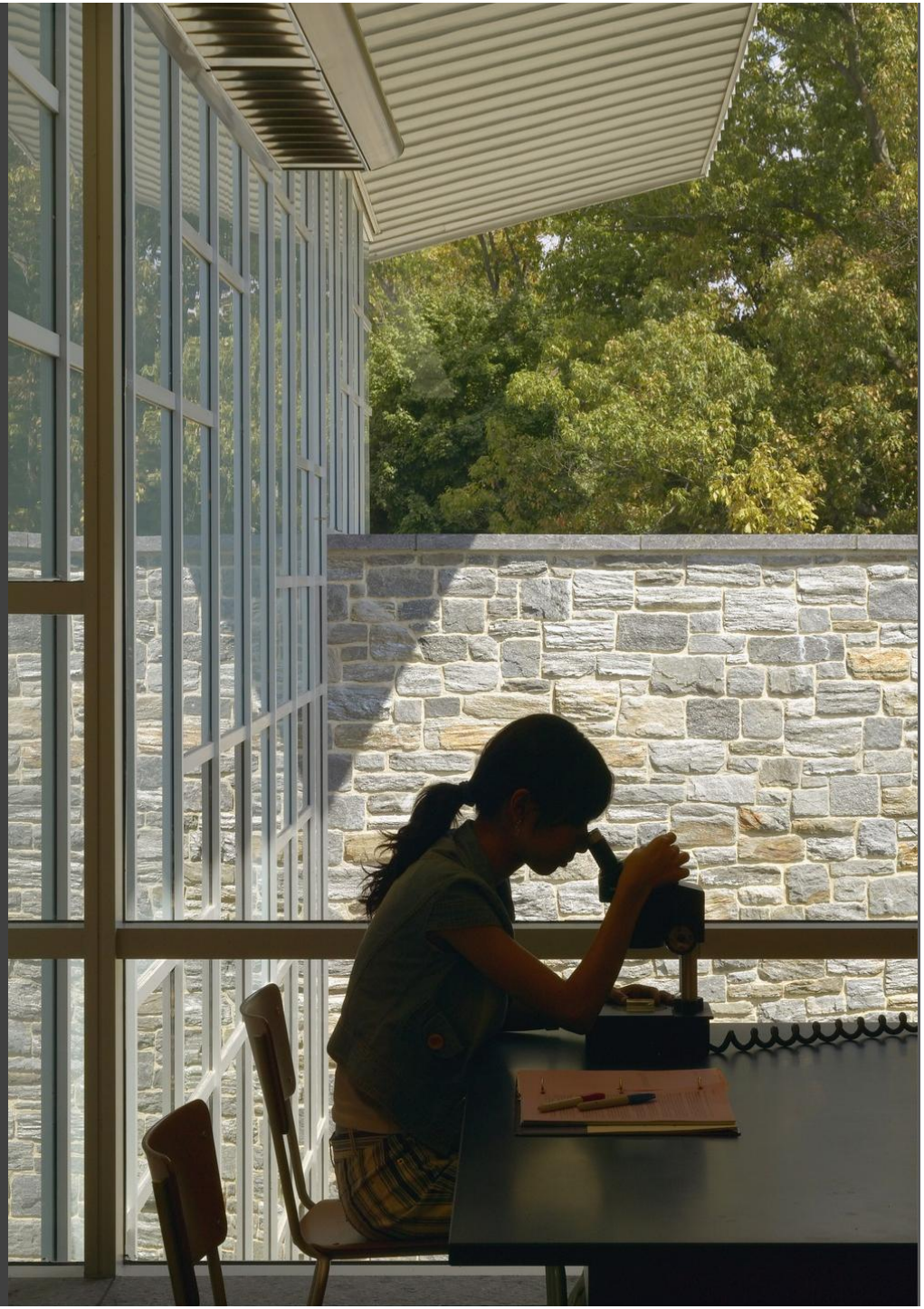
The Teaching Lab of Tomorrow

IFMA
Academic Facilities Council
Spring, 2014

EYP/



lab space > bench space

EYP
Architecture & Engineering
is a team of architects, engineers, and other professionals dedicated to expertise-driven design.

We are passionate about our work, inspired by our clients, and committed to shaping a better world through integrated sustainable design.

We believe that the best designs arise from a collaborative journey of discovery with our clients that reveals insights and spurs innovation.

EYP/

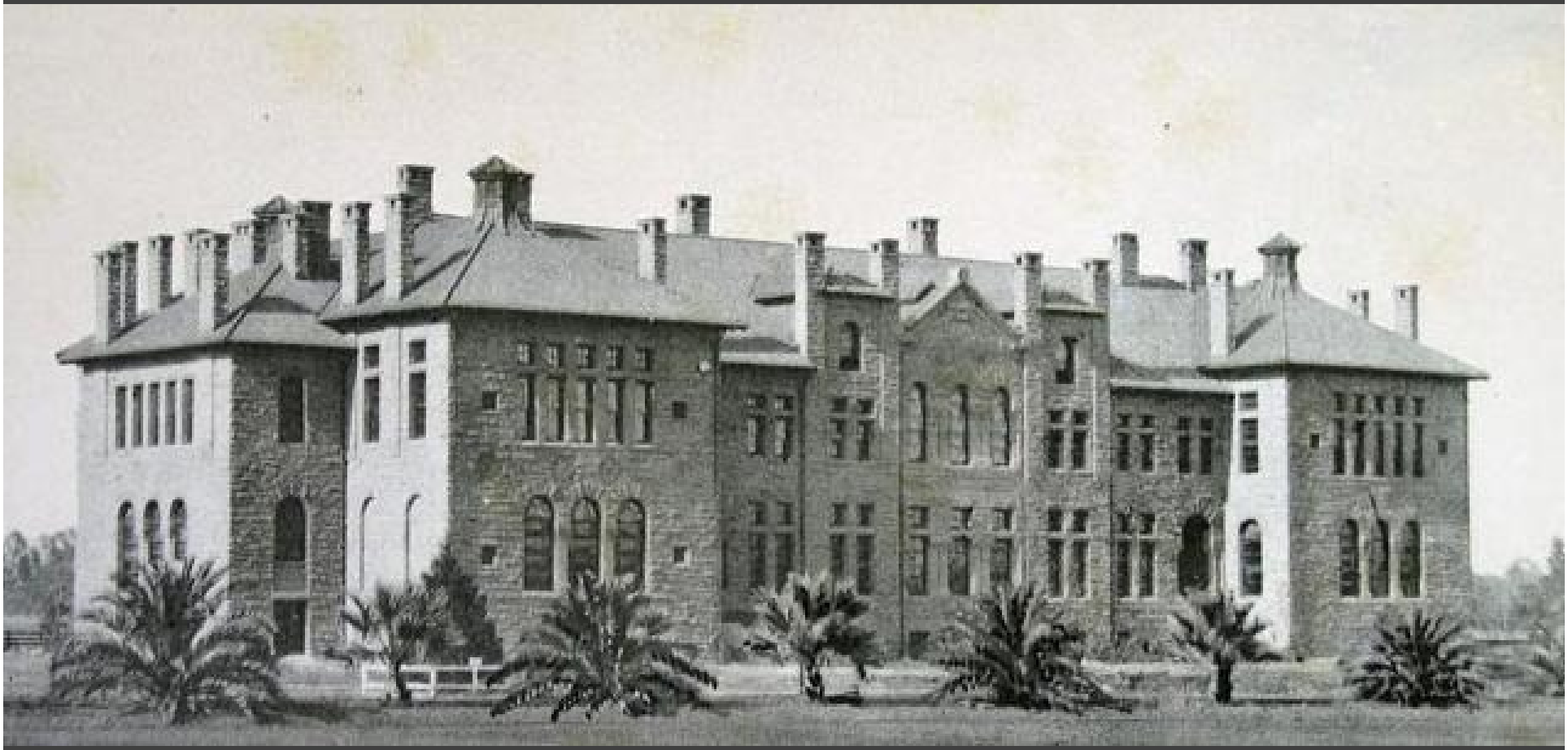
top ten list

when(thinking about) designing

teaching laboratories

10

multi-disciplinary

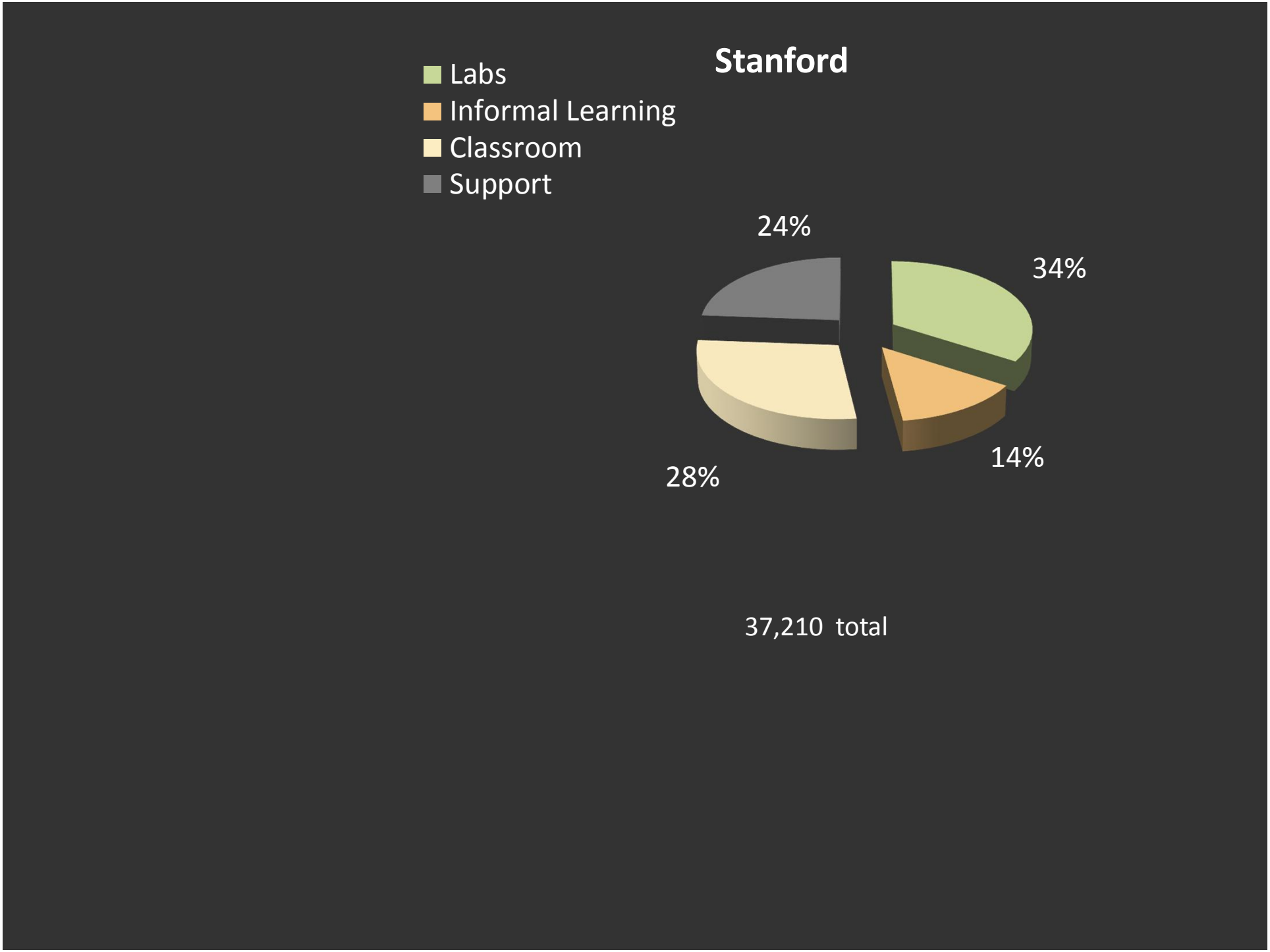


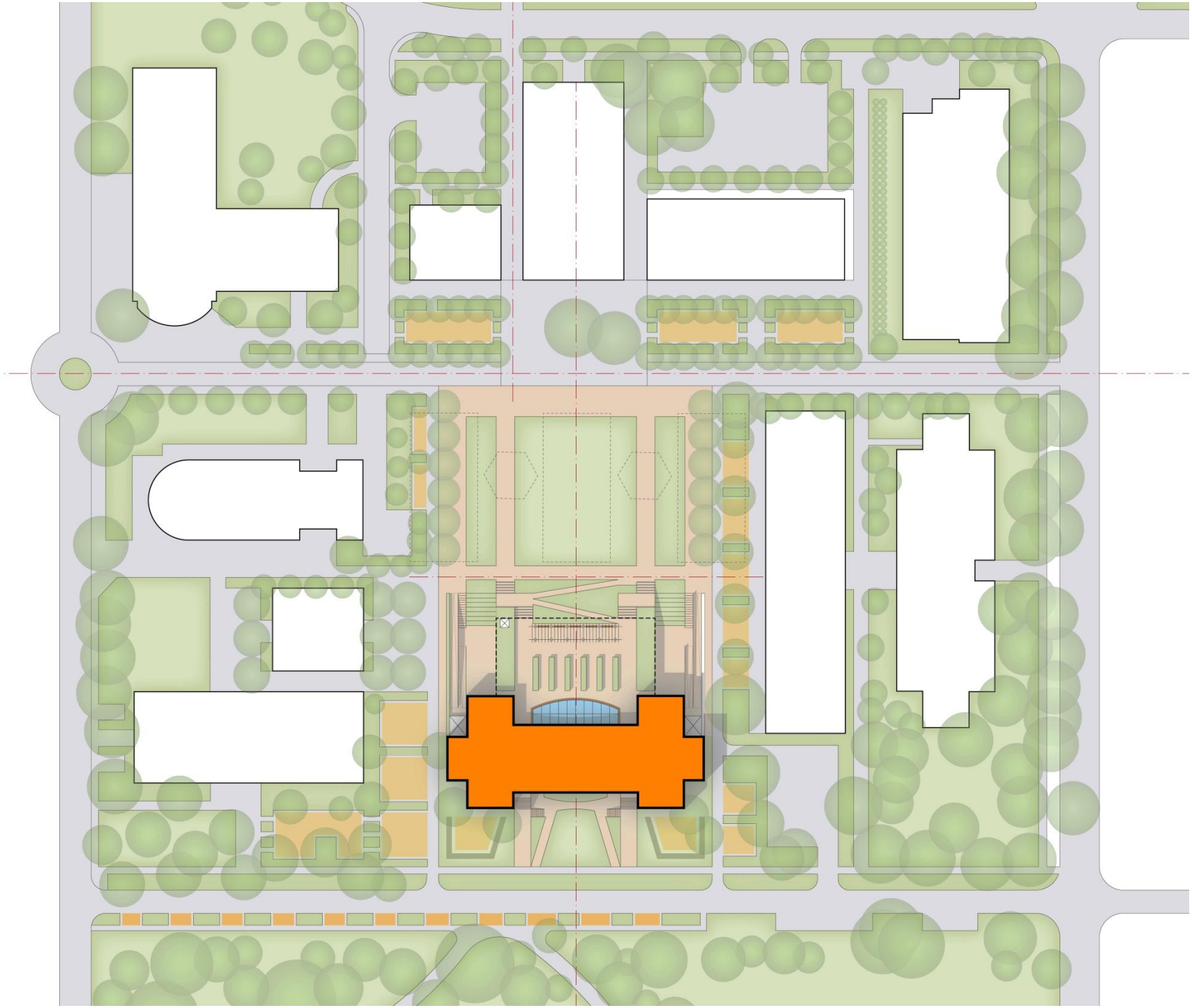
The rehabilitation and expansion of the existing Old Chemistry Building into the
Science Teaching and Learning Center (STLC)

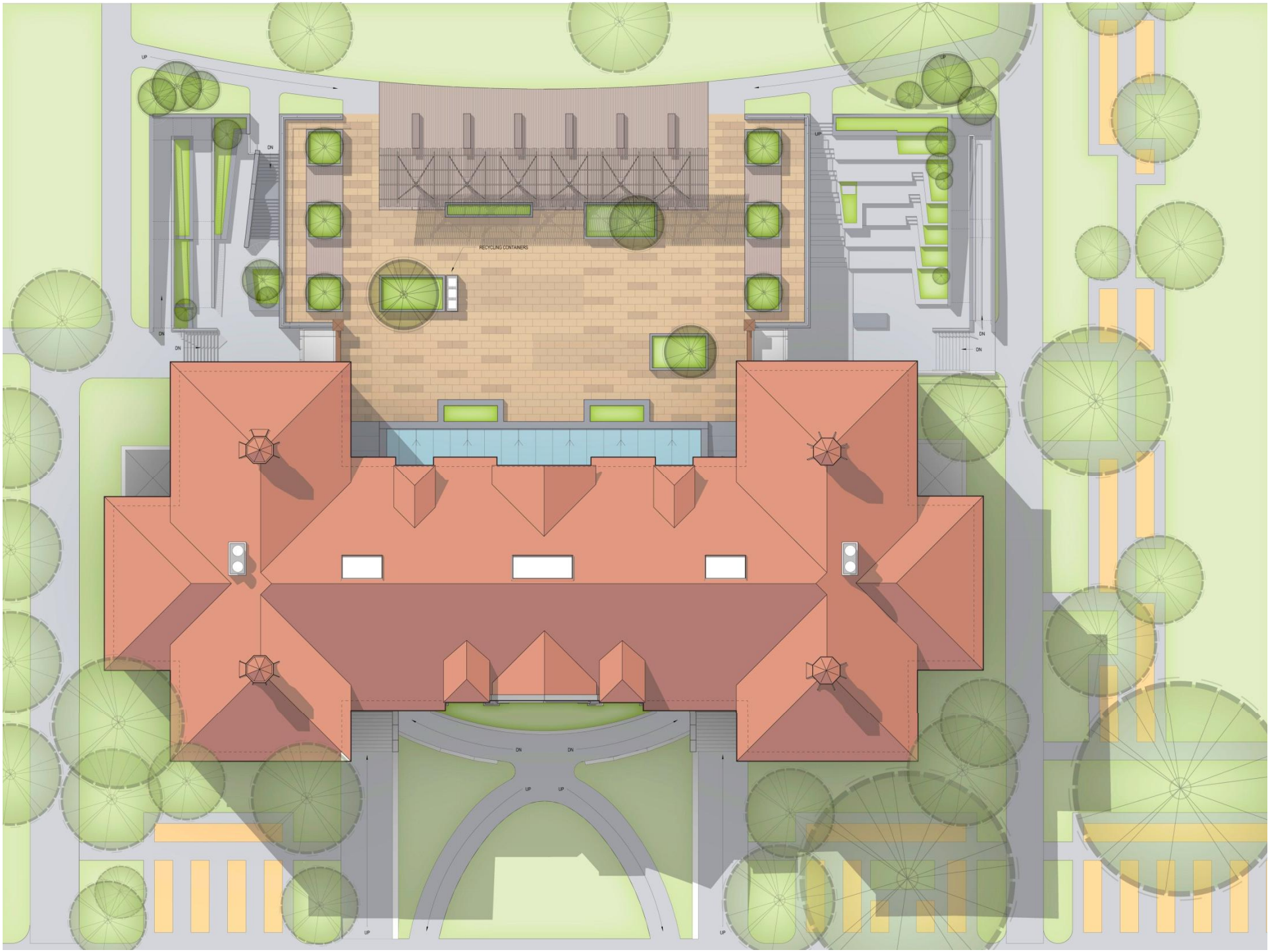
is a component of a long range vision to enhance the existing sciences precinct on campus

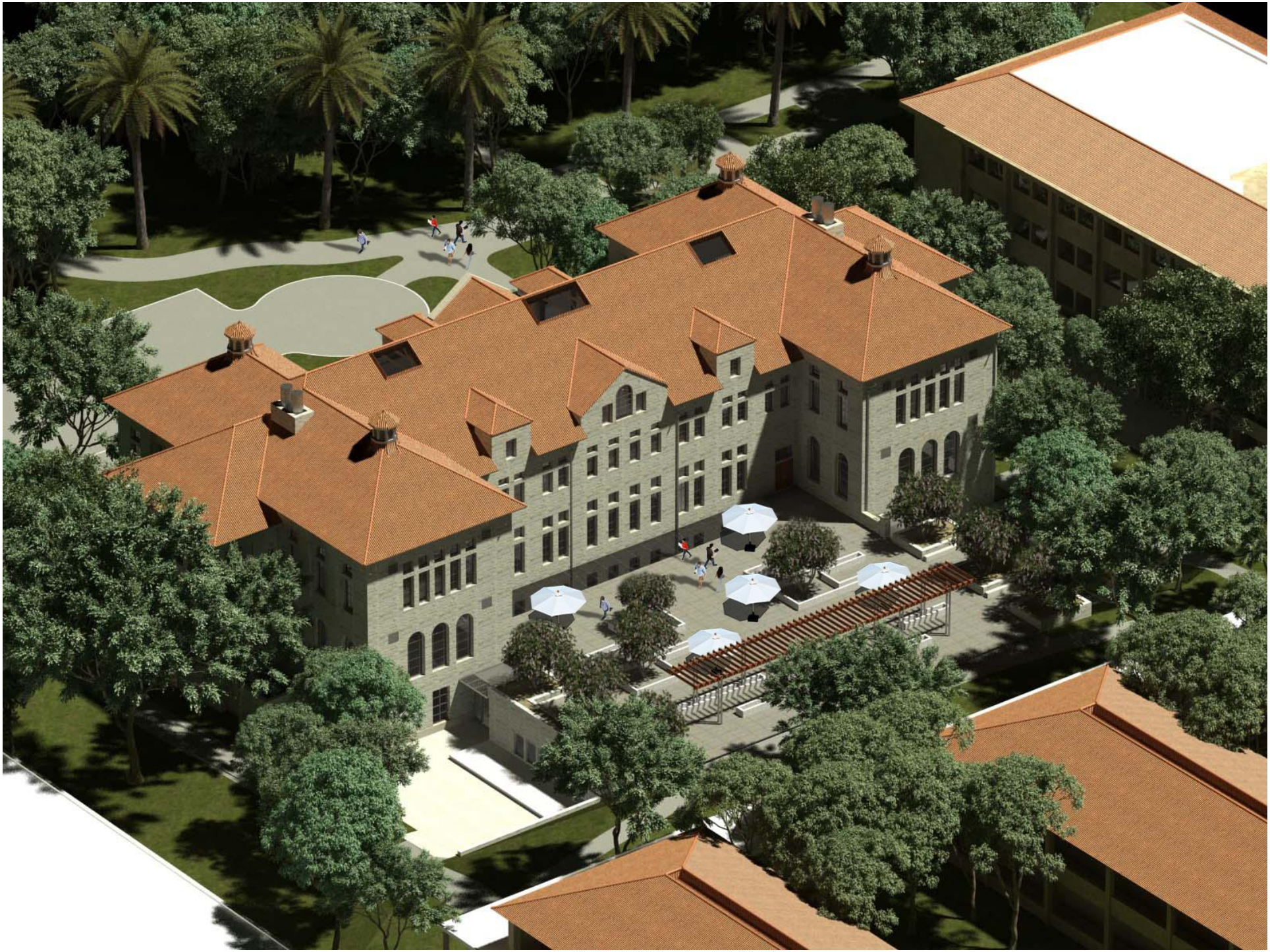
with STLC as one of the critical anchors.

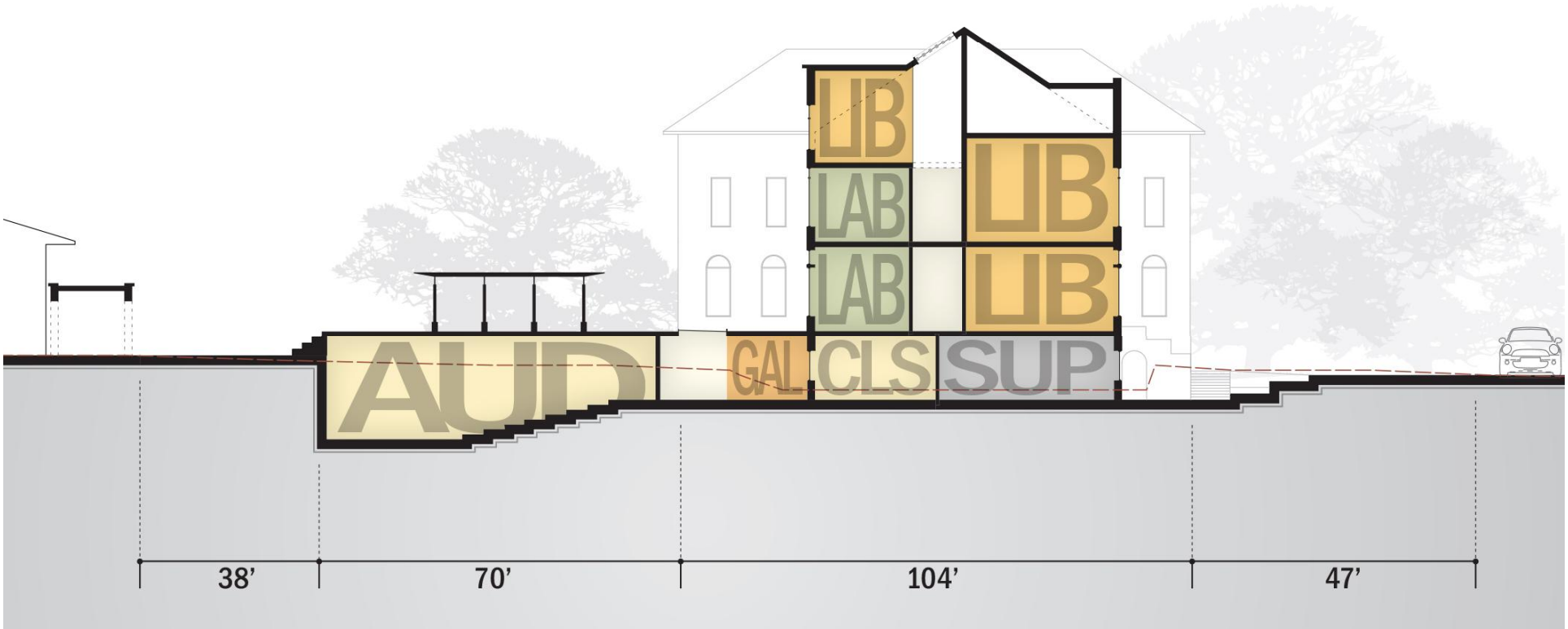
The overarching goal of the STLC is to transform the learning and discovery process in life science education.


Stanford
Labs
Informal Learning
Classroom
Support
24%
34%
14%
28%
37,210 total

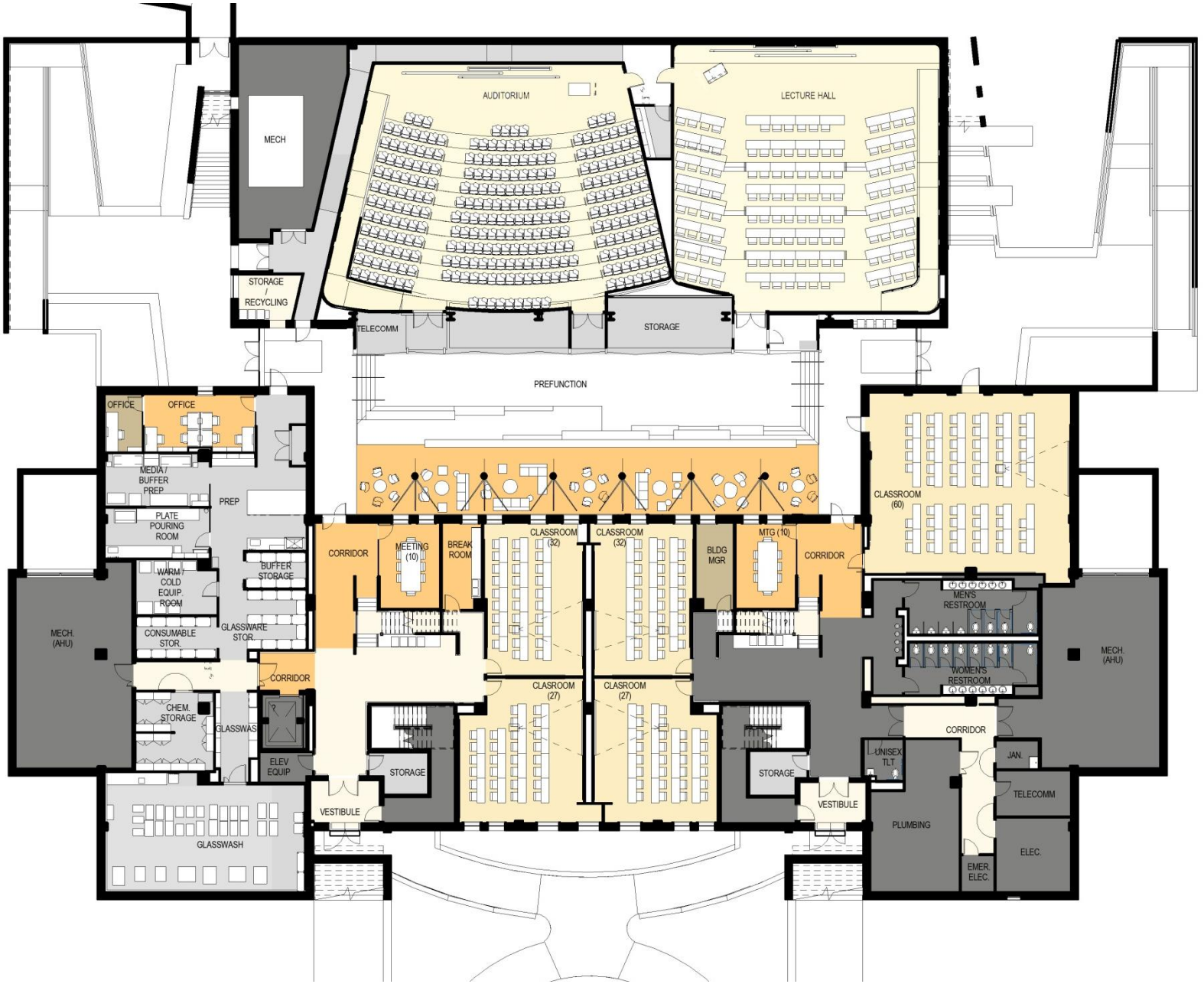



RECYCLING CONTAINERS
UP
DN




LIB
LAB
LIB
LAB
LIB
AUD
GAL
CLS
SUP
38’
70’
104’
47’

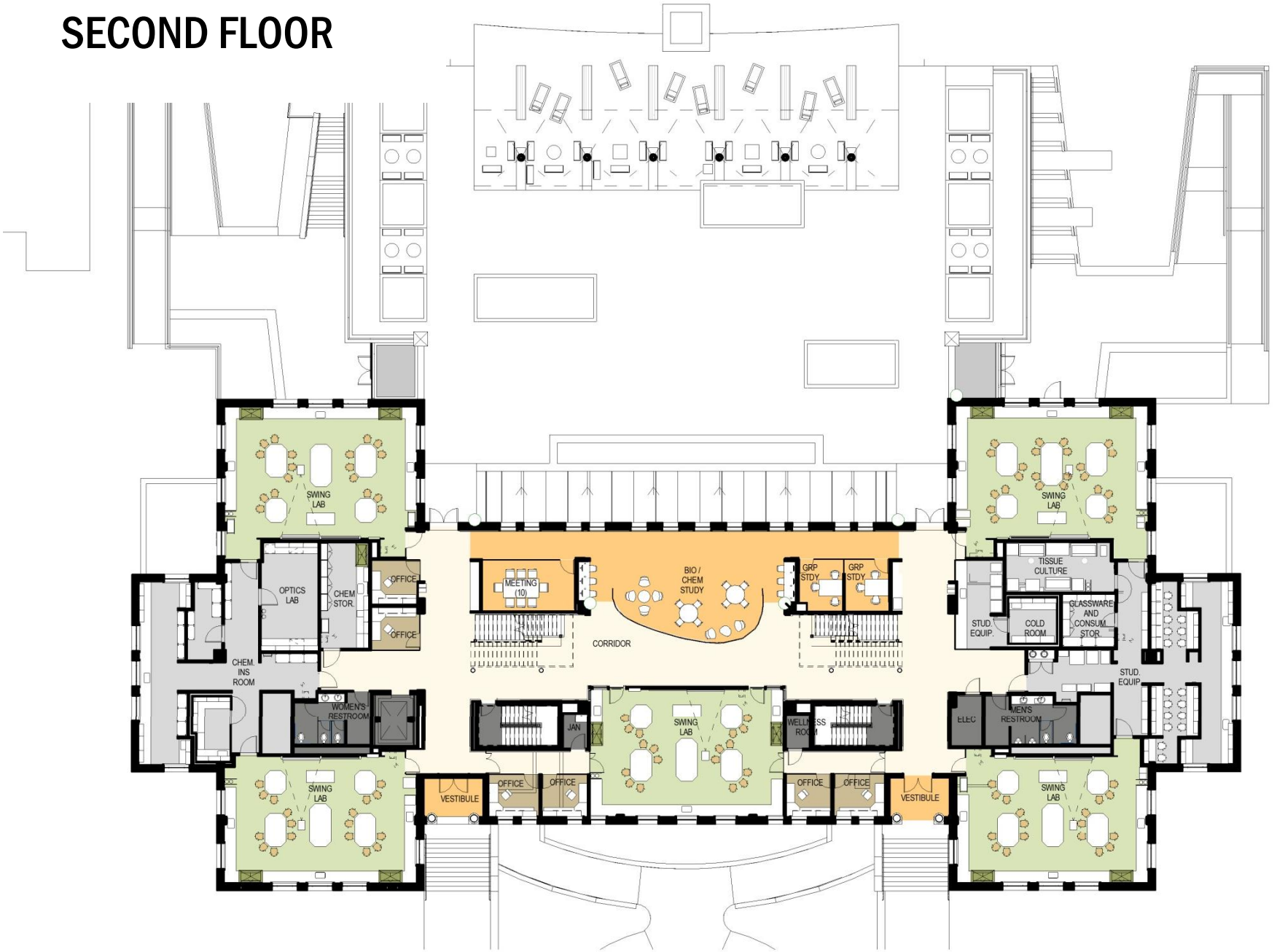
FIRST FLOOR


AUDITORIUM
LECTURE HALL
MECH
STORAGE / RECYCLING
TELECOMM
STORAGE
PREFUNCTION
OFFICE
OFFICE
MEDIA / BUFFER PREP
PREP
PLATE POURING ROOM
WARM / COLD EQUIP. ROOM
BUFFER STORAGE
CONSUMABLE STOR.
GLASSWARE STOR.
CORRIDOR
CHEM. STORAGE
GLASSWASH
ELEV EQUIP
GLASSWASH
VESTIBULE
STORAGE
CORRIDOR
MEETING (10)
BREAK ROOM
CLASSROOM (32)
CLASSROOM (32)
CLASROOM (27)
CLASROOM (27)
BLDG MGR
MTG (10)
CORRIDOR
STORAGE
VESTIBULE
CLASSROOM (60)
MEN'S RESTROOM
WOMEN'S RESTROOM
CORRIDOR
UNISEX TLT
JAN.
TELECOMM
PLUMBING
ELEC.
EMER. ELEC.
MECH. (AHU)
MECH. (AHU)

Gallery

Auditorium

SECOND FLOOR

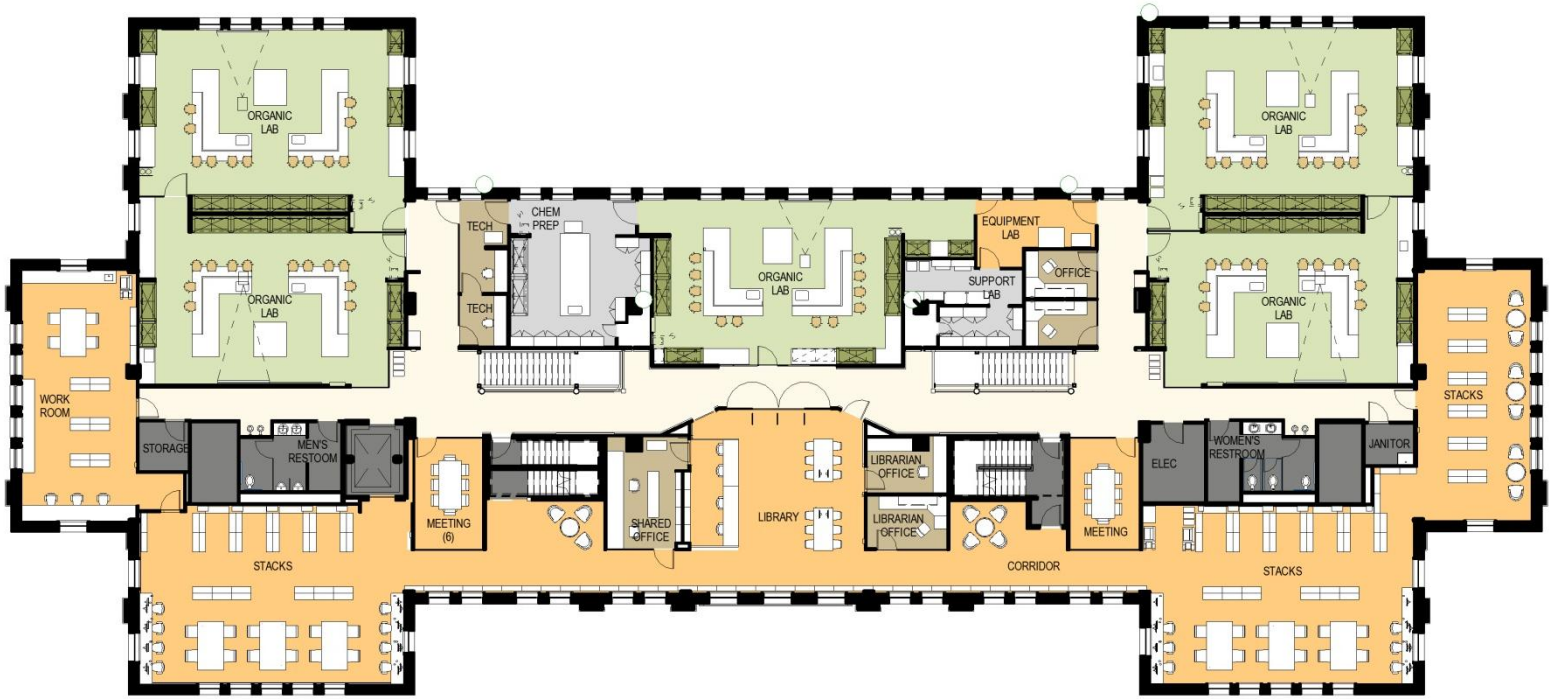



MENTEN
FRANKLIN
YALOW
CLARK
BARTON
STANFORD
UNIVERSITY

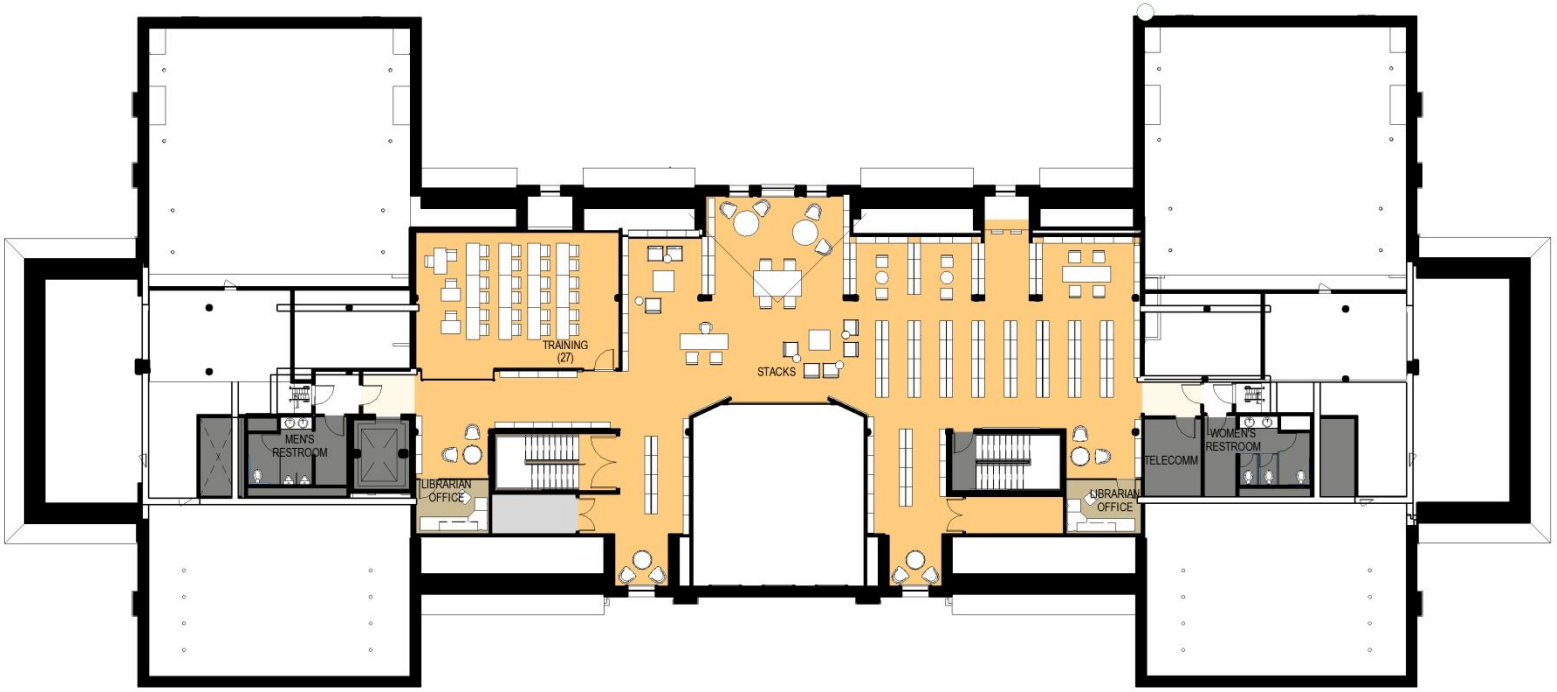
2nd Floor Collaborative Study Space


STANFORD
UNIVERSITY
FRANKLIN

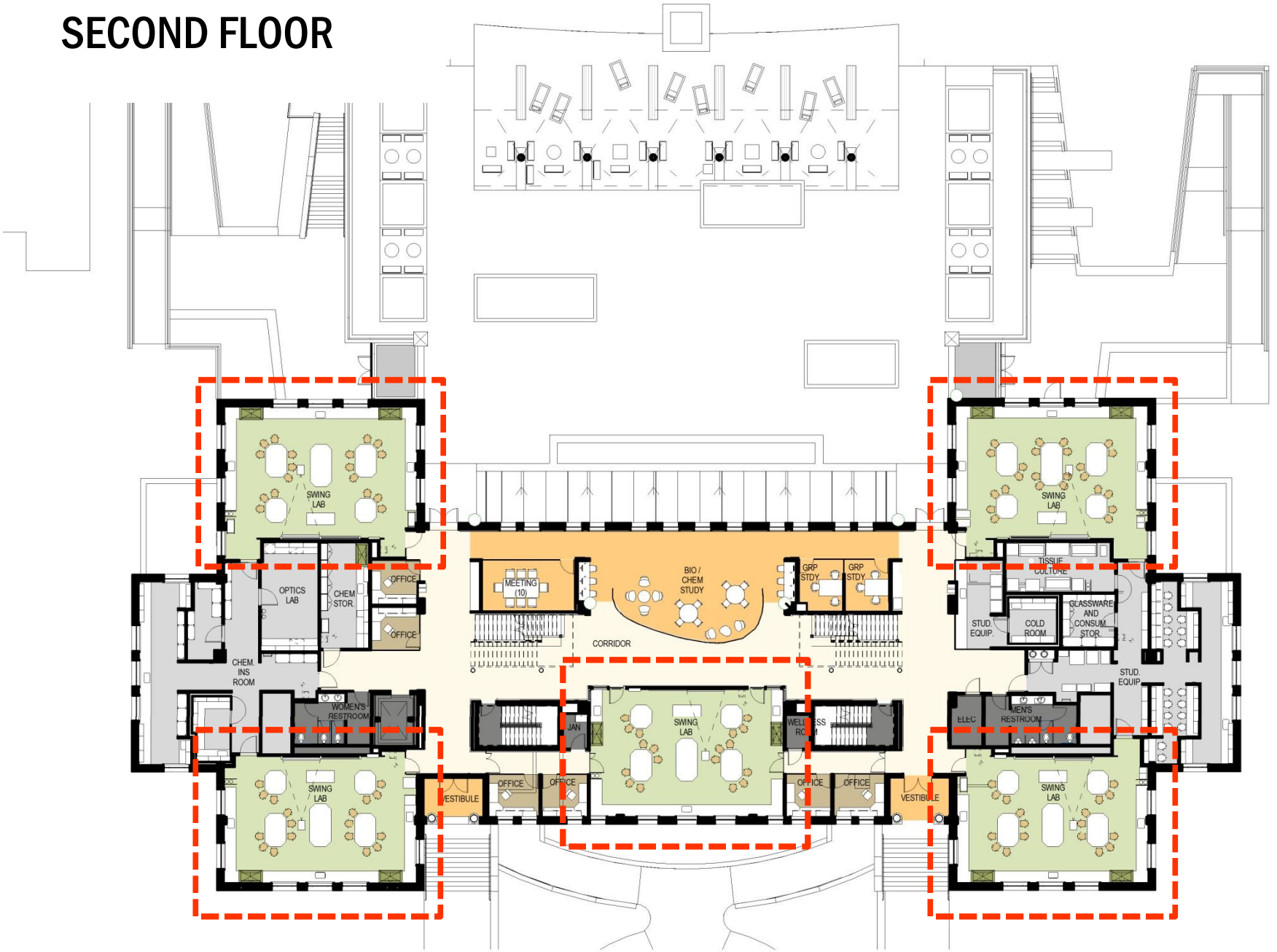
THIRD FLOOR


ORGANIC LAB
ORGANIC LAB
TECH
CHEM PREP
TECH
ORGANIC LAB
EQUIPMENT LAB
SUPPORT LAB
OFFICE
ORGANIC LAB
ORGANIC LAB
WORK ROOM
STORAGE
MEN'S RESTOOM
MEETING (6)
SHARED OFFICE
LIBRARY
LIBRARIAN OFFICE
LIBRARIAN OFFICE
MEETING
ELEC
WOMEN'S RESTROOM
JANITOR
STACKS
STACKS
CORRIDOR
STACKS

FOURTH FLOOR



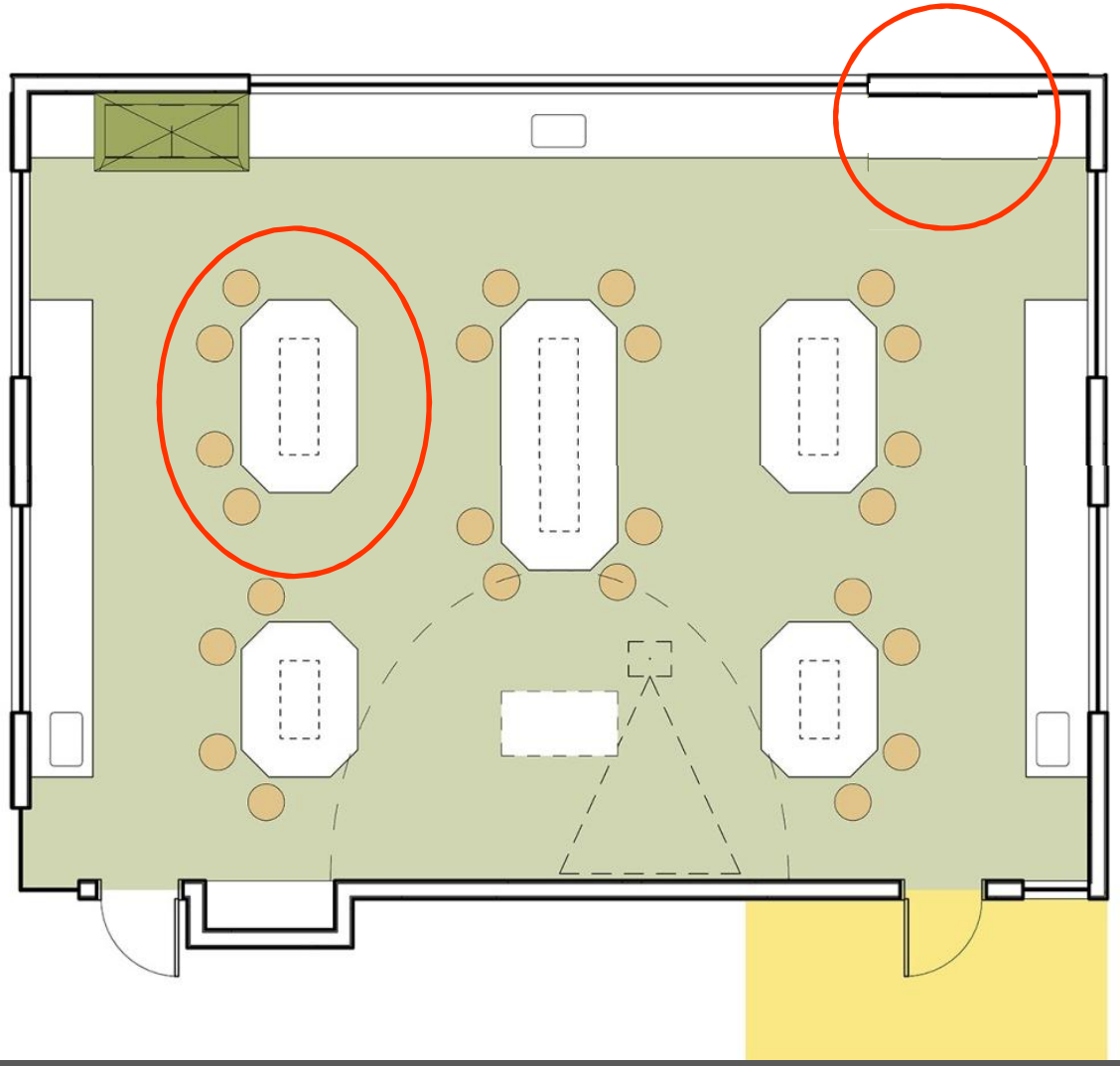
SECOND FLOOR



Old Chem

Biology

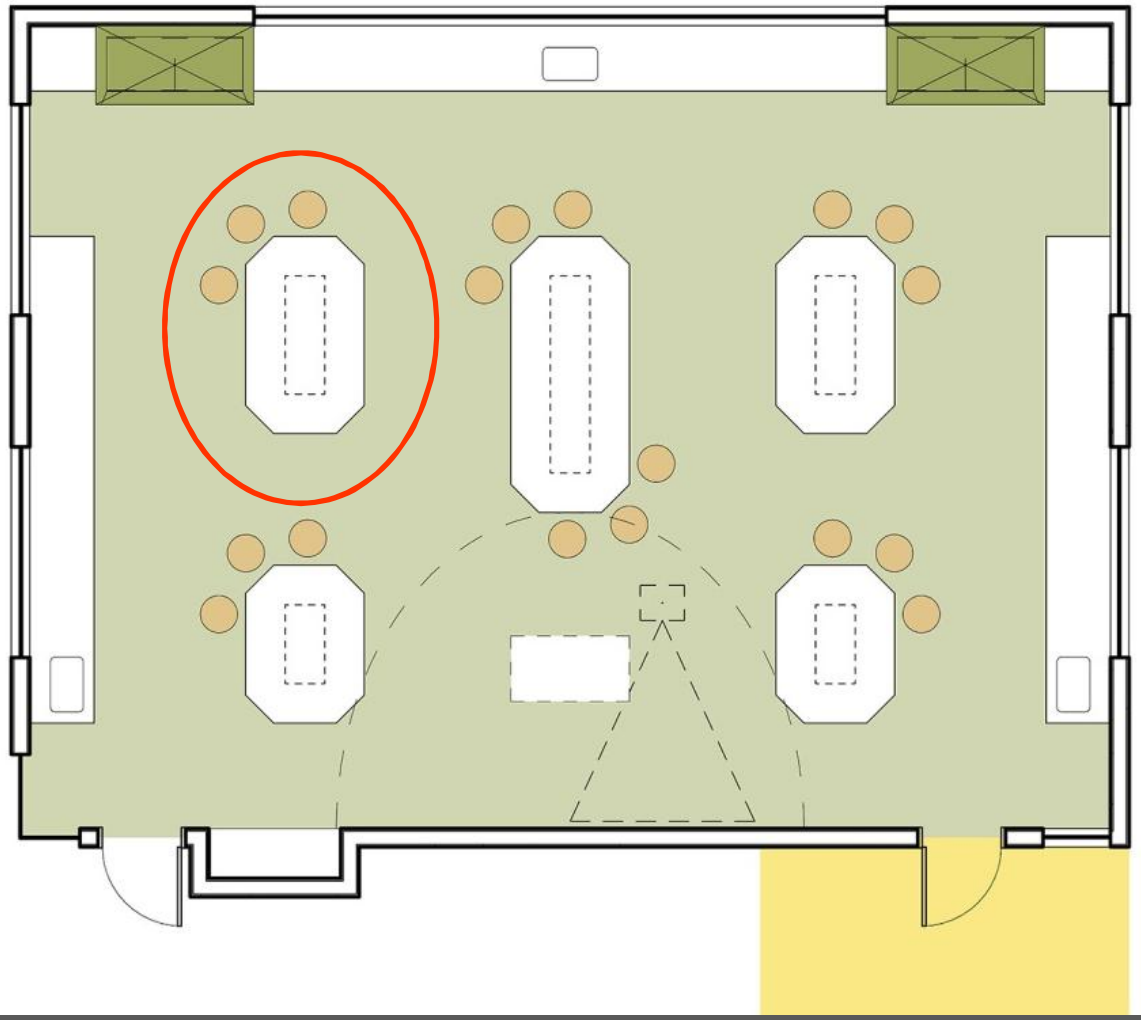
12 pairs
or
6 groups of 4



Old Chem

Chemistry

6 groups of 3

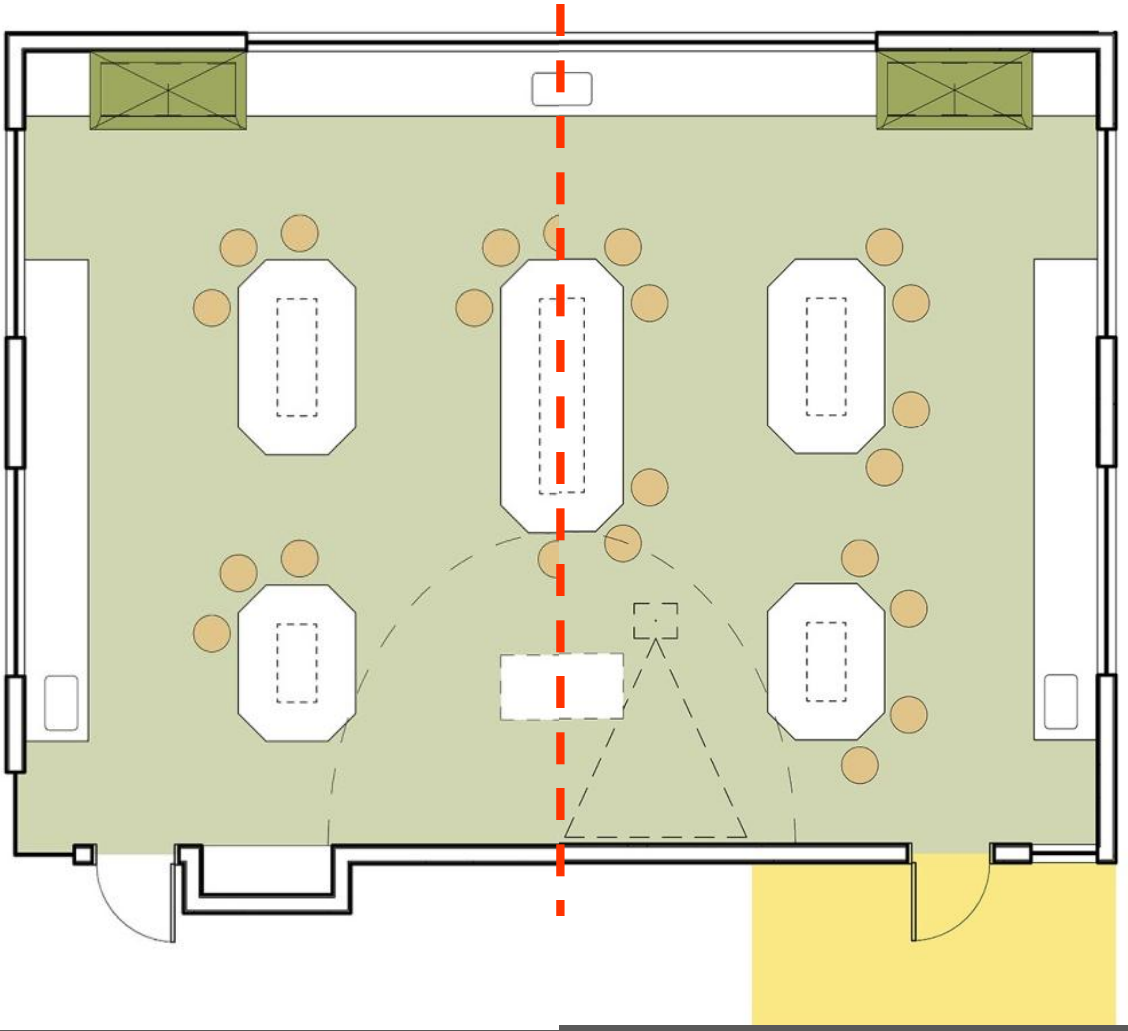


Swing
Laboratory

Group benches
without legs

Chemistry:
group = 3

Biology:
group = 2 X 2



9

inter-disciplinary

V Tech:

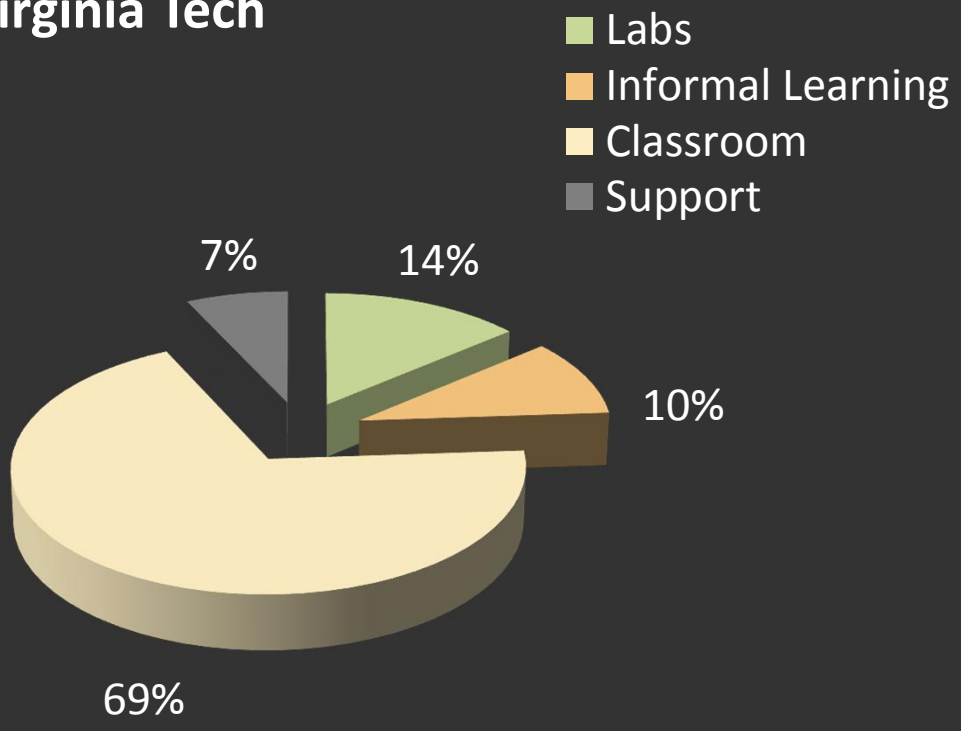
Integrated Learning Environment (ILE)

Learning spaces that will facilitate and inspire the adoption of new active learning strategies across all disciplines and curricula.

- Flexibility to accommodate future teaching paradigms.
- Robust technology infrastructure supporting unparalleled internet connectivity.

Focus on students working in teams to learn through problem-based analysis and simulation - electronically as well as visually.

Virginia Tech



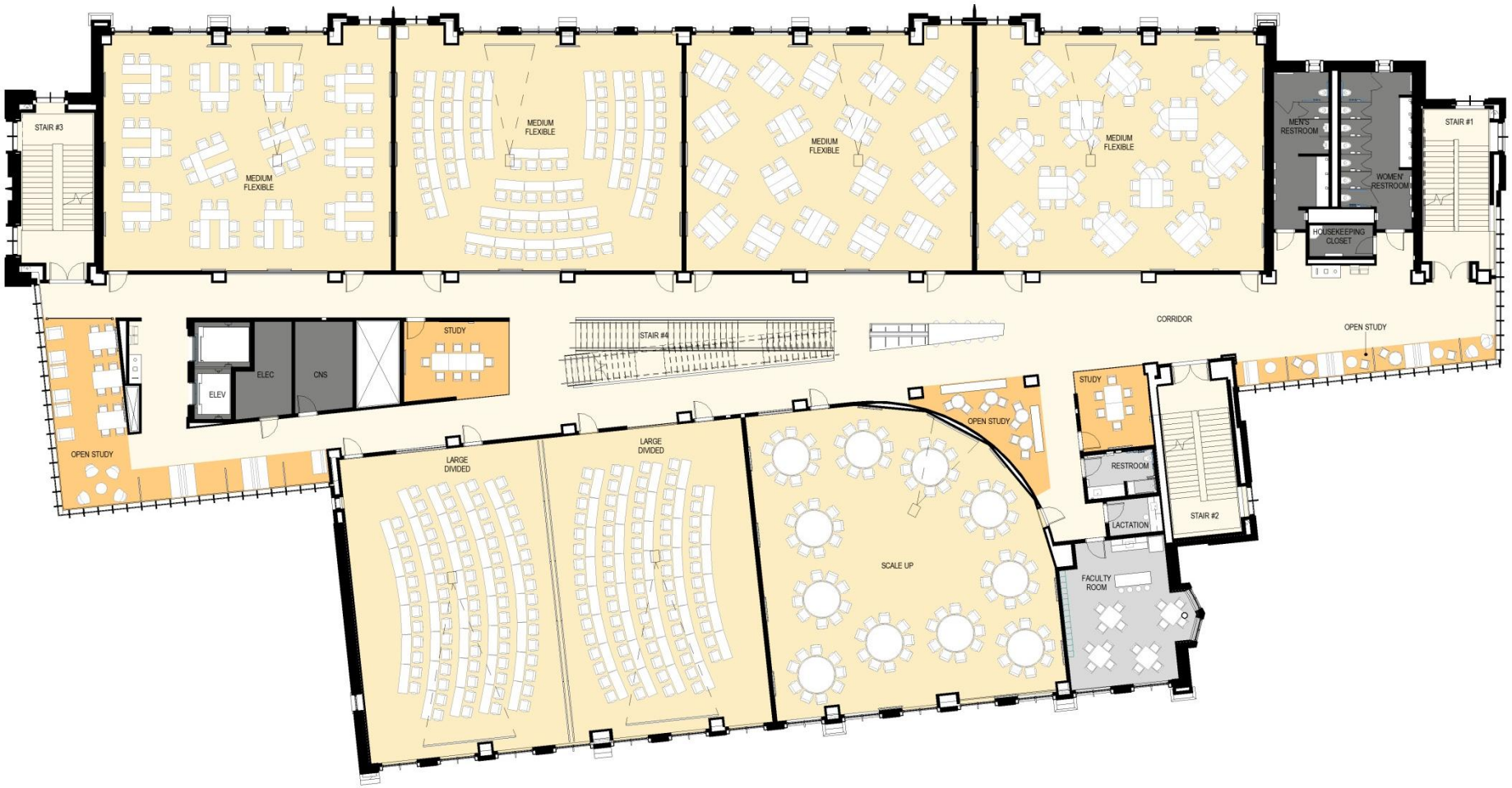
47,955 total


NORTH
0'
10'
20'
40'
Scale: 1"=20'

FIRST FLOOR


FACILITY MANAGER
BLACK BOX SUPPORT
STAIR #3
PREVENTATIVE MAINTENANCE
HK SUPERVISOR
BLACK BOX CLASSROOM
MEDIUM DIVIDED
MEDIUM DIVIDED
MEDIUM FLEXIBLE
MEN'S RESTROOM
WOMAN'S RESTROOM
HOUSEKEEPING CLOSET
STAIR #1
MAIN VESTIBULE
CORRIDOR
STUDY
ELEV
ELEC
SECURITY
STUDY
STUDY
STUDY
OPEN STUDY
STAIR #4
MAIN VESTIBULE
HK SUPPLY
ELEV MACHINE ROOM
STORAGE
VESTIBULE
VESTIBULE
AV CLOSET/ STORAGE
VENDING
STUDY
STAIR #2
SCALE UP
STUDY
TRASH/ RECYCLING
CORRIDOR
MECH
MAIN ELEC
TIERED CLASSROOM

SECOND FLOOR



THIRD FLOOR


TISSUE CULTURE
INSTRUMENT
PREP
PREP
INSTRUMENT
TISSUE CULTURE
STUDY (COMP LAB)
STUDY (COMP LAB)
TEACHING LAB
TEACHING LAB
TEACHING LAB
TEACHING LAB
STAIR #3
WOMEN'S RESTROOM
HOUSEKEEPING CLOSET
STAIR #1
ELEV
ELEC
AUTOCLAVE
CHEM STORAGE
MICROSCOPE
STUDY
STAIR #4
CORRIDOR
OPEN STUDY
OPEN STUDY
LARGE CLASSROOM
LARGE CLASSROOM
STAIR #2

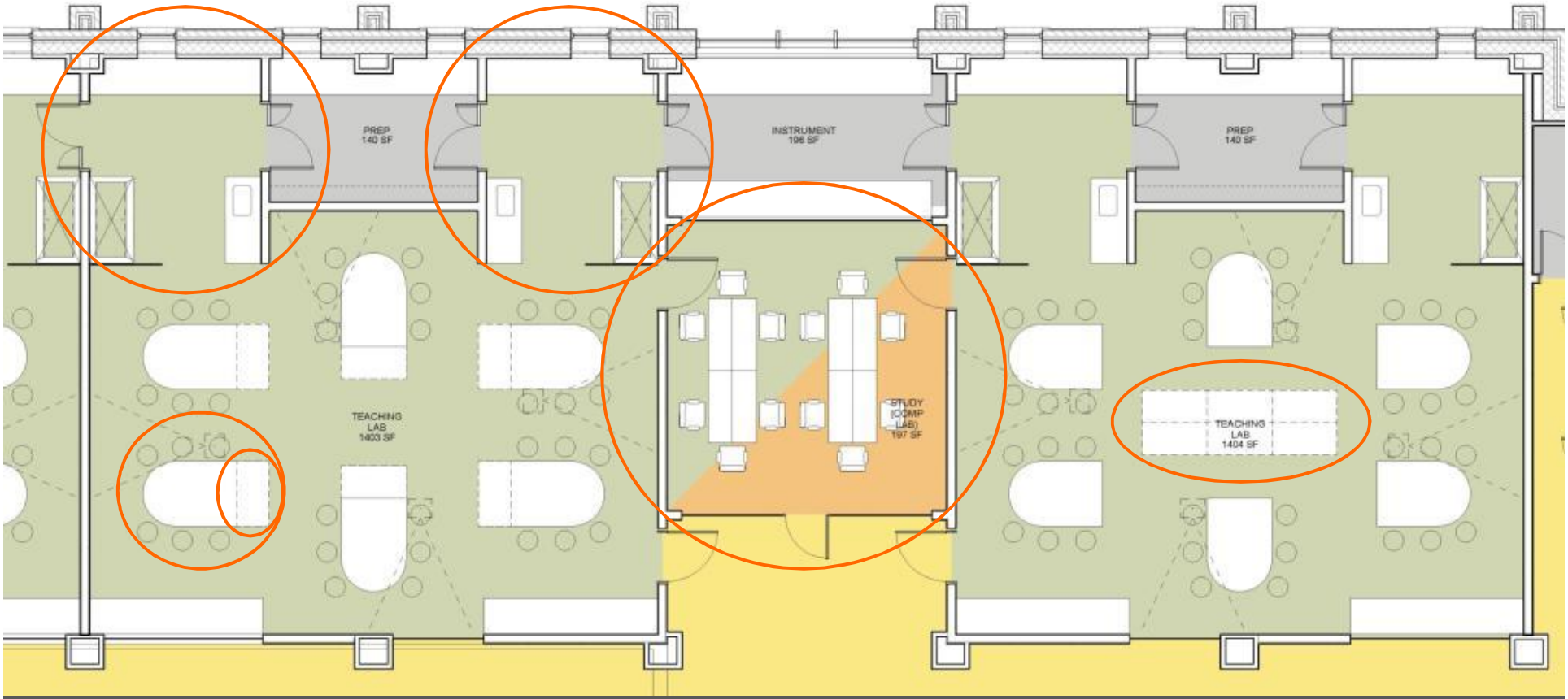
V Tech: Integrated Science Curriculum:

Integrated undergraduate general science curriculum, in which students are designing and conducting experiments to answer questions at the interfaces of biology, chemistry, geology and physics.

Helping solve some of the world's most pressing problems (water, energy, disease, poverty) through science.

Example:
develop and test nanoparticles to deliver genes to cells.

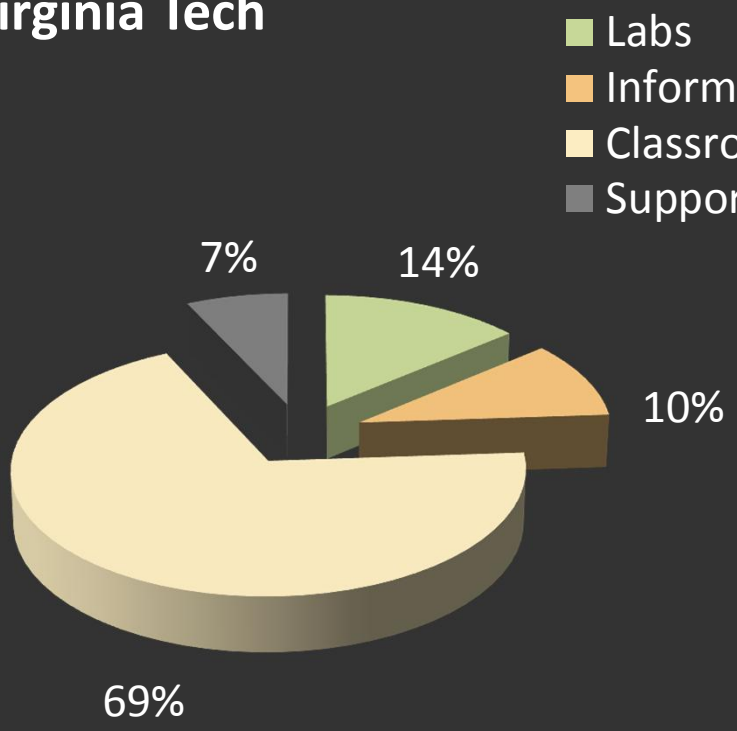
Interdisciplinary Teaching Laboratories




Molecules in individuals
Probabilities of change (mutation, recombination)
Effect on individuals
Individuals in ecosystems
Probabilities of fixation (selection, drift, migration)
Ecological meaning
Modelling
Evolutionary Hypotheses
How probable is a specific course of evolution in the light of the data?

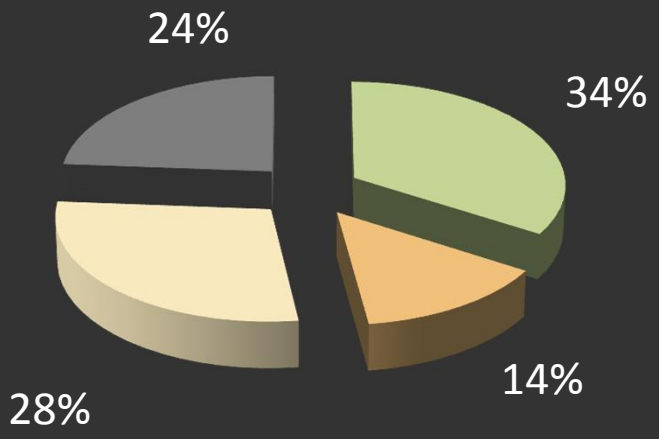

Molecules in individuals
Probabilities of change (mutation, recombination)
Effect on individuals
Individuals in ecosystems
Probabilities of fixation (selection, drift, migration)
Ecological meaning
Modelling
Evolutionary Hypotheses
How probable is a specific course of evolution in the light of the data?

Virginia Tech



47,955 total

Stanford



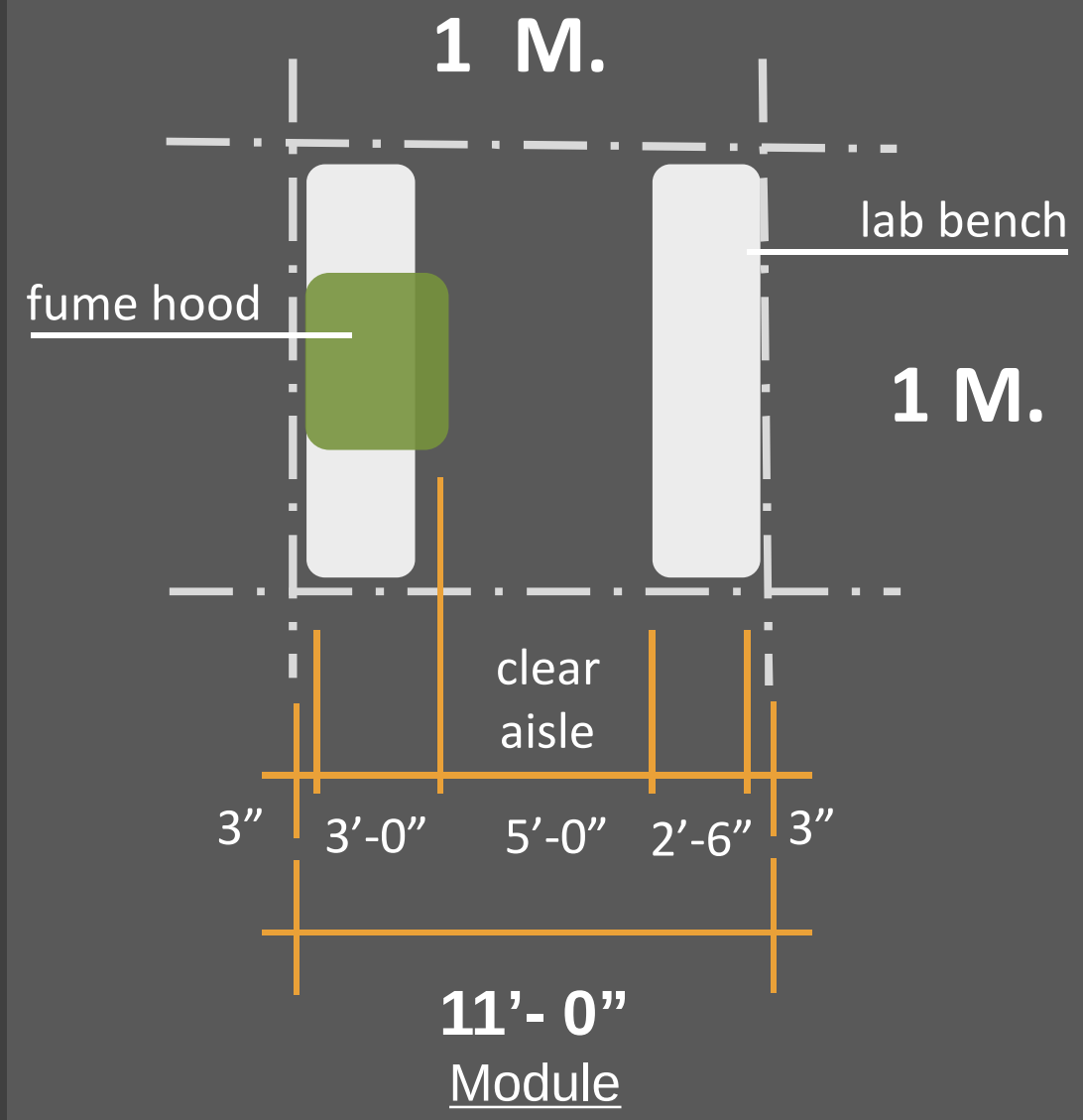
37,210 total

8

long-term flexibility

Long-term flexibility

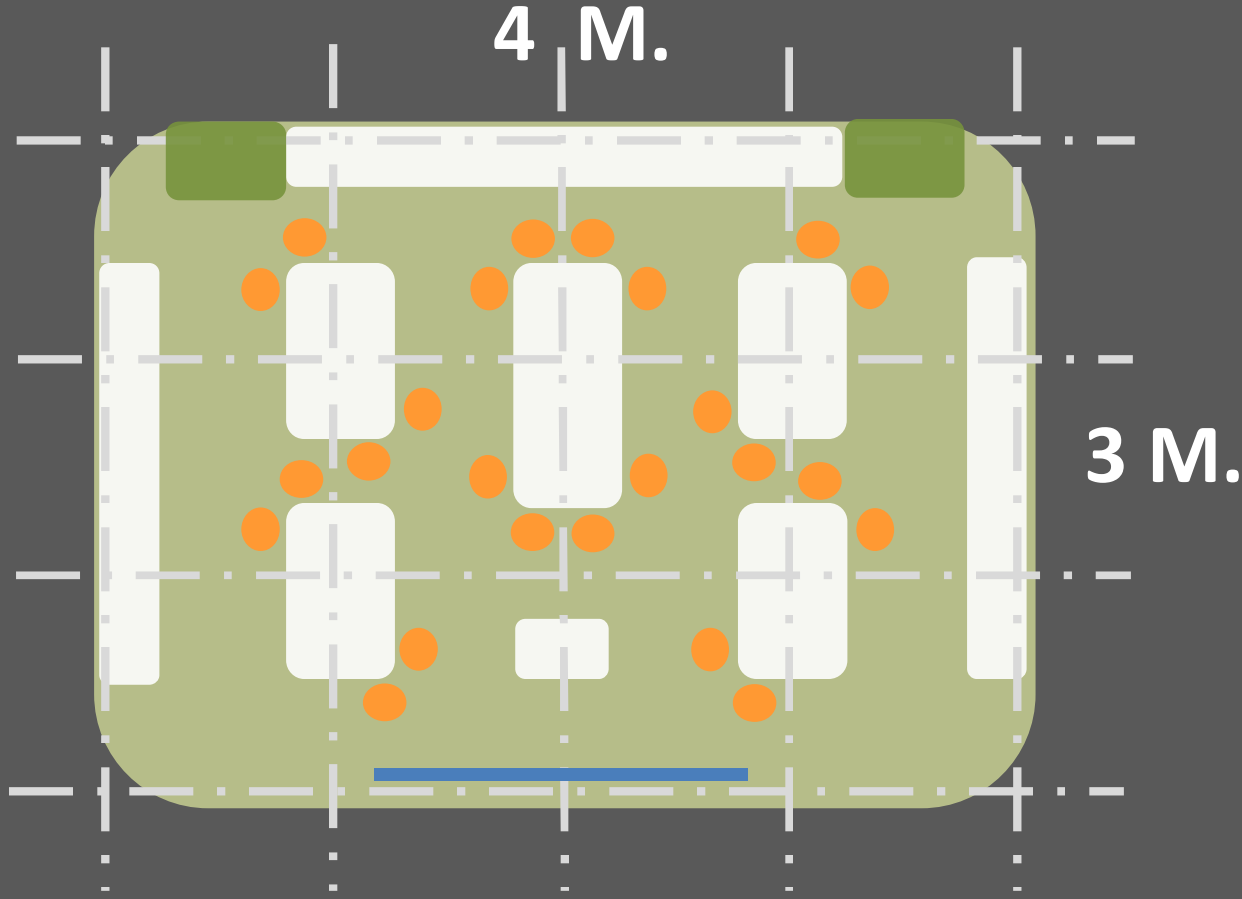
Modularity:



Long-term flexibility

Stanford Swing Lab

24 students in Biology



11’- 0” Module	**10’- 6”** Module	**10’- 0”** Module
44’ X 33’	42’ X 31’-6”	40’ X 30’
1,452 sf	**1,323** sf	**1,200** sf
	- 9 %	**- 18 %**

Savings:

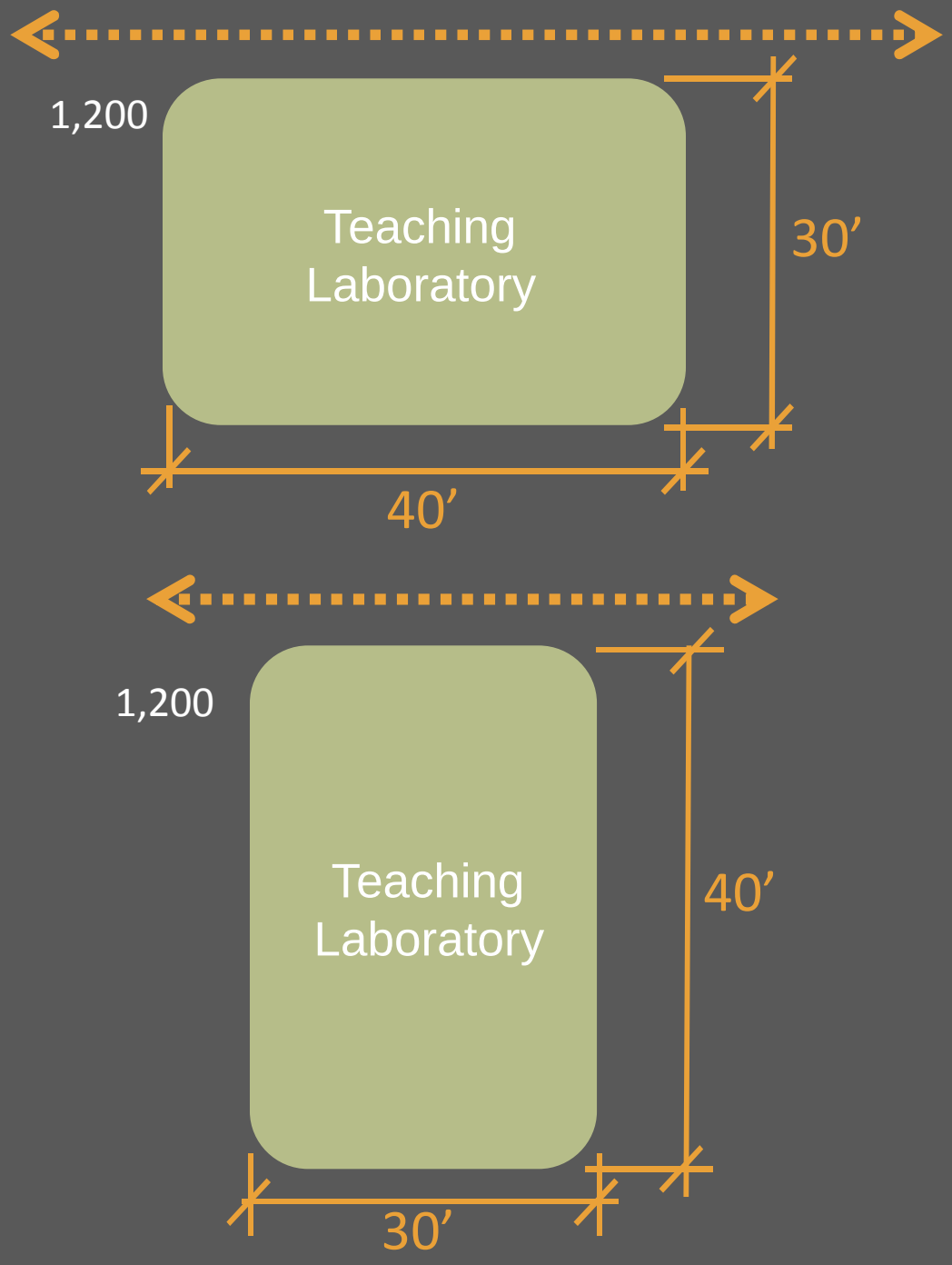
7

efficiency

Efficiency Strategies

40 foot Corridor:
10 feet wide =
400 sf

30 foot Corridor:
10 feet wide =
300 sf



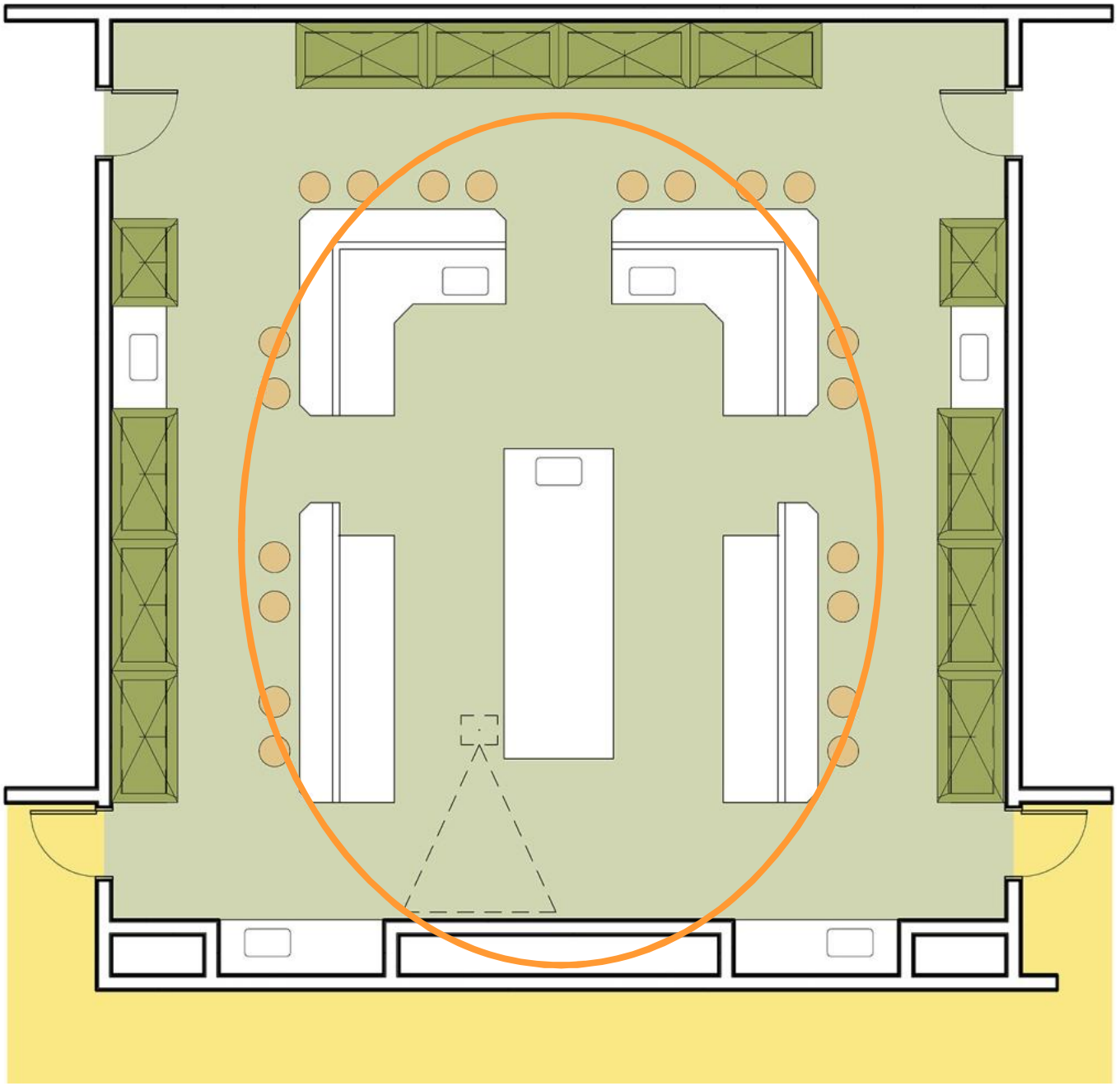
6

pedagogy

Pedagogy

Pedagogy

Pre-lab discussion **in** the lab



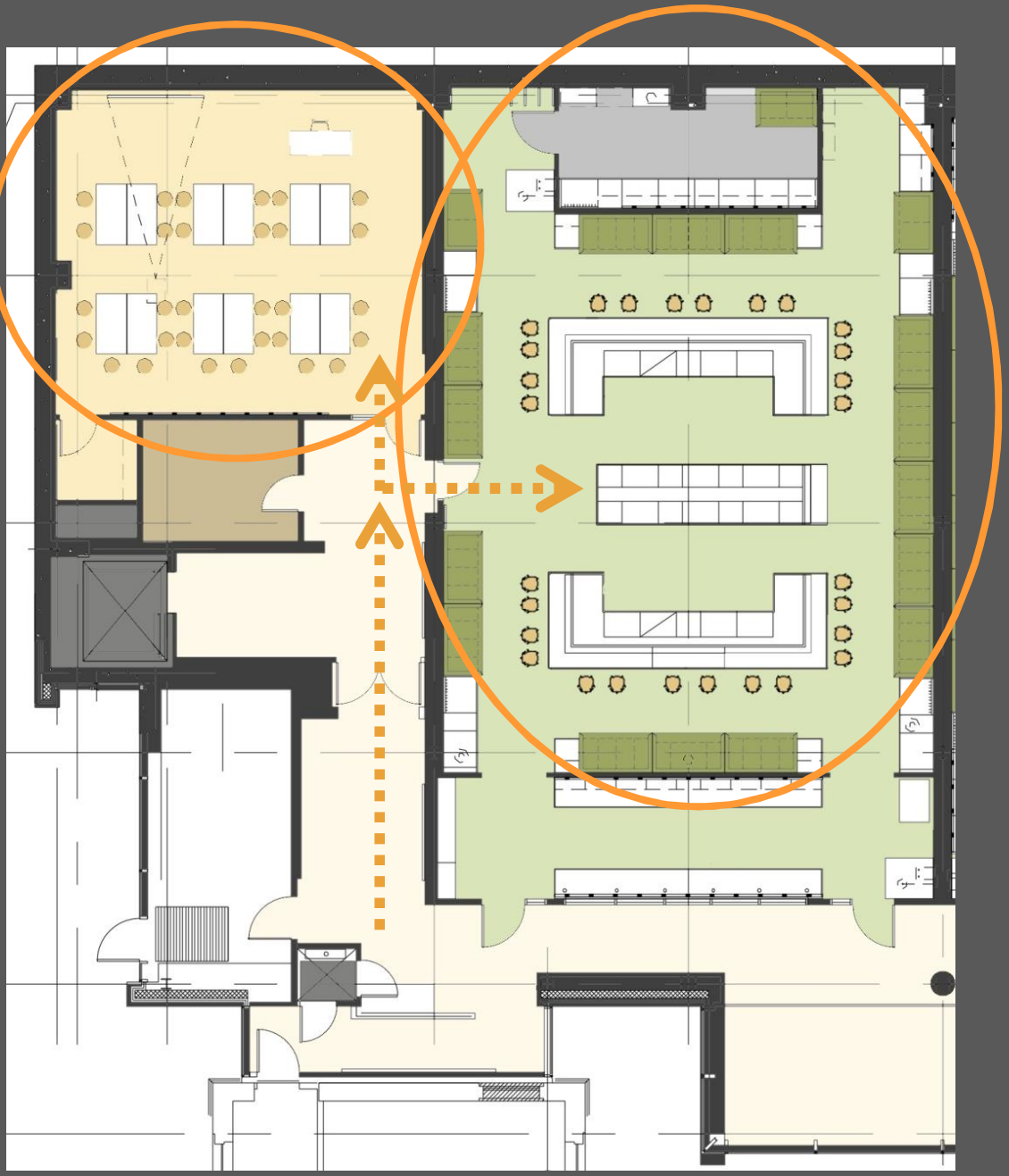
Pedagogy

Pre-lab discussion

not - in the lab

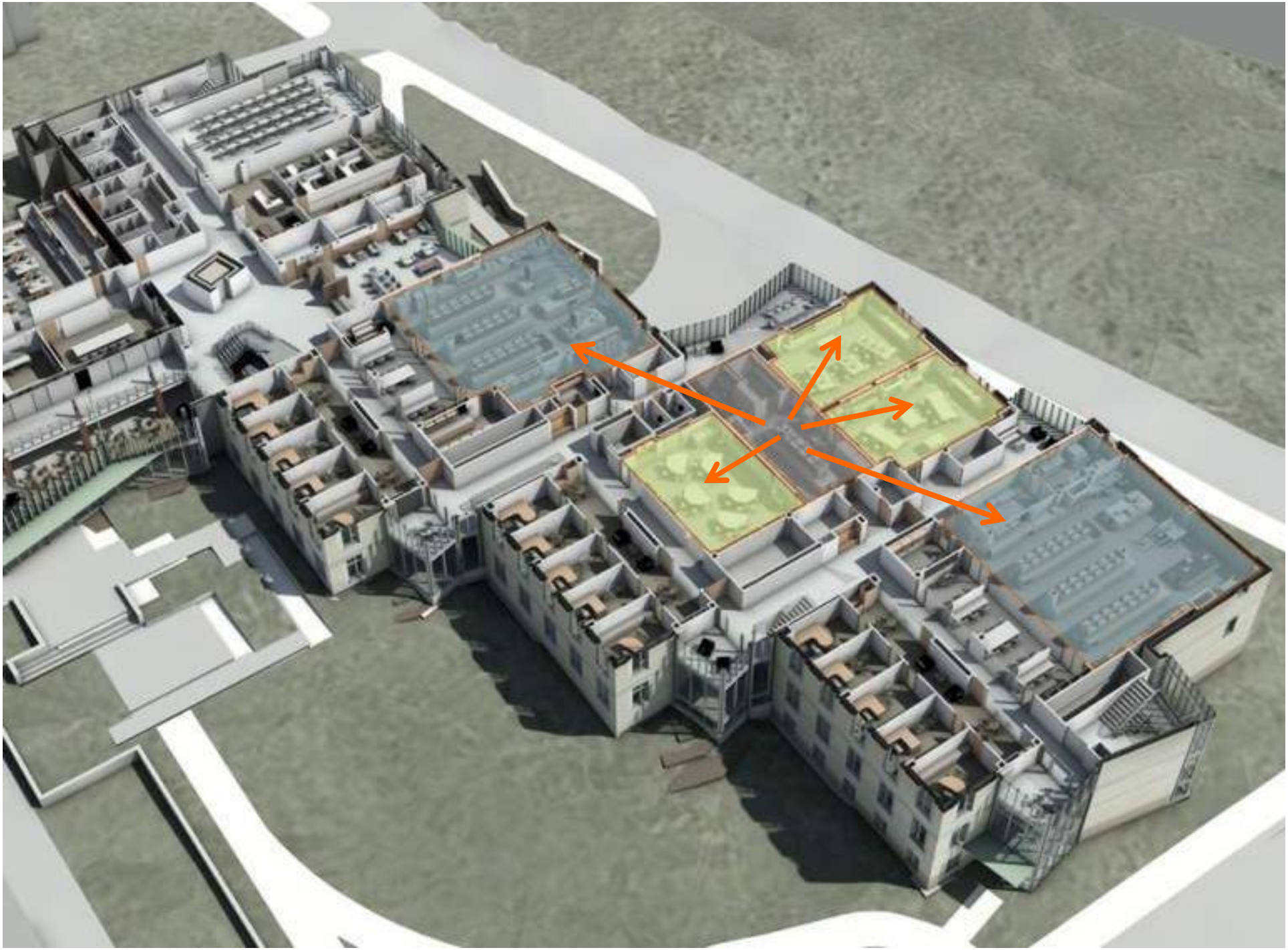
20 students
@
25 sf

500 sf



5

adjacency



4

Science on display

"One of the design features that I really love is the openness, I love the way I can walk down what we call 1st Avenue and look into the labs and see what is going on. You feel connected".

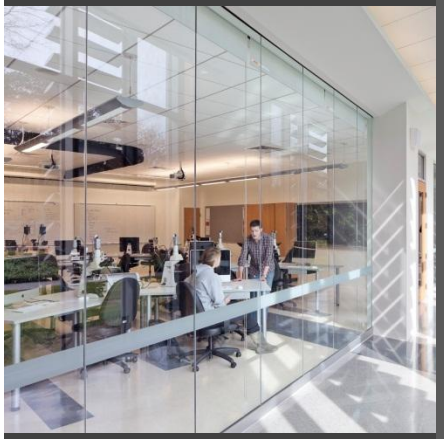
Ronald A. Crutcher
President, Wheaton College

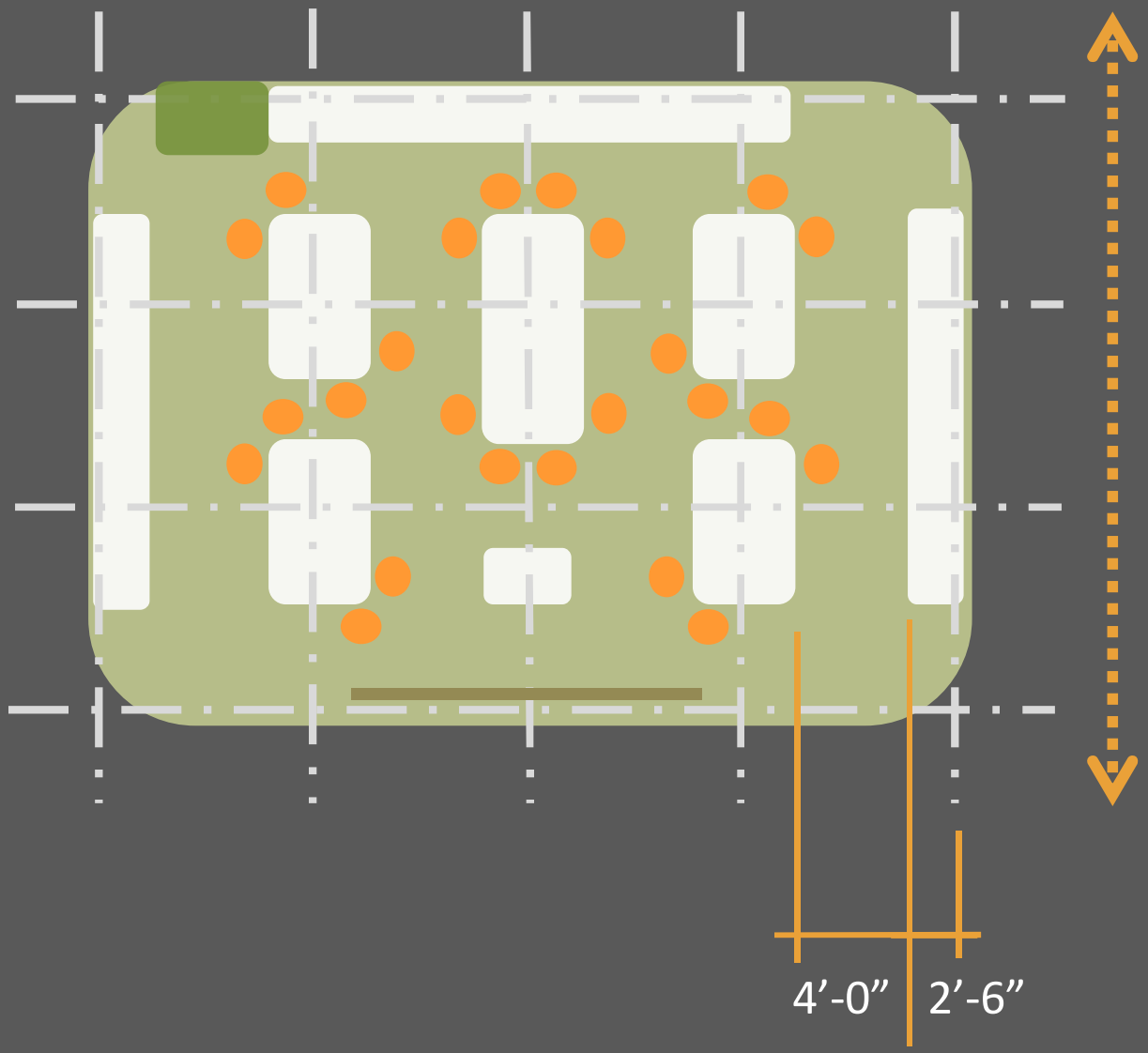
Visibility

Science on display

Stanford Swing Lab

24 students in Biology



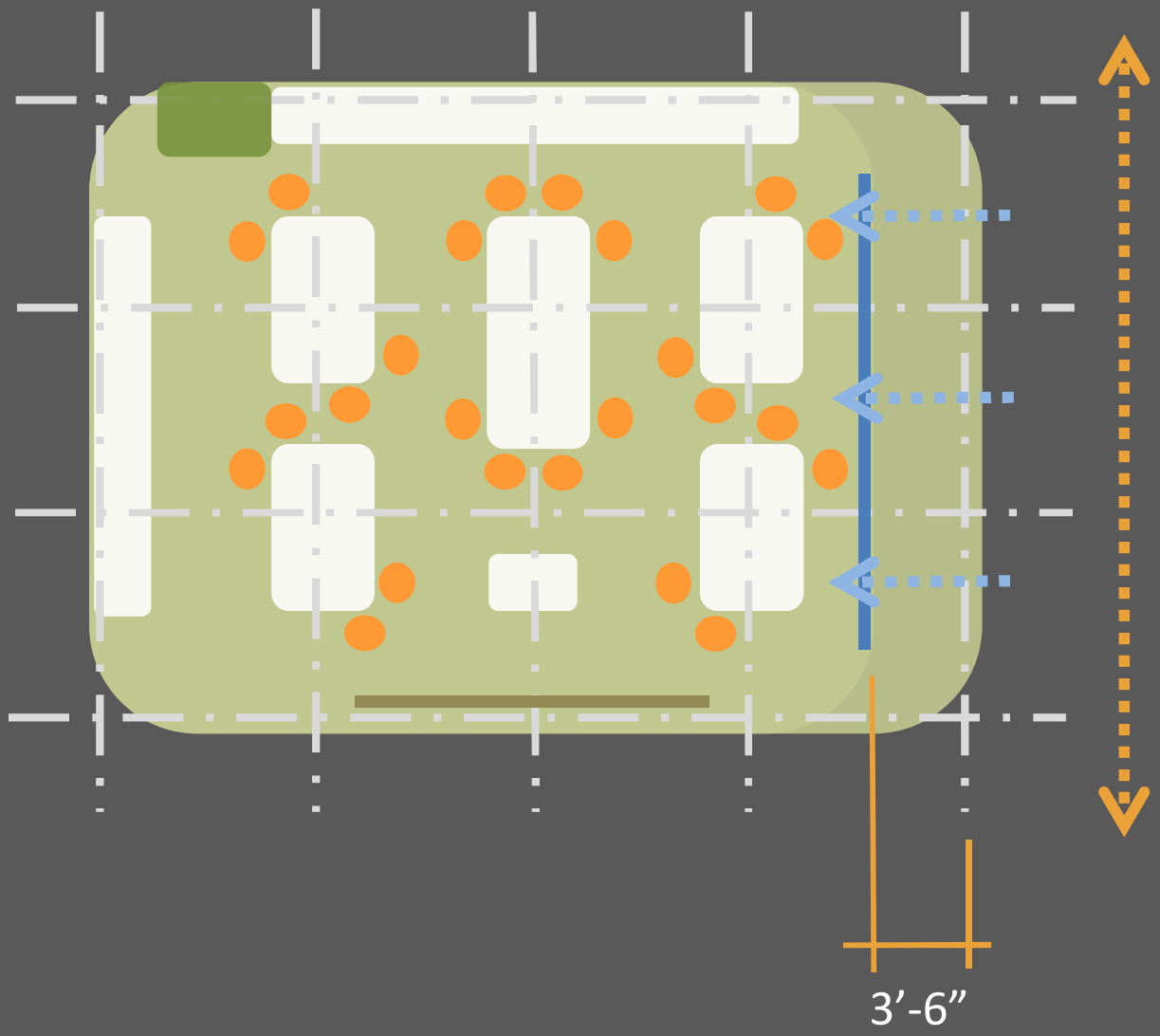


Visibility

Science on display

Stanford Swing Lab

24 students in Biology



Savings:

3’-6” X 30’

105 sf

- 9 %

3

daylight

Daylight

Rocky Mountain Institute
rmi.org

National Renewable Energy Laboratory
nrel.gov

- health
- attendance
- achievement
- safety

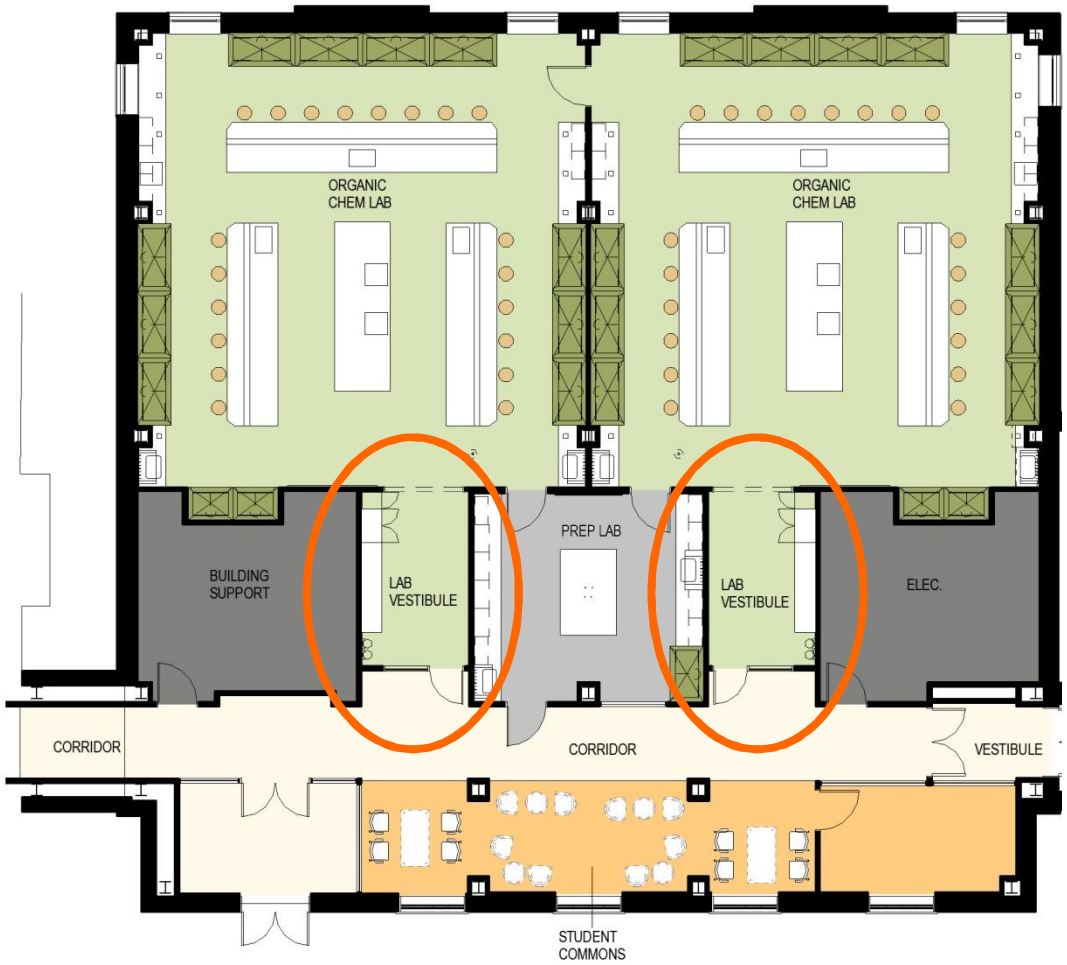
people like natural light

Daylight

2

safety

TCNJ – TEACHING LAB



1

???

the teaching lab of tomorrow

Goals:

10. multi-disciplinary
9. inter-disciplinary
8. long-term flexibility (module size?)
7. efficiency
6. pedagogy
5. adjacencies
4. visibility (science on display)
3. daylighting
2. safety
1. ???

The
Teaching
Lab
of
Tomorrow

Use program pieces to create an affordable and accessible STEM learning environment

Write your story – begin with your goals

You have 10 minutes….have fun!

step 1

The
Teaching
Lab
of
Tomorrow

Create … an affordable and accessible STEM
learning environment

with your goals in mind

Build your learning environment

You have 20 minutes….have more fun!

step 2

The
Teaching
Lab
of
Tomorrow

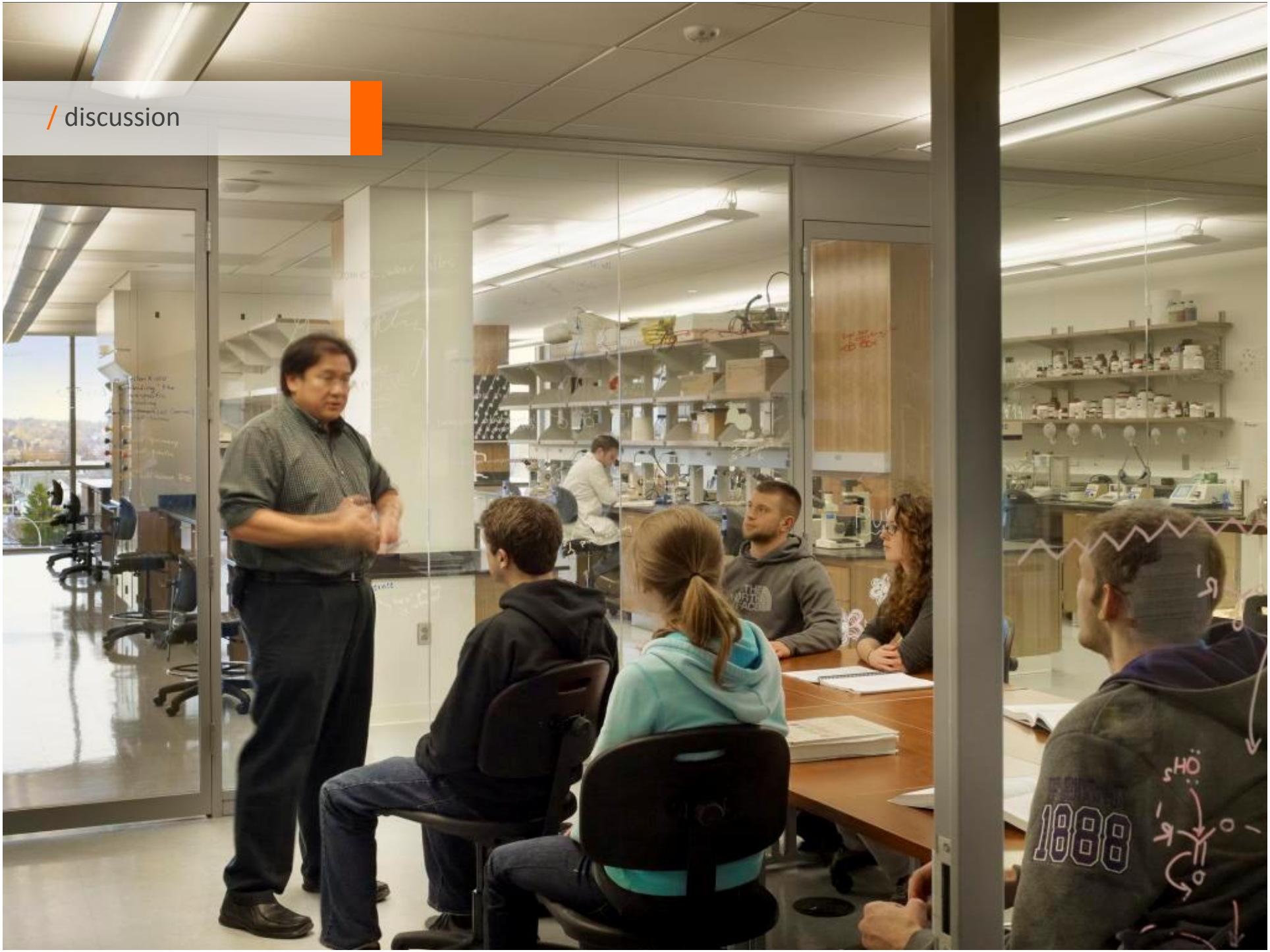
Create … an affordable and accessible STEM
learning environment

with your goals in mind

Share what you learned

step 3

/ discussion



The
Teaching
Lab
of
Tomorrow

participants

The
Teaching
Lab
of
Tomorrow

participants