

ADVANCED SPACE ANALYTICS:

A Paradigm Shift in M&O



DEBORAH WYLIE

Program Master Planning Director

Los Angeles Community College District / Cordoba Corporation
deborah.wylie@build-laccd.org



ROB BARTHELMAN

Partner / CIO / Planner

Steinberg Hart
rbarthelman@steinberghart.com



COURSE DESCRIPTION

Amid higher education uncertainties, our exploration of space utilization becomes even more vital. This interactive session goes beyond theory, exploring tangible M&O efficiencies. We'll engage in discussions of collaborative planning, schedule optimization, ensuring spaces are right-sized, and we will seek to unlock the myriad benefits that come with strategic space use and assignment.

AGENDA

- Description and Learning Outcomes
- Key Terms and Definitions
- Why Space Utilization Matters
- Positive Effects on Facilities M&O
- Case Studies and Examples
- Suggested / Best Practices



Credit(s) earned on completion of this course will be reported to American Institute of Architects (AIA) Continuing Education Session (CES) for AIA members.

Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions to specific materials, methods or services will be addressed at the conclusion of this presentation.

LEARNING OBJECTIVES

Today, we look forward to achieving the following objectives:

Four Areas of Focus

1. Acquisition of key terminology utilized in the context of studying space utilization.
2. Understanding the importance of efficient space utilization in educational facilities for enhancing learning quality, reducing costs, improving productivity, and contributing to sustainability/carbon reduction.
3. Appreciating the benefits of optimized space utilization on maintenance and operations, encompassing heightened collaboration, reduced costs, planning, and informed decision-making.
4. Analyzing real-world case studies and examples to gain insights into successful strategies for improving space utilization, along with practical best practices such as flexible layouts, collaboration zones, technology integration, and regular assessments to optimize space usage effectively.

ADVANCED SPACE ANALYTICS

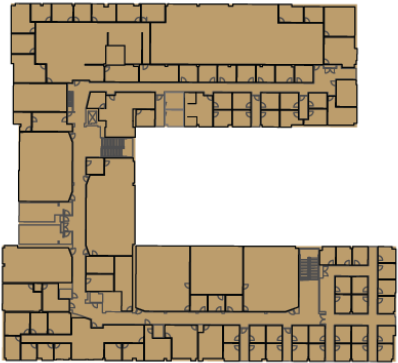
Key Terms & Definitions

ASSIGNABLE SQUARE FOOTAGE (ASF)



Usable square footage within a given space (measured from finished wall to finished wall). For example, the ASF of a 10' x 10' room is 100 ASF.

GROSS SQUARE FOOTAGE (GSF)



Total area of a building enclosed by the exterior face of the perimeter walls, including space that is not used such as wall thicknesses and vertical penetrations.

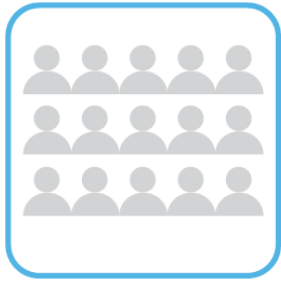
ADVANCED SPACE ANALYTICS

Key Terms & Definitions

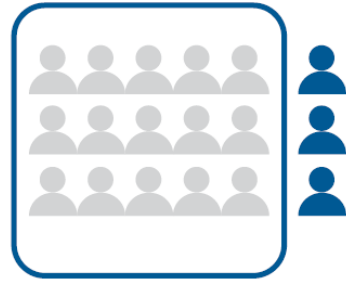
CAP-LOADS (All Classrooms & Labs)



LOW USE
Over 100% cap/load
overbuilt



RIGHT USE
At 100% cap/load



HIGH USE
Under 100% cap/load
under-built

Capacity Load Ratio Calculation

$$\text{Capacity Load} = \frac{\text{Current Capacity}}{\text{Enrollment Level (load)}} \times 100$$

ADVANCED SPACE ANALYTICS

Key Terms & Definitions

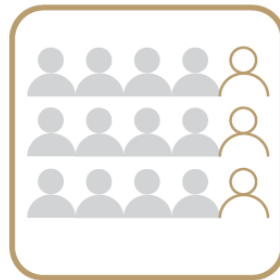
STATION OCCUPANCY BY CLASS RM/ LAB

Example:

12 Students in 15 Stations

$$= (12 / 15) \times 100$$
$$= 80\% \text{ Occupancy}$$

Measure this against desired standard; California requires 66% for classrooms and 85% for labs.



Class Room #	Station Occupancy
232	-
236	40%
325	-
102	78%
105	64%
133	83%
136	91%
200B	109%
203	91%
222	53%
232	74%
233	64%
250	58%
302	62%
320	83%

The % of stations that are occupied by students when the rooms are in use.

ADVANCED SPACE ANALYTICS

Key Terms & Definitions

AVERAGE WEEKLY ROOM HOURS (BY BLDG)

Example:

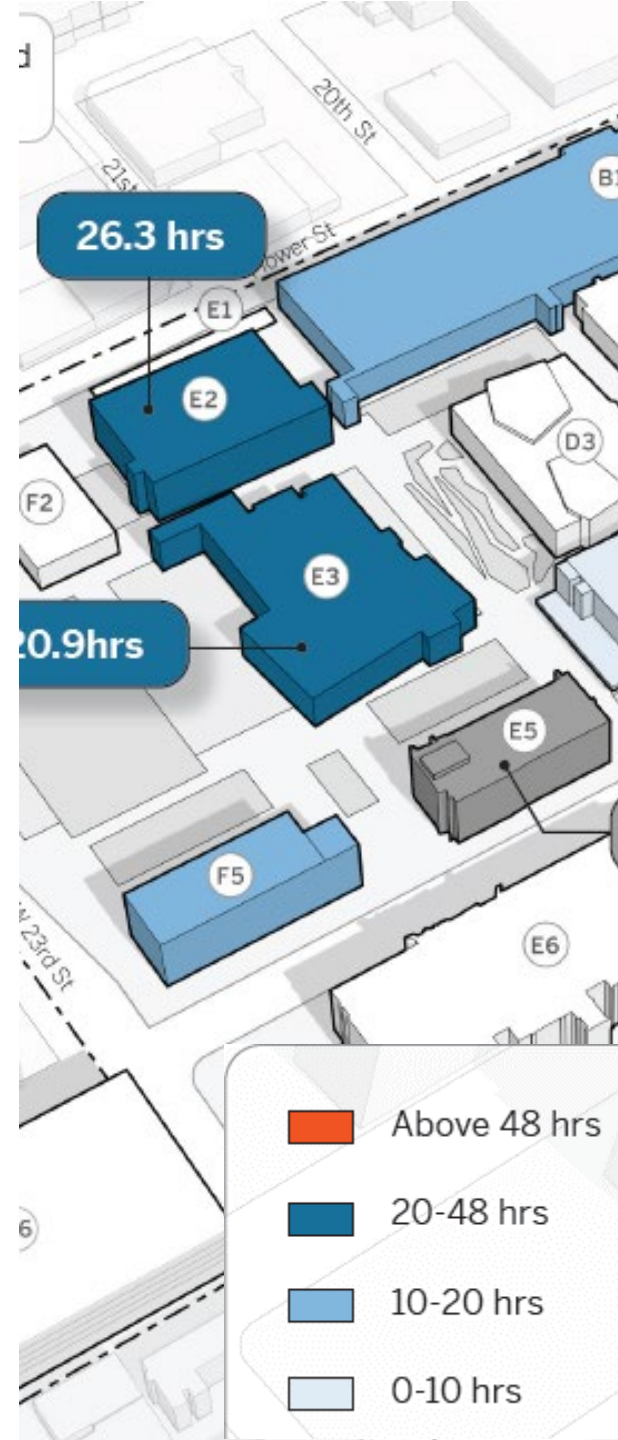
Total hours of use across all rooms,
divided by # of rooms.

= 368.8 hours / 14 rooms

= 26.3 WRH

Measured against California standards of:

- 48 hours for classrooms
- 27.5 hours for labs.



The number of hours that a building is used for instructional activities each week.

ADVANCED SPACE ANALYTICS

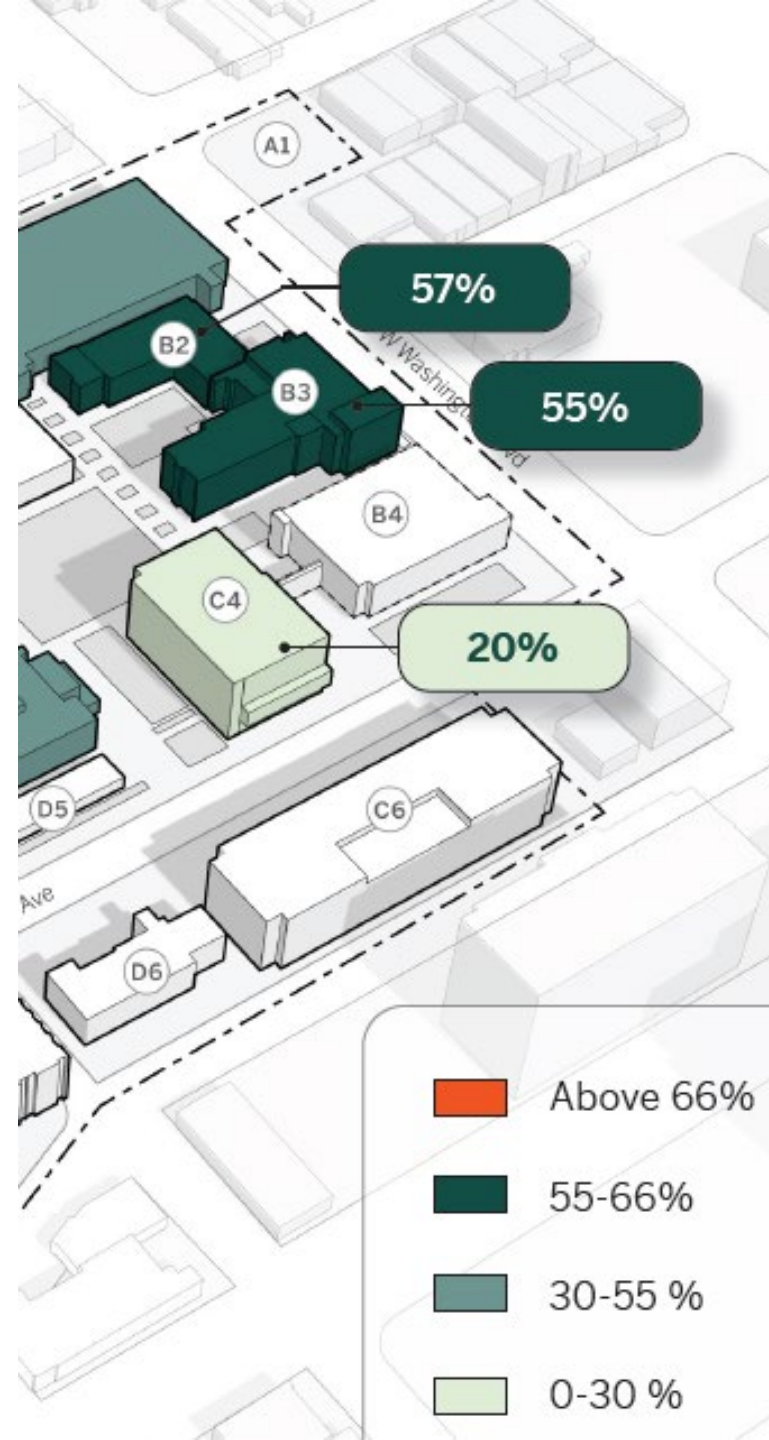
Key Terms & Definitions

STATION OCCUPANCY BY BUILDING

Example:

Enrollment Headcount in all labs & classrooms, divided by # stations.

Measure this against desired standard; California requires 66% for classrooms and 85% for labs.



The % of all stations that are occupied by students when the building is in use.

ADVANCED SPACE ANALYTICS:

The Impact on Maintenance & Operations

Space Utilization Matters

- **Quality of Learning**
 - Appropriate size, furniture, and technology to intended use, course, modalities
- **Productivity**
 - Simplicity in room & technology use, ease in scheduling, adaptability & flexibility
- **Cost Efficiency**
 - Cleaning, maintenance, Energy
- **Environmental Impacts**
 - Electrical and HVAC usage, Carbon Impacts



ADVANCED SPACE ANALYTICS:

The Impact on Maintenance & Operations: Los Angeles CCD Custodial Zoning

Project: Los Angeles
Scheme: (S137_86) Los Angeles Mission College

Navigation

- Label Style
- AA
- Snap OFF
- Constrain OFF
- Ortho Edit ON
- Grid OFF
- Scale FT
- Dimension OFF
- Full Zoom (F)

Views+Data

- Edit ON
- Add Objects
- Shape (H) ON
- Move (D) ON
- Rotate (R)
- Marquee (M)
- Copy (C)
- Cut (X)
- Paste (V)
- Undo (Z)
- Redo (Sh-Z)
- Save (S)
- Print (P)

Floor Views + Data

Component view

All (dynamic)

Label setting

Add attribute to space label

None

Spaces color coding

Zones Custodial

None		+	-
Zone A		+	-
Zone B		+	-
Zone C		+	-
Zone D		+	-
Zone E		+	-

Components color coding

None

Background image setting

Show YES

Slab Space Component Label

ADVANCED SPACE ANALYTICS:

The Impact on Maintenance & Operations: Los Angeles CCD

dabblefox

🔍 dabbleADMIN
👤 dabbleCUSTODIAN
🔍 dabbleQC
📦 dabbleSHELF
🏠 dabbleSPACE
🗺️ dabbleFLOORPLAN
🔧 dabbleEDITOR
📌 dabbleSETUP

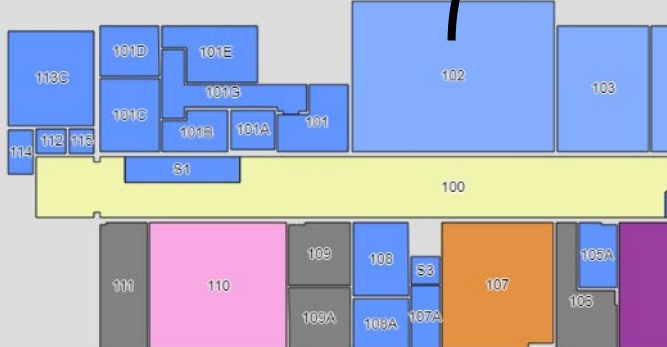
- Home
- Room Details
- Custodians
- Zones
- Reporter
- Sites
- Buildings
- Rooms
- Scenarios
- Settings

Scenario Settings: LACC Default - 2021/05/07 - LA City College

SUMMARY

+
-

Toggle Select Visible



	Level 1	Level 2	Level 3	Level 4	Level 5
1_ROUTINE					
Clean chalkboards and trays (Classroom with Hard Floor)	Daily	Daily	Daily	EO Day	EO Day
Empty waste containers (Classroom with Hard Floor)	Daily	Daily	Daily	EO Day	EO Day
Sweep, dust-mop floor / Straighten Furniture (Classroom with Hard Floor)	Daily	Daily	EO Day	EO Day	EO Day
Clean erasers (Classroom with Hard Floor)	Daily	Daily	Daily	EO Day	EO Day
Damp-mop, sanitize floors (Classroom with Hard Floor)	Daily	Monthly	Monthly	Twice Yearly	---
_Report Maintenance Issues (LACCD Note)	EO Day	Daily	Daily	Daily	Daily
_Turn Off Lights/Lock Door (LACCD - Note)	Daily	Daily	Daily	Daily	Daily
_Close/Lock Windows, Doors, Turn-Off Lights (Typical)	Daily	Daily	Daily	Daily	Daily
Clean, Sanitize, Disinfect High-Touch Surfaces (High-Touch Spaces)	Daily	Daily	Daily	EO Day	EO Day

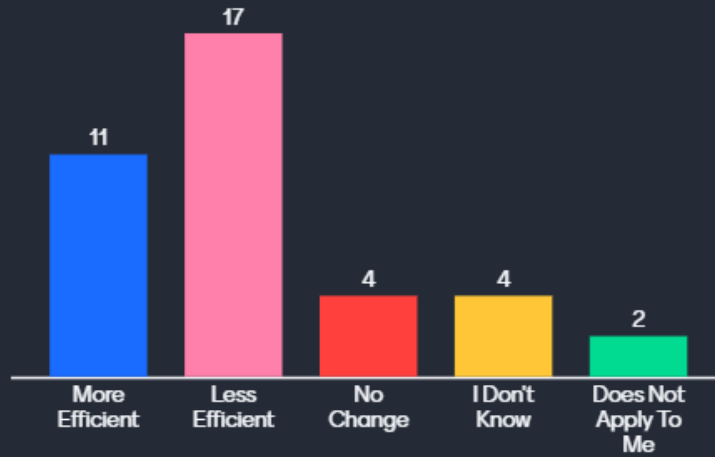
Super Admin

LACCD

Help



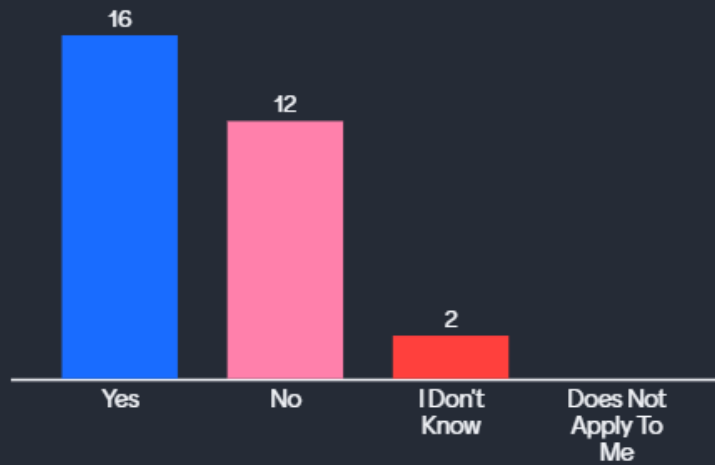
Following the Pandemic, Is your Maintenance & Operations More or Less Efficient?



38

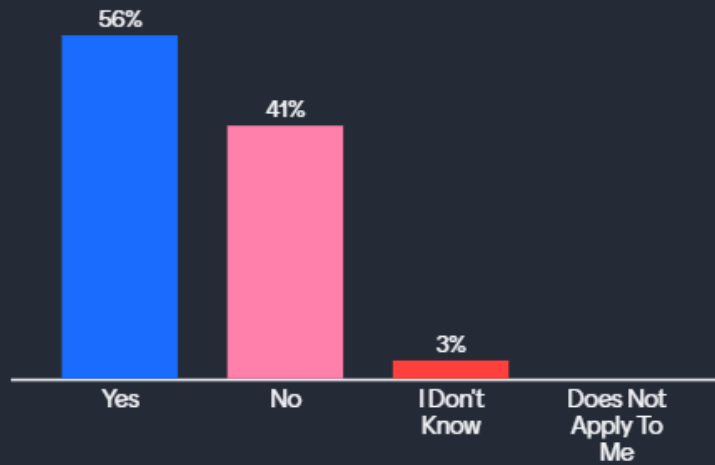


Has Space Use Analysis Been a Part of Your Understanding your M&O Efficiencies?



30

Has Virtual/Remote Learning Affected Your Approach to Maintenance & Operations?



34



If YES... In What Ways Had Virtual/Remote Learning Affected Your Maintenance & Operations?

5 responses

flexibility

inconsistent data

less pressure on om

scaled back in some areas

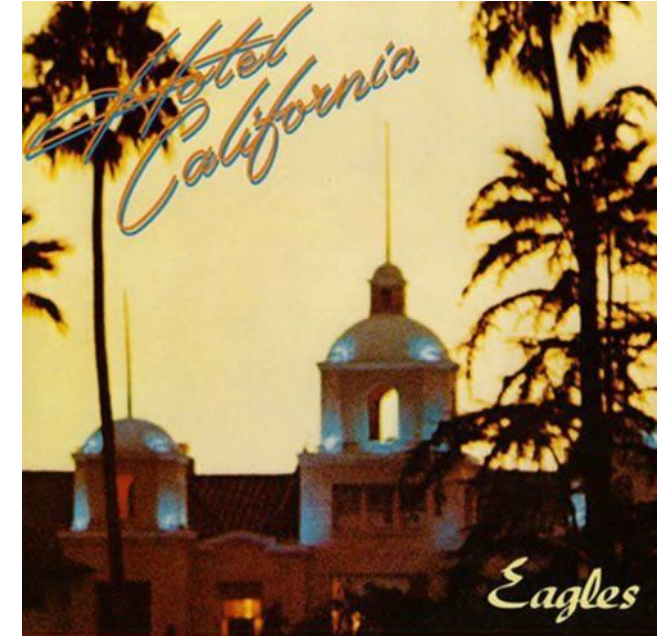
reality of work on site



California State University Channel Islands



Formerly Camarillo State Mental Hospital



LOS ANGELES COMMUNITY COLLEGE DISTRICT (LACCD)

Context

- 9 Colleges, 2 satellites
- 200,000 students
- Previous bonds replaced aging facilities
- Focus now on renovation and sustainability



EVERYTHING
EVERYWHERE
ALL AT ONCE

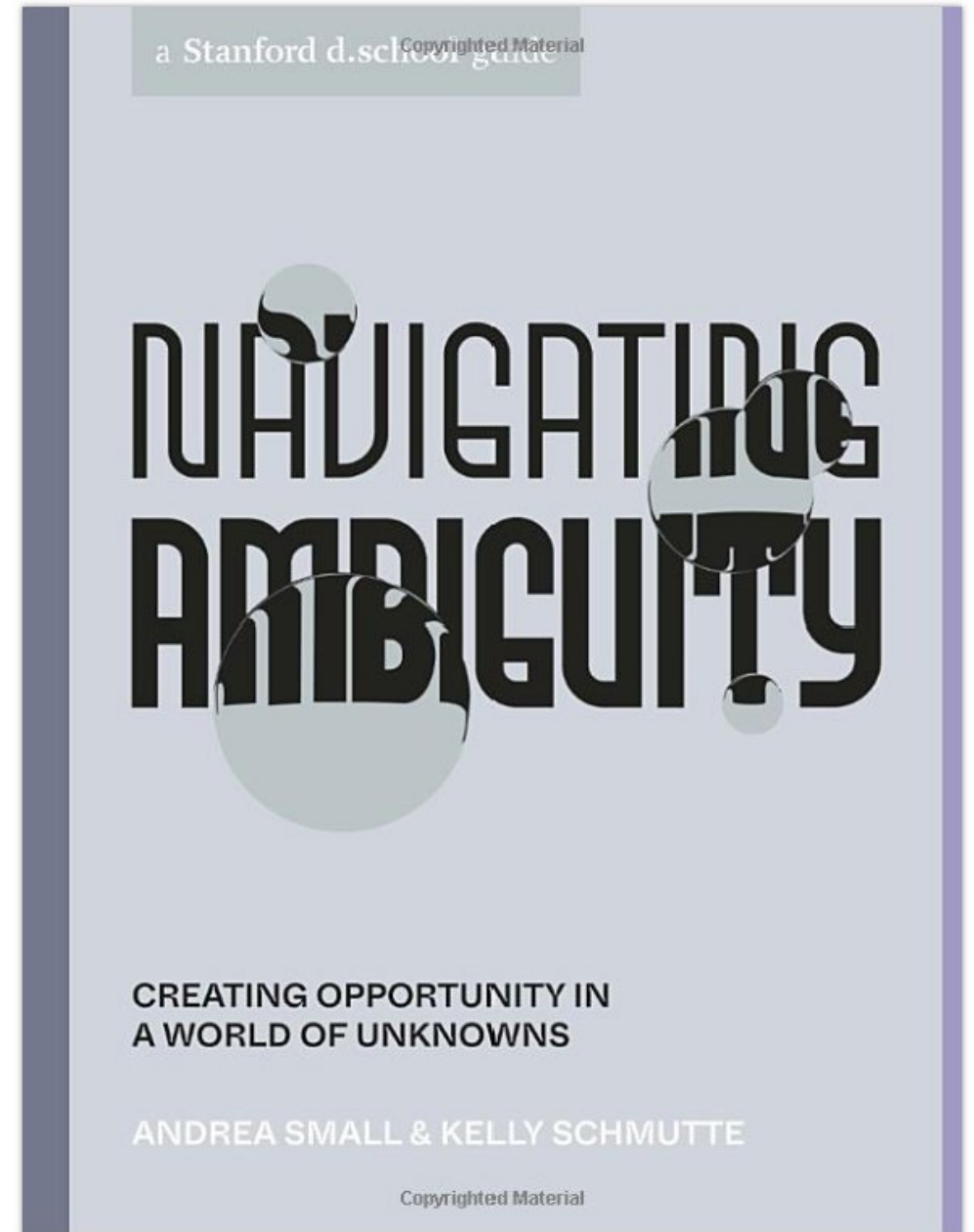


LOS ANGELES COMMUNITY COLLEGE DISTRICT (LACCD)

- Enrollment uncertainty
- In-person uncertainty

- Designing for future flexibility
- Designing to draw students to campus...to stay on campus

- Within existing resources and facilities
- Leveraged for stewardship



MEASURE LA – Scoping & Sizing the Bond



FOCUS

- Pre-1970s Buildings
- Infrastructure
- Technology
- Sustainability
- Athletic Facilities
- Specific College Needs
- Student Housing

Pre-1970s Buildings

- Begin with data
- Trust, but verify
- Study and assess
- Renovation over replacement

Sustainability

- Carbon free power by 2030
- Carbon free by 2040

Housing

- Use bonds to fund capital construction enabling affordable rents

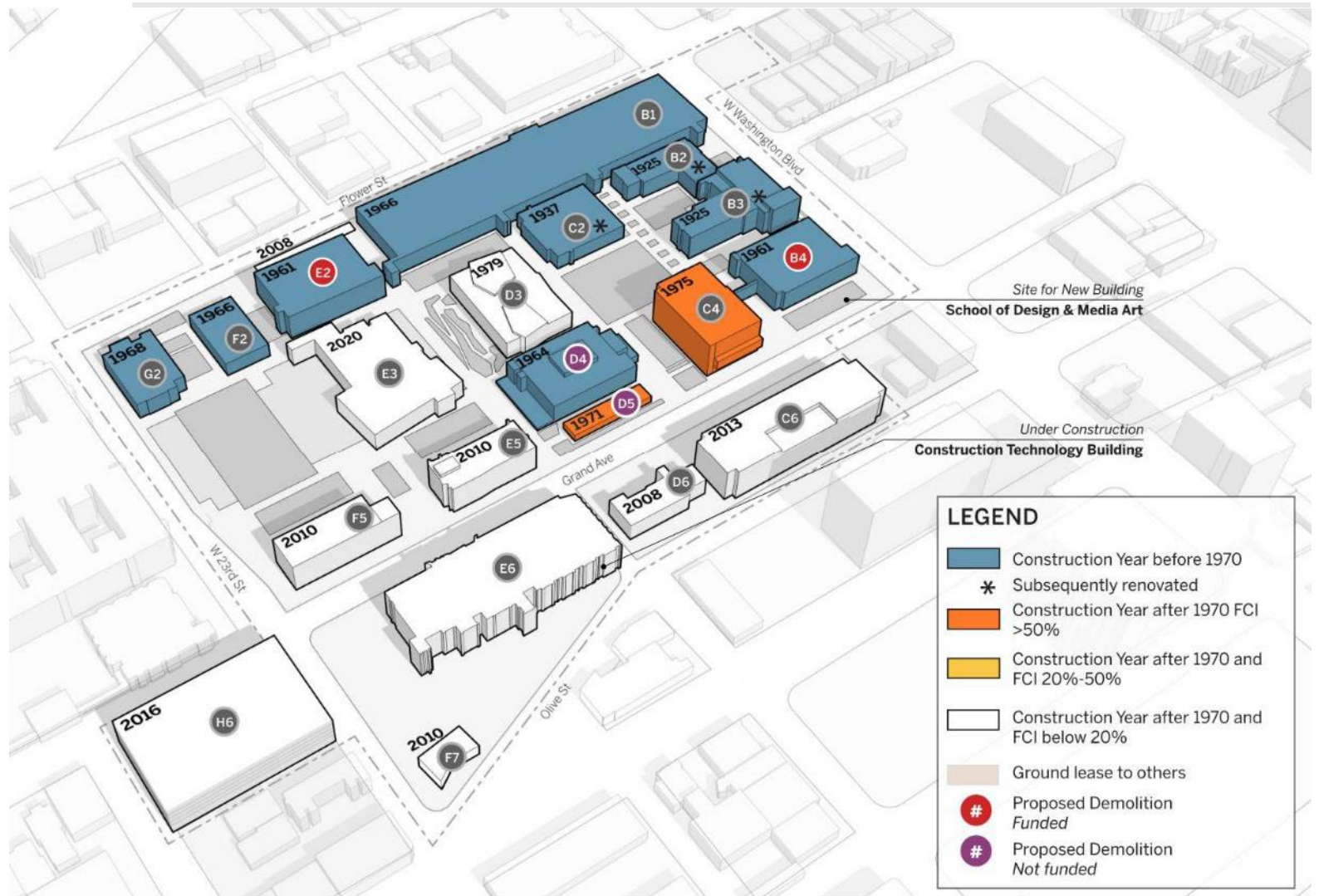
INFRASTRUCTURE

At Any Scale, Efficiency Matters

Utilities in Miles							
College	Hydronic Lines	Domestic/ Fire Water	Sewer/ Storm Water	Central Plant Chillers	Natural Gas	Electrical Distribution & Service	Telecom
East Los Angeles College	20.6 Miles	13.5 Miles	19.9 Miles	2,453 TON	3.6 Miles	12.5 Miles	4.9 Miles
City College	12.2 Miles	5.9 Miles	12.5 Miles	1,000 TON	3.6 Miles	7.1 Miles	3.7 Miles
Harbor College	3.5 Miles	7.6 Miles	11.4 Miles	1,831 TON	1.8 Miles	13.1 Miles	4.9 Miles
Mission College	2.2 Miles	4.8 Miles	9.5 Miles	1,200 TON	1.5 Miles	9.3 Miles	3.4 Miles
Pierce College	4.4 Miles	20.1 Miles	38.6 Miles	1,770 TON	5.1 Miles	28.7 Miles	5.6 Miles
Southwest College	3.1 Miles	7.1 Miles	13.9 Miles	1,820 TON	1.7 Miles	13.2 Miles	4.1 Miles
Trade-Tech College	0.7 Miles	6.5 Miles	9.2 Miles	NA	1.7 Miles	5.6 Miles	1.6 Miles
Valley College	4.8 Miles	7.2 Miles	15.7 Miles	750 TON	5.2 Miles	19.0 Miles	7.7 Miles
West Los Angeles	2.3 Miles	5.3 Miles	16.9 Miles	1,560 TON	2.1 Miles	11.7 Miles	4.3 Miles
	53.9 Miles	78.0 Miles	147.6 Miles	12,384 TON	26.2 Miles	120.3 Miles	40.3 Miles

BUILDING RENEWAL STUDIES

- **Stage 1 Assessment** - Review building condition and overall program needs
- **Stage 2 Pre-Programming Study** - including forensic testing; recommendation for renovation and cost estimate, including secondary effects
- **Stage 3 Program/PPC** - Prepare recommended project for Design-Build team
- 46 Buildings across 9 campuses...**all at once**
- Determine direction, scope, swing/surge, phasing



LA TRADE-TECH

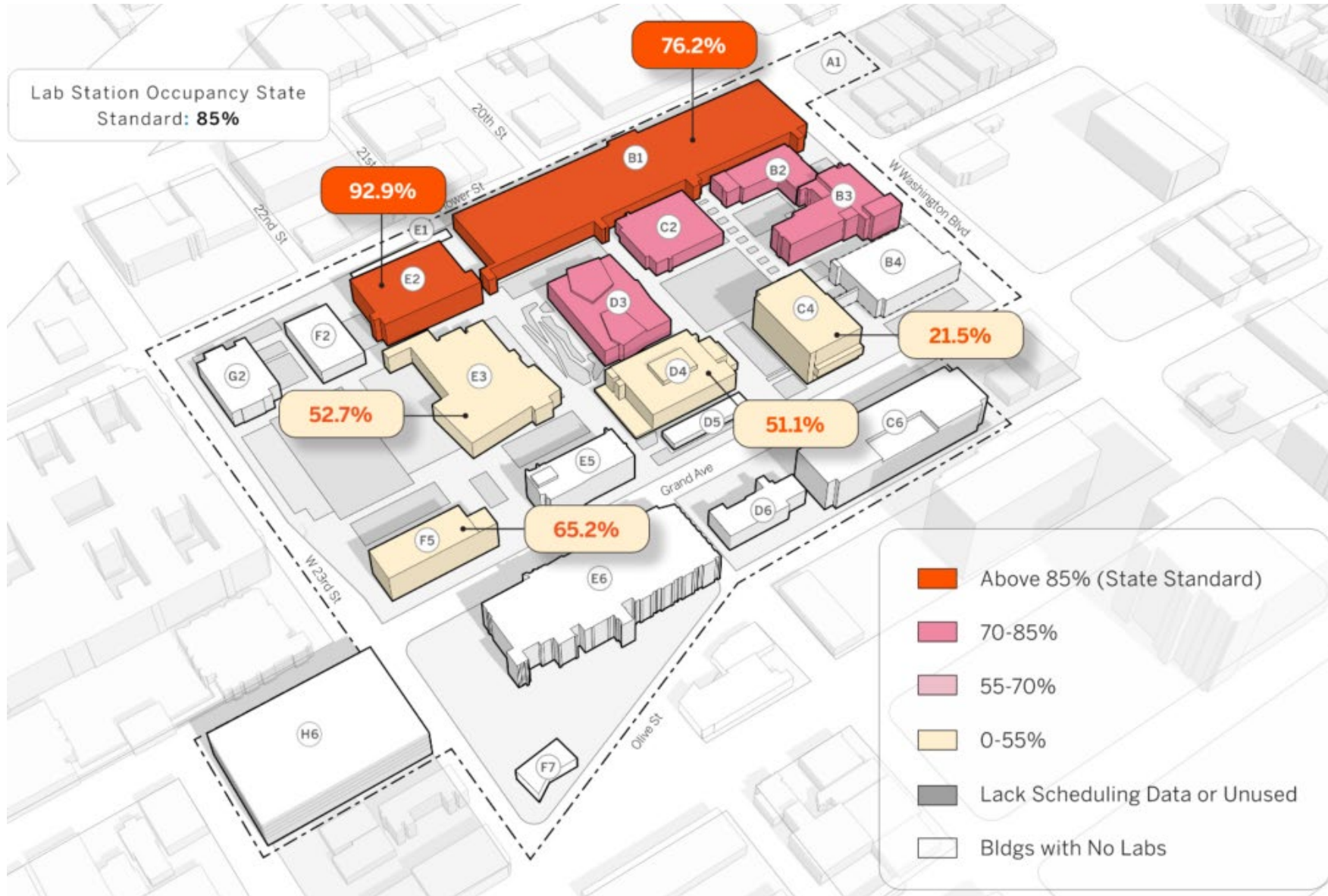
Weekly Room Hours by Building



Bldg #	Weekly Bldg Hrs	Number of Labs	WRH
B1	588.8	36	16.4
B2	288.6	8	36.1
B3	20.5	4	5.1
C2	56.1	5	11.2
C4	313.4	15	20.9
D3	39.1	1	39.1
D4	381.9	22	17.4
E2	322.8	17	19.0
E3	143.9	5	28.8
E5	-	0	-
F5	3.1	1	3.1
G2	-	0	-

LA TRADE-TECH

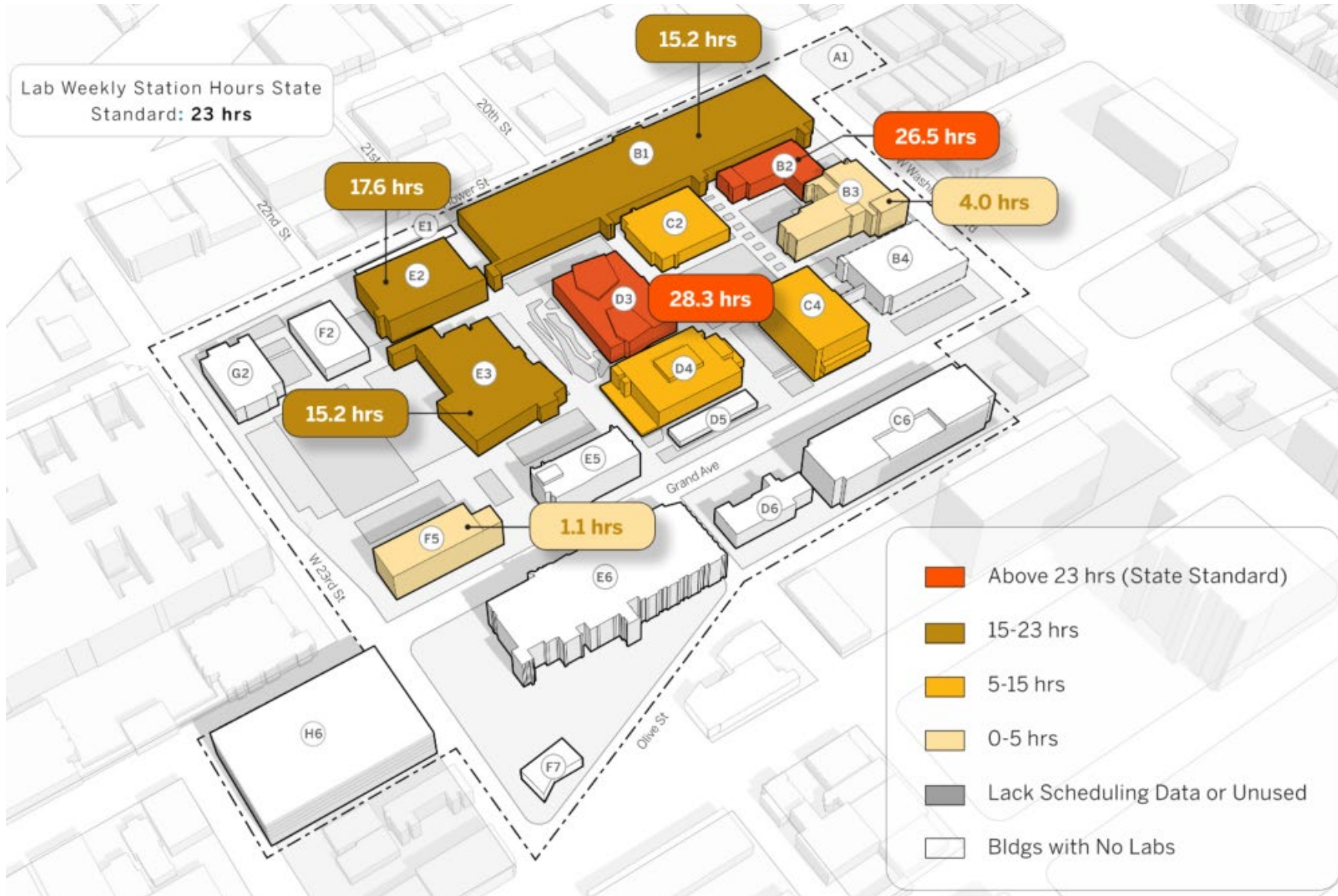
Station Occupancy by Building



Bldg #	Average Station Count	Median Station Occupancy %
B1	32	92.9%
B2	34	73.5%
B3	16	77.8%
C2	39	76.5%
C4	33	50.0%
D3	26	72.3%
D4	38	51.1%
E2	25	92.9%
E3	44	52.7%
E5	-	-
F5	40	35.0%
G2	-	-

LA TRADE-TECH

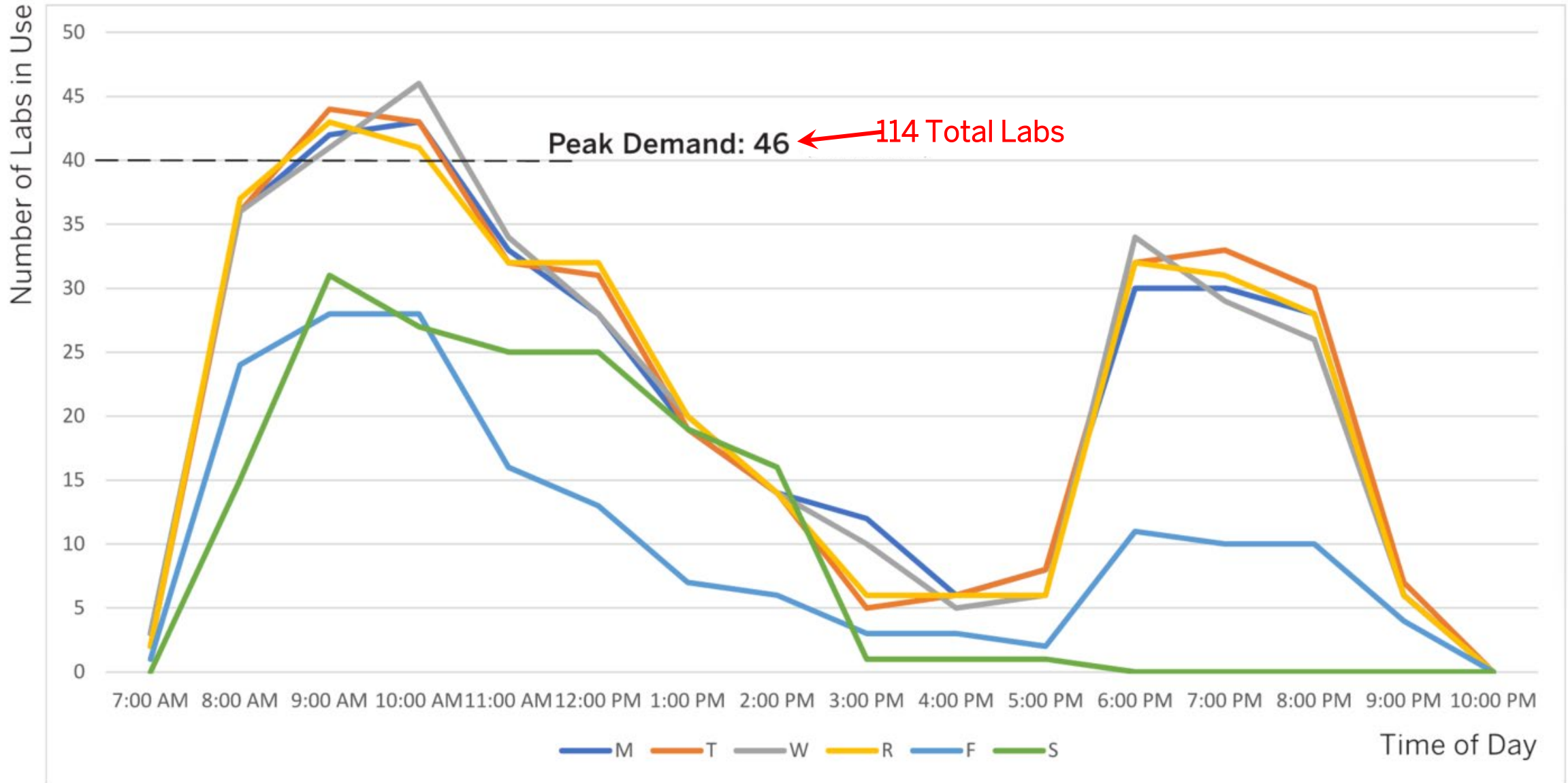
Weekly Station Hours by Building



Bldg #	WRH	Median Station Occupancy	Weekly Station Hours
B1	16.4	92.9%	15.2
B2	36.1	73.5%	26.5
B3	5.1	77.8%	4.0
C2	11.2	76.5%	8.6
C4	20.9	50.0%	10.4
D3	39.1	72.3%	28.3
D4	17.4	51.1%	8.9
E2	19.0	92.9%	17.6
E3	28.8	52.7%	15.2
E5	-	-	-
F5	3.1	35.0%	1.1
G2	-	-	-

LA TRADE-TECH

Lab Use by Hour of Day



...and What About Remote?

COLLEGE	Remote		Hybrid		In-Person		Total				Remote Classes	Classes In-Person + Hybrid	Seats In-Person + Hybrid
	Class Count	%Fill	Class Count	%Fill	Class Count	%Fill	Class Count	%Fill	%Classes in Person	%Seats in Person			
ELAC	823	87%	192	60%	1,011	52%	2,026	69%	50%	44%	41%	59%	54%
LACC	528	69%	92	58%	458	53%	1,078	62%	43%	35%	49%	51%	43%
LAHC	300	70%	10	83%	261	55%	571	64%	46%	38%	53%	48%	40%
LAMC	382	73%	38	54%	263	53%	683	66%	39%	32%	56%	44%	37%
LAPC	687	84%	95	74%	645	68%	1,427	77%	45%	40%	48%	52%	45%
LASC	263	66%	32	46%	116	40%	411	57%	28%	29%	64%	36%	36%
LATTC	302	72%	66	49%	759	64%	1,127	65%	67%	63%	27%	73%	70%
LAVC	660	77%	136	56%	536	46%	1,332	63%	40%	36%	50%	51%	46%
WLAC	398	65%	60	58%	234	52%	692	61%	34%	31%	58%	43%	39%
TOTAL	4,343	76%	721	59%	4,283	55%	9,347	66%	46%	40%	47%	54%	48%
	46.5%		7.7%		45.8%		100.0%						

Credit Classes Spring 2024 (data as of 1/30/24)



ADVANCED SPACE ANALYTICS

Data Sources

Data Sources and References

- Space Use / Re-Use
 - Institution's Scheduling System Data, Spatial Data
- Data Sources: Space Use
 - Standards, Assumptions, and Best Practices
- Data Sources: Maintenance
 - Industry Standards, Manufacturers, Historic Processes
- Planning For Funding
 - Objective, Data-rich Planning, Supportable Solutions
- Hurdles to Achieving Desired Efficiencies
 - Outdated Systems Data, Time Commitment, Others?



ADVANCED SPACE ANALYTICS

Data Sources

Data Sources – Space and M&O

- Data Sources / Space Use
 - FICM
 - National / State Education Standards
 - School, College, University Standards
- Data Sources / Maintenance & Operations
 - APPA
 - ISSA
 - Your Own Best Practices

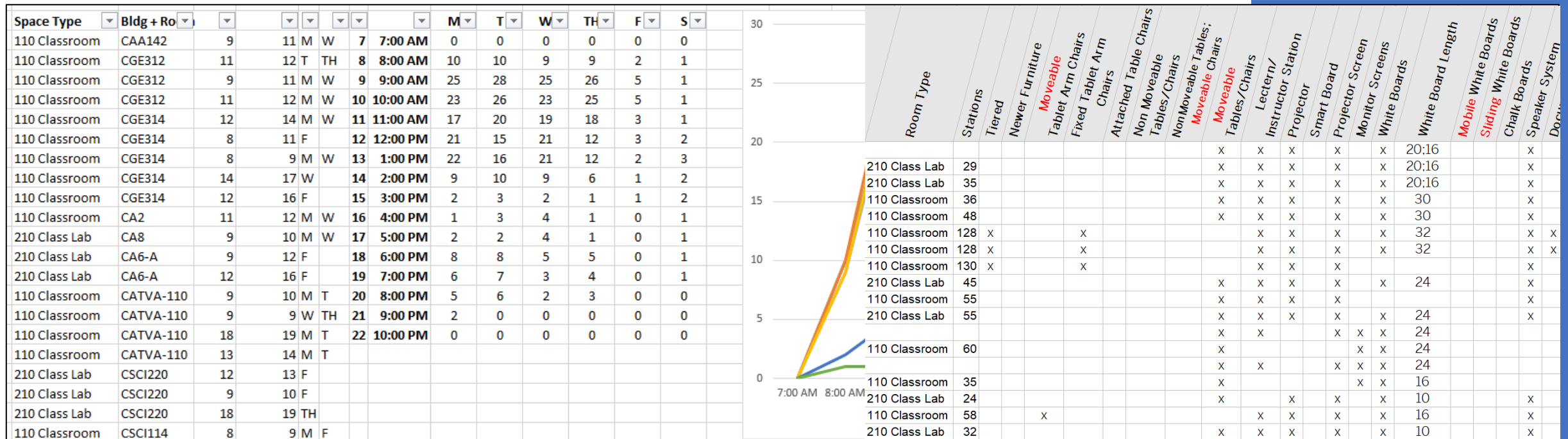


ADVANCED SPACE ANALYTICS

Data Sources

Data Sources – Space

- Space Use and Equipment
 - Classroom & Lab Schedule



ADVANCED SPACE ANALYTICS

Data Sources – “Subjective Data”

Space Use

- Right-Sizing / Pedagogy
 - Smaller Attendance
 - Hybrid Scheduling
 - HyFlex Learning
- Space Conversion
 - Flexible, Adaptable, Tech-supported
- Strategic Space Planning
 - Shared, Un-”owned”

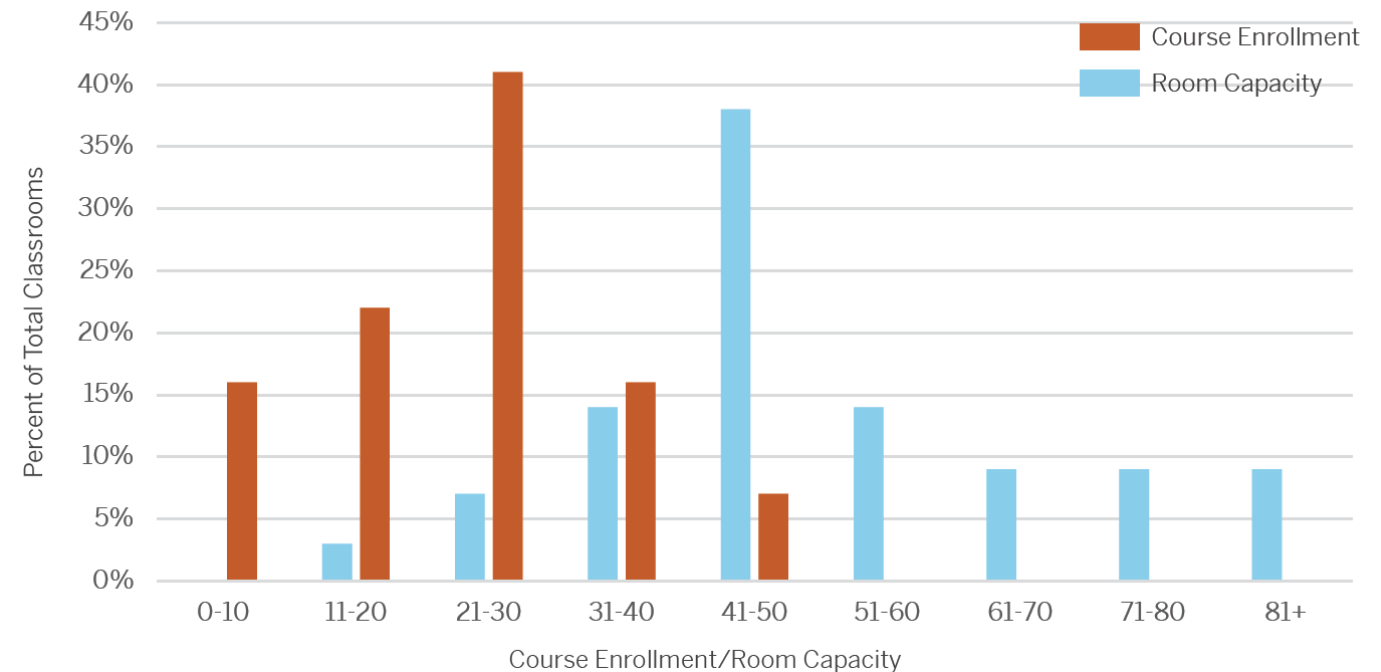


New HyFlex technology implemented in B1



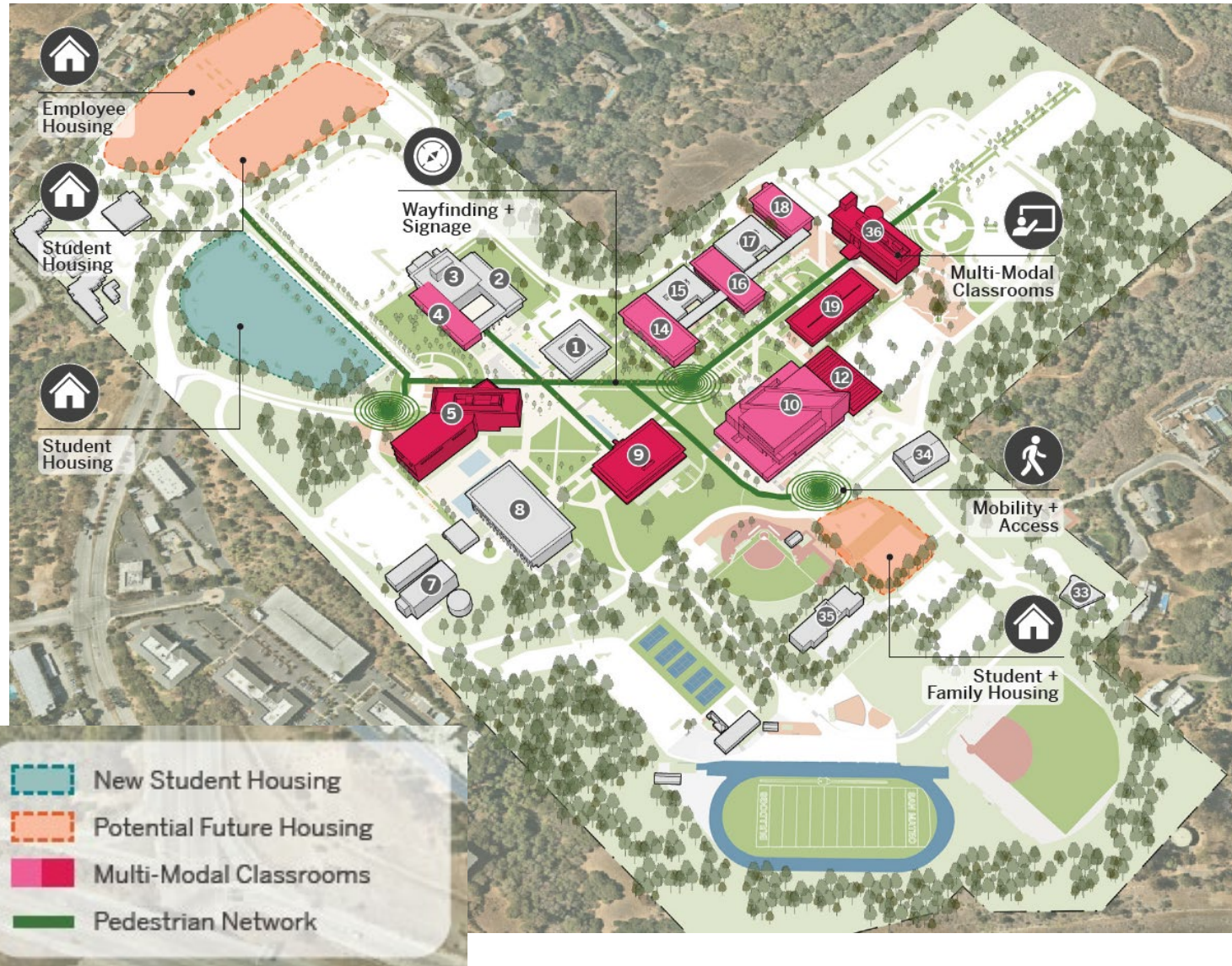
HyFlex class in session

Course Enrollment and Seat Count



ADVANCED SPACE ANALYTICS

Example: College of San Mateo



Facilities Master Plan

Scope

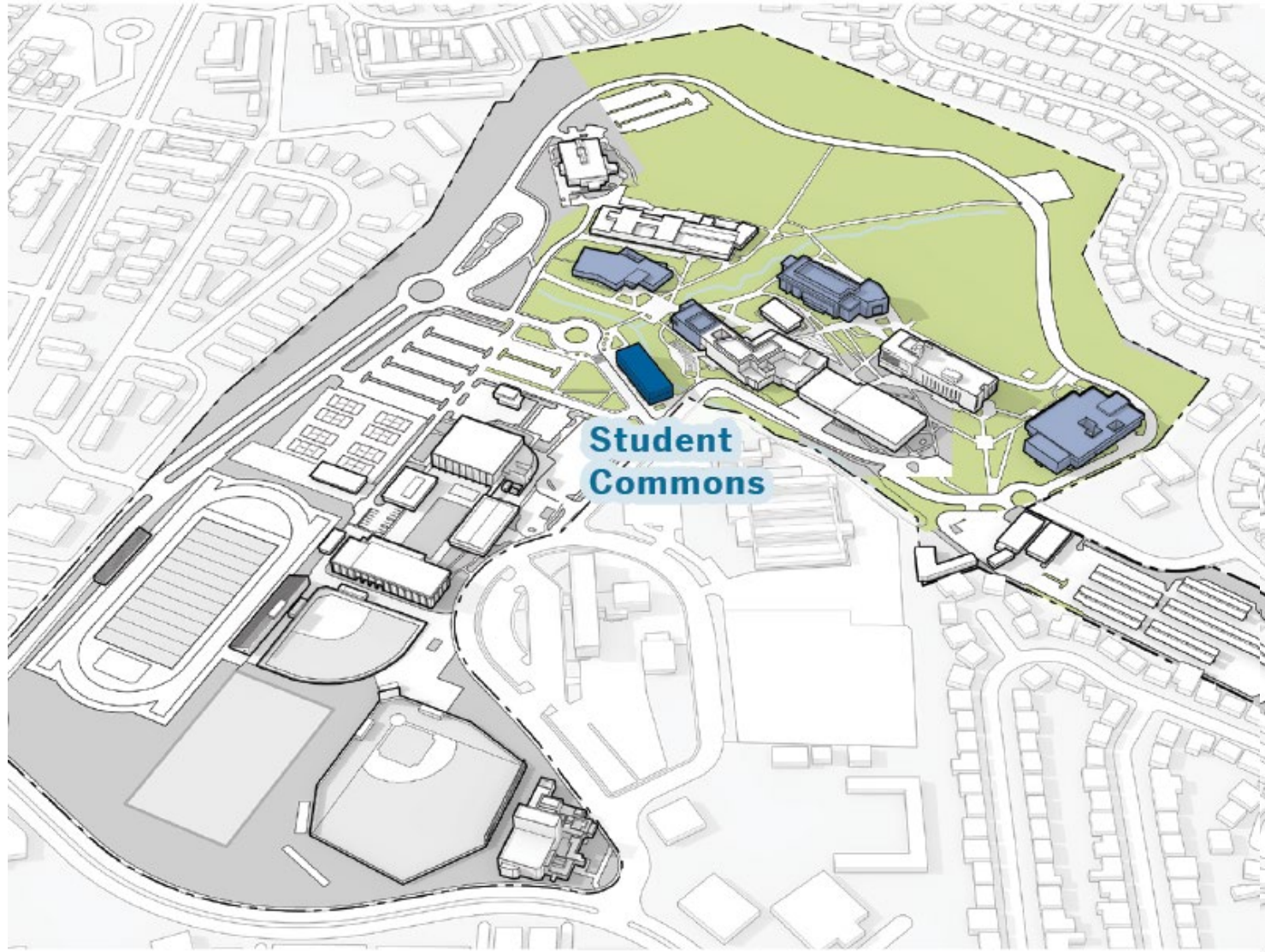
- Physical Assessment
- Space Utilization
- Options & Recommendations
- Setting Priorities

Outcomes

- No-Growth Plan
- Renovations & Retrofits
- Adaptable, Hyflex Lecture & Labs
- Tenant Improvements
 - New-use, Underutilized Rooms
- Furniture, Equipment Upgrades
- Priorities Planning
- Student Housing

ADVANCED SPACE ANALYTICS

Example: Contra Costa College



Facilities Master Plan

Scope

- Physical Assessment
- Space Utilization
- Options & Recommendations
- Setting Priorities

Outcomes

- No-Growth Plan
- Demolition, Renovations & Retrofits
- Adaptable, Hyflex Lecture & Labs
- Tenant Improvements
 - New-use, Underutilized Rooms
- Furniture, Equipment Upgrades
- Priorities Planning

ADVANCED SPACE ANALYTICS

Example: Contra Costa College



ADVANCED SPACE ANALYTICS

Discussion Points

Bringing Greater Efficiency & Effectiveness to Your Maintenance & Operations

- How should space planning consider various factors, including class size, program requirements, student experience, and maintenance and operation's needs?
 - Getting a seat at the table
 - Your 'Post-Pandemic' Underutilized Spaces?
 - Other

This concludes The American Institute of Architects Continuing Education Systems Course