



REINVENTING THE MODERN
23RD - 27TH OF JUNE 2024

The Making of UC Merced Before & After The 2020 Project

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Historic Reinvention
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WHO IS UC MERCED?

UC Merced is the **newest campus** of the University of California and the nation's first doctoral research university of the 21st century.

As it is at all University of California campuses, **research is the cornerstone** of UC Merced. Innovative faculty members conduct interdisciplinary, groundbreaking research that will solve complex problems affecting the San Joaquin Valley, California and the world.

Inaugural Undergraduate Class **began in 2005**, First Graduation Ceremonies in 2009.



A venue for social mobility
reflecting California's emerging
diversity



Research distinction in unique,
targeted areas



A catalyst for economic
diversification in the Central
Valley

WHAT IS PROJECT 2020 ?

- Initiated in 2013 with the intent of doubling the size of the Campus by 2020
- Accommodate enrollment growth from 6,000 to 10,000 students
- \$1.3 billion plus comprehensive development project
- 1.2 M GSF campus expansion
 - Utilities and site infrastructure
 - Classrooms and research facilities
 - Student life and recreation facilities
 - Student residences
 - Dining & retail
 - Conference Center
 - Administrative Offices



PROJECT GOALS – ESTABLISHED WITH STAKEHOLDER INPUT

- Adopt an **aggressive construction schedule** that results in substantial completion by 2020 of new academic space for teaching and research, as well as space for housing, dining, student life, athletics, campus operations, and the associated infrastructure necessary to accommodate increased access to the University.
- Provide **mixed-use facilities** that allow for interdisciplinary scholarly activities and result in a unique, dynamic, and inspiring environment for students, faculty and staff.
- Create built-in **flexibility and adaptability** to accommodate future needs.
- Implement a project plan that **expands capacity** appropriately across all building and facility categories necessary for enrollment growth.
- Create a **cost-effective development** that takes advantage of existing investments in campus infrastructure and provides the best overall value for the lifecycle of the facilities.
- Support UC Merced's **sustainability** goals.
- Incorporate private-sector **innovation** and expertise in design, construction and management.
- **Shift certain risks** related to design, construction, operations and maintenance.
- Facilitate greater capacity to **focus on the University of California's core mission** of teaching, research and public service.

THE 2020 PROJECT: EFFECTIVELY DOUBLED THE CAMPUS IN 4 YEARS



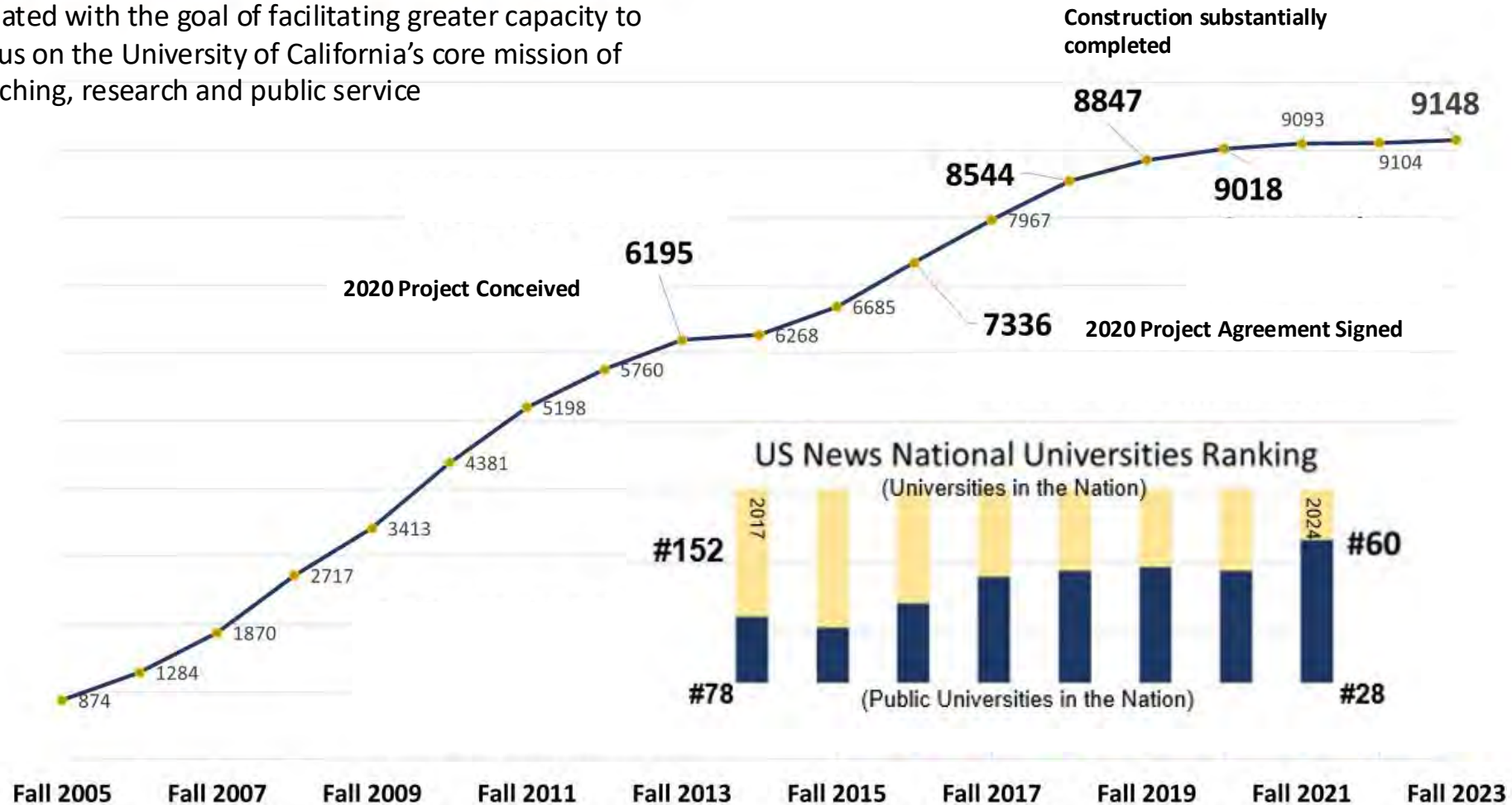
AT COMPLETION

- Project delivered on time and on budget. Operations began with each milestone delivery.
- Well organized logistics and project delivery approach by the contractor.
- Mobilized 1000+ person workforce minimizing impact to ongoing campus operations.
- Award winning design that provides a dynamic pedestrian friendly campus.
 - 2017 award for Social Infrastructure Project of the year
 - 2017 Infrastructure Journal Global Award
 - 2023 Urban Land Institute (ULI) Americas Award for Excellence
- Operations and maintenance of completed facilities managed by the project developer as an active partner with an overall responsive approach.



Enrollment Growth at UC Merced

Created with the goal of facilitating greater capacity to focus on the University of California's core mission of teaching, research and public service





#60

UNIVERSITY
IN THE
NATION

/// U.S. NEWS & WORLD REPORT

N060





#15

IN THE
NATION

/// THE WALL STREET JOURNAL



IN THE COUNTRY FOR
ADVANCING OUR STUDENTS'
FUTURE PROSPECTS

/// THIRD WAY'S ECONOMIC MOBILITY INDEX

99.5%

CALIFORNIAN

64.7%

FIRST-GENERATION
UNDERGRADUATES

58.8%

PELL GRANT-ELIGIBLE

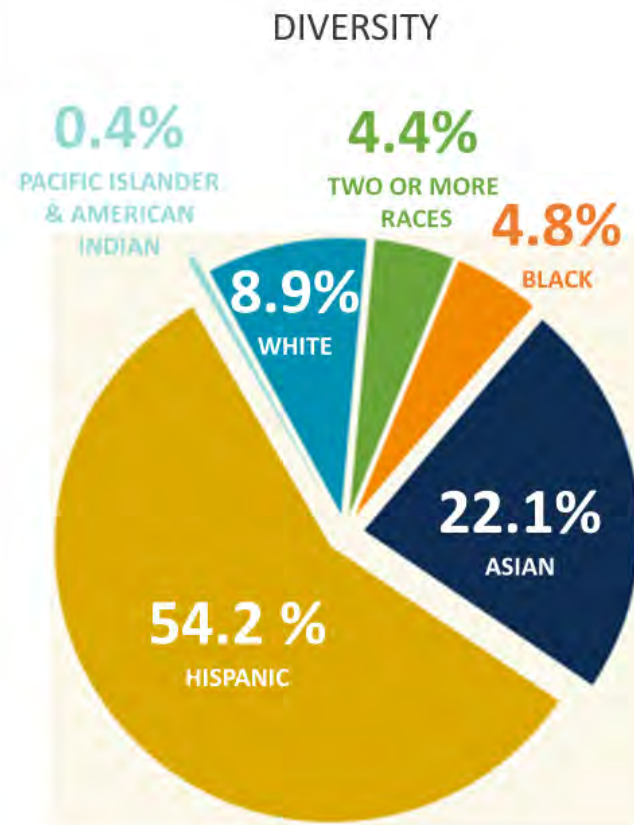
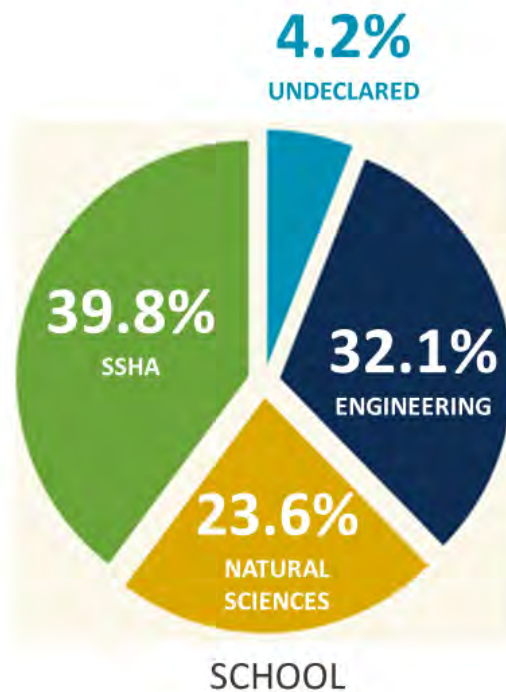
UNDERGRADUATES AT A GLANCE F2023

8,373

TOTAL UG

613

UG TRANSFERS

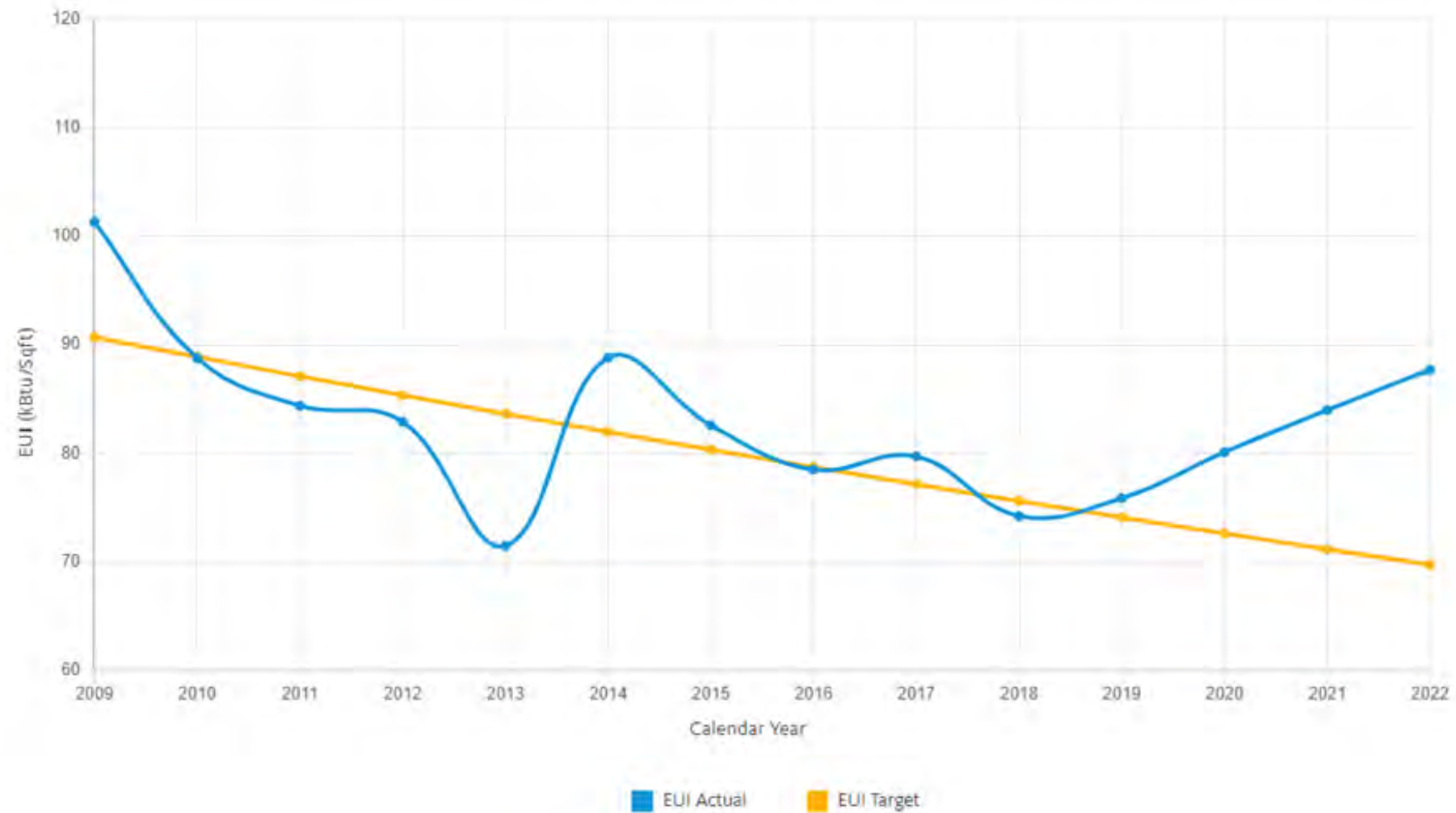


OTHER KEY ACCOMPLISHMENTS

1 Campus for Sustainable Buildings by AASHE
#1 Carbon Neutral Research Campus in USA
#1 Social Infrastructure P3 Project (\$1.34B)

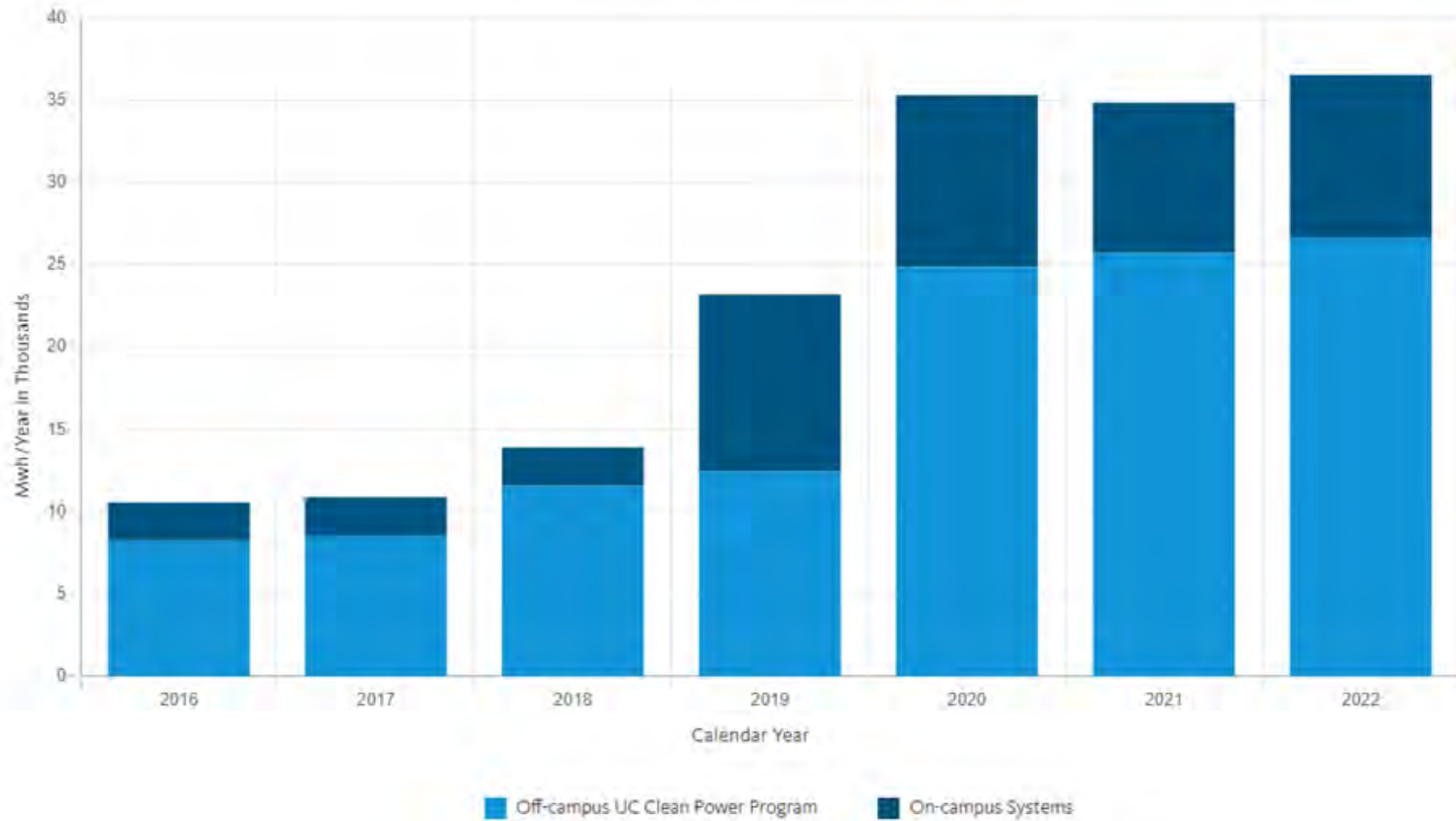
In 2022, UC Merced successfully achieved an Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment and Rating System (AASHE STARS) Platinum rating for its environmental performance.

ENERGY USE INTENSITY (EUI)

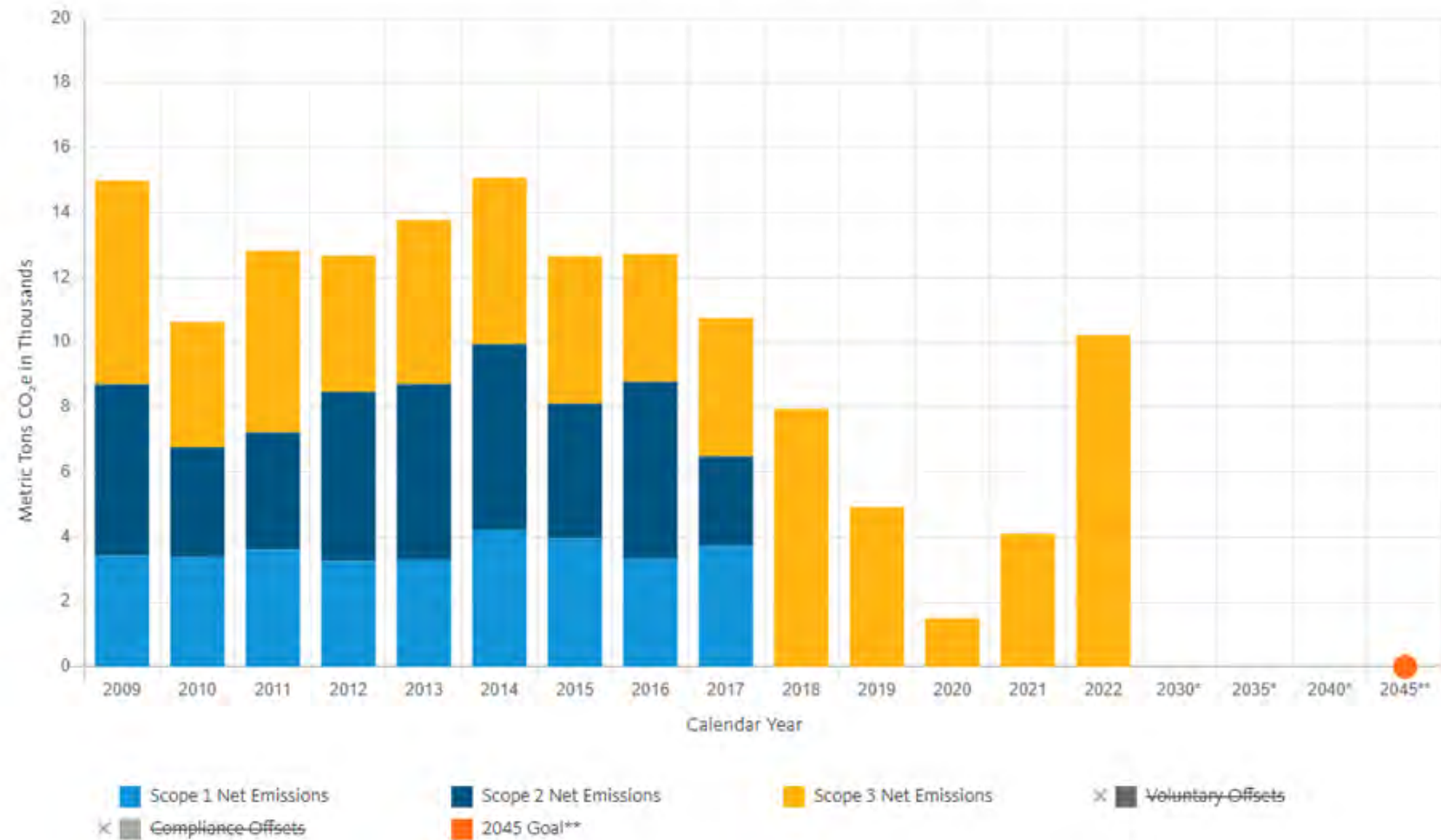


UC Merced saw an increase in its EUI in 2022.

ENERGY – RENEWABLE ENERGY USE



CLIMATE PROTECTION – EMISSIONS



* Interim goals for 2030, 2035 and 2040 to be developed through fossil-free planning that is underway at each location

** 90% direct reduction of total emissions from 2019 levels with residual emissions negated by carbon removal



Experimental Smart Farm at UC Merced Integrates Fossil-free Technology



UC Merced Researchers Receive State-funded Grants To Spur Climate Action

OVERVIEW OF THE 2020 PROJECT



Technical	Financial	Legal	Delivery
JLL	EY	Nossaman	WT Partnership
AECOM			Woods Baggot
SCB Architects			AECOM

Project Site Area	219 Acres
Total Square Footage	1.2 Million GSF of LEED Platinum Facilities 1,700 beds 1,500 additional parking spaces
Design and Construction Budget	\$1.3 Billion
Asset Categories	Academic, Research, Residential, Student Life, Parking, Infrastructure and Roads
Construction Time Frame	First Delivery: Fall 2018 Second Delivery: Fall 2019 Substantial Completion: Fall 2020
Design and Construction Funding Sources	UC External Financing: \$600 million Developer Funding: \$590.35 million Campus Funds: \$148.13 million
Development Partner	Plenary Properties Merced • Plenary Group (Equity) • Webcor (Construction) • Johnson Controls (O+M) • SOM (Master Plan) • Architecture: SOM, HOK, WRNS Studio, Mahlum, Page Southerland Page • Infrastructure: Arup

THE PROGRAM

1998 - 2005



1998 MERCED SITE SET IN CALIFORNIA'S RAPIDLY GROWING SAN JOAQUIN VALLEY

- 3.2 million people in a region expected to double by 2050
- Fastest projected growth in California
- <15% of +25yr olds with 4-year degrees
- Historically high unemployment (2x US average)
- Latino majority projected by 2035

2002 Groundbreaking

2005 Opening

- 300,000 ASF State-funded
- 608 Beds of Student Housing
- Dining & Recreation Centers



ONLY 100 acres approved for development at the edge of 7,000 acres (with major environmental constraints)

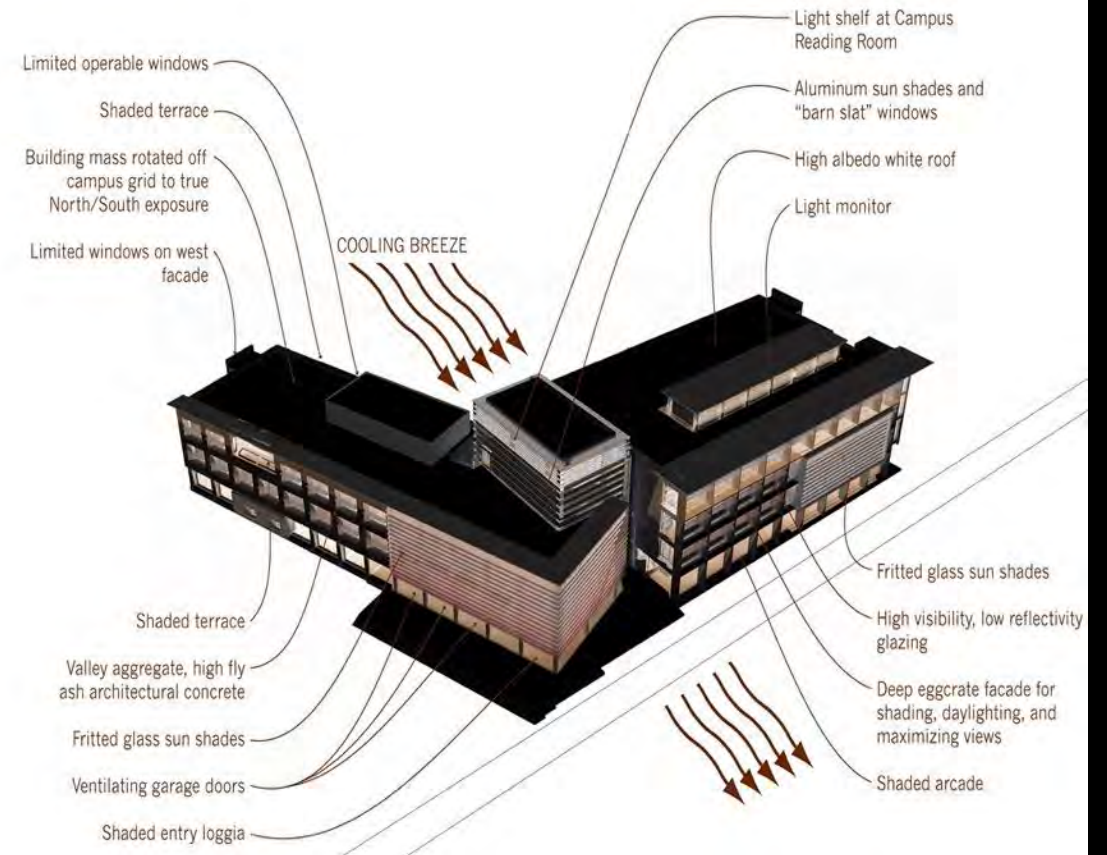


AMBITIOUS FACILITY ENERGY BENCHMARK TARGETS BY USE

California Institute for Energy & Environment
derived baseline for benchmarks from 4 UC and 4
CSU campuses' 1999 ave. for peak and annual
loads.

- **80%** target for initial 300,000 ASF
- **65%** target for next 300,000 ASF
- **50%** target for next 300,000 ASF
- Buildings to surpass CA-Title 24 codes by 30%
- LEED Gold Minimum
- Increasingly aggressive benchmarks developed over time to **"Strive to 25%"**
- Research Labs & Data Server Rooms + all plug loads to be within targets - **no free pass!!**

Architectural language developed to respond to climate & capture carbon



OPTIMIZATION OF CAMPUS ENERGY INFRASTRUCTURE AS CAMPUS CONTINUES TO GROWS



UC Merced's Central Plant is the 1st LEED Gold facility of its kind in the country, providing district level heating and cooling to all academic buildings employing a 2-million-gallon thermal storage tank.



UC Merced's 10-acre 1MW solar array, built through a Power Purchase agreement, significantly reduced energy demand from the public grid and provides some resilience to potential blackouts.

ARCHITECTURAL REGIONALISM: INTEGRATES THE CLIMATE, LANDSCAPE AND CULTURE UNIQUE TO A PLACE



An aesthetic grounded in the Central Valley:
Simple, straightforward and functional forms and surfaces

Arcades, daylighting and permeable walls reduce energy loads and foster social interaction

Promoting pedestrian circulation and social interaction thru light and shade



Arcades and porticos along pedestrian corridors



Lanterns signify key entries and connect public spaces



Daylighting public uses activates public spaces



Shaded public areas generate community

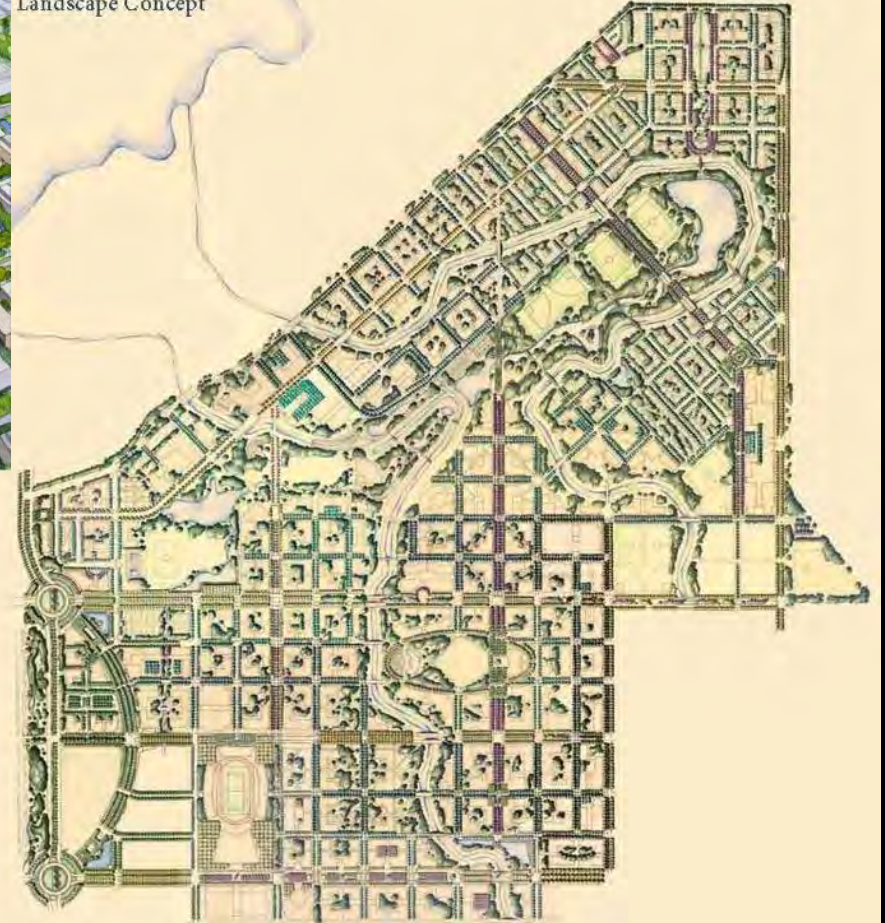


THE 2009 PLAN AND THE PROJECTS

2002 - 2015



Landscape Concept



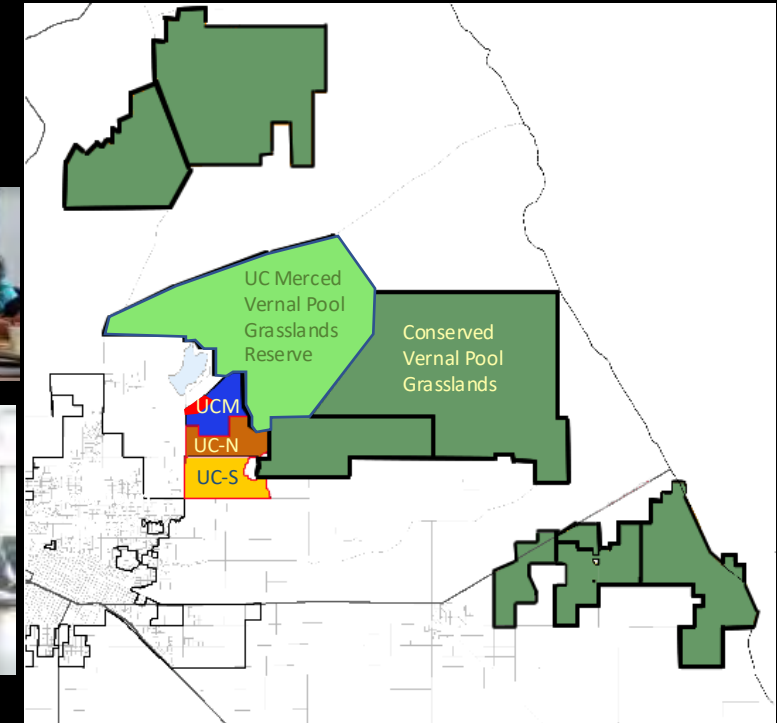
LONG RANGE DEVELOPMENT PLAN 2007-2009

Negotiating a New Footprint – *in just four months after 10 years*

- 25,000 students on 815-acre reconfigured footprint
- Adjacent University Community North planned for 15,000 residents and 5,000 jobs
- 30,000 acres dedicated to open space
- 2020 Project-level entitlement under CEQA

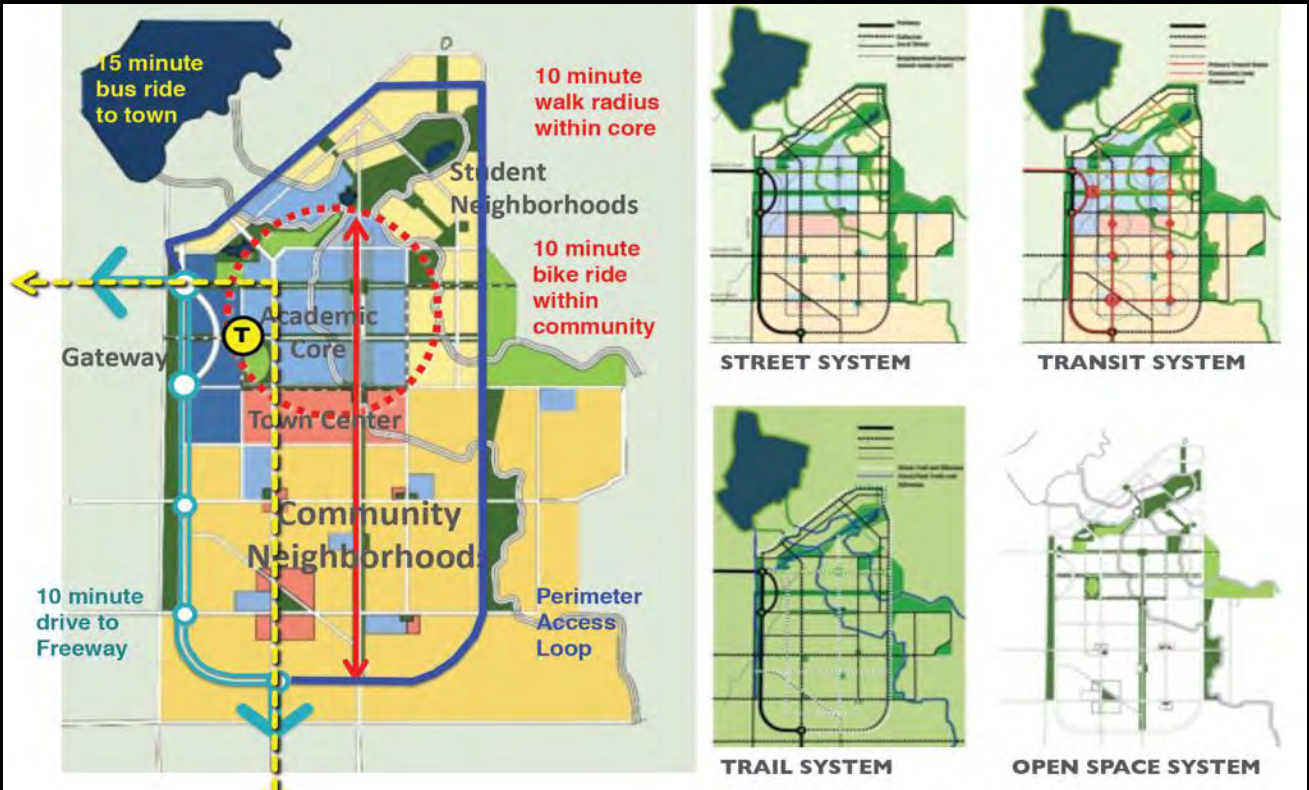
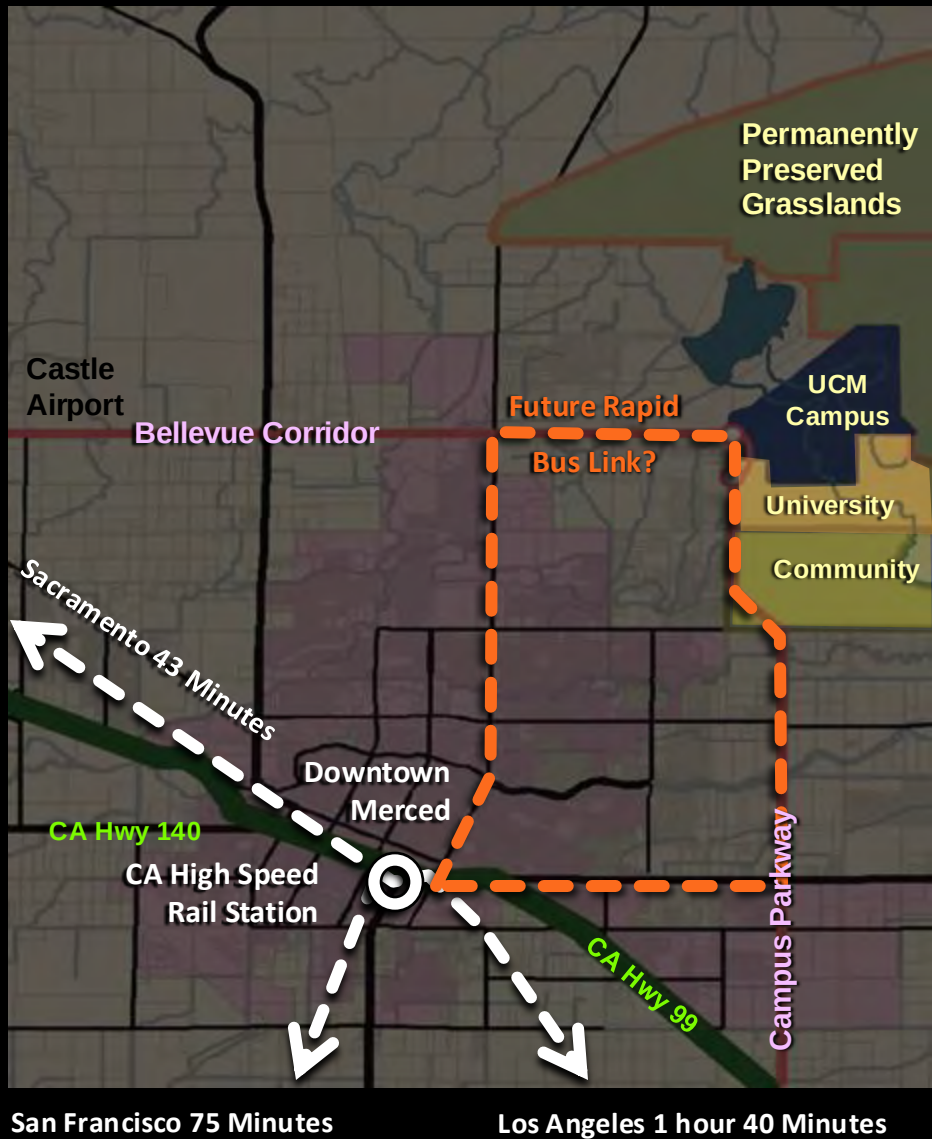
Multiple Agency Reviews

- *US Army Corp of Engineers*
- *US Env. Protection Agency*
- *US Fish & Wildlife Service*
- *CA Dept. of Fish & Game*
- *12 Environmental Groups*
- *City & County of Merced*
- *Merced Irrigation District*
- *Business Groups at regional & state levels*



MOBILITY PLAN INTEGRATED WITH LOCAL NETWORK TO REDUCE SCOPE 3 CO₂

- (-50%) Planned University Community for 30,000 residents
- (-20%) Proposed Rapid Bus Link to Downtown Merced , Hwy. 99 and future High Speed Rail Station via Campus Parkway



SUSTAINABLE INFRASTRUCTURE SYSTEMS

Renewable energy grid

- Solar thermal power stations located
- Solar shading over parking
- Wind turbine energy spines at perimeter
- Hydroelectric turbine at canal to be rebuilt

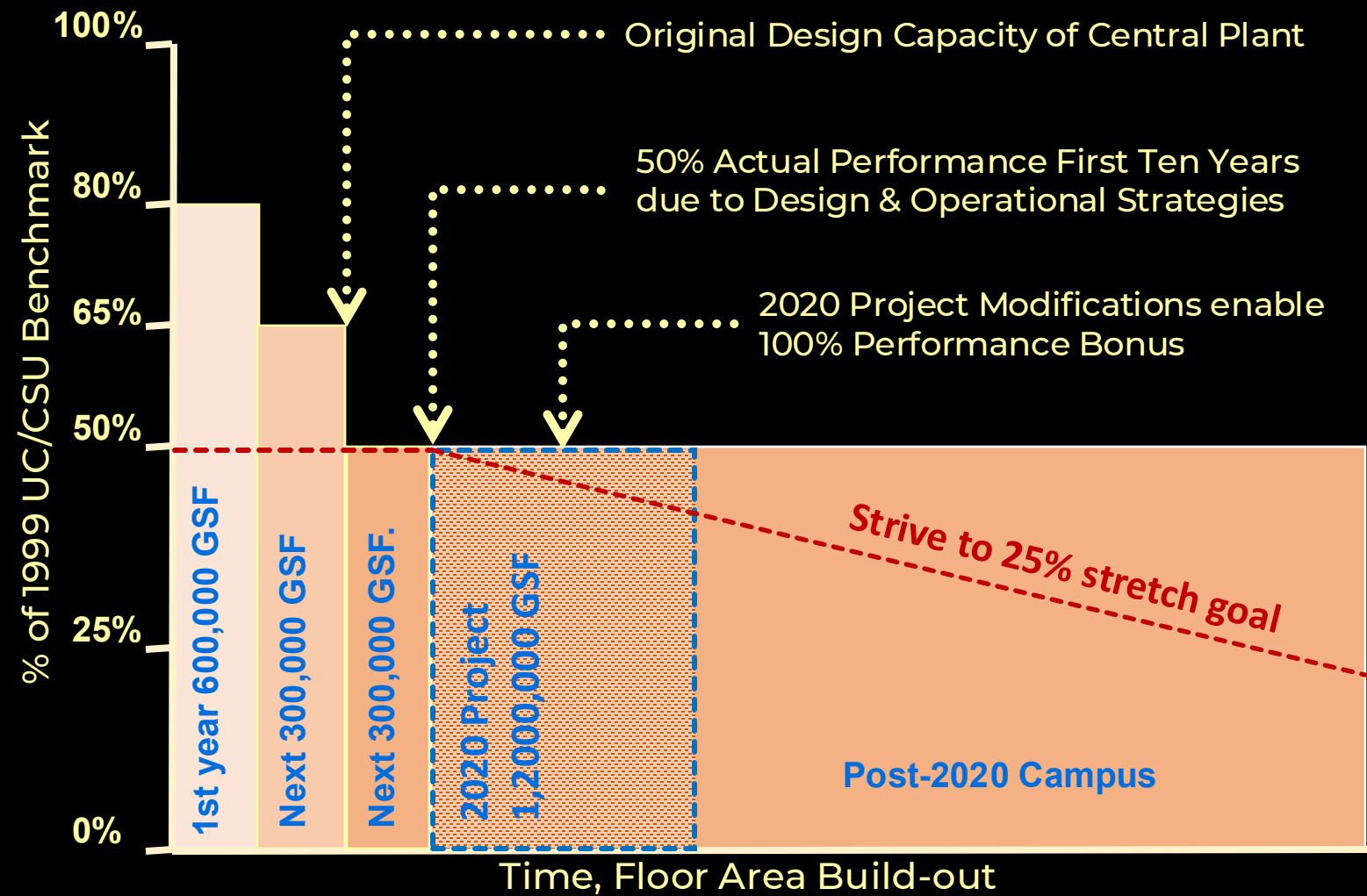
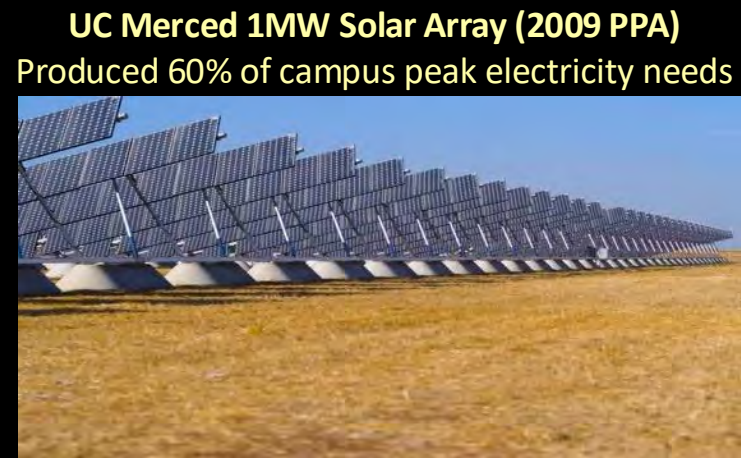
Stormwater & Reclaimed Water Systems

- Integrated storm water management
- Wastewater treatment area for irrigation
- Off-site rainfall to be captured
- Urban runoff cleansed through on-site, open space and street systems
- Stormwater holding area located
- Interim Agricultural Production Zone located

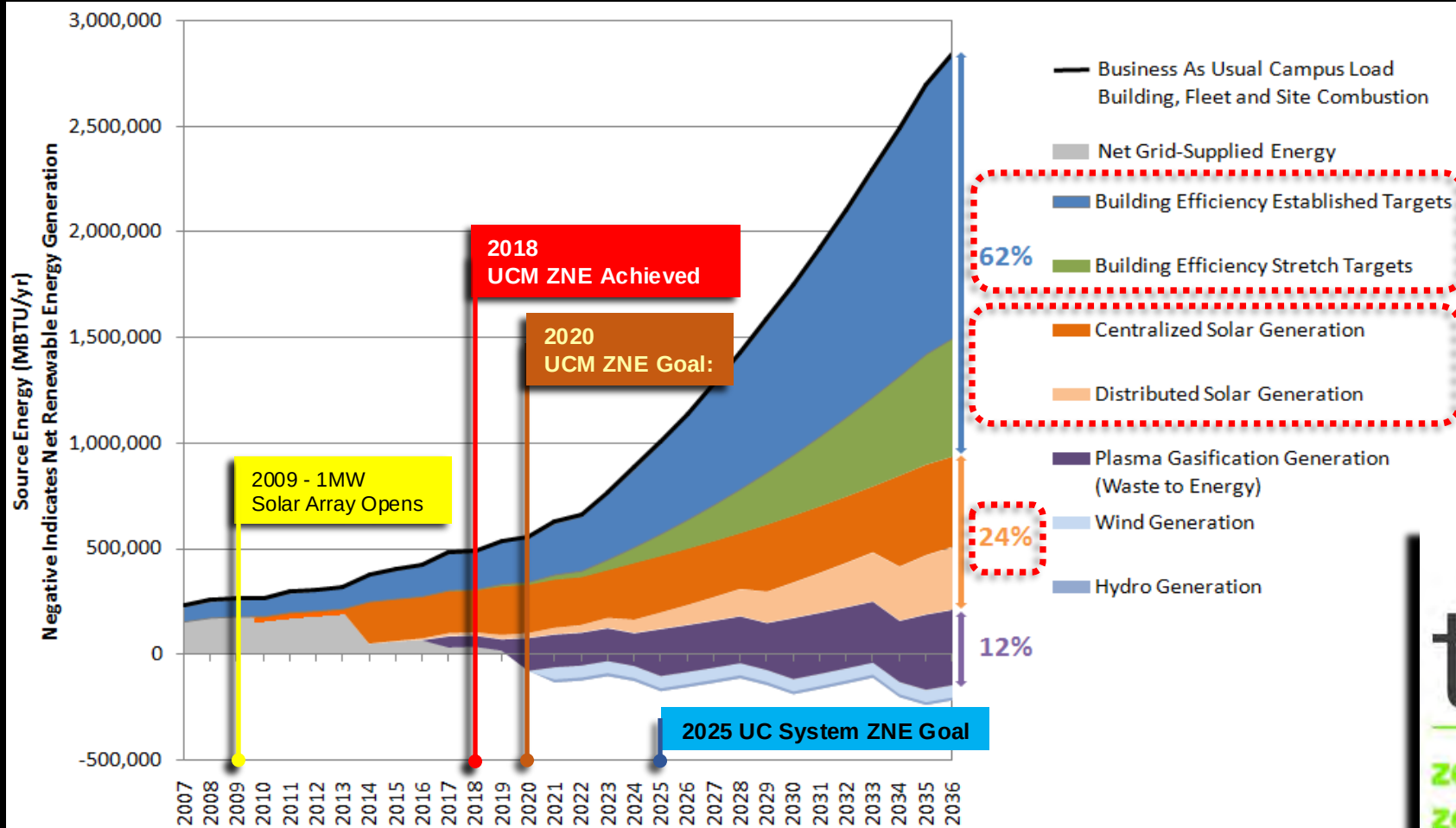


Whole Building Energy Performance Targets

GOAL:
To consume less than 50% of the energy and peak demand of other university buildings in California



UC MERCED'S PATHWAY TO ZERO NET ENERGY AND CARBON NEUTRALITY



Whole-Building Energy Benchmarks Adopted by:

- The University of California
- The State of California
- National Renewable Energy Lab
- General Services Administration

UC MERCED
triplezero
 zero net energy. zero landfill waste.
 zero net greenhouse gas emissions.

2009 UC MERCED LRDP APPROVED

Dozens of Policies Tied to Sustainability & CO₂ Objectives

AWARDS

- 2013 California Architectural Foundation, Nathaniel Owings Award for Environmental Excellence
- 2012 American Institute of Architects, Committee on the Environment, Top Ten Green Projects Award
- 2011 Society of College and University Planning, Honor Award, Plan for an Existing Campus
- 2010 International Green Industry Hall of Fame, Excellence in Land Use Planning
- 2010 American Institute of Architects, California Council, Award of Merit, Urban Design
- 2009 Governor's Economic/Environmental Leadership Award, Land Use Planning
- 2009 Association of Environmental Professionals, Outstanding Planning Document Award
- 2009 National Renewable Energy Lab, Best Practices Case Study, Comprehensive Land Use Planning

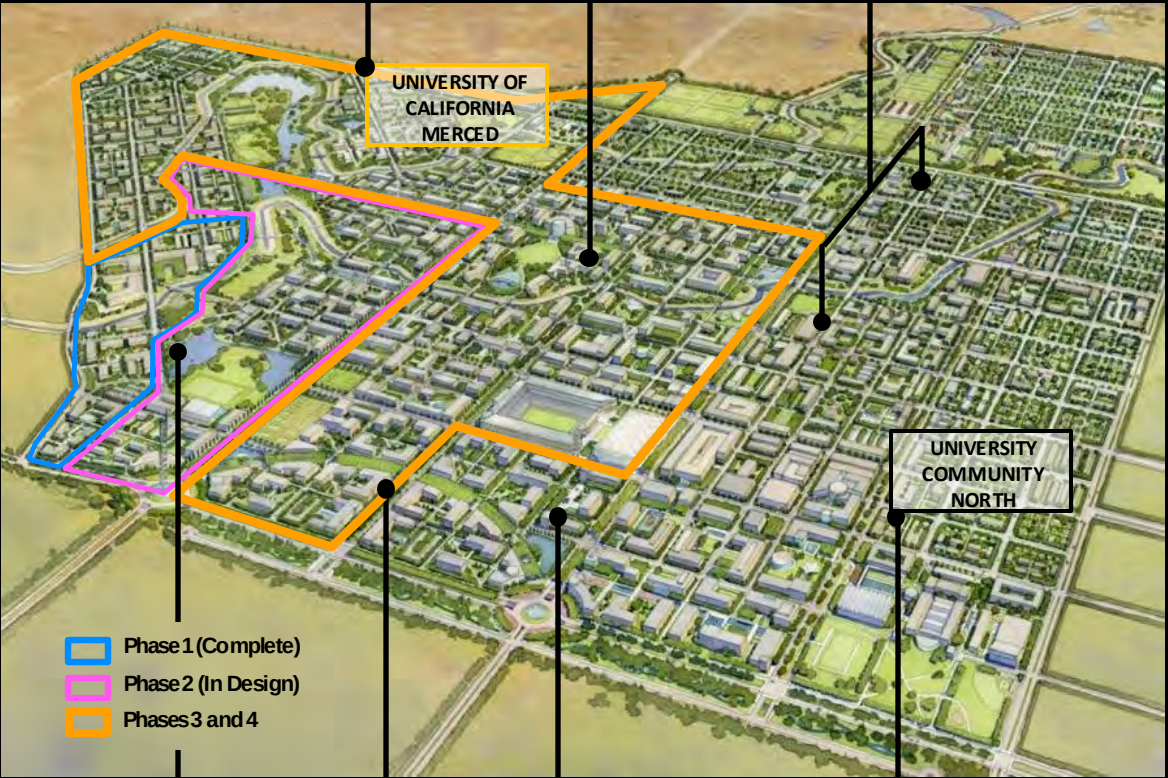


The car-free campus is bordered by 30,000 acres of permanently preserved vernal pool grasslands.



Low-water bioswales, native plants and ~ 50,000 trees will define the campus landscape.

A pedestrian-oriented, orthogonal N/S 300' street grid shapes site planning and circulation, optimizes shade and wind patterns, roof top solar yield, promotes efficient land use and facilitates bicycle and pedestrian circulation.



Natural topographic depressions, known as the North and Bowls, manage 1,600 acre feet of winter stormwater and provide open space and recreational venues.

A multimodal transit center is located at the campus gateway.

The **Gateway District** provides venue for public/private joint R&D ventures and regional jobs

University Community North provides housing for 15,000 people and 5,000 jobs within a 10 minute walking distance to the campus Academic Core.

By 2009 UC Merced had achieved founding Chancellor Carol Tomlinson-Keasey's dream to become a recognized model in sustainable campus development.



Chancellor CT-K and Governor Davis at Groundbreaking



Governor Schwarzenegger Receiving the Governor's Environmental and Economic Leadership Award



First Lady Michelle Obama's
2009 Commencement Address to
UC Merced's first full graduating class



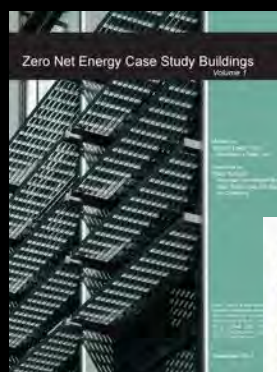
"There are few things more rewarding than to watch young people realize they have the power to make their dreams come true."

UC MERCED PROVED HIGH PERFORMANCE SUSTAINABLE DESIGN ACHIEVABLE AT LITTLE ADDED COST



University of California 2014 Cost Study showed
cost impact of new
California Building Code on
UC Merced Student Services Building was

<1%



THE PUBLIC PRIVATE PARTNERSHIP

2015 - 2020



BUILDING THE ANALYTICAL FOUNDATION TO SPUR INDUSTRY INTEREST



2009 Long Range
Development Plan

Award-winning plan and policies intentionally structured to support innovative project delivery



2010 Bay Area Council
White Paper

Examined potential efficiencies from a Design-Build-Finance-Operate-Maintain delivery strategy



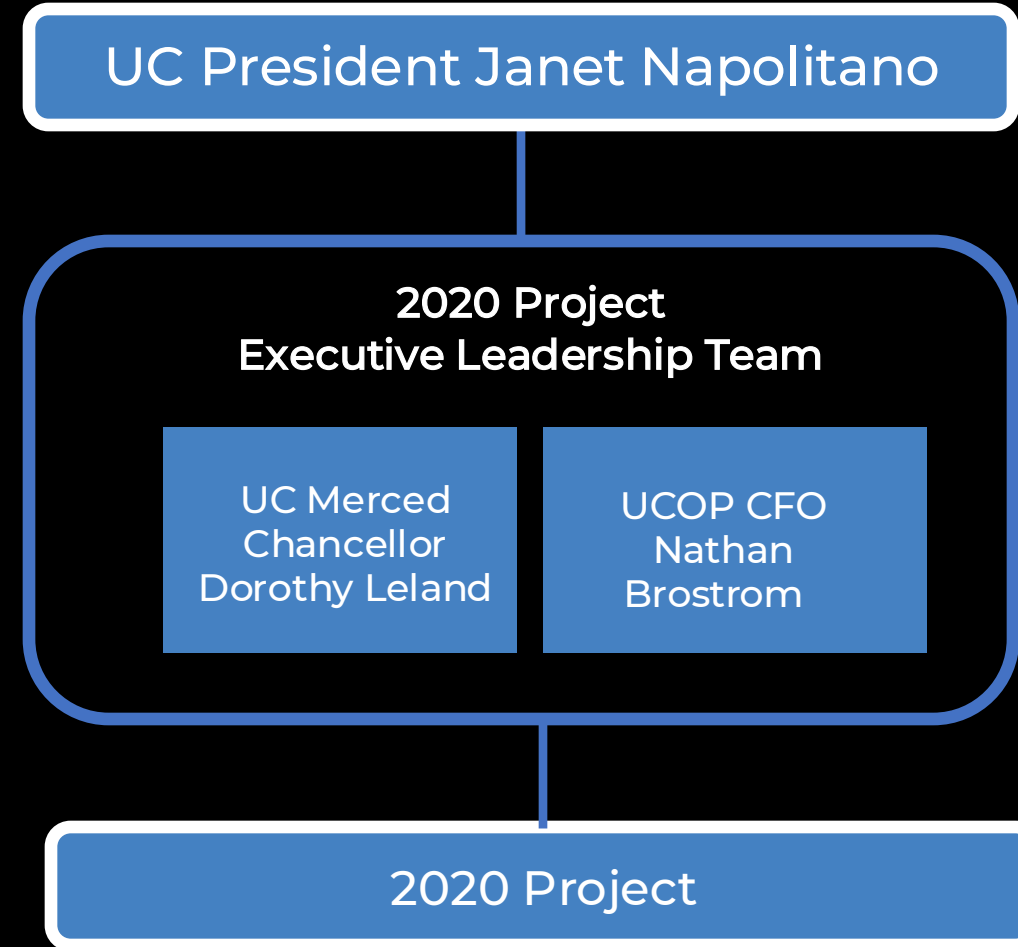
2012 KPMG Bellevue
Gateway Screening Analysis

Examined potential efficiencies from a Design-Build-Finance-Operate-Maintain for non-state funded facilities

BUILDING THE INSTITUTIONAL CONFIDENCE IN A MEGA PROJECT



ULI Advisory Panel provided recommendations in 2013 supporting a public-private partnership approach



2020 PROJECT APPROVED IN 2009 COMPARED TO 2013 UPDATE

- **2020 Target Capacity:** 10,000 students; Capacity up to 2.5 MGSF; 5,000 student beds; 355 acres
- **2010-2020 CFP:** 1.25 MGSF; Cost \$950 million, including 2,500 student beds and \$100 million for infrastructure
- **2013:** 2020 Project modified to 1.4MGSF including 2,500 student beds on 200 acres for \$1.5 Billion

Campus Planning Documents:

- LRDP & Policies
- Capital Financial Plan
- Physical Design Framework
- Campus Facilities Design Standards
- Sustainability Strategic Plan
- Climate Action Plan



2009 Long Range Development Plan



2013 Long Range Development Plan Update

THREE THINGS ABOUT P3'S

WHY GO
WITH A P3?

HOW DOES
DBOFM*
WORK?

WHAT'S
DIFFERENT IN
P3?

The Campus Architect's Role?

* DESIGN-BUILD-OPERATE-FINANCE-
MAINTAIN

UNIVERSITY OF CALIFORNIA, MERCED PROJECT 2020 APPROVED

March 2015 Regents Item:

“The proposed scope and strategy for the Project, its operational and financial considerations, and a proposed delivery timeline have received extensive modeling and evaluation, and the analysis indicates that the proposed DBFOM delivery method could provide:”

- *Economies of scale.....**BETTER***
- *An advantage in time to delivery.....**FASTER***
- *Efficient and cost-effective pricing of lifecycle design, construction, and facilities management.....**CHEAPER***
- *Increased budgetary certainty with respect to facilities maintenance and operations (avoiding deferred maintenance backlog).....**REDUCED FISCAL RISK** and*
- *Transfer of significant non-core risks from the campus to Concessionaire.....**REDUCED NON-CORE RISK***

*University Executive Vice President: “**You have one throat to choke.**”*

WTF IS A DBFOM?

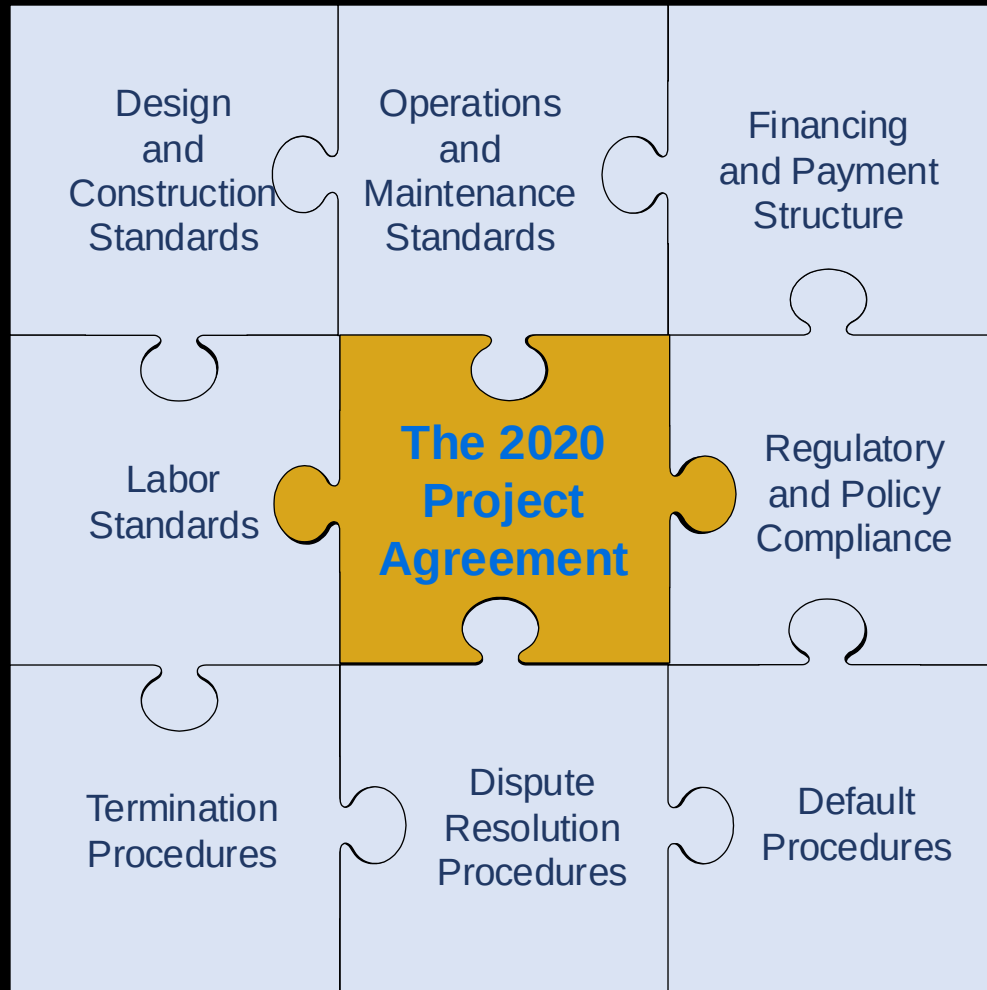
It bundles all project elements into a single, coordinated delivery strategy



- **Creates link** between design and construction of facilities and long- term maintenance
- **Holds the Developer accountable for performance** over life of the asset
- **Incorporates life-cycle financial plan** within affordability constraints established by the University
- **Addresses future obligations** for capital maintenance
- **Creates competition** for all Project elements
- **Manages certain risk elements** to enable campus to focus on core teaching, research and public service missions

“THE PROJECT AGREEMENT”

A performance-based tool used to deliver the project



Adapted from agreements used in similar, successful transactions and customized to meet the campus’ needs

Key Terms

- Developer’s obligation to design, build, finance, operate and maintain major building systems for a term of 39 years
- Financial Requirements
- Delivery dates for all facilities
- Detailed campus review of design and construction to ensure compliance with the contract terms
- *Penalties for performance failure and a “non-compliance” points scheme that would lead to progressive remedies up to and including default and termination*
- Hand back conditions and reserves
- Limitations on Developer’s ability to assign the Agreement, and
- Direct agreement with Lenders setting forth rights & obligations

LIFECYCLE QUESTIONS FOR DEVELOPING THE PROJECT AGREEMENT

What is the role of a “100 Year” building on campus?

Can we afford buildings that last more than 40 Years?

Do we want buildings that last more than 40 years?



Sterling Memorial Library,
Yale University

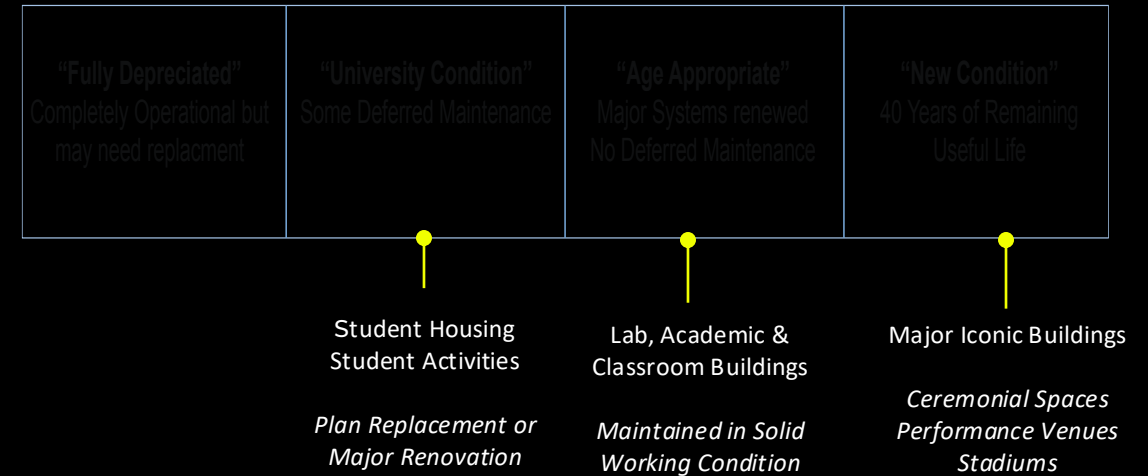


Boelter Hall, UCLA
“Birthplace” of the Internet

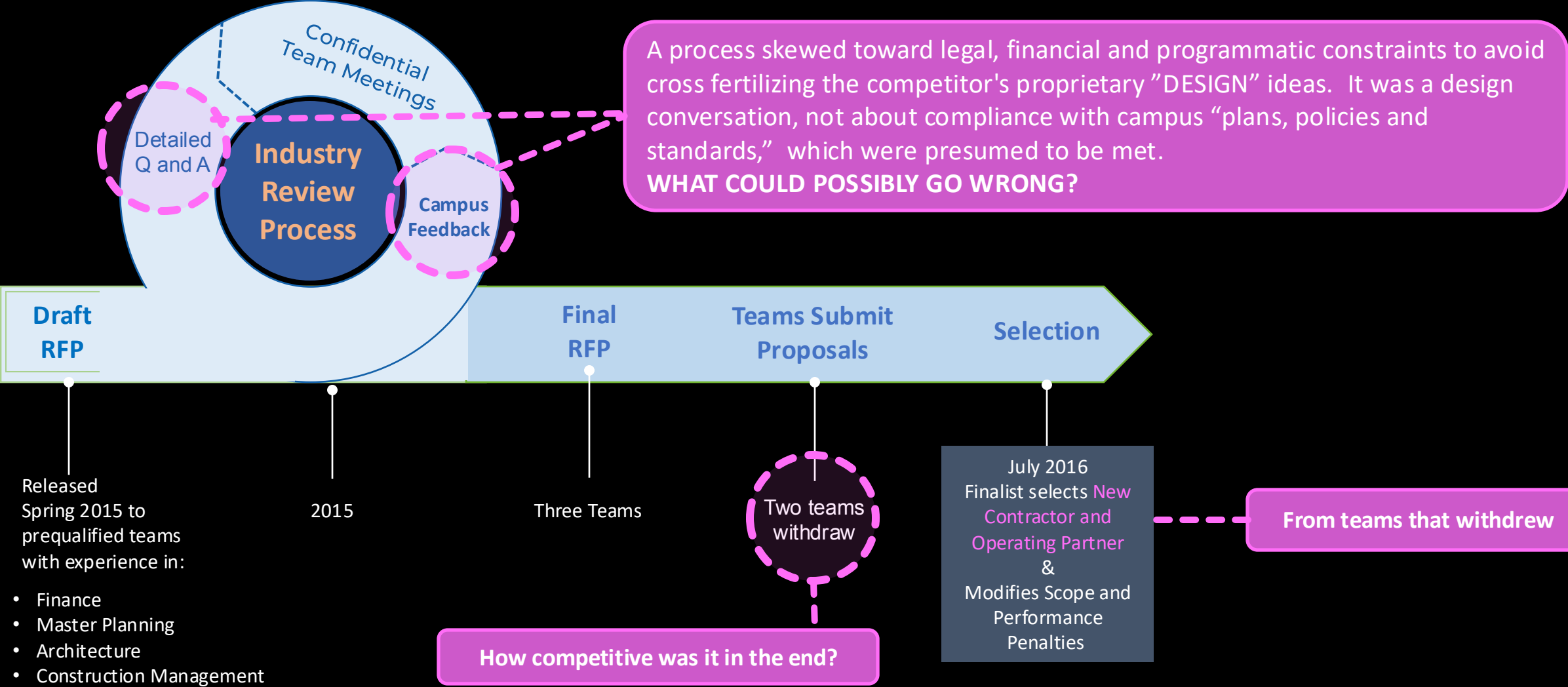


Caruthers/Neilson Hall Dormitory

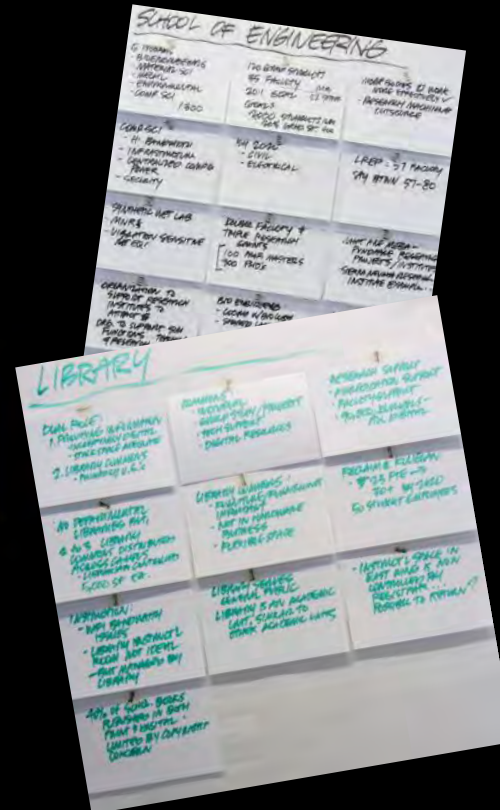
Blended Hand-back Approach Developed
Avoids future capital maintenance nightmare
Smooths maintenance budget as campus takes on O&M



PROCUREMENT PROCESS TIMELINE



Developing the program and details of the agreement was a time intensive process involving campus wide workshops with stakeholders to develop priorities.



THE 2020 PROJECT USED A HYBRID APPROACH TO MAINTENANCE OF MAJOR BUILDING SYSTEMS

- The Campus responsible for a portion of the maintenance of the entire campus, including 2020 Project facilities. These services include *Custodial, Grounds and Existing Dining Facilities*, resulting in a 50% increase in represented positions on the Merced campus
- Developer responsible for maintaining major building systems of buildings it designs and builds, having NO impact on current represented employees.
- Labor protections and Prevailing Wage built into Project Agreement

Prevailing Wage and Labor Compliance Program

Contracts require payment of prevailing wage

Skilled Workforce

Full compliance with skilled workforce provisions of Section of Calif. Public Contract Code

Small Business Goals

Contract incorporates specific goals to advance small business participation in the Project

Services retained by the University

After construction, 400 additional jobs will be created by the campus

Services not provided by developer:

- Janitorial and Custodial
- Landscaping
- Security
- Parking Services
- Shipping and Receiving
- IT/Audio Visual Support
- Laboratory Fit-out and Safety

FINANCIAL OUTCOMES

Traditional Approach (10 Years) 2010-2020

Estimated cost in UC Merced 2010 Capital Financial Plan

- **1,250,000 Million GSF/780,000 ASF**
- **\$950 Million**
- **\$760/GSF**

Public Private Partnership Approach (8 Years) 2012-2020

Estimated cost in November 2015 presentation to UC Regents

- **1,400,000 GSF/920,000 ASF**
- **\$1.144 Billion**
- **\$817/GSF Total Project Cost/\$655/GSF Construction Cost**

Final contracted cost in July 2016 presentation to the Regents

- **1,200,000 GSF/790,000 ASF**
- **\$1.338 Billion**
- **\$1,115/GSF Total Project Cost/\$892/GSF Construction Cost**

36.5% change between bidding and contracting costs per GSF “APPROVED”

47% higher than traditional approach projection, less escalation (15.6%) = 31.4% higher



In the end, it appears to have cost nearly ~30% more, rather than ~20% less.

Differential “mitigated” by finding Japanese pension fund willing accept lower interest payments on debt.

<http://2020project.ucmerced.edu>

2020 PROJECT: VIEW LOOKING SOUTHWEST



2020 PROJECT: VIEW LOOKING NORTHEAST



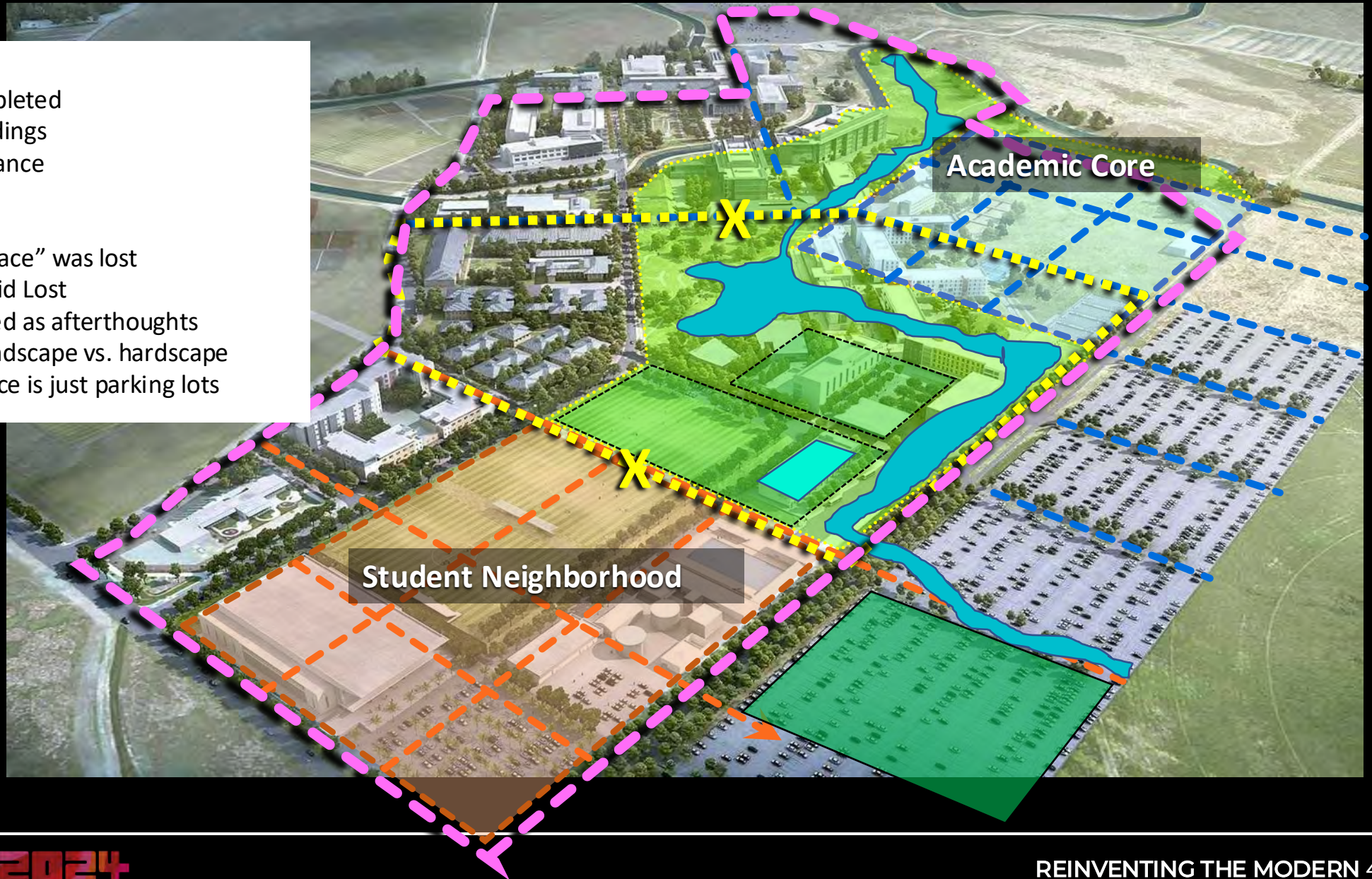
2020 PROJECT WITH OVERLAY OF 2009 LRDP GRID & LAND USE

Biggest Wins:

- It got funded and completed
- 13 LEED Platinum Buildings
- Campus programs advance

Lost Opportunities

- South Bowl "Sacred Space" was lost
- Interconnectivity of Grid Lost
- Odds and end uses sited as afterthoughts
- Lack of attention to landscape vs. hardscape
- The entrance experience is just parking lots



SHADE FOR GATHERING OR TRAVERSING THE PUBLIC REALM IS FORGOTTEN



PHASE 1: SHADE WITHIN THE PUBLIC REALM WAS HIGHLY VALUED



IRRIGATION CANALS TREATED AS OBSTACLES, NOT AS OPEN SPACE RESOURCES/AMENITIES



PROJECT 2020 | LESSONS LEARNED

Stakeholder Interactions

- **A process that allows for greater collaboration** with, and interaction between, the campus and the architect/contractor/developer team **could have established a more informed position on construction costs**, providing iterations for the campus to refine its options and priorities, perhaps **eliminating the need for a BAFO phase, and the concomitant elimination of desired program areas**.

Procurement

- To ensure a better alignment between scope/program requirements and affordability in future projects, the campus would **recommend a more efficient and collaborative, “progressive” procurement approach** between the campus and the development team to build market tested cost estimates iteratively and collaboratively throughout the process.

PROJECT 2020 | LESSONS LEARNED (continued)

Design

- Campus stakeholders expected the ability to modify the conceptual designs after the contractor's bids were accepted and the construction costs confirmed. **This misalignment of expectations required consistent re-education of stakeholders.**
- A key lesson learned is that **research lab space is not generic.** While it is possible to create some level of flexibility in wet lab design and construction, some level of customization will nearly always be required. Had the campus had the benefit of some of the Technical Requirements for the scientific areas supported in the research buildings, both time and dollars could have been saved.

PROJECT 2020 | LESSONS LEARNED (continued)

Construction – Delivery

- In that the structure of the contract was predominantly performance based coupled with the aggressive delivery requirements, the teams led by the Campus Building Official (CBO) and Designated Campus Fire Marshal (DCFM) who perform **design review and construction inspections were bifurcated from normal university administrative authority lines** to establish a clear delineation between the “Owner” and the “Authority Having Jurisdiction”. In general, the approach taken **allowed for clear lines of responsibility for the majority of permitting and inspection related issues, minimizing, but not eliminating the campus’ exposure to risk associated with the project delivery.**
- A **less urgent project timeline would have allowed more time for time consultation and the need for fewer changes** late in the process at additional cost. Beginning before demand for space overwhelms helps to avoid the costs of urgency. The **urgent timeline to complete the facilities also resulted in several expensive construction decisions.** For instance, there were three tower cranes on site concurrently at one point in the project.

PROJECT 2020 | LESSONS LEARNED (continued)

Operations

- Adding and integrating an outside layer of operations and maintenance organization to an existing campus is a complicated endeavor. **Ideally, the operational planning should be started as early in the project as possible.**
- Plan for **adequate in-house staff to manage the contract.**

PROJECT 2020 | LESSONS LEARNED (continued)

- Make sure the organization has the institutional fortitude and faith to see the process through
 - Not fit for the faint of heart.
 - It should not be considered 'free money'.
- **Don't throw the skeptics under the bus! They keep you honest.**
- Never assume outsiders know more about the campus than campus staff.
- Allow enough duration in the project plan to develop an agreed-upon approval process.
- Base-lining: Have a framework for what to do and when to do it in the process.
- Clarify the overarching design principles and objectives early; then carefully translate them into performance requirements.
- Economies of scale: this method is best suited to larger projects.
- Do not underestimate the front-end cost and time of reinventing the development process.

Q & A