

LAKERIDGE MIDDLE SCHOOL
LAKE OSWEGO SCHOOL DISTRICT
LAKE OSWEGO, OREGON



EXECUTIVE SUMMARY

With its welcoming, biophilic environment, Lakeridge Middle School is designed to support the unique needs of the middle school learner.

BIOPHILIC SURROUNDINGS In alignment with research confirming the positive, emotional impact that natural materials, patterns, and features can have on students, the design team used elements of biophilia throughout the school. Featuring natural light and ventilation, views, wood beams and White Oak tree trunks, the design evokes the feeling of being in nature to reduce stress, anxiety, and aggressive behavior.

LEARNER-CENTRIC ENVIRONMENT Wrapped around an exterior courtyard, the classrooms have been reimagined as a series of tech-savvy, paired Learning Studios. Each space features multiple teaching walls, mobile technology, and flexible furniture. Connected via a sliding glass door, the rooms share access to a maker space outfitted with hanging power grids, shop-style sinks, and mobile tool closets for project work.

PROMOTING EQUITY The cafeteria/commons is designed for students who thrive in more active areas as well as those who need calm. The space is broken into several zones, each offering a range of seating options and scales. The wood ceiling brings warmth and acoustical comfort to the space and a wall of glass creates visual and physical connection to a covered porch and courtyard. Every person in the building has access to private, single-occupant restrooms, which allow safe accommodation for all.

HIGHLY SUSTAINABLE BUILDING Dedicated to sustainability, Lakeridge Middle School represents a 71% reduction in energy use compared to a baseline middle school and is registered with the Energy Trust of Oregon’s “Path to Net Zero” program. Its structure and systems are designed to support occupants and reduce damage after a major seismic or storm event.

LAKERIDGE MIDDLE SCHOOL



SCOPE OF
WORK AND
BUDGET



OWNER
Lake Oswego
School District

SITE
AREA
28 acres

BUILDING
AREA
141,000 SF

GRADES
HOUSED
6-8

STUDENT
CAPACITY
1,100

SQUARE FEET
PER PUPIL
128 SF

OCCUPANCY
DATE
March 2021

CONSTRUCTION
COST
\$70M

CONSTRUCTION
COST PER
SQUARE FOOT
\$496/SF

ADVOCATING FOR FUTURE STUDENTS

The first of two area middle schools to be rebuilt, the Lakeridge design process included the entire community to develop a district educational specification in addition to the building design.

Tasked with the challenge of supporting learning for the next 100 years, the process included an Ed Spec Team, a Design Advisory Team, and broad community engagement. The process established goals for future learning, sustainability, and regional resilience.

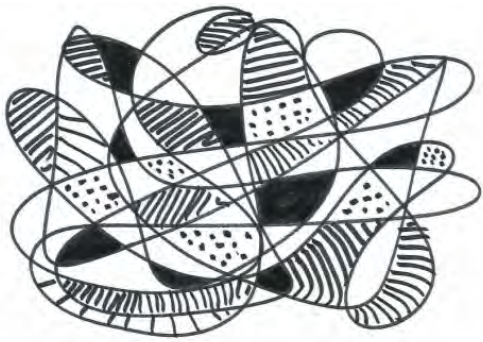
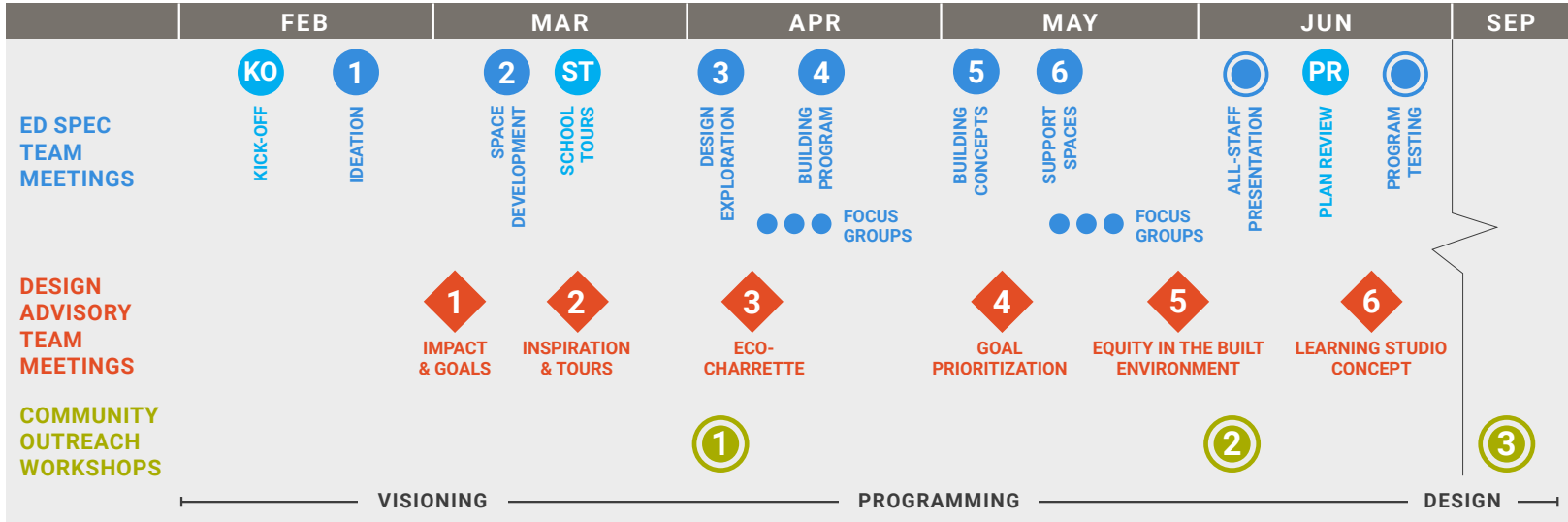
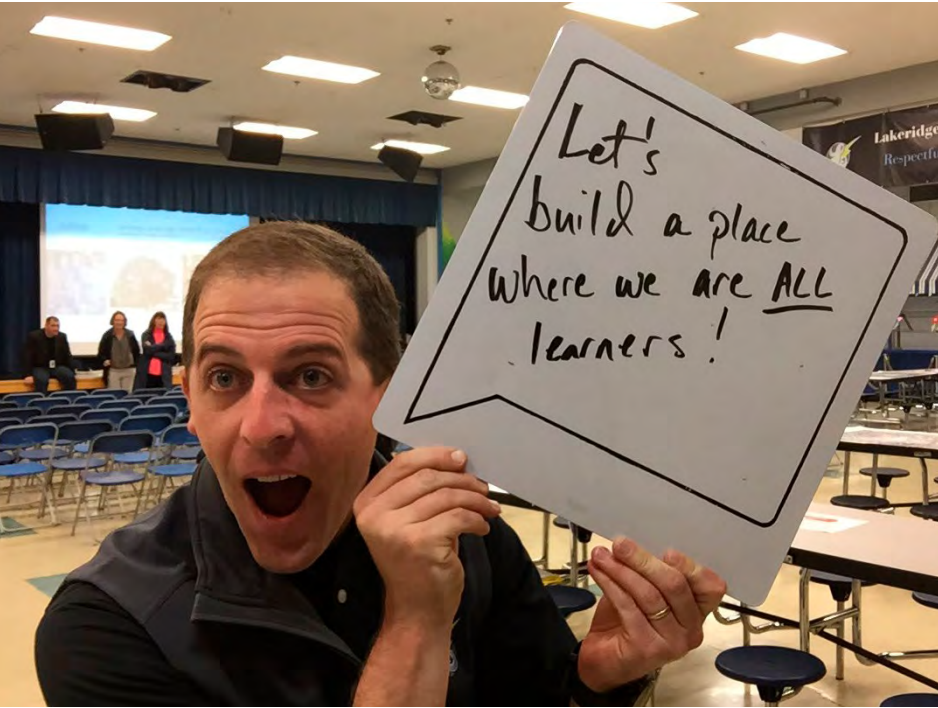
ED SPEC TEAM (EST) Tasked with establishing spatial criteria, this 11-person committee was comprised of District leaders, Teachers on Special Assignment, and middle school staff. This group met six times and toured six area schools, providing feedback and creating goals to shape how the allotted area should be used to best serve the needs of the future students of Lake Oswego.

DESIGN ADVISORY TEAM (DAT) Tasked with analyzing and synthesizing goals set by the EST, this 25-person committee was comprised of EST members, Lake Oswego School District personnel, Lakeridge faculty, parents, and students, and community stakeholders. They met six times and served a critical role in sharing the design decision-making with the community.

COMMUNITY PARTICIPANTS Over three weekends, the community at large was invited to participatory workshops to ask questions, provide feedback, review project goals, discuss construction phasing, and share their hopes for the new school.

DISTRICT & MIDDLE SCHOOL FOCUS GROUPS These groups were comprised of representatives from students, athletics, community school, facilities, food services, equity, library, special services, technology, transportation, administration, counseling, general classrooms, arts, science/ stem, physical education/health, and special services. They were brought in at key junctures to collaborate, enhance, and/ or challenge design solutions, or to validate the direction established by the EST and DAT.

BELOW: The EST and DAT met multiple times to ideate and set goals for the project. Community outreach and working with the students were also important to the success of the project.



We are committed to being connected and inclusive: students, staff, parents, everyone!

GOAL-SETTING AND
PRIORITIZATION

The community outlined ten goals for the District’s new middle schools. The DAT then worked with the District, staff, faculty, students, and parents to prioritize the top three goals specific to Lakeridge Middle School:

- 1. LEARNER-CENTRIC ENVIRONMENT** Building provides tools students need to learn, including technology; allows deep exploration; learning objectives fit each student’s needs; flexible spaces.
- 2. PROMOTE EQUITY** All users are emotionally comfortable and physically secure; recognition that students learn in different ways; diversity is embraced.
- 3. HIGHLY SUSTAINABLE BUILDING** School is a beacon for green building practices; learning opportunities; save long-term utility and maintenance costs.

The remaining seven goals also influenced the school design:
STIMULATE CURIOSITY & ENGAGEMENT Opportunities for hands-on learning; learners have choices; sense of excitement; kids don’t want to go home!

PROMOTE HEALTHY LIVING Encourage physical activity; Encourage positive mental environment, less stress; connect nutrition and food production.

CONNECTION TO NATURE People in and around the school feel connected to the natural environment; daylight and views; opportunities to learn outdoors; site as a learning tool.

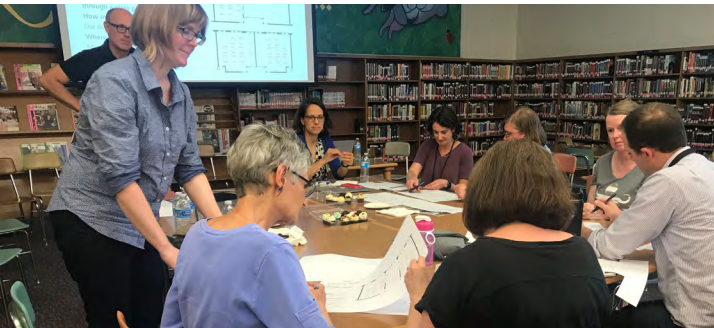
RESILIENT DESIGN Building systems can withstand a major seismic event; building can be a community resource after a disaster; school can resume normal operations quickly.

INSPIRE LEARNING THROUGH BEAUTY Community pride in the school; moments of inspiration through architecture.

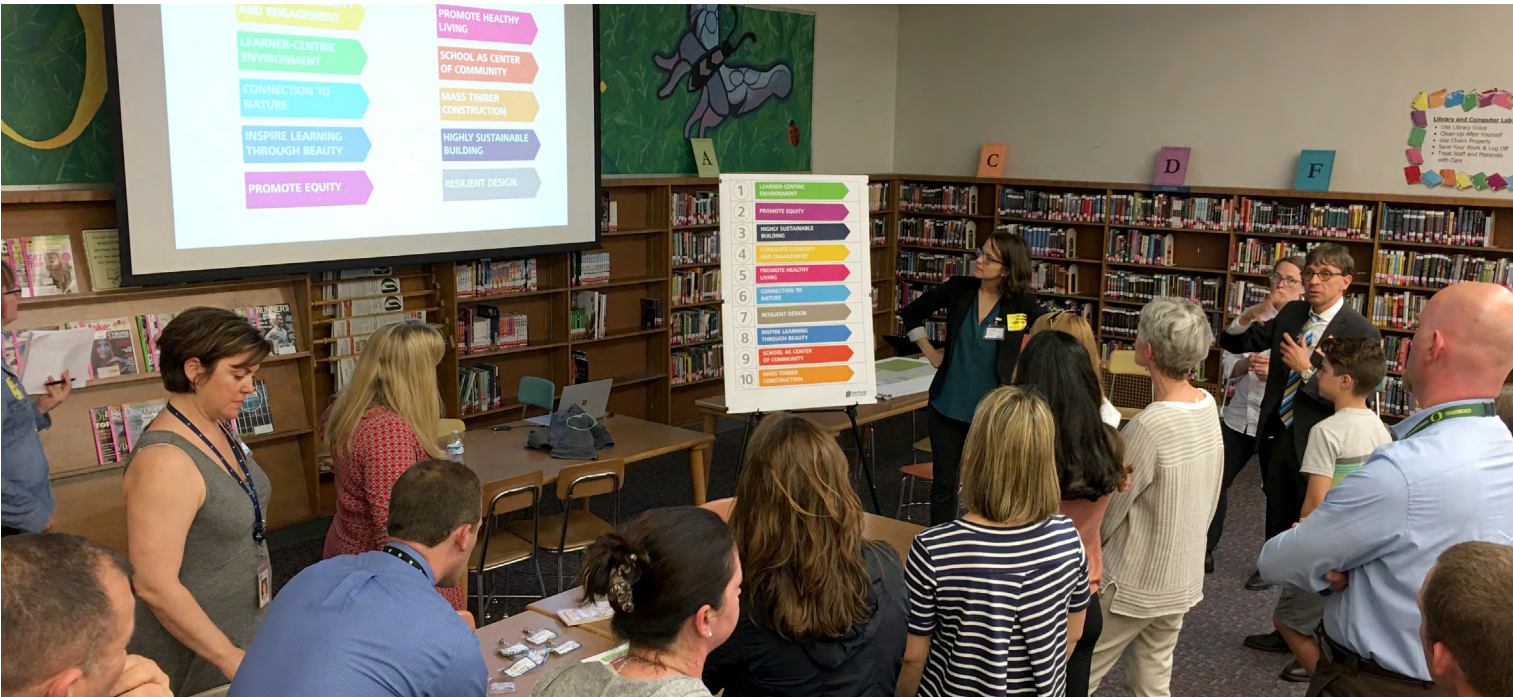
SCHOOL AS CENTER OF COMMUNITY Provokes learning for everyone – students, parents, teachers; part of the culture of Lake Oswego; places to host events and gather.

MASS TIMBER CONSTRUCTION Utilize locally-available, highly renewable wood products in construction; beauty of wood brings warmth to space.

BELOW: The DAT looks more specifically at the design solution for the Lakeridge site, providing comments on site diagrams and indicating their preference on a variety of topics.



1	LEARNER-CENTRIC ENVIRONMENT
2	PROMOTE EQUITY
3	HIGHLY SUSTAINABLE BUILDING
4	STIMULATE CURIOSITY AND ENGAGEMENT
5	PROMOTE HEALTHY LIVING
6	CONNECTION TO NATURE
7	RESILIENT DESIGN
8	INSPIRE LEARNING THROUGH BEAUTY
9	SCHOOL AS CENTER OF COMMUNITY
10	MASS TIMBER CONSTRUCTION



SUPPORTING THE NEEDS OF TEENAGE LEARNERS

Based on input from the stakeholder groups, the Design Team identified key building program elements that would allow the middle schools to meet their vision and goals, but also tailor the spaces for the unique needs of the Lakeridge Middle School student.

CLASSROOMS AS LEARNING STUDIOS Support all aspects of learning: self-directed, teacher-coached, individual, small-group, large group, experiential, multi-disciplinary, etc.

CAFETERIA AS SEMI-DISTRIBUTED COMMONS Accommodate a wide variety of students, including those who prefer quieter areas and those who thrive in larger open areas.

LIBRARY AS READING ROOM As technology changes the way resources are delivered, the library will be a more-intimate space to celebrate reading the printed word.

GYMS AS LARGE, FLEXIBLE TEACHING STATIONS Gyms can be divided into two teaching stations or used at its full size for competition. The larger gym is also equipped to be an assembly space and large-ensemble performance space.

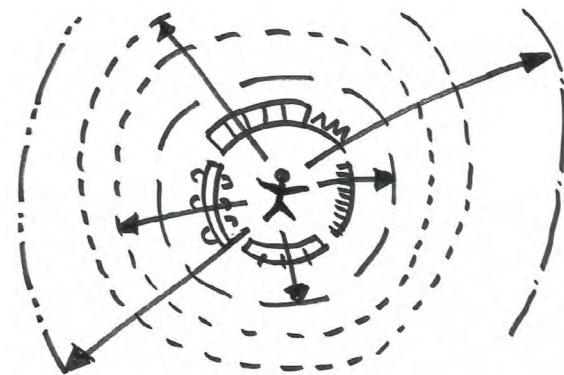
SPECIAL EDUCATION AS A RESOURCE FOR STUDENTS A suite of rooms can be organized to serve any of the District's special services. This will allow schools to meet current programming and ability to be flexible for future program changes.

NATURE AS A TANGIBLE ASSET The natural environment will be easily accessible via views, direct connections between curricular areas and the commons, and nature play elements.

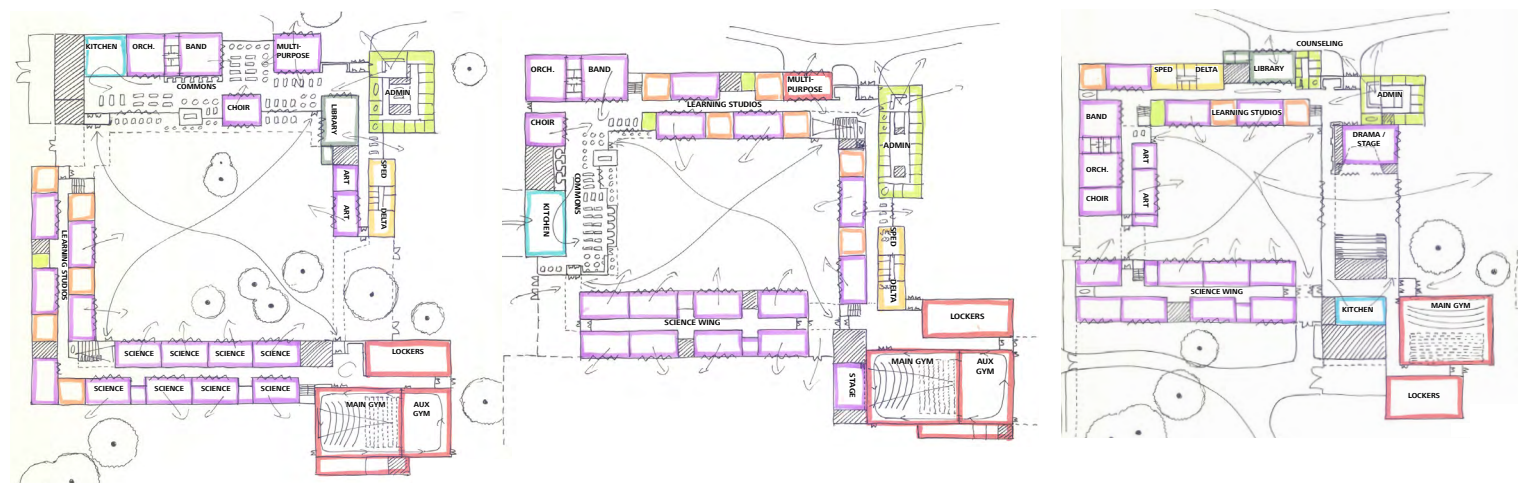
BUILDING ORGANIZED AS A LOOP Expose students to a variety of learning opportunities with a continual loop organization that has no dead ends.

FLEXIBILITY IN THE FACE OF THE UNKNOWN Designed before the global pandemic, the flexible features of the building allowed easy adaptation: 100% outside air, large classrooms, covered play as cafeteria, and a secure outdoor courtyard contributed to a safe, comfortable return to in-person learning.

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"Every space is a space to learn, students have access to tools they might need in every setting."



EXPOSING TEENAGE LEARNERS TO ARCHITECTURE

In 2018, the Design Team hosted the local SchoolsNEXT team at a Lakeridge DAT meeting, offering insights into the students' work and in turn, invited the students to share thoughts on the design of their new school.

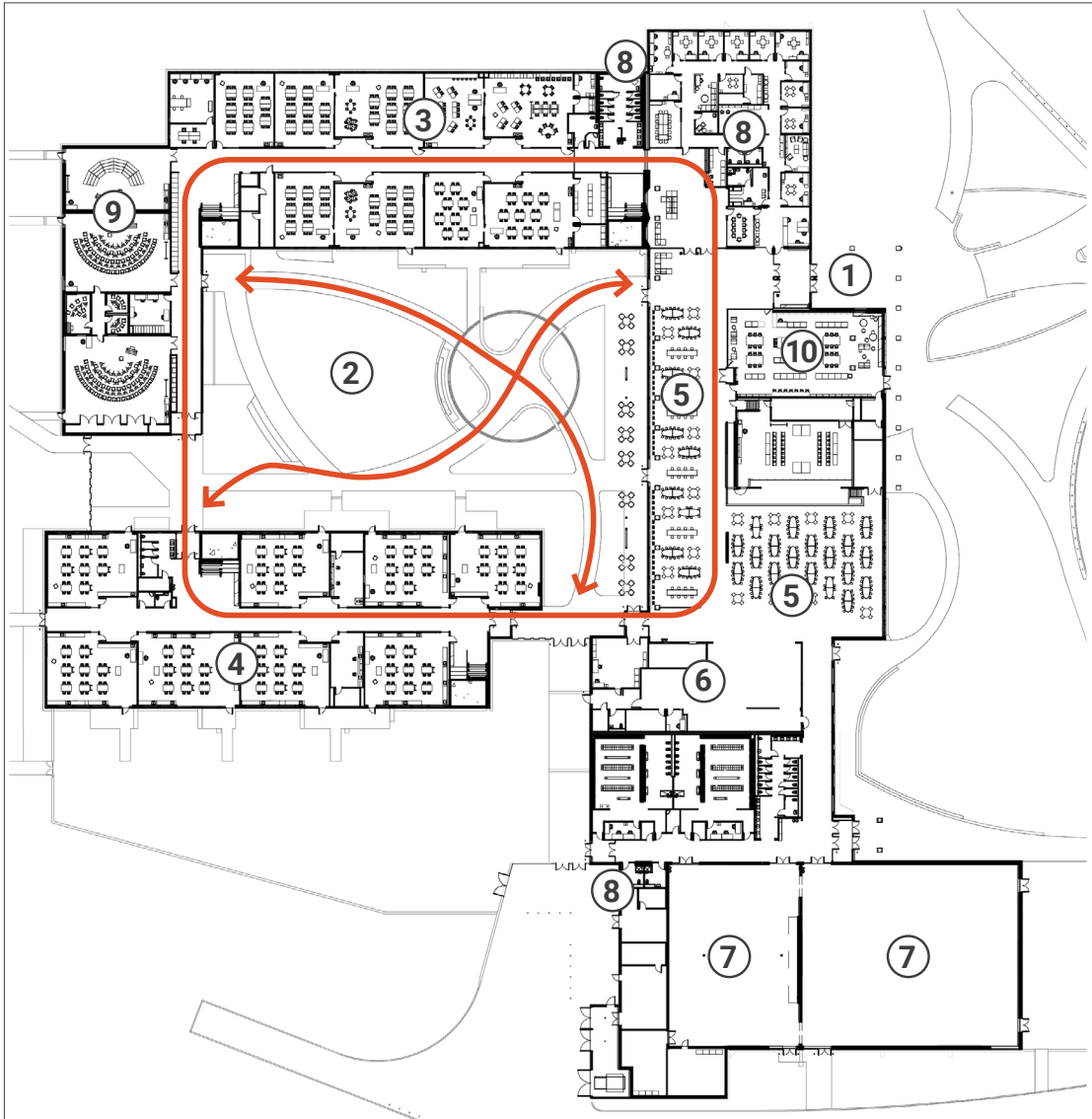
More recently, the Design Team provided materials and volunteered their time to assist a "new to architecture" teacher plan a model building class and helped the students translate their ideas into three dimensions. It was gratifying to see many of Lakeridge's design features, such as the courtyard and connections to nature, had been translated into the class's design ideas.

EDUCATIONAL ENVIRONMENT DESIGN

AN ENGAGING AND ACTIVE ENVIRONMENT

To create an environment tailored to the academic, social, and emotional needs of the teenage learner, the building is organized as a “loop,” which eliminates dead ends, diversifies circulation pathways, exposes students to a variety of learning, and reduces travel distances by encouraging short-cuts through a secure outdoor courtyard.

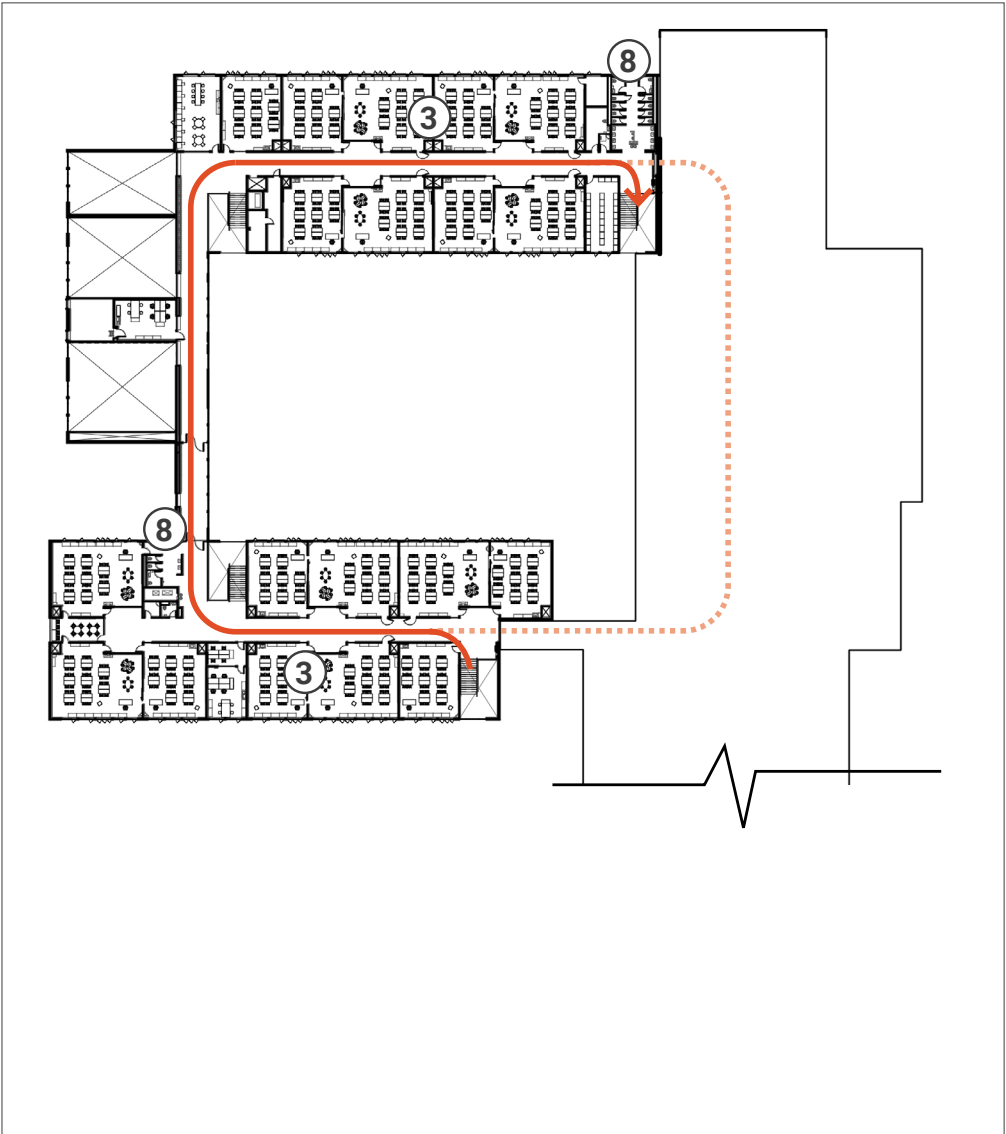
The biophilic elements, natural material palette, and building performance continually re-enforce a connection to nature which has shown to create improved learning outcomes.



FIRST LEVEL FLOOR PLAN

FLOOR PLAN LEGEND

- | | | |
|----------------------|------------------------------|---------------|
| 1. Main Entry | 5. Distributed Commons | 9. Music Wing |
| 2. Outdoor Courtyard | 6. Kitchen and Served | 10. Library |
| 3. Learning Studios | 7. Gymnasium | — The “Loop” |
| 4. Science Rooms | 8. Single-occupant Restrooms | |



SECOND LEVEL FLOOR PLAN



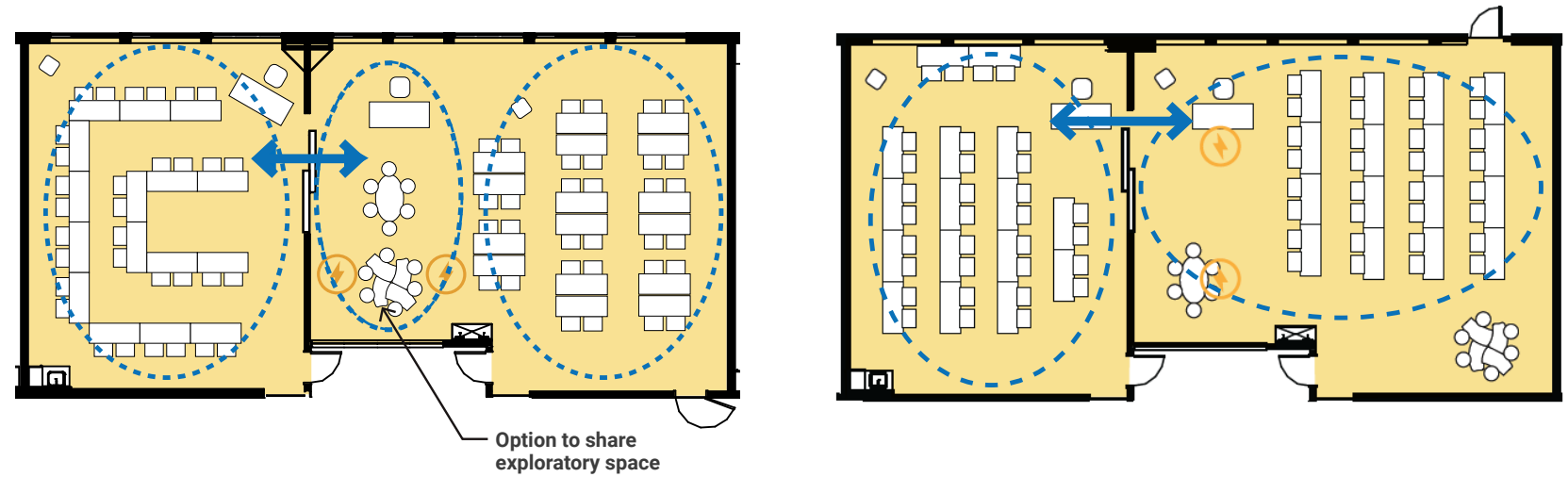
EDUCATIONAL ENVIRONMENT DESIGN

LEARNING IS INTERACTIVE AND ADAPTABLE

The design team and faculty tested full-sized mock-ups for a year, landing on pairs of 950 SF “general” classrooms and 1,150 SF “makers labs” that are physically and visually connected. Dubbed “Learning Studios,” the spaces offer flexibility with multiple teaching walls, flexible furniture, and mobile technology.

The makers lab can seat a class at tables with an open work area or spread out into small groups. The labs contain hanging power, industrial sinks, and mobile tool closets. Exposed concrete floors throughout the Learning Studios allow STEAM activities to take place anywhere. Teachers and students collaborate to plan how the spaces will be shared and utilized each day.

BELOW: During the mock-up stage, the design team created a magnetic tool to sample configurations within the two full-sized test rooms.



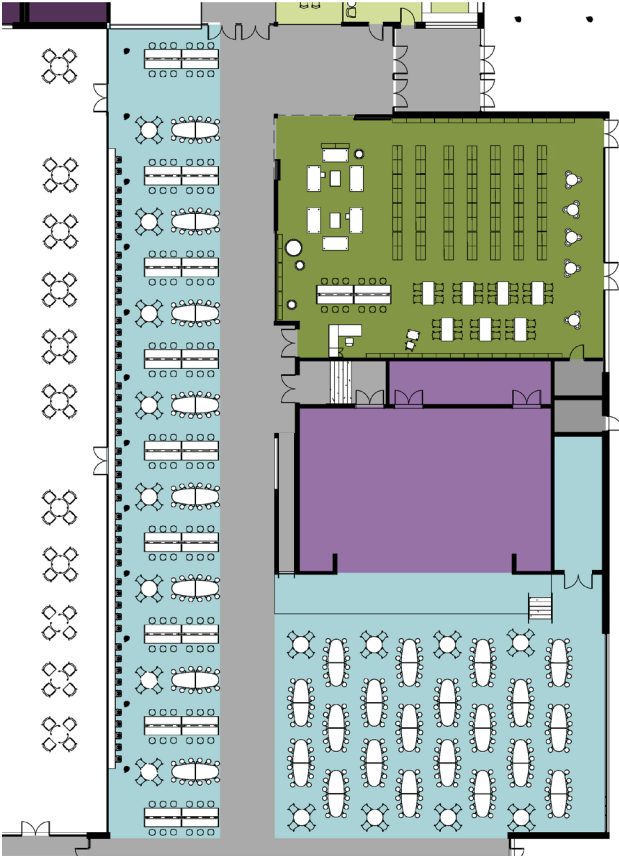


EDUCATIONAL ENVIRONMENT DESIGN

PROMOTING EQUITY: FINDING YOUR PLACE

To support student well-being, the traditional middle school cafeteria was reinterpreted into a distributed commons, catering to students who thrive in more active areas as well as students who prefer calmer, quieter spaces.

The commons is broken into several zones, each offering a range of seating options and scales. A covered porch offers additional seating in the outdoor learning courtyard. The adjacent library opens to the quieter eating area, providing additional space for students to read, play games, or work on puzzles.



- LEGEND
- Distributed Commons
 - Library
 - Outdoor Seating
 - Stage/Music Room
 - Circulation

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EDUCATIONAL ENVIRONMENT DESIGN

TWO GYMS IN ONE

Two gymnasiums are connected by two roll-up, garage-style doors and can be cordoned off or opened up, depending on usage. The larger of the two gyms is equipped to be an assembly space and large-ensemble performance space, and both gyms are equipped to serve as community shelter in case of emergency.



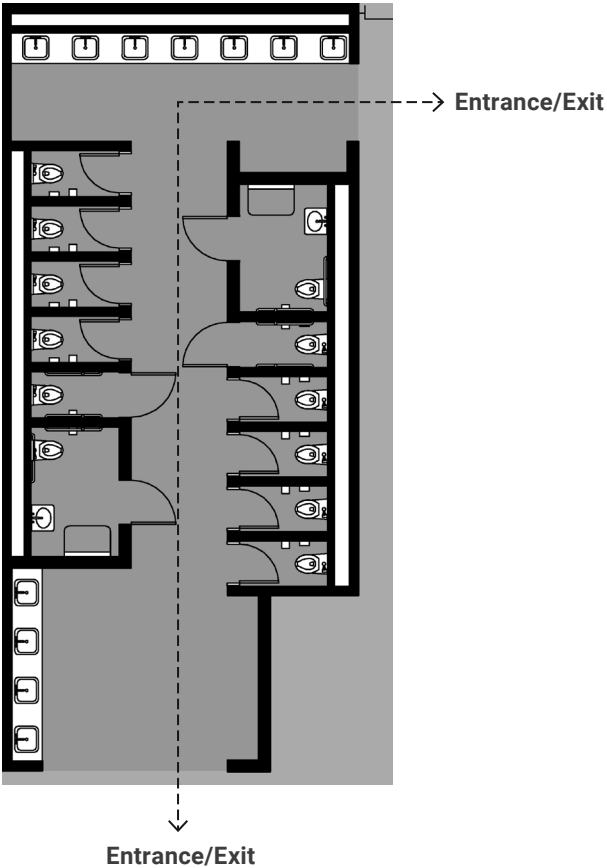
LAKERIDGE MIDDLE SCHOOL



EDUCATIONAL ENVIRONMENT DESIGN

PROMOTING EQUITY: STUDENT WELL-BEING
The restrooms throughout the building allow for personal privacy and safety for all students regardless of abilities or gender identity.

Rows of individual, non-gendered toilet rooms provide acoustic and visual privacy with full-height doors that open to a hallway with shared sinks for handwashing, allowing staff supervision to prevent unsupervised congregation and bullying.

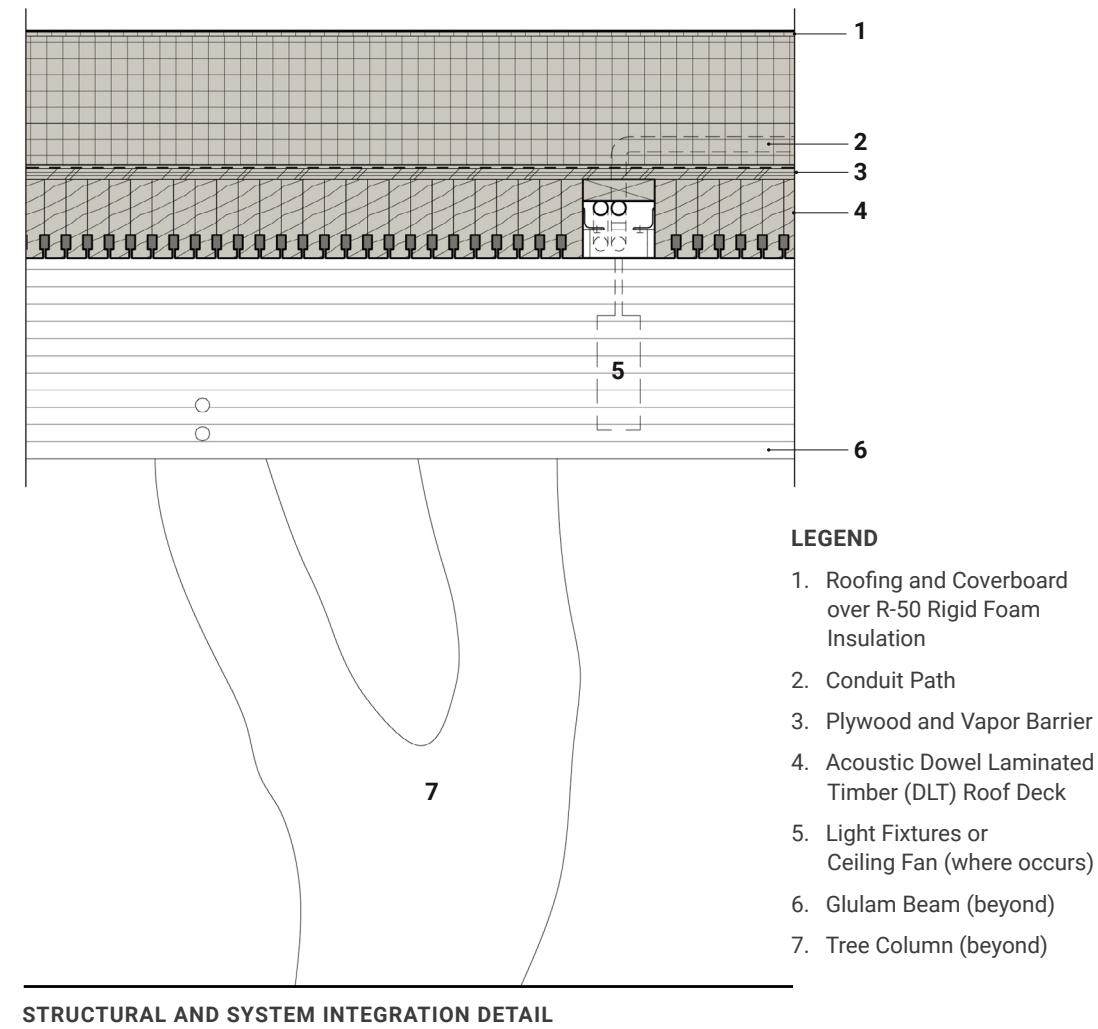


EDUCATIONAL ENVIRONMENT DESIGN

HIGHLY SUSTAINABLE BUILDING: LOCAL MATERIALS

Locally-sourced dowel-laminated-timber (DLT) ceilings create an intimate scale across the public areas of the school. This single material serves as a structural element, providing acoustic absorption and forming a final finish that ties into biophilic and low-carbon goals.

The library (shown at right) benefits from the warmth of the wood to achieve the District’s goal to “create a more intimate space to celebrate reading the printed word.”



EDUCATIONAL ENVIRONMENT DESIGN

HIGHLY SUSTAINABLE BUILDING: GETTING MORE BY USING LESS

Polished concrete floors perform as a structural element as well as provides thermal mass that offsets temperature gain throughout the day.

Structural walls and ceilings are left exposed to minimize materials and save on costs.

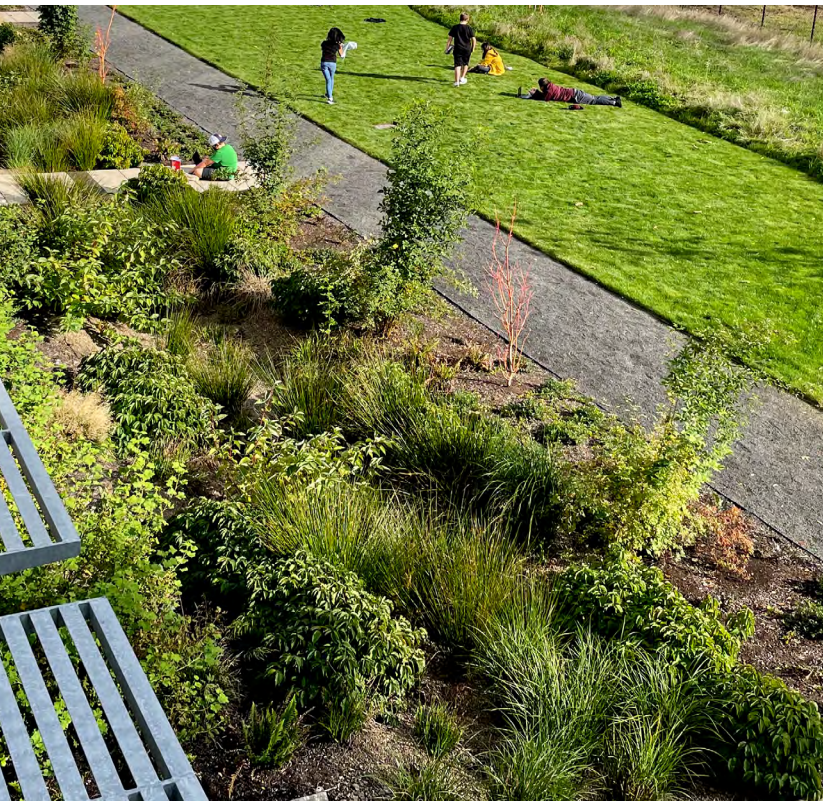
Wood screens and benches add a natural element to the space and encourage students to linger.



A SITE RICH IN HISTORY
AND INSPIRATION


The design team researched the history of the site, the geology, the trees, and the surrounding areas which led to inspiration for the landscape forms as well as the palette of natural materials and colors used throughout the project.


A CHALLENGE BECOMES AN OPPORTUNITY
A site with a high water table and heavy clay is not conducive to infiltration. To solve for this, stormwater is managed through vegetated biofiltration planters, utilizing native plants and underground detention chambers. The planters also aid in removing pollutants such as pesticides, oils and grease, sediment, phosphorus, and metals.





SITE PLAN LEGEND


- 1. Vehicle Access
- 2. Bus Drop-off
- 3. Parent Drop-off Lane
- 4. Main Entry Plaza
- 5. Visitor/Staff Parking
- 6. Secure Courtyard
- 7. Science Yard/Garden
- 8. Existing Wetland
- 9. Existing Athletic Fields
- 10. Pedestrian Connections


 Landscape Area

 Enhanced Landscape Area

 Stormwater Planters

 Native Meadow/Planting Area

 Mulch

 Existing Trees to Save

PHYSICAL ENVIRONMENT DESIGN

HIGHLY SUSTAINABLE BUILDING: IN CASE OF EMERGENCY

Designed as a Seismic Risk Category IV structure, the building is a community shelter in the case of a seismic event, large-scale power outage, or other disruptive incident. Hybrid passive cooling, a robust building envelope, and operable windows allow the school to be habitable without power.

The gymnasiums, commons, kitchen, and locker rooms have extra features that will support temporary shelter. Water connection for pumper trucks can supply water to these areas, while select kitchen equipment and emergency outlets (colored red) receive power from a generator.

The resilient features of the school were championed by a local advocacy group, the Lake Oswego Sustainability Network. Members have continued to work with local officials to develop action plans should these spaces be needed.

STRUCTURAL CAPACITY
Entire building structure designed to Seismic Risk Category IV with enhanced Lateral Bracing

PASSIVE SURVIVABILITY
Robust building envelope, daylighting, and high performance operable windows allow school to be habitable without utility power

COMMUNITY RECOVERY SHELTER
Gyms, Commons, Kitchen, Locker Rooms:

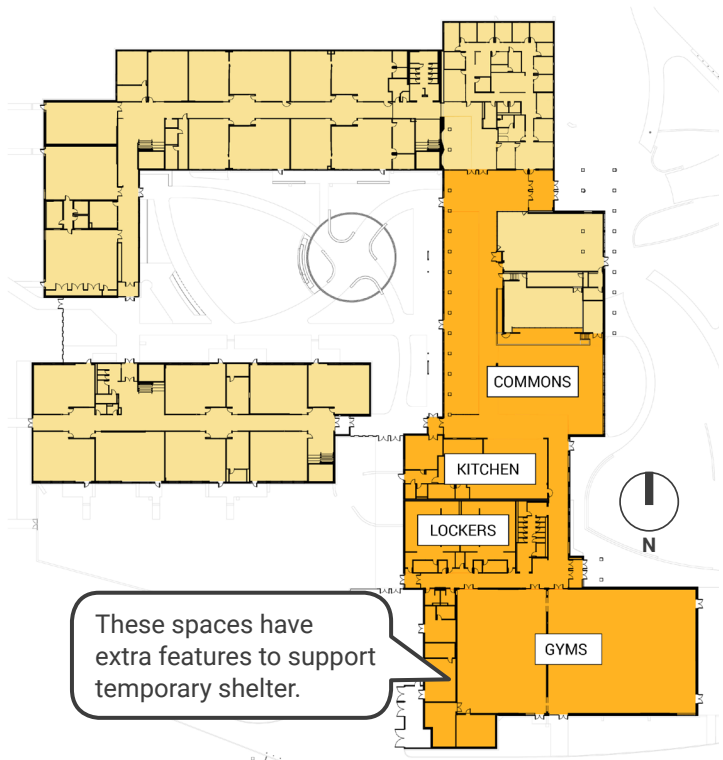
Back-up generator can support limited electrical loads in the above spaces

Back-up ventilation exhaust at gyms

Passive ventilation at commons and Learning Studios

Exterior water connection for pumper trucks serve kitchen, locker rooms, and restrooms

Kitchen is all electric and select cooking equipment can run off generator or future battery storage system



RESILIENT STRATEGIES: COMMUNITY RESOURCE



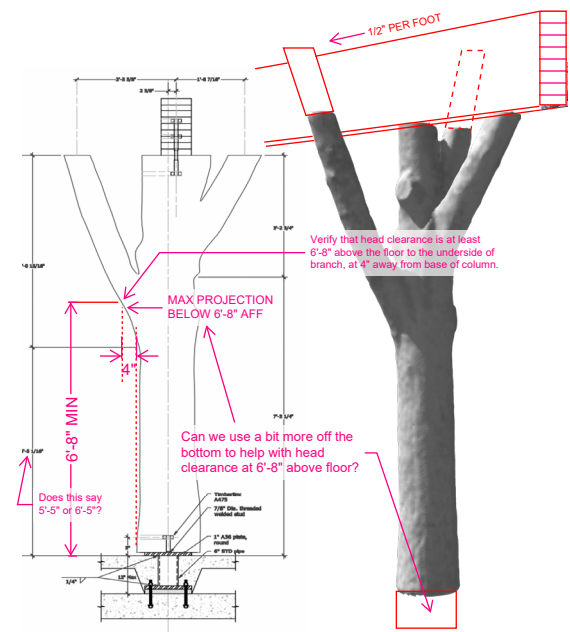
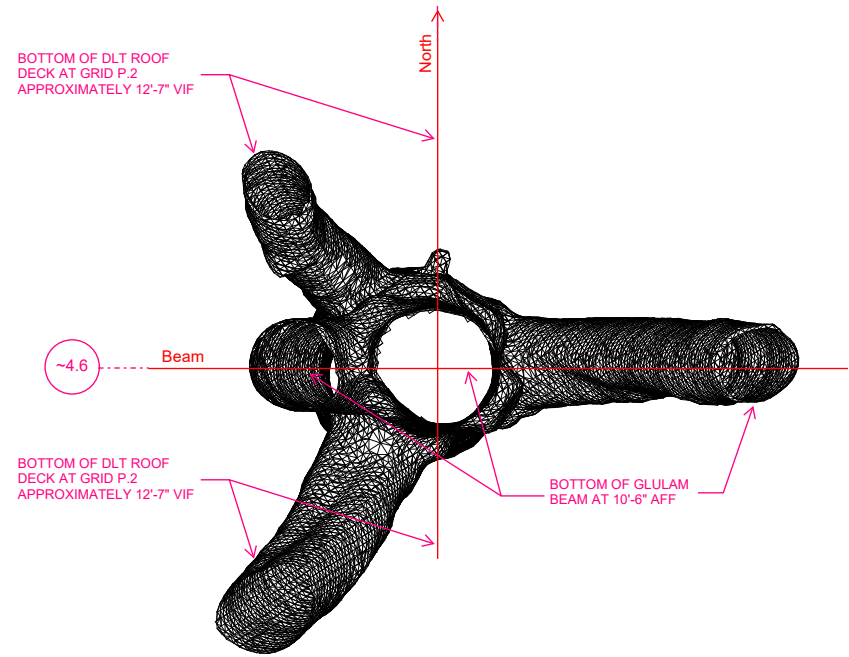
PHYSICAL ENVIRONMENT DESIGN

NATURE AS AN ASSET: REPURPOSED TREES

The design team partnered with tree construction experts who identified 29 trees from the site that could be harvested and converted into structural columns for the new school. On average, each column stores approximately 1,000 pounds of CO2e and replaces the gravity load of an HSS steel column.



LAKERIDGE MIDDLE SCHOOL



PHYSICAL ENVIRONMENT DESIGN

NATURE AS AN ASSET: SALVAGED BOULDERS

The team salvaged dozens of large boulders – remnants of the Missoula Floods that occurred approximately 13,000 to 18,000 years ago – to tell the story of the site's geology and provide informal seating.

Integrating the boulders into the design also proved economical, as it saved additional costs of hauling and disposal.

LAKERIDGE MIDDLE SCHOOL

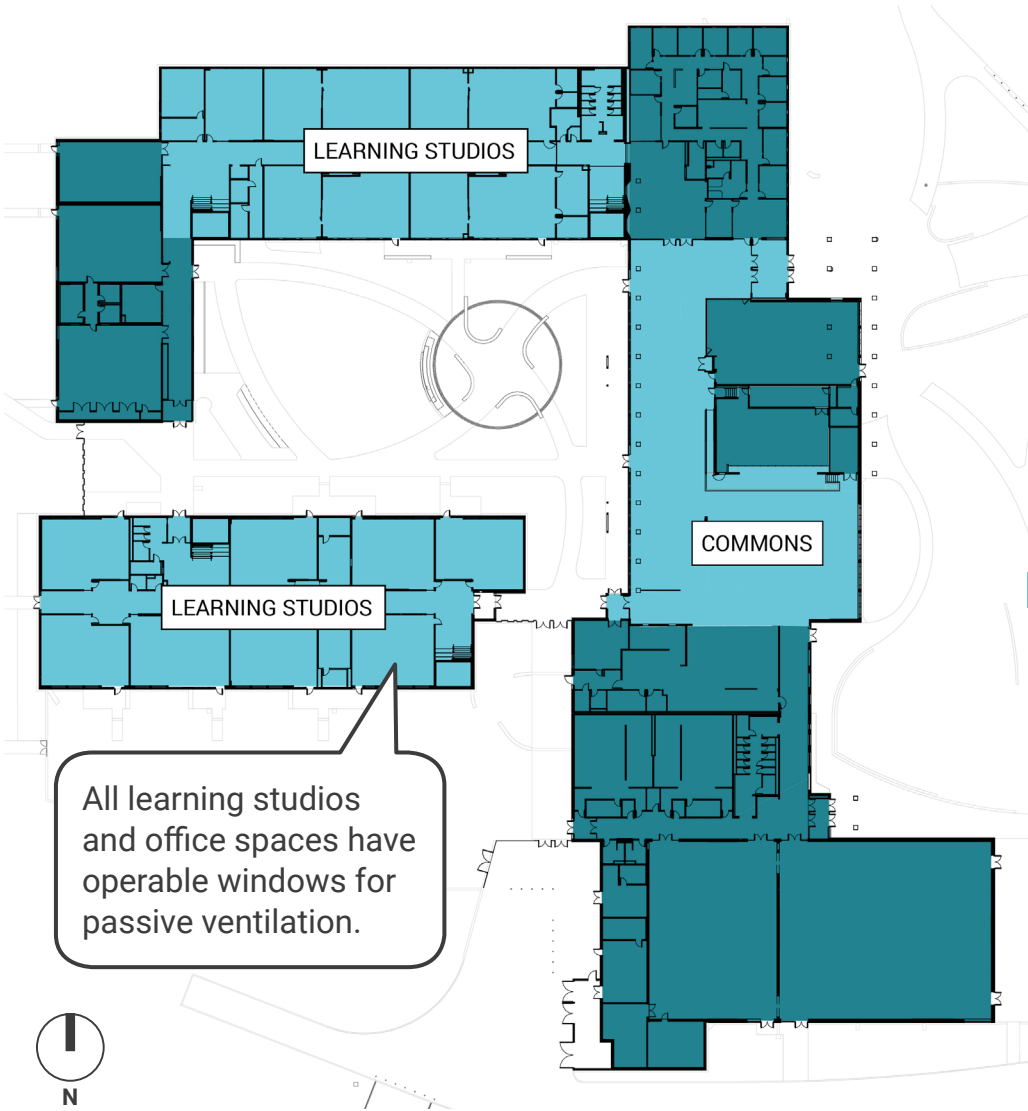


EXCEEDING EXPECTATIONS

One of the community’s top goals for Lakeridge was to design a highly sustainable building.

HIGHLY SUSTAINABLE BUILDING: ENERGY-EFFICIENT

The design team established the 2030 Challenge as the metric for targeting **70% energy efficiency savings** from a baseline middle school. In reviewing actual data from the first fully occupied year, the building is achieving this established goal, even while operating in an “enhanced ventilation mode” with classroom windows open through winter, and ventilation fans running at higher speeds. In the past year, the District has installed photovoltaic panels on the roof, which now **power 8% of the school with on-site renewable energy.**



HYBRID PASSIVE COOLING: ZONED APPROACH

CONVENTIONAL HVAC

Conventional HVAC systems with central heating and air conditioning from Variable Air Volume (VAV) package rooftop units are provided in areas with:

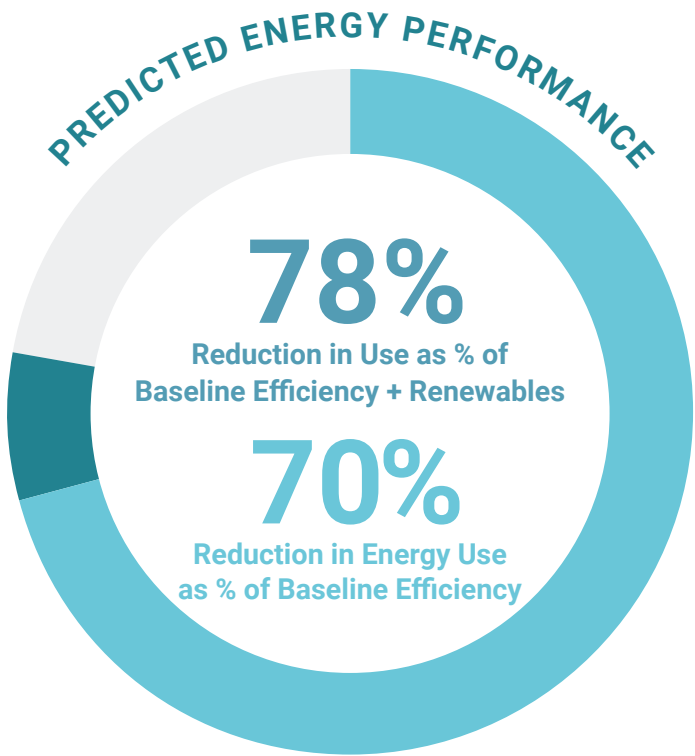
- Small interior spaces without operable windows
- Performing arts spaces with acoustic sensitivity
- Active metabolic rates for gyms, music, and drama
- Large group assembly gathering

HYBRID PASSIVE COOLING

Central Dedicated Outside Air (DOAS) Ventilation with partial heating and cooling, supplemented by night flush across exposed concrete floors and passive cooling

Occupant engaged with interior comfort by “trimming the sails”:

- Open and close windows when outdoor conditions are ideal
- Open stack exhaust roof vent dampers per indicator sign
- Turn on ceiling fans to assist cooling
- Close and lock operable windows when indicated



Climate Zone:	4c	Building Area:	141,000 SF
Window %:	28%	R-Slab:	5
U-Factor:	0.15	R-Wall:	30
SHGC:	0.25	R-Roof:	50
PV Array:	190 KW	Air Leakage Rate:	.20 cfm/SF

PREDICTED ENERGY USE INTENSITY (KBTU/SF/YR):

EUI: 22.1
NET pEUI: 16.4

(BASELINE EUI: 73 | TARGET EUI: 22)

The above is based on actual energy use from Sept 2021 through Aug 2022. Onsite solar PV production is predicted after being installed in Summer 2022.

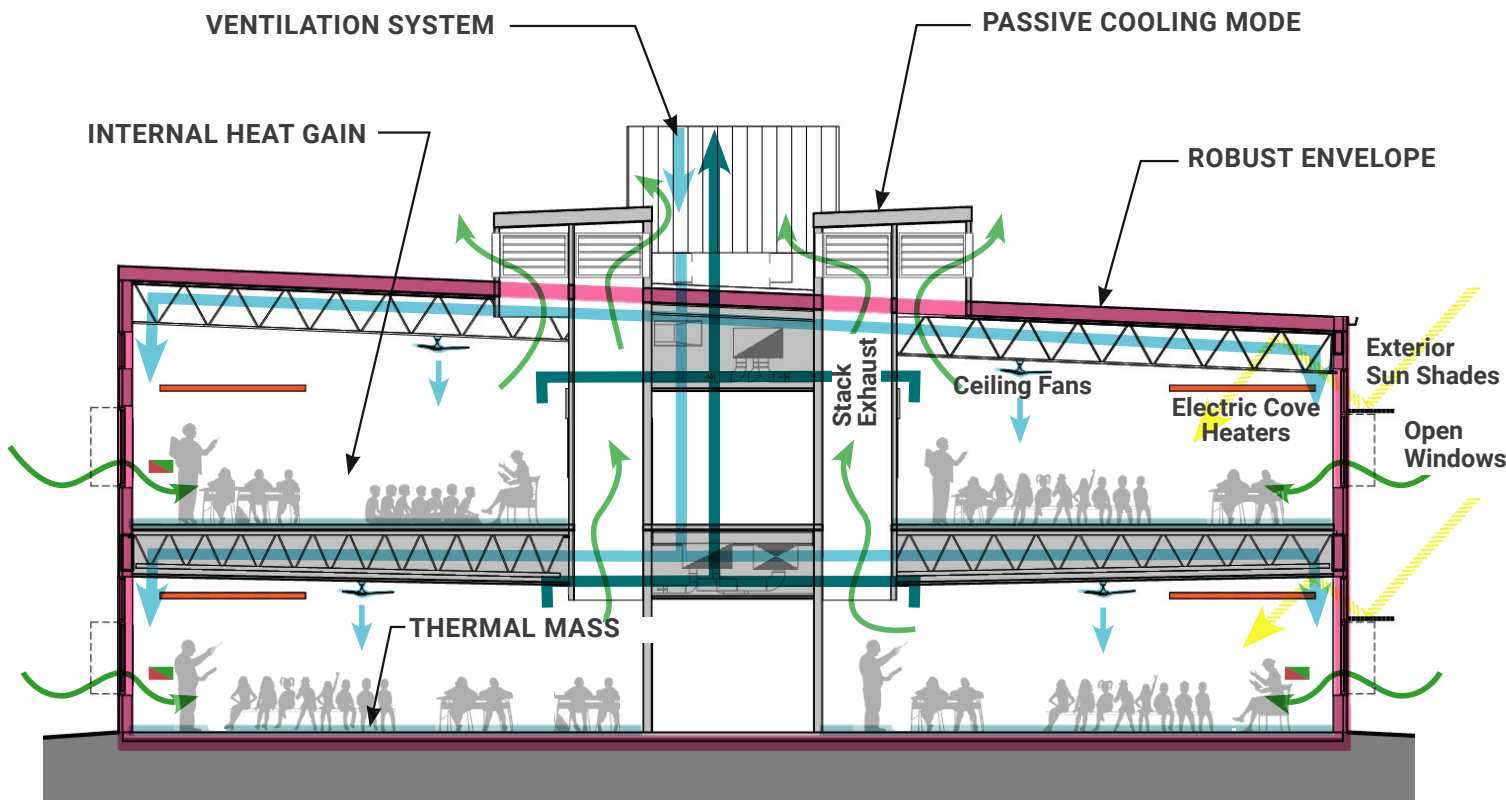
SUSTAINABILITY AND WELLNESS

HIGHLY SUSTAINABLE BUILDING: PASSIVE COOLING

Hybrid passive cooling and a robust exterior envelope were two strategies that helped this project meet the 2030 Challenge.

Lakeridge is also registered with the Energy Trust of Oregon’s Path to Net Zero Energy program, which provided financial incentives to support early design analysis and installation costs for high-performance features.

By simplifying mechanical equipment and leveraging occupant engagement, the hybrid passive system saved approximately \$400,000 in construction costs, while operating more efficiently and resiliently.



Teachers and students are able to maintain comfort in the Learning Studios by activating the stack exhaust roof vents and opening the windows.



SURPASSING THE DISTRICT'S GOALS

Students, teachers, and District leaders share their thoughts on how the new building meets the project's vision and goals, and celebrate how the school is supporting the unique needs of the Lakeridge Middle School student.

A LETTER FROM THE PRINCIPAL TO HIS STAFF

"With our return to Lakeridge, we have a new opportunity to explore all the innovative features based on project goals established by our Community and Design Advisory Team. We can collaborate in new ways with our shared Learning Studios and flexible furniture based on the design mock-up in our old junior high building. We can engage with the innovative Passive Cooling Controls to maintain occupant comfort, which will be especially useful in these initial hot weeks of the school year."

INSPIRING LEARNING THROUGH BEAUTY

"Seeing the kids the first day, coming into this facility, having their jaws drop in awe of this beautiful place. Coming from where they came from, with an aging facility, this building just opens up to the doors for a new way of teaching."

– Director of Facilities

"What I thought when I first came to this school was amazed at how it turned out." – Student

"This environment feels so much nicer, and just feels more safe and secure than the old school." – Student

"It feels warm, it feels welcoming, it feels like a space that really supports the kind of learning that we want to do with kids. Part of that is the spacious hallways and open classroom formats." – Principal



LEARNER-CENTRIC ENVIRONMENT

"I think having a new school can affect how you do in school, like if you have a good environment and a happy space, you do better and you focus more." – Student

"The kids have been incredibly engaged and I can see they like going to school now." – Teacher

"I'm glad I can go here, because I feel like it is a very safe environment, very welcoming, and just like overall happy, bright and warm, and fun. I love this school. It is awesome." – Student

OPERATING DURING A PANDEMIC

"Reflecting back on our first year of in-person learning during the Covid-19 pandemic, we needed to adapt our building systems beyond their intended design function. Thankfully, our new school is well suited for this flexibility, with many operable windows and the fresh air ventilation system at the Learning Studios and Commons." – Principal

STIMULATING CURIOSITY AND ENGAGEMENT

"I looked at the trees that they used like columns and I thought wow, that's really cool." – Student

"It looked like a college campus. It feels like I'm going to get a good education... it feels like I'm going to have a good day." – Student

CONNECTION TO NATURE

"There's a lot of windows, which I like because it brings in a lot of natural light." – Student

"It has a lot of windows so it is very light in all the classrooms, which is amazing. I've heard a lot of kids say that they love the classrooms because they can see outside." – Teacher

"There is not a single space in this building you can be without feeling connected to the world around you." – Principal