

Interconnected Education.

Kodiak High School
Kodiak, Alaska



Association for Learning Environments
2017 MacConnell Award



On the remote island of Kodiak, Alaska, a population of 14,000 people live and work in one of the harshest climates on earth.

The people are hardworking. Predominantly tied to the industries of commercial fishing, government and military.

Of the 3,500+ square miles that comprise the island, Kodiak has less than 100 miles of road—creating natural limitations to services provided to its population, including education.

Kodiak High School is the only high school on the island serving 780 students and reaching many others in less accessible villages through its distance learning programs.

Restricted by a piecemeal array of outdated buildings, Kodiak Island Borough School District began a journey over ten years ago that would chart the course for re-imagined education in one of our nation's most secluded, yet globally-connected communities.



Executive Summary

The successes of Kodiak High School are intrinsically tied to an inclusive and robust planning and design process, innovative and right-sized to the community.

In the face of unique limitations from the State funding model, this diverse, rural community set out to analyze their educational specifications and clearly identify where it was falling short. They began, in earnest, with a facilities review and 20-year needs plan developed in 2008. Recognizing their inability to provide the educational programming they had outlined, the District presented its case to the State to qualify for funding, dramatically changing the future path of Kodiak High School. Defining scope and continually seeking community involvement, the team began design

conversations to reimagine Kodiak High School. Early revisions to ed specs began to shift curriculum delivery, and the district’s planning process culminated with the passage of bond funding in 2009.

Community Engagement

In Kodiak, there exists a diverse blend of industry and culture including commercial fishing, healthcare, aerospace, and the US Navy and US Coast Guard. In order to ensure that school staff, students, and the surrounding community would be in support of the final building, the design team conducted 43 meetings over four months during schematic design. Voices heard included the Kodiak Island School District Borough, Kodiak Island Borough, Oversight Team, Kodiak High

“Because of the facility design, innovative instruction is possible, and it all started with the community conversations”
- Stewart McDonald, Superintendent

School PTSA, students and staff, the community at large, and the Citizens Advisory Committee. In one meeting, a student named Samantha said, **“If we see new things, we are more apt to create new things.”**

The design committee took this charge to heart. The existing school facility was a confusing maze of additions and renovations, forcing isolation for many student groups. As a result, there was a loss of cohesiveness and empathy. The District, user groups, and students made it clear they wanted the new building to reinvigorate the sense of community absent from the existing building. Even though the future space was unknown to these students and educators, champions for change arose throughout the planning and design process, including many who would ultimately never use the new facility themselves. It was a sign that even in an isolated fishing community, a transformation of educational delivery could revolutionize a school.

Innovative Programming & Planning

As the design team became embedded in the school and community (including short-term co-locate efforts in the school itself to develop design schemes), they continued to listen to feedback from the school, community, District, and Borough. When the time came to present the primary design direction for the new high school, it was the community that selected the boldest of options: a four-story tower and renovated CTE wing. This decision from a fairly conservative community was surprising, in part,

because the only facility in Kodiak of a similar height is the hospital.

The four-story tower addition brings learning from the depths of the school and utilizes a large amount of glazing to maximize daylight throughout the school. A common theme of vertical connections can be seen throughout the school – from the showcase “Cascading Commons” to the second floor access of the new gymnasium and library. The gymnasium bleachers extend from the second floor similar to a hockey stadium, simplifying circulation and introducing the community to activities taking place in the heart of the academic tower. This helps introduce and engage the community at large in to the academic community. Most importantly, this reinforces the goal of the high school to be a community asset— a core value that was lost in the old school.

Support of Learning

To support the new programming needs of Kodiak High School, the tower encapsulates most core curriculum spaces, as well as the career and college center. The new “Fitness Lounge” is an active space that includes the student store, never-ending ping pong tournaments, and forefront exposure to the CTE wing, now tied to the primary building circulation spine.

Balance of Needs

As many students remain on the island following graduation to enter the industries of fishing, aerospace, and healthcare, connecting all programs and types of people was a major focus of the new facility. Kodiak also serves as the hub of the Distance Learning Programing which reaches the remainder of the island population that is not within accessible distance

to the City of Kodiak. With the school curriculum bolstered by important partnerships with local colleges and even research initiatives of NASA, all students (including distance learners) have benefited from the increased offerings of the school to provide them with dual credit and/or certifications which will allow them to pursue a livable wage following graduation.

At the end of the day, Kodiak High School was built to support its community. During design, this is why feedback from so many user groups was vital to the development of the building.

Functional Adaptability

The functional adaptability of the school (including zoning flexibility for separation of private and public space) allows the building to quickly adapt from hosting a school sporting event, community fundraiser, robotics competition, dance, or senior citizen luncheon. In many families, there are multi-generational ties to the school, so it holds a great deal of pride in the hearts of many. The reason the new building is successful as a beacon of learning and opportunity is due to its focus and offerings to the surrounding community.

Creative Site Development

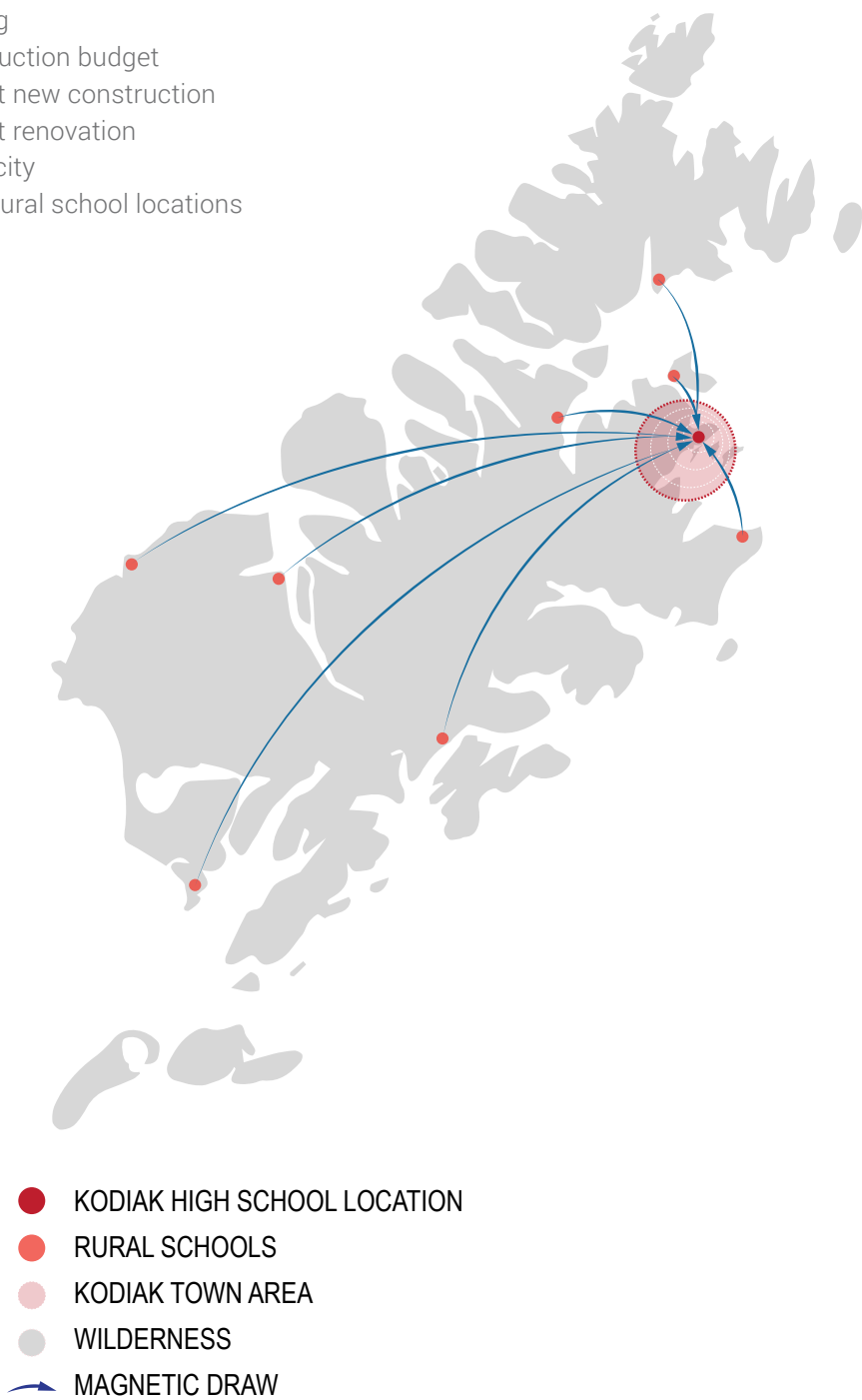
The 10 phases of construction on the occupied site were completed over a span of nearly 3 years. Subsequently, its vertical presence on a picturesque site overlooking the harbor and neighboring hills is both a decision of efficiency, as well as prominence in the community.

Scope of Work

Kodiak High School serves as the epicenter of the Kodiak Island Community, extending its reach far beyond the walls of the school.

Project Scope:

- 5 years of planning
- \$60 million construction budget
- 85,000 square feet new construction
- 104,00 square feet renovation
- 900-student capacity
- External reach to rural school locations



Former Entrance to Kodiak High School



Typical Hallway and Classroom of Former School



Former Classroom for Digital Learning

Origins

Kodiak High School opened in 1966 as an integrated vocational education school designed to support local culture and industry. Vocational education was part of students' daily schedule. With offerings such as fur processing, carpentry, welding, and fishing, the school directly supported the surrounding community, native Alutiiq population, and blue collar way of life.

Over time, Kodiak introduced a "college-first" initiative with a 1970s building addition, but the shift departmentalized the facility and the unifying theme of vocational education was lost. Additions and renovations further created a maze within the building, segmenting and dividing learning typologies, as well as the very groups of students that attended the high school.

Need for Change

Operating under a state-run funding structure, the story of a new Kodiak High School begins in 2006 with approval from the Alaska Department of Education & Early Development to review facility needs and create a Master Plan. Subsequently, Kodiak High School was identified as the first major project, undergoing further review and spurring a time of exploration to investigate new school trends. In 2008, a Master Plan was created, with multiple building options identified to fulfill educational goals.

The School Board voted overwhelmingly to move forward with an option that would build a substantial addition and renovate the remaining facility. The integrated CTE model would expose students to a wide range of career and professional opportunities in a meaningful way. After a failed attempt to pass a bond in 2008, the scope was revised (removing an administrative building project).

Community Response

Leading up to the school bond in 2009, District faculty, students, and community members rallied behind the concept of a new academic wing and restored vocational wing. Top priorities of the community included:

- Vocational instruction available to all students
- 21st century academic instruction
- Activities to support the development of soft skills necessary for the real world

Additionally, capacity would be increased from 550 to 900 to better suit the current and future student population.

In 2009, Kodiak Island Borough voted to authorize approximately \$76 million in bonds to fund the Kodiak High School addition and renovation.



School & Community Engagement

The Community of Kodiak

Inhabited by generations of hardworking people, Kodiak’s history and traditions lie closely tied to its place on the water. Home to the Alutiiq people for over 7,000 years, it has seen chapters of history surrounding fur trading, establishment of eastern orthodox missionaries, commercial fishing, and as a military outpost. Even though the territory was originally purchased by the United States in 1867, Kodiak’s more modern history is relatively new; the state of Alaska was not incorporated into the United States until 1959, less than 60 years ago.

As it is now, Kodiak is a socially and economically diverse location, home to largest Coast Guard base in the United

States. In addition, the Navy operates a small training facility for Navy SEALs focused on cold weather survival. Fishing remains the strongest industry on the island with major exports in salmon, halibut, and crab.

The island is the second largest in the United States, and roughly two-thirds is designated a national wildlife refuge, home of the famed Kodiak bear and the spawning ground for five species of salmon.

The city of Kodiak has roughly 6,500 residents, with approximately 14,000 in the Kodiak Island Borough itself (operating similar to a county government structure). It extends beyond the contiguous island to include 15 surrounding islands and coastline.

Ethnic diversity is apparent throughout the city of Kodiak and its rural schools, with the majority of the population predominantly native and minority races.

Relevant Stakeholders

Kodiak Island Borough School District provides education to nearly 2,500 students. The district operates four large elementary schools, a middle school, a high school, and eight rural schools (K-12), in addition to participating in State-wide distance learning through the program AKTEACH.

Representative of the District, various members of administration, operations, and the high school itself were involved throughout the planning and design process (see chart on following page).

Tied to the crucial funding and oversight for this project, the Kodiak Island Borough was also a major stakeholder in the process.

Project Challenges

Realizing the vision for Kodiak High School has been many years in the making (see timeline below). With the bulk of the facility dating to the 1960s and 1970s, the last major additions for core instruction took place in the early 1980s.

Throughout the 1990s and early 2000s, the District faced numerous defeated attempts to implement improvements. Bound by state funding and limited by its local bonding capacity, years went by before there was opportunity for change.

In 2004, the Borough ran a bond election to build a high school addition based on findings of the 1990 Facilities Study and Master Plan. The bond failed.

In 2006, the District sought funding from the Board of Education (run by the State of Alaska) to perform a comprehensive review of District facilities. The measure was approved, and in 2007, findings pointed directly to Kodiak High School as the most urgent project of need.

2008 brought refinement to the direction, as the Board voted unanimously to build a new building and supplement with renovations, as opposed to simply renovating the existing facility. However, when the bond was placed on the ballot that year, it was defeated again (cited in part, for including adjacent administrative components).

Continuing to reach out to the public and work with the preliminary design team to explore options within budget, Kodiak Island School District Borough placed the high school on the ballot once more in the fall of 2009.

This time, the project was approved, setting course for a dream to become a reality.

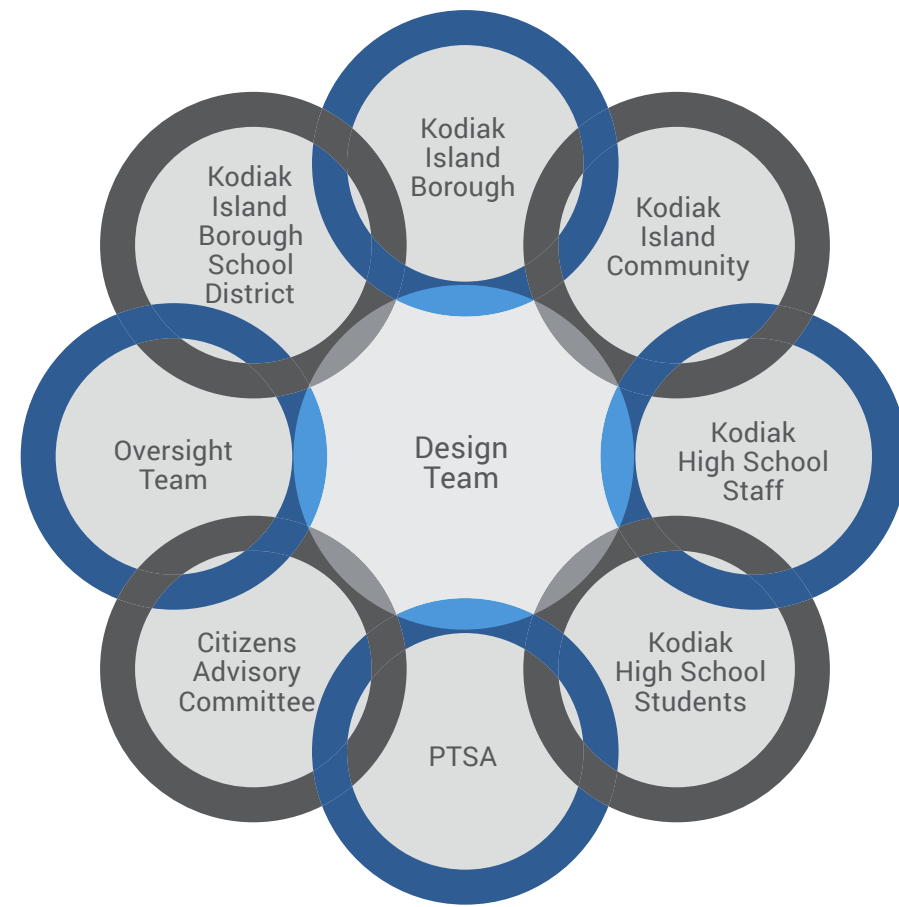
Available Assets

While both a challenge and opportunity, the diverse, yet interconnected nature of the city of Kodiak plays largely into the ways this project’s potential was shared with the community. Opponents and supporters alike were engaged from early on. From parents to government officials, interested business owners, tribal representatives, School District staff members, and industry professionals, the hopeful success of Kodiak High School meant early community involvement invested in the outcome.

When the 2008 bond did not pass, a joint task force between Kodiak Island Borough and Kodiak Island Borough School District was formed by the Mayor to address next steps. This collaborative investigation by both the Borough and District led to the answers needed to overcome the failed bond. By reducing the project scope (dropping an administrative office space which had been an earlier component) and communicating the changes to the community, the project was able to receive the funding needed through the 2009 bond.

As the project moved into subsequent stages of design, community involvement remained a crucial factor.





43 Meetings 200 Voices

Value of Process

After funding was approved in late 2009, Kodiak Island Borough School District underwent further review of the facility and District educational specifications. The design team was brought on at the conclusion of that process in late 2010.

Sparing no time, the design team immediately began meeting with staff, students, community members, and key stakeholders to receive feedback on how the new Kodiak High School could better serve the Island of Kodiak. Every space in the existing high school was observed and measured, and staff members were engaged throughout.

The majority of the time with each staff group was spent reviewing how space was utilized and talking about plans. Aspects that were working well, as well as challenges were communicated, and sketches and revisions to preliminary plans were done in-person with each group to ensure feedback was understood. Focus groups were revisited with updated plans, and questions and concerns discussed openly.

As the design options began to form, the team conducted over 43 community meetings, incorporating over 200 voices. Advocates in this process included:

- Core academics
- Custodial and building services
- Parent Teacher Student Association (PTSA)
- Technical & career education
- Students
- PE, athletics, and extra curricular
- Welcome center and administration
- Special needs
- Music and performing arts
- Visual arts
- Media center and student production center
- Cafeteria and food service
- Rural schools
- Central services and business office
- Community members





Educational Environment

Vision & Goals

The motto of Kodiak Island Borough School District is “Engaged in Learning. Prepared for Life.” In a sense, the goal of this project was to return to the historic roots of the school and its place in the community through integration of CTE/Vocational components and their visible tie to the surrounding industry.

As the design team met with staff, students, and community members during the early stages of the design, the intent was to foster dialogue, conversation, and idea generation, ensuring each voice was heard.

The basis of these sessions were rooted in the previously completed Educational Specifications, building upon the space allocations and adjacencies and District Guiding Principles and Mission. The findings focused on five key points:

- Relationships
- Learning
- Community
- Transparency
- Flexibility

Programming Goals

Further developing the key goals of Relationships, Learning, Community, Transparency, and Flexibility, the project sought to foster an interconnected environment supportive of Kodiak’s far-reaching presence in the Borough, State of Alaska, and beyond.

Key project goals:

- Creating a facility that reflects the unique character of Kodiak and instilling pride in students and the community.
- Providing a connection between vocational/career and technical education, core academics, and community.
- Providing an inviting and comfortable learning environment where students feel a sense of ownership.
- Providing natural light in all instructional spaces.
- Maximizing instructional space, while minimizing circulation.
- Highlighting views and establishing indoor/outdoor connections.
- Designing spaces to be flexible for multiple uses and an evolving program.
- Providing various sizes of collaborative learning spaces throughout the school.
- Creating a design that is more efficient, able to be used as a learning tool, and can adapt to future sustainable opportunities.

Support of Curriculum

Prior to the renovation of Kodiak High School, the school faced unaddressed deficiencies dating to 1982. Music, physical therapy, speech language, counseling, reading, and ELL programs did not have space designed to meet program needs. Science, arts, and vocational classes were being taught in regular core classrooms, too small to meet instructional needs. As stated directly by the district, **“Facility limitations are defining instructional programs rather than programs defining facilities.”**

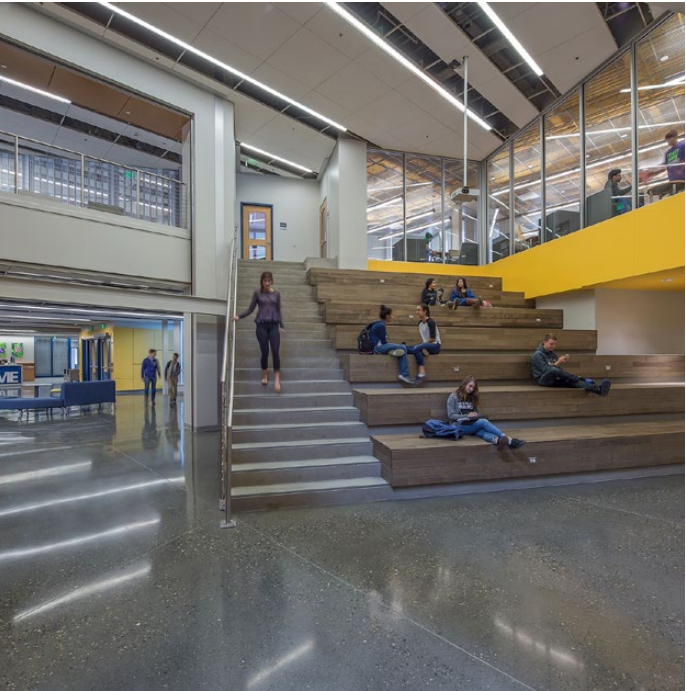
Following the renovation/addition of Kodiak High School, the school is experiencing the benefits of forward-thinking curriculum and providing interconnected education within the school and through virtual connections to distant locations.

A major driver of how the building’s program is distributed is tied to the dispersed delivery of CTE programs. By pulling the programs from the recesses of the building and giving them a visible, prominent position in the school, participation in the CTE curriculum has gone up to 70%, and is expanding in influence to other facets of the school.

Core curriculum is provided in the 4-story addition, and large group spaces for teaching, learning, and congregating spill into the surrounding areas, encouraging blended learning, group activities, and cross-collaboration.



The “Fitness Lounge” offers a student-run store, activities for after-hour use, and a prominent connection to the corner of the school primarily offering CTE/Vocational Education courses



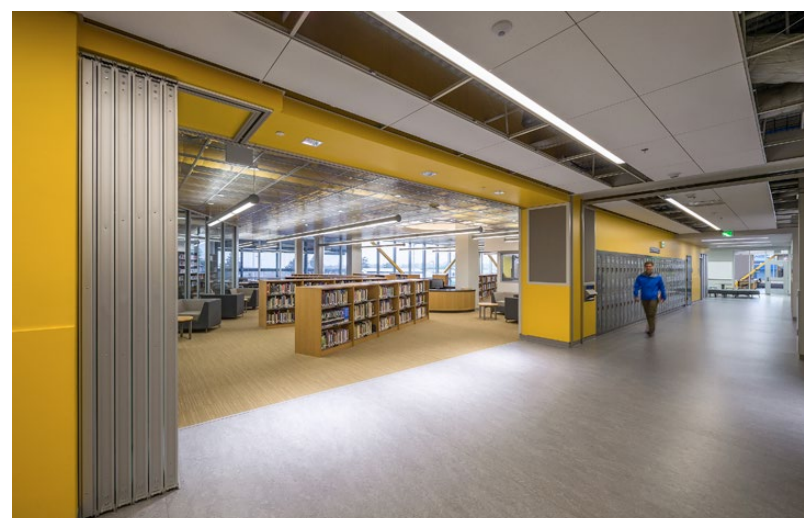
Kodiak’s “Cascading Commons” is adjacent to the main entrance on the main circulation spine of the building. Transparency offers ease of supervision, and its proximity to community-centric spaces allow it to be used for a variety of uses



Culinary classes at Kodiak are taught by an experienced chef who incorporates elements of science and math in curriculum



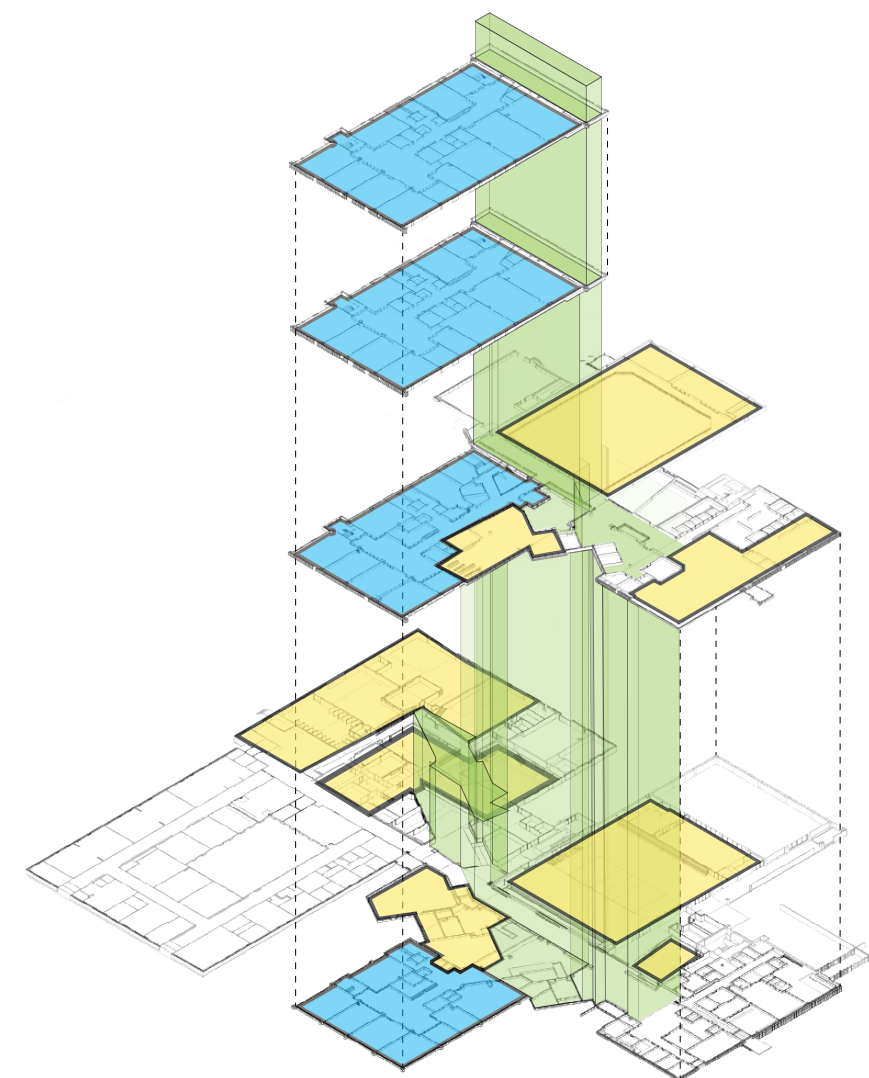
Views to the town and surrounding harbor are seen from a science classroom in the tower addition



The prominent yellow color used throughout the building signifies areas of "gathering"

From top to bottom and corner to corner, intentional interconnectivity at Kodiak High School allows core curriculum, career/vocational learning, and community use spaces to merge with fluidity.

As result, vertical and horizontal integration have broken down the physical and cultural barriers which were once more than apparent in the former school.



LEARN LINK EXPLORE



High-end CTE projects, such as electric cars, are designed in one program, moved into a robotics lab to program and code electronic components, fabricated by the welding shop, and equipped with steering and braking mechanisms by the auto shop — creating a collaborative finished product the students can operate in competitions.



Environmental Support of Teaching & Learning Styles

As determined by the educational specifications and continued investigation and analysis of spatial programming, the support of varied instruction and learning styles is seen within Kodiak most immediately by its sense of transparency. In the previous school, classes were segmented, offered in inadequate spaces. Now, each floor offers new opportunities for instruction.

In the tower addition, primarily housing core curriculum classes and the library, a commons on each floor is accessible to teachers who would like to open the wall of their classroom to expand into a larger workspace, and includes flexible furniture to easily reconfigure for a variety of uses (photo above). Resource rooms are located on each floor, and a small group/studio room overlooking the harbor can be used for student work sessions, meetings, or group work. Similarly, reconfigurations of adjacencies and spaces within the CTE classrooms allow multiple types of learning to take place simultaneously.

For large group needs, Kodiak offers multiple options, all within close proximity and able to be easily supervised. The first, the Cascading Commons (pictured on the page before) is a large seating area that spans from the second floor to the first floor. From simple amenities like electrical plugs in the seats, to offering a large drop-down projection screen, its flexibility for conducting presentations, club meetings, studying, community use, or meeting with friends makes this central location a crucial circulation and gathering component with vitality. With close proximity to the tower, gym, dining hall, and CTE spaces, it has been a large contributor to breaking down walls between ethnic and culturally diverse student groups due to its very nature to encourage students to easily mingle.

Adjacent on the second floor, the dining hall offers a sweeping view of the harbor and is used beyond the lunch hour for mock restaurant operations (operated by the culinary program), for student clubs, and for student dances.

One unique decision of the design was to place the gym's primary public access on the second floor. Top down seating has encouraged community members to engage with more of the building, or feel free to explore areas where student projects and art are on display. Younger students visiting the school with their parents are given the opportunity to gain more exposure to programs available at the high school level, and as result, STEM and CTE curriculum is now filtering down to the middle school and elementary school level.

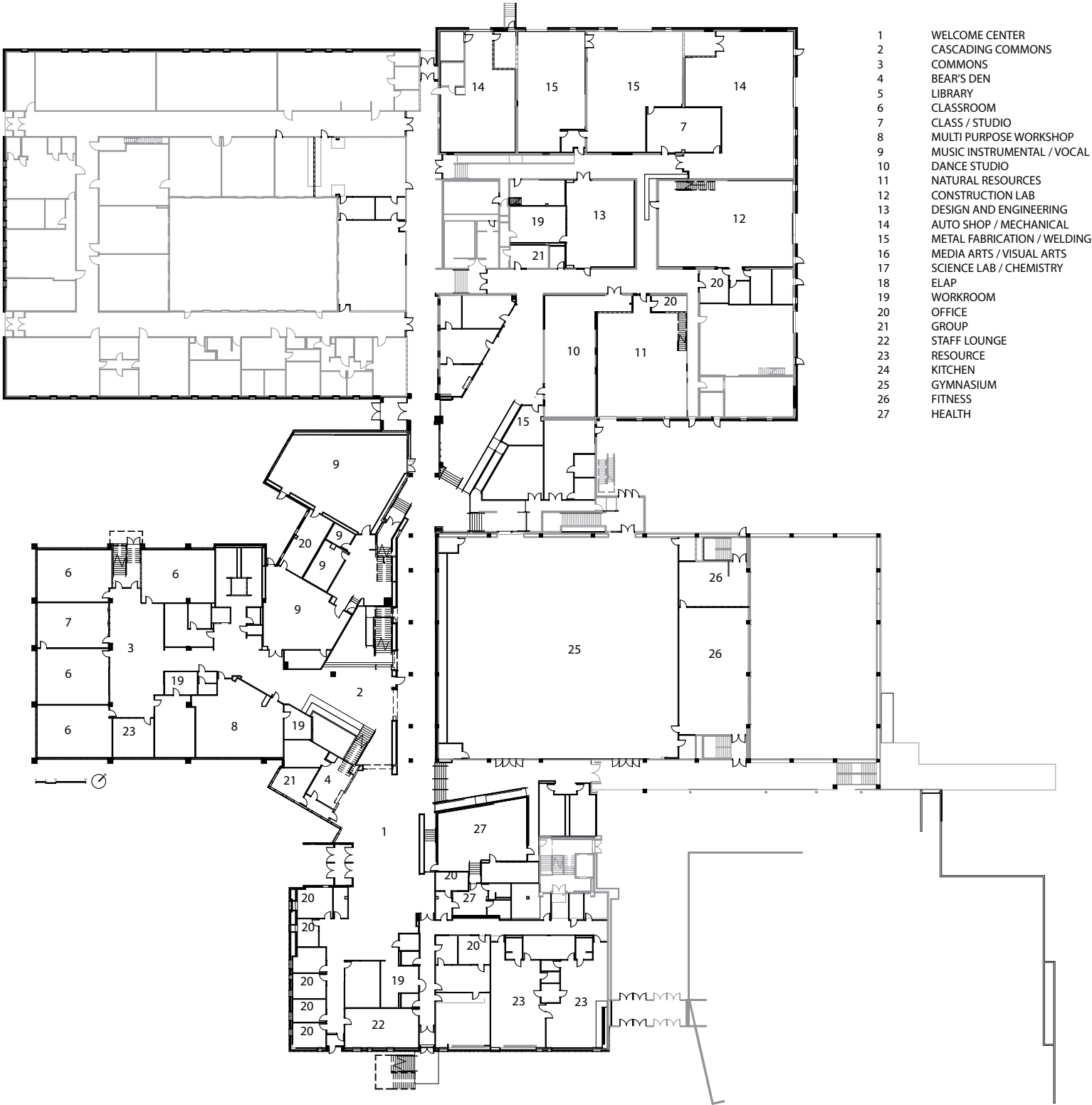
Adaptable & Flexible

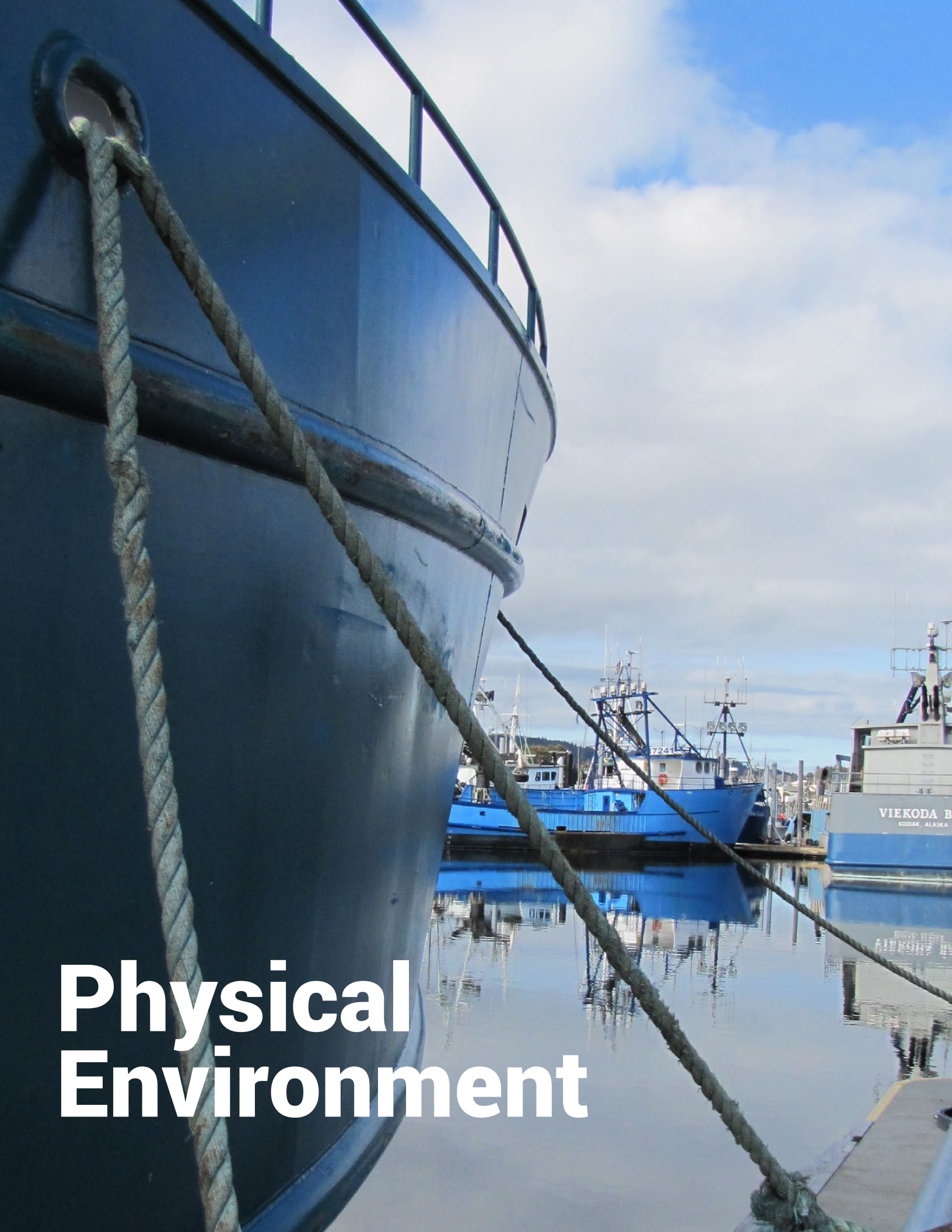
As previously described, built-in flexibility has been crucial to the success of the building. One example of how this is working to the school's advantage can be seen in the ways the space can adapt for unique events, and further reach students located across the country:

The fisheries program, for example, operates as one part lab, one part industrial complex. It features a large garage door, and the program includes an actual fishing vessel owned and operated by the District (kept at the local marina). The classroom itself is wired with the audio and video to operate as a virtual studio. In the event the high school would like to offer a live broadcast of a shark dissection, the garage doors allow the equipment necessary to bring in the animal, and the classroom can fill up with students to watch the event in-person. Furthermore, the broadcast can be displayed locally on the projector in the Cascading Commons, students in the rural schools can tie in the live online feed, and students across the state and in the lower 48 can join as well — all with access to interact in real time with the scientist conducting the dissection. Spatial considerations, integration of technology, and collaborating within the community all contribute as the reasons such a unique educational opportunity is available to the students.

From classroom flexibility, to bringing real-life relevance to the surrounding industries, Kodiak High School's agility, prominence in the community, and reach to surrounding areas has transformed the way education is being delivered.

Floor One Floor Plan





Physical Environment



Physical Attributes of the Environment

Kodiak Island is located in the Gulf of Alaska, covering just over 3,500 miles. The city of Kodiak is the central hub of activity, fueled by hardworking residents who are not deterred by over 70 inches of rain in the summer, and 70 inches of snow in the winter. As one might imagine, exposed coastlines, a limited road system, and harsh weather are commonplace for the island. The construction of Kodiak High School had to be broken into 10 phases, and special exterior cladding was chosen based on the amount of water that falls annually and exposure to the corrosive salt spray.

The largest employment opportunities are in commercial fishing, the U.S. Coast Guard, and other government entities. Jobs in trades fields, transportation, utilities and tourism are also present. The abundance of wildlife and scenic beauty on the island includes over 3,000 Kodiak Brown Bears.

The Kodiak Island Borough School District operates out of Kodiak, serving the educational needs of the entire Kodiak Island Borough through facilities in Kodiak, and rural facilities in outlying towns. Each rural town is represented by a Federally recognized Native Alaskan tribe. In those locations, 80% of students are Alutiiq (the indigenous people of Kodiak). Meaning, that within the District, schools may have 14-18 languages spoken within the walls of a single facility.

Capitalizing on advancements in audio/video technology are way of life necessitated by the many miles which separate students from teachers, or students from their class. The campus of Kodiak High School serves as the hub of this communication, with many classes virtually integrated with students across the Borough.

The building itself features materials designed to withstand the harsh weather, while reflecting the natural surroundings in its palette of colors and textures.



Left: The fishing harbor of Kodiak; Above: The serene Kodiak coastline



Top: Wind turbines seen behind Kodiak High School; Above: Natural wildlife of the island



Facility Context in Community

Situated prominently on a hillside above the waterfront, Kodiak High School overlooks the community from its front door, with a low-lying mountain range to its rear. The campus features additional District offerings, including the Middle School and Administration building, calling for careful consideration of how the new Kodiak High School would interact with site flow and traffic during peak hours. Ultimately, the tower addition turned the entrance, and modified parking to allow for separation from the drop-off.

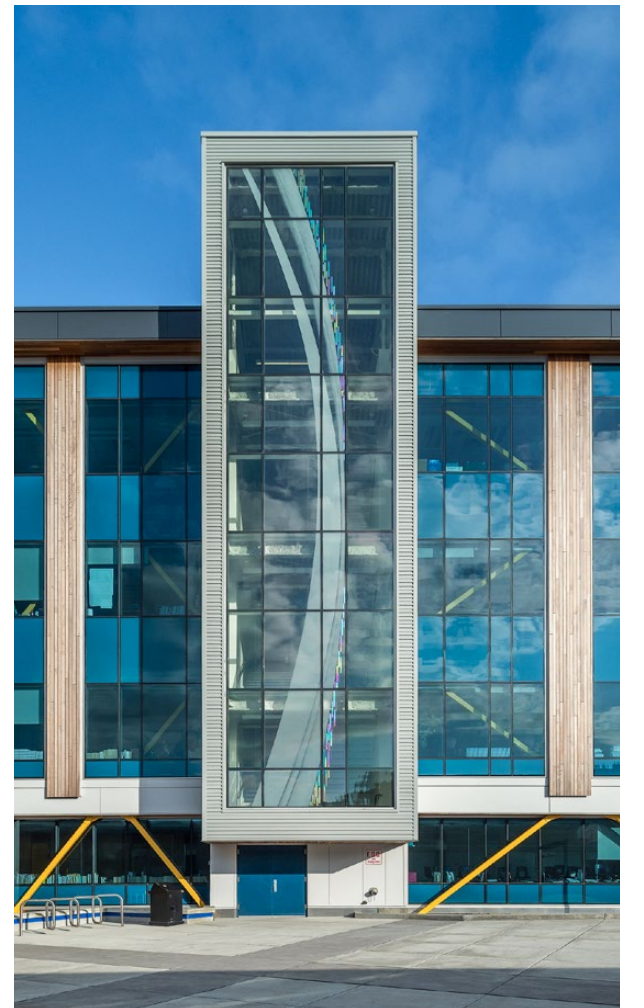
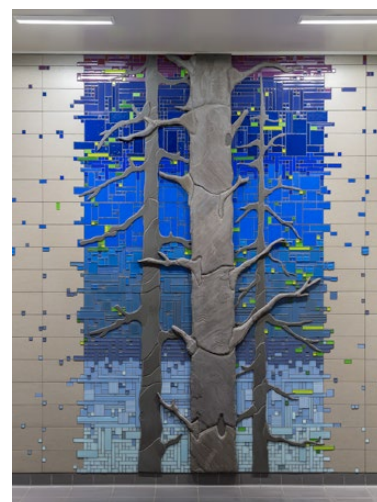
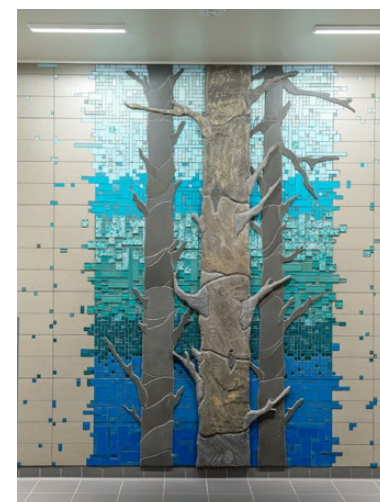
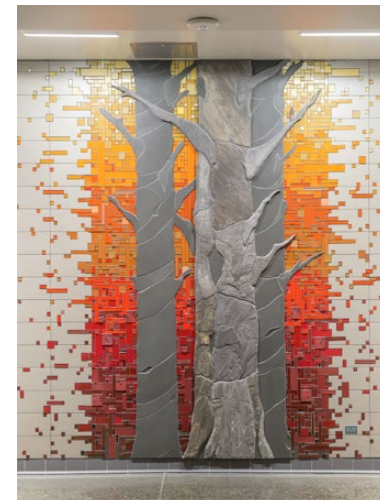
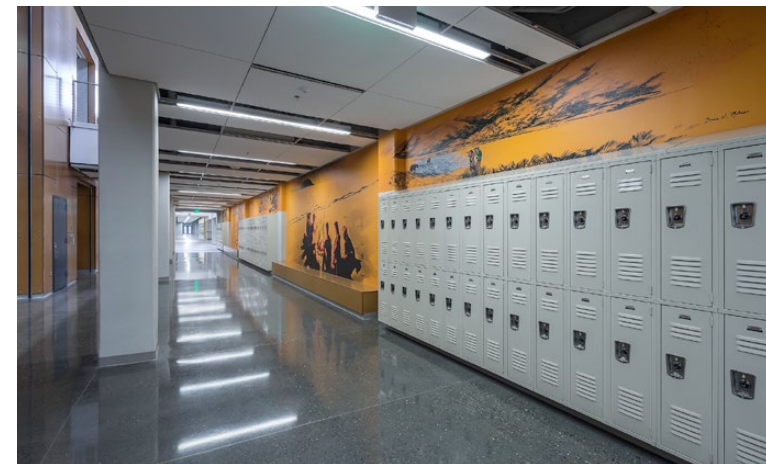
The concept of the high school as a community asset is especially critical in rural Alaska—there are not many community venues. Kodiak High School is designed to support all aspects of community use: education, sports, arts, continuing education and community school activities, as well as independent groups and rentals.

It is even designed to serve as the primary community emergency shelter in the event of a tragic repeat of the tsunamis and earthquakes that hit Alaska in the 1960s.

In effort to convey the rich heritage of the Kodiak Community and the State of Alaska, Kodiak had the opportunity to allocate 1% of the budget to public art projects focused on the themes of fishing, industry, and nature, designed primarily by Native Alaskans. (See photos, next page.)

Inspire & Motivate

Given the close-knit nature of the people of Kodiak, the presence of the new Kodiak High School immediately made an impression on the community. It is one of the tallest buildings on the island, and many who pass by can't help but stop to see the inside. The reaction has been noticeable. For those who have been with the project since the planning stages before the bond, they remember the skepticism of using public money and the potential to call anything new, "the Taj Mahal." When Kodiak High School opened after completing its addition and renovation, the surrounding community took note. No longer skeptical, they realized that their lists of "wants" during the planning stages had been made a reality in this innovative facility. Local shops without the capacity to own high-end machinery, such as a plasma cutter, found themselves reaching out to the high school to involve high school students in creating necessary pieces for their work. The CTE and Vocational Education component have been called the "R&D Department" of Kodiak by many community members, realizing that the forward-thinking innovation is helping raise up a workforce of knowledgeable and skilled young people. In turn, these real-life examples to assist with prototyping or manufacturing provide invaluable opportunities to students to see first-hand where their education could take them.





Embedded in the community, engaged on a global scale. Kodiak High School is proving that “rural” does not limit opportunities.



Results

Achievement of Educational Goals and Objectives

Kodiak High School has returned to its roots, but in a way that is pushing the future of education, and how Career and Technical Education plays a part in obtaining a living wage job, going on to attend college, or inspiring a new path of study. CTE classes are no longer for certain types of students, socioeconomic classes, or limited by the physical constraints - they are truly open to all, and the varied opportunities in robotics, digital media, fabrication, welding, auto shop, woodworking, health science, art, and commercial fishing are enticing students to get involved in new and innovative ways.

Kodiak High School now has 70% of its student population enrolled in some form of CTE/Vocational class.

Achievement of District Goals

The Mission of Kodiak Island Borough School District is being lived out daily in the re-imagined Kodiak High School: *The Kodiak Island Borough School District, in close cooperation with our diverse island community, exists to provide an educational program of the highest standard that empowers all students to achieve personal and academic excellence while developing their full potential as responsible, productive citizens.*

What once was a facility unable to provide the academic offerings desired — lacking space for group activities or collaborative learning, and plagued by supervision concerns is now a global participant in high-quality learning. Students who had previously wrote off the idea of ever enrolling in a CTE program are now finding

themselves intrigued by the possibilities, and realizing that gender or socioeconomic norms don't need to play a role in their education. Opportunity is available to all.

One of the school's greatest successes can be seen with the students who participate in the English Language Acquisition Programs (ELAP). With a total of 18 languages spoken at Kodiak High School (and the majority of students coming from ethnically diverse backgrounds), the student body faces unique cultural and language barriers. In the old school, English Language Learners (ELL) would normally have been pushed into intervention-style programs. Graduation rates among ELL students was as low as 42%. **In the new school, initiatives to get rid of the “otherness” and providing access to programs in a blended learning style have resulted in ELL students reaching 100% graduation rate.**

For rural students who must connect virtually with the Kodiak campus, they once had very limited access to CTE/Vocational education. Once a year, a District-owned trailer would travel from village to village and provide about two weeks of opportunity to experience expanded learning opportunities based on what could be transported.

Today, embedded technology within Kodiak High School is turning classrooms all over the school into virtual learning opportunities. Students can participate in real time, virtually, with the orchestra or band - then later integrate seamlessly with the ensemble for the performances. From a technical standpoint, it has taken a long time to fine-tune, but it's providing students with the camaraderie and belonging that would normally not be a part of participating from afar.



Similarly, in the welding program, distance learning offerings has excelled tremendously. 2016 marked the first rural schools student in the State of Alaska to receive a pipe welding certification through the Kodiak Island Borough School District virtual welding program.

Inspired by the changing face of science, technology, and CTE education, unique opportunities have arisen that include a partnership with The World Bridge Project. NASA's Ames Research Center, the European Space Agency, and Intelesense Technologies have collaborated directly with Kodiak students to set up the first two pre-earthquake sensor platforms of their kind in the world. One is located at Kodiak High School, and another is at a rural Kodiak school location, Old Harbor School. Students are designing, testing, and monitoring sensors in collaboration with scientists seeking to forecast seismic events through the Global Earthquake Forecasting System.

In partnership with NASA, the Kodiak Launch Complex, and Alaska Aerospace, Kodiak students are also designing small satellites that will be constructed on-site during the school year. By launching the “CubeSats” in weather balloons, they'll be able to reach high altitude orbits to gather data able to enhance the Global Earthquake Forecasting System program.

These projects, and the global initiative of these bright students contributed to Kodiak High School students being named the **2016 NASA Europa Challenge Winner** (winning for the second year in a row, and this time, entering at the university level).



By enabling student connections to a project actively linked to real industry, teachers take the role as a facilitator, and the students can be mentored and directed by industry leaders. For these students, finding real-world, meaningful connections to education and seeing its impact on the world around them is perhaps the best educational metric a school could ask for.

Achievement of Community Goals

The new Kodiak High School belongs as much to the community as it does to the students. The programming of the facility was heavily influenced by conversations with the community, and as such, the District is doing their best to partner with area businesses, cultural organizations, and providers of higher education.

Most notably, area businesses are finding that the progressive educational tools available at Kodiak High School provide real-life learning opportunities and value to their companies. When faced with a problem that requires a plasma cutter or 3D printer, reaching out to the high school class gives students an ability to work side-by-side with industry professionals to fabricate a solution, and in turn, gain valuable experience.

Additionally, the benefit of having a facility that can be easily partitioned for public and private use is inspiring expanded community use and involvement from groups such as the Kodiak Arts Council, sports booster clubs, Alutiiq language preservation project, and service clubs.

Unexpected Results

The mingling of student groups and transformation of school culture has become the best unforeseen result of the addition and renovation. In the old facility, social groups each had their own distinct place, and classrooms had no reason (or space) to collaborate. As the students moved into the new Kodiak High School, the interconnected nature of the facility forced the old barriers to break down. With glass all over the facility, flexible spaces, walls, and furniture, the student population began to pivot in their treatment of one another.

The old facility was a considerable challenge to supervise, but by integrating so much glass in the new facility and supplementing with video monitoring,

the students no longer actively seek out trouble on the school campus. The transparency results in ongoing conversations with staff members as to how best to provide security in the building, but the trade-offs given the fluidity and daylight between the spaces has far outweighed the negatives.

In terms of building energy performance and opportunity, the high school was designed to perform better than before - but due to cost limitations, was unable to take its energy efficiency to the level initially desired. The community feared another “fuel-oiled box” but the cost to install a ground-source heat pump (for example) was prohibitive given the already ambitious nature of the project budget.

As such, the design of the building intentionally included flexibility to transfer the from fossil fuels to another source of energy in the future.

As of December 2016, Kodiak Electric Authority has pledged to pay for the conversion from gas to electric in the coming year, meaning that Kodiak will be powered by 99.7% renewable energy (through wind and hydro power).

This opportunity was not anticipated at the time of design, but the underlying anticipation of moving away from fossil fuels was instrumental in designing systems flexibility to accommodate future changes.

The Future

Although the process of renovating Kodiak High School took many years and involved hundreds of individuals to become a reality, the educational opportunities provided to the students and the value to the community at large have brought this project full circle. Graduates of the old facility are already seeing the rewards brought to their students, and the cycle will continue for generations to come.

As the District tagline states, “Engaged in Learning. Prepared for Life.” and that is truly the way this high school is serving its students. With an average graduation of 99%, Kodiak High School is impacting the community and the world, and its students have been further enriched by the integrated opportunities brought to them as result of the tireless work to make this project a reality.



In the coming year, Kodiak will make conversions allowing it to run wholly on local, sustainable energy sources.



Pressure Volume Work

$PV = nRT$

pressure volume moles temperature constant

$$\frac{(1.0 \text{ atm}) \times (10.0 \text{ L})}{(0.5 \text{ mol}) \times (0.08206)} = \frac{(0.5 \text{ mol}) \times (0.08206) \times (T)}{(0.5 \text{ mol}) \times (0.04626)}$$

$\frac{?}{?} = T$

$M-L =$

Kodiak High School
Kodiak, Alaska