The Breck School

Master Plan, Renovation, and Expansion
Minneapolis, Minnesota
LEED Silver Certified

Executive Summary / Breck School

SIZE

65,000 SF (New)
10,000 SF (Renovation)

COMPLETION DATE

August 2013

AWARDS

2014 Institutional Merit Award Winner - ALA Design Awards

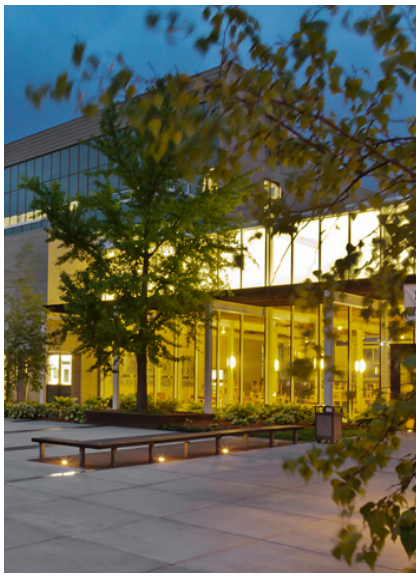
Breck School is an independent, college-preparatory, Pre K-12 school located near the suburbs of Minneapolis, Minnesota. It was founded in 1886 and is affiliated with the Episcopal Church.

In 2008, Breck School commissioned this firm to perform master planning, a redesign of the overall site, renovation and expansion of existing buildings, and construction of new spaces, including playing fields and green spaces. The master plan included four phases of design.

Special environmental care was taken to ensure that the footprint of the new building matches that of the old. The new building was constructed in the exact same location.

Executive Summary / Breck School

Overall Goals and Outcomes



The goal of the Master Plan was to provide a more organized school building for all grades and departments. The existing school was loosely divided by grade level through multiple attached buildings. While maintaining the existing divisions between grade levels the school wanted a closer relationship between departments thus connecting these levels through area of study. The planning and programming for the Upper School, the first building to be completed, was based upon interdepartmental relationships rather than grade level. Classrooms, labs, common spaces, and circulation were planned based upon the teaching philosophy of the school.

Today the new Upper School functions as a learning space where different educational departments are interconnected and bridge the different class levels.

Scope of Work / Breck School

SERVICES PROVIDED

Master Planning
Site Planning
Programming
Architecture
Structural Engineering
Interior Design
Sustainable Design
MEP/FP Engineering

The Master Plan and Renovation of Breck School was a significant addition and remodel project as part of a long-range master plan originally developed by this architectural firm. The school facilities were originally built in stages between 1956 and 1965 as a senior high school. They were purchased by Breck in subsequent years. Several major additions, including a new chapel, field house and entry commons have been added to the campus over the years, as well as many systems upgrades and interior remodels.

Initial project scope included:

- Demolition of a portion of the existing building centrally located in the current building footprint
- Construction of a new 43,000 sf 3-story Upper School addition that includes a Media Center, classrooms, science labs, administrative offices, restrooms and shared student common spaces
- A small 1,300 sf addition and minor remodel to the existing Lower School dining facility

Scope of Work / Breck School

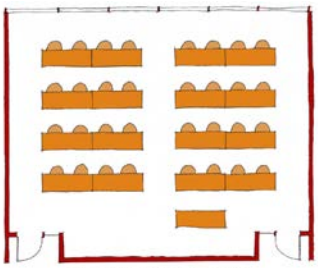
- Modest remodel of the existing 12,000 sf South Classroom wing (primarily room finish and lighting upgrades)
- Structural reinforcement of adjacent existing roof structures (to accommodate additional snow loading) located to the west, south and east of the new 3-story addition
- Demolition and reconstruction of the existing 3,500 sf receiving area to provide access for construction of the new 3-story addition
- Hardscape and landscape restoration of a small exterior courtyard that will be disrupted during construction

Alternates for pricing delineated in the drawings and should include the following items:

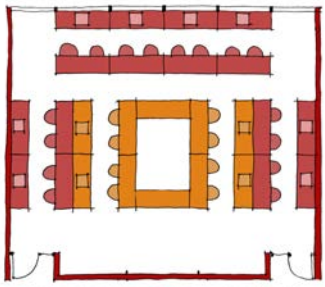
1. New South classroom addition (approximately 19,000 sf)
2. North Science classroom remodel (approximately 9,000 sf)
3. Glass Box pavilion in the courtyard (approximately 900 sf)
4. Green Roof on Level 400

Scope of Work / Breck School

Master Planning

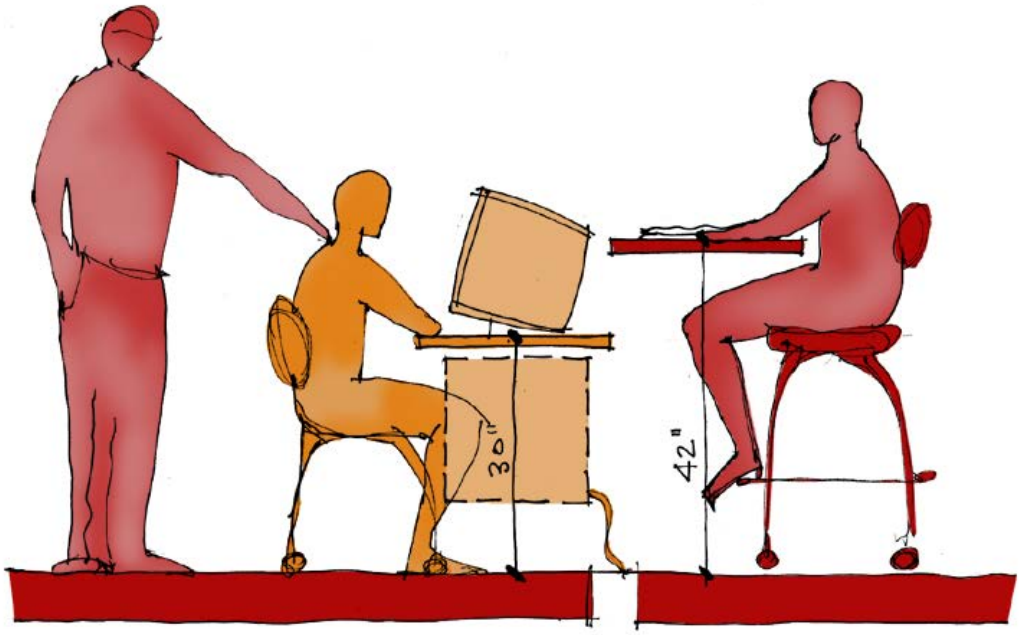


With the initial scope of needs laid out by the school board, the firm developed an approach to master planning and programming for this project where the value presented is not only apparent in the resulting design, but the birth of a process that allowed for the school and the designers to jointly make value decisions. This process created the transparency needed to allow the building committee to explain how and why decisions are made to their constituents. Additionally, the firm found this process to be very beneficial in generating community support.



The architects identified five elements believed to be important to the successful planning and ultimate completion of this master plan, renovation and expansion project. These include, Engagement, Identity, Cross-Disciplinary Community, A Culture of Inquiry, and Sustainability and Energy Efficiency.

The beliefs inherent in these 5 elements were as follows:



Scope of Work / Breck School

Master Planning

Engagement

The planning process should be inclusive and engage a diverse group of individuals to work productively in order to create a facility that expresses the vision of the Breck School.

Identity

The completed facility should have an identity that strengthens the image and visibility of the curriculum both within the building and outward to the surrounding campus.

Cross-Disciplinary Community

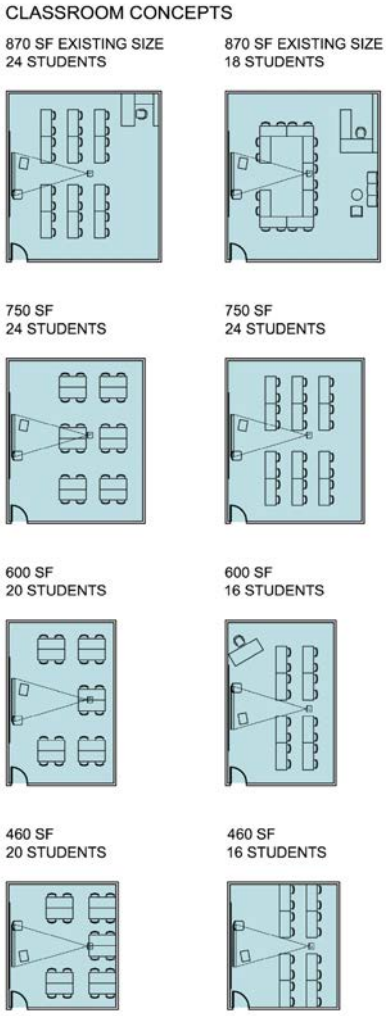
Since this project will combine a range of disciplines and age groups into a unified facility, it is an opportunity to create an interdisciplinary community that fosters interaction and learning across former boundaries.

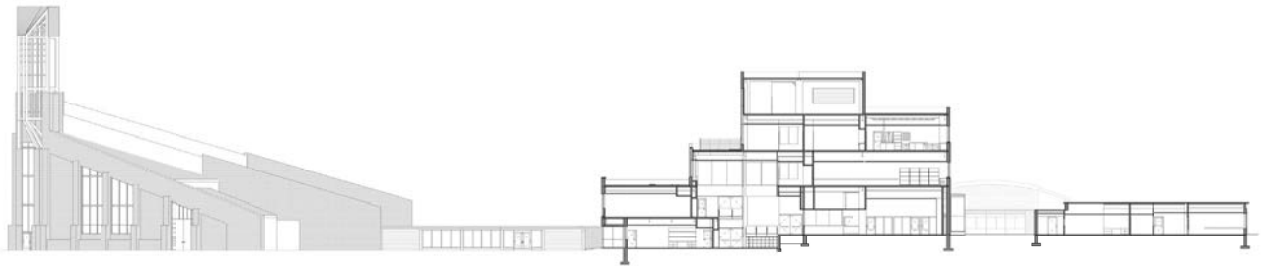
A Culture of Inquiry

To support a culture of inquiry, individual classrooms and laboratories should be designed to promote active, hands-on investigation, where students can work interactively with each other and with faculty.

Sustainability and Energy Efficiency

The completed facility should be one that uses natural resources wisely by building on principals that are both sustainable and energy efficient.





Scope of Work / Breck School

Master Planning - Community Engagement

1. Identify stakeholders

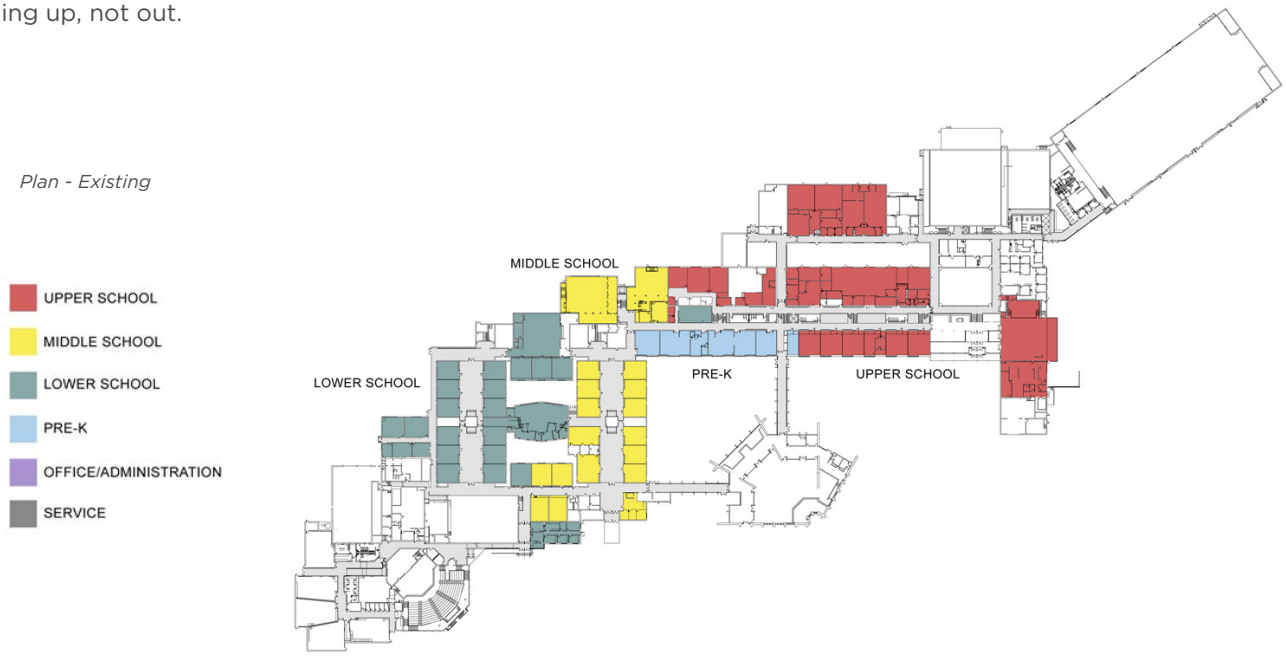
Specific stakeholders consisted of the various member bodies of Breck School: the school board, head master, faculty, administration, department heads, business office, and facilities personnel. The best results in planning and design come from the variables that are unique to each project. To this end, as mentioned previously, the firm worked closely with the faculty, students, administration, staff, and community members of the Breck School to arrive at a plan and ultimate design that reflects the culture and aspirations of the institution, as well as a program tailored to their needs. With an established shared understanding, the firm engaged the community in a progressive series of meetings/workshops where we collectively verified program requirements and developed planning parameters.

2. Name challenges

The existing school campus is a grouping of multiple buildings that are all interconnected. The buildings were all constructed as additions throughout the 60 year history of the site. This project was located within the heart of the campus where it replaced a building built in 1971. Because of site constraints, the campus could not expand outward.

Due to the various ponds on and adjacent to the property, altering the existing drainage may have damaged the ecology of these small bodies of water. Because of these ponds, and the location of the existing flood line on the site, the new building was built within the same footprint as the old building. This aspect of the design retained the open green space of the campus and also avoided having to re-grade the site and change the existing site drainage patterns. Because the new building was located within the center of an existing interconnected campus, the demolition and construction required an extraordinary amount of coordination between the architect, owner, and contractor. All of the buildings and structures adjacent to the new addition were still in use during construction. The new building was literally “book-ended” by existing spaces that were still in use. Storm runoff from the roof was decreased due to the green roof and the fact that the new roof was of equal size to the existing; new area overall was provided by building up, not out.

Plan - Existing



Scope of Work / Breck School

Master Planning - Community Engagement

3. Describe available assets

Breck School is located in Golden Valley, Minnesota. It is located just a couple miles from Downtown Minneapolis, a city with a wealth of cultural resources. The school itself possesses state of the art sports facilities, acclaimed theatre and art resources, and numerous successful alumni that continue to support the school.

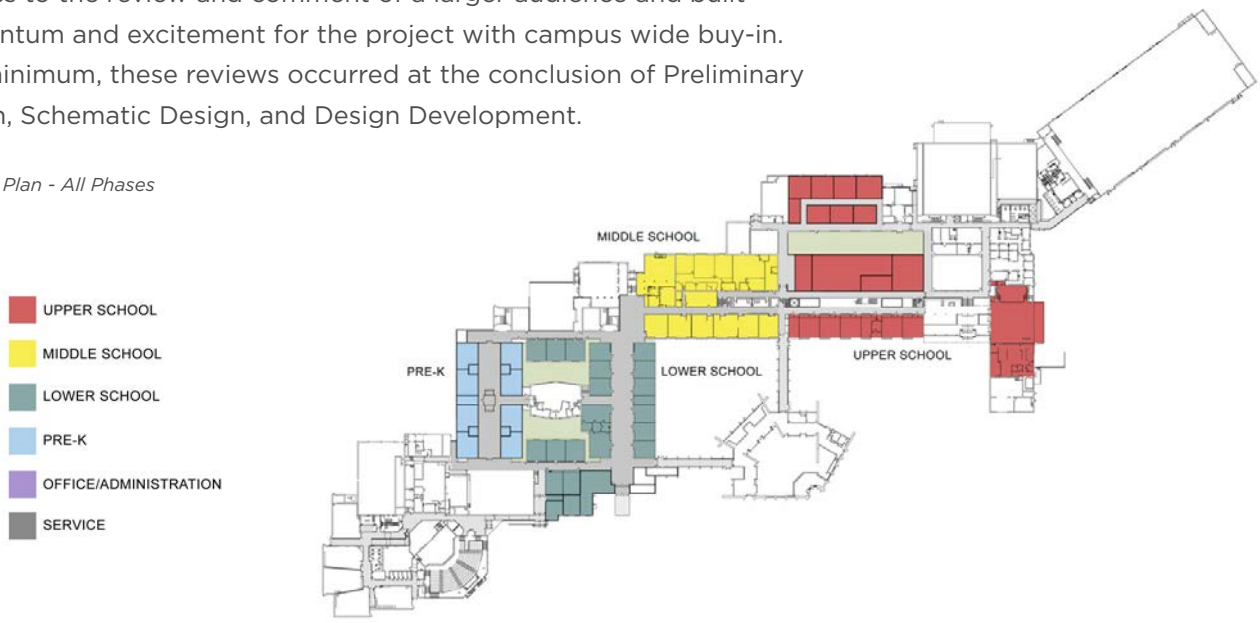
4. Describe value of process and project to the community at large

Prior to beginning construction the school was required to obtain approval from the City Council as part of the zoning process. Part of the approval process was to address local community concerns regarding the construction process. Throughout this process and during construction the community was constantly updated on the progress.

The local community utilizes the school grounds year round. One of the concerns prior to construction was that open green space would be taken for the new building. Since the new building was constructed on the footprint of the existing building preserving green space for the enjoyment of the neighbors.

Throughout pivotal points in the development of the project, the firm continued to engage the larger campus community. This opened the process to the review and comment of a larger audience and built momentum and excitement for the project with campus wide buy-in. At a minimum, these reviews occurred at the conclusion of Preliminary Design, Schematic Design, and Design Development.

Plan - All Phases



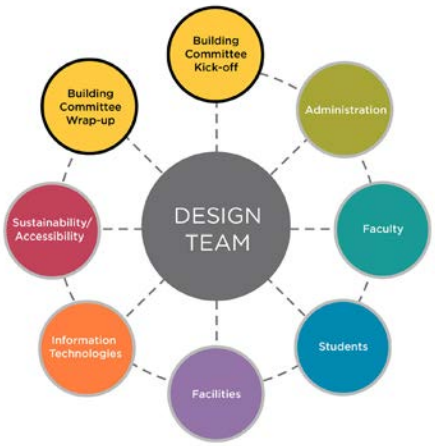
Scope of Work / Breck School

Master Planning

Before the planning of any specifics took place, precedent studies were conducted on various similar schools that portrayed similar demographics and program necessities as Breck. This research was both extensive and integral to meeting the needs of the school's stakeholders, ensuring state-of-the art design and programming inclusions and helping to identify true priorities - a practice necessary to staying on time and on budget.

Our planning team utilized both data gathered from the school beforehand and qualitative information assembled from **engaging** in exploratory sessions with a broader school community, including administrators, faculty, staff, students and other internal and external stakeholders as part of the planning process. Using standardized methodologies for classifying and calculating space planning data, they were able to readily benchmark the renovation's program.

The team worked hard to push the limit of new technologies and emerging spatial strategies to create dynamic spaces that serve the changing way in which teaching and learning take place in and out of the classroom.



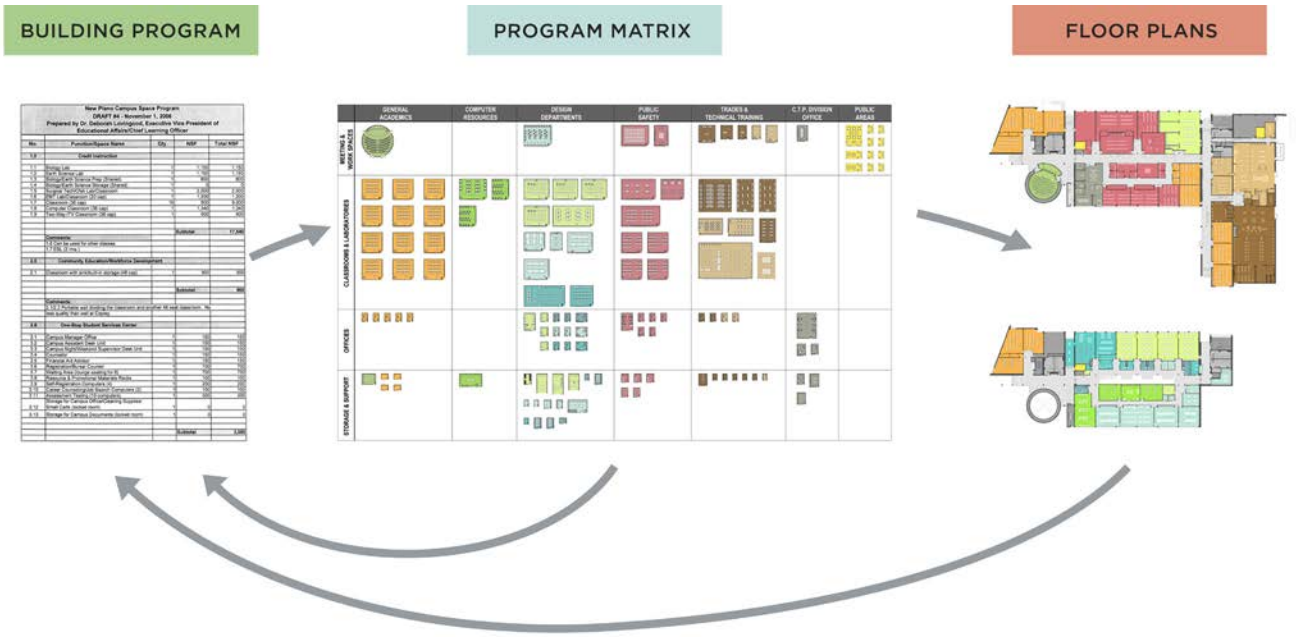
Classrooms & Enrollment, by Grade & Division 2008-2015	Existing Situation			Phase 1			Phase 3			Phase 4		
GRADE	Opening Day 2008-09	Division Subtotals	Enrollment : Classrooms	2008 Target Enrollment	2008 Target Subtotals	Enrollment : Classrooms	2010 Target Enrollment	2010 Division Subtotals	Enrollment : Classrooms	2012 Target Enrollment	2012 Division Subtotals	Enrollment : Classrooms
Pre-school & Kindergarten	54 68	122		48 64	112		48 64	112		48 64	112	
1 2 3 4	73 81 87 82	323		72 72 80 80	304		72 72 80 80	304		72 72 80 80	304	
5 6 7 8	82 80 94 88	344		80 90 90 90	350		80 90 90 90	350		100 110 110 110	430	
9 10 11 12	97 109 98 105	409		108 108 108 108	432		128 128 128 128	512		128 128 128 128	512	
Enrollment Total		1198			1198			1278			1358	
Pre-school & Kindergarten General Classrooms	7	7	17.43	8	8	14.00	8	8	14.00	8	8	14.00
Lower School General Classrooms Language Classrooms	16 4	20	20.19 16.15	17 4	21	17.88 14.48	17 4	21	17.88 14.48	17 4	21	17.88 14.48
Middle School General Classrooms Science Class & Labs	17 4	21	20.24 16.38	18 4	22	19.44 15.91	19 4	23	18.42 15.22	25 4	29	17.20 14.83
Upper School General Classrooms Science Class & Labs	20 5	25	16.36	21 6	27	16.00	25 6	31	16.52	27 6	33	15.52
Subtotal Visual Arts Classrooms Performing Arts Classrooms		73 4 5	16.41		78 4 5	15.36		83 4 5	15.40		91 4 5	14.92
Breck School Total		82	14.61		87	13.77		92	13.89		100	13.58

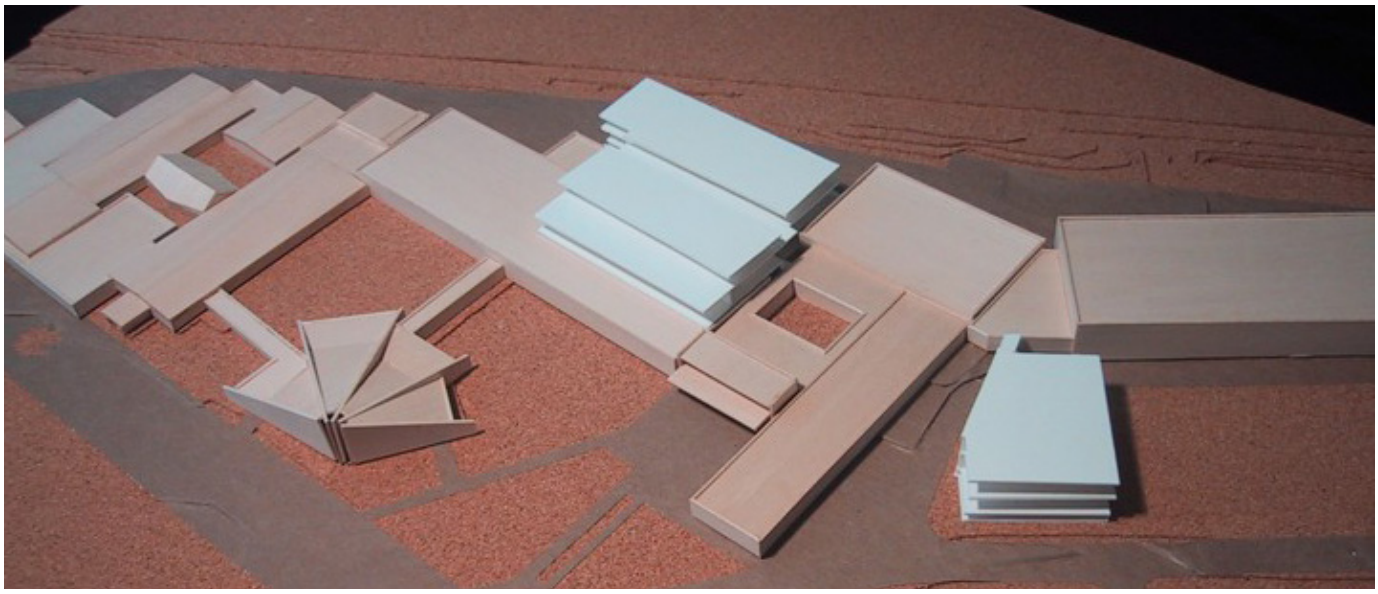
Scope of Work / Breck School

Master Planning

The program for this master plan, renovation and expansion included multiple classrooms, playing fields, green spaces, informal gathering areas, study nooks, meeting arenas, faculty offices, multifunctional laboratories, and a library/media center, all incorporating fluidity and transparency throughout major academic zones that occupy this multistory school.

The architects offered multiple programming and design options through visual tools so that all of the building constituents had a clear understanding of how the project was progressing and to ensure the site will be efficient for the school and able to accommodate additional growth in the future.

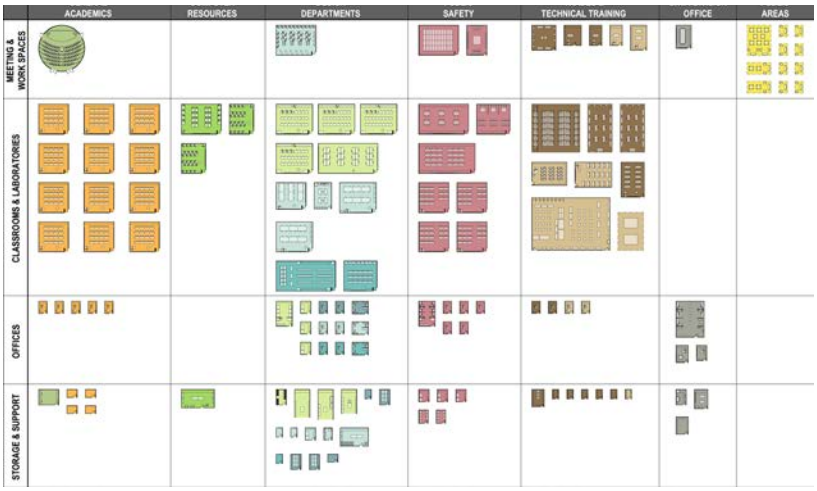




Scope of Work / Breck School

Master Planning

These visuals included detailed descriptions that outlined individual room requirements (Programming Space Diagrams), a space matrix that identifies the type and size of each space in the preliminary program, organizational floor plans that show the relationship of the spaces to each other, and the building massing to indicate the relationship of the buildings to the larger campus context. In this process, anomalies become readily apparent and questions can be raised if the proposed program doesn't seem to fit within the benchmark parameters.



A specific method this firm developed to verify and analyze the program is a mock scheduling exercise. Testing the initial program through a mock scheduling exercise proved to be effective in verifying that instructional spaces are sufficient to meet the needs of the student population within the constraints of the expected scheduling methods. Often, this exercise will flush out spaces that are marginally used. Alternately, this can propose modified scheduling to increase efficiency of space use. With this information, further discussions often find alternative ways to accommodate teaching needs. Used previously on similar projects, the use of these tools resulted in a 20% reduction in the program.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:00					
9:00	[20] CS 101		[20] CS 101		[20] CS 101
10:00					
11:00	[18] CS 102	[18] CS 212	[18] CS 102	[18] CS 212	[18] CS 102
12:00					
1:00					
2:00	[24] CS 101		[24] CS 101		[24] CS 101
3:00		[18] CS 252		[18] CS 252	
4:00		[18] CS 230		[18] CS 230	
5:00	[20] CS 102		[20] CS 102		[20] CS 102
6:00					
7:00	[18] CS 305		[18] CS 305		[18] CS 305
8:00		[20] CS 252		[20] CS 252	

COMPUTER **CLASSROOM** 150 **CAPACITY [24]**

Mock Schedule

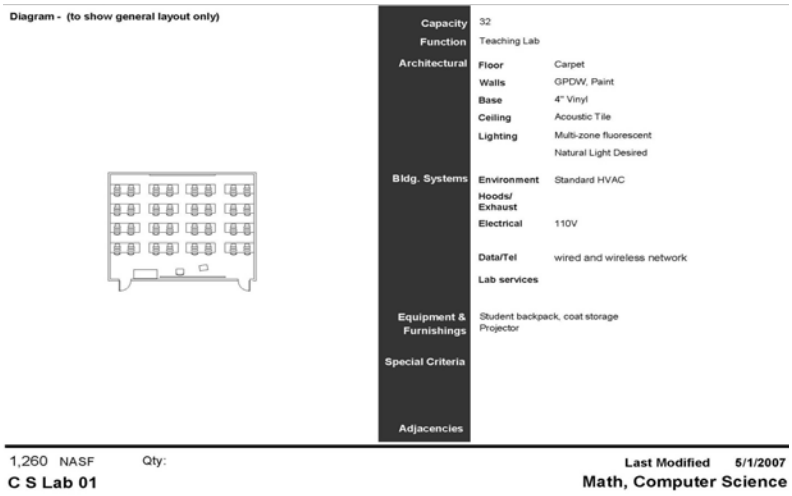


Diagram - (to show general layout only)

Capacity	32	
Function	Teaching Lab	
Architectural	Floor	Carpet
	Walls	GPDW, Paint
	Base	4" Vinyl
	Ceiling	Acoustic Tile
	Lighting	Multi-zone fluorescent Natural Light Desired
Bldg. Systems	Environment	Standard HVAC
	Hoods/ Exhaust	
	Electrical	110V
	Data/Tel	wired and wireless network
	Lab services	
Equipment & Furnishings		Student backpack, coat storage Projector
Special Criteria		
Adjacencies		

1,260 NASF Qty:

C S Lab 01

Last Modified 5/1/2007

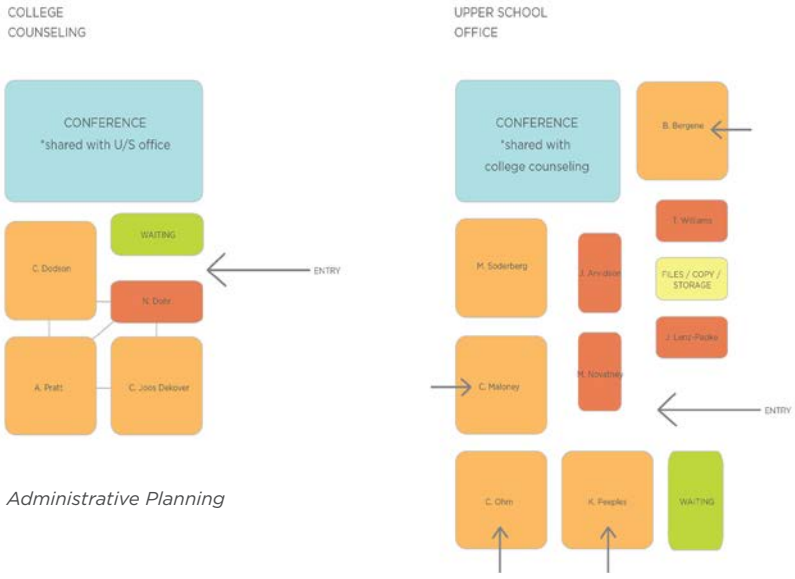
Math, Computer Science

Programming Space Diagram

Scope of Work / Breck School

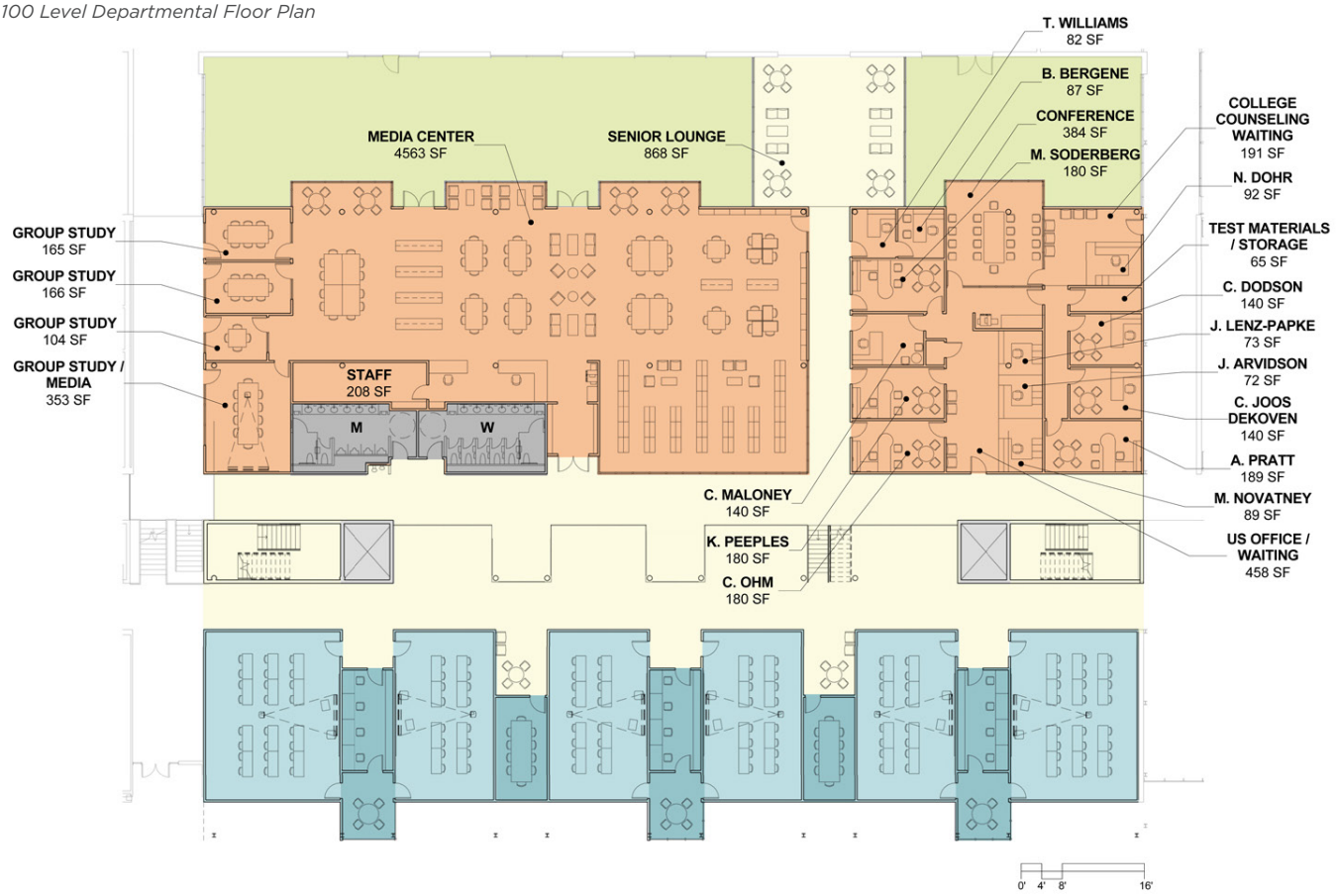
Master Planning

Once a single direction was agreed upon, the firm proceeded by showing alternatives for the next level of development. Along each step in the process, implications were discussed of each alternative on the program and budget. The result was and engaging planning process with a diverse group of constituents and arrive at a solution that provided a shared vision for the future facility.



Administrative Planning

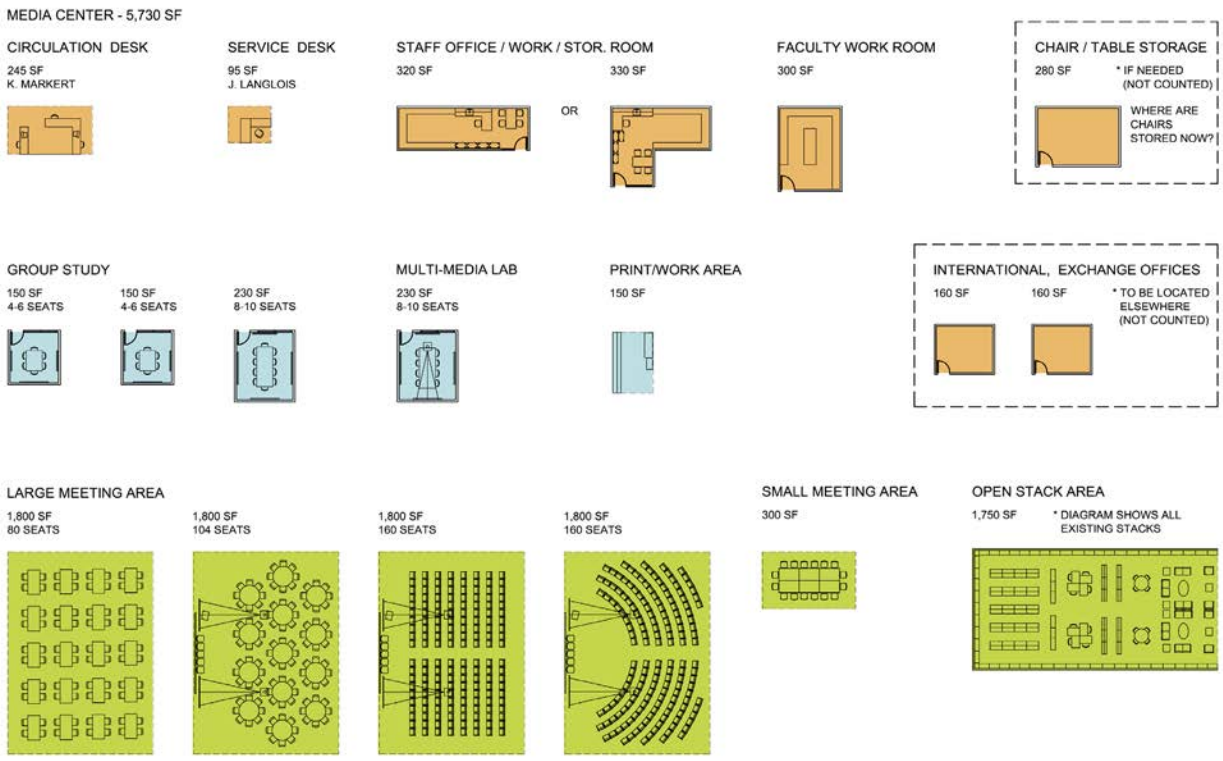
100 Level Departmental Floor Plan

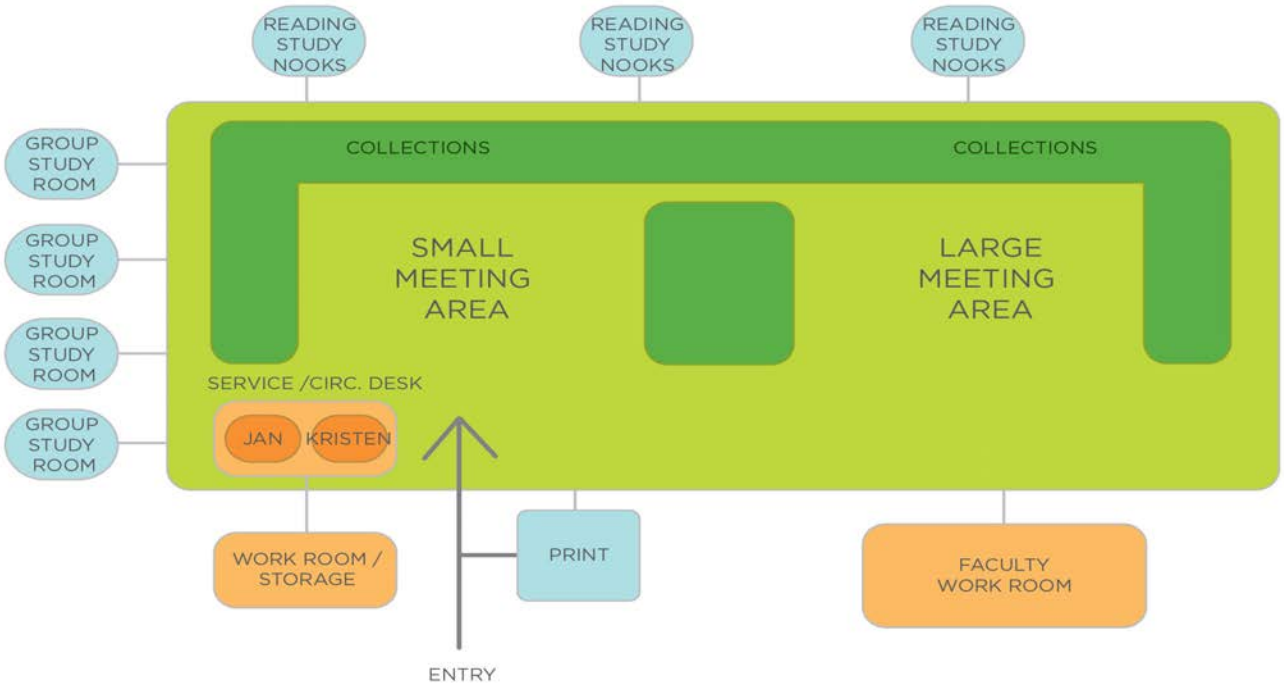


Scope of Work / Breck School

Master Planning

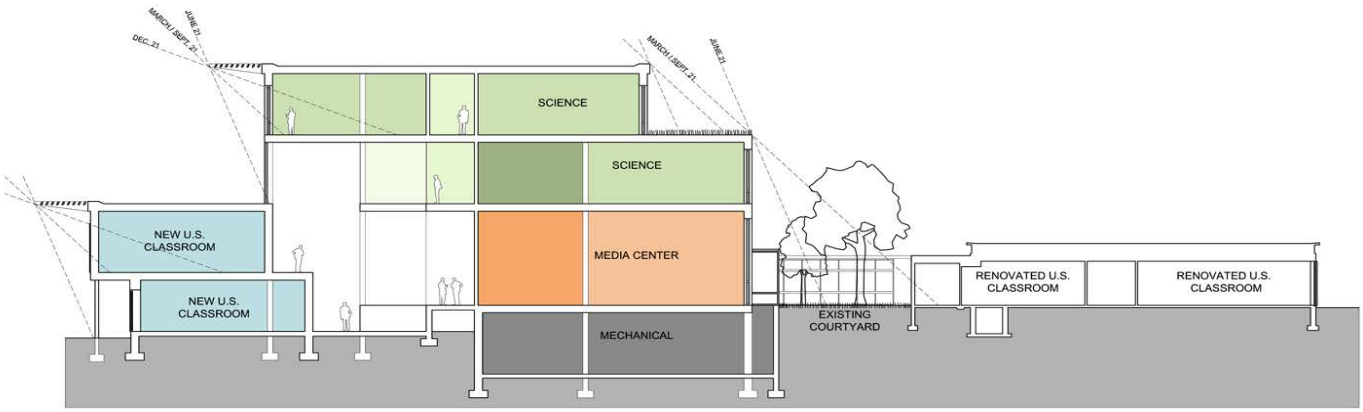
Media Center Planning





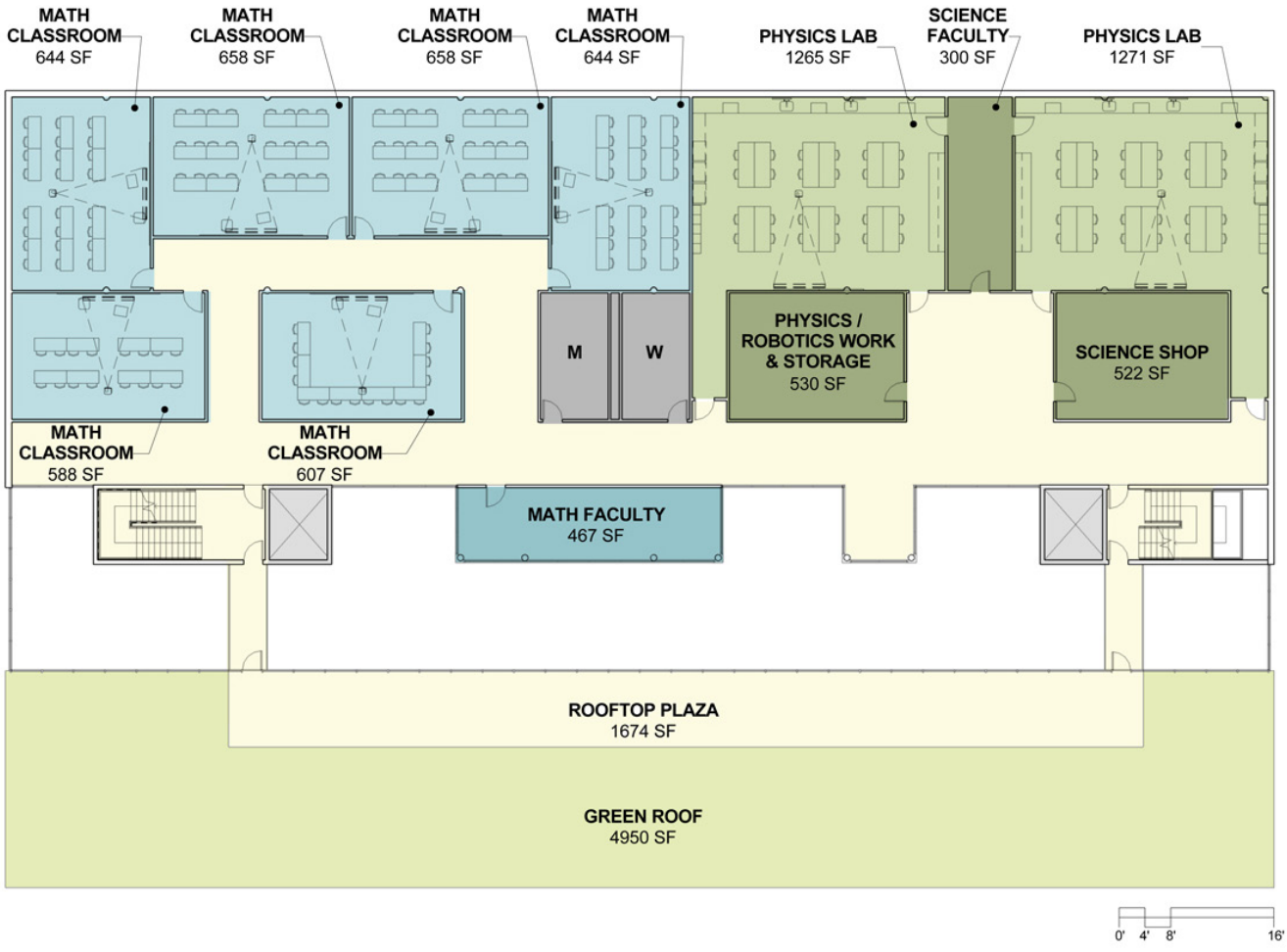
Scope of Work / Breck School

Master Planning

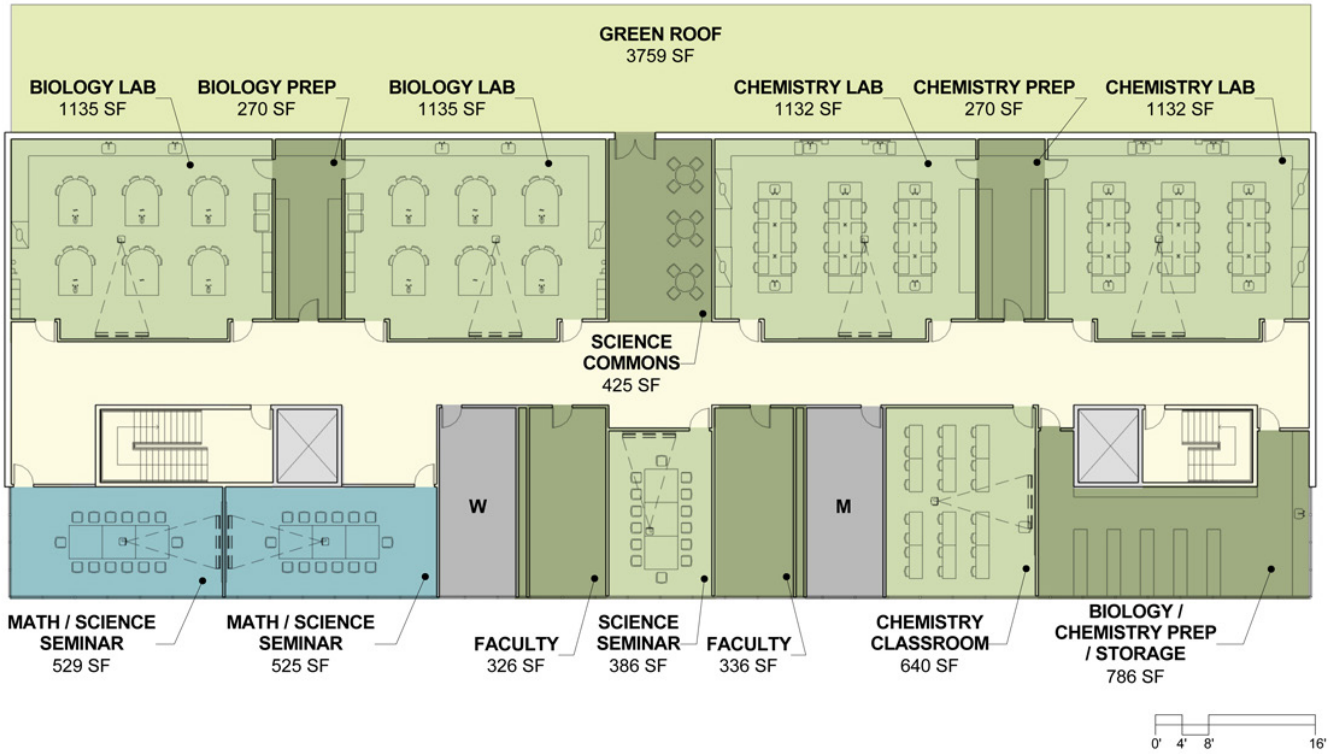


PHASE 1 SECTION LOOKING WEST

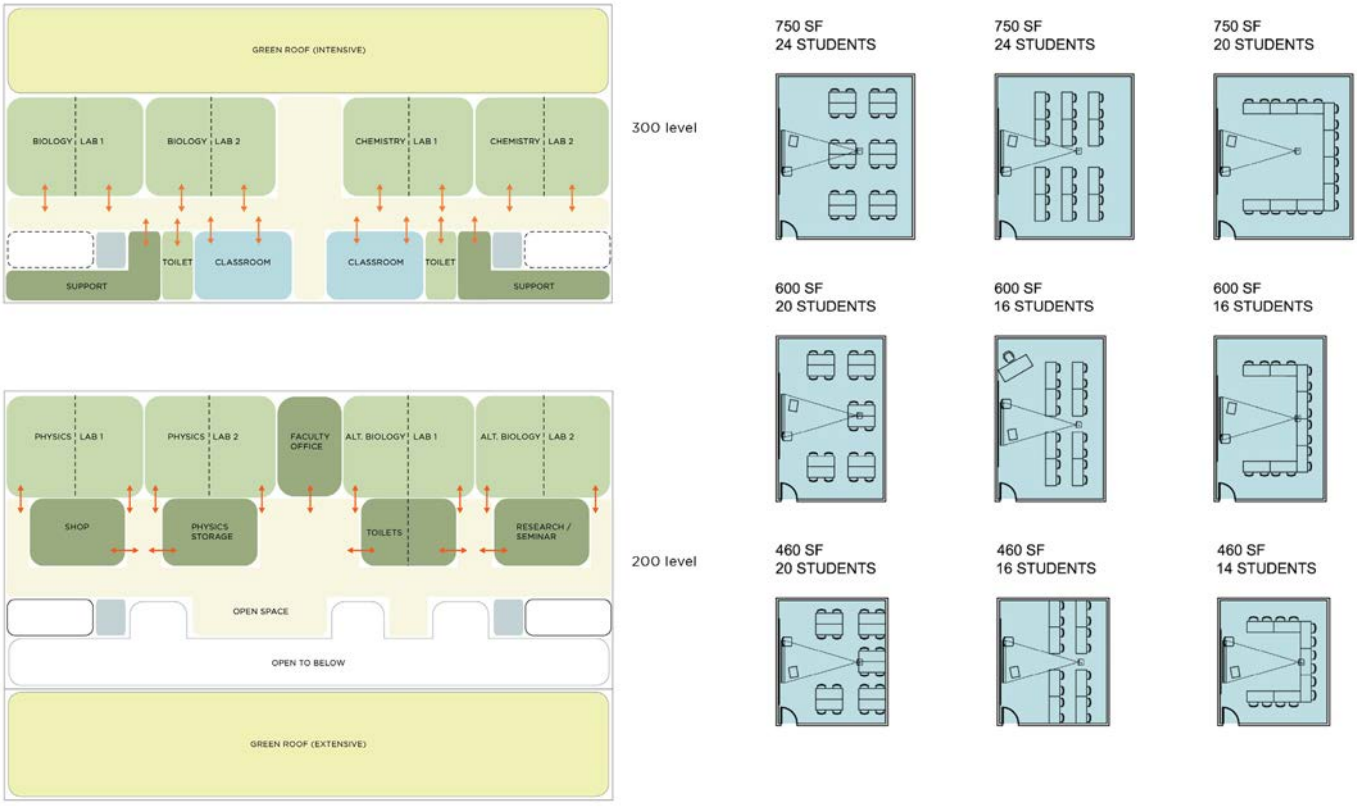
200 Level Departmental Floor Plan



300 Level Departmental Floor Plan



Sciences Planning

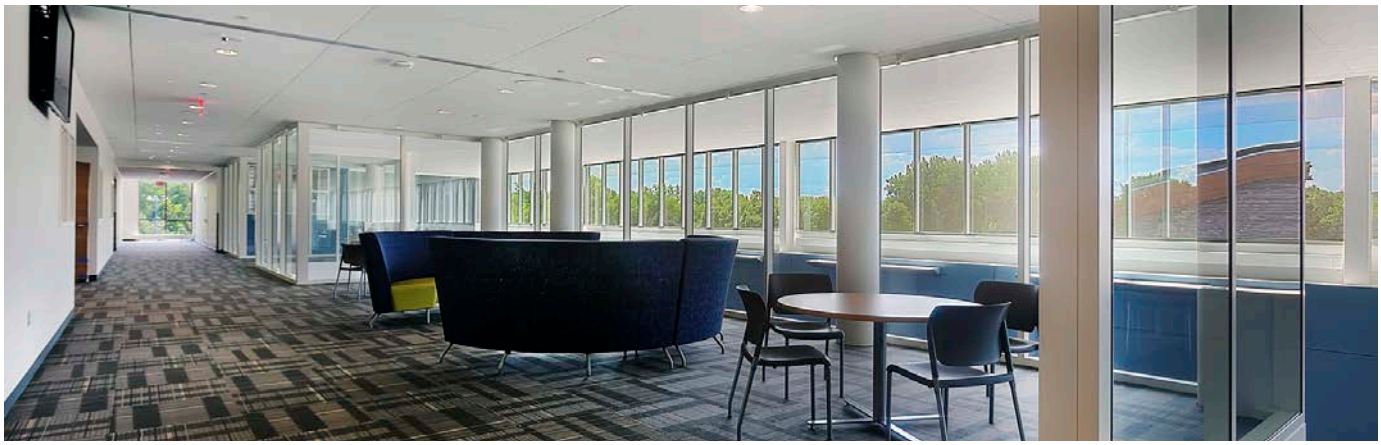


Scope of Work / Breck School

Master Planning

This project provided the opportunity to establish a new image and **identity** of a unified facility for the K-12 School. The design incorporates a an open multilevel addition with several tall glass windows on several sides and clear room dividers, thus communicating the strength and integration of the curriculum at large. This transparency establishes continuity between the interior and exterior, providing passersby's with the view of the activities taking place within the building and connecting the building to the rest of the campus.

The designers have found that opening corridors to natural light and providing view windows from the corridors to the learning and hands-on spaces can make the corridors more inviting, while exposing the tools and excitement of school to the building occupant. This visual connection between the corridors and labs also makes them safer. Corridor walls are further enhanced with displays that explain the range of learning taking place with the facility.



Scope of Work / Breck School

Master Planning

Cross-Disciplinary Community

Since this project combines a range of ages and disciplines into a unified facility, it was an opportunity to create an interdisciplinary community that fosters interaction and learning across former boundaries.

One of the most important aspects of this project was to create spaces that support active inquiry by providing teaching facilities that are fully equipped with the technologies and instrumentation essential for academic investigation and organizing these spaces in a manner which brings the various stages of learning together. The advantage of this is two-fold: it demonstrates the interrelationship among the subjects and it allows for the multiple use of individual spaces. It was critical to organize the academic facility in a manner that fosters a sense of community and encourages a cross-fertilization of ideas among the students and faculty.

A great deal of collaborative learning takes place outside the traditional classroom/study setting. Open areas, which foster informal discussion, were planned at strategic locations throughout the school. These areas were furnished with comfortable seating, marker boards, and academic displays. These spaces serve as a way to engage students and faculty by providing a range of places to gather, as well as a means to visually connect the multiple levels.

The line between the hallway and the classroom is blurred in the modern design of schools. Ubiquitous wireless access and emphasis on collaborative study is pushing campus corridors to their limits. Once a path from class to class, the routes of public circulation in academic buildings are now playing an increasingly central role in the academic experience. Breck School's informal seating arrangements outside of more specialized classrooms offer an ante-space—a threshold—for connection, mentoring, and cross-disciplinary interactions.

The open multi-level plan acts as an academic polis, a place that encourages the sharing of ideas and friendly exchanges. Balconies are perched throughout the atrium, providing temporary nests for group work and quiet study, while offering visual connection throughout the space to foster communication and intermingling.

Scope of Work / Breck School

Master Planning

The designers endeavored to create comfortable, safe environments that can serve a range of pedagogies from individual inquiry, to small group work, to presentations to the entire class. Whenever possible, we locate all full-height equipment around the room's perimeter and keep clutter to a minimum in order to maintain clear visibility throughout the room. Lighting systems were designed to provide a soft, even quality which can be easily controlled in the event of low-light experiments or image projections. Many of the desks and tables can be either fixed or movable depending on the need for flexibility.

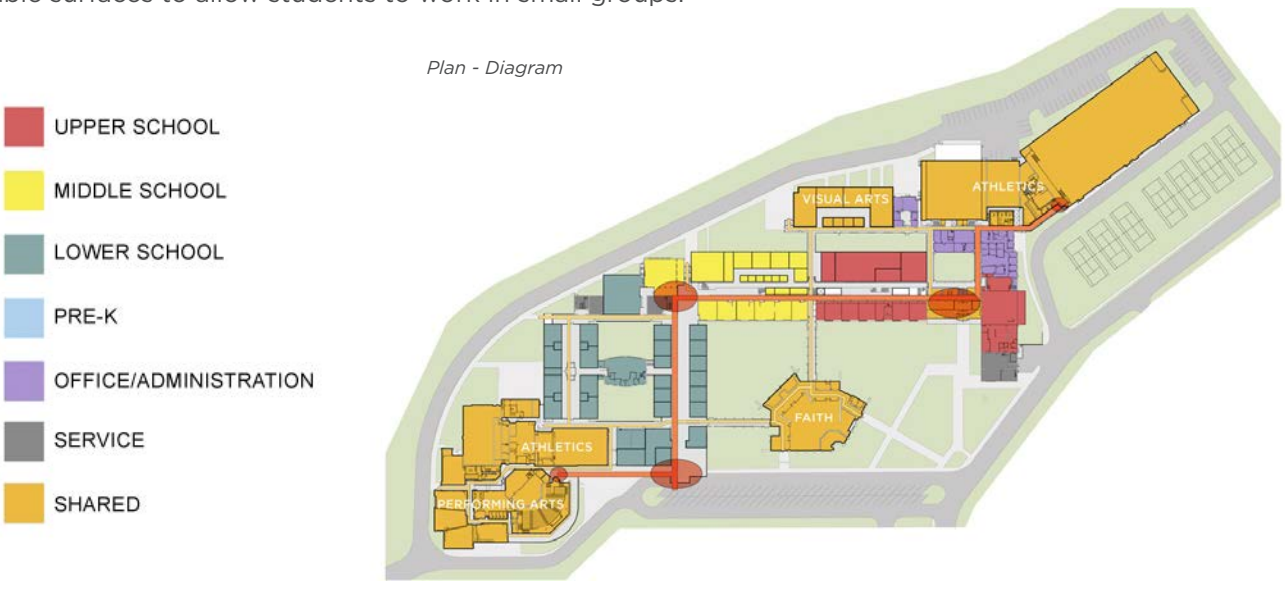
The architects have found that flexibility is not so much a matter of movable partitions and altering building systems as it is creating appropriately-sized spaces that are well serviced and versatile to changing needs.

The most important aspect of any school facility is safety. This begins with designing individual spaces that maintain clear visibility, unobstructed by equipment and apparatus. Having view windows to the corridor provides an additional passive safety aspect to the by increasing natural surveillance. Teaching labs, and classrooms are located in close proximity to spaces occupied by faculty. Steps were taken to ensure that learning spaces are not isolated, but clustered together into enlarged spaces. Efforts included that the walls of classrooms be equipped to allow a number of methods of presentation to occur simultaneously. Projection screens should not obscure the writing surface. The sidewalls of these classrooms can be covered with writable surfaces to allow students to work in small groups.

A Culture of Inquiry

To support a culture of inquiry, individual classrooms and study labs are designed to promote active, hands-on investigation, where students can work interactively with each other and with faculty.

Plan - Diagram



Scope of Work / Breck School

Master Planning

The firm approached **sustainability** and energy efficiency goals with the idea that the completed facility, with its structure and mechanical systems, should not be seen as a static object, but as a living, breathing organism that responds to the cycles of the day and of the season. The building itself should become a teaching tool for environmental responsibility.

All buildings systems, including HVAC, electrical, and plumbing, were planned with ample capacity to accommodate the range of instruction that may take place over the foreseeable future. The actual airflow into the classroom spaces are able to adjust to the changing demands over the day, the season, and the life of the building. This allows the building systems to meet peak class loads and adjust down when the spaces are not in active use to reduce energy consumption.

Phase one entailed the demolition and new construction of the Upper School (High School), Media Center, science facilities, and classrooms. The architects also analyzed the existing mechanical system and charted a plan for ongoing upgrades through the various phases of the work. Project construction started in early June 2012 sand was completed on time in August of 2013. Breck remained fully and safely operational during the school year, with noisy and disruptive work occurring in the summers or off-hours. Enclosed, tempered and lit temporary circulation routes were provided for students and staff around construction areas.

Budget / Breck School

CONSTRUCTION COST

$17.5 M

CONSTRUCTION BUDGET

$17.5 M

AOR FEE

$1.575M

Overall Project Cost:

$21 Million

STEP 2 alternate

629 Breck Parking Spaces

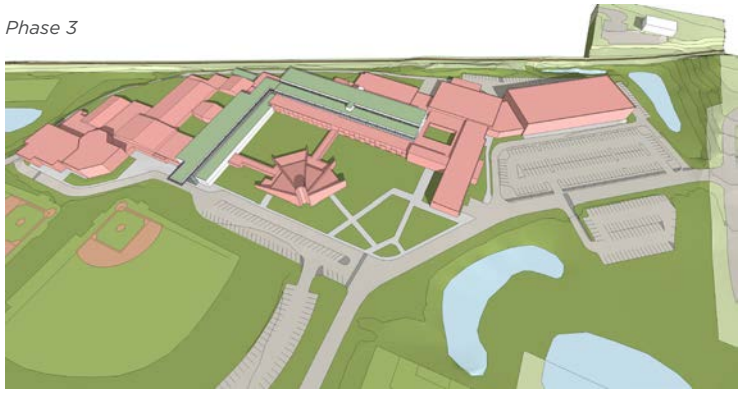
73 Net Additional Spaces

Legion Lot Retains 35 Spaces

Phase 1

Phase 2

Phase 3



Phase 4

Educational Environment / Breck School

1. Describe & illustrate how the environment supports the curriculum

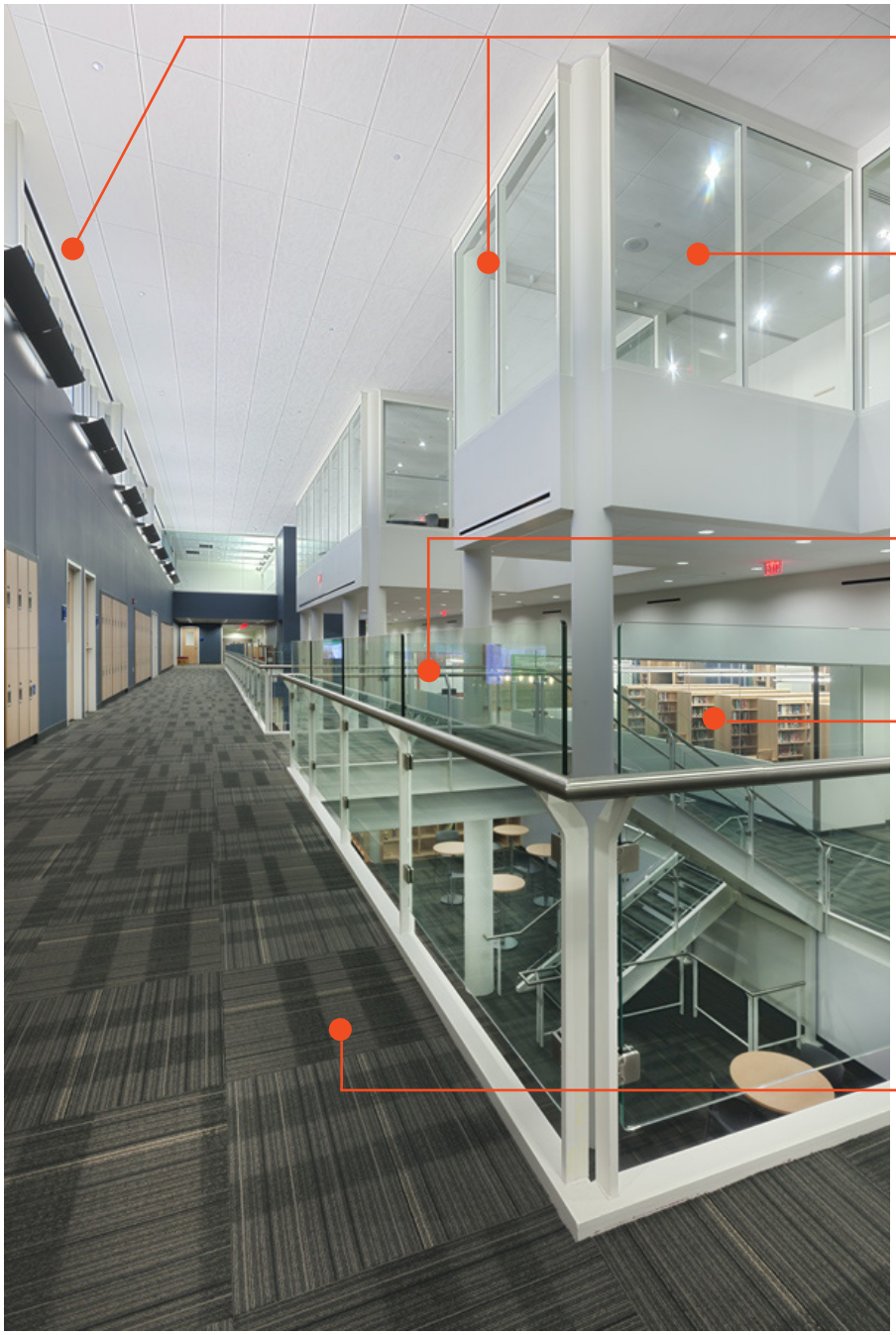
The particular curriculum at the Breck School strives includes goals of connection, active participation, creativity, flexibility of equipment and space to accommodate the necessities of the lesson at hand. Equipment and colors that make the learning material easy to ingest and retain the focus of the students. The design of the classrooms, study spaces, traffic flow arenas, laboratories and learning centers are a direct reflection of the intentions of the curriculum. The visibility and transparency between levels and throughout the learning spaces provides for extra connectivity. Bright colors and exciting technological incorporations including smart boards, wireless electronics, cameras, flat screens and projection systems throughout classrooms and laboratories invite active participation, creativity and provide further flexibility and capability to each space. The school is organized by department similar to a college or university. This allows teaching to be centered around a specific education department rather than the grade level.

Educational Environment / Breck School

2. Describe & illustrate how the environment supports a variety of learning & teaching styles.

Particular innovative steps were taken to ensure flexibility, autonomy and collaboration were a part of every space developed in this design. The new classrooms are designed in clusters to offer options for meeting in small and large groups and to provide spaces for individual learning with faculty members. Laboratories are designed with flexibility in mind, offering layouts that accommodate intense lab work and collaborative group discussion. The heart of the Upper School is a vibrant, multistory, multi-functional gathering space. Each major academic zone opens into the central space, visually connecting all parts of the building: classrooms, labs, offices, and media center.

Physical Environment / Breck School



Daylight

Daylight filters in through top tier windows throughout the body of the building and provides natural sunlight throughout the facility.

Contemplation

Overlooking the circulating lower floors are quieter group study spaces. While gathering spaces are ubiquitous throughout the levels, they take a variety of forms that complement the adjacent program.

Spontaneity

The overlooking levels serve as impromptu gathering spaces which enhances continuous connection throughout the building.

Atmosphere

The different levels are visibly connected providing movement, energy, and community connectivity. As students rise through the school, the surrounding program becomes more contemplative, from the lunch room and gymnasium at the base, to the library and study spaces on upper levels.

Variety

A guiding principle behind the transparent levels is that movement, communication, and visibility transform the traditional campus building into an open and lively interactive space. Spatial variation, dispersed gathering areas, and easy access to these spaces invite students to occupy this space and use it to the fullest for all sorts of various purposes.

Physical Environment / Breck School

1. Describe & illustrate the physical attributes of the environment

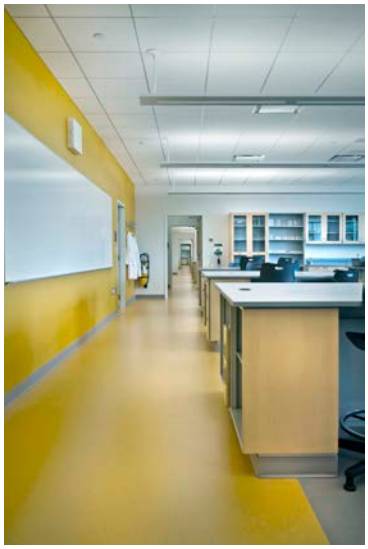
Special care was taken in consideration of the many physical attributes that combined to form the new Breck School. Transparency and safety were of utmost priority in this design. In this effort, large clear windows and partitions were used whenever possible to create a sense of openness and heightened subject inquiry, which both added to the safety of the facility and creates additional subject-matter interest across various disciplines. The incorporation of these windows and clear partitions also provides for optimal daylight harvesting, cutting down on overall heating and lighting costs for the facility. Bright colors were integrated wherever possible to capture the attention, focus and interest of the students. Particular steps were taken to ensure the integration of top-notch technological capabilities wherever possible.

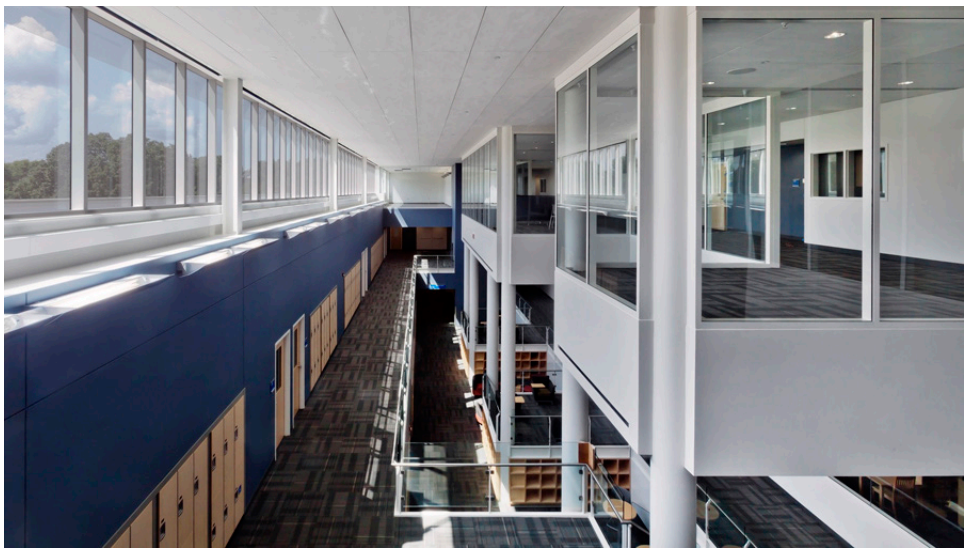
2. Describe & illustrate how the facility fits within the larger context of the community

The process included extensively looking comprehensively at the campus context and the project site. As previously mentioned, the existing school campus is a grouping of multiple buildings that are all interconnected. Located in the center of a campus that was 60 years in the making, the only option for the school was to build on top of the exact location of the 1971 building and create upwards renovations and addition solutions. This challenge brought about some creative and unique implications resulting in a multilevel learning center that now spans the K-12 spectrum.

3. Describe & illustrate how the project inspires and motivates

This project was designed with the intention to inspire environmental stewardship and integrity, The flexibility of the spaces offers a high amount of budgetary stewardship in terms of the fact that the ability of these spaces to transform depending on the needs of the class and program provides for long term costs via negating the need for constant remodeling. Also, instilling a belief and active effort in environmental stewardship is a goal that was central to both the design firm and the community stakeholders. Additionally, connectivity of the different spaces developed provides for a cross-disciplinary, and therefore cross-inquiry environment for the students, opening up avenues to exploration of various subjects.





Results of the Process & Project / Breck School

1. Explain how the project achieves educational goals and objectives

The Upper School classes are centered more on department than they are on grade level. The project offers areas of the new buildings that are specific to these departments. The number of classrooms in each department are sized based upon the individual class needs and optimal number of students. For example a seminar room in the English department was sized for 12 – 16 students. Based on the philosophy of the school this is an optimal number for a class that focuses on literature with open class readings. Math classrooms are sized for 32 – 36 students. This is an optimal number of students for a class that focuses on both lecture and small group work.

2. Explain how the project achieves school district goals

As a privately funded school Breck has the freedom and flexibility to allow faculty to take a more progressive approach to education. Many aspects of the Breck Philosophy could be emulated by local districts to achieve greater success.

3. Explain how the project achieves community goals

As previously discussed, one of the main initiatives for this project in terms of educational stewardship objectives, school district goals and overall community goals was the development of a sustainable building that achieves green standards. The building was constructed on the footprint of the existing building preserving the adjacent greenspace which is used by the surrounding neighborhood. During construction the school worked with the local community to assure them that the building process and design would not negatively affect the surrounding area. Today, Breck School is a good neighbor to the surrounding residents and offers a year round park like setting for the local community to enjoy and use.

Results of the Process & Project / Breck School

Results of the Process & Project / Breck School

OVERALL SUSTAINABLE DESIGN INTENT AND INNOVATION

The new Upper School at Breck was designed to integrate sustainable features in both the aesthetic and environmental aspects of the spaces within and around the building. The proportions of the atrium allowed for the opportunity to incorporate a large area of glass opposite the interior of the third floor. The large amount of south-facing glass illuminates the entire atrium during the day, eliminating the need for artificial lighting during these times. Mechanical shades are used during the warmer months to prevent the space from overheating.

The green roofs are not only used to filter and slow the amount of storm water run-off, but also offer a pleasing aesthetic where they can be seen from the interior of the upper floors. The green roof that is adjacent to the fourth floor is accessible to the occupants of the building. Science labs and classrooms are located on the fourth floor and the green roof is now used as a teaching tool by the science faculty.

The large glass seating areas at the north side of the Media Center facing the courtyard allow northern indirect light to flood the space. Large glass windows are located in all north- facing classrooms and science labs, taking advantage of the natural light during warmer months, as well as reflected light from the snow-covered ground during the cold Minnesota winter months.

Results of the Process & Project / Breck School

LEED Silver Certified

ENERGY

- Predicted EUI kBtu/sf/yr – 9.462
- No on-site renewable energy (NA)
- Predicted regional energy reduction target finder – 9%
- Actual EUI – 9.463 (renewable energy NA)

COMMUNITY CONNECTIVITY

- School has a bus stop at the entrance to the property. School also serves students with private bus transportation.
- The new building added 40,000 SF of new space to the Upper School with no added parking. All parking is existing.
- Walk Score – 26

INDOOR ENVIRONMENT

- Ventilation – Most ventilation is mechanical due to the amount of science labs. The media center has (2) 6' door openings into a court which will serve as natural vent. The 400 level also has doors to an accessible green roof which can also serve as a natural vent into the corridor and science commons area.

- Light – All lighting within the building is dimmable and is connected to daylight sensors. The lighting will decrease wattage output based upon the amount of natural light coming into any individual space. Lighting is also controlled by vacancy sensors. All lighting within a room will automatically turn off after a few minutes when not sensing movement within a room.

- Temperature – All rooms are heated individually through hydronic heat and VAV through individual thermostats. While all existing buildings on campus still use steam heat, the new Upper School utilizes hydronic heat and chilled water cooling per space.

WATER

- In a 24-hour period, the rate of storm water run-off is 2.05 cfs through the use of two green roofs.
- Waste water – 1/8 gallon per flush urinals and low-flow toilets.
- Potable water usage – (kGal) 247.61
- % of regulated potable water vs. baseline – 60.9%
- EXTRA – Each floor of the new building has a water bottle filling station. This decreases the amount of waste water at drinking fountains and cuts the number of plastic spring water bottles used by students.

The footprint of the new building matches that of the old. After the old structure was demolished, the new building was built in the same location. Storm water run-off from the roof was decreased due to the green roof, plus the fact that the new roof was equal size to the existing. A new area was provided by building up, not out.