Saugus Middle High School

A4LE Planning & Design Awards 2022

EXECUTIVE SUMMARY

The new Saugus Middle High School brings students from grades 6-12 together in a STEAM-driven complex of fabrication labs, collaboration spaces and project areas that offer hands-on opportunities for exploratory learning. The design unites two schools within a single building, accommodates a robust educational program, and supports an equitable and engaging learning experience.

An involved visioning process engaged students, faculty, parents and community members to determine how the new school could both address district challenges such as inequality and overcrowding, and support a diverse range of learning and teaching styles. The consensus outcome identified three goals that would drive the design process and shape the future of Saugus' public education.

PROJECT GOALS:

- Foster 21st century learning through a STEAM-based curriculum
- Establish small learning communities to promote social and emotional well-being
- Create a school that embodies the unique spirit of Saugus

SCOPE OF WORK & BUDGET	OWNER	ENROLLMENT	GRADES	FACILITY SIZE	SITE SIZE	DATE OF OCCUPANCY	CONST. COST	SUSTAINABILITY
	Saugus, MA Public Schools	**1,360 students**	**6-12**	**271,000 SF**	**21.75 acres**	**August 2020**	**$129,763,000**	**LEED Platinum Certified**

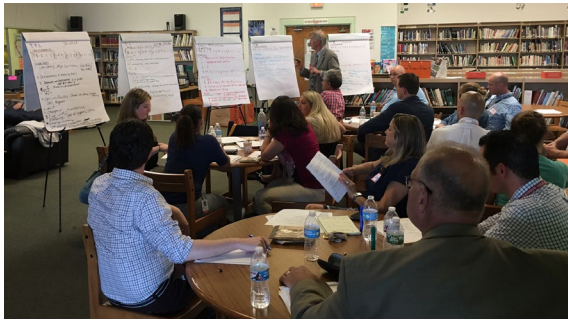
UNDERSTANDING THE COMMUNITY

Located ten miles north of Boston along U.S. Route 1, Saugus is a suburban town characterized by its strong community values, forward-thinking approach to education and rich history of innovation.

Because Saugus residents have immense pride in their Town's storied past, incorporating this history, culture and context into the design would give the new school a unique connection to its community. Independent research, meetings with community members and visits to historical sites in Saugus afforded the team a deeper understanding of the Town and community.

Considered the birthplace of the American iron and steel industry, the Saugus Iron Works was the first integrated iron works in North America and is known for developing state-of-the-art iron making technology. Now designated a National Historic Site, it is a significant landmark within the community and stands as a testament to Saugus' long history of innovation.

Although best known for iron production, prosperous industries in ice and lobstering were also foundational to the Town's development. The Saugus River, which runs through Saugus into the Atlantic Ocean, was vital to the transport of goods and tools that made the iron, ice and lobstering industries successful.



Saugus Iron Works National Historic Site

STAKEHOLDERS

The design team worked closely with a core group of 30 stakeholders representing a cross-section of the Saugus community to establish project goals. From there, the team engaged a wider range of stakeholders for maximum insight and input toward the design.

PROJECT STAKEHOLDERS:

- Educators
- School administrators
- District administrators
- School Committee
- Parents
- Community members

VISIONING FOR THE FUTURE

Led by the design team and an educational planner, Saugus community members engaged in a series of visioning sessions to further identify project goals and set stakeholder expectations. The sessions included interactive workshops to determine educational and architectural priorities.

Community Surveys

Public surveys were used to elicit opinions of those less likely to attend public events. These surveys helped identify deficient spaces in the existing schools as well as new spaces and design elements that would better support curricular goals and student well-being.

Learning Modalities

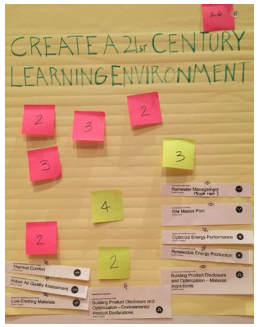
The visioning sessions introduced stakeholders to different learning styles and the physical attributes and furniture that support these approaches. With the understanding of different learning modalities, the group engaged in a productive dialogue about opportunities specific to Saugus' educational model and determined that the design should support a collaborative, exploratory learning model that caters to a diverse range of learning styles.

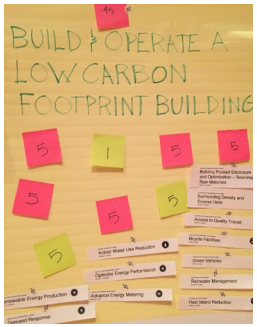
Space Precedents

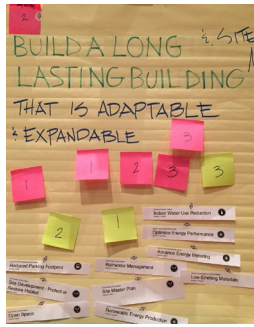
To better understand the types of collaborative spaces that would support both small and large group work as well as different types of activities, the design team reviewed and presented precedents from schools around the country. Favorable examples included light-filled common areas as well as academic spaces with flexible furniture and innovative technology.

Success

The project represents a transformation of Saugus' school system to incorporate innovative, equitable and supportive learning. The high level of community and stakeholder involvement in the visioning process fostered a sense of pride and ownership of the project that resulted in the Town vote to approve the new school passing with 71% in support.







CHALLENGES

While the decision to combine the middle and high school into a single building was beneficial for shared resources and increased equity across the school system, it also presented challenges. Students at different levels have a wide range of academic, social and emotional needs that the design must be mindful of. Creating distinct entrances and identities for each school, as well as designated areas to make the large school welcoming and comfortable for all were important planning goals.

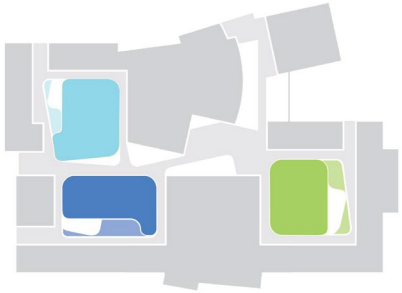
VALUE OF PROCESS

With Saugus school facilities on the brink of losing accreditation, this project presented an opportunity to shift the trajectory of the school system. Designers, stakeholders and community members united under a shared vision for a new facility that supports an equitable, diverse and engaging educational experience for its students. The new Saugus Middle High School not only realizes this vision but has become an accessible community hub that benefits the entire Town.

EDUCATIONAL VISION

The robust visioning process identified three primary goals to drive the design:

- Foster 21st century learning through a STEAM-based curriculum
- Establish small learning communities to promote social and emotional well-being
- Create a school that embodies the unique spirit of Saugus



PLANNING FOR WELL-BEING

To clearly differentiate middle and high school while benefiting from mutual resources, the school is organized into three zones: a four-story high school wing, a three-story middle school wing and a connective core of common spaces. To promote student well-being, the design implements a team-based organizational strategy that divides academic zones into grade-level "pods", creating smaller learning communities that foster human connection.

The placement of each pod is tailored to the specific needs of the grade level it houses: 12th grade is located on the first floor to provide ample space for events such as college fairs, while 8th and 9th graders share a floor to establish a level of familiarity that will ease the transition from middle to high school.

STEAM-BASED CURRICULUM

Comprised of academic classrooms, fabrication labs, science labs and art studios surrounding a central project area, the pods are designed to facilitate hands-on learning and collaborative study that will prepare students for higher education and successful careers. The core curriculum is supplemented with specialty spaces, including drama classrooms, a robotics lab, a broadcast studio, a coding & web/graphic design lab, and 3D design labs, that encourage exploratory learning across disciplines.

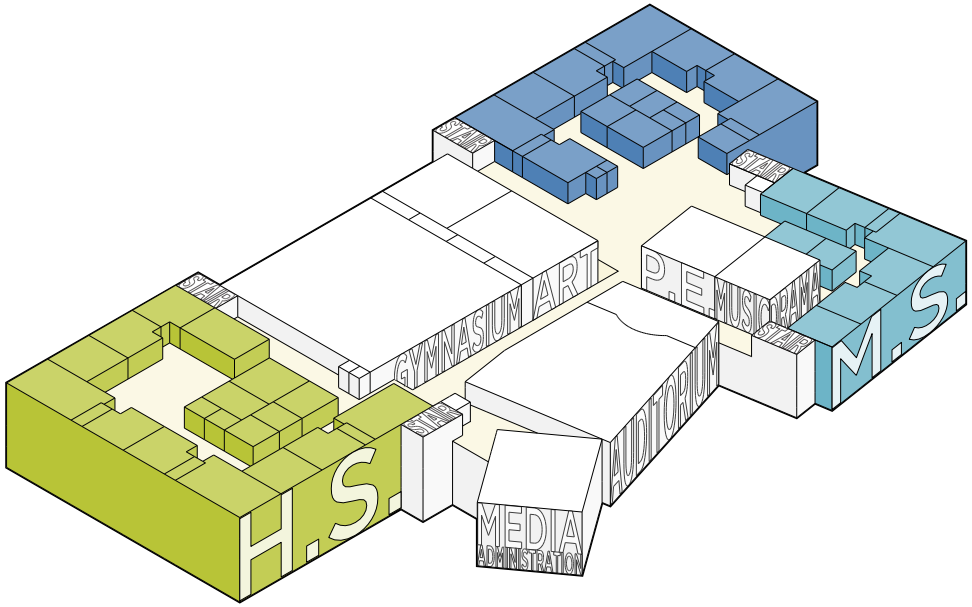
RESPONSIVE DESIGN

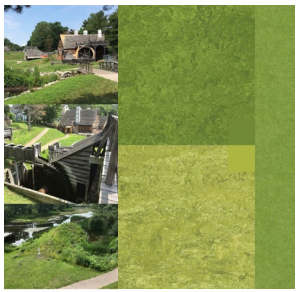
The flexible nature of the design results in spaces that are adaptable to a wide range of pedagogies and programming. Teachers can easily reconfigure classrooms in response to different lesson plans and can even extend teaching space beyond the classroom with operable glass partitions that convert a single room for 24 students into a large workspace for over 50 students. Similarly in common areas, portable technology and furniture allows open spaces to transform quickly and seamlessly. Tables can be collapsed and rolled into storage, to be replaced by folding chairs for large scale audiences or movable pin-up boards to create a gallery for student work.

Throughout the school, informal seating provides opportunities for different levels of social and academic engagement: tiered seating in the cafeteria functions as an impromptu lecture space; the forum stair can accommodate large presentations; recessed bench nooks offer a secluded retreat for independent study.

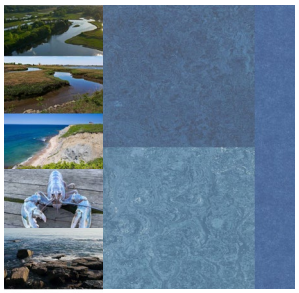
LEARNING COMMUNITIES

The three pods in the new middle high school are each characterized by one of Saugus' vital industries—iron, ice, and lobstering. Each pod has a distinct color scheme derived from its industry, creating a unique palette and clear identity that helps students feel connected to the pod they belong to. Green colors in the high school reflect the rolling, grassy hills of the Iron Works Historic Site and the blue tones in the middle school pods are inspired by water, which played an essential role in both the ice and lobstering industries.

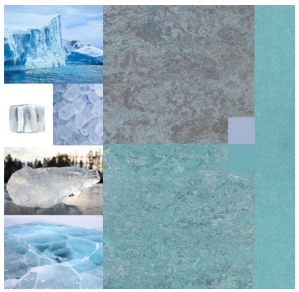




Iron Works
pod color scheme



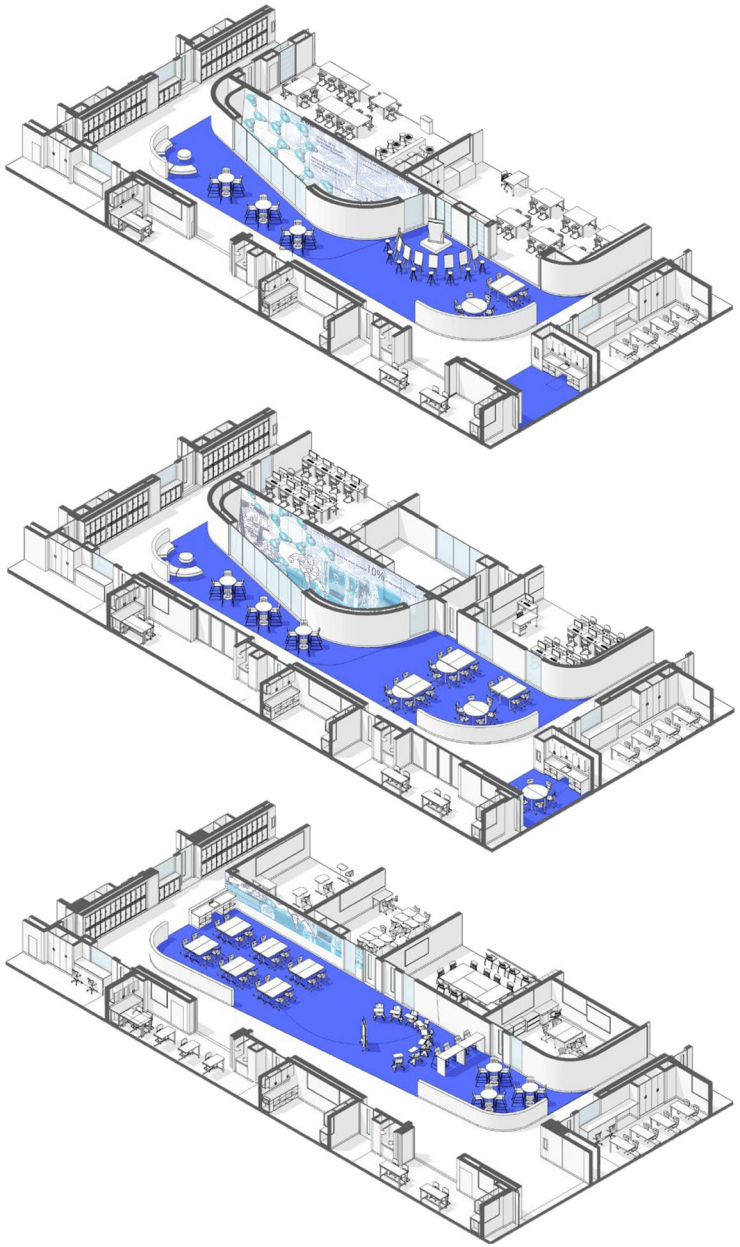
Water (lobstering)
pod color scheme



Ice
pod color scheme

FLEXIBLE PROJECT AREAS

Each grade-level pod centers on a shared collaborative area to facilitate project work outside of the classroom. A resource for both students and teachers, this space is designed to support the hands-on nature of a STEAM-based curriculum with whiteboards, sinks and an array of furniture to aid in science experiments, art projects and project-based learning.



Furniture in the project areas can be reconfigured to support a variety of functions such as project work, group presentations or independent study.

EDUCATIONAL OPPORTUNITY

Specialty learning spaces throughout the school offer students access to advanced technology and enable them to explore academic and extra-curricular interests not previously available.


ROOFTOP CLASSROOM


ROBOTICS LAB


SCIENCE LAB


BROADCAST STUDIO


MAKER SPACE

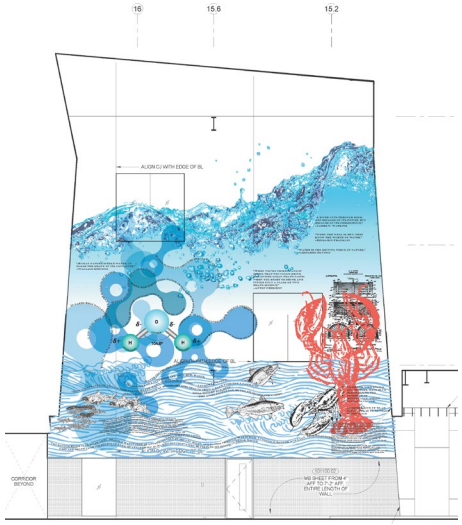

PROJECT AREA

PHYSICAL ATTRIBUTES

Shared Common Areas

Academic pods are connected via shared common areas including the high school cafeteria, middle school cafeteria and library. These light-filled spaces are centrally located for easy access and feature a range of seating options—from a forum stair to study nooks—that can be used for dining, informal learning or study.

Given the open nature of these spaces, color, material and lighting are used to differentiate program. In the cafeteria, red ceiling baffles and wall tiling differentiate dining space from circulation and a continuous LED strip along the curved wall of the forum stair promotes movement.



Water Supergraphic - Middle School Pod

Lightwells

The architecture of the new school is characterized and punctuated by monumental lightwells. Their unique architectural form is designed to bring natural light deep within the building footprint, illuminating the interiors and highlighting important programmatic spaces. These open, multi-story spaces establish sightlines across the school and views to the outdoors, while glass display cases and glazing between classrooms and project areas further extend daylight and transparency within the interior.

Supergraphics

Designed to celebrate Saugus history and culture, wall graphics throughout the school honor some of the Town's iconic landmarks, industries and people. Vibrant colors are interwoven with historic imagery and illustrated elements to visually communicate the story of Saugus and help students appreciate the richness of their community. Often mounted along lightwells, these vibrant and engaging graphics activate the space, help with wayfinding and foster a sense of connection to the community.

COMMUNITY CONTEXT

Driven by the community's vision of a facility grounded in contextual history, the design takes inspiration from its site and setting along Route 1—a major highway connecting prominent cities along the U.S. East Coast. Well-known for over-the-top billboards such as a 68-foot-tall cactus marking the location of a popular steakhouse or the statue of an enormous orange dinosaur at the site of an old mini golf course, this stretch of Route 1 has become a source of nostalgia within the Saugus community.

Images of prominent Route 1 billboards overlay a map of Saugus, marking the middle school entrance and setting a spirited tone for the learning environment.

A RESOURCE FOR ALL

A town-wide investment in resources, time and community efforts, Saugus Middle High School is welcoming and accessible to all. Core public spaces including the cafeteria, gym, auditorium and athletic fields are multi-functional to support a variety of school-wide and community gatherings. Local theater groups and community colleges utilize the state-of-the-art auditorium for rehearsals and performances. A special classroom on the third floor provides a designated space for medically fragile community members with widespread views and access to the rooftop outdoor classroom.

The school's location along the Northern Strand Community Trail makes it conveniently accessible for community use and adult education programs, while the inclusion of bike racks and electric vehicle charging stations encourage sustainable forms of transit.

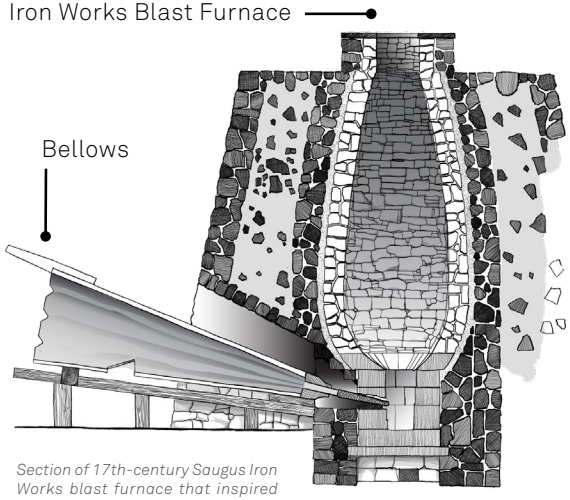
HOW THE PROJECT INSPIRES AND MOTIVATES

Drawing from a thorough and researched understanding of the Town's history, culture and context, the design incorporates elements of this history and connects occupants to the greater spirit of the Saugus community. With a past rooted in industry and innovation dating back to the original Saugus Iron Works, the architecture of the new school references this technology as a reflection of the innovative learning that drives Saugus' educational program.

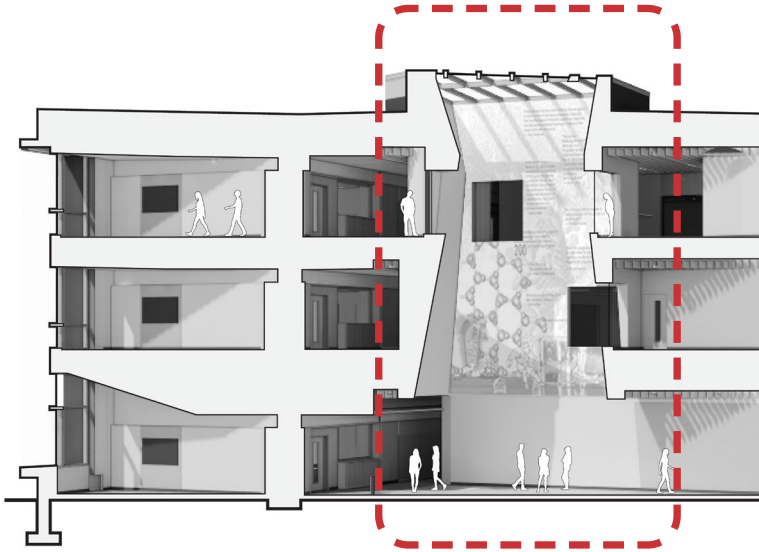
The building's exterior is characterized by its sculptural metal-clad main entrance, which is comprised of two main volumes: the library and auditorium. The angular form is reminiscent of the accordion-shaped bellows used to power blast furnaces at the historic Saugus Iron Works.

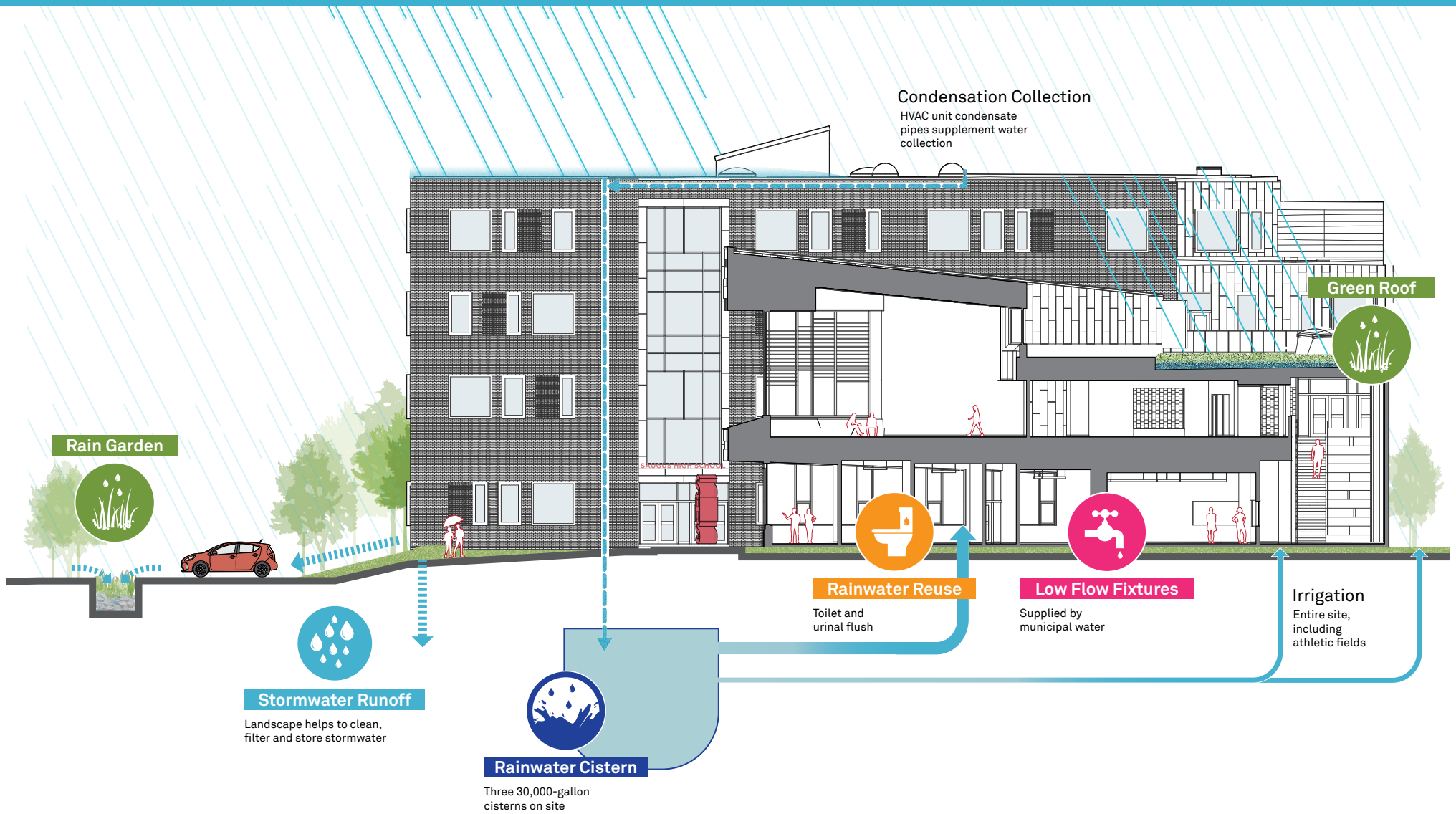
The curved form of the multi-story lightwells reference a cross-section of the blast furnaces that powered the Iron Works and direct light deep into the academic zones. Used to produce raw cast iron bars, the blast furnaces were a critical innovation of the 17th century Iron Works. The project areas and overhead lightwells are similarly integral to the design of the new middle high school, providing places for students to gather, collaborate and engage in hands-on learning.

A sketch of the Iron Works bellows re-imagined as the school's exterior



Section of 17th-century Saugus Iron Works blast furnace that inspired the school's lightwells





WATER CONSERVATION

The approach to water conservation on the site has a positive impact on the surrounding ecosystem and reduces the building's annual consumption of potable water by 45%. These systems are also used as a teaching opportunity to educate students about sustainable technology and inspire interest in the field of environmental science.

Strategies for limiting potable water use are divided into three main components: reuse, conservation and stormwater management. The roof is designed as a catchment system to collect stormwater, which is then channeled into three 30,0000-gallon underground cisterns.

Two cisterns are used to supply irrigation for native plantings and a third directs water into the building where it is passed through multi-stage filters and exposed to UV light before being used to operate low-flow fixtures.

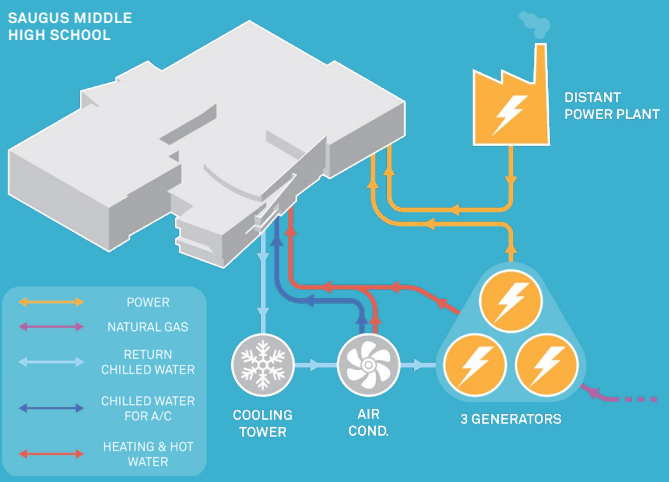
A green roof and rain gardens in the parking lot filter stormwater runoff from the site, and the added softscape helps mitigate heat island effects by interspersing cooler surfaces between the hotter hard surfaces and enabling trees to grow in the parking lot and provide shade.

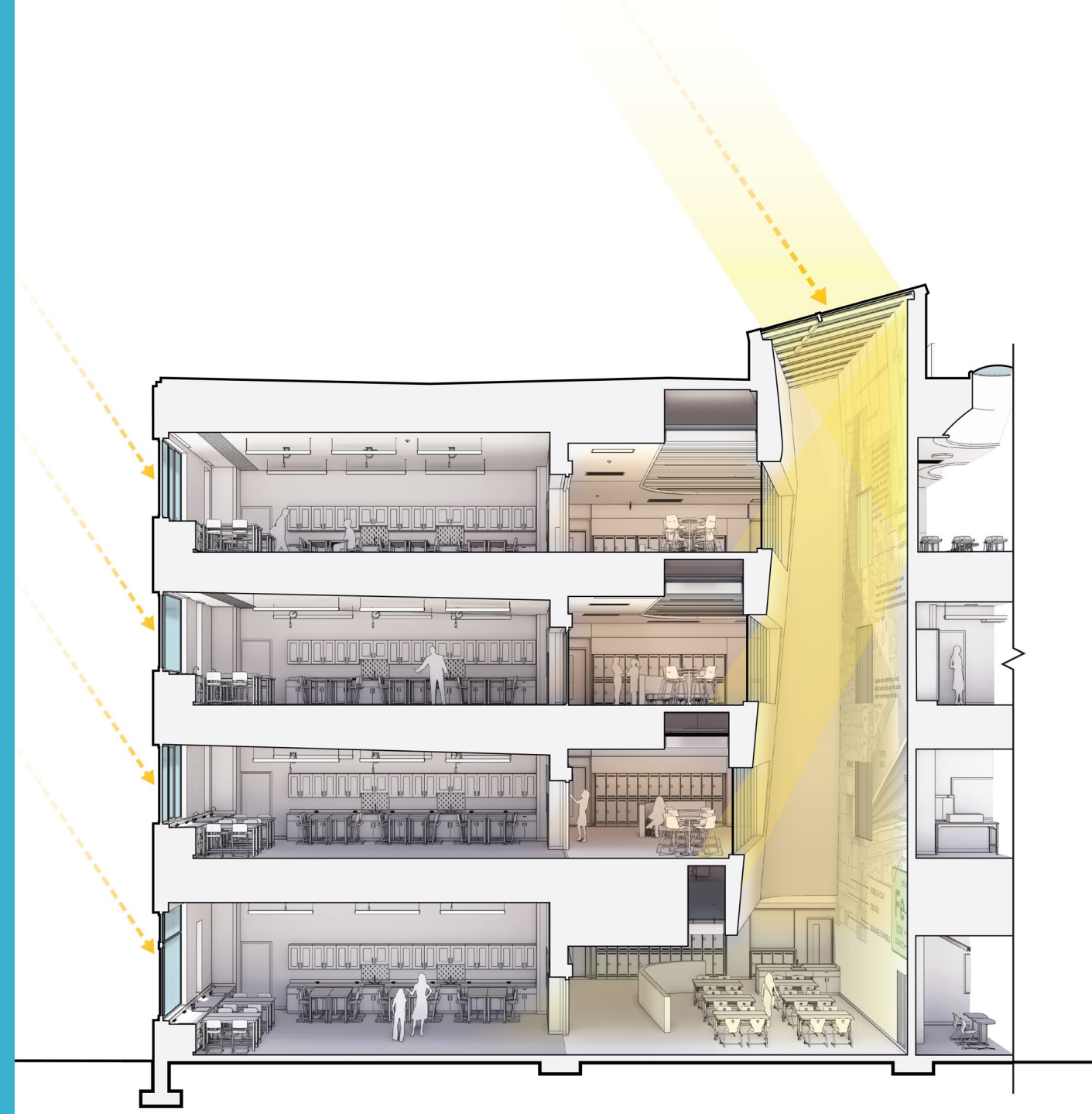
ENERGY-EFFICIENCY

A careful balance of natural and artificial lighting creates striking interior spaces while minimizing energy use. Lightwells are designed to draw as much natural light into the school as possible to improve productivity, student well-being and to create a warm and welcoming learning environment. Large circular skylights provide additional natural light and include recessed cove lighting that mimic the effect of daylight, even at night.

In all academic spaces, vacancy sensors save energy by dimming and turning off lighting in response to daylight levels and occupancy. In addition, special education spaces feature tunable white lighting for its positive effect on mood, behavior and concentration, which helps realize the community's vision of an equitable educational experience for all.

In support of a new resilient and future-ready facility, the design includes a combined heating and power system that generates electricity on-site and ensures emergency systems will be operational when they are needed most. The **tri-gen** system reduces operational carbon emissions by 49 tons annually and eliminates emissions associated with regional source generation by utilizing waste heat for space heating, domestic hot water heating, and space cooling.





HEALTH & WELLNESS

Sited less than 300 feet from a busy six-lane highway, the facility responds to the challenge of providing optimal air quality with mechanical units positioned on the roof, so their intake faces away from the highway and prevailing winds. This enables displacement ventilation systems to distribute clean air throughout the interior, bringing 20% more fresh air into the spaces at low velocity without the typical costs and acoustical distractions associated with conventional mechanical systems.

Within the school, student well-being is a top priority. Uninterrupted views to the outdoors, light-filled academic and common spaces, and a small group organizational structure all contribute to an optimal learning environment. Gender-neutral restrooms throughout the school help establish Saugus Middle High School as an inclusive space where all are welcome and celebrated.

DURABLE & GREEN MATERIALS

Materials in the new school were selected to create a healthy interior environment, lessen the building's impact on the natural environment, and to support the vision of a facility that embodies the spirit of Saugus. Products were specified with certain properties in mind: insulation made from renewable sources; wood components such as bamboo wall panels, cabinetry substrates, millwork, and wood doors are all FSC-certified; linoleum flooring that is durable, easy to maintain and available in a range of colors that support the school's wayfinding system and pod identity. By including locally sourced materials, the design reduces embodied carbon and reinforces the school's connection to the community.

LEED Platinum Certified

ENERGY REDUCED FROM BENCHMARK	REDUCTION IN ENERGY COSTS	CARBON REDUCTION	WATER CONSERVATION	LIGHT POWER DENSITY (LPD)	RESTORED HABITAT	FOOD WASTE COMPOSTING
26%	**33%**	**48.7** tons/yr	**1,500,000** gallons/yr	**0.53** watts/sf	**17%**	**100%**

Results

Saugus Middle High School embodies the community's vision of an innovative facility that centers on student wellness and a STEAM-based curriculum. State-of-the-art classrooms, labs, makerspaces and studios expand educational opportunities, while the team-based organization of the pods creates close-knit learning communities within the greater facility. As the pioneer project in the redevelopment of Saugus' schools, this project is an example of the profound success that can be achieved through close collaboration between designers, stakeholders, and a driven community.

Despite opening in the midst of a global pandemic, the design proved resilient and adaptable throughout the transition between hybrid and in-person learning. Flexible layouts enabled spaces to be reconfigured in response to the latest health guidelines. High-performing ventilation systems and outdoor learning areas helped students feel safe and comfortable despite the extreme circumstances.

"When a student walks into this space, their expression says it all... the learning and exploring possibilities are limitless."

MYRA D. MONTO, ASSOCIATE PRINCIPAL,
SAUGUS MIDDLE HIGH SCHOOL