Town of Concord

Concord Middle School Project

Middle School Building Committee

07.15.2021

EWING COLE | SMMA

Total Project Cost Range per RFS $80-$100 M
Total Project Cost maximum per CMSBC vote $108 M
Total Project Cost maximum currently estimated $102 M

Replace two middle schools with one combined middle school, grades 6-8

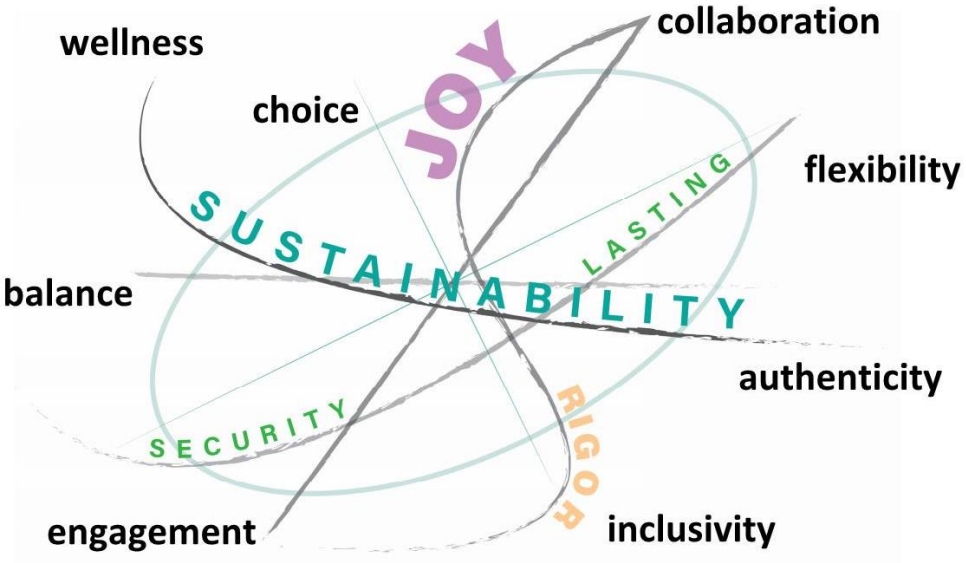
Design enrollment 700 Students

Team Teaching Model, meet Ed Plan

Design for Net Zero Energy Ready

Primary Goal:
Consolidate two middle school populations **into a single, 21st century learning facility** that will serve the community for generations.

Vision: Eight Core Principles



Vision : Specifics

Collaboration
furniture and spaces designed for the full range of experiences and modes to prepare students to be effective adults

Flexibility
- various room sizes with ability to combine or divide spaces to support all teaching modes and learning styles
- planning ahead to facilitate future expansion and ease renovation

Authenticity
- real and warm materials such as natural wood and fabrics
- connection to nature

Inclusivity
- barrier-free design
- zoning for after-hours and community use
- an auditorium and cafeteria that can hold the entire school
- effective and intuitive circulation for connection and good communication

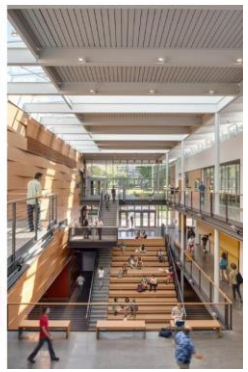
Engagement
- spaces for hands-on innovation, creativity and joyful learning
- a green building that can be a teaching tool
- one special defining space or campus element

Balance
foster the full spectrum:
- technology to craft
- teacher-led to student-led
- indoors to outdoors
- independent to group

Wellness
- sustainable, high-performance school with care applied to comfort, acoustics, natural light and connection to the outdoors
- a school for the whole-person

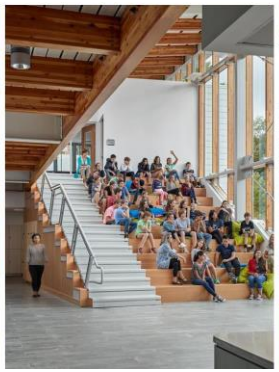
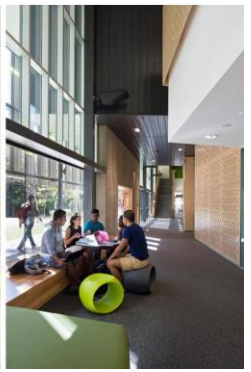
Choice
allow for teacher and student autonomy while balancing standards with latitude for individual pathways to success

The above Visioning occurred in 2018, before this Building Committee was established, but serves as a reference and captures many current visions.





700 student enrollment

Address the unique social and emotional needs of the early adolescent

Fidelity of teaming
Fidelity of grade
6th grade academy

Home base
- **Bullying prevention**
- **Academic support**
- **Social + emotional support**
- **Entertainment and fun**

Exploration of identity

Opportunity for choice

Embody joy in learning

Offer opportunity for innovation, reflection and repose

Utilize resources wisely

Provide connections to the natural landscape

Provide strong connection to the history of concord

Social, collaborative, reflective media center at the heart of the school

Multi-cultural center

LEARNING

Create a middle school learning environment that addresses the unique **social and emotional needs of the early adolescent**. This pedagogical priority translates into a facility that:

- Supports the efficacy of the educational team,
- Supports the fidelity of teaming,
- Embodies joy in learning,
- Fosters a pervasive spirit of inclusion,
- Offers opportunity for active engagement as well as opportunity for innovation, reflection and repose
- Places a social, collaborative, reflective media center at the heart of the school

CONTEXT

Create a building and a landscape that enhances the existing character of the community and is **strongly connected to the natural landscape.**

HISTORY

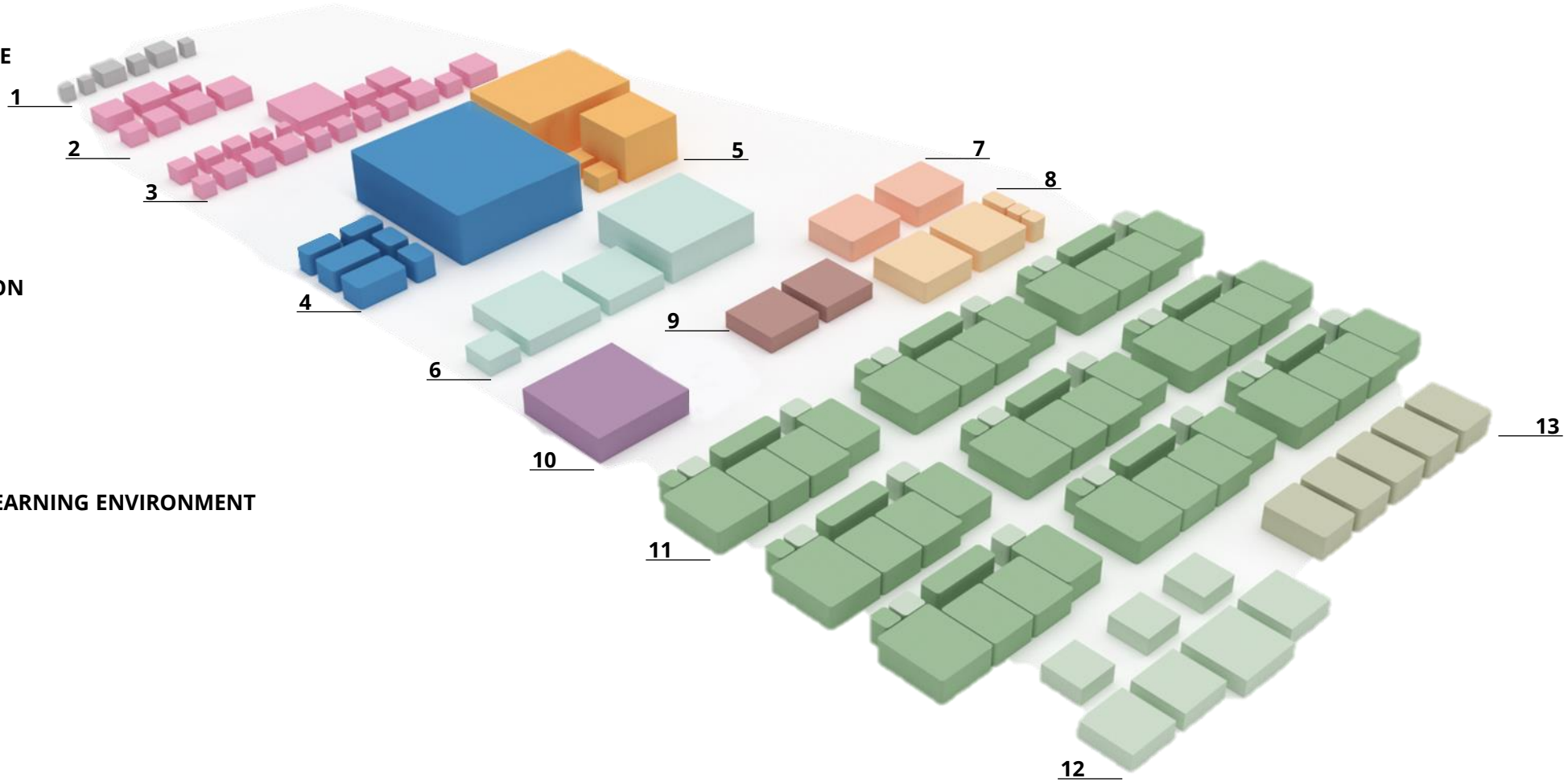
Create a building and a landscape that enhances town vitality and is **strongly connected to the history of Concord.**

ENVIRONMENT

Create a building and a landscape that **utilizes resources wisely** – one that balances energy use and consumption with optimized comfort, learning, and wellness.

LEGEND

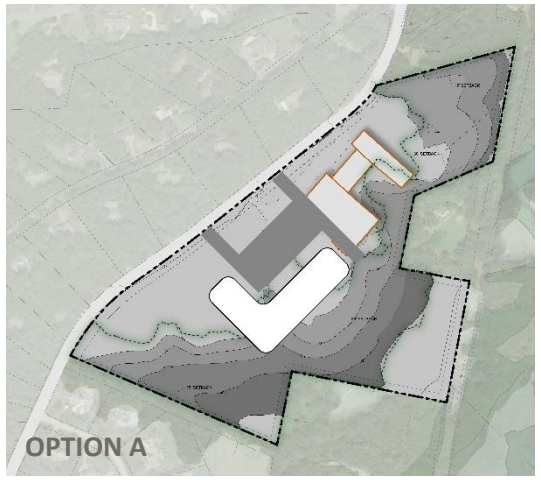
1. CUSTODIAL & LOADING
2. NURSE
3. ADMINISTRATION & GUIDANCE
4. HEALTH & PE
5. AUDITORIUM
6. DINING
7. ART
8. MUSIC
9. VOCATIONAL & TECHNICAL
10. MEDIA & RESOURCE
11. CORE TEAM
12. DEDICATED SPECIAL EDUCATION
13. WORLD LANGUAGE

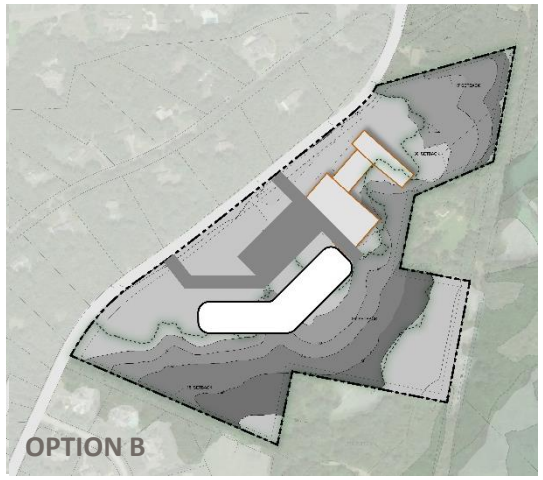


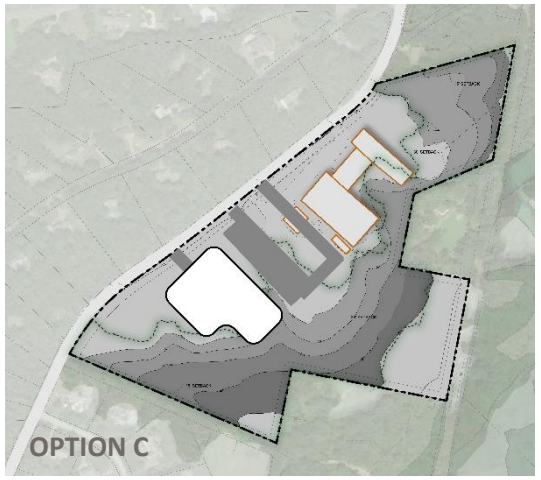
SUMMARY OF SPACES

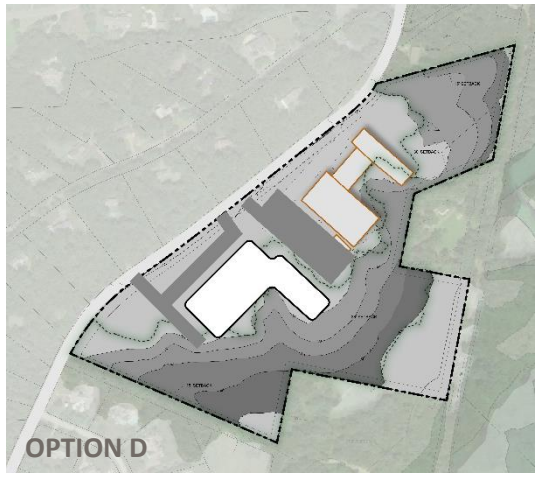
- 97,098 NET SQUARE FEET
- 145,647 GROSS SQUARE FEET
- 21ST CENTURY MIDDLE SCHOOL LEARNING ENVIRONMENT
- ACHIEVES ED PLAN GOALS

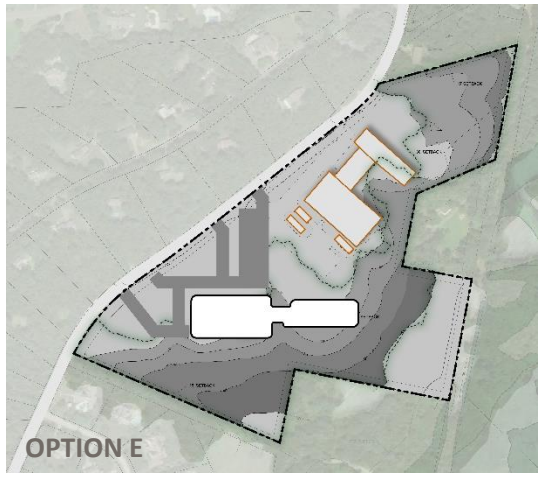
FLOOR PLAN UPDATES











OTHER SITE STRATEGIES AS PRESENTED MARCH 16th 2021

MAIN LOBBY

COLLECT AND DISTRIBUTE
COLLECTS LARGE POPULATION OF ENTERING STUDENTS
DISTRIBUTES STUDENT POPULATION TO EDUCATIONAL, TEAM AND SHARED SPACES.

A PLACE FOR IMPROMPTU EVENTS AND LEARNING

A PLACE TO DISPLAY ART AND PROJECTS

BREAKS LONG CIRCULATION SPINE THROUGH THE INTRODUCTION OF DAYLIGHT AND VIEWS, ELEMENTS CRITICAL TO CREATING A PLACE OF JOY AND WELLBEING

PROVIDE FLEXIBLE SPACE FOR STUDENT ENGAGEMENT AND SOCIALIZATION BECOMING THE HEART OF THE BUILDING.

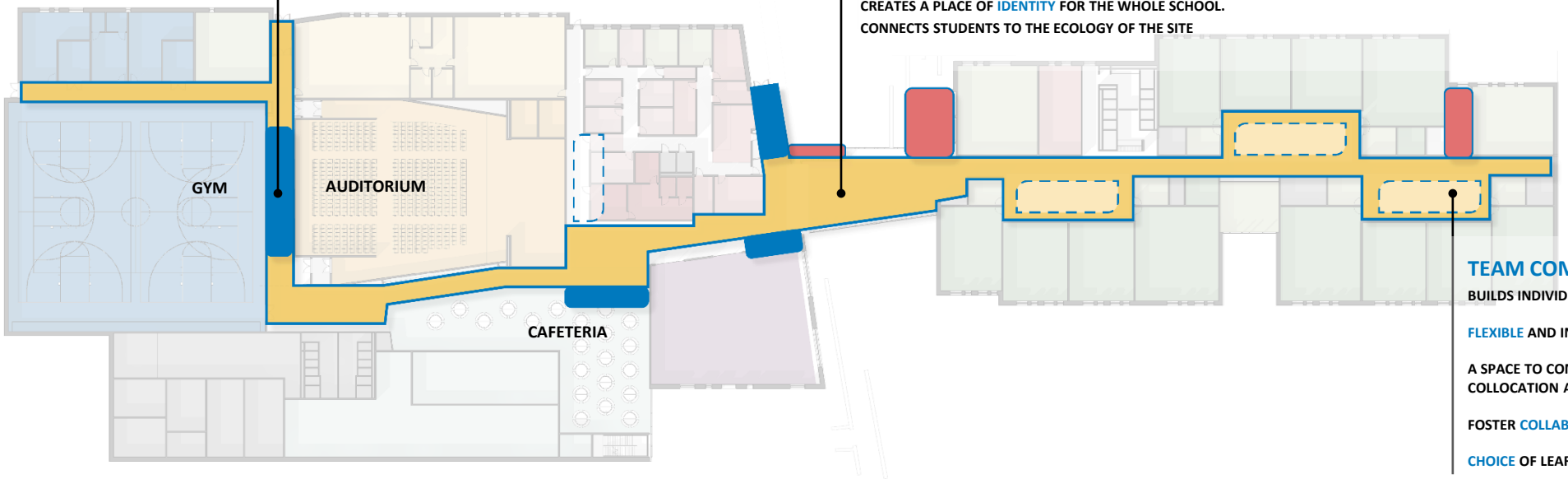
THROUGH FURNITURE AND FLEXIBLE DESIGN PROVIDES STUDENTS WITH CHOICE OF PLACES FOR SOCIALIZATION AND COLLABORATION

CREATES A PLACE OF IDENTITY FOR THE WHOLE SCHOOL.
CONNECTS STUDENTS TO THE ECOLOGY OF THE SITE

COMMUNITY LOBBY

COLLECTS AND DISTRIBUTES SPECTATOR AND PERFORMANCE AUDIENCE

PROVIDES BREAKOUT SPACE FOR GATHERING AND PRE-FUNCTION



TEAM COMMONS

BUILDS INDIVIDUAL IDENTITY AND THAT OF THE TEAM

FLEXIBLE AND INTIMATE ENVIRONMENT

A SPACE TO COMBINE TALENT THROUGH TEACHER COLLOCATION ACROSS SUBJECTS

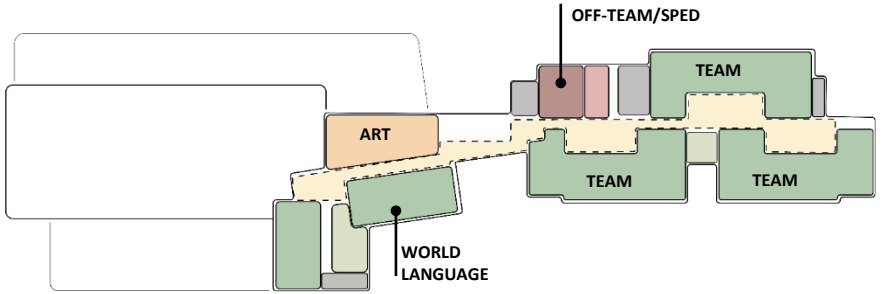
FOSTER COLLABORATION BETWEEN STUDENTS

CHOICE OF LEARNING/TEACHING ENVIRONMENT

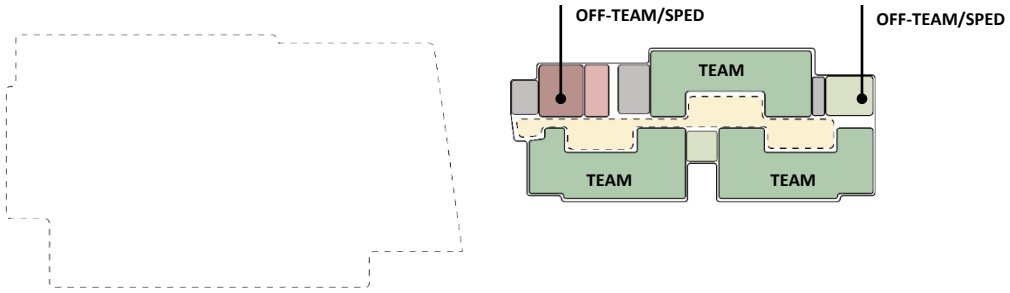
SHARED SPACES

CLASSROOMS AND TEAMS

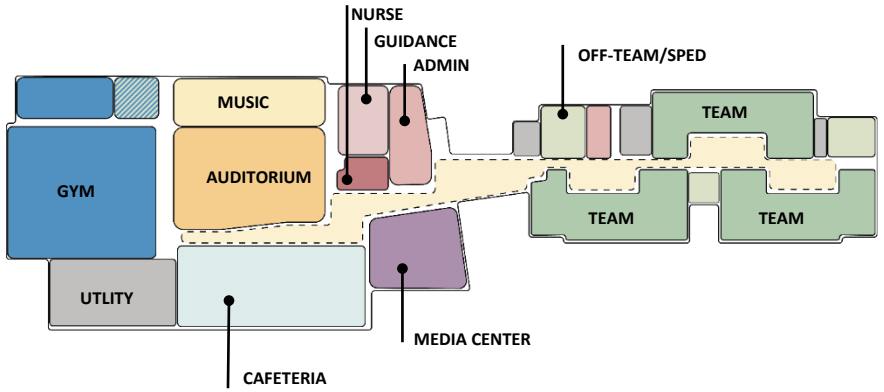
BUILDING ORGANIZING AND CIRCULATION DIAGRAM

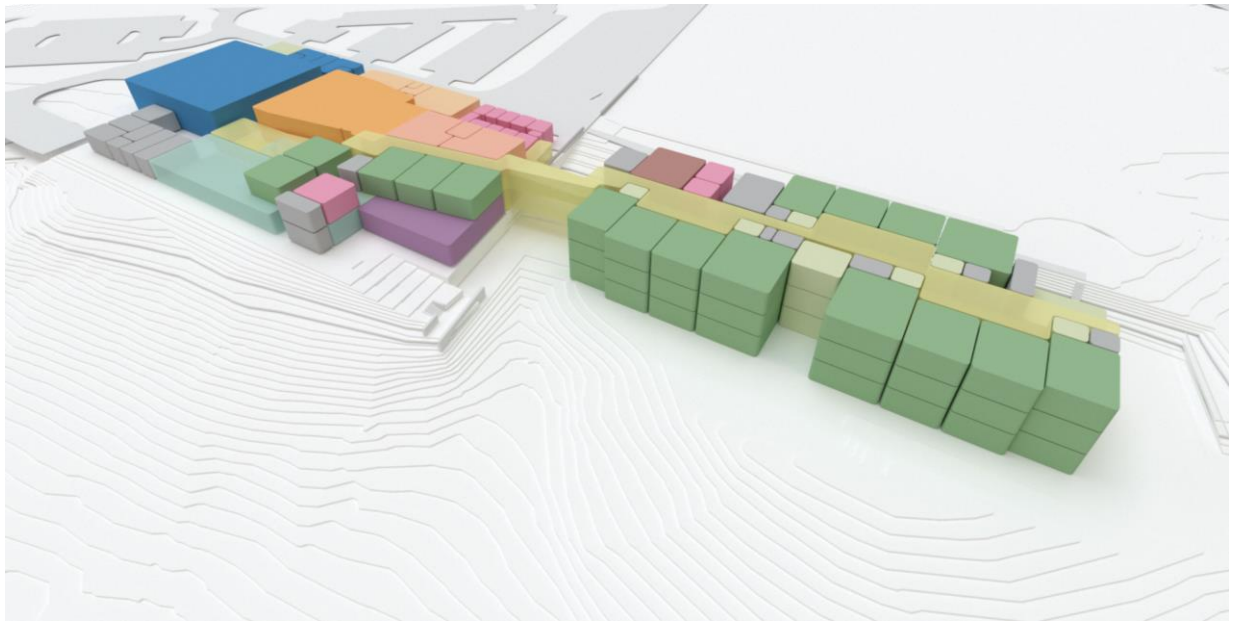


UPPER-LEVEL

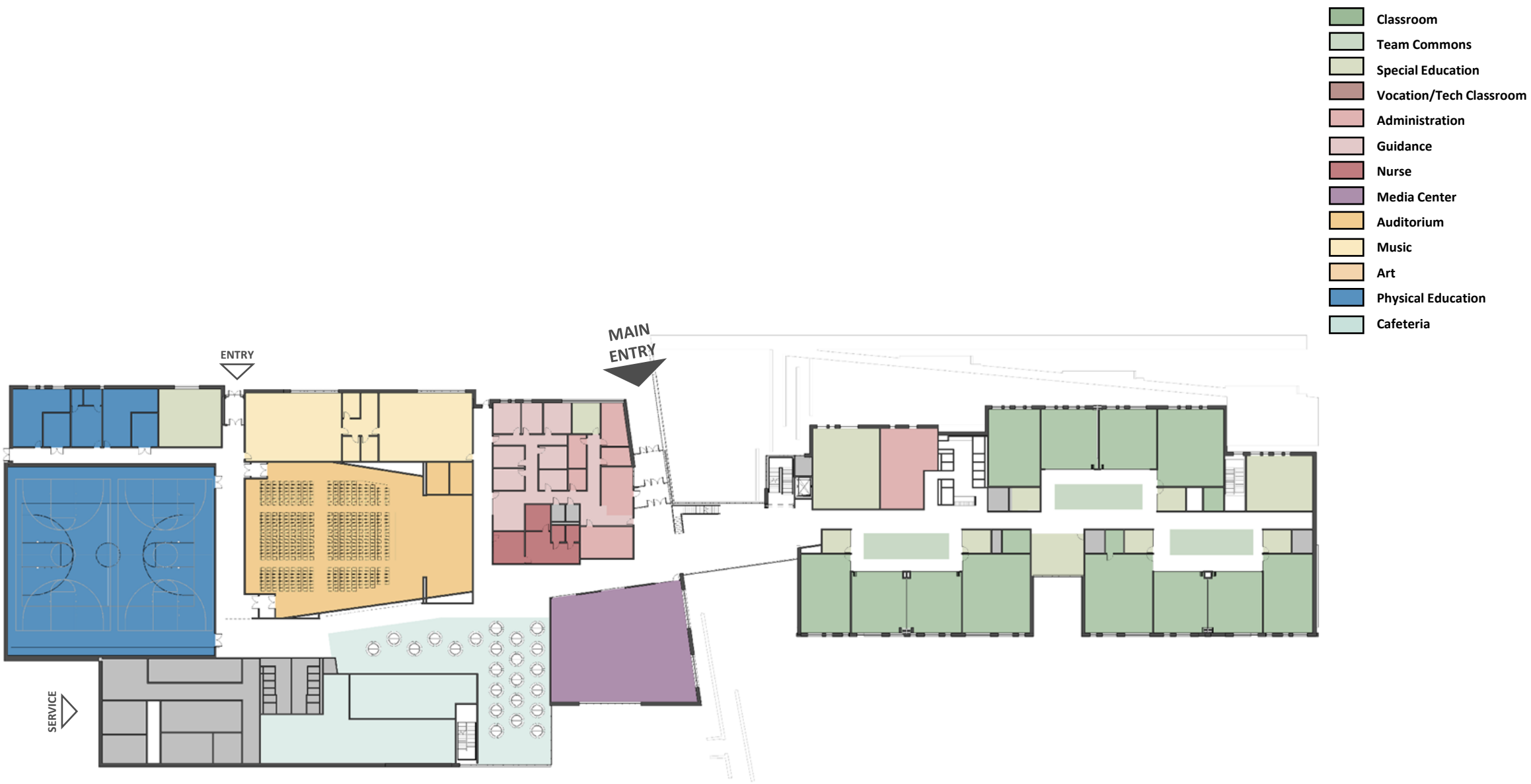


LOWER-LEVEL





ORGANIZING DIAGRAM

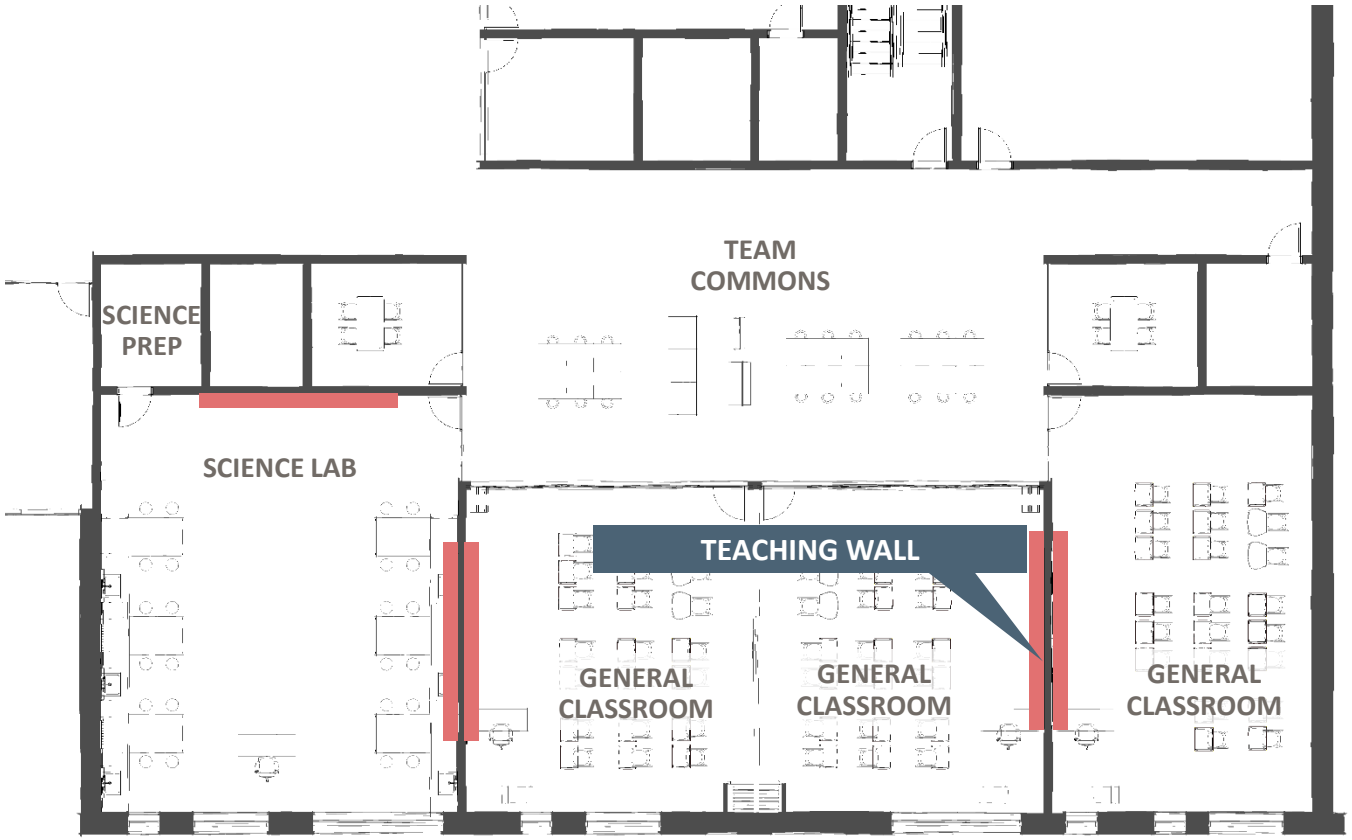


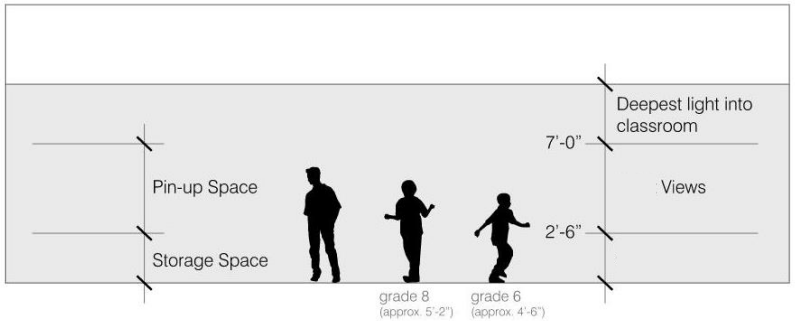
GROUND FLOOR PLAN

UPPER-LEVEL PLAN

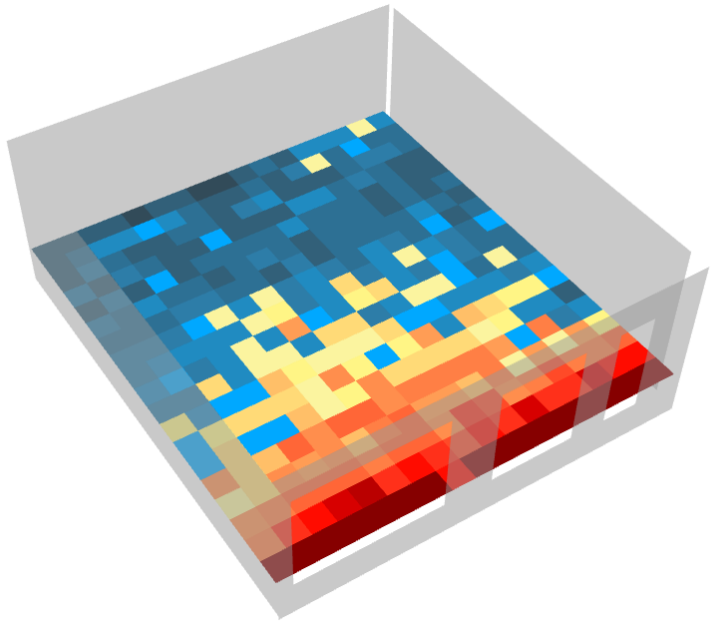
LOWER-LEVEL PLAN

- Classroom
- Team Commons
- Special Education
- Vocation/Tech Classroom
- Administration
- Guidance
- Nurse
- Media Center
- Auditorium
- Music
- Art
- Physical Education
- Cafeteria


TEAM
COMMONS
SCIENCE
PREP
SCIENCE LAB
TEACHING WALL
GENERAL
CLASSROOM
GENERAL
CLASSROOM
GENERAL
CLASSROOM


Deepest light into
classroom
7'-0"
Pin-up Space
Views
2'-6"
Storage Space
grade 8
(approx. 5'-2")
grade 6
(approx. 4'-6")
4'-0"
14'-0"
10'-0"

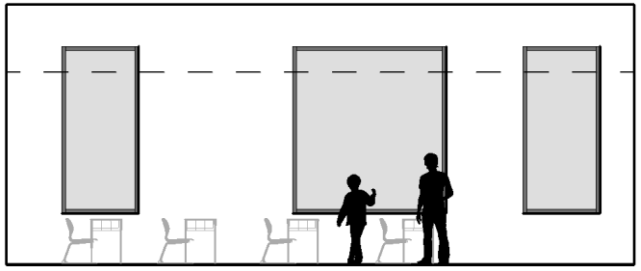
CLASSROOM



SPATIAL DAYLIGHT AUTONOMY

◀ Never Daylit Mostly Daylit ▶

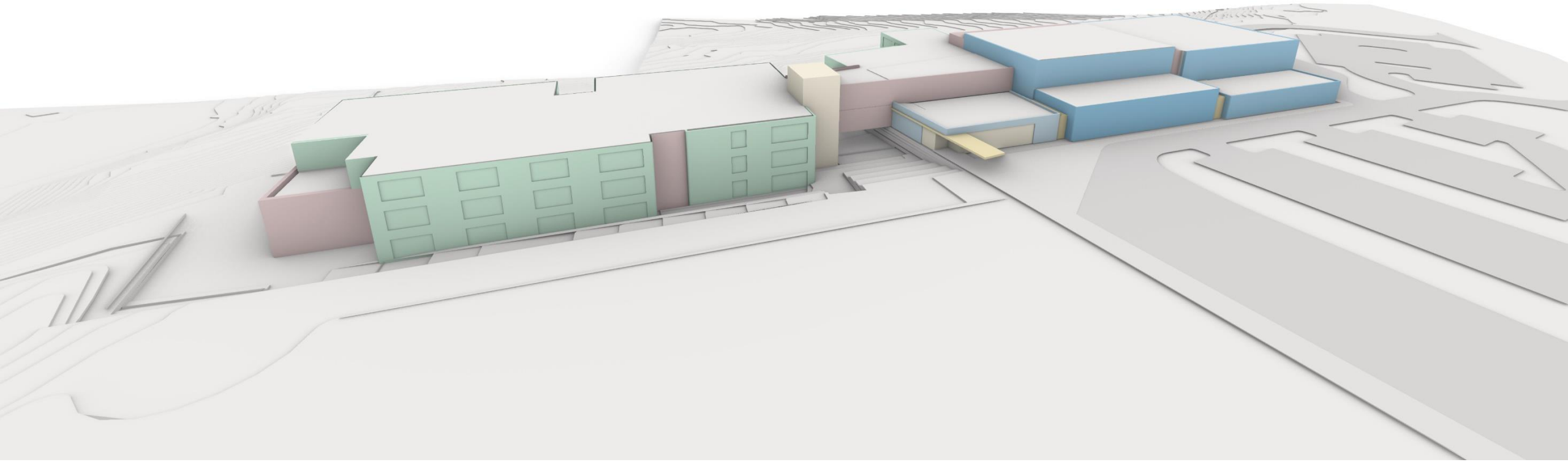
10% 30% 50% 70% 90%



INTERIOR ELEVATION

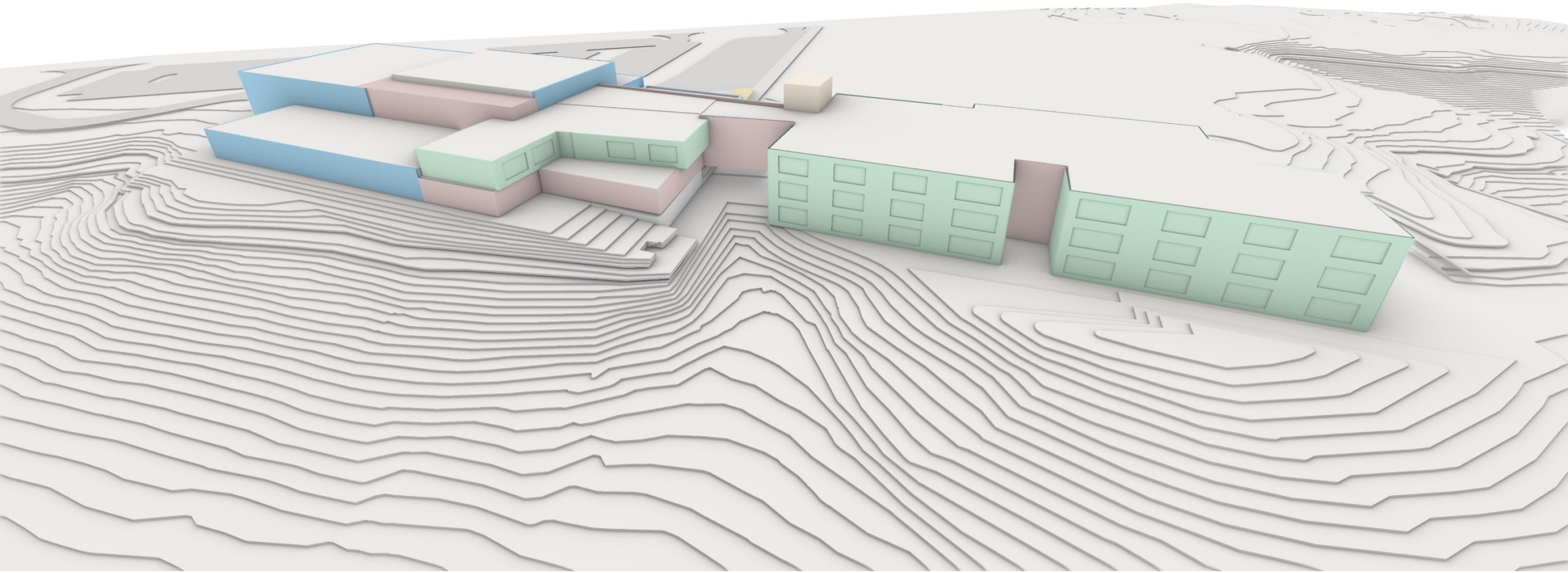
DAYLIGHTING, GLARE, AND HEAT GAIN

N



MASSING CONCEPT

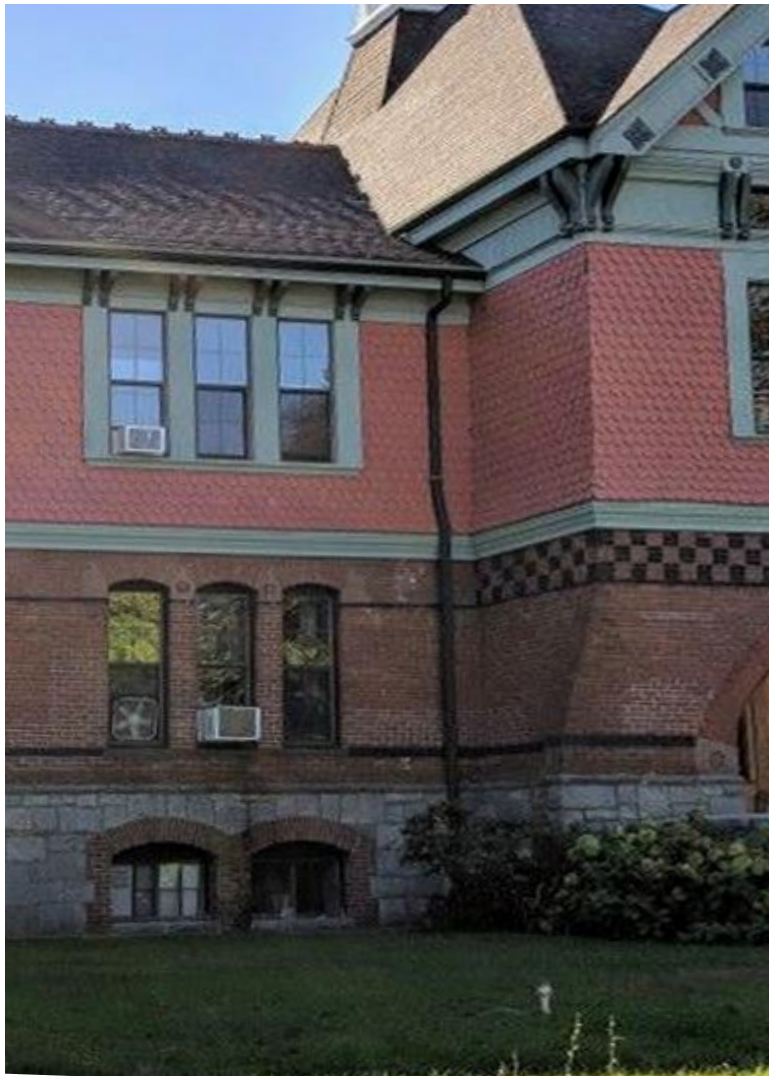
N



MASSING CONCEPT

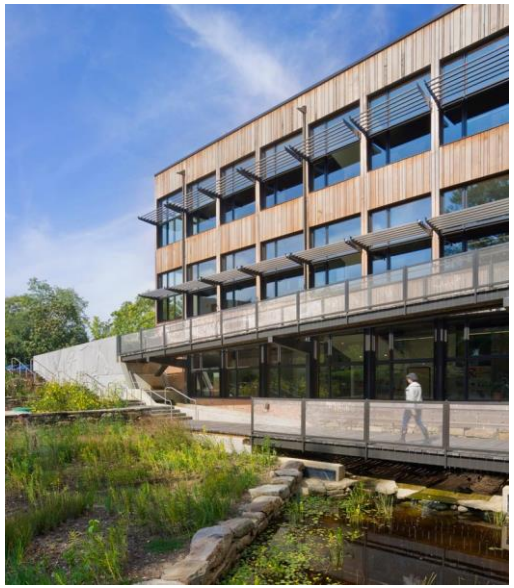
South Hampstead High School

MASSING CONCEPT



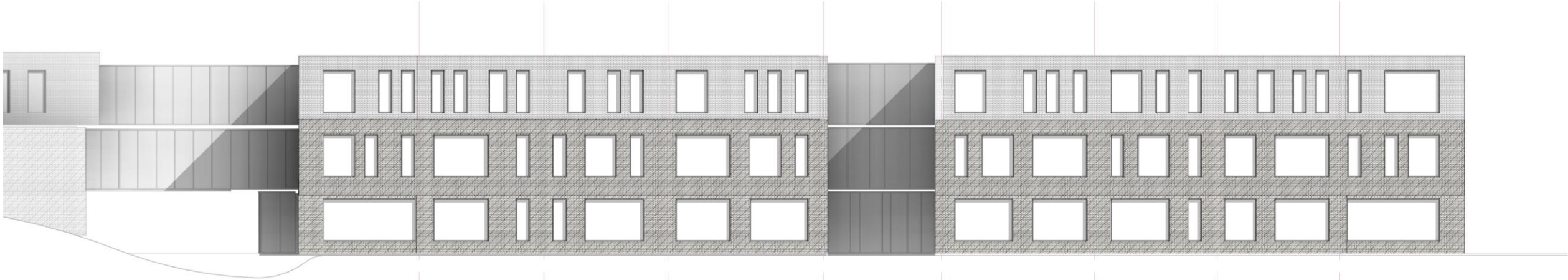
HISTORIC ARCHITECTURE IN CONCORD


South Hampstead High School

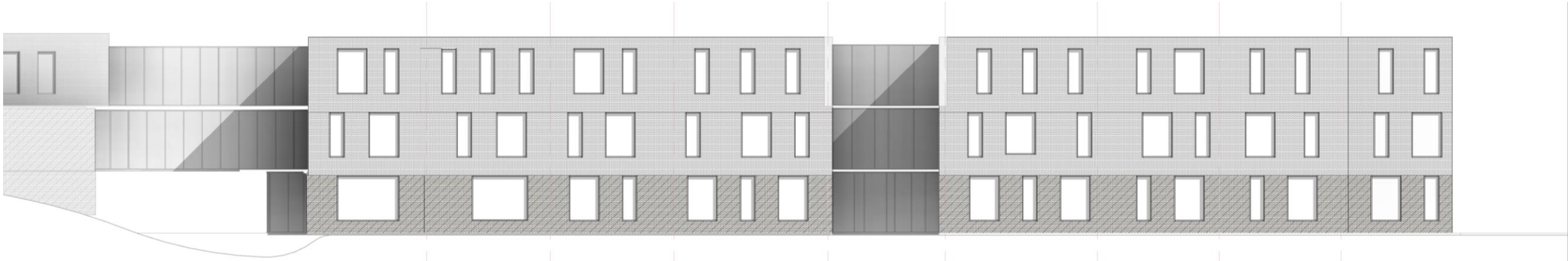



King Open/Cambridge Street Upper School


Abingdon School, Oxfordshire, UK



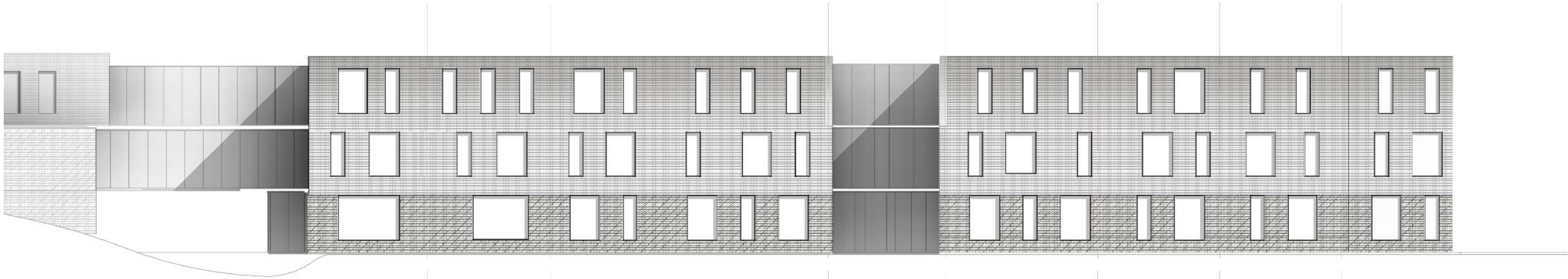
CONCEPT – CORNICE



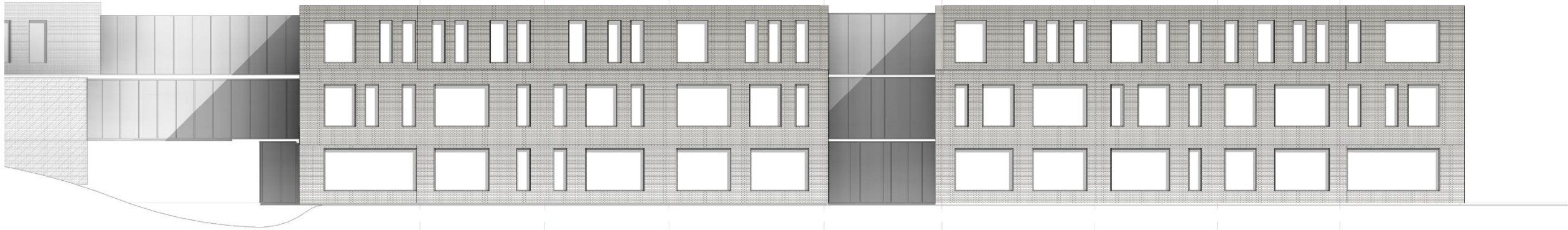
CONCEPT – BASE

New Tiunda School

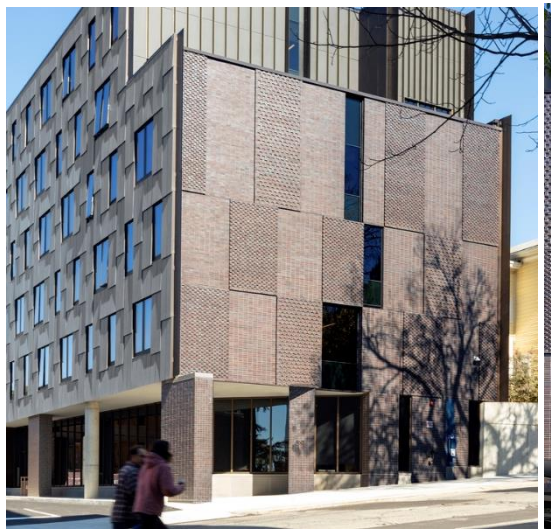
CONCEPT TREE MIST

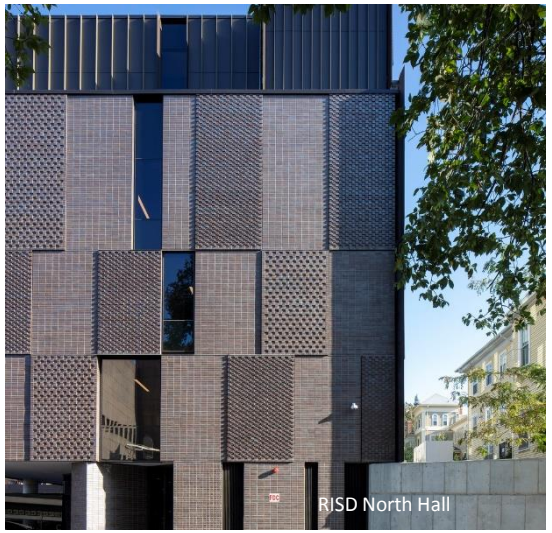


CONCEPT – TREE MIST WITH BASE



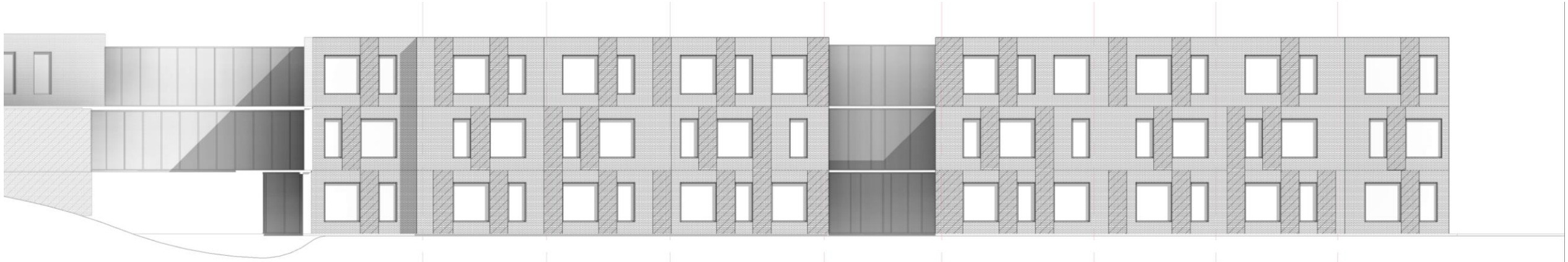
CONCEPT – TREE MIST



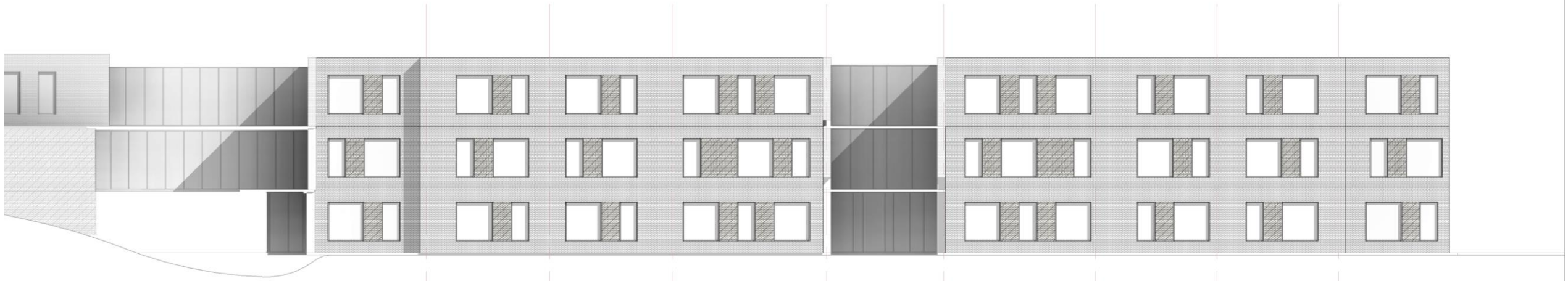


RISD North Hall

Taft High School, Chicago IL



CONCEPT – SYNCOPATED MUSICAL SCORES



CONCEPT – MUSICAL SCORES

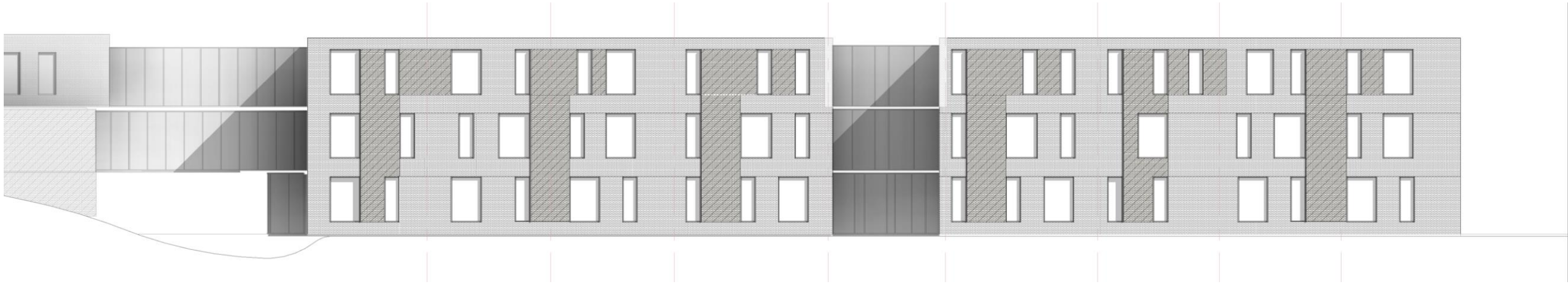

McIlvanney Campus Kilmarnock, Scotland


Hanscom Primary School


Charter Oak International Academy


Lisle Elementary School

CONCEPT VERTICAL STRIATION



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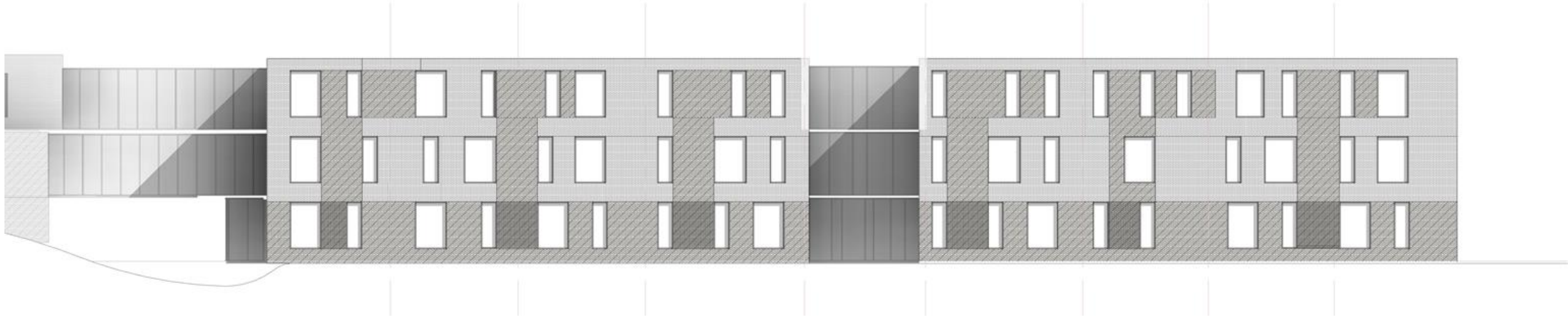
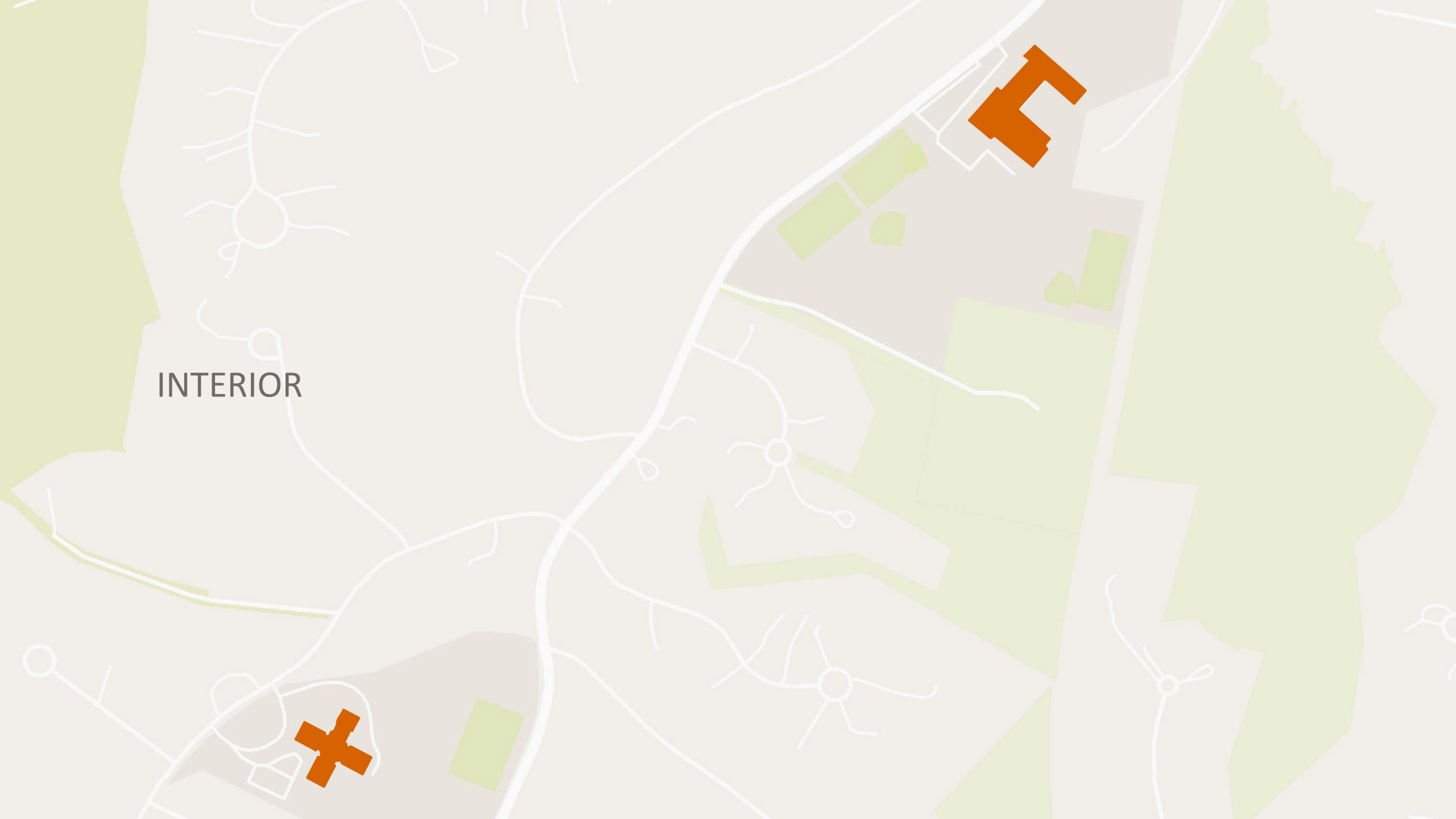


CONCEPT VERTICAL STRIATION W/ BASE


INTERIOR

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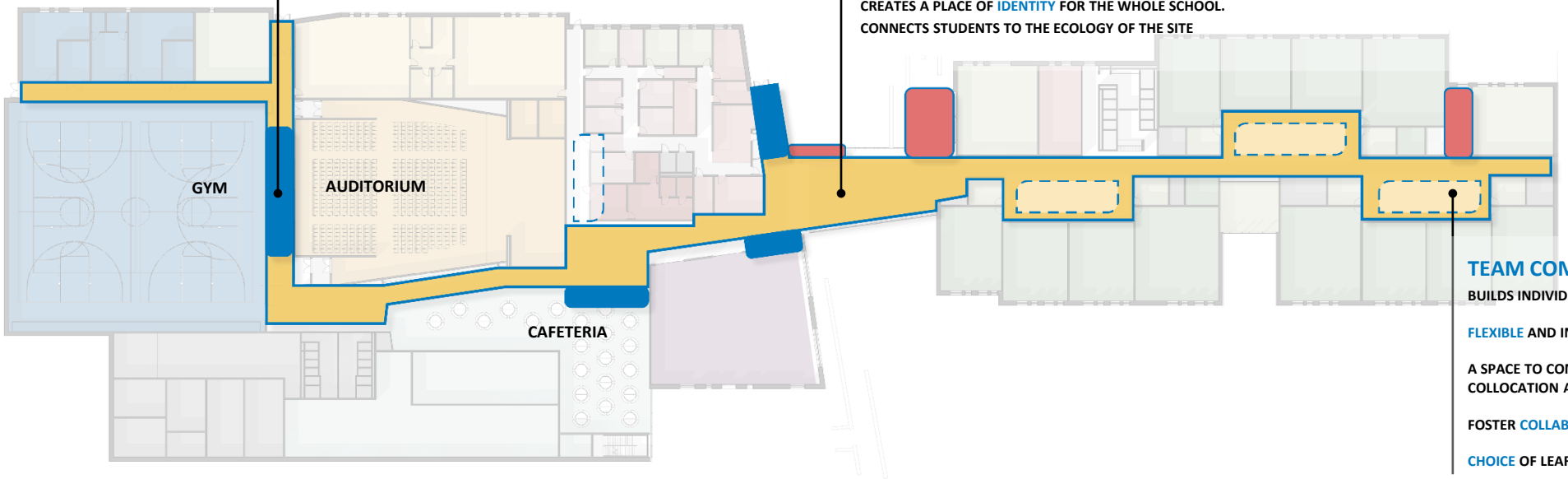

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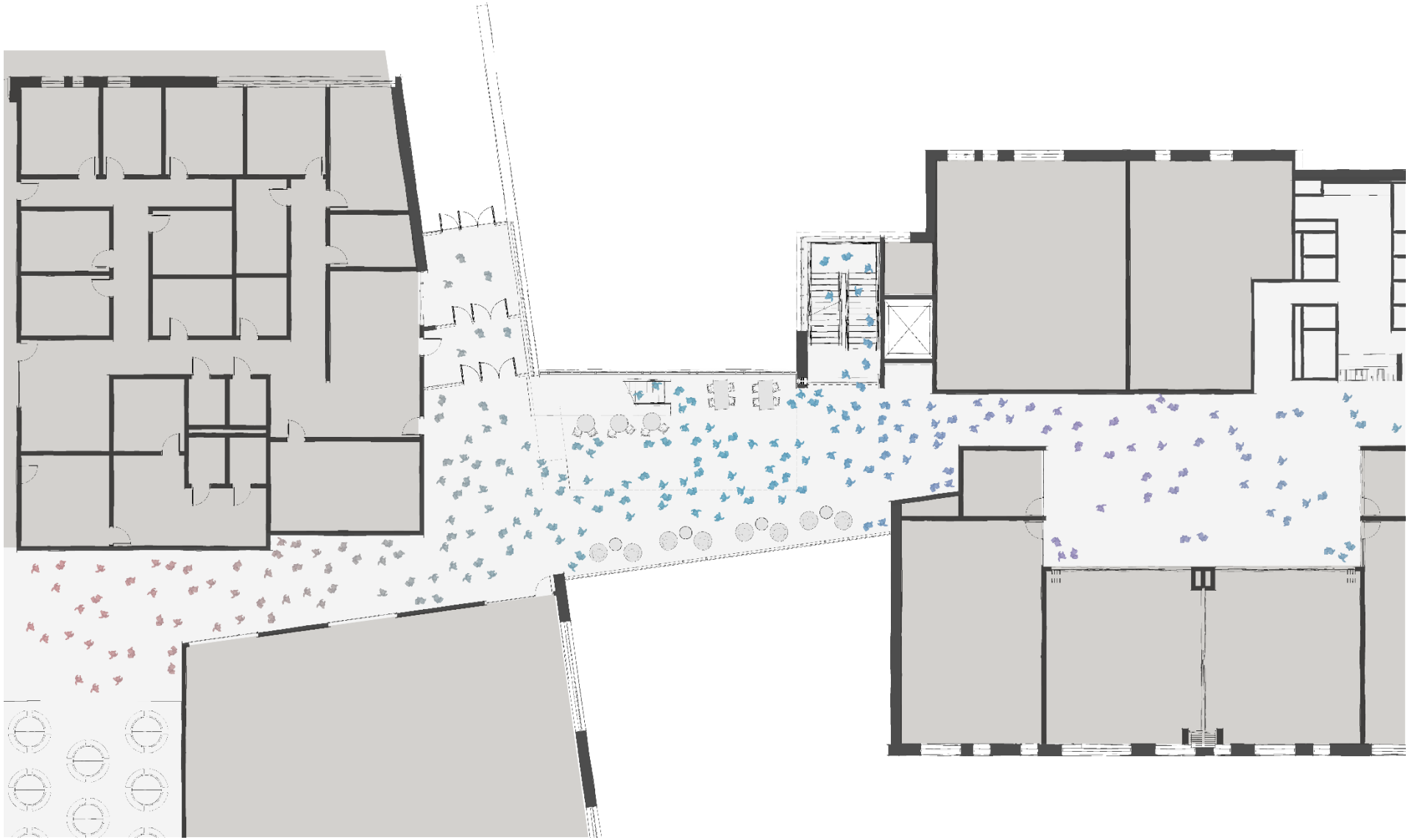


LOBBY CIRCULATION

Wilson High School Tacoma, WA


Meadowdale Middle School WA


Arlington Elementary School Tacoma, WA


Meadowdale Middle School WA

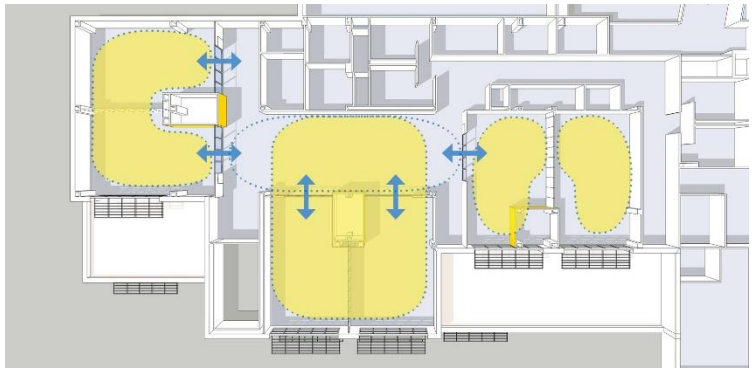
TEAM PRECEDENTS

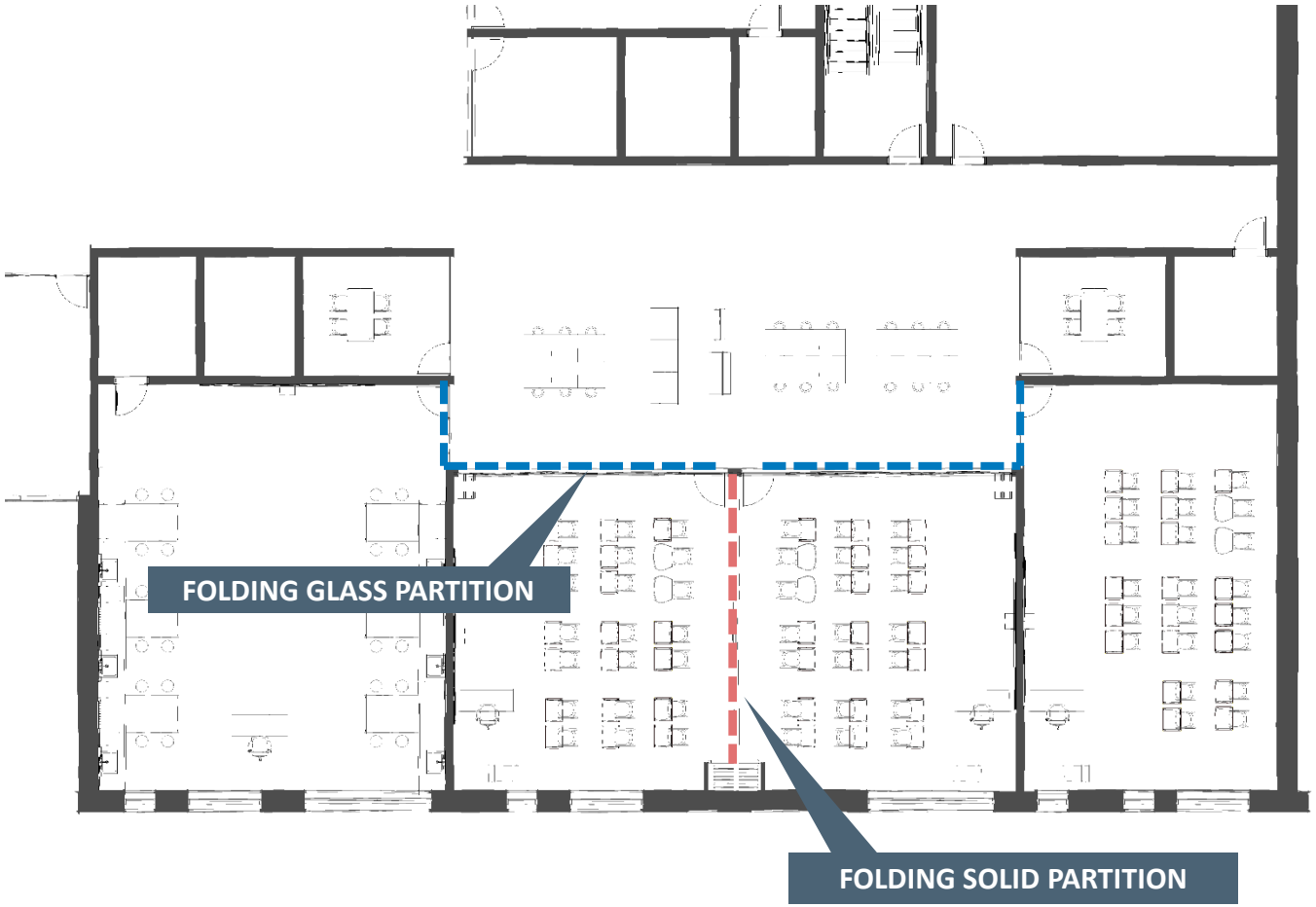
Northwood Elementary School Mercer Island WA

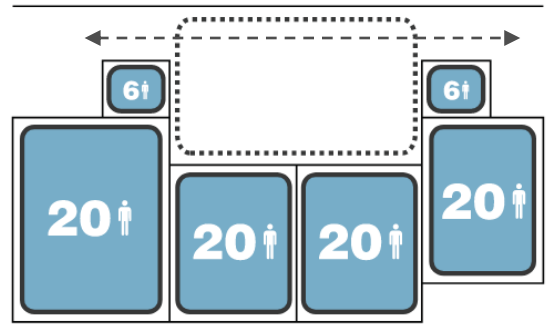
Northwood Elementary School Mercer Island WA

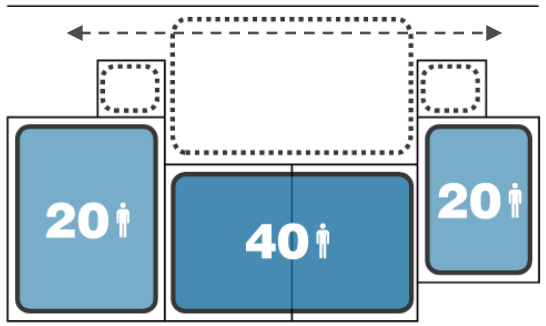
TEAM PRECEDENTS

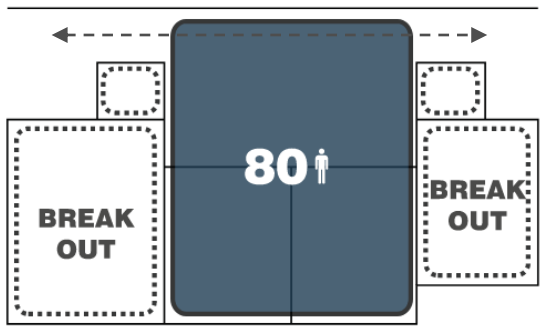

WHOS IN THE
SPOTLIGHT...



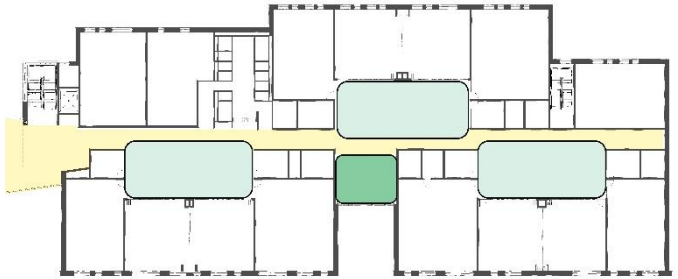


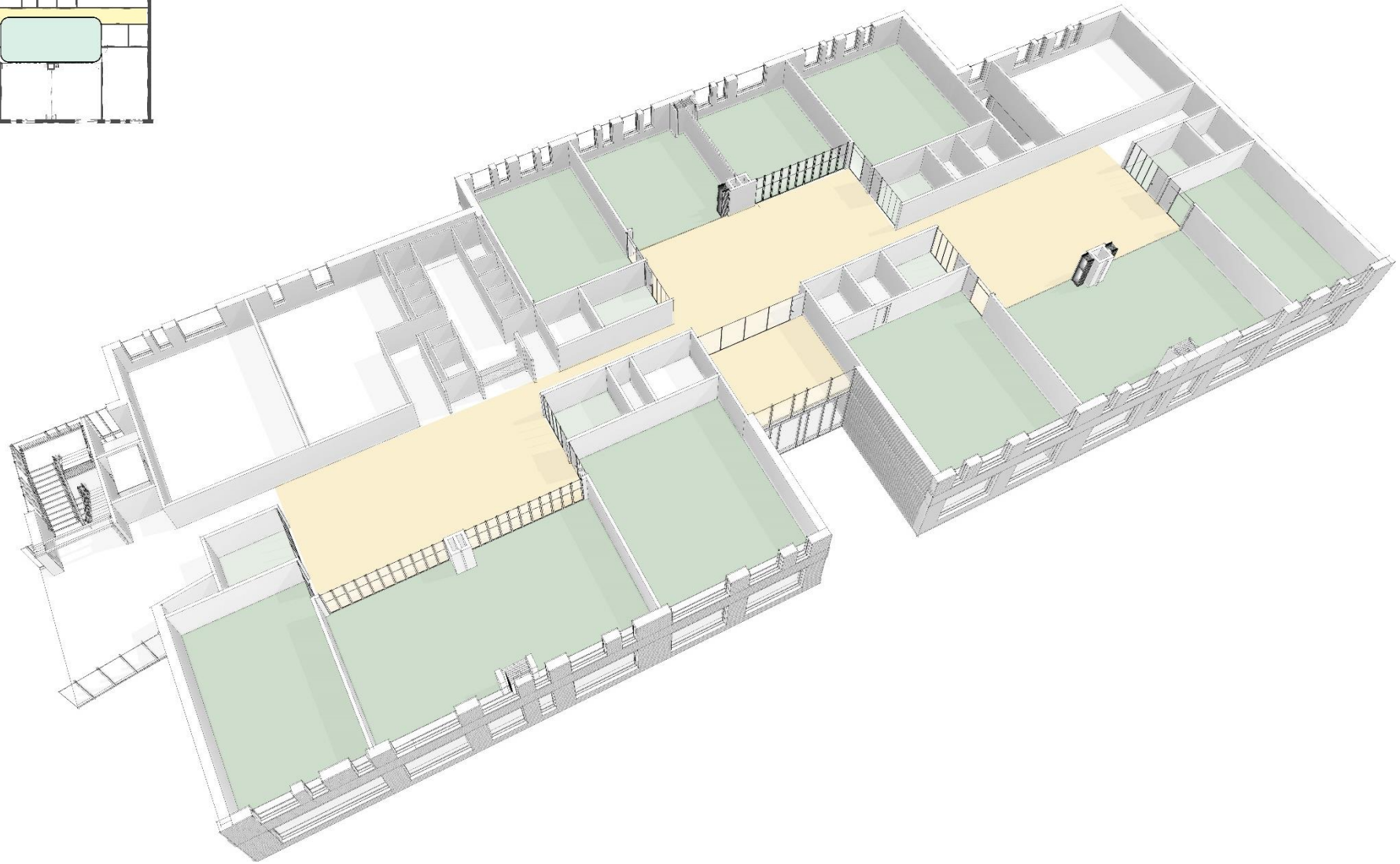




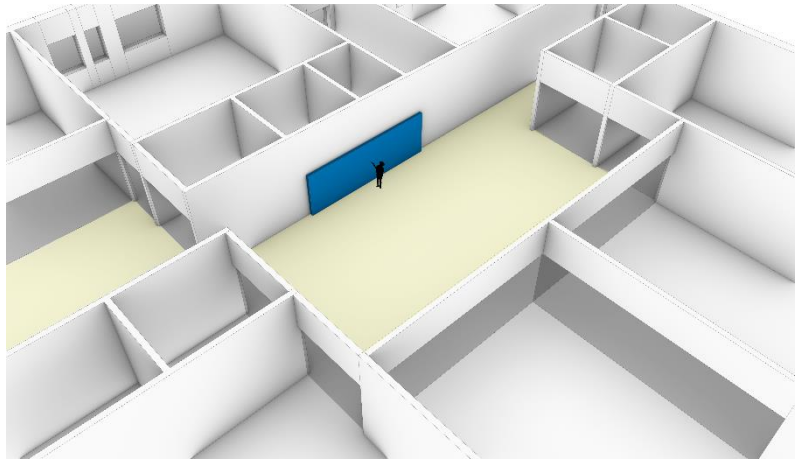


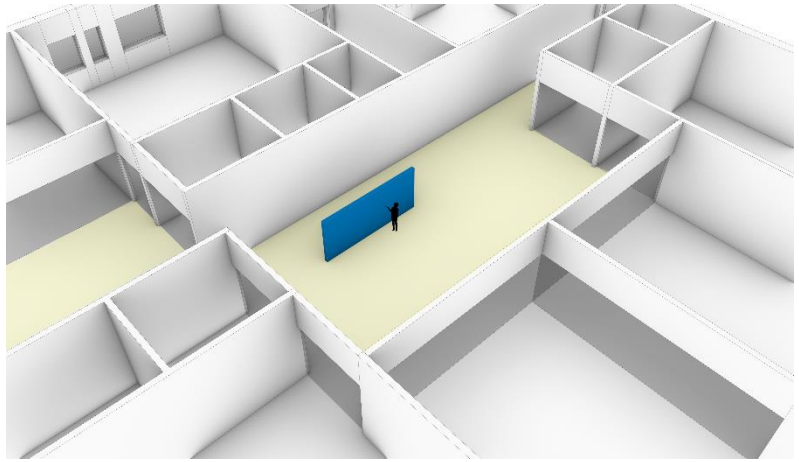
FIDELITY OF TEAMING

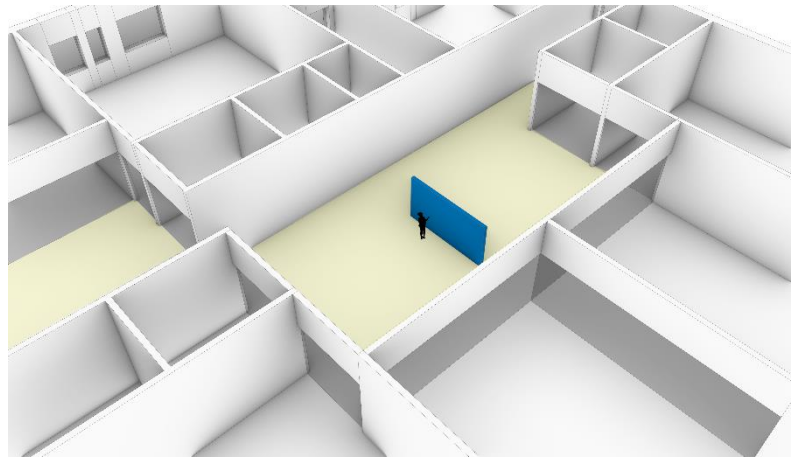




FIDELITY OF GRADE







STRATEGIES TO USE SPACE

PIN UP/MARKER WALL

BENCH/STORAGE

SCREEN OR DIVIDER

POTENTIAL TOOLS

COUNTER

Sustainability & MEP Systems Design

Agenda

- Mechanical Systems Overview
- Electrical Systems Overview
- Plumbing Systems Overview
- Energy and Sustainability Analysis
  - EUI Update
  - EZ Code
  - Solar PV update
  - Other Sustainability Criteria:
  - Green Cleaning/IPM
  - LEED Certifiable

Mechanical Systems Design

HVAC System Approach

Ventilation

- Comply with MA-EZ and International Mechanical Code
- Demand Control Ventilation for Classrooms and other spaces
- COVID Considerations

Heating and Air Conditioning

- Electrically powered heat pumps
- No gas-fired equipment for heating
- Heating for freeze protection required for loss of normal power

MA EZ Code Highlights - Mechanical

- Heat pump capacity limited to 5 Btu/hr/sf
- Space heating equipment COP ≥ 1.5
- Fan horsepower is limited per IECC 2021
- Demand Response Capable to reduce load by 2% of capacity or 10% of peak demand
- All mechanical ventilation requires energy recovery, except kitchen hoods and hazardous exhaust
- Minimum Sensible Energy Recovery Ratios must be met (80% Prescriptive, 75% Performance)

Heating/Cooling Systems

System Options planned for Life Cycle Cost Analysis

1. Air Source VRF + DOAS
2. Ground Source VRF + DOAS
3. Ground Source HW & CHW Heat Pump + Fan Coils + DOAS

NOTE: System Option 1 is the system assumed in the current budget. Ground source systems have a higher first cost and will increase the construction cost if selected.

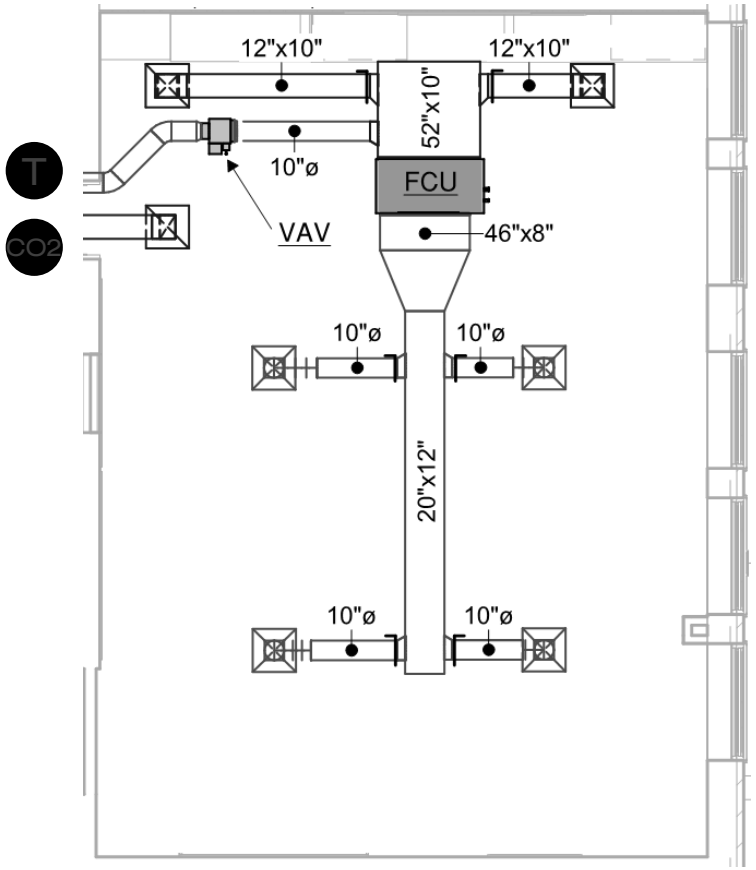
Ventilation System

DOAS Units

- Central or Distributed
- Packaged or VRF-supported
- Control to Space CO2 Levels
- Compliance with MA-EZ

Heating/Cooling System

Air Source VRF System



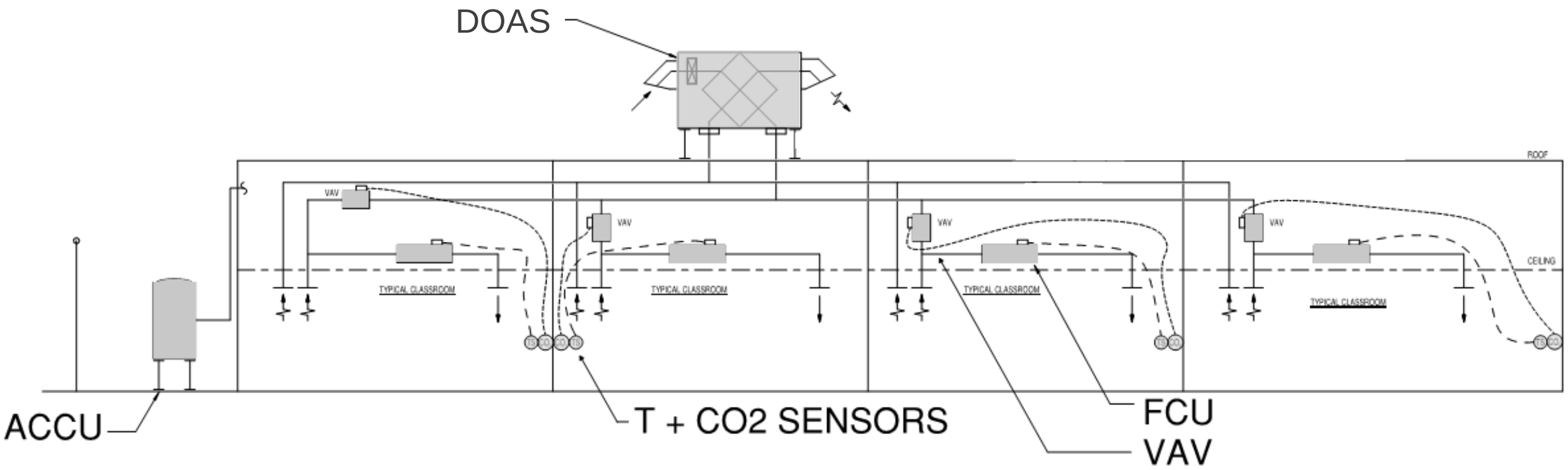
Heat Pump Units

VAV Box

Air Cooled Condensing Units

DOAS with VAVs and FCUs

Air Source VRF + DOAS



Plumbing Systems Design

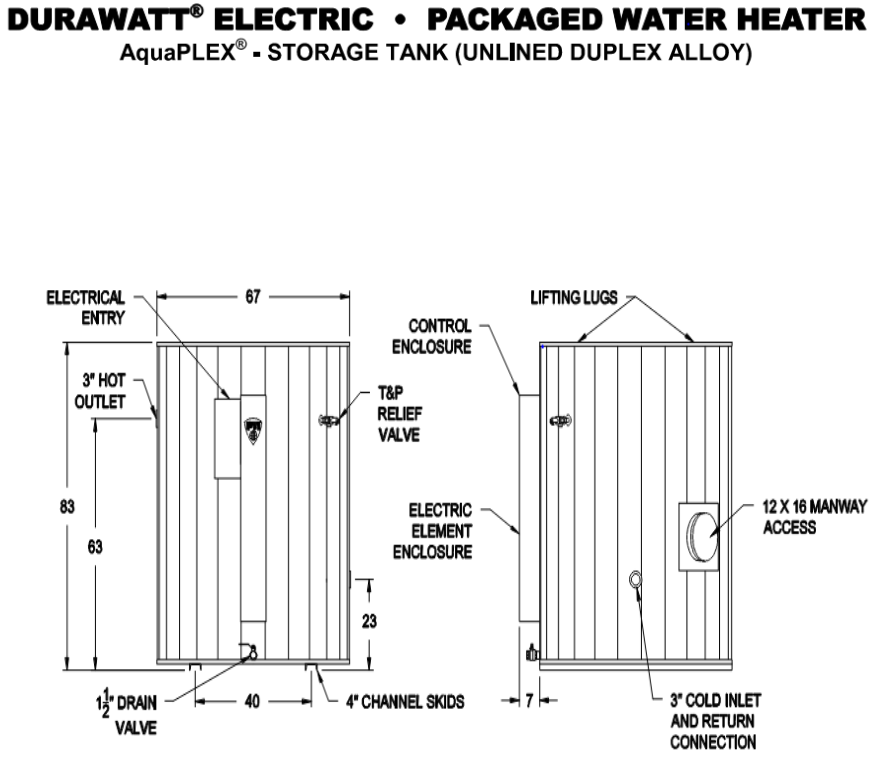
Plumbing

Water Service

- Domestic booster pump may be required
- Confirmed through Hydrant Flow Test

Plumbing

- Electric Water Heater(s)
  - Net Zero Ready - All electric
  - Centralized, Storage type.
  - 95-100% Efficient
  - Compliant with MA-EZ Code

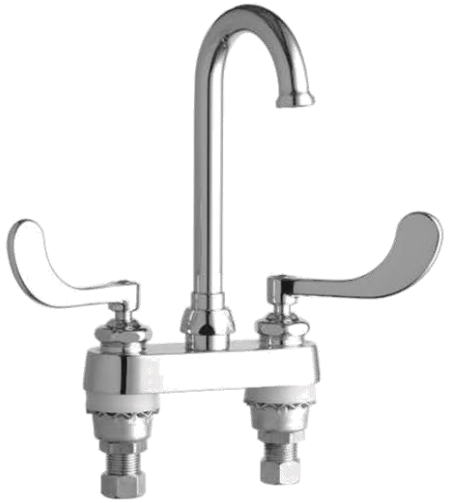


Plumbing

- Lavatory Faucets
  - 0.35 GPM – 0.5 GPM
  - Electronic, Sensor Operated
  - Regenerating Type/Battery Powered.
- Sink Faucets
  - 1.5 GPM
  - Manual

LEAD FREE

- **PWRX™ Long-Life Battery System:** Battery Life - 480,000 cycles (10 years @ 4,000 cycles per month). Advanced battery & electronics reduce the downtime and maintenance costs associated with changing batteries.
- **Easy Installation:** Simple integrated design; sensor, solenoid valve and electronics are enclosed in the spout. No control box below deck.
- **Above-Deck Mixing:** Allows user to manually adjust temperature. Leak-free ceramic disc valve. Hot limit safety stop to reduce the risk of accidental scalding. Installer can set temperature and remove handle to prevent user adjustment.



Plumbing Low-Flow Fixtures

- Flush Valves/Water Closets
  - Automatic, Exposed, Sensor-Operated, Regenerating Type/Battery Powered
  - 1.28 GPF
- Flush Valves/Urinals
  - Automatic, Exposed, Sensor-Operated, Regenerating Type/Battery Powered
  - 0.125 GPF

GENERAL DESCRIPTION:
Exposed, sensor-operated Selectronic® Toilet Flush Valve for floor-mounted or wall-hung 1-1/2" top spud bowls. PWRX 10-Year Battery System.

BATTERY LIFE:
4 years

GENERAL DESCRIPTION:
Exposed, sensor-operated Selectronic® Urinal Flush Valve for 3/4" top spud urinals. CR-P2 lithium battery powered.

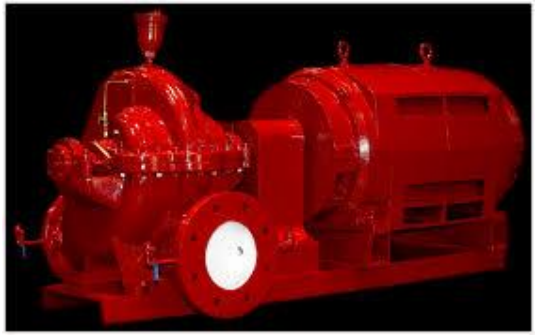
Plumbing **Fire Protection**

Fire Service

- Double Check Valve Assembly

Fire Service - Pump

- Requires water supply flow test analysis.
- Fire Pump may be required.
- To be determined/confirmed during design.

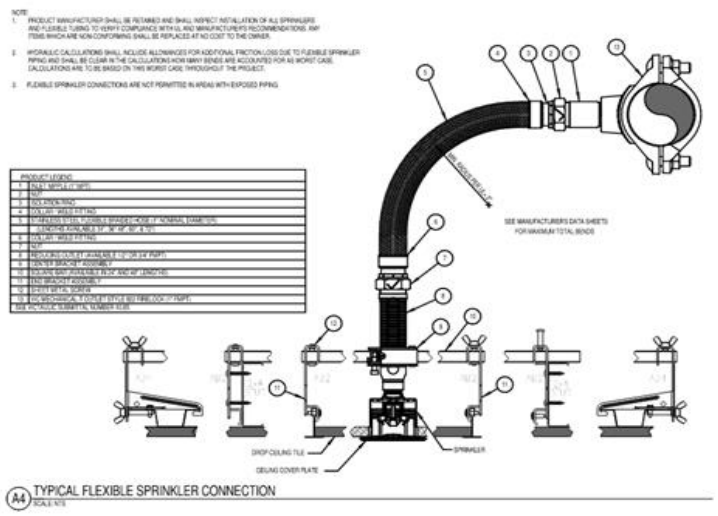


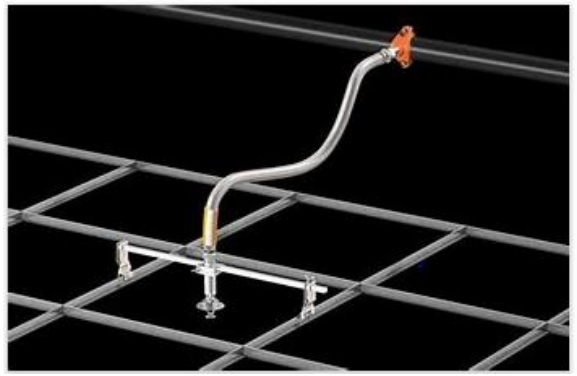
Fire Service Room

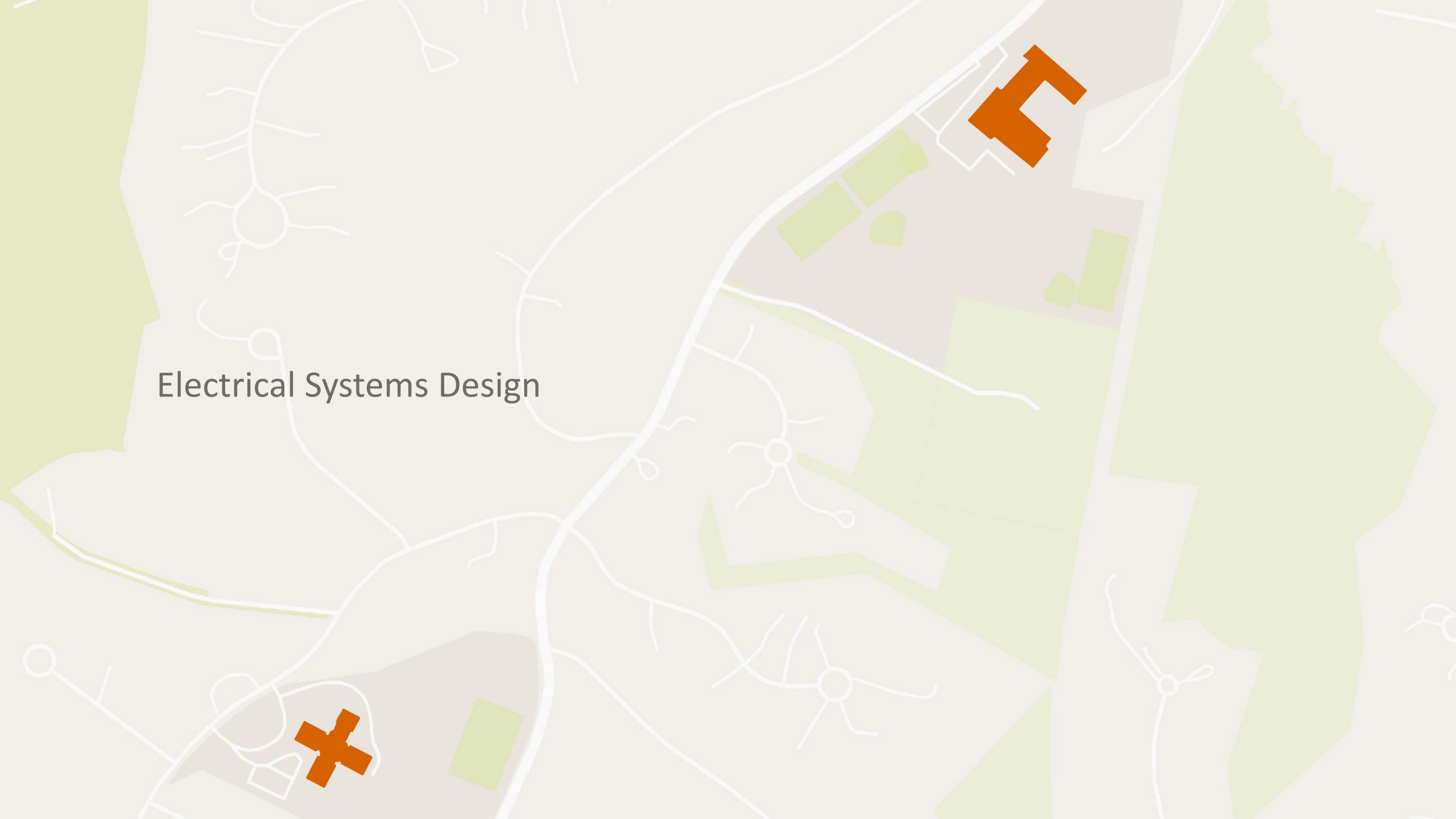
- Wet sprinkler zones
- Dry sprinkler zones (roll up door areas, loading dock)

Plumbing **Fire Protection**

- Sprinkler Head Types: Concealed, Upright/Pendant, Dry Pendant, Horizontal Sidewall
- Flex Heads/Flexible piping connections to sprinklers (stainless steel flexible braided hose in lieu of black steel hard pipe).
  Note: Flexible sprinkler connections are not permitted in areas with exposed piping.






Electrical Systems Design

Electrical Systems

Service & Distribution

- New 277/480V, 3Ø 1600A Electrical Service
  - Pad-mounted Transformer
  - Switchboard
  - Distribution Panels
  - Power and lighting Panels
  - Stepdown Transformers
  - Metering
  - Photovoltaic Ready Infrastructure

Electrical Systems

Metering

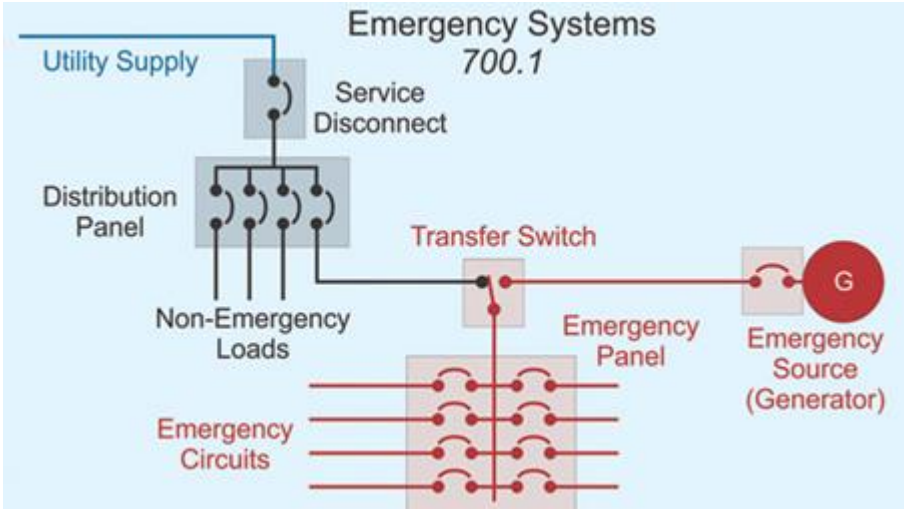
Loads to be Metered Separately- ASHRAE / LEED

- Total Building
- HVAC
- Interior Lighting
- Exterior Lighting
- Receptacle Circuits
- Individual Loads > 10% of total annual bldg. consumption

Design Goals

- Tie metering into the BMS system
- Meters to record consumption and demand.
- Data to be stored for 36 months

Electrical Systems



Pad-Mounted Generator

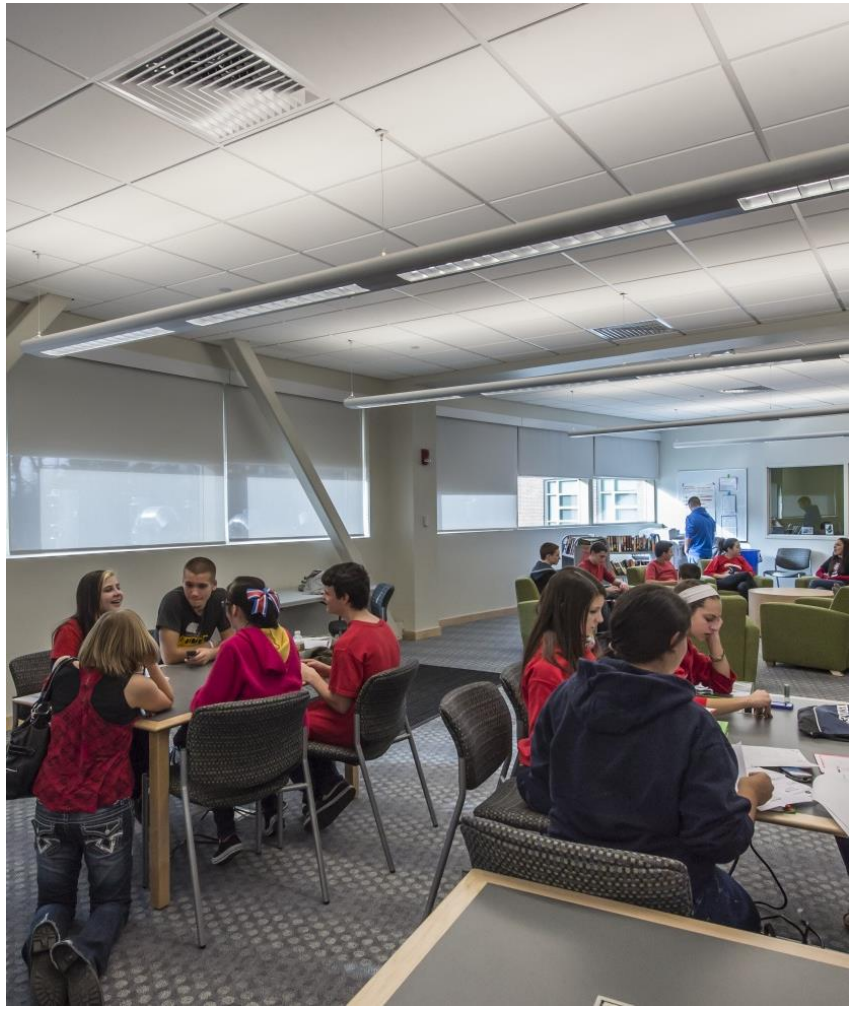
Emergency (Life Safety):

- Exit signs & Emergency lighting.
- Fire Pump (if applicable)
- Fire alarm system
- BDA (if applicable)

Code-Optional Standby (planned for this project):

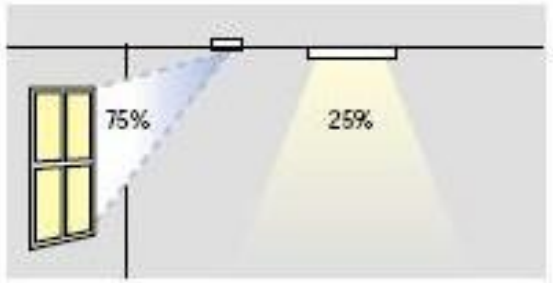
- HVAC systems required for Freeze protection, pumps and controls
- Kitchen Refrigeration
- Tel/data & Security System
- Public address & telephone systems
- Elevator
- Custodian area receptacles
- Convenience receptacles in Nurse & Admin areas

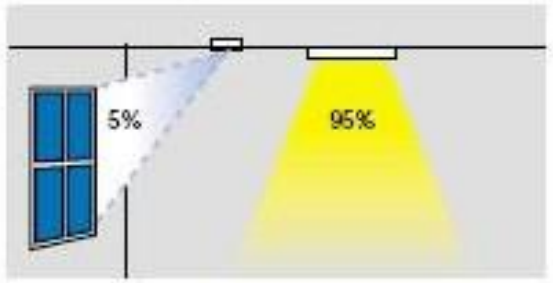
Electrical Systems



Lighting & Controls

- High Efficient Interior and Exterior LED Lighting
- Intelligent Lighting Control System
- Daylight Harvesting
- Occupancy Sensors
- Timeclock
- Demand Response





MA Energy Code Highlights

1. Base Code

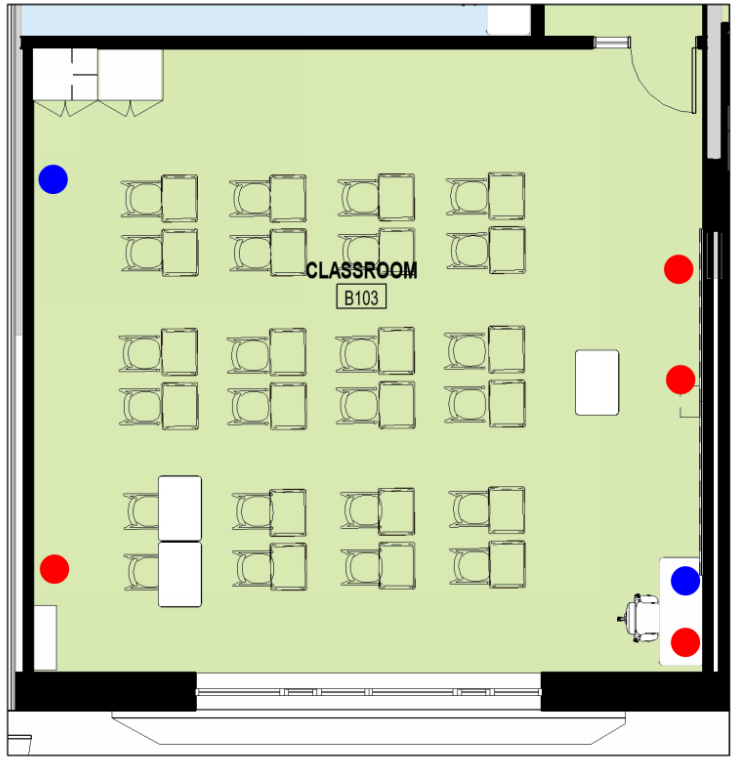
IECC 2018 is the base Code adopted by Massachusetts, with mandated Amendments:

- Amendments become part of the base code.
- Lighting power density requirements to ASHRAE 90.1-2019 stds. (School- .72 W/SF) [MA EZ Code requires IECC 2021, equivalent to 90.1-2019]
- (3) C406 section options required as base code, 2 lighting options selected.
- PV readiness
- EV Charging Stations (per EZ Code)

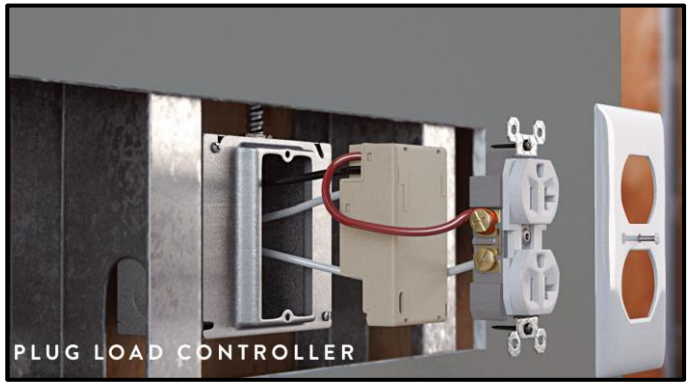
2. Massachusetts Stretch Code

- 10% overall building energy performance better than MA Energy Code (IECC 2018) with Amendments (.65 W/SF).

Electrical Systems



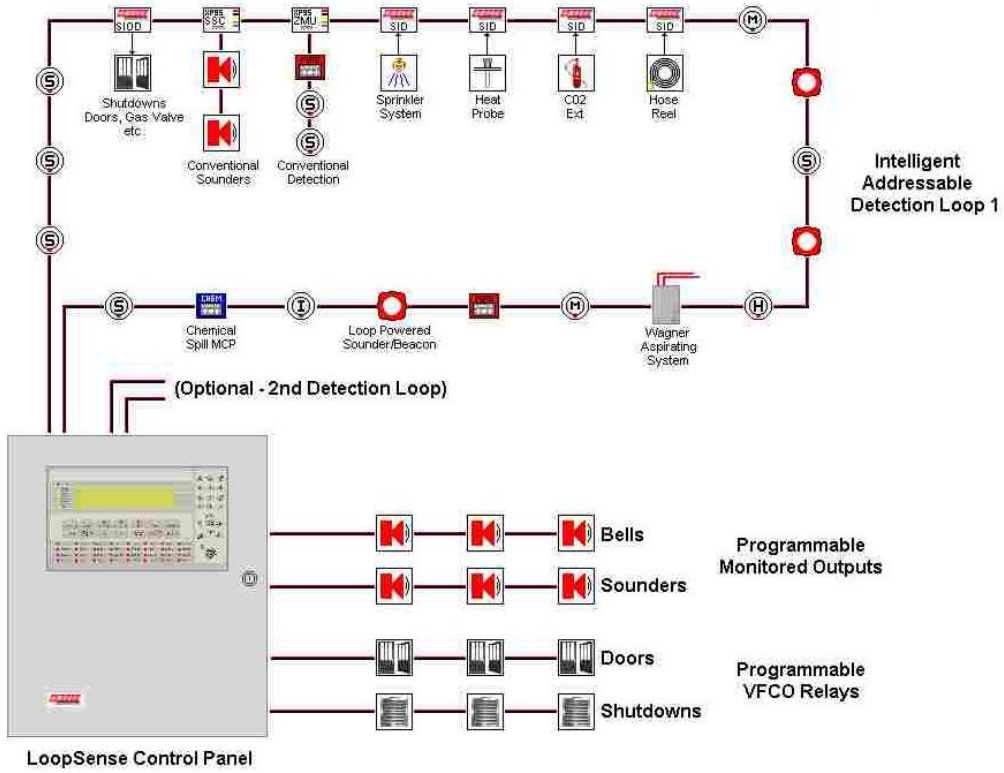
NON-CONTROLLED OUTLET
CONTROLLED OUTLET



Plug Load Controls

- One Plug Load Controller controls individual receptacles or a group of devices on one common circuit
- Automatically controlled receptacles will be permanently marked with the universal power symbol per the NEC.
- Automatically control 50% of receptacles in the following areas:

Electrical Systems



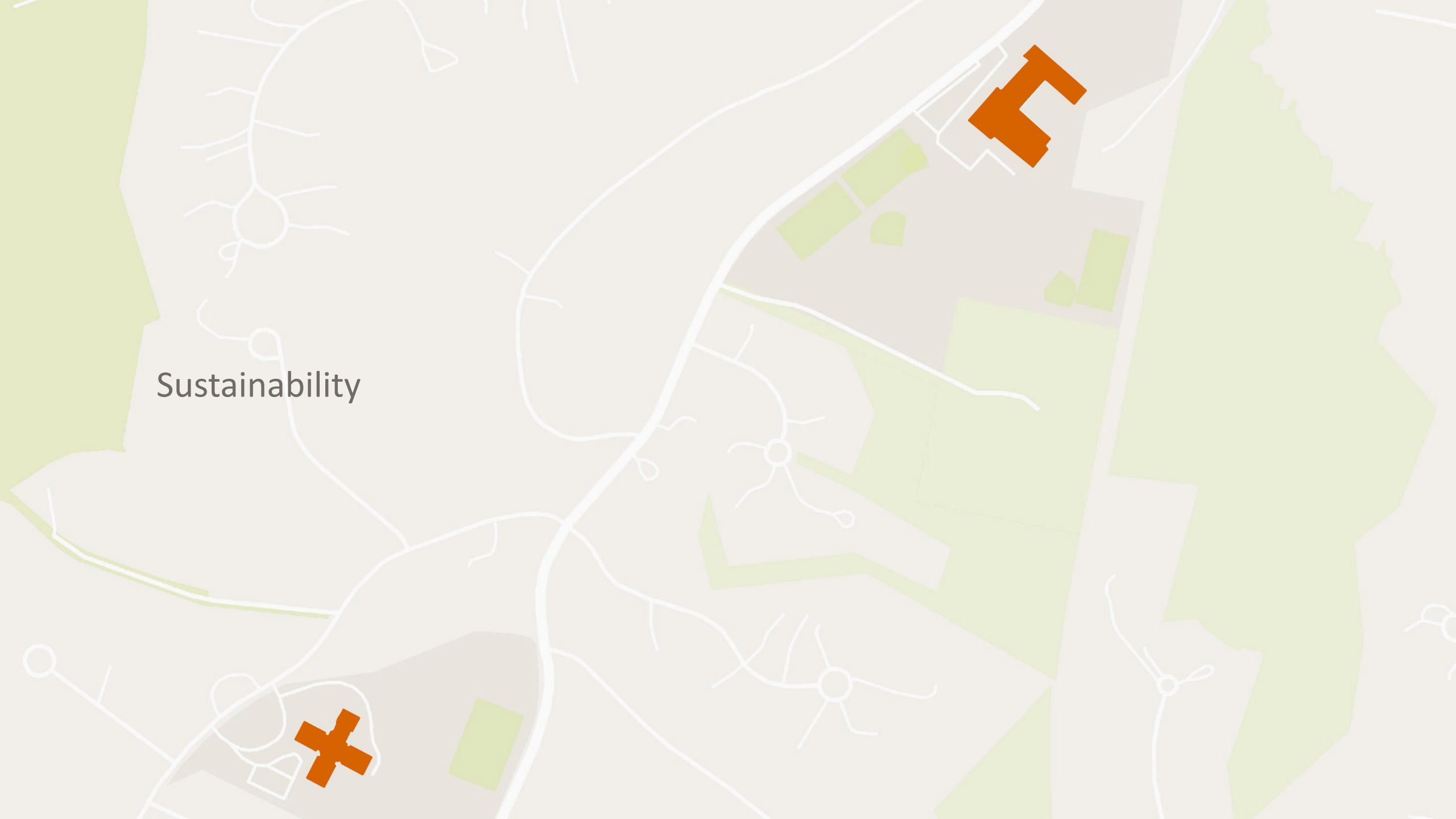
Fire Alarm System

- Fully Addressable class A non-proprietary system with voice evacuation.
- Speaker/Strobes
- Pull Stations

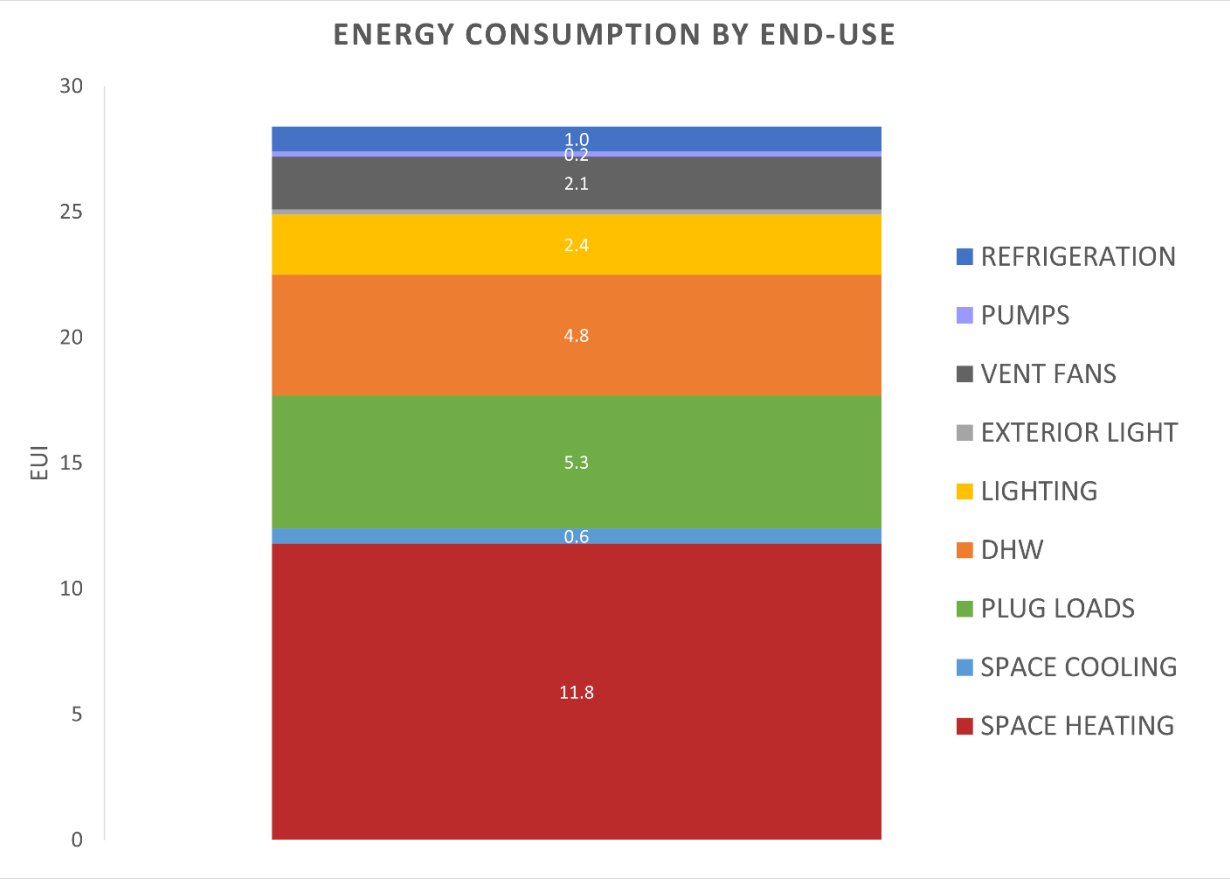
  Smoke Detectors

  Heat Detectors

  Tamper and Flow Switches


Sustainability

Concord Middle School EUI Goal Update



28

EUI

Massachusetts EZ Code

- Average Enclosure U-value IECC 2021
- EV Charging Infrastructure:
  - No less than 60% of parking spaces must be EV Capable
  - No less than 10% of parking need to have EV Supply Equipment
  - Will impact site EUI (metering/monitoring building vs. EVs EUI)
- Demand Response Capable:
  - The building must include DR controls & infrastructure capable to reduce by at least 2% power in peak demand, or 10% of estimated peak demand based on energy model simulationdied

LEED

Scorecard [certifiable]

Embodied Carbon Analysis

Environmental Literacy - Signage

LEED v4 for BD+C: Schools
Project Checklist

DRAFT

Project Name: **New Concord Middle School**
Date: March 17 2021

Preliminary LEEDv4 Silver (50 points) Assessment - subject to change pending schematic design

Y	?	N			
1			Credit	Integrative Process	1

1	4	#	Location and Transportation		15
		15	Credit	LEED for Neighborhood Development Location	15
	1		Credit	Sensitive Land Protection	1
	1		Credit	High Priority Site (check exist. Bldgs status - Asbestos & soils)	2
		5	Credit	Surrounding Density and Diverse Uses	5
		4	Credit	Access to Quality Transit	4
	1		Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

5	5	2	Sustainable Sites		12
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
	2		Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
1	1	1	Credit	Rainwater Management	3
1	1		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
		1	Credit	Site Master Plan	1
1			Credit	Joint Use of Facilities	1

6	1	5	Water Efficiency		12
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction - assumes no irrigation	2
3	1	3	Credit	Indoor Water Use Reduction - 30% goal	7
		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

17	6	8	Energy and Atmosphere		31
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
5	1		Credit	Enhanced Commissioning	6
10	2	4	Credit	Optimize Energy Performance - LEED is energy cost based	16
1			Credit	Advanced Energy Metering	1
1	1		Credit	Demand Response	2
	1	2	Credit	Renewable Energy Production - 10 yrs min. PPA contract**	3
	1		Credit	Enhanced Refrigerant Management	1
		2	Credit	Green Power and Carbon Offsets	2

6	2	3	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
1	1	3	Credit	Building Life-Cycle Impact Reduction - LEEDv4.1 credit	5
1			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations - LEEDv4.1 credit	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1			Credit	Building Product Disclosure and Optimization - Material Ingredients - LEEDv4.1 c	2
2			Credit	Construction and Demolition Waste Management	2

8	6	2	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Prereq	Minimum Acoustic Performance	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
1	1	1	Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
	1		Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
1	1	1	Credit	Daylight - LEEDv4.1	3
1			Credit	Quality Views	1
	1		Credit	Acoustic Performance - $$$ - challenging at doors - high maintenance	1

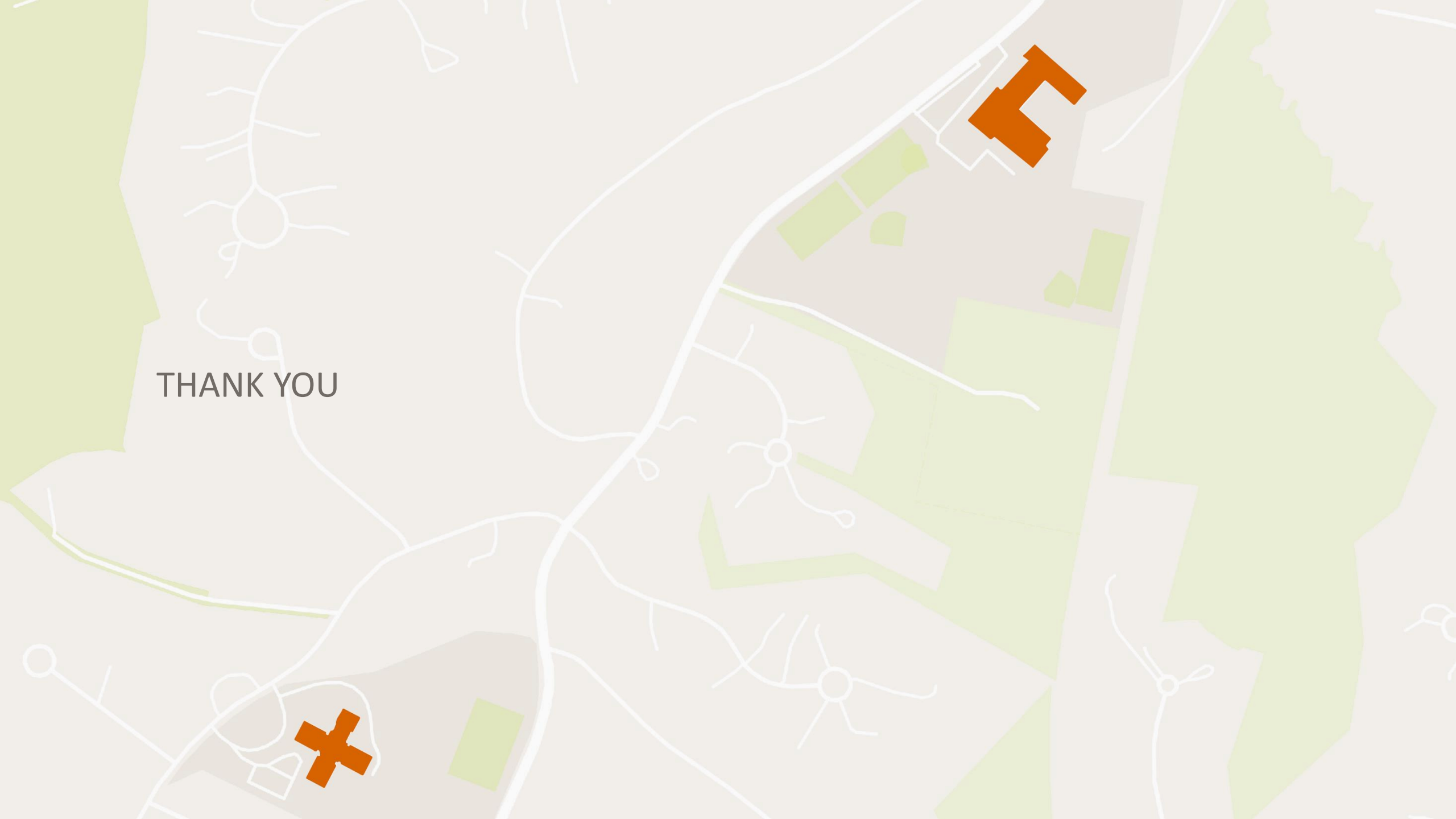
6	0	0	Innovation		6
5			Credit	Innovation:green cleaning/IPM, Low mercury lamps, Exempl. EPD/HPDs/CMWP, TBD	5
1			Credit	LEED Accredited Professional	1

2	2	0	Regional Priority		4
1			Credit	Regional Priority: Building LCA (Tally)	1
1			Credit	Regional Priority: Optimize energy performance (8 points min)	1
	1		Credit	Regional Priority: Rainwater management (2 points min)	1
	1		Credit	Regional Priority:Renewable energy (3 points min) or access to transit or Surroun	1

52	26	44	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

**Renewable Energy and Green Power Credits - project PV/renewable procurement only qualifies if school district owns the RECs through owning system or through PPA agreement/RE purchase agreement.


THANK YOU