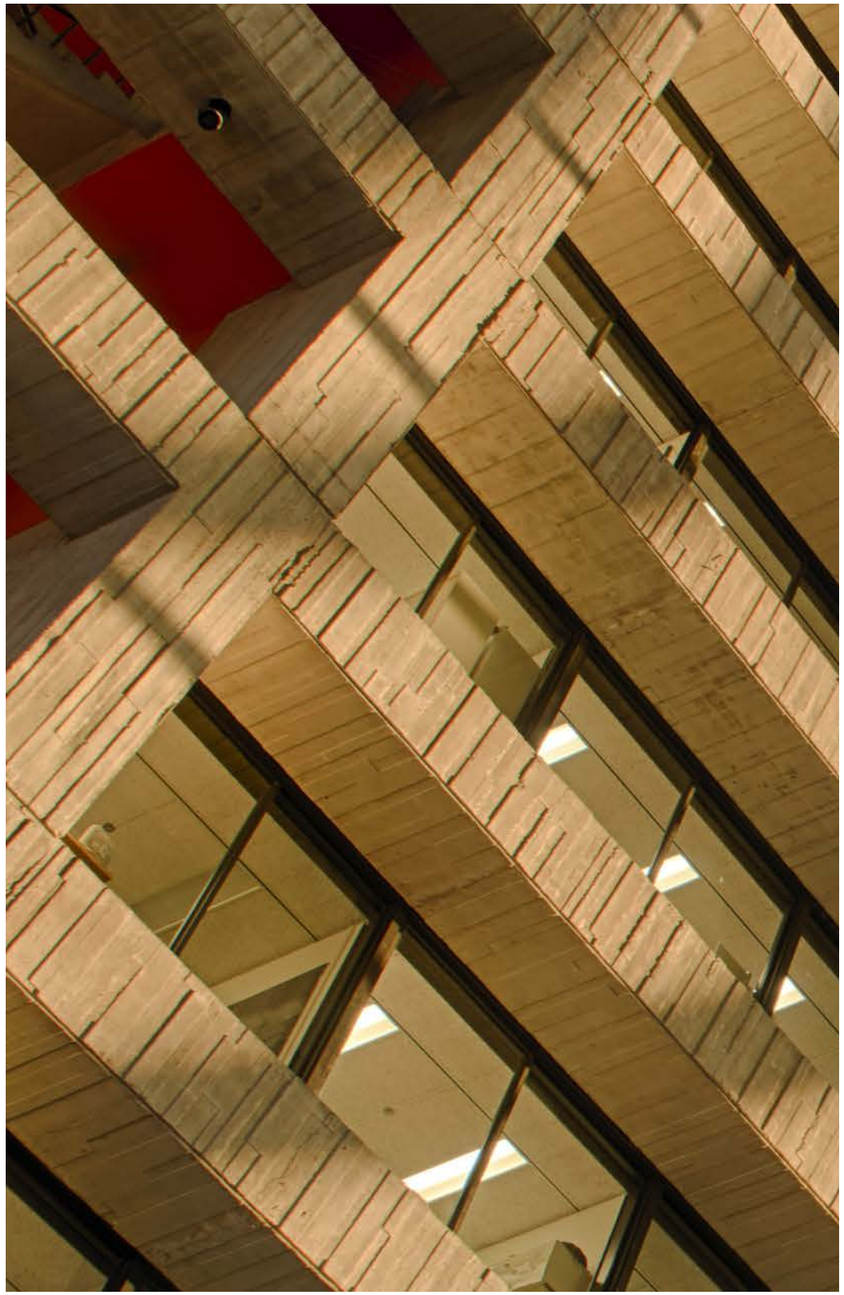
Wilson Hall 2.0

Wilson Hall 2.0 reimagines the iconic hub of Fermilab life and culture. Completed in 1972, this 240,000-square-foot structure has experienced many iterations of office design during its nearly 45 years. As the laboratory's most populous building, it houses over 700 researchers, visiting scientists, and management and support staff. Additional functions include a cafeteria, employee services, a library and a wide variety of conference and meeting rooms.

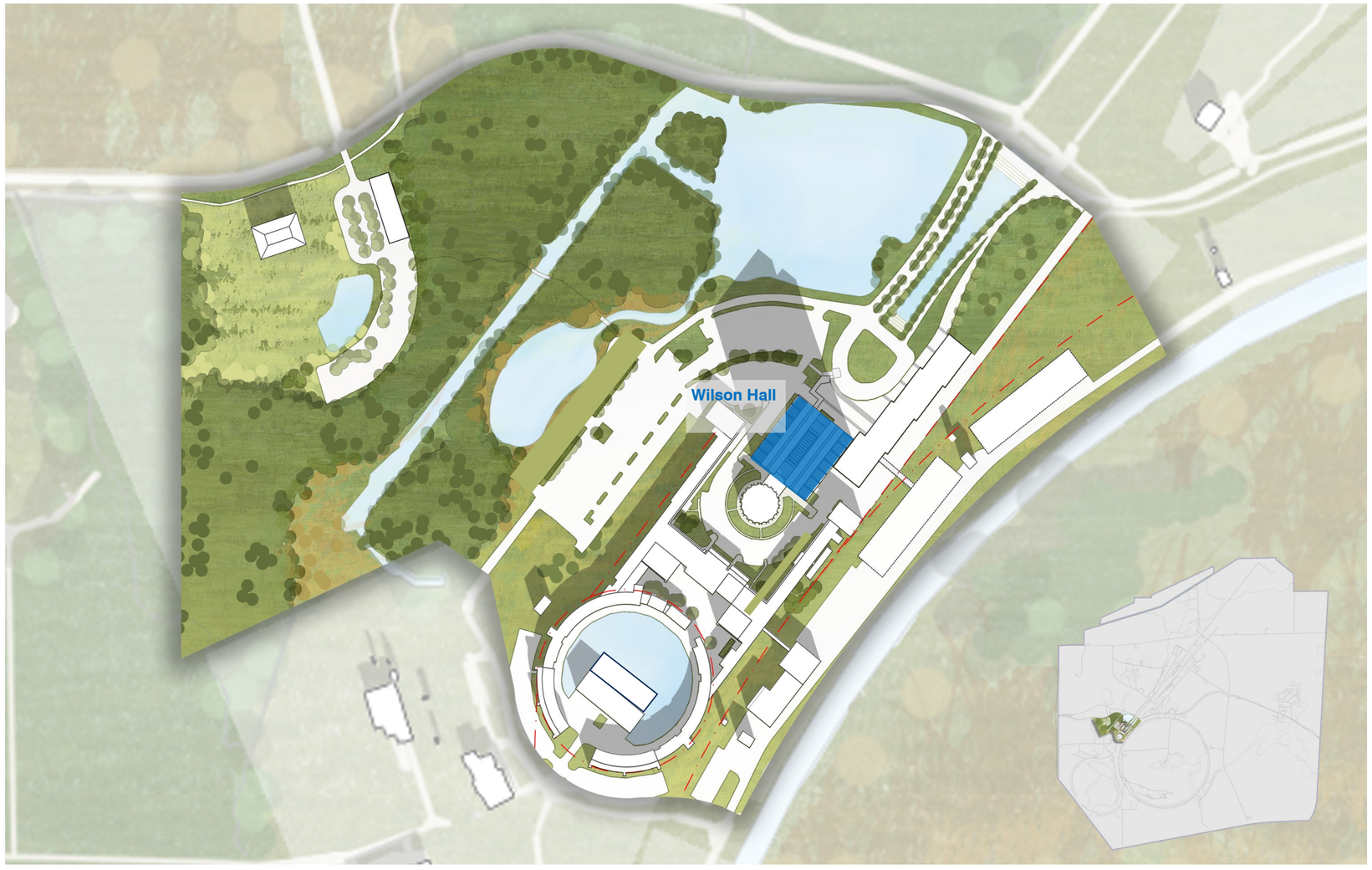
Significant technological, cultural and sociological changes have occurred since 1972. As Fermilab moves into its next generation of workers, creating the open, inviting and collaborative international research community envisioned at Fermilab necessitates the renovation and reorganization of Wilson Hall. Workspaces will be transformed into places designed to foster collaboration, attract and retain the next generation of scientific researchers, promote well-being, and use space efficiently.

In addition to workspace design on floors 4 to15, Wilson Hall 2.0 also reimagines the public and shared spaces, most notably, the ground floor and atrium level. Also to be considered are the usage and layouts of the second and third floors, as well as consideration of ways to add elevators to the building.

Wilson Hall 2.0 is not one large project but rather an umbrella encompassing numerous, evolving and ongoing revitalization efforts over the next 10 to 15 years. In that spirit, the following pages illustrate recent improvement to the atrium, as well as highlights of the Wilson Hall Renovations GPP project, an effort currently in design. This already funded project, anticipated for occupancy by early 2018, reimagines and renovates the 13th floor, as well as portions of the ground floor, into state of the art, open, inviting, and collaborative places the next era of research.

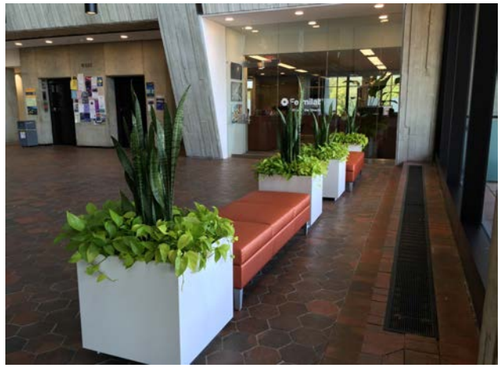


Location plan



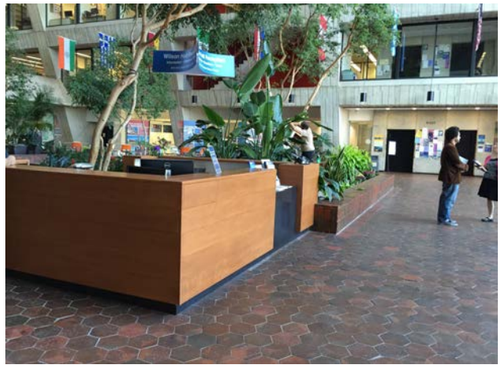
Recent Atrium improvements

An area for visitors to feel welcome and view compelling Fermilab video presentations has been recently unveiled. Located behind the video wall are two fully renovated public restrooms.



Formerly heavy and off-putting concrete wall were removed to create an open and transparent entrance to the new location of the directors office (beyond). Seating groups and planters have been placed around the atrium creating a warm and hospitable environment.

The southeast and southwest corners of the atrium have been reimagined and renovated as “work café” areas. These function as informal collaboration and meeting spaces, as well as alternative individual work areas.



The newly installed reception desk, staffed during business hours, directs business visitors to their destinations, while informing the casual curious visitor about what to do and what to see during their visit.

WH Renovations: 13th floor

The Wilson Hall Renovations project is funding and currently in the design stages. Anticipated for occupancy by early 2018, the 13th floor component reimagines and renovates the entire floor, transforming the space into a state of the art headquarters for the LNBF. Kick starting the WH office renovations, this project will stand as a prototype for future office renovations.

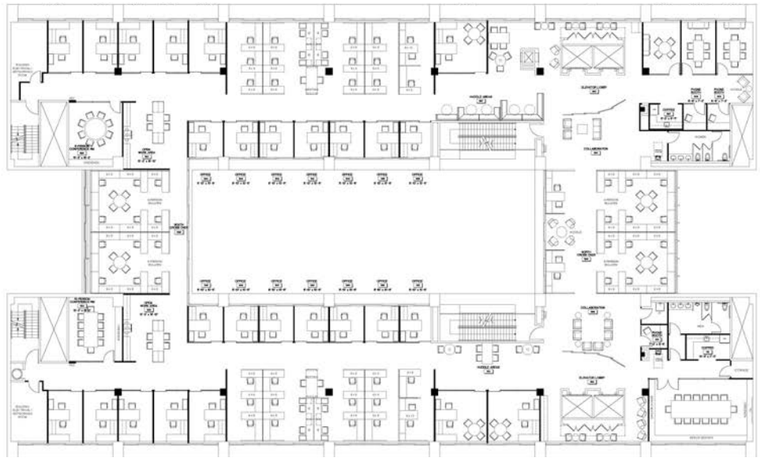
The zone planning diagram at the right indicates idealized locations of the various office types and functional spaces. The idea is to create an organizational motif the best locates each function with regard to accessibility, privacy, views, daylight, visibility and other planning criteria.

The 13th floor concept plan below illustrates one possible layout based on the zoning concept. The final plan will likely vary, but will grow out of the zone diagram and the various “plug and play” component ideas shown in the concept plan.

Zone Legend

- Open office
- South crossover
- Work Cafe
- North crossover
- East conference area
- West lobby / huddle
- West conference area
- East lobby / huddle
- West elevator wrap
- East elevator wrap

Office floor planning zone diagram

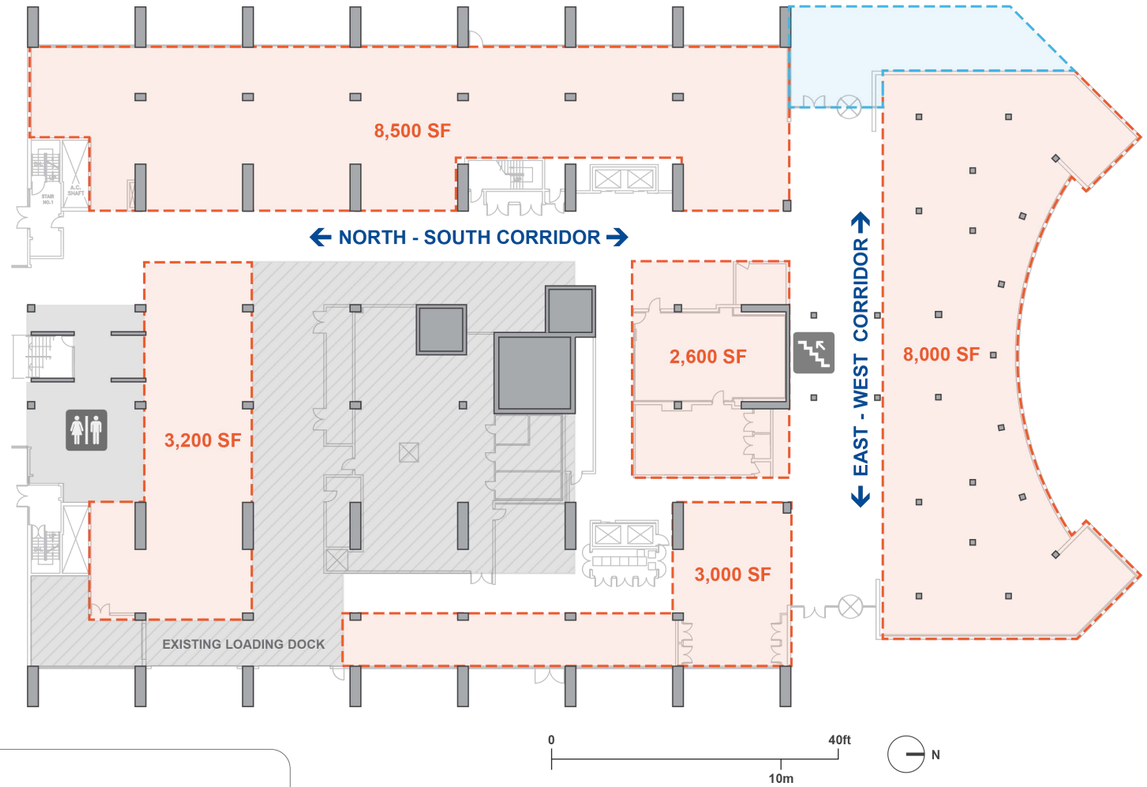


13th floor concept plan

WH Renovations GPP: Ground Floor

The ground floor component of the Wilson Hall renovation project reimagines this foundational component of the building. Creating the framework for its long term usage as an inviting portal into the full vitality of Wilson Hall it first puts in place a master plan concept. The plan identifies various space that could be considered for alternate or adaptive reuse. The goal is to make the best long term use of the ground floor by locating commonly used staff wide and visitor wide functions within its footprint.

As of this writing the planned scope of work is unfolding, but it appears as if the efforts under this project will focus on the north end of the floor and on improvements to the west entrance.



LEGEND

- West Entrance Improvments
- Tenant Space
- Back-of-House Operations
- CORRIDOR
- Future Stairs to Atrium/Mezzanine
- Future Restrooms

The Fermilab approach to uncovering the mysteries of the universe is eat, sleep and work to drive discovery.

The Scientific Hostel

Convenient temporary lodging is important to the creation of an open, inviting and collaborative international research community. The Scientific Hostel will augment currently available on-site housing for short-term visitors. It provides an attractive, efficient and convenient modern hostel.

The phrase “eat-sleep-work to drive discovery” has become a Fermilab motto. Fermilab envisions the character of the atmosphere critical to implementing its role in the Particle Physics Project Prioritization Panel (P5) Strategic Plan for U.S. Particle Physics in the Global Context, also titled “Building for Discovery.”

In that spirit, Fermilab proposes the development of a 100-room hostel as part of our laboratory complex. Drawing from the Master Plan vision, the guiding principles and the motto, this facility is to be located in the Central Campus district of the site, the laboratory’s hub of activity.

The design concept begins with an understanding of the needs, expectations and lifestyle of the current and next generation of researchers and visitors. It brings together the best of both the domestic and international character of our laboratory culture.

The typical guest will possess a “younger” sensibility and expectations. Typical travelers will check into their room, leave their bags and go back to the lobby to use their computer or meet associates. Alternatively, they will often take the short quarter-mile walk to Wilson Hall to meet colleagues for meals, meetings or work.

A compact but connected room
Guest rooms will be much smaller than the average American hotel (190 square feet versus typical 300 square feet), but without sacrificing amenities and a quality experience. The room designs use space efficiently while providing state-of-the-art technology to keep visitors connected and engaged during their working visits. This approach positively affects stewardship of natural and financial resources as well as energy consumption.

A compact "work café" lobby
Emphasis is placed on the design of the lobby. It will be a bright and airy setting characterized by high ceilings and a contemporary coffee-shop feel. It will be a place where visitors can relax, work or connect with friends and associates.

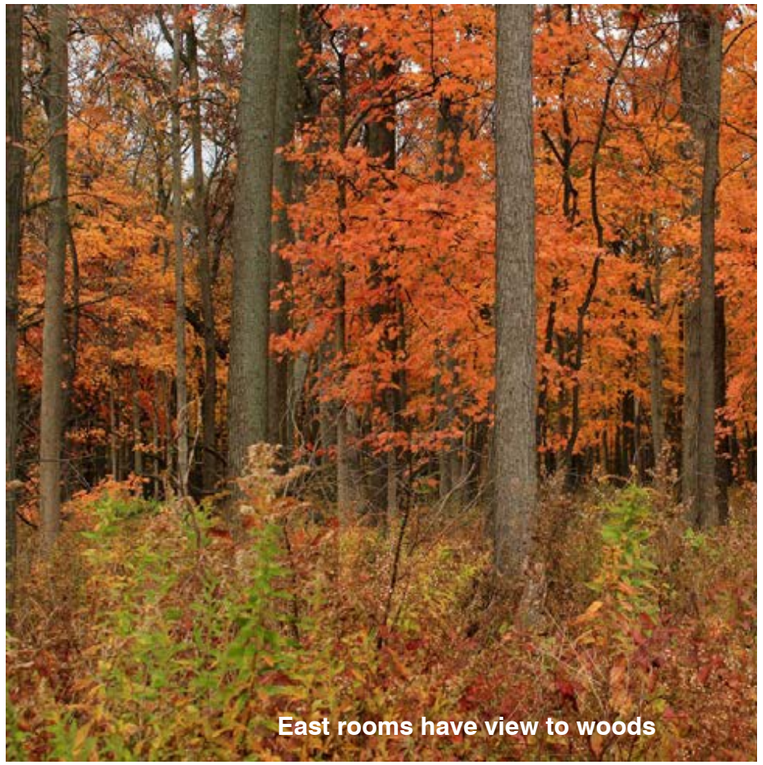
Ground Floor

Second Floor

Third Floor

Fourth Floor

West Elevation



East rooms have view to woods

Typical guest room interior

The Global Accelerator Center provide modernized working conditions for over 25% of the laboratory staff. It creates a unified culture with a strong sense of community both for the laboratory and national and international visiting and collaborating accelerator scientists.

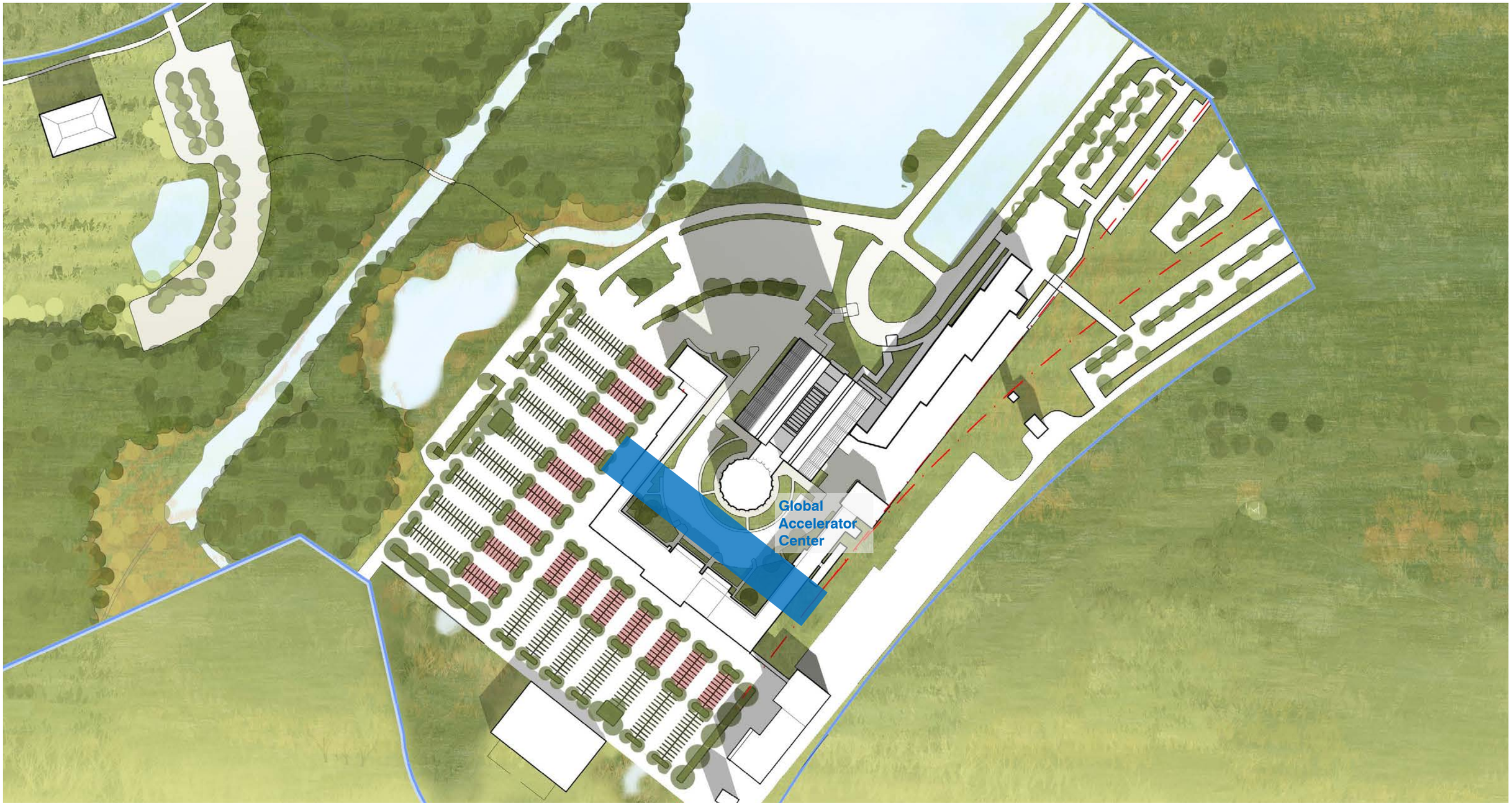
Global Accelerator Center

Fermilab has transitioned from operations focused on high energy colliding beams at the Tevatron to providing high intensity proton beams for neutrinos and precision physics measurements using muons, as well as leading national and international teams of accelerator scientists to develop transformational accelerator technologies for use across the SC complex and elsewhere. This transition, combined with the condition and age of Fermilab accelerator facilities, creates the need to consolidate core research functions and modernize key support buildings.

In that spirit, the campus plan development program proposes the construction of the Global Accelerator Center. This modern facility will provide modernized working conditions for over 25% of the laboratory staff, creating a unified culture with a strong sense of community both for the laboratory and national and international user community. It will house both laboratory accelerator scientists and visiting and collaborating national and international accelerator scientists.

The Global Accelerator Center will replace current, 40-year-old, outdated and inefficient buildings and portable trailers, spread across the laboratory. It will enable integration of the accelerator science, operations, and technology community, and allow these scientists to better support the science missions at the laboratory. In addition, the project will renovate for and adaptive reuse two 1970's era buildings (the Cross Gallery and Transfer Gallery). The project will result in interdisciplinary collaboration built on existing laboratory capabilities and expertise, currently dispersed across the Fermilab site.

Viewed together with the current Wilson Hall renovation projects, and the planned Integrated Engineering Research Center (IERC), the Global Accelerator Center will complete the transformation of Fermilab's Central Campus for the next generations of scientific discovery.


Global
Accelerator
Center

Fermilab's core capability in Advanced Computer Science, Visualization, and Date is at the heart of understanding and interpreting the scientific mission.

Next Generation Computing Center

Computational science is an important strategic theme at the laboratory. Fermilab's core capability in Advanced Computer Science, Visualization, and Date is at the heart of understanding and interpreting the scientific mission. Major computational science initiatives on the horizon include the High Energy Physics Cloud, an active archival Facility, and a scientific workflow system.

Supporting these initiatives requires ongoing improvements in Computational Science infrastructure and facilities, to keep pace with fast developing technology and scientific demands. In that spirit, the campus plan development plan proposes the construction of the Next Generation Computing Center (NGCC). Located in the computing district near the Iconic Feynman Computing Center (FCC), this facility will provide additional functionality complementing the FCC and setting the stage for the next generation.

A number of elements are included in the conceptual program for the new NGCC. The first is Big Data Storage. This storage driven component will provide large disk storage, tape storage and networking space. This space is planned to be located underground, protected from weather disasters, as it will house "treasure data" from experiments.

The second element will provide functionality needed by the computing division but not currently available in the existing FCC building. Chief among these is meeting and collaboration space. Collaboration space will range from the smallest "hoteling" type group workspaces, through conference rooms of 8 to 12 people, and up to and including a 300-seat auditorium capable of providing division wide meetings.

The final element is the construction of space to provide additional computing systems and equipment. Two system augmentations are envisioned; one system for business needs, and a separate more open system for the scientific community and other general-purpose needs. These systems will employ open air, state of the art, and green cooling systems.

When completed the NGCC will provide much needed facilities and capacity for the "Next Generation" of computational science at Fermilab.


NEXT GENERATION

As an inviting portal to the campus, the Welcome and Outreach Center will be a multifaceted place, creating a powerful and informative bridge between the laboratory and the world beyond its borders.

Welcome and Outreach Center

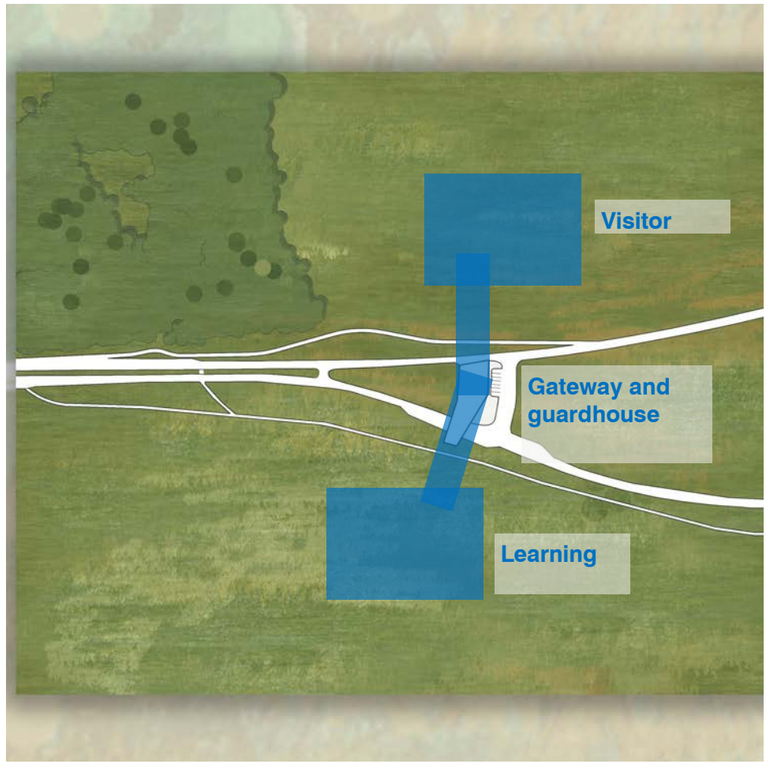
There is an adage that states, “You never get a second chance to make a first impression”. In that spirit, the development plan proposes the Welcome and Outreach Center. As an inviting portal to the campus, it will be a multifaceted place, creating a powerful and informative bridge between the laboratory and the world beyond its borders.

Currently, most first impressions are created at the Pine Street (west side) entrance to the campus. The perceptions created fall short of the welcoming and informative visitor experience envisioned by the master plan.

The planned welcome center will replace confusing, obsolete, aging and redundant elements comprising the current entrance, while envisioning a complex that collocates public interface and information functions into a fully reimagined arrival district.

When complete, the Welcome Center will create a larger presence within the broader community. Its location, highly visible from Kirk Road, will elevate Fermilab’s profile to surrounding communities in a fresh and more present way. Fermilab would become less mysterious and more accessible to all.

Site plan



Central to the project is a new consolidated 24-hour, manned entrance gateway and guardhouse replacing the two existing structures. Attached to the guardhouse will be a new sate of the art security office.

Beyond the gateway and security element the project proposes a new home for the education center integrally entwined with the new functionality of a visitor center. Fermilab has no visitor center, and the current education center struggles with the space constraints presented by its current facility further inward on the campus. A new facility could greatly enhance Fermilab currently ambitions and successful program partnering with school districts all over the state of Illinois and beyond. The visitor center would expand outreach to persons of all generations, offering opportunities to communicate Fermilab's scientific research to all.

The Boulevards

The “Boulevards” develops distinctive, functional and visually unified transportation corridors connecting the major entrances with the major destinations within the campus.

The Fermilab Campus Master Plan guiding principles aim to ensure an enhanced campus experience that is welcoming and informative to both local and international visitors. The campus plan initiatives envision integrative design, improvements in campus landscapes, and improvements in mobility and wayfinding,

Responding to these challenges and aspirations, the development plan proposes the “Boulevards”. This project, brings a together an array of design elements and approaches, creating distinctive, functional and visually unified transportation corridors connecting the major entrances with the major destinations within the campus.

The current campus vehicular circulation system is somewhat complex. It initially grew from the rural roads in place at its founding. As the campus developed over the next 50 years, roads were added (and subtracted) in response to the construction of accelerators, beamlines, raised earth berms and experiments.

Roads are typically the same width, with curbless gravel shoulders, minimal lighting and signage, minimal landscaping, and unscreened, undesirable views of scattered utilities and support structures along the way. Effectively, all roads appear to be service roads. This creates confusion among the uninitiated as to where they should and should not travel. As the campus hosts increasing number of international visitors and users in the years to come, this condition will become more problematic.

As major planned developments and experiments migrate toward the core campus region, the clarity and improvement in the transportation corridor will prove to be an important infrastructure improvement, providing clarity to the mobility and wayfinding experience, enhancing the campus experience and facilitating.

Design notes

The design of all areas shown in green on the diagram bring together multiple campus plan initiatives to clearly elevate the experience of the boulevards, in the hierarchical sense.

Landscaping and other screening approaches hide all undesirable views of equipment and the like. A fully integrated, coordinated and signage and wayfinding program foster simple navigation of the site. A unified system of efficient roadway lighting will be implemented.

Separate biking lanes will be provided in both directions along the side of the roads and clearly identified. Streetscaping and other unifying elements will be designed and implemented.

Center Point

“The Boulevards” proposes to establish a “State and Madison” baseline location for organizing the campus. Just as Chicago emanates from the intersection of State and Madison streets, Fermilabs addressing and order will emanate from this point. A turnabout proposed for this crossing of the two boulevards, will become a strong geographical marker, creating a sense of arrival, a sense of place, and centering the site. Wayfinding at this location will direct the traveler to all major destinations. The proposal also aims to rename these streets, making them more identifiable and memorable.

A tree lined divided road with dedicated bike path will characterize portions of the boulevard. Visitors will clearly perceive a distinction between this major arteries and lower level service roads.

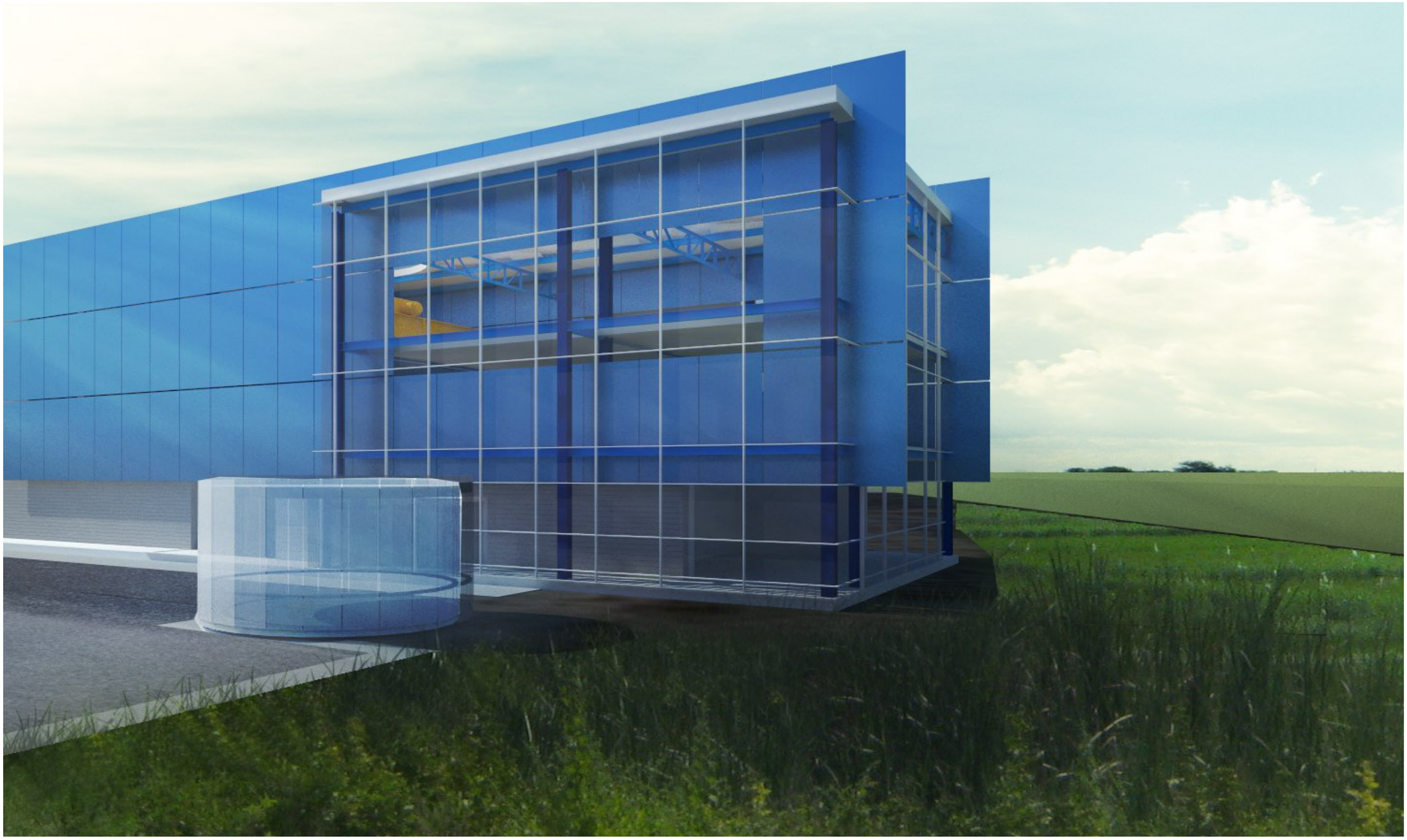
tools for science

Long Baseline Neutrino Facility

The Long Baseline Neutrino Facility is an international mega-science project for hosting the Deep Underground Neutrino Experiment in the United States.

Located in the Neutrino District of the core campus at Fermilab, the Long-Baseline Neutrino Facility (LBNF) constructs a complex of buildings and beamlines. Its location within the campus core provides easy proximity to Central District facilities housing the international community of researchers and engineers supporting the science program. The resulting powerful particle accelerator complex will produce the worlds most intense neutrino and antineutrino beams and send them 800 miles straight though the earth to the partner Dune detectors in South Dakota.

The complex, currently in the planning stages, will include the construction of a number of surface buildings, an earth berm and extensive underground construction. The scope of development will include additional roadways and access from the Central District, as well as site configurations to accommodate the new facilities.



Long Baseline Neutrino Facility

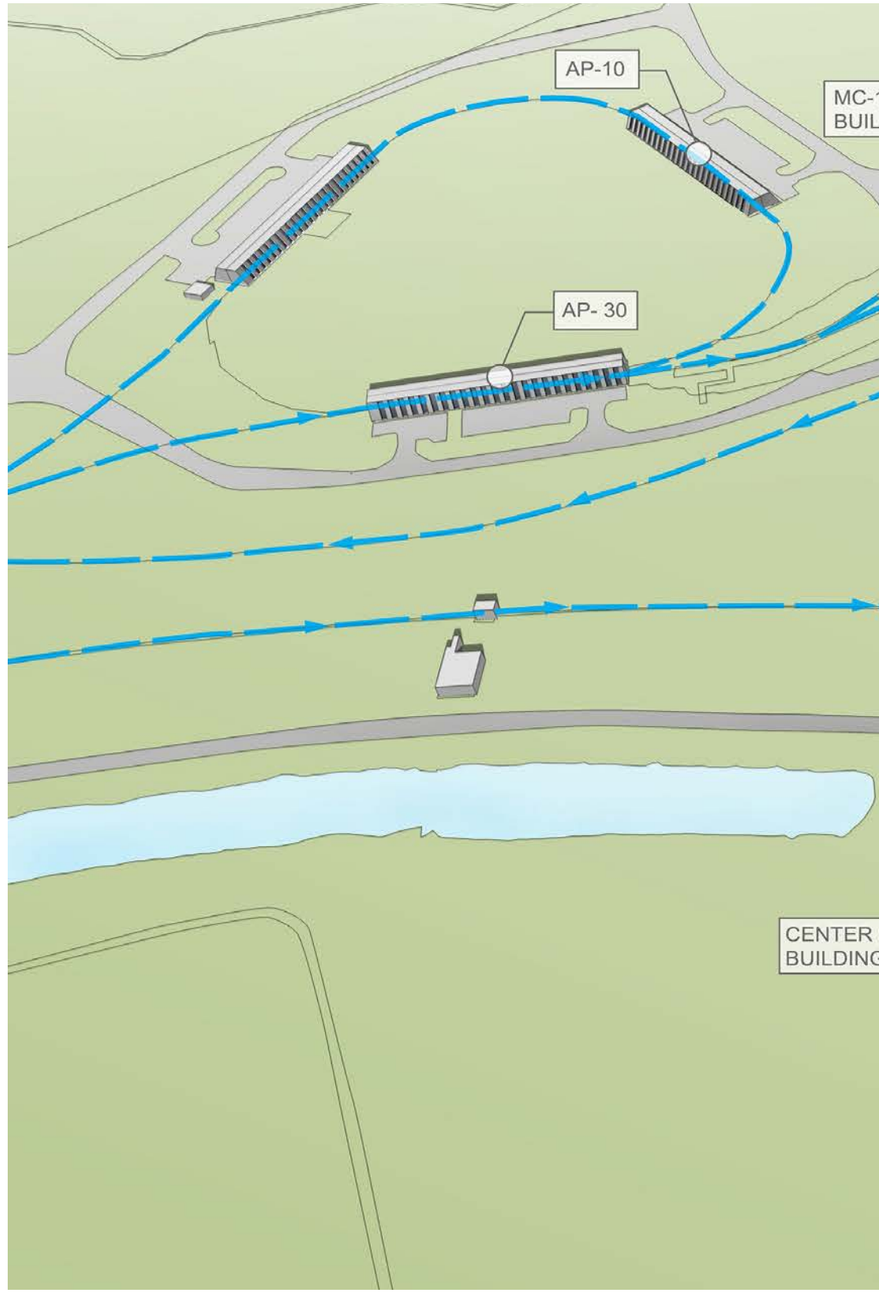
LBNF Site Plan

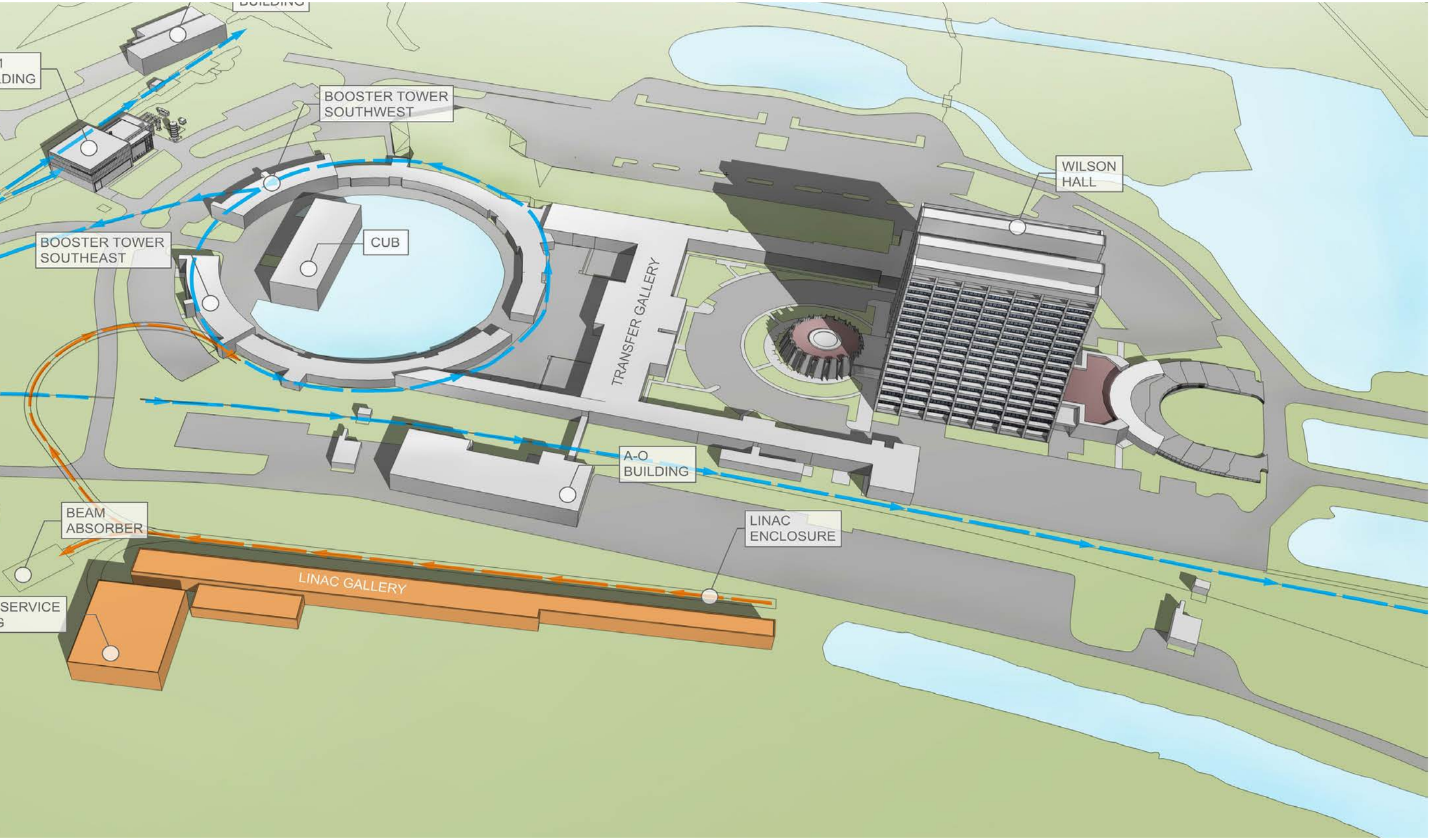
The existing linac and booster have served Fermilab for decades. The envisioned Superconducting Linac Complex will eventually replace these facilities with even more powerful accelerators for the next era of science.

Superconducting Linac Complex

The Superconducting Linac Complex (SCLC) is a set of improvements to the existing accelerator complex which will provide high-power proton beams in support of the Fermilab particle physics research program. The SCLC comprises the construction of a new 800-MeV superconducting linear accelerator injecting into the existing accelerator complex. Upon the completion of PIP-II, the existing 400-MeV linear accelerator will be retired from service.

The immediate goal of SCLC is to provide more than 1 Megawatt of proton beam power onto the LBNF neutrino production target (the PIP-II experiment facility) The secondary goal is to provide a platform for long-term development of the Fermilab complex to support higher beam power to LBNF and to support a broader research program based on high power proton beams.





infrastructure and support

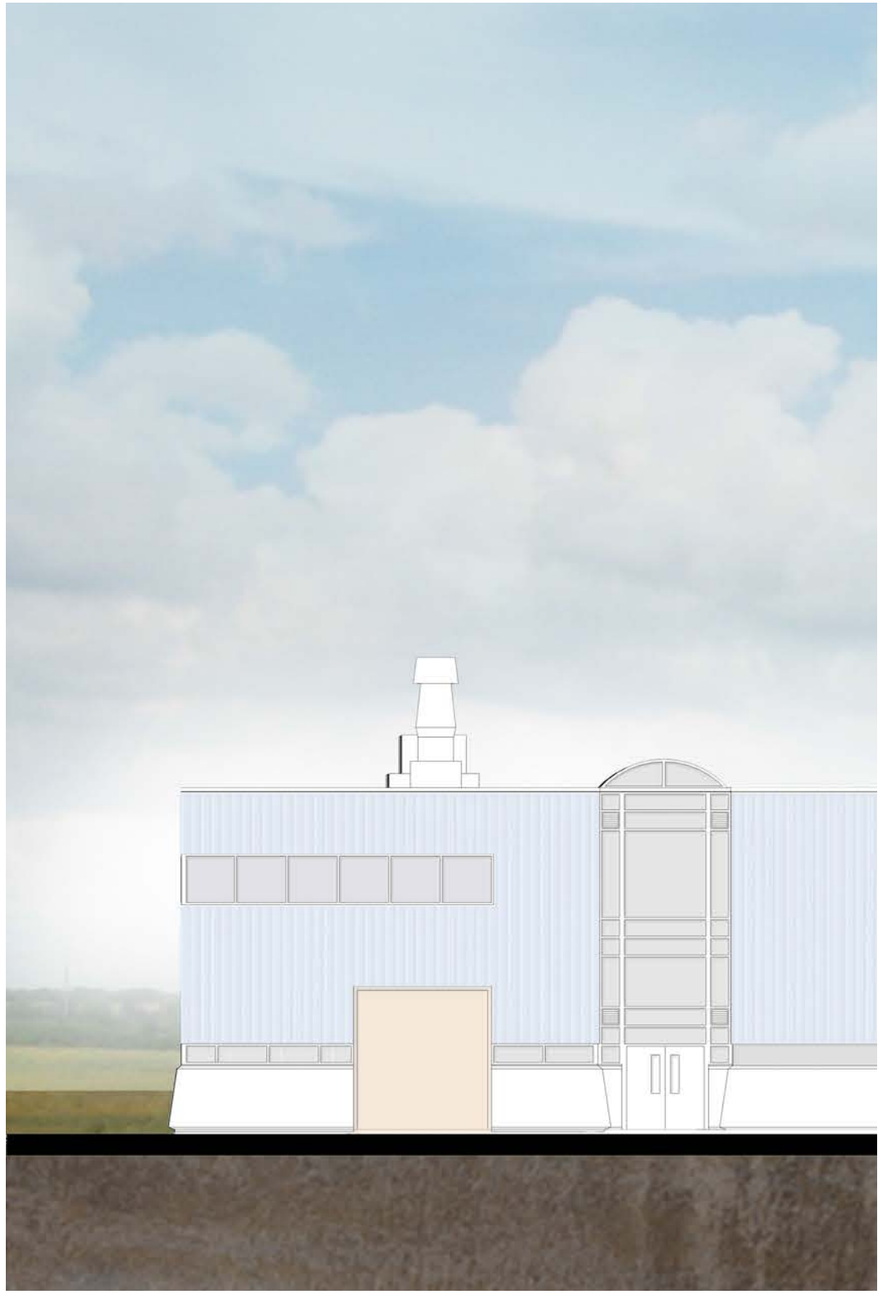
Fermilab's ongoing ambitious science program is pressing the industrial facilities toward a particularly intense period of component processing and assembly.

Industrial Center Building Addition

For over 30 years, the Industrial Center Building (ICB), with its two 30 ton overhead cranes, has served as the Technical Divisions premier space to build and assemble the largest components for accelerators and detectors. Surrounded by four buildings with lower capacity cranes, the industrial district carries out its mission of design, development, fabrication or procurement, and the testing of accelerator and detector components at the heart of Fermilab's overall mission. Here Technical Division personnel not only build the components of the accelerators and detectors of today and the near future, but also think far in advance to prepare for the next generation of high-energy physics machines.

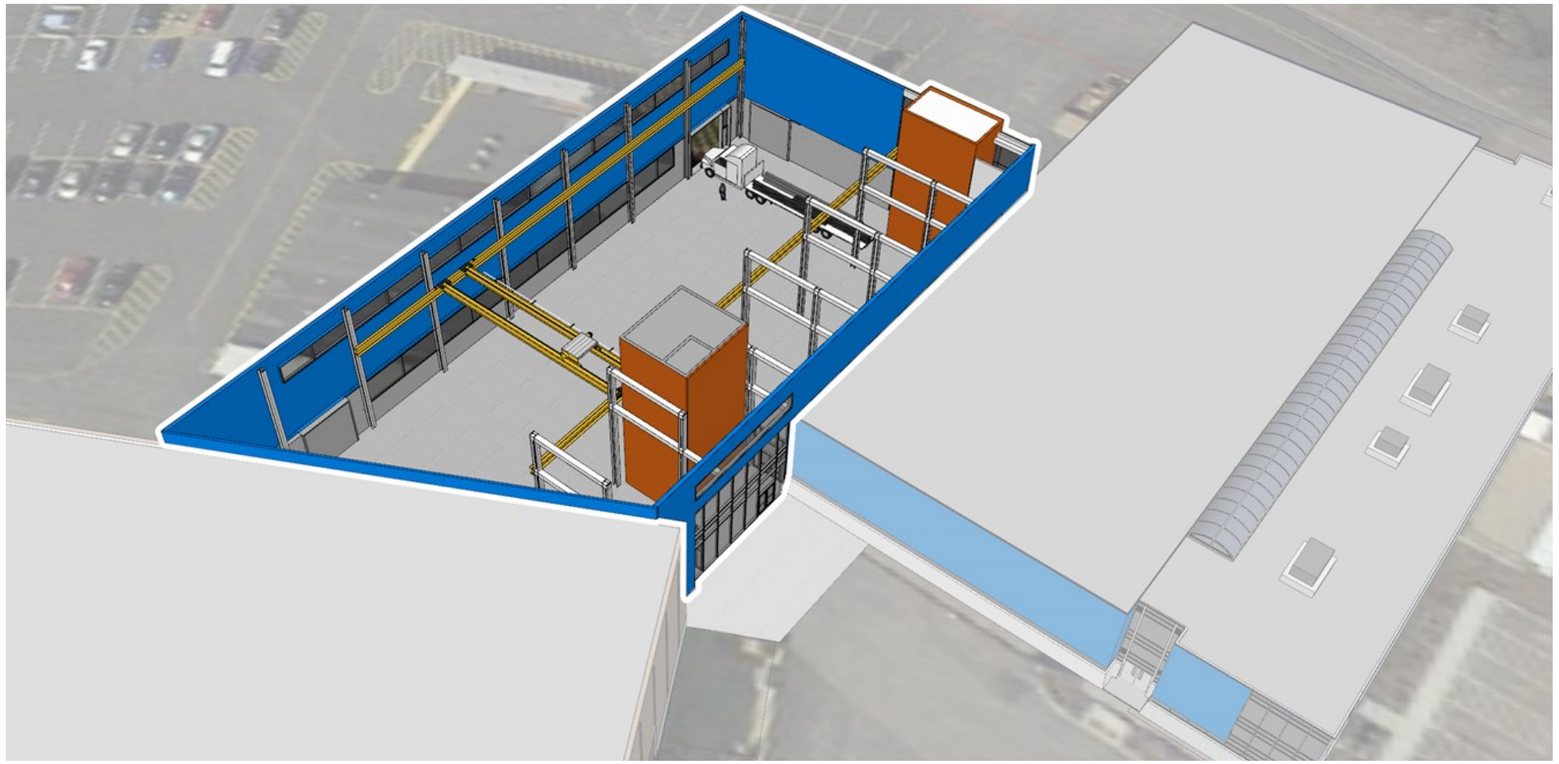
Fermilab's ongoing ambitious science program is pressing the industrial facilities toward a particularly intense period of component processing and assembly. Responding to the ever-growing demand placed on the current infrastructure, the campus plan development plan proposes the construction of the ICB –Addition, providing additional high bay and supporting office space to meet this demand.

The project will build a new high-bay addition to the Industrial Center Building (ICB). The proposed addition will include 15,000 gross square-feet at grade comprised of 10,500 square-feet of high-bay space with 40-ton crane coverage and 2,400 square-feet of low-bay space. When completed the ICB Addition will provide critical high bay space for component processing and assembly, well positioning the complex for the future.



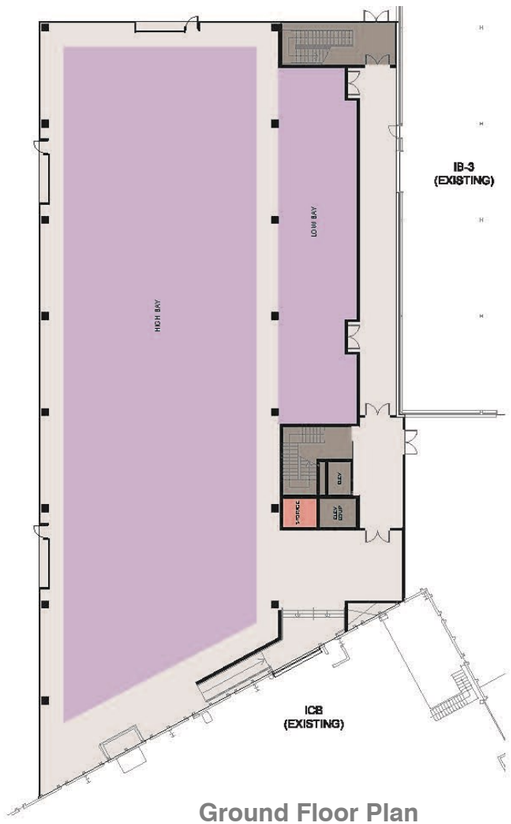
South Elevation


IB-3
IB-CA
IB-2
IB-C
Future Development
IB-4
IB-1
Future Courtyard
IARC
HAB
Future Development
327

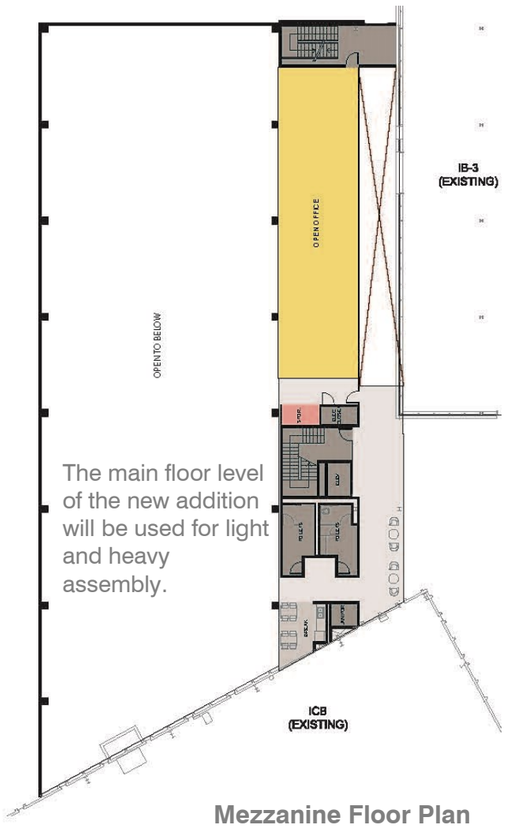


The ICB-A project includes direct connections between the existing and new high bay areas. This addresses the immediate need for additional assembly space and presents an opportunity for future flexibility. The project represents steps towards centralizing activities, executing the planned expansion, and providing improved access and circulation for the buildings in the Industrial Complex.

A glass entry attached to adjacent to an atrium corridor will serve as the main entrance for pedestrian traffic and will provided visitors and employees with direct indoor access to the Industrial Center Building (ICB) and the Industrial Building 3 (IB-3).



Ground Floor Plan



The main floor level of the new addition will be used for light and heavy assembly.

Mezzanine Floor Plan

Section looking south

Additional office space is also needed. Office occupancy of the permanent buildings in the Industrial Area is currently running at 100%. Over the low bay area the new building will have two floors of mezzanine designated for offices.

Functions not requiring crane coverage will be located in the low-bay under the future mezzanine offices.

West Elevation

Central plants are prized for their efficiency of design, operation, and maintenance as well as energy savings. Expanding Fermilabs Central Utility Building will enable Fermilab to build on its efficiency while expanding capacity to service a number of projects within the twenty year development vision.

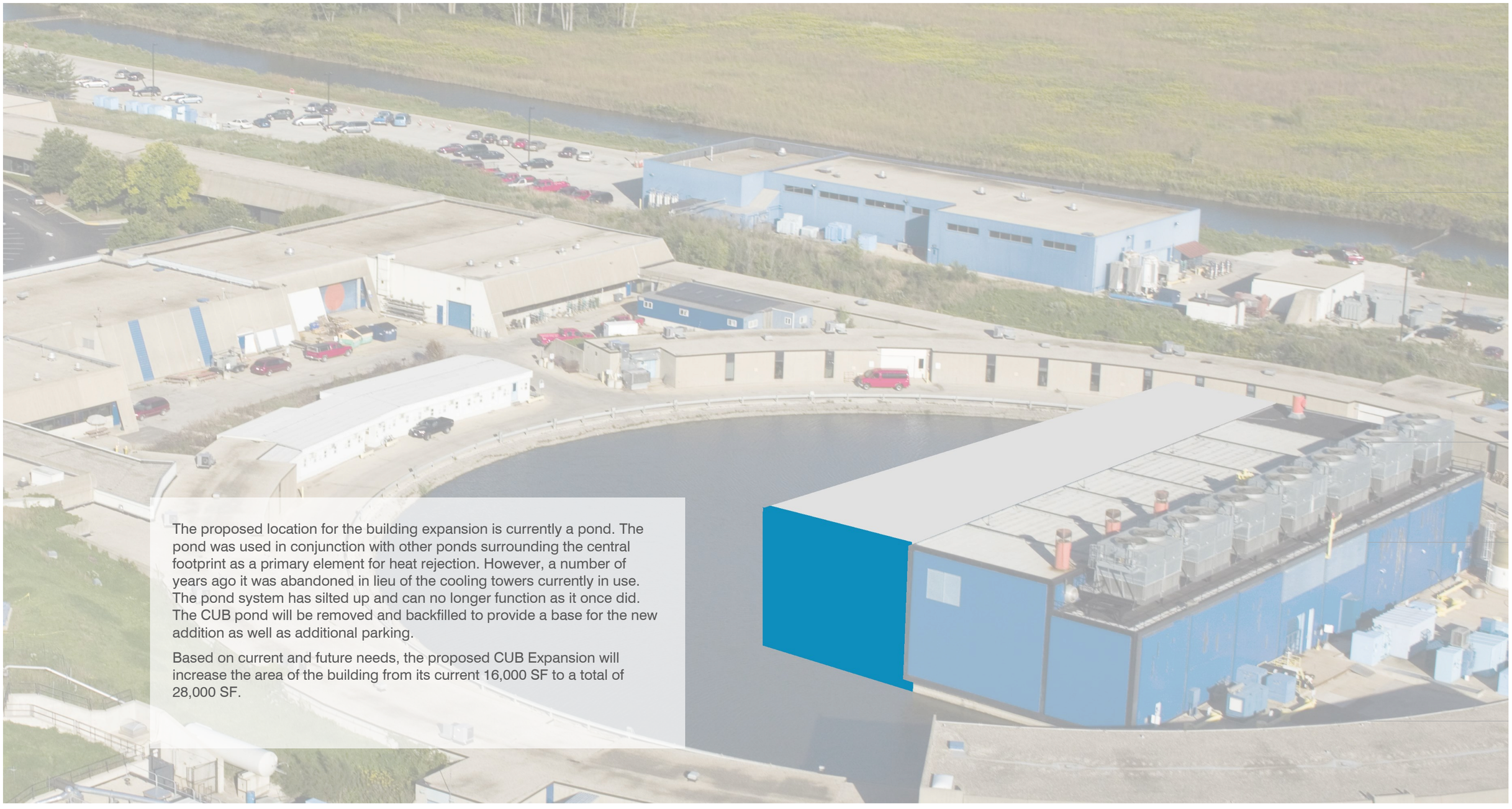
Central Utility Building Expansion

The central utility plant at Fermilab's Central Utility Building (CUB) has a proven, decades long track record of efficiently providing heating and cooling water for both conventional and programmatic uses. The conventional side provides water for heating and cooling Wilson Hall, as well as the footprint area building south of Wilson Hall. The programmatic side of the plant provides treated water to experimental areas and facilities beyond the footprint.

As described elsewhere in the master plan, a number of new central district development projects are in planning stages. One, the Integrated Engineering Research Center will relocate up to 200 staff from the fringes of the campus to the central district into a new state of the art facility interconnected with Wilson Hall. Another, the Global Accelerator Center, proposed just south of Wilson Hall will draw another 100 staff to the district. Ongoing renovation projects within Wilson Hall will gradually increase the population density of this 16-story icon. Additionally, the Superconducting Linac Complex hosting the PIP II and ultimately PIP III accelerators is to be located east of Wilson Hall, very near to the central district.

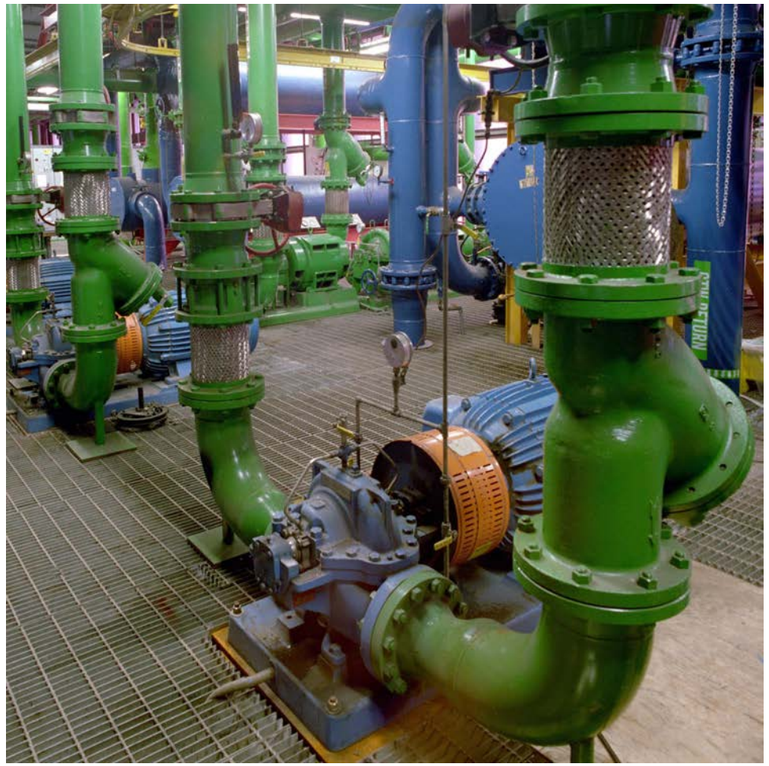
This convergence of next era developments presents an important opportunity for synergy of projects. Central plants are prized for their efficiency of design, operation, and maintenance as well as energy savings. For these reasons, the opportunity to expand the CUB to provide heating and cooling water for both occupant comfort and programmatic loads to support central district expansion is compelling.

In that sprit, expanding the CUB is proposed. The expansion is necessary and beneficial on two fronts. The first is assuring its continued efficient operation to meet current loads, by providing much needed space for maintenance access, equipment replacement and redundancy, and functional separation needs. Secondly, it will facilitate the provision of heating and cooling water to potential future central campus developments. In summary, the enlarged facility will serve the needs for the next twenty years, in a safe, maintainable, efficient, and accessible manner.



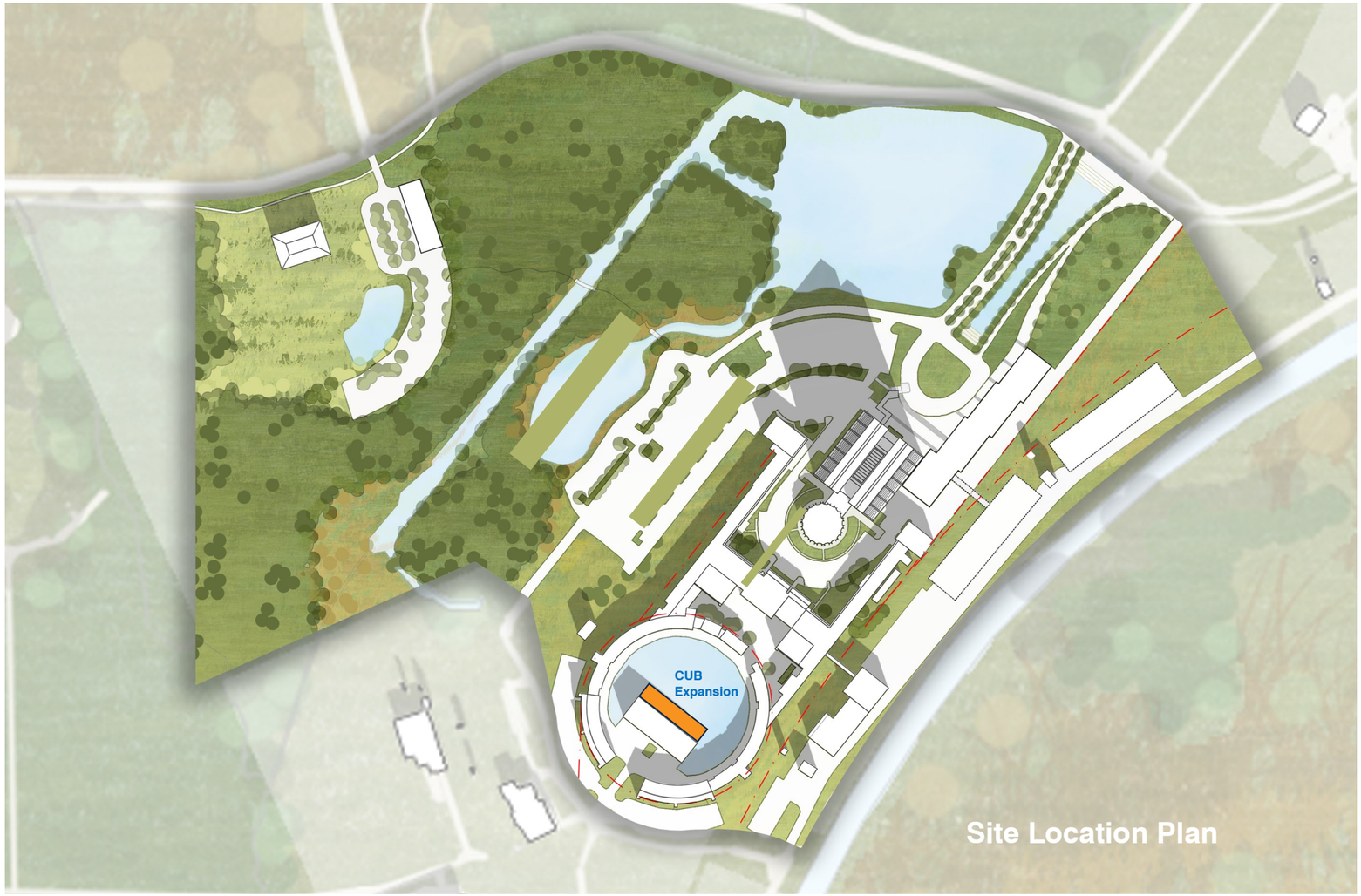
The proposed location for the building expansion is currently a pond. The pond was used in conjunction with other ponds surrounding the central footprint as a primary element for heat rejection. However, a number of years ago it was abandoned in lieu of the cooling towers currently in use. The pond system has silted up and can no longer function as it once did. The CUB pond will be removed and backfilled to provide a base for the new addition as well as additional parking.

Based on current and future needs, the proposed CUB Expansion will increase the area of the building from its current 16,000 SF to a total of 28,000 SF.



The existing CUB, operated and maintained by FESS Facility Management, supports a number of the footprint buildings with cooling and heating for both HVAC and equipment cooling. It is congested and has little to no space for additional equipment. Its current cooling capacity is marginally adequate to handle some of the proposed future loads, but leaves no spare capacity for redundancy or expansion. System reliability and servicing cycles, indicated the need for near 100 percent redundancy, which is not achievable within the current space confines.

An expansion of roughly two thirds of the existing building will comprise the proposed addition. A portion of the expansion will allow for the separation of certain more corrosive operations by expanding existing functions housed in the current structure into the proposed building addition. Other areas of the existing building contain controls and variable frequency drives requiring an increased level of cooling for operations will be addressed with the addition. Possibly the greatest benefit of the expansion is to re-plan some of the existing equipment to eliminate the hazards of servicing congested areas.



Site Location Plan

For nearly 40 years the technical district complex has been home to the creation of accelerator components. Revitalization will prepare the district for the next decades.

Industrial District Revitalization

For nearly 40 years the technical districts complex of industrial have been home to the vital mission of design, development, fabrication, procurement and testing of accelerator components. Here Technical Division personnel not only build the components of the accelerators and detectors of today and the near future, but also think far in advance to prepare for the next generation of high-energy physics machines.

As Fermilab embarks on its next major scientific initiatives the complex is in need a makeover. In that spirit, the Fermilab Campus Plan development plan proposes the Industrial District Revitalization (IDR) project. This project will address important needs present at the facilities in two ways.

The first will be to replace the siding and windows in the four metal-sided high bay buildings. The existing siding and widows are past their useful life. New state of the art siding and window systems will provide increased energy efficiency and a durable envelope and finish.

Secondly the project proposes and expansion of the technical division (TD) headquarters office space to the south of the Industrial Center Building. This will allow new state of the art, flexible, day lit office space for division management and staff. This will replace the dark, narrow, bunker like spaces currently used for this purpose. This expansion will also reimagine the outside courtyard area and of the district and create a more open and unified entrance and connection between elements of the complex.

When completed the project will provide a renovated and reinvigorated technical district, exemplifying the master plan guiding principles and setting the stage for its next 40 years and beyond.

Utility Upgrade Projects

Maintaining a dependable utility infrastructure from which science programs can be accomplished are vital to the Fermilab Campus.

Maintaining a dependable base from which science programs can be accomplished depends upon robust, redundant, maintainable, and flexible utility systems. The major utility systems in place at the Fermilab Campus are High Voltage Electrical (HV), Industrial Cooling Water (ICW), Domestic (DWS), Sanitary Sewer System (SS) and Natural Gas piping (GAS). Without these systems, science at Fermilab cannot exist. Over recent years upgrades and improvements have been ongoing. Currently two major Utility Upgrade Projects (UUP) are underway.

The first is an upgrade to portions of the Industrial Cooling Water (ICW) infrastructure. This project is putting in place a newly restored backbone including new piping, isolation valves and new lateral connections throughout the site. It is also upgrading the master pump house to best serve the required system loads. Additionally, in order to maintain adequate system pressures, two additional pump stations are being installed to support the anticipated loads.

The second project is a new high-voltage (H/V) Master Substation facility, replacing the obsolete original Master Substation. The project is putting in place a new substation building housing the new state of the art electrical systems and components essential to the support of accelerators, experiments, and computer operations in a safe and reliable manner.

These two projects make significant headway in the ongoing efforts to keep site utilities in peak condition to support science. However, work remains as founding era systems continue to age. Ongoing UUP efforts aimed at continued refurbishment are needed to continue providing a reliable and flexible utility infrastructure. These efforts will establish a stable base from which to serve both programmatic and conventional power requirements across the site for the decades to come.

The following pages provide a summary of known utility improvement needs as Fermilab moves forward. They are grouped by systems and affinities into possible project groupings. These groupings serve to provide information and planning outlooks. Funding packages and actual project groupings and schedules will be determined as plan implementation proceeds.

Without replacement of aging equipment, maintenance costs and service interruptions will continue and likely grow in both frequency and severity (increasing exponentially), putting our scientific programs at risk.

Utility Upgrade Projects

Electrical

Oil Switch Replacements: An inventory of existing oil-filled switchgear and transformers across the site has been completed. Using this compilation as a foundation, unit substations and oil switches will be replaced with modern switchgear and air switches. The current switches pose an environmental risk, and per DOE direction, oil switches will be replaced with ones using SF-6 gas.

High Voltage Feeders: End-of-life high-voltage feeder cables need to be replaced. Additionally, as part of this effort, feeder loops will be created to provide redundant capabilities, improving electrical service reliability.

Unit Substation Replacements: This initiative will replace approximately 30 obsolete original equipment (founding era) unit substations original to the lab. They will be replaced with modern, technologically current, state of the art equipment.

Industrial Cooling Water

Main injector ICW: The industrial cooling water piping system network serving the Main Injector complex is nearing end of life and should be scheduled for replacement.

ICW Pond System: The network of ponds comprising the ICW Pond system are in need of improvements. The goal of this work is to increase storage capacity of water on site, supporting the surface water management program.

Cress Creek Flood Mitigation: Flooding problems are troublesome at the north end of the site. Various buildings, including the Casey's Pond Pump House, have suffered flooding during times of heavy rainfall. The Cress Creek Flood Mitigation project will construct site modifications at the north end of the site to help mitigate flooding alleviating the present issues.

Domestic Water System

Among a number of domestic water issues are systems close to failure in the Village, at Site 38 and at Lab 8. Additional issues at various locations around the site include water quality resulting from resident time of water in pipes.

Sanitary piping system

Sanitary piping is in need of replacement at a number of locations throughout the site. A persistent problem is pipe failure which allows groundwater infiltration into the pipes. This infiltration artificially increases the quantities of water needing to be sent offsite to treatment facilities.

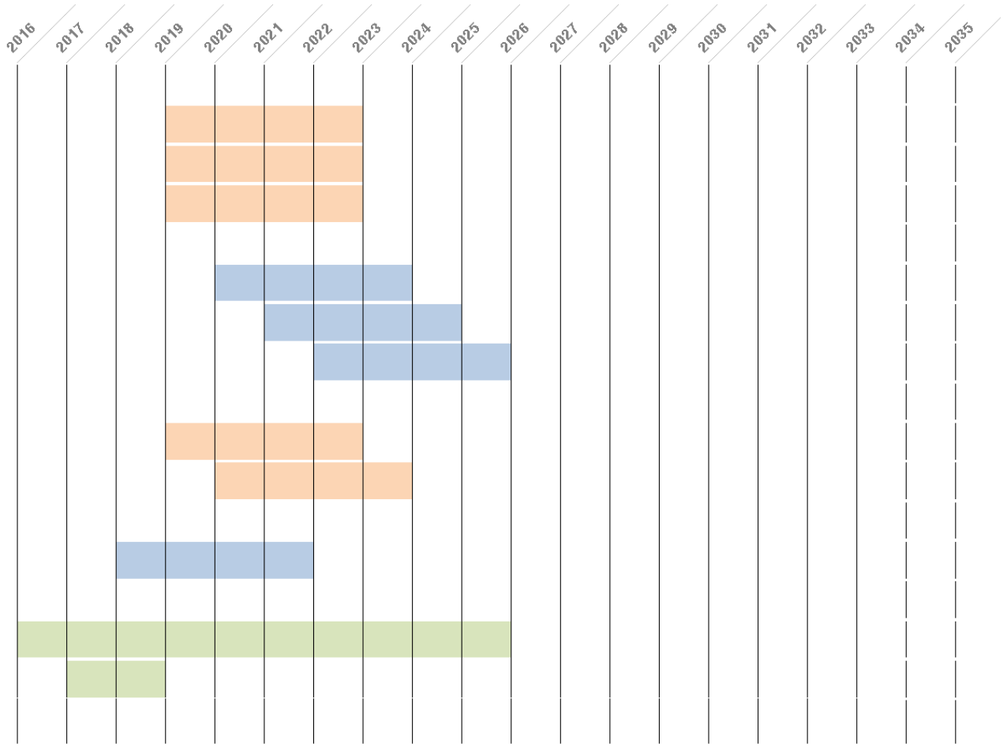
General system wide initiatives

Metering: As a green monitoring and management utility program, and to meet DOE direction, meters should ultimately be installed on all essential systems throughout the campus.

Utility Master Plans: In support of the Fermilab Campus Master Plan, individual system master plans are needed. Just as the master plan enables global and integrative planning, the system plans can do the same. This will allow capacity optimizations, flexibility, proper resource and improvements focus, best leveraging utility improvement upgrade efforts.

Utility Upgrade Projects Outlook	Proposed Funding
Electrical (H/V)	
Oil Switch Replacement	*
High Voltage Feeders	*
Unit Substation Replacement	*
Industrial Cooling Water (ICW)	
Main Injector ICW	*
ICW Pond System	*
Cress Creek Flood Mitigation	*
Domestic Water (DWS)	
System failure replacements	*
Water quality	**
Sanitary System (SS)	
GW Infiltration failure repairs	**
General	
Metering	**
Utility Master Plans	**

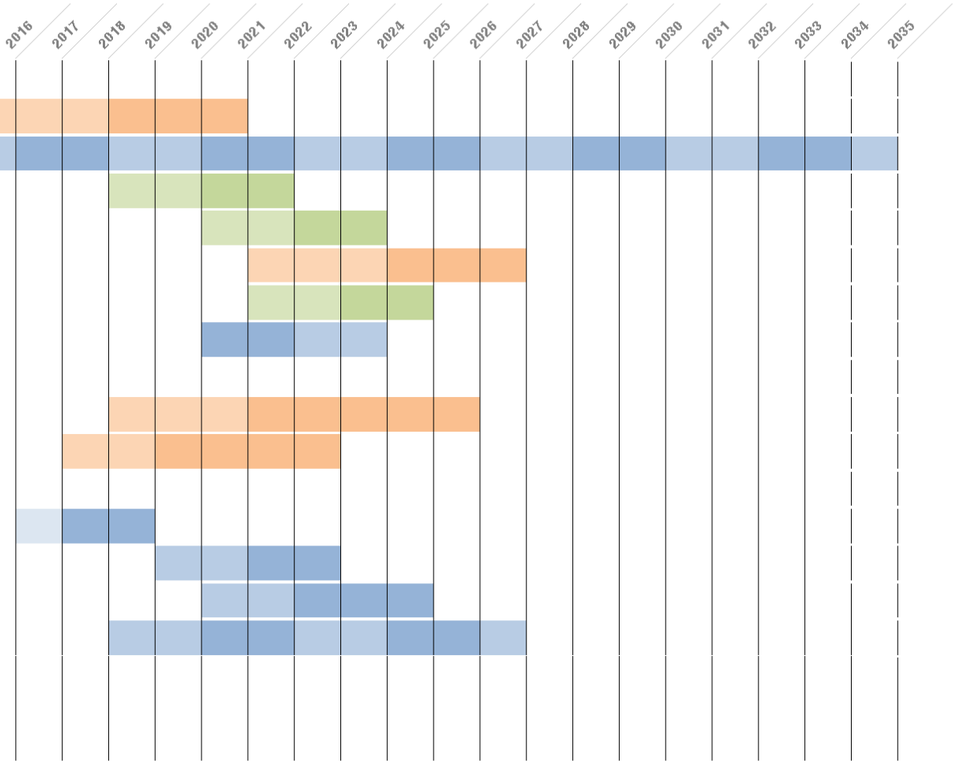
* Combination funding (GPP, Operating)
** Ongoing with incremental funding - various sources



implementation

Implementation Outlook

Project Implementation Outlook	Proposed Funding
Research Community	
Integrated Engineering Research Center (IERC)	SLI
Wilson Hall 2.0	*
Scientific Hostel	***
Next Gen Computing Facility (NGCF)	**
Global Accelerator Center	SLI
Welcome and Outreach Center	**
The Boulevard	****
Tools for Science	
Superconducting Linac Complex	Line
Long Baseline Neutrino Facility	Line
Infrastructure and Support	
Industrial Center Building Addition (IBC-A)	GPP
Central Utility Building Expansion	GPP
Industrial District Renewal	GPP
Utility Upgrade Projects	GPP



* Combination funding (GPP, Operating)
** Potential private funding
*** Private funding and operation model
**** Ongoing with incremental funding - various sources