

### 01 Introduction

### **Principles and Key Elements**

### **Projects and** Initiatives

- Campus-Wide
- Central Campus
- East Campus
- Lake Campus

There is also a brief discussion at the end of this section about the Forrestal campus.

### **A Sustainability** Framework

## **Land Use**

This section describes the historic and potential future organization of campus land uses and identifies opportunities for future development. The principles of the 2026 campus planning framework that are described in Section 1 wc call for providing an integrated environment for teaching, living, learning and research, and fostering a setting that is welcoming supportive, and encourages positive interaction and exchange. These principles recognize the importance of effective land use planning supportive, the first principles of the decided in the section of the decided in the control of the section of the decided in the control of the section of the decided in the control of the decided in the section of the decided in addition to the physical beauty of the campus, careful arrangement of uses in relation to each other within the campus and to the land uses adjacent to the campus contribute greatly to Princeton's vitality and sense of community.

### Movement

A key element of campus planning involves strategies for moving students, faculty, staff, visitors and others to and around the campus. The nature, quality and variety of transportation modes affect land use, mobility, accessibility, quality of life, public

The planning process found that a much higher percentage of Princeton faculty and staff commute to campus in single occupancy whelees than at any other campus that was studied, including peer institutions in similar settings. This over-dependence requires substantial investment in road infrastructure and parking facilities, which are costly in terms of capital expense and land consumption; reductions the over-dependence would have multiple benefits, including reductions framework proposes a dignificant shift toward more sustainable modes of transportation, such as mass transit, carpooling, walking and cycling, as part of an enhanced commitment to the University's transportation demand management (TDM) programs, and policies.

### Landscape

### **A Look Ahead**



## 01 Introduction

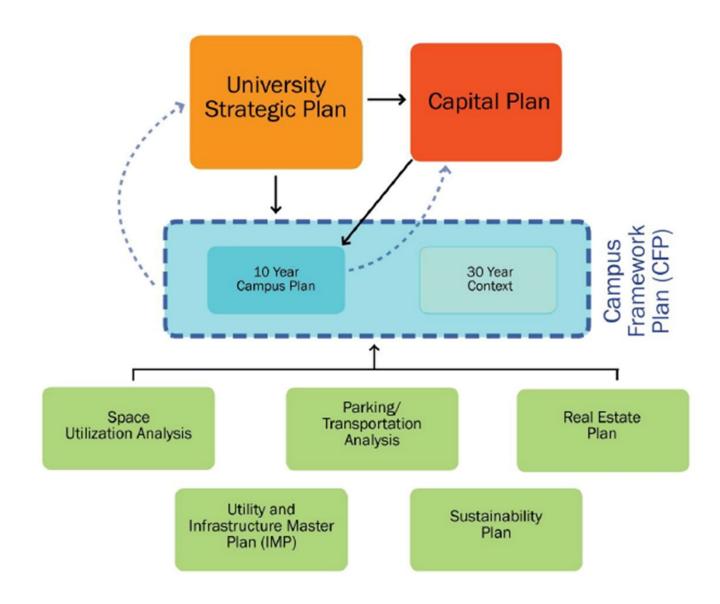
Princeton University's mission, as formally adopted by its trustees in 2015, is to "advance learning through scholarship, research, and teaching of unsurpassed quality, with an emphasis on undergraduate and doctoral education that is distinctive among the world's great universities, and with a pervasive commitment to serve the nation and the world."

The University's defining characteristics include "a human scale that nurtures a strong sense of community, invites high levels of engagement, and fosters personal communication;" "a commitment to welcome, support, and engage students, faculty, and staff with a broad range of backgrounds and experiences and to encourage all members of the University community to learn from the robust expression of diverse perspectives;" and "a vibrant and immersive residential experience on a campus with a distinctive sense of place that promotes interaction, reflection, and lifelong attachment."

Princeton has long taken pride in the beauty of its campus and the extent to which it supports the pursuit of its mission. As the University continues to grow and improve and expand, this campus planning framework provides guidance for its development through the next decade and beyond.

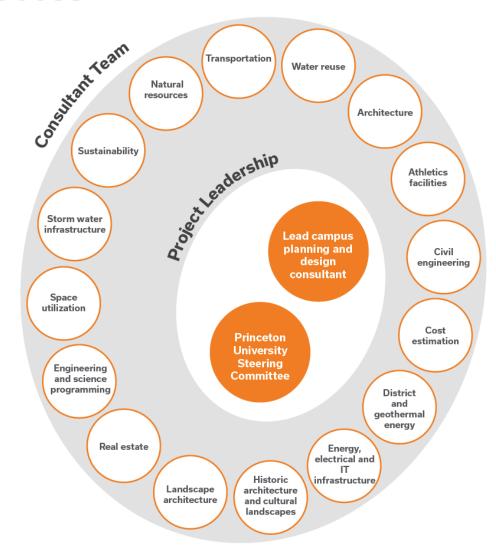


## The 2026 Campus Framework Plan





## **Process**

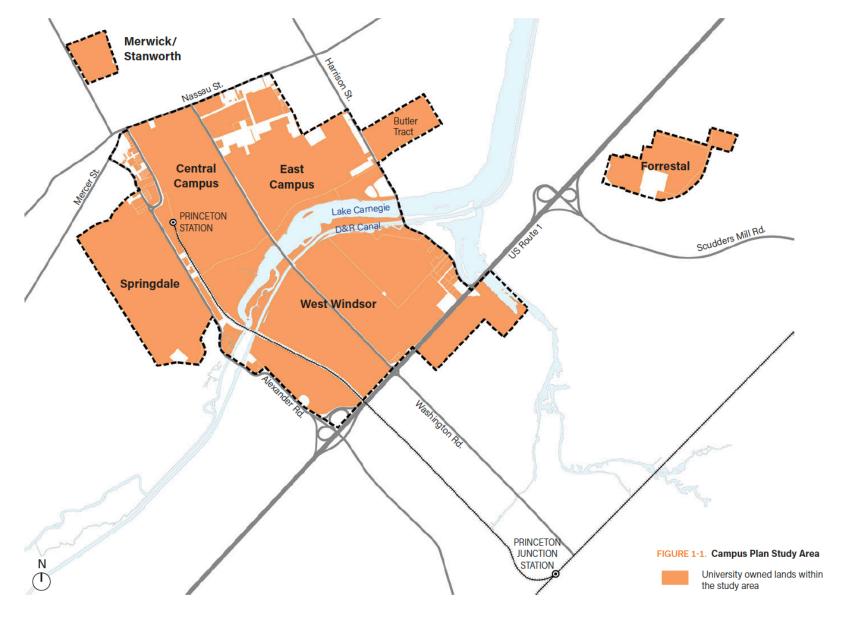




# O2 Principles and Key Elements

This section has two purposes: to present the foundational principles upon which the campus planning framework is built, and to provide an overview of some of its key elements. It concludes with an illustration of the potential components in the planning framework







## **Principles**

The campus planning process identified five principles, based on the University's values and priorities, to guide the evolution of the campus. The five principles are as follows:

Provide an integrated environment for teaching, living, learning and research

Enhance the campus's distinctive sense of place

Foster a setting that is welcoming and supportive and encourages positive interaction and exchange

Create a climate that encourages thoughtful and creative approaches to sustainability Serve communities that extend beyond the campus



## **Objectives**

The campus planning framework recognizes the importance of landscape in defining the identity and functionality of the Princeton campus and establishes a comprehensive landscape framework to accomplish the following objectives.

#### Sense of Place

The planning framework honors the campus's distinct sense of place while adapting landscape design strategies to the unique conditions of new development sites. As the campus evolves and is further developed, the coherent and cohesive relationships between landscape and buildings will continue to be an essential feature. Similarly, the traditions of vistas and pathways for pedestrians (enhanced to provide greater support for bicycles) can help maintain a sense of orientation and welcome.

## **Support Community** and Interaction

The campus landscape plays an essential role as the campus commons. It supports chance encounters as well as programmed events. The campus should be a setting that allows space for reflection and affords opportunity for exploration and imagination.

### **Enhanced Functionality**

Despite its many attributes, the Princeton campus does not fully support some requirements of a modern campus. The planning framework recognizes the need to expand the network of accessible pathways and provide better support for a bicycle culture. In new areas of development, the landscape should be designed to support pedestrian access and comfort while incorporating requirements for service deliveries, parking and transit.

### **Stewardship**

The planning framework recognizes the importance of maintaining and enhancing the quality and character of existing natural and cultural landscapes. The landscape of Stony Brook and the tributary woodland fingers provide a beautiful and ecologically important setting that supports reflection, recreation and research. Successive generations of important landscape architects, such as Beatrix Farrand, have endowed the campus with a network of landscapes with historical and cultural significance. The planning framework proposes options that support and enhance the quality of these landscape conditions.

### **Performative Landscape**

The landscape performs important functions in relation to storm water management, geothermal exchange, wetland buffers, bio-habitat connectivity, woodland preservation, and teaching and learning. The framework calls upon the landscape to accommodate a range of functions that support long-term sustainability and resiliency while also contributing to the distinctive Princeton campus experience.



## **Key Elements**

The campus planning framework has many components, but the following five key elements would play a central role in enabling the University to achieve its highest priorities and goals.

**Continued Stewardship and Renewal of the Central Campus** 

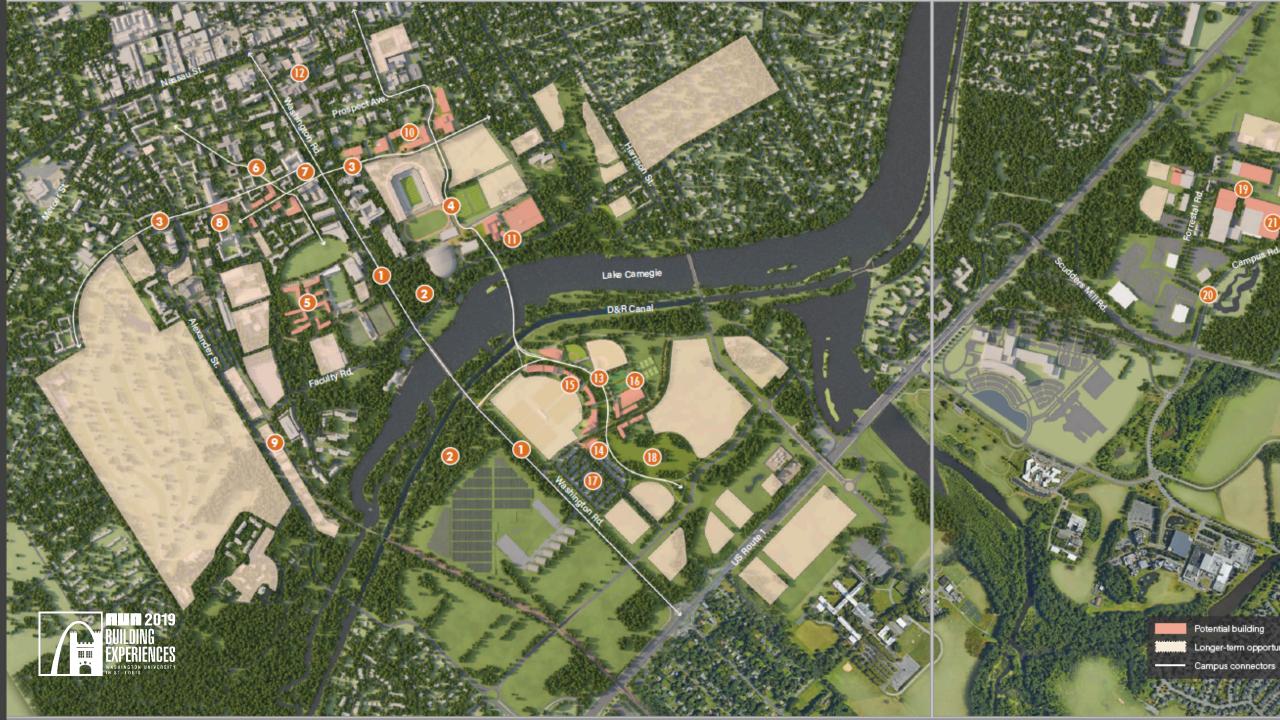
**Enabling Expansion of the Undergraduate Student Body** 

**Expanding and Enhancing Engineering and Environmental Studies** 

**Creating a Lake Campus** 

**Cultivating Community** 



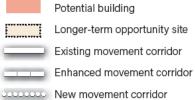






Potential to convert existing soccer practice field to game field







Residential college development











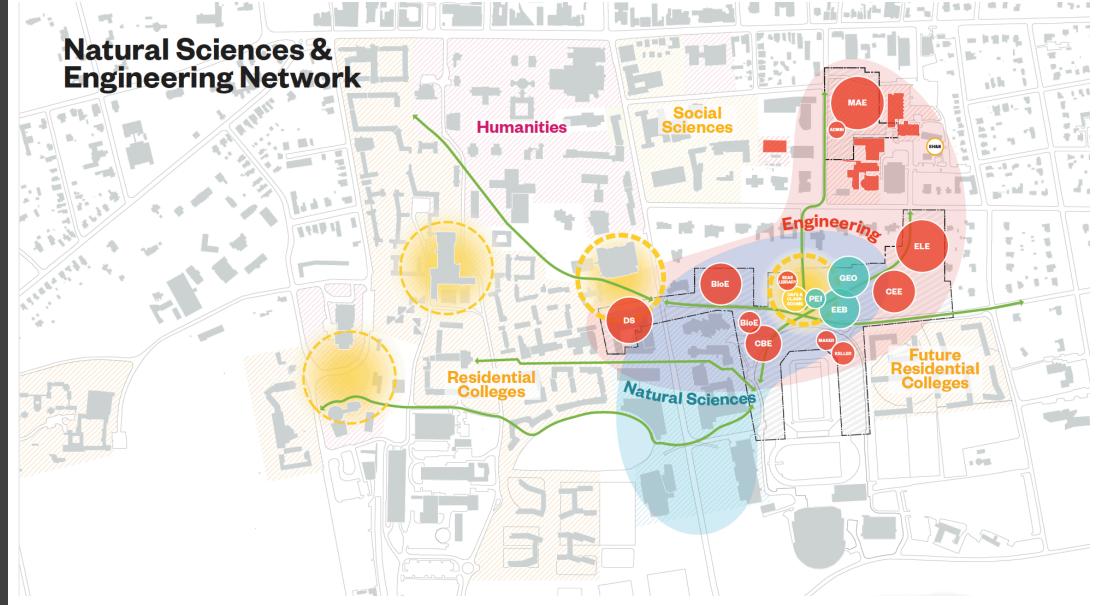




































# 03 Projects and Initiatives

This section provides greater detail about the projects and initiatives that were described in the previous section. They are organized under the following sub-headings:

- Campus-Wide
- Central Campus
- East Campus
- Lake Campus

There is also a brief discussion at the end of this section about the  ${\color{red} {\bf Forrestal\; campus}}.$ 

















## **Central Campus Projects and Initiatives**

The Central Campus will remain the focus of many aspects of university life. There could be incremental renewal and enhancement to accommodate growth and evolution, and to improve use and circulation in some areas. Some of this evolution would take the form of sensitive infilling, while in other areas redevelopment is proposed to accommodate undergraduate residential uses, academic uses and enhanced campus life programming.

The most significant potential changes and improvements could take place in the following areas:

- The proposed residential college sites south of Poe/Pardee fields
- 2. The diagonal walk
- A Frist/Guyot/McCosh node and the Wilson College, Eno Hall and 1915 Hall sites
- 4. Dillon Gym expansion
- A possible residential mixed-use corridor along Alexander Street.





## **East Campus Projects and Initiatives**

The campus planning framework envisions significant development on the East Campus and a transformation over time from its existing street and block pattern to a finer grained and variegated campus setting akin to the Central Campus. The most significant projects and initiatives would include:

- New facilities for the School of Engineering and Applied Science (SEAS) and for Environmental Studies
- 2. A new East Campus entry
- 3. Enhancements behind 185 Nassau Street and along William Street.





## Lake Campus Projects and Initiatives

The campus planning framework envisions a new Lake Campus as an integrated extension of the existing campus. It is envisioned as a vibrant, mixed-use community with space for academic partnerships and innovation initiatives; administrative offices; athletics and recreation; graduate student and possibly post-doc housing; retail, convening, amenities, and potentially a hotel; and campus and visitor parking. The Lake Campus contains more than 210 acres east of Washington Road, and additional acreage west of Washington Road, that could be used to support Princeton's teaching and research mission over the ten- and thirty-year time horizons of this campus planning process, and well beyond.

Just as the incremental development of the Central Campus responded to its physical context (such as ridge lines and topography that slopes gradually toward the lake), the Lake Campus would respond to its unique site characteristics by establishing a central landscape to unify the campus, buffer and protect the sensitive ecosystems of the D&R Canal, provide visual connections, and create a crossroads threaded into its daily life. The proposed pedestrian bridge over the

lake and canal would bring this part of the campus within walking and cycling distance of the rest of the campus, and would help to integrate the Lake Campus into the overall tapestry of Princeton campus life.

The planning framework focuses all initial development on the east side of Washington Road, while reserving the lands west of Washington Road for future development. (This means that, at least for now, the 27 acres west of Washington Road that house solar panels would continue to do so; these panels provide between 5-6% of the University's total annual electricity use.)

The following elements of the Lake Campus proposal are described in this section:

- 1. Lake Campus Walk
- 2. Tiger Lane Crossing and Transit Hub
- Academic Partnerships. Innovation Space, Administration and Housing
- Athletics
- 5. Parking
- Campus Meadow.

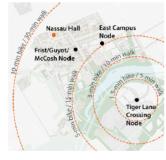


FIGURE 3-17. Walking and Cycling Distances from Tiger Lane Crossing Node



### 04

## A Sustainability Framework

A defining characteristic of Princeton's planning process has been thorough integration of campus planning and infrastructure planning with sustainability planning. The campus planning framework includes a sustainability framework that identifies priorities, proposes performance targets, and suggests planning and design strategies that can be incorporated into the campus's physical development to advance Princeton's sustainability objectives. Another component of the campus planning framework is an integrated infrastructure master plan that coordinates Princeton's utility infrastructure needs with its anticipated development and sustainability objectives. This section provides an overview of the sustainability framework that incorporates sustainability objectives and strategies into campus planning.



## Princeton University Campus Plan Sustainability Framework

January 2018



EVEL Agency for Infrastructure collaboration with Urban Strategies, Im Burns & McDonne Rickes Associates In Vanasse Hangen Brustlin, In In Infrastructure Control Nitsch Engineerin Van Note Hange

## Princeton Building Energy Vision

Transsolar
KlimaEngineering
Behnisch Architekten
KPMB Architects

August 2016

Electricity

ectrical Loads

### **EXECUTIVE SUMMARY**

Princeton University is considering committing to achieving carbon neutrality by the year

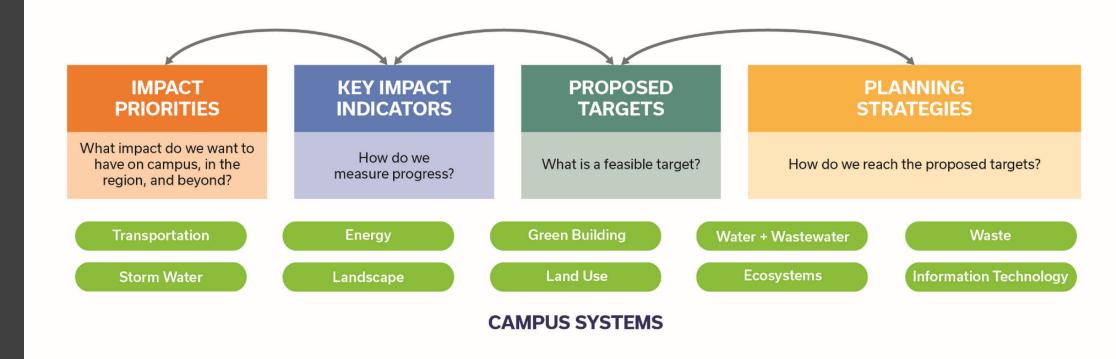
2046 and has already made progress toward such a goal, especially with campus infrastructure. Achieving full carbon neutrality within the next 30 years, however, will require a fundamental reconsideration of how Princeton procures, builds, renovates, occupies, operates and maintains the fu complement of its capital assets. As a global leader in teaching, research, and scholarship – including climate change scholarship – Princeton must also increase its leadership in building innovation.



RESEARCH, EDUCATION, + LEADERSHIP **Scope of the Princeton Sustainability Plan** Engagement Communications GREENHOUSE GAS EMISSIONS Research & Resilience **Education Land Use Campus Energy Green Building Habitat** Strengthened Sustainability **Ethos** Landscape **Transportation Food** Water & **Purchasing** Wastewater Waste



## **Components of the Sustainability Framework**





## **Transportation**

**Impact Indicator:** 

The percentage of commuters using alternative transportation modes.

**Proposed Target:** 

Decrease the proportion of commuters arriving in single occupancy vehicles and increase the proportion using shared or active transportation modes such as walking, cycling, transit and ride-sharing.

Planning Strategies:

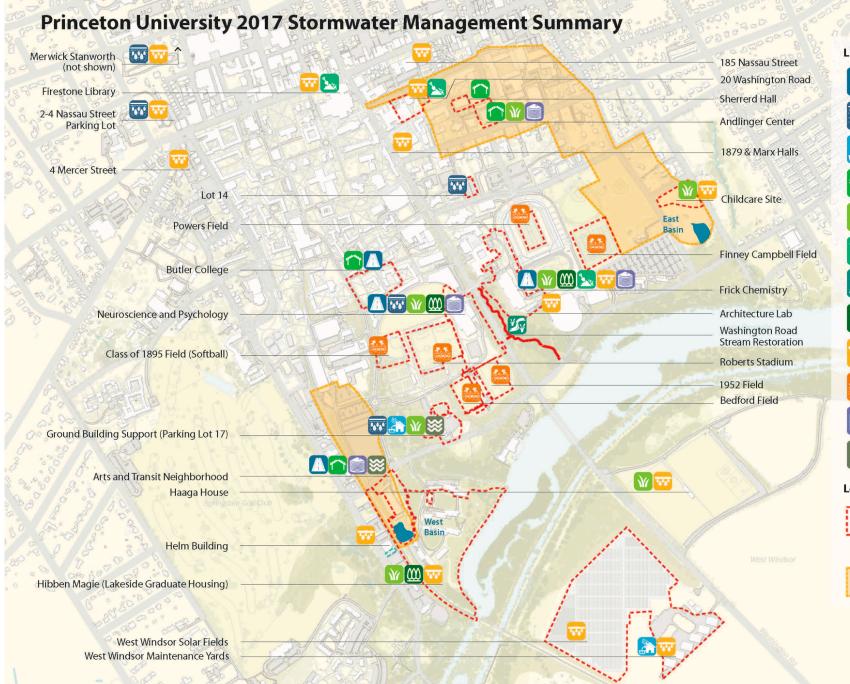
- Expand transportation demand management (TDM) strategies combined with significant reductions in provision for commuter parking
- Increase and enhance access to on-campus and regional transit services
- Develop an enhanced on-campus and regional cycling and pedestrian infrastructure.



## **Storm Water Management**

Impact Indicator:	Quantity of storm water managed (percent of campus that manages the 90th percentile storm depth, i.e., the amount of campus land area that can manage the equivalent of 1.25 inches of precipitation).  Quality of storm water discharge (total suspended solids, phosphorus and bacteria concentrations).
Proposed Target:	Increase the quantity of storm water managed on campus and improve the quality of storm water discharged from campus.
Planning Strategies:	<ul> <li>Undertake ecological restoration of stream corridors, lake edges, wetlands</li> <li>Pursue project-scale and retrofit storm water opportunities (e.g., sub-surface infiltration, bio-retention, storm water harvesting, green roofs, porous pavement, etc.)</li> <li>Consider district-scale storm water opportunities (e.g. natural storm water treatment landscapes; green infrastructure corridors, etc.).</li> </ul>









**Porous Pavement** 



**Impervious Cover Reduction** 



**Downspout Disconnection** 



**Green Roof** 



**Bioretention and Rain Gardens** 



**Amended Soils** 



**Stream Restoration** 



**Buffer Restoration** 



Subsurface Infiltration



Under-field Storage



**Rainwater Harvesting** 



**Manufactured Treatment Device** 

#### Legend



Campus Plan Projects (Completed 2006 - Present) that meet campus stormwater goals



Drainage Areas for Regional Detention Basins

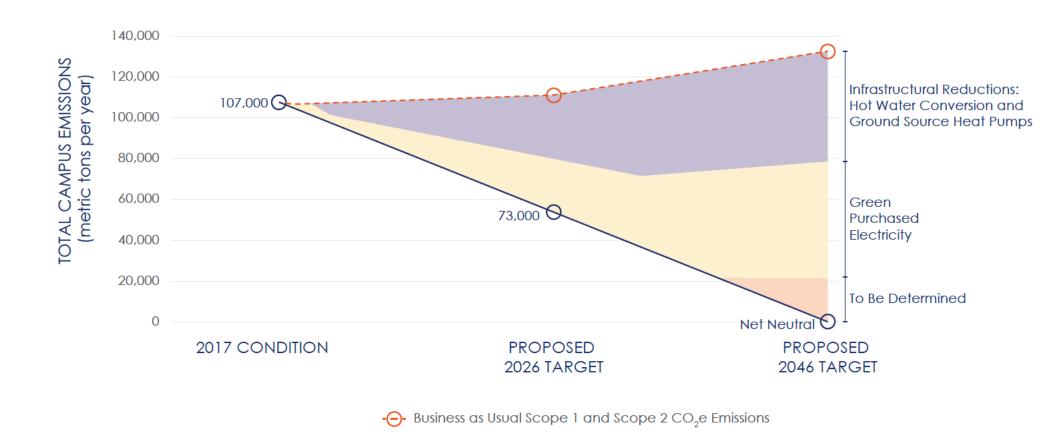


## **Reduced Greenhouse Gas Emissions**

Impact Indicator:	Metric tons of CO <sub>2</sub> e per year.
Proposed Target:	Significantly decrease annual CO <sub>2</sub> e emissions, notwithstanding campus expansion, and set the University on a course for net neutral CO <sub>2</sub> e emissions by 2046.
Planning Strategies:	<ul> <li>Phased conversion from steam to a heating hot water distribution system with geo-exchange wells</li> <li>Energy efficiency improvements</li> <li>Increased use of on-campus solar power, either through dedicated solar arrays or by installing panels on rooftops and above surface parking facilities where feasible</li> <li>Potential increased capacity to procure green electricity</li> <li>Potential use of biofuels and other carbon-mitigating options.</li> </ul>



## **Energy: GHG Reductions vs. Net Zero**



Proposed Target Scope 1 and Scope 2 CO<sub>2</sub>e Emissions

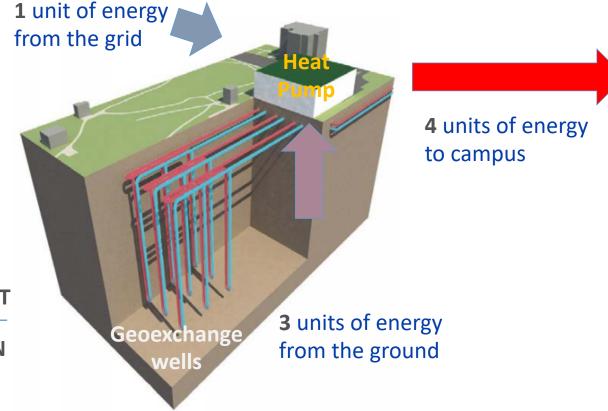




## **Energy: Heat Pump Chillers and Geoexchange**

Higher coefficient of performance (COP) than traditional heating and cooling (COP = 4 in example below)

COP of 6 or greater is possible with heating and cooling from geoexchange – higher is better!











## LCCA Examples – New Residential Colleges

### **High Performance Building Envelope (Punched Windows)**

Double IGU with argon

#### **Quantitative Benefits:**

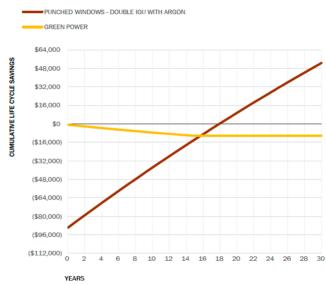
LCC Net Present Value	\$52,700
Green Power LCC Net Present Value	(\$10,469)
Annual Site Energy Savings over Proposed Design	1%
Ordinary Payback Year	16

**Contribution to Campus Sustainability Goals** 



#### LIFE CYCLE COST ANALYSIS

9032 PRINCETON UNIVERSITY - RESIDENTIAL COLLEGES







11/30/2018

## LCCA Examples - New Residential Colleges

### **Campus Steam Condensate for Building Heating**

Uses "no charge" campus steam condensate already returning to the central plant instead of campus steam to heat the building.

### **Quantitative Benefits:**

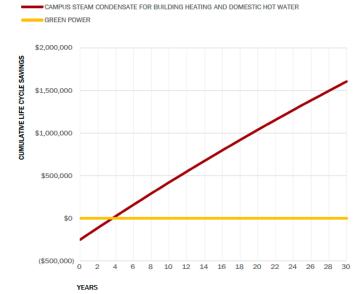
LCC Net Present Value	\$1,604,000
Green Power LCC Net Present Value	n/a
Annual Site Energy Savings over Proposed Design	n/a
Ordinary Payback Year	3

**Contribution to Campus Sustainability Goals** 



#### LIFE CYCLE COST ANALYSIS

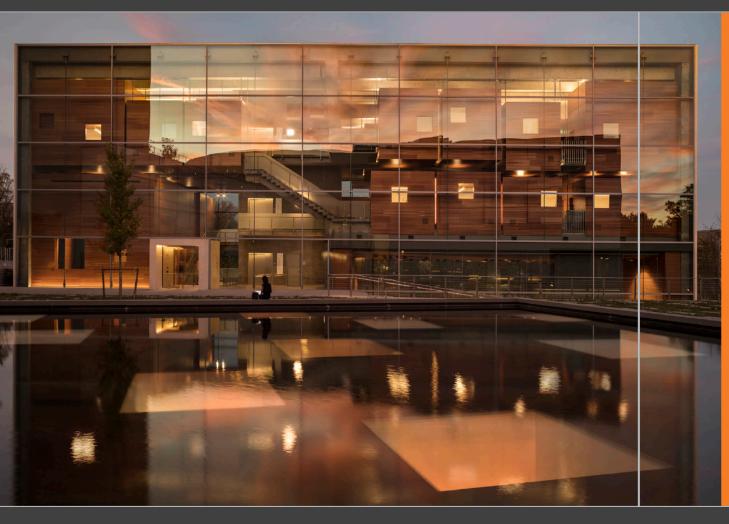
9032 PRINCETON UNIVERSITY - RESIDENTIAL COLLEGES







11/30/2018



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## A Look Ahead

Just as the Princeton campus will continue to evolve as projects are approved and new opportunities and priorities emerge, so too is this planning framework intended to evolve over time and with experience. As a framework that looks ahead over both ten-year and thirty-year horizons, it leaves the door open to multiple possible directions for the future, while providing enough guidance to inform decision-making over the nearer term.

By integrating planning for development with planning related to land use, sustainability, infrastructure, transportation and landscape, it allows the University to pursue multiple objectives in a comprehensive way. The framework is backed up by the indepth work of experts in many fields, and by analyses and assessments that provide detailed guidance to the University planners, senior officials and project managers who will have responsibility for overseeing the development of the campus not only over the next ten to thirty years, but beyond.

When alumni return to campus, as many do each year, they frequently comment both on how much the campus has changed, and how much it hasn't. There is something about the look and feel of the campus that is immutable, powerful, and both comforting and uplifting, and for more than 260 years it has managed to retain its core characteristics while becoming much larger, much more multi-faceted, and much more diverse.

This framework envisions a campus with an expanded student body and one or more new residential colleges; substantially expanded and improved space for engineering and environmental studies; a thoroughly reimagined East Campus; a lively and attractive Lake Campus fully integrated into the rest of the University; a geography in which Lake Carnegie has moved from the periphery to the center of campus; enhanced achievements in multiple forms of sustainability; a significant shift from single occupancy vehicles to other modes of transit,

including walking, cycling, shuttling and mass transit; and new academic partnerships in an innovation ecosystem that supports the mission of the University and increases its capacity to have a positive impact on the world.

The purpose of the planning framework is to help the University make wise and informed decisions as it pursues these goals and others that undoubtedly will emerge over time, while sustaining the distinctive sense of place that has long characterized the campus lands that have been entrusted to its care.



### Architect Selections (2018-present)

Schlaich Bergermann Partner Lake Carnegie Bridge Deborah Berke Partners Residential Colleges (1,100 beds) James Corner Field Operations Campus Landscape Architect SOM Lake Campus / East Campus Master Plan Adjaye Associates and Cooper Robertson New Princeton University Art Museum Ennead Environmental Studies and School of Engineering WRNS University Health Services Mithun / ACC Graduate Housing (600 beds) Sasaki Lake Campus Racquet Center and Athletic Fields ZGF / Burns & MacDonald Thermally Integrated Geoexchange Energy Resource (TIGER) ZGF / Tim Haas East Campus Parking Structure In Process Dillon Gym Expansion In Process Campus Wayfinding Master Plan

https://campusplan.princeton.edu



