



Banneker Academic High School

District of Columbia Department of General Services

District of Columbia Public Schools

NCPC Final Submission

December 2019

acknowledgments

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THANK YOU

This report is the result of a collaborative effort on the part of the District of Columbia Department of General Services, District of Columbia Public Schools, Banneker Academic High School, MCN Build and Perkins Eastman DC. We thank all involved for their ideas, time, expertise, and passion.

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executive summary

Perkins Eastman DC is very excited to be working with the District of Columbia Public Schools (DCPS), the District of Columbia Department of General Services (DGS), District of Columbia Department of Parks and Recreation (DPR), our Design-Build partner MCN Build, and the Banneker Academic High School community of students, parents, teachers, and administrators on this project.

Our goal for the new Banneker High School building and campus is to provide an inspiring facility worthy of the high academic rigor of the school, design spaces that complement the school's educational and cultural goals, and create a 21st-century school that fosters the next generation of environmental stewards.

Banneker Academic High School is open to students in all eight (8) wards of the city through an application process, and does not have neighborhood boundaries. The existing school is located at 800 Euclid Street NW, in a 1930s era building originally built for a middle school program. The High School has outgrown its current location, and will be relocating to the site of the existing Shaw Junior High School, in the Shaw neighborhood. The Project will include the complete demolition of the existing Shaw JHS building, located at 925 Rhode Island Avenue, NW, and the construction of an all new Banneker Academic High School.

The project is bounded by R Street NW to the north, 9th Street NW to the east, Rhode Island Avenue NW to the south, and 11th Street NW to the west. The site is relatively flat, with very little grade change across the block. Directly adjacent to the school site is the DPR Cardozo Park facilities. The fields, Dog Park, Skate Park, and basketball courts of Cardozo Park will be renovated as part of the school construction, and a joint use agreement between DCPS and DPR will be created. The site has served DC Public Schools since the Shaw Junior

High School was constructed in the early 1970s.

The existing Shaw Junior High School building is three stories tall with a full story basement below. The school was closed in 2008 and has remained abandoned. The new Banneker Academic High School will be four stories tall, or approximately 56 feet. The target school size is 175,000 gross square feet, and will serve up to 800 students.

The entrance to the new school will be located off of 9th Street NW, one block from the Shaw - Howard University Metrorail Station. It is anticipated that the majority of students will be arriving via the Metro. Loading and service will occur via an existing public alley located at the southeast corner of the site, and connects through between 9th Street and Rhode Island.

The Banneker project is targeting LEED for Schools v4 Gold Certification at a minimum. It will also be targeting Net Zero Energy - Ready, and utilizing the design guidelines for the WELL Building certification program to provide a design that enhances the indoor environmental quality and assists in user wellness.

The project was reviewed by the Commission of Fine Arts on July 18th, 2019. At that meeting, the Commission did not take action. While the Commission expressed support for the general concept, including the location of the building and the organization of the school around the interior learning commons, they recommended a conceptual reconsideration of the site plan. The project team was asked to further develop the logic for circulation and use of by the school and the general public.

In response to the Commission's recommendations, the team reorganized the building massing and site organization to enhance the relationships between site uses, and between the building and the site. In

particular, the gym massing and the community plaza were re-oriented to align with Rhode Island Avenue. The project was re-submitted to Commission of Fine Arts for review as part of the commissions September 19, 2019 hearing and received Concept Level Approval.

The project was submitted to the National Capital Planning Commission (NCPC) in October 2019 for Concept Level review. On November 4, 2019, the Commission voted to approve the Banneker project concept, but the review requested the Project Team consider the reintroduction of the formerly abandoned 10th Street NW right-of-way (ROW) across the site. During subsequent discussions between DCPS and representatives of NCPC and the District's Historic Preservation Office, it was determined that reopening the street itself was not feasible, however, a pedestrian experience across the site within the zone of the original ROW might be possible.

In November, the project was submitted to the Commission of Fine Arts for Final Level review and approval. Since the orientation of the major site elements was still being reviewed and discussed with NCPC and HPO, the Project Team requested that CFA only review and provide a determination on the school building, deferring the site review. The Commission awarded final approval to the Banneker High School building design on November 21, 2019. The Project team anticipates resubmitting for final approval of the site in January 2020.

project schedule & funding

AGENCY APPROVALS

Selective Demo Permit	June 2019
Abatement Permit	July 2019
SWM & DC Water Reviews	Sept - October 2019
CFA Concept Approval	October 2019
CFA Final Approval - Building	November 2019
NCPC Concept Approval	November 2019
Raze Permit	November 2019
Foundation to Grade Permit	November 2019
DCRA EISF Approval	December 2019 (anticipated)
CFA Final Approval - Site	January 2020 (anticipated)
Building Permit	January 2020 (anticipated)

CONSTRUCTION MILESTONES

Selective Demolition & Abatement	June - October 2019
Raze	November - December 2019
Excavation & Foundations	November - December 2019
Steel Erection	January - May 2020
Exterior Envelope	June 2020 - March 2021
Sitework Substantial Completion	May 2021
Building Substantial Completion	July 2021

Demolition of the existing Shaw Junior High School and construction of the new Banneker Academic High School will occur in one phase beginning summer 2019 and ending in summer 2021. To meet the fast track schedule, the construction will be permitted through a series of early release packages which include Raze and Abatement, and Foundation To Grade, and Superstructure permits. Other required agency reviews, such as Storm Water Management (SMW) with the DC Department of Energy & Environment (DOEE) and the DC Water review will be timed so all sign-offs are obtained at or before the Foundation to Grade Permit approval is required.

During construction, the Banneker students will remain in the existing Banneker High School, located at 800 Euclid Street NW, for the 2019-2020 and 2020-2021 school years.

The schedule compiled by the design-build team of MCN Build and Perkins Eastman DC is fast tracked in order to maintain the Owner's objectives of a July 2021 substantial completion deadline.

FUNDING

The Guaranteed Maximum Price (GMP) value for the Banneker High School project is \$125,776,609.00. The GMP is currently under review by the Department of General Services, and will be submitted to the DC Council in December for their review and approval.

schedule challenges

A Phase 1A / 1B archaeological survey was performed as part of the site investigation for the project. The area that currently makes up Cardozo Park was originally occupied by homes and small businesses dating back to before the civil war. Due to the apparent lack of grade change across the site over the decades, it was believed that some of the original foundations might still be discoverable on site.

During the initial test excavation, several artifacts were discovered, including an mostly intact clay jar that originally contained Calcutta chutney, imported to London, England. The excavations also uncovered evidence of a pre-civil war kiln, and several building foundations. Phase 2 and Phase 3 excavations have followed, and provided more artifacts and evidence of the original inhabitants of the site.

The ongoing archaeological investigations have meant that geothermal well field drilling, which was originally scheduled to begin in October, will not be starting until the spring months of 2020. Since the fields and park site work is not on a critical path, the Project Team does not currently anticipate that the delay in drilling will have too many impacts on the overall project schedule.



construction schedule

Draw ID	Description	Original Duration	Revised Duration	Start	Finish
Banneker HS Baseline Schedule - DRAFT					
Milestones					
Milestones					
M1200	Final Computer	0	0	16-Jul-21	16-Jul-21
M1300	Architectural Drawings	0	0	16-Jul-21	16-Jul-21
M1310	Construction Available	0	0	16-Jul-21	16-Jul-21
M1318	Substantially Dry - Area C	0	0	16-Jul-21	16-Jul-21
M1000	Permitting Power	0	0	16-Jul-21	16-Jul-21
M1300	Substantially Dry - Academic	0	0	16-Jul-21	16-Jul-21
M1300	Substantially Dry - Academic Academic	0	0	16-Jul-21	16-Jul-21
M1000	13 Approvals	0	0	16-Jul-21	16-Jul-21
M1000	Schematic Approved	0	0	16-Jul-21	16-Jul-21
M1000	Construction ITP	0	0	16-Jul-21	16-Jul-21
M1000	Contract Approval	0	0	16-Jul-21	16-Jul-21
M1000	Power Stud	0	0	16-Jul-21	16-Jul-21
Summary Durations					
Pre-Construction					
Design Submissions					
Design Approval by DCPS/DGS					
GMR & Finding Updates					
SH & Community Outreach					
Permit / Regulatory Coordination					
Building Permit					
PEPCO					
DC Water Coordination					
Construction					
Demolition & Abatement					
Demolition & Abatement					
M1000	Green Demolition	0	0	16-Jul-21	16-Jul-21
M1000	Start Demol	0	0	16-Jul-21	16-Jul-21
Sequence 1					
Sequence 2					
Sequence 3					
Sequence 4					
Sequence 5					
Foundations					
Foundations					
M1000	Start Foundations	0	0	16-Jul-21	16-Jul-21
Micropiles					
Area A					
Lower Level / Basement					
Area B					
Area C					
Structure					
Structure					
M1000	Structure Complete	0	0	16-Jul-21	16-Jul-21
M1000	Complete Scaffolding	0	0	16-Jul-21	16-Jul-21
M1000	Start Steel Erection	0	0	16-Jul-21	16-Jul-21
Area A					
Area B					
Area C					
Envelope					

Draw ID	Description	Original Duration	Revised Duration	Start	Finish
Envelope					
M1000	Envelope Complete	0	0	16-Jul-21	16-Jul-21
M1000	Start Envelope	0	0	16-Jul-21	16-Jul-21
Roofing					
Academic Main Roof					
East Elevation					
East Terrace - 3rd Floor					
East Lobby Entrance Canopy					
North Elevation					
North Elevation Low Roofs					
North Elevation - Academic					
South Elevation - Academic					
Auditorium - North & West Elevations					
Auditorium Roof					
Commons Gym - All Elevations					
Gym Roof					
West Lobby Connector Roof					
Interiors					
Basement					
Main Electric Room					
Main Mechanical / Pump Rooms					
Back of House Rooms					
1st Floor					
1st Floor					
M1000	Substantially Complete - 1st Floor	0	0	16-Jul-21	16-Jul-21
Gang Bathrooms - 1st Floor					
Vestibule / Lobby - East					
2nd Floor					
2nd Floor					
M1000	Substantially Complete - 2nd Floor	0	0	16-Jul-21	16-Jul-21
Gang Bathrooms - 2nd Floor					
3rd Floor					
3rd Floor					
M1000	Substantially Complete - 3rd Floor	0	0	16-Jul-21	16-Jul-21
Gang Bathrooms - 3rd Floor					
4th Floor					
4th Floor					
M1000	Substantially Complete - 4th Floor	0	0	16-Jul-21	16-Jul-21

10th Street



9th Street



SITE AND CONTEXT

site & building history

NEIGHBORHOOD CONTEXT

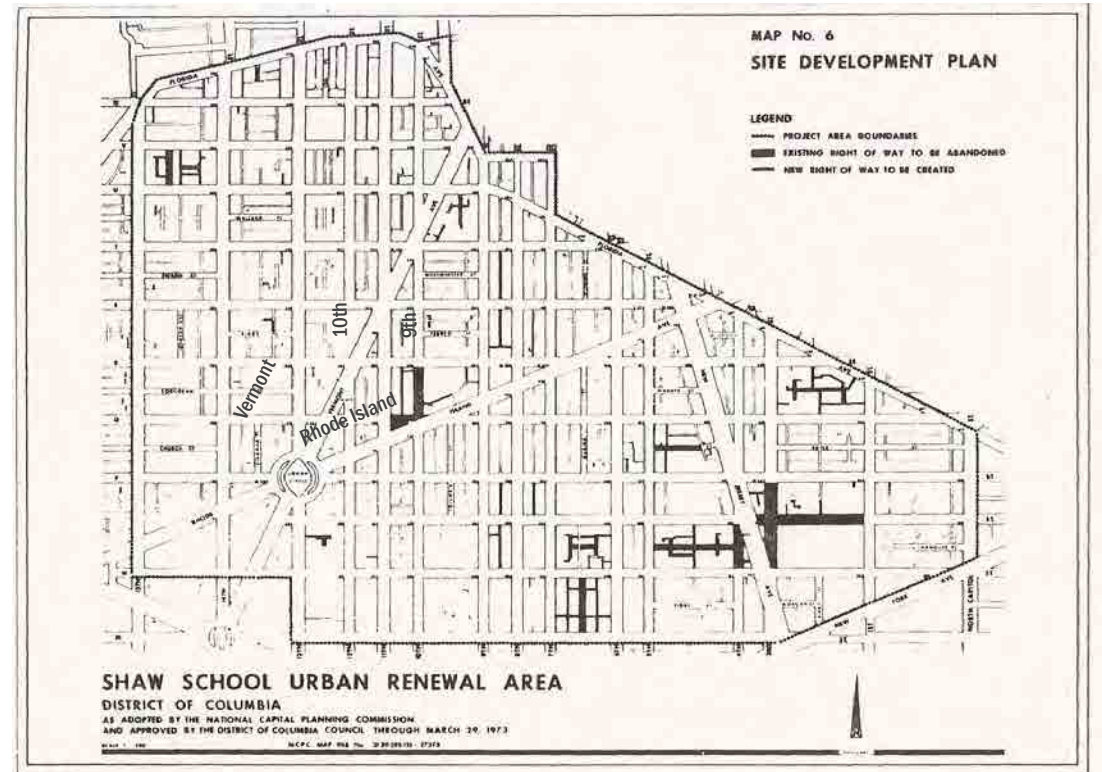
The Shaw neighborhood has a rich and colorful history in the heart of DC. The neighborhood stretches north of downtown along the old streetcar lines on 7th, 9th, and 11th Streets. The area developed mostly after the Civil War as an economically and racially mixed community, with buildings of diverse quality in a rich variety of architectural styles. Row houses dominate a streetscape punctuated by churches, apartment buildings, and a few commercial strips.¹

Shaw, and the adjacent U Street corridor have historically been the city's black social, cultural, and economic hub, witness to Martin Luther King, Jr., Malcolm X, and numerous riots, marches, and protests that fought to achieve racial equality in Shaw and the entirety of America.²

Today, Shaw is a vibrant neighborhood, with a rich cultural scene. The main commercial strip along 7th Street is home to many locally-owned businesses of all types, and the Shaw metro station makes the neighborhood easily accessible to the rest of the city. The historic Howard Theatre, located on a strip once known as the “Black Broadway” continues to be a hub of creativity and culture in DC.

¹ District Of Columbia Inventory Of Historic Sites Alphabetical Version
September 30, 2009

² Smith, Kathryn S. (1997-01-01). “Remembering U Street”.
Washington History. 9 (2): 28–53.



Shaw School Urban Renewal Area map 1973

National Capital Planning Commission, a U.S. government agency



Shaw location diagram by James Hare

Derived from DC neighborhoods map.png by Peter Fitzgerald, CC BY 3.0,
https://commons.wikimedia.org/wiki/File:DC_Neighborhoods_-_Shaw.svg



The previous location of Shaw JHS was a block away from the current Shaw JHS on Rhode Island Avenue, NW. In 1928 the school moved to a building formerly known as the McKinley Manual Training School.



Shaw JHS moved to current location in 1977

SHAW JUNIOR HIGH

Since its inception in 1921, Shaw Junior High School has been in three different locations. The school moved to the current site at 9th and Rhode Island Avenue NW in 1977.

Shaw Junior High school was a high performing school under the supervision of Dr. Percy Ellis through his 33 years of service. He was very thoughtful and strategic about everything that happened at Shaw, and was very involved with students and their parents.

There was something for every type of student at Shaw. As alumna Ateya Ball-Lacy states:

“School pride extended beyond the good grades and high-test scores we collectively earned. Every school organization at Shaw excelled at what it did. The school choir, cheerleading team, double-dutch team, annual school musical, and string ensemble all exuded excellence. The teams entered and often won competitions.”

Many Shaw students were accepted into Duke Ellington School of the Arts and other premier schools.¹

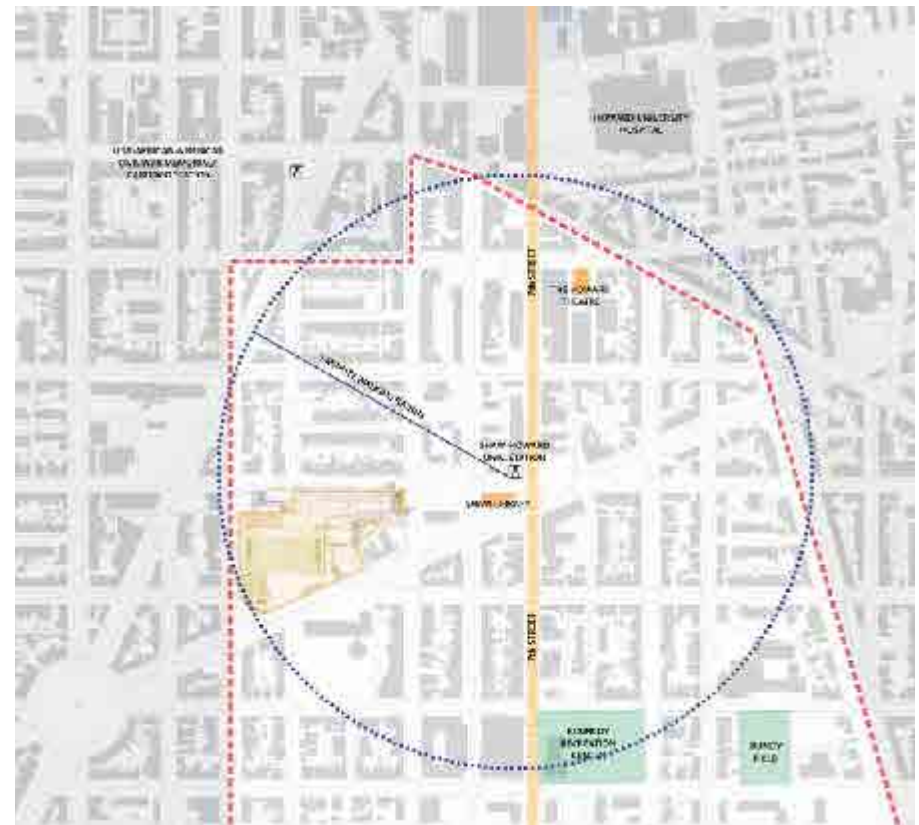
¹ Ball-Lacy, Ateya. “An Ode to Shaw Junior High”. 10 January 2019, Washington City Paper, Accessed: 30 April 2019.



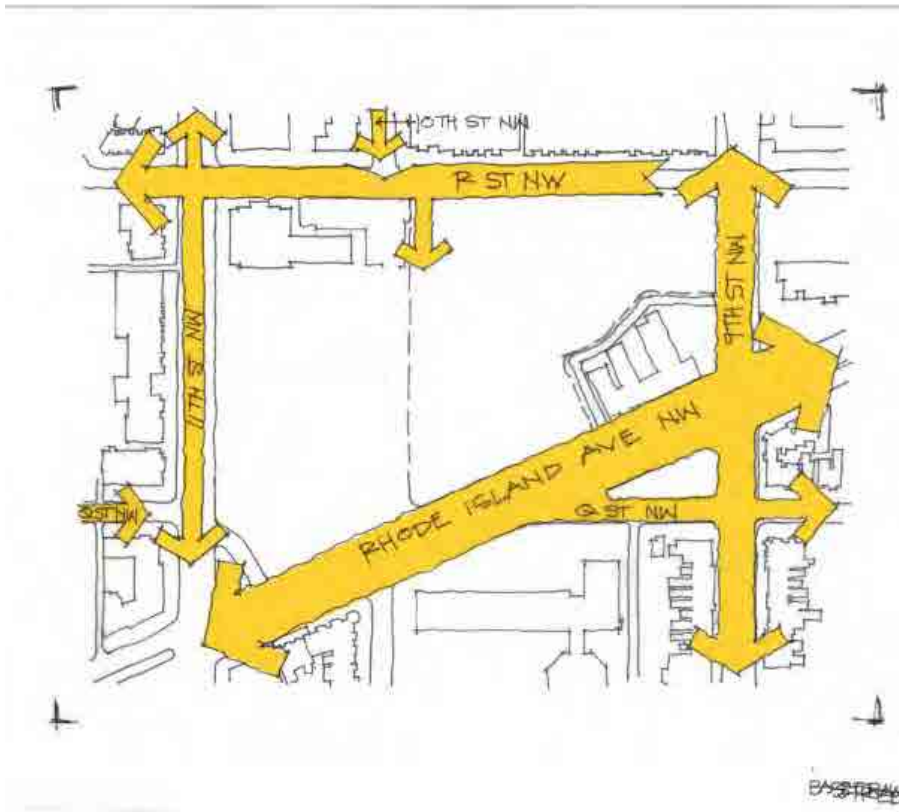
site analysis



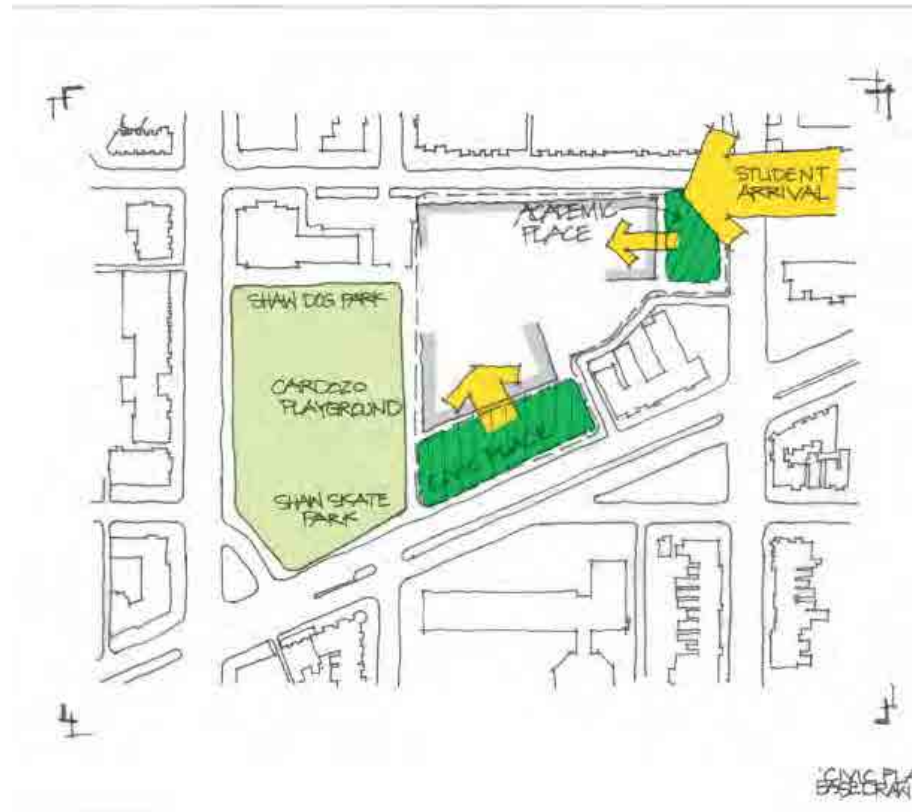
Site Location in DC/MD/VA region



Site Neighborhood Context and Walking Radius



Street Grid

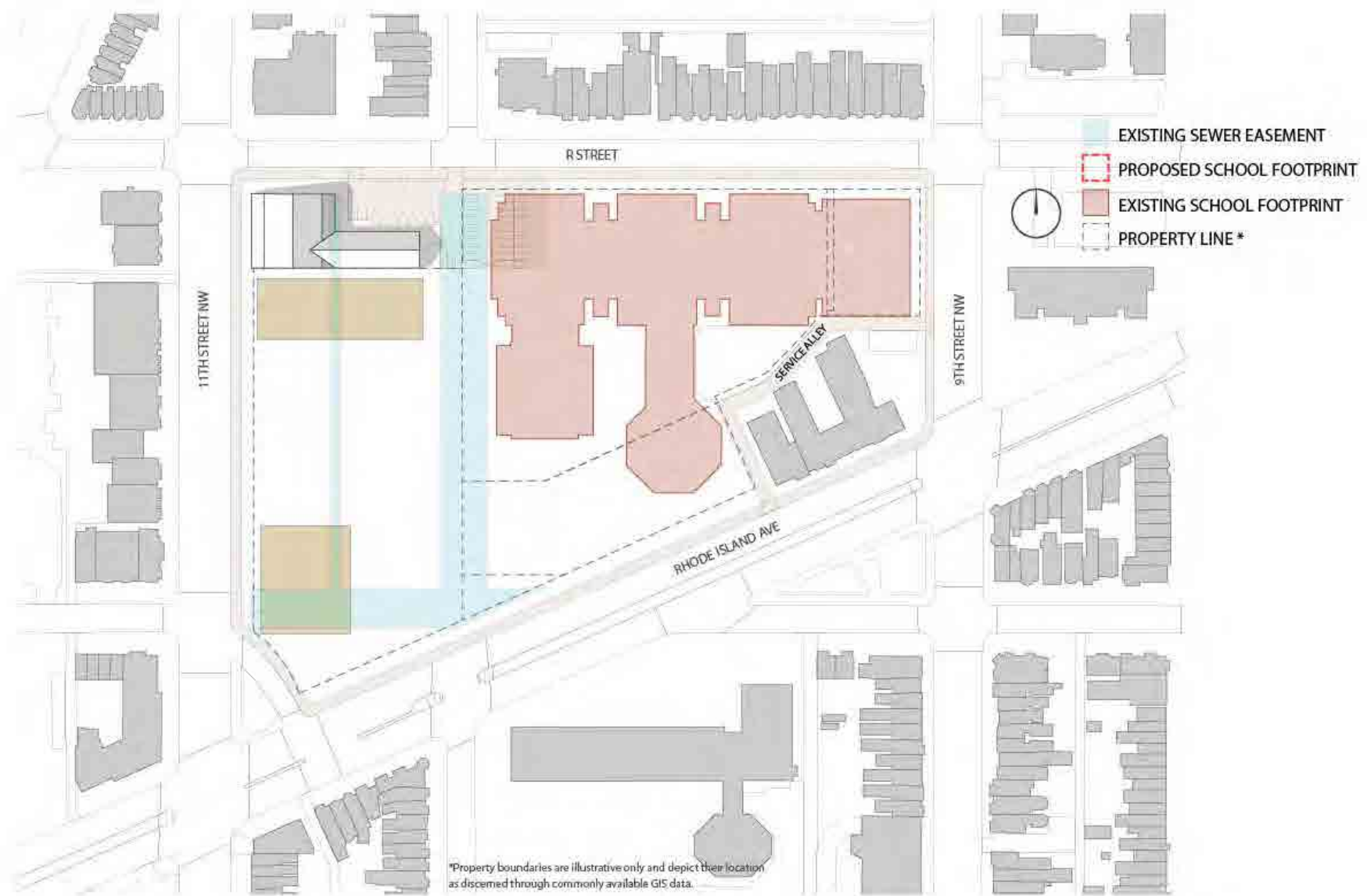


Civic Place

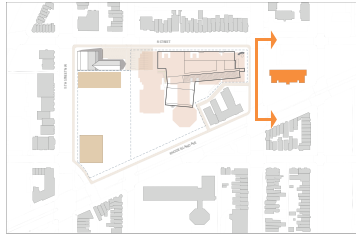
pre-shaw middle school site plan



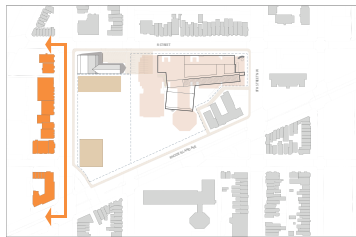
existing shaw middle school site plan



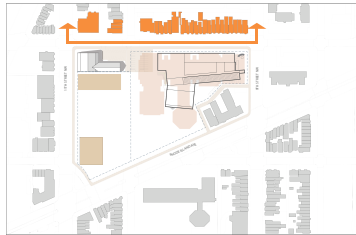
site context



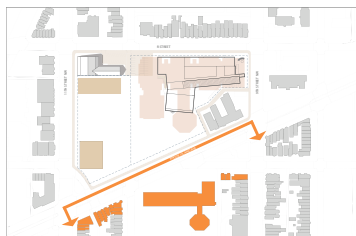
9th Street



11th Street



R Street



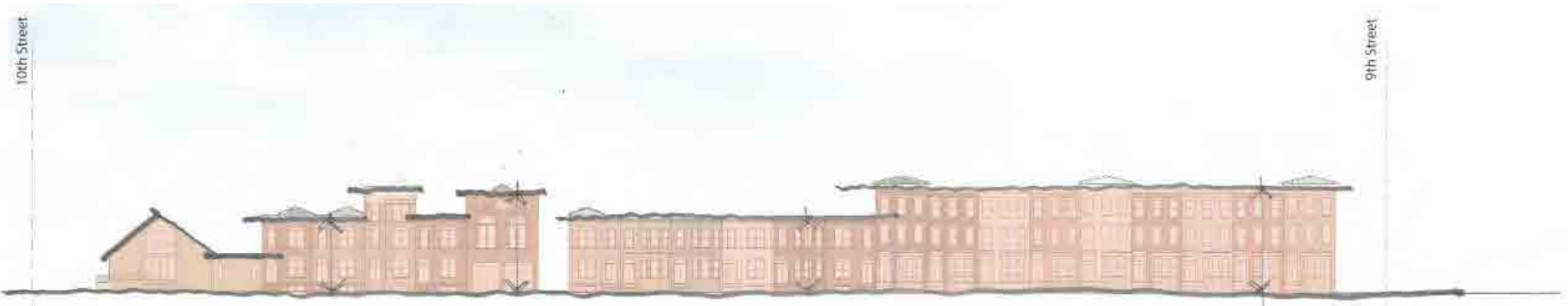
Rhode Island Ave



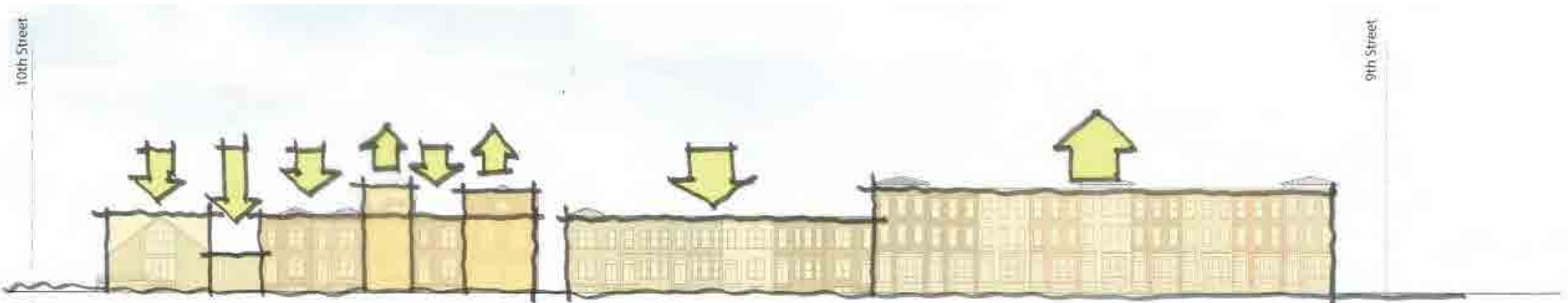
r street streetscape analysis



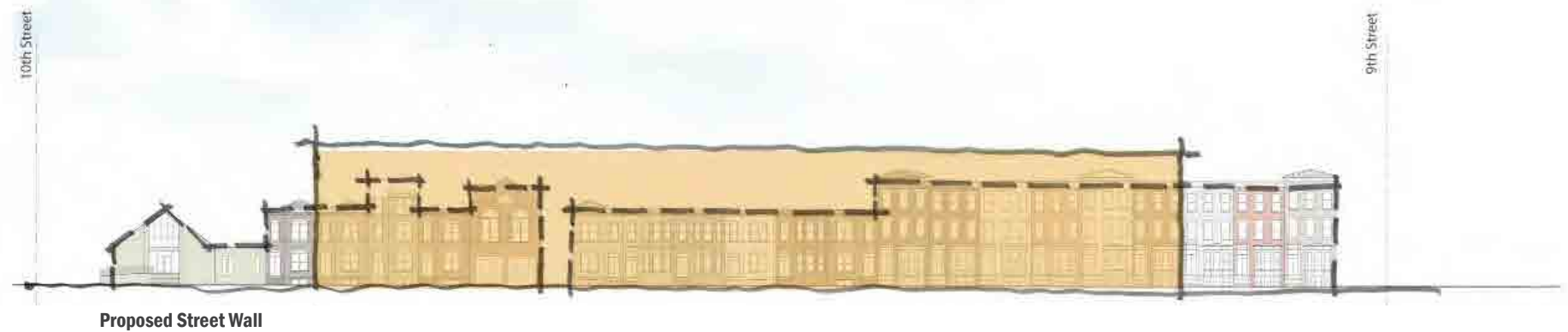
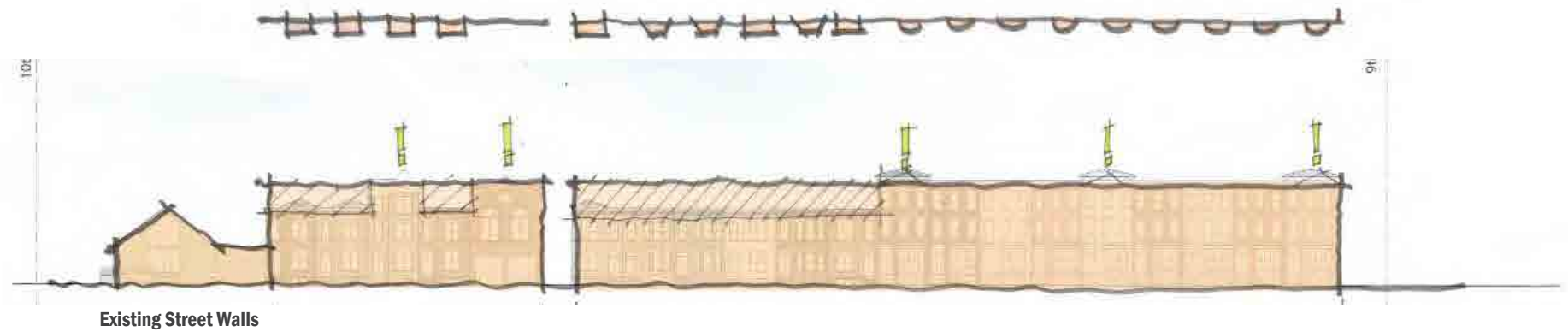
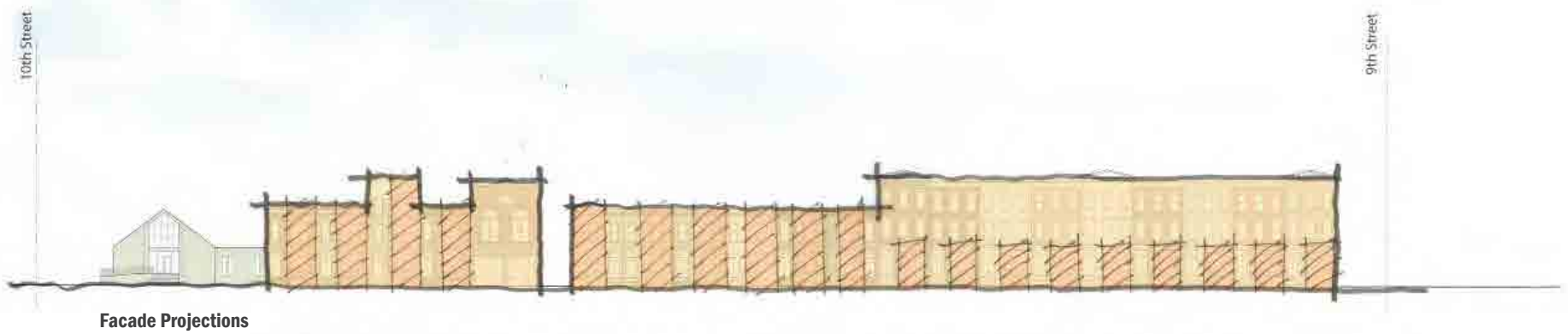
R-Street North Elevation



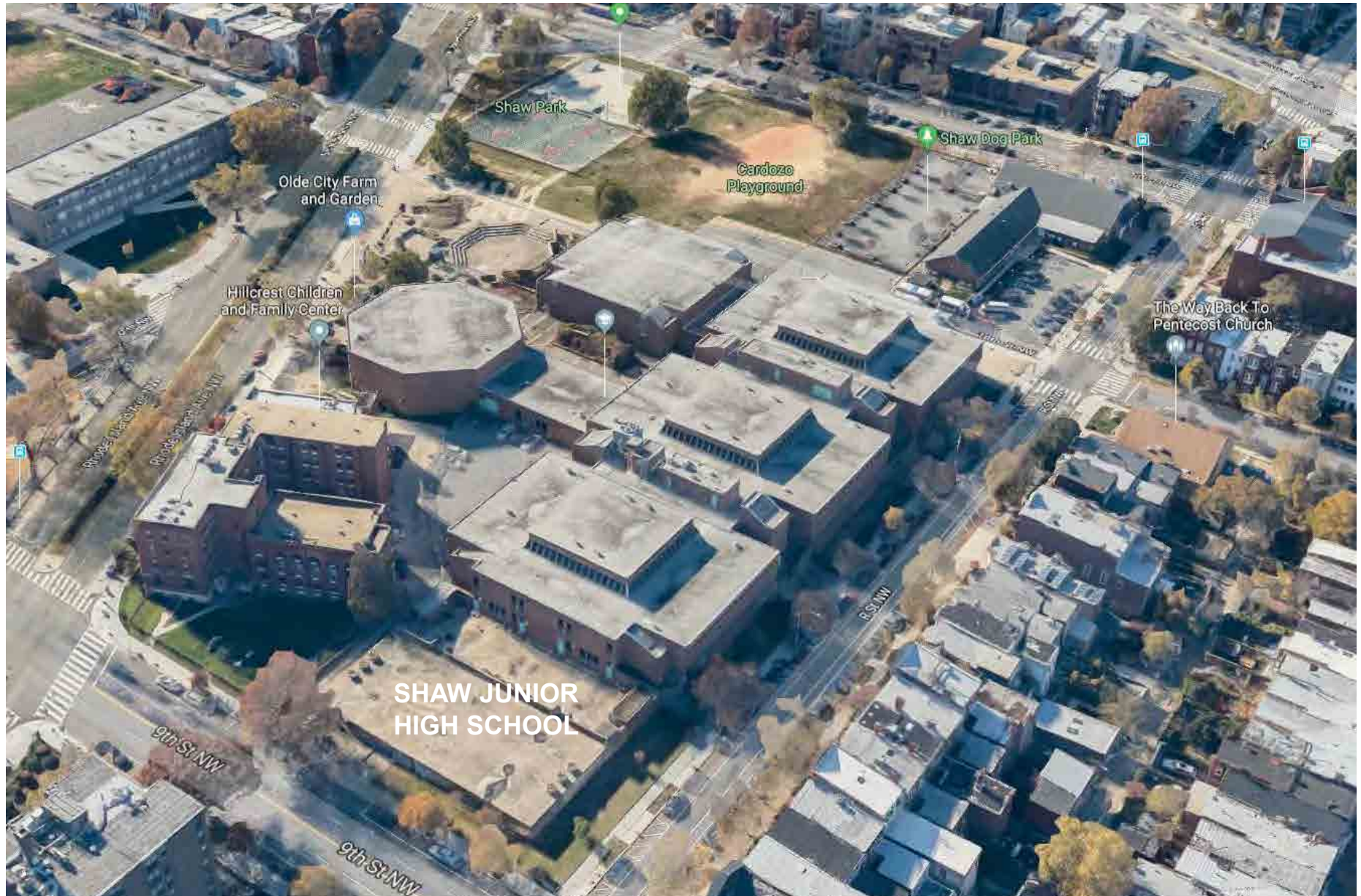
Heights



Massing



existing building



Shaw Junior High School



View from 9th Street and R Street



View from 10th Street and R Street



View from Rhode Island Ave and 10th Street

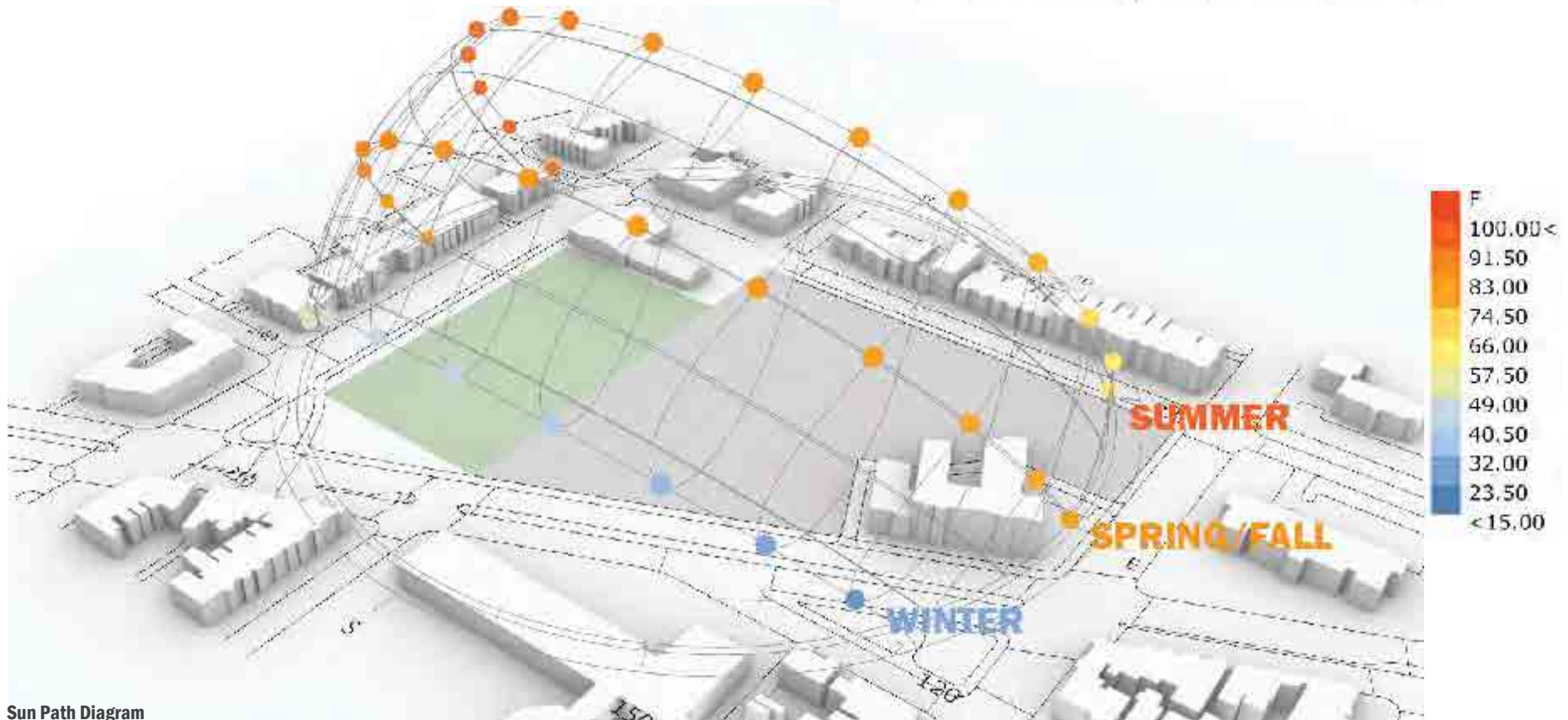
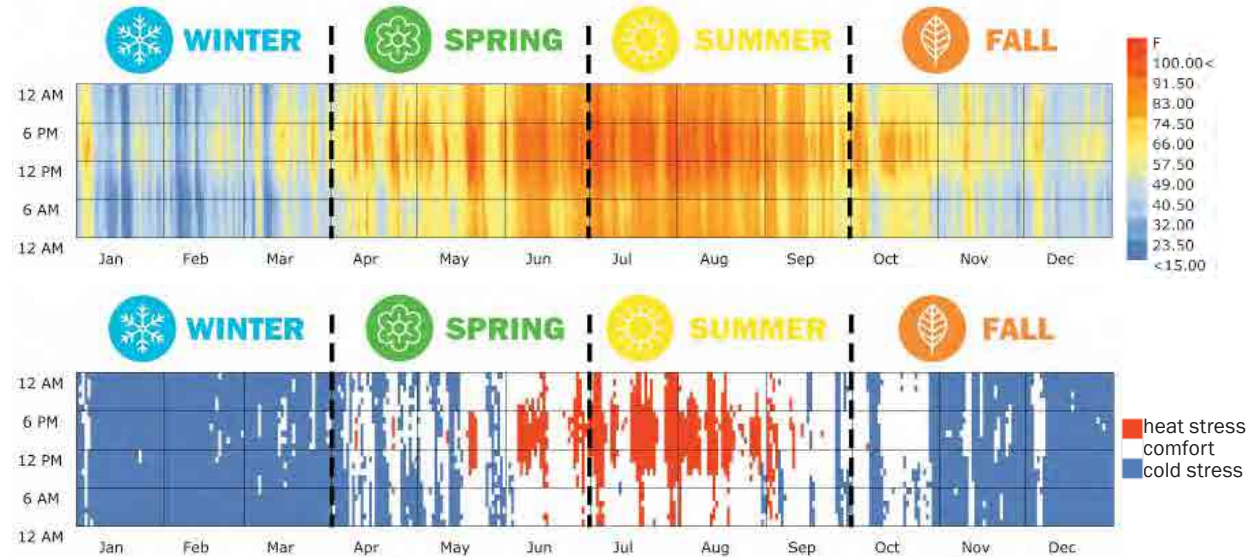


View from Rhode Island Ave

climate analysis

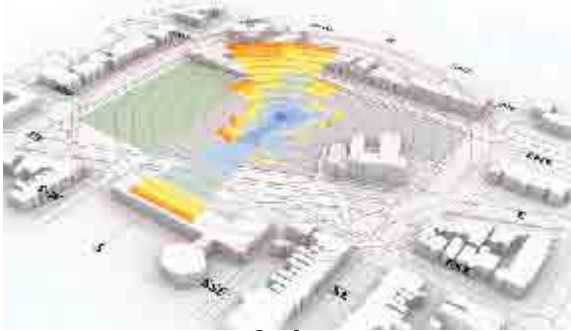
Washington, DC experiences extreme weather swings, with hot humid summers and cold dry winters. It is therefore challenging to create a thermally comfortable outdoor environment, except in the swing seasons of spring and fall, but even including these seasons the outdoor environment is only comfortable around 11% of the year.

Additional measures for solar and wind control in outdoor spaces should therefore be employed to extend thermal comfort.



Sun Path Diagram

Winter



Spring



Summer



Fall

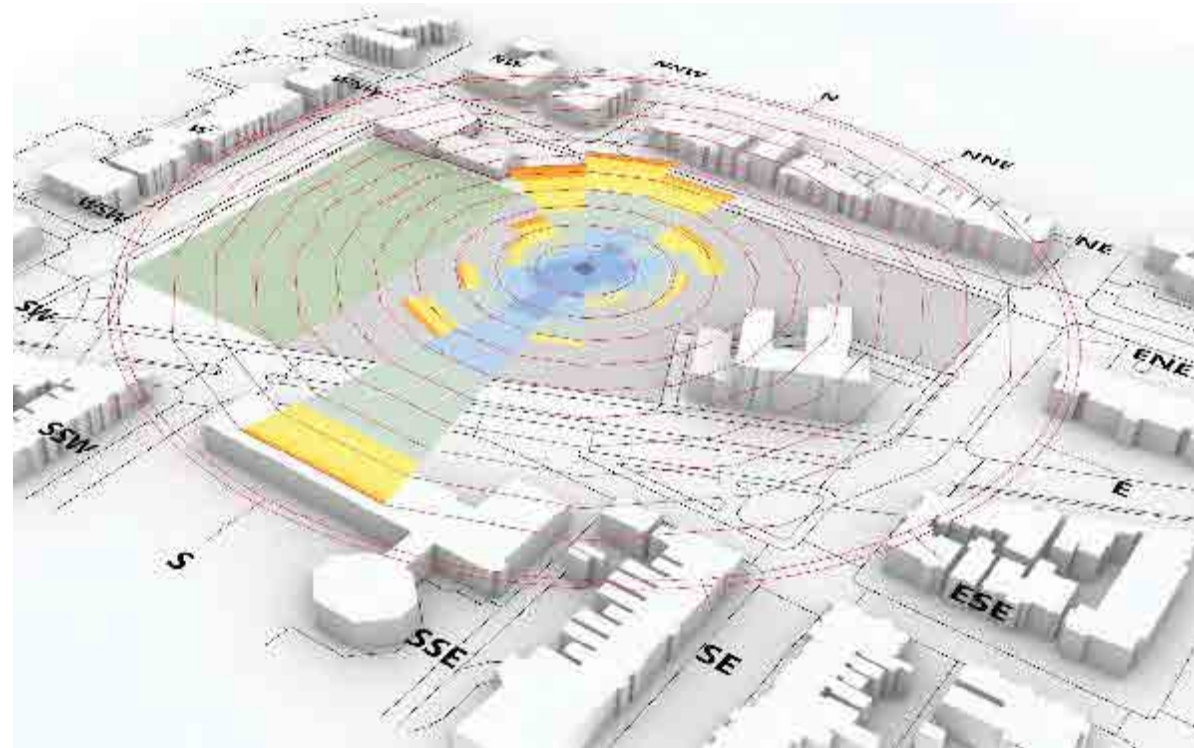


wind analysis

In the Washington, DC region, prevailing winds shift by season.

Cold winter winds tend to come from the northwest with relatively high velocity, making outdoor areas that face north relatively inhospitable.

During the rest of the year, winds come from the south primarily, especially in the summer months. These breezes are more welcome for ventilation to extend comfort.



Yearly Wind Rose

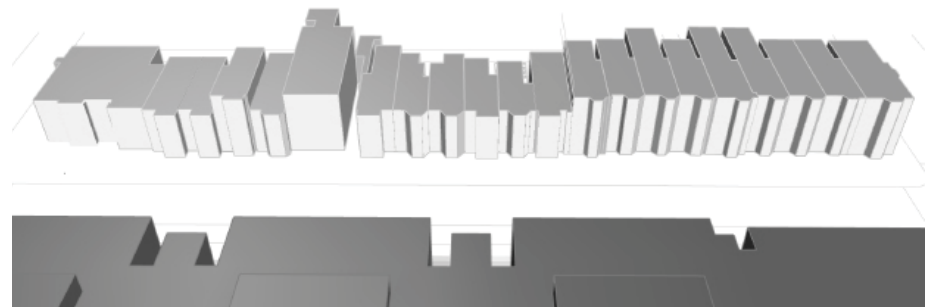
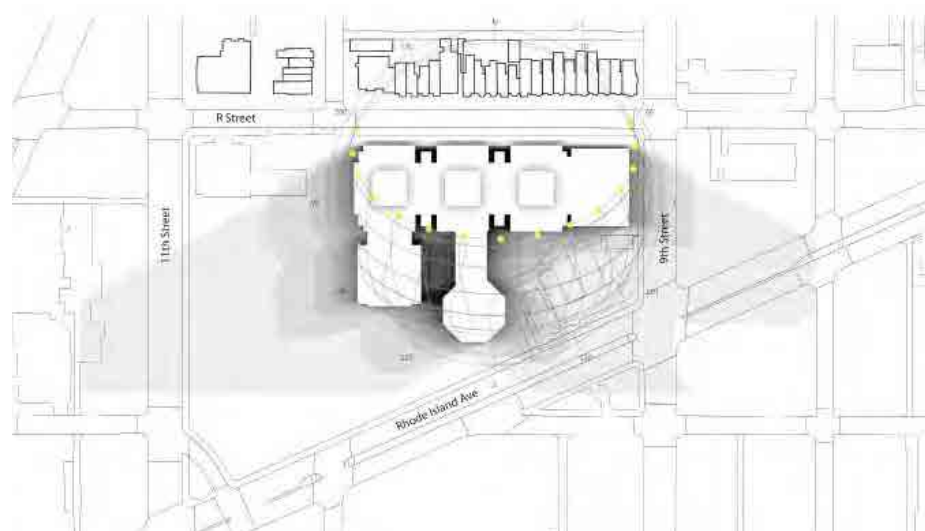
existing building shadow analysis

Understanding the current shadow casting conditions of the existing building, is important prior to beginning a new design. The existing building casts shadows on outdoor recreational areas in the Fall, and the Spring while casting shadows on R-Street during the winter for longer hours of the day.

The most significant shadow impact of the existing building beyond DCPS property happens during the winter on R Street.

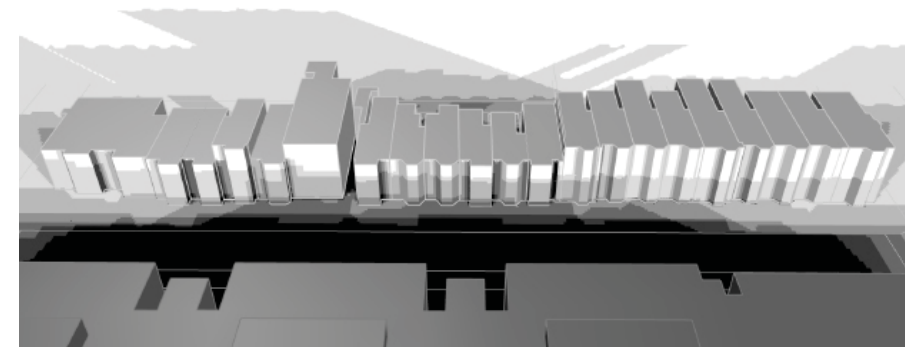
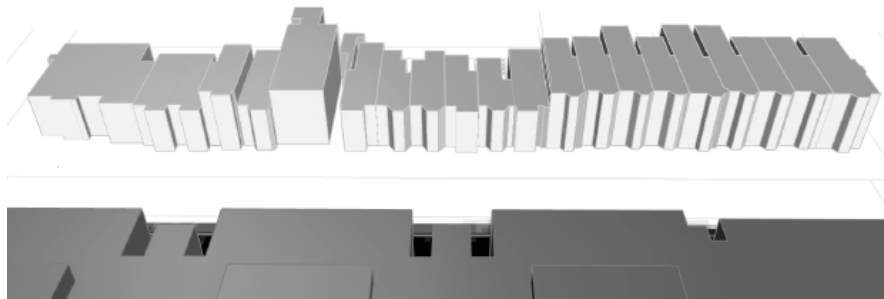
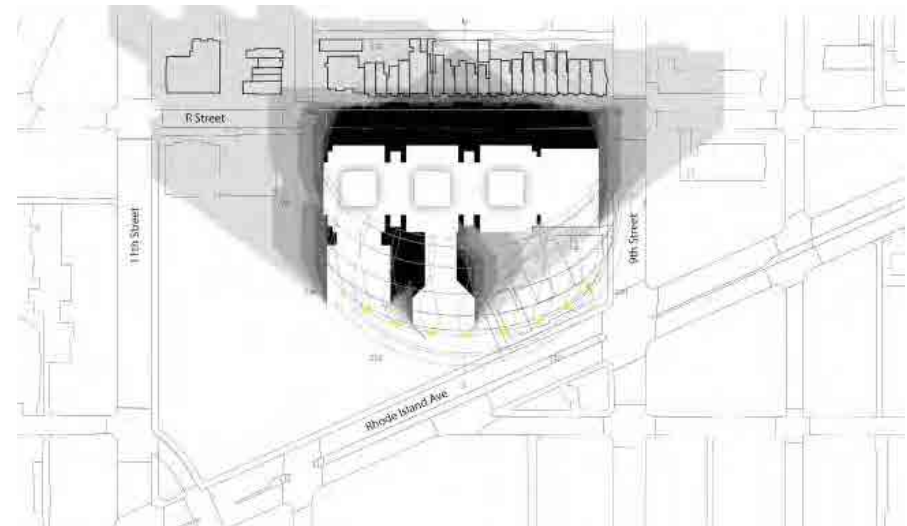
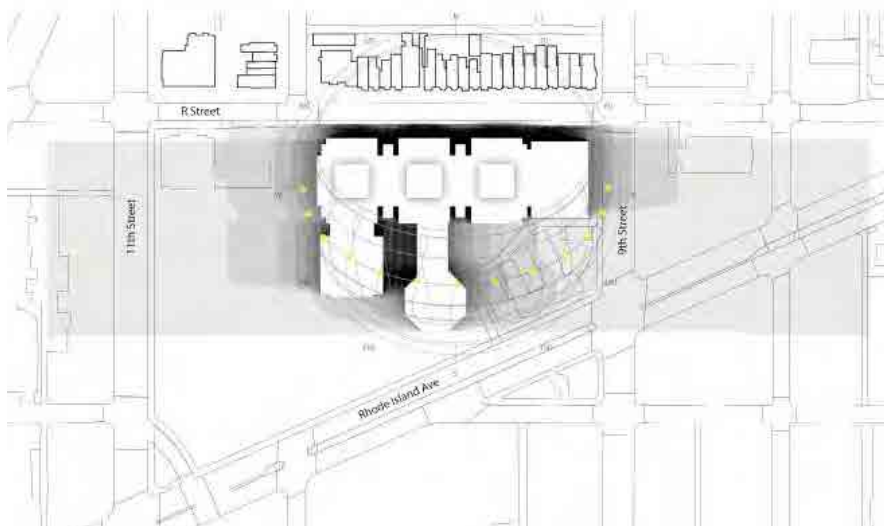
This needs to be considered while designing a new building to minimize the impact of building shadows on neighboring properties.

Summer



Fall/Spring

Winter



SHADOWS LEGEND







OUTREACH AND COORDINATION

public engagement

In 2018, DC Public Schools (DCPS) formed a School Improvement Team (SIT), which is a working group of 10-15 stakeholders that includes teachers, school administration, parents, and neighbors. SIT members also include community leaders (ANC, civic associations, City Council representatives, etc.), such as the representative/s from the Save Shaw Park committee that serve on the Banneker SIT. Their role as a SIT member is two-tiered: (1) offer feedback, ideas, and concerns to the project team, gathered from their respective constituent groups, and (2) communicate major design decisions and construction logistics announcements out to these constituent groups. DCPS works with the Department of General Services (DGS) and the design-build team to organize SIT Meetings that help move the project forward with transparency. Since last spring, DCPS has hosted eight (8) SIT Meetings.

In addition to the SIT Meetings, DCPS and DGS believe that there should be a broader medium for engagement with a wider pool of stakeholders in attendance. Some of those vehicles include:

- the project webpage,
- biweekly project updates, and
- Community Meetings

Community meeting dates are posted on the DCPS school modernization project page, shared calendars, and on fliers. DCPS hosted six (6) Community Meetings since Spring of 2018. The purpose of the Community Meetings was to condense and summarize the happenings of the last few SIT Meetings and to amplify big announcements. The meetings always feature a Q&A session in which community members/attendees also express their opinions and share feedback on what's been discussed and reviewed.

DCPS and DGS employ methods that they feel provide reasonable means of transparency and participation; however, at times, particular groups may be missed. DCPS maintains a community email distribution list, and encourage meeting attendees to share contact information. This email distribution list includes the following listservs:

- Ledroit Park,
- U Street,
- Columbia Park,
- Ward One News,
- SHAPPE,
- Brookland,
- Southwest DC,
- Eckington,
- Capitol Hill Listservs,
- Ward 5 and 6 MOCRS in the Mayors Office,
- local ward based education alliances, and
- local ANC Commissioners.

In addition to community meetings, DGS and DCPS have held “Envelope Meetings” which target the organizations who are located on the same block as the new school. This includes the Phyllis Wheatley YWCA, Hillcrest Children and Family Center, and the 10th Street Baptist Church. The project team aims to create as little disturbance as possible for all residents of the surrounding Shaw community, but also recognizes that as directly abutting neighbors to the construction, these organizations are in a unique position relative to the upcoming activities to the site.

As the design phases wrap up, and construction begins, the project team will continue to meet with the SIT and hold Community Meetings. A key community meeting will occur this fall as the construction team gears up to begin razing the building.



Banneker Community Meeting

AGENCY OUTREACH

In addition to community outreach, DGS, DCPS and the Project Team have met with District agencies to review the agencies requirements around design, and permitting. Some of these agencies include:

- US Commission of Fine Arts (CFA)
- DC Department of Energy & Environment (DOEE)
- DC Water
- DC Department of Transportation (DDOT)
- DC Office of Zoning (OZ)
- DC Office of Planning, Historic Preservation Office (OP-HPO)
- District of Columbia Regulatory Authority (DCRA)
- DC Department of Parks and Recreation (DPR)
- National Capital Planning Commission

DCPS and DPR have begun to develop a Memorandum of Understanding (MOU) between their agencies. The intent of the MOU is to provide access to the improved recreation field for both the new high school and the various Shaw community leagues/teams and other community uses. The basketball courts, dog park, and skate park will be omitted from the MOU and left as shared community space—no different from how they are used now.

Geotechnical and Phase I Environmental Site Assessments were performed and submitted to DCRA for review as part of the project's Environmental Impact Screening Form submission. The EISF submission is currently still in review.

Gorove / Slade prepared a Comprehensive Transportation Review (CTR) for the relocation and expansion of the Benjamin Banneker Academic High School onto the Shaw JHS site. The vehicular capacity analysis concluded that under future conditions, the majority of intersections around the school will operate at acceptable conditions, the intersection of Rhode Island Avenue NW and 9th Street NW should be explored more for possible signal timing adjustments, and the school is not expected to have a negative impact on the surrounding neighborhoods traffic network.

agency feedback

The Commission of Fine Arts, National Capital Planning Commission, and the DC Historic Preservation Office in the Office of Planning have provided valuable feedback at each stage of the design process, and the Project Team has endeavored to incorporate their feedback in a meaningful way.

COMMISSION OF FINE ARTS (CFA)

The project was initially submitted to CFA for a Concept Level Review in July 2019. The Commissioners were supportive of the location of the new school building in the northeast corner of the site, and the organization of the school around an interior learning commons. They felt there was a strong benefit to the community in the inclusion of a new playing field to the site, and in maintaining the existing park facilities. However, the Commissioners had some concern on the clarity of the site organization.

“{The Commission} recognized that these major program elements have driven the planning of the project; however, they found it difficult to understand the site constraints, circulation logic, and design intent from the documentation provided. Specifically, they questioned the disposition of the recreational and program elements across the site without a clear spatial or organizational concept, resulting in a quilt-like pattern of discontinuous small spaces without a strong relationship to the interior spaces of the school itself.”

“... they recommended consideration of rotating the gym volume on the southwest side of the building to align with Rhode Island Avenue in order to better address the avenue and to allow a larger, more usable outdoor space.”

In response to the comments, the Project Team reoriented the gym massing to align with the diagonal of Rhode Island Avenue NW, and took a fresh look at the allocation of program elements across the site, and the pedestrians experience as they crossed the west side of the property.

On September 19th, the Commission reviewed the second concept submission for the new building and site design, and expressed appreciation to the designers for the revisions they made to the building orientation and the clarity brought to the configuration of outdoor spaces. For the subsequent Final Review, the Commissioners, they asked the designers to continue to look at ways to soften some of the hard edges between the outdoor spaces to provide a more inviting feel for the students and the community. In relation to the continued development of the site, they made the following suggestion that:

“the same strong, contemporary architectural language proposed for the school building also inform the design of site elements, such as the perimeter gates and fencing.”

In its meeting of November 21, 2019, the Commission of Fine Arts approved the final design for the new building for Benjamin Banneker Academic High School. Due to a recent outdoor program change by DCPS, from a football field to a track/soccer field, the Project Team requested that the Final Review of the site design be deferred to January to allow the Project Team to fully develop the revised plan, incorporating also feedback from the National Capital Planning Commission, and the DC Historic Preservation Office.



JULY CONCEPT PLAN



SEPTEMBER CONCEPT PLAN

NATIONAL CAPITAL PLANNING COMMISSION (NCPC) & DC HISTORIC PRESERVATION OFFICE (HPO)

The Benjamin Banneker Academic High School design was submitted to NCPC in September for Concept Review. NCPC approved the Concept Level submission of the project during its November 7, 2019 hearing, with a recommendation that

“...the applicant explores opportunities to formally denote the 10th Street corridor reflecting the original L’Enfant right-of-way. Strategies could include the use of framing elements such as an allee of trees, and by ensuring that no vertical elements obscure the view.

As part of the review process, consultation with the DC Historic Preservation Office (HPO) was initiated by NCPC in accordance with Section 106 of the National Historic Preservation Act. HPO strongly supported the re-introduction of the historic rights-of-way that had been demolished in the 1970s when Shaw Junior High School was built.

“Since the site includes/is adjacent to portions of historically significant rights-of-way (ROW) associated with the Plan of the City of Washington/L’Enfant Plan (i.e. 10th and Q Streets, NW and Rhode Island Avenue, NW), we recommend that the {Area of Potential Effect} APE indicate these ROW and the associated view corridors that extend through the site and beyond”

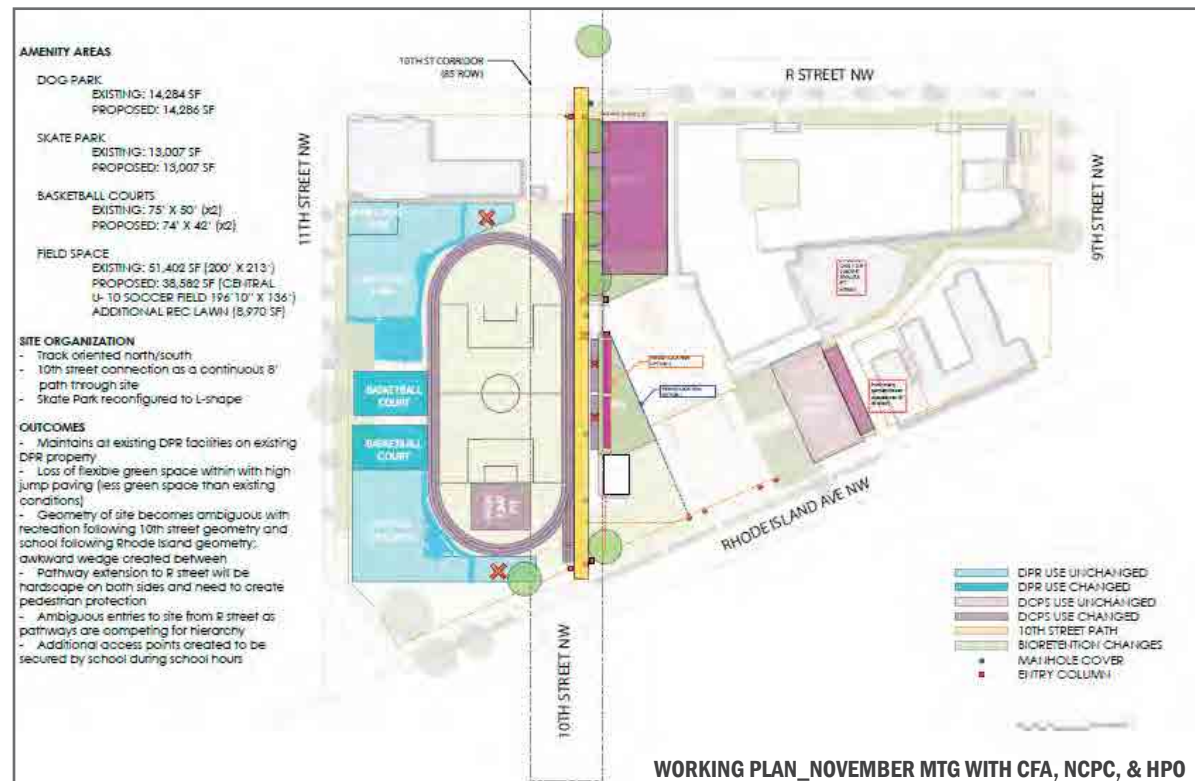
The Project team met with members of NCPC and HPO on November 6, 2019 to review HPO’s comments as they related to the Banneker High School design. During that meeting, HPO indicated that the proposed building design was “generally compatible” the

surrounding historic buildings and districts, but that the site landscape plan was not done enough to commemorate the historically significant L’Enfant ROW.

A follow up meeting was held with CFA and HPO on November 15, 2019 to review a further iteration of the site landscape plan which replaced the proposed football field with a 250m track, which provided the Project Team with more options of expressing the

historic rights-of-way and view corridors across the site. A subsequent video conference call was held on November 25, 2019 to review these ideas in more depth with CFA, NCPC and HPO.

The site design that is presented in this submission reflects the further evolution of the site plan ideas discussed with CFA and HPO during that meeting.



design principles



1 Inspire life-long learning



2 Activate Interdisciplinary Learning



3 Expand the Learning Commons as the Heart of the School



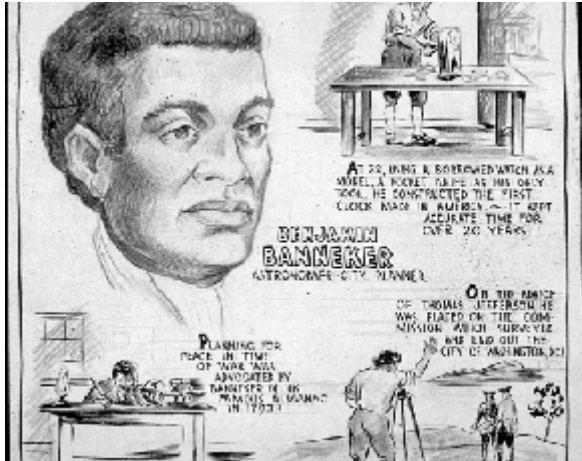
6 Compliment the Civic Center of Shaw



7 Design for Net Zero Energy



8 Achieve Net Positive Education



4 Celebrate the legacy of Benjamin Banneker



5 Sculpt memorable & interactive outdoor spaces



9 Be a Good Neighbor

During the public engagement process, the project team developed nine (9) Design Principles which summarize all of the aspirations of the various stakeholders into unified goals for the project's design.

These Design Principles will continue to serve as guidelines for how to make the best decisions for the project and the community for future phases of the process.

For Banneker Academic High School, the design principles outline what the project team hopes to achieve, with a focus on civic presence, community connectivity, and—most importantly—the student experience. Ultimately, these principles will support the team's overarching goal of creating a high-performance 21st-century learning environment.

student engagement

On June 6th, the design-build team held a workshop in the Banneker HS learning commons to share the design concept and talk with students about what was most important to them for the new building.

The conversation was framed around three topics: Community & Culture, Wellness, and Sustainability.

Key Takeaways for each conversation are below.

COMMUNITY & CULTURE

The most common idea cited is that students want to maintain a sense of togetherness and comfortable “home” feeling about the school. Relating to this are ideas about creating spaces for student-teacher interactions, building a sense of school pride, and not becoming “too big”.

Other key ideas include incorporating school colors, alumni photos, recognition of past leadership, and always putting academics first.

WELLNESS

The students shared many valuable ideas about how to foster health and wellness. Among the most important characteristics are access to views and natural light, inclusion of nature and access to outdoor spaces. In terms of spaces they asked for both open, innovative, community spaces as well as quiet individual rooms for concentration or escape.

They also were quick to recognize that physical activity is very helpful to reducing stress and want to be sure that traditional athletic spaces are complemented with



other activity spaces (indoors and out) for casual play and movement. One important concept relating to this is that these types of spaces or activities are available to students throughout the school day as needed, and not just during before/after hours, or dedicated PE class.

SUSTAINABILITY

There were two components to this conversation, first, how the students want to engage in the design process, and secondly, how they might incorporate sustainable activities into the school culture for years to come.

During the current process students are very interested in participating in construction tours and getting building updates from the D/B team. They also asked if they could fill community service hours by assisting in the process in some way.



In the future, there were many good ideas shared such as composting, starting an environmental stewardship club, and use of technology to reduce waste.

The design-build team will work with DCPS going forward to think of educational ways to involve students in the design process as well as how to showcase design and sustainability concepts for future classes of achievers.

PRELIMINARY STUDENT ENGAGEMENT CALENDAR

YEAR	MONTH	MILESTONE	CLASSROOM TOPIC	TOUR TOPIC
2020	January	BIM Modeling	BIM (clash detection, 3D, etc)	
	February	Foundations	Lateral earth forces, water forces	
	March	Geothermal Field		Well Field
	<<PARC TESTING>>			
	May	Superstructure		
April				
August				
June	September	Water tight / Envelope		
July	October			
	November	HVAC Systems		MEP equipment and ductwork
	December			
2021	January			PV Installation
	February			
	March	Fields & Court Work		
	<<PARC TESTING>>			
	May	The Finished Product		Tour of the finished building
April				

student wellness

Banneker students are very serious about their academic work. The design for the new Banneker facility will consider the mental and physical stress which accompanies such scholastic fervor.

Some strategies for stress relief the students have asked for include places for quiet meditation, yoga, and other “head clearing” activities such as walking a loop through the building or in the landscape.

Providing ample views to the landscape, allowing natural daylight to penetrate deep into the building, and providing textures, materials, and patterns that mimic nature will all be important features to help create a calm and comfortable environment.

Some key design elements currently being studied are a measured walking path surrounding the central atrium; connection to controlled natural outdoor spaces both on the roof and the site. It is also key to foster a sense of community and connectivity by providing views between spaces throughout the building and providing places for relaxation, conversation, and positive communication among peers as well as between staff and students.



view of banneker learning commons







PROJECT INFORMATION & DRAWINGS

site analysis

Positioned in the heart of Washington, DC within the Shaw community, the Banneker High School campus presents numerous opportunities to engage both the school community and the local neighborhood.

The site is bordered by residential scale R Street NW, lined with two- and three-story town homes and a converted fire station. Mature street trees border the school side of the street with intermittent replacements as trees have reached their life span.

9th and 11th Streets NW border the respective East and West boundaries of the school site. Both are punctuated with mid-rise multifamily structures.

10th Street NW is interrupted by the school parcel, but many individuals were observed using the sidewalk to bisect the site on commutes by foot, bike and scooter. The city infrastructure picks up again to the south of the site along Rhode Island Avenue NW.

Rhode Island Avenue NW provides the most significant border to the school parcel and serves as a major city thoroughfare. The view shed of the current parcel in this area has long been fronted with chain-link fence and an expansive concrete plaza.

Seaton Elementary School borders the south segment of Rhode Island NW and is set back from the road alignment creating a civic green space. This reflects how other civic spaces and institutions address the Rhode Island corridor and should be reflected in the development of the Banneker school site.

The existing amenities present on-site are a 14,000 SF dog park with a fenced smaller dog space within, a 13,000 SF skate park on a converted tennis court, two basketball courts, and an approximately 50,000 SF open lawn space.

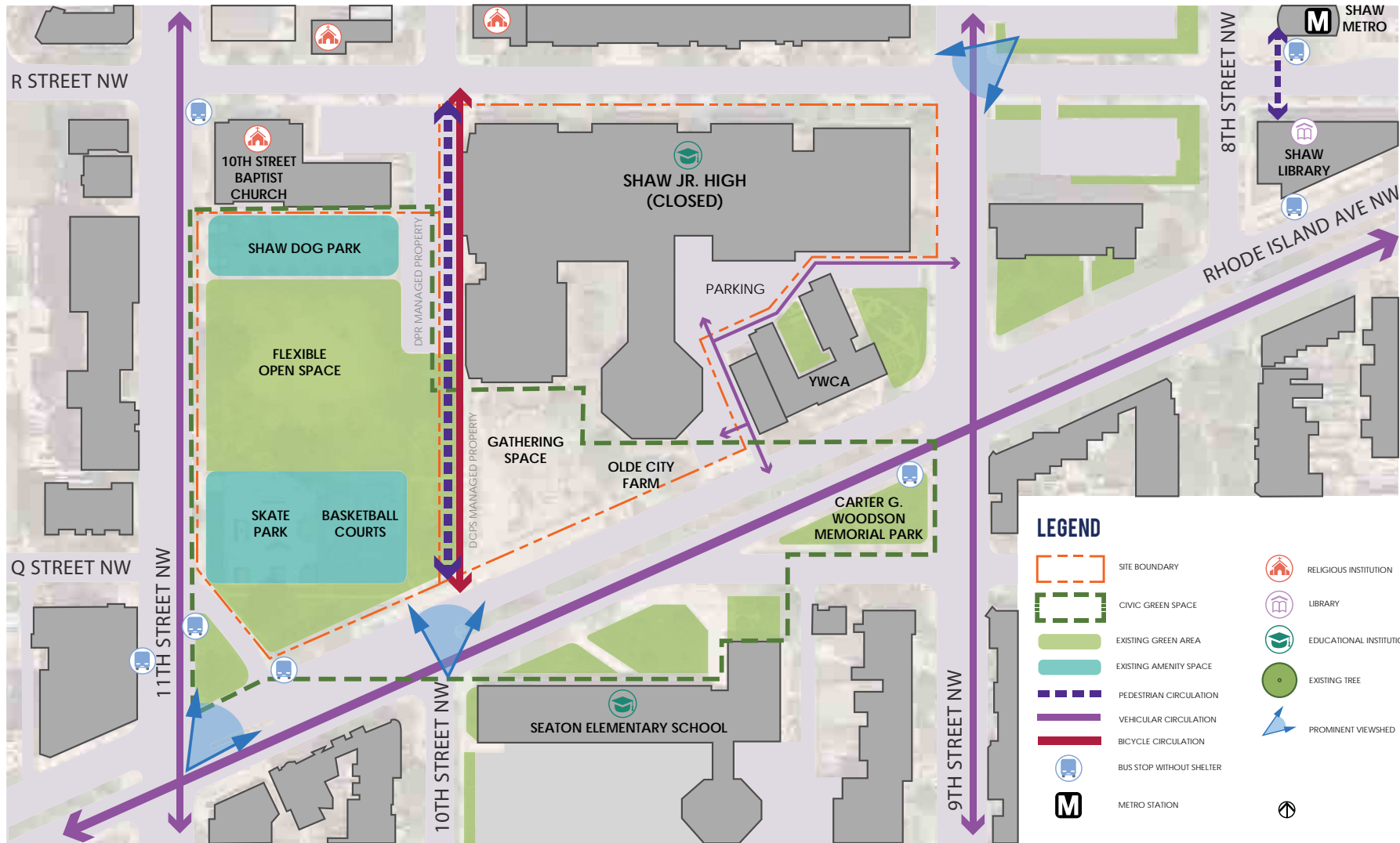
Three Heritage Trees are located on-site.



RHODE ISLAND AND 11TH STREET NW



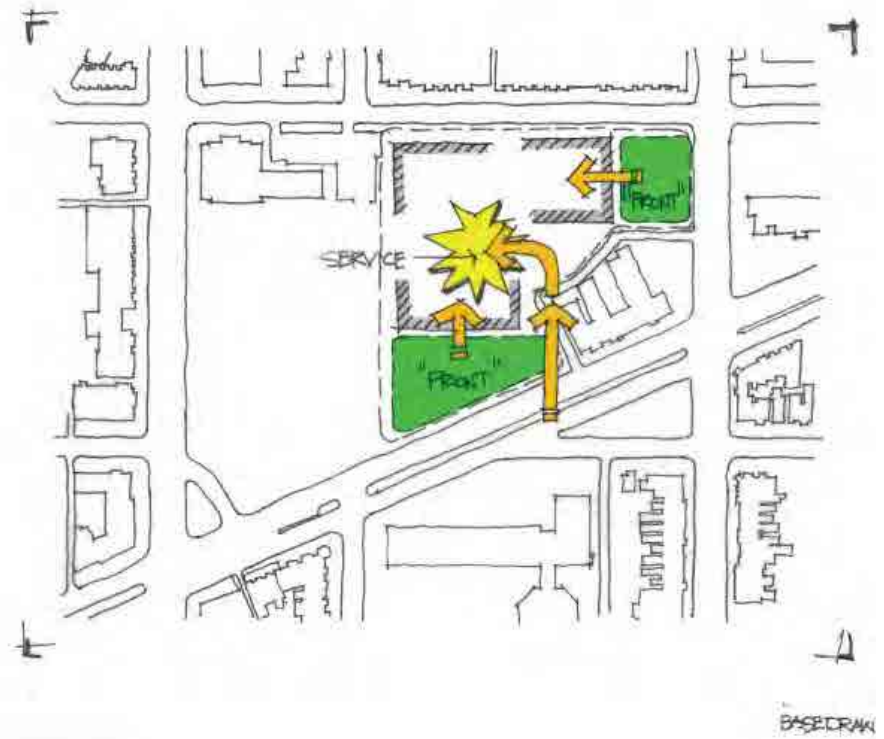
SEATON ELEMENTARY SCHOOL



site diagrams



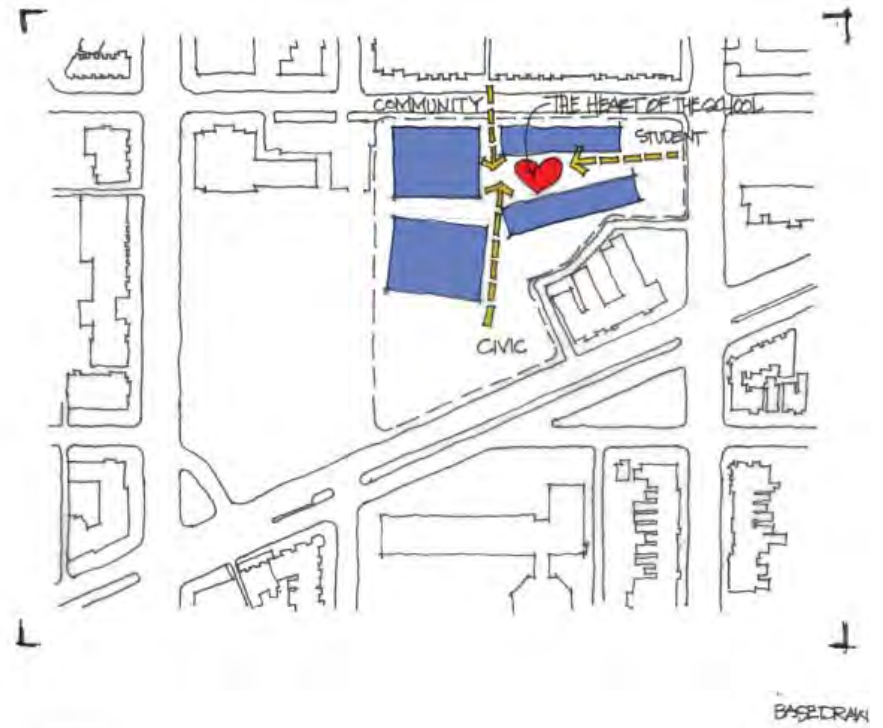
Important Sides



Service



Security



Heart of the School

site organization

The building siting and orientation is based on net-zero design principles and proximity to the Shaw - Howard Metro Station. The building layout occupies the northeastern portion of the site addressing frontages along R Street NW and 9th Street NW, leaving the rest of the DCPS and DPR parcels available for public and school-related site programming.

The corner of R and 9th streets is visible from the Shaw - Howard Metro Station and should be designed to draw users to the new high school campus. This destination will be the first opportunity to create a student-focused entrance and place making urban plaza.

The western edge of the building provides an opportunity for a community focused entrance and Shaw-specific destination that relates to the larger campus.

The bisection of the site by the 10th Street pedestrian corridor creates a boundary between public and school focused spaces without creating a non-permeable barrier. The design intent is to create a multi-modal connector that accommodates on-site circulation and addresses its role in a larger circulation network.

The site frontage on Rhode Island Avenue offers an opportunity to address a major city corridor with a civic space that mirrors the open space across the street at Seaton Elementary School. The campus will fit seamlessly into the sequence of built edges and open spaces along Rhode Island Avenue.

Site amenities maintain existing public uses to the east of the new Banneker school building, with direct access to the community from 11th Street NW (i.e.: dog park and skate park). Amenities used on a daily basis by students are located closer to the building for ease of access and safety.

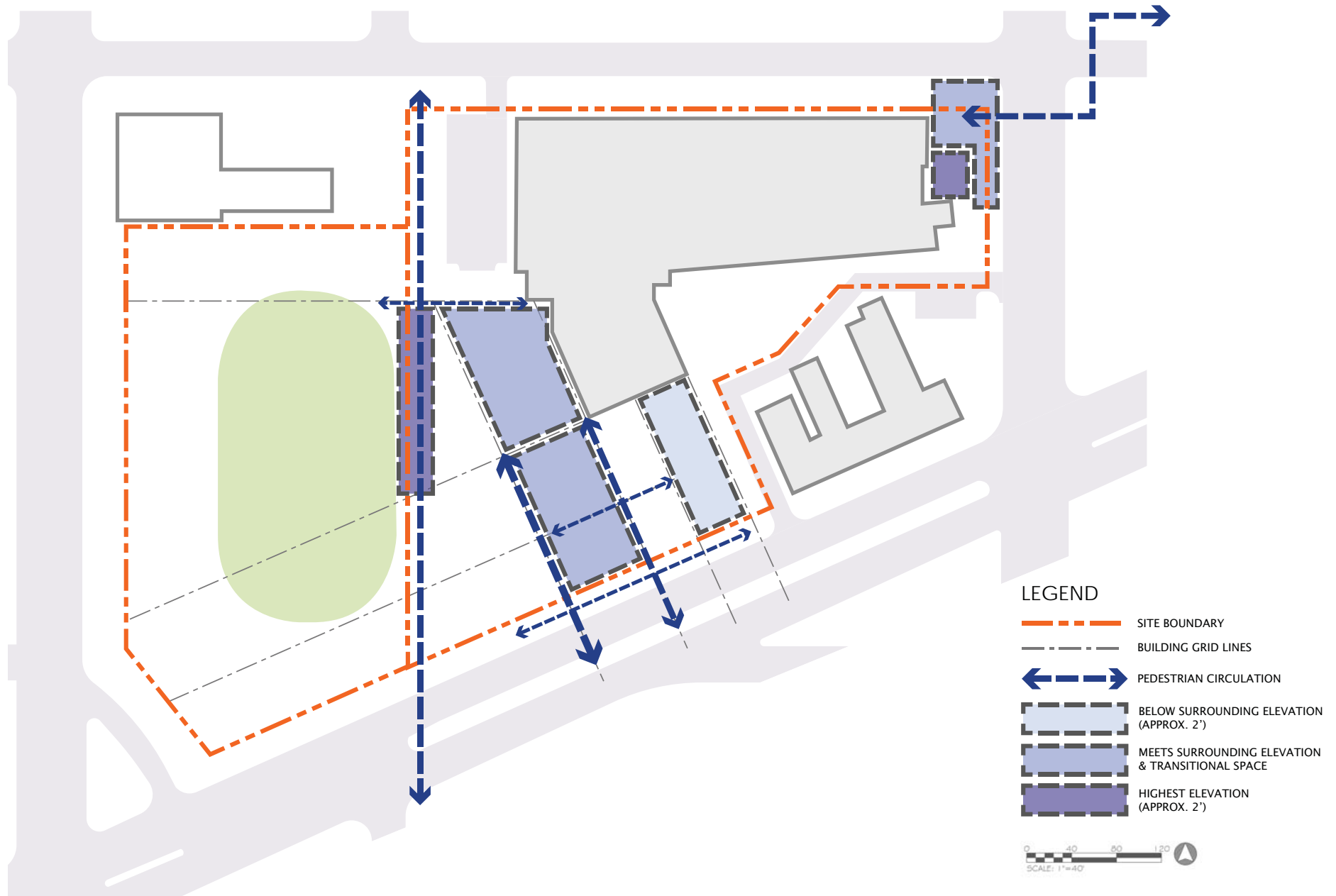
As the heart of the Shaw community, the current open space is to be elevated to a programmable field. Community and school engagement will dictate desired sports that can be accommodated.



10TH STREET NW



site organization



landscape design

The design team intends to create a vibrant campus that serves as an educational experience. In order to accommodate a variety of learning styles across a broad curriculum and meet the demands of this high-performing student body, the team has incorporated a number of features designed to stimulate, inform, and inspire - as well as create beautiful spaces on the school grounds. All materials will be selected for durability and minimal maintenance requirements.

The development of the site will require compliance with current storm water regulations, and the design response to meet these requirements will be visible demonstrations of environmental stewardship. As part of the storm water management strategy, large swaths of native plants will be incorporated in bioretention areas, which are landscape-oriented storm water management facilities that filter runoff and reduce its volume and velocity. Planting buffers will also be used to unify the streetscape on 11th Street NW and Rhode Island Avenue NW. The plants will be selected for their seasonal interest, with a particular focus on the months when school is in session. Plants will also attract wildlife such as butterflies, birds and beneficial insects. Further interaction with the bioretention can be provided through boardwalks that physically immerse students in their environment.

The most prominent feature of the site is its city setting. The design and construction of the new campus will be integrated into the urban fabric and recognize its placement along the historic 10th Street cartway. Existing elements such as the skate park, dog park and mature trees will remain to preserve social cohesion in the community and to demonstrate stewardship of the neighborhood and the environment. A 250-meter practice track and U10 soccer field provides new programming opportunities for the community and the school. The area between the recreation facilities and the new building becomes

an important civic space that addresses Rhode Island Avenue and provides a campus quad setting focused on the student population.

OUTDOOR EDUCATION

Outdoor education areas of varying scales will provide flexible and inspiring settings for learning, as well as a peaceful and healthy school environment. Rooftop, courtyard and other site spaces will be designed as a flexible learning and recreation environment to accommodate all aspects of the curriculum. An important node at the West Entrance is activated as a tree-lined plaza at the heart of the school campus, serving the dining area inside, and community events, pep rallies and other larger-scale gatherings. In addition to the planted bioretention cells, a native plant demonstration garden will be located along the northern edge to provide an attractive streetscape at R Street and opportunities to study indigenous species.

School recreation facilities include a 250m practice track, a 110m straightaway, a regulation tennis court, and a practice soccer field. A high intensity interval training/obstacle course is located along the track for fitness and to provide an opportunity for students needing a physical and/or mental release.

The team has studied the District's curriculum, and specific lesson units have been gathered to inspire design responses that provide relevant venues and equipment for teaching and hands-on learning. The site offers numerous opportunities for different learning styles and curriculum variations. In addition to the science, music, math and physical education opportunities in the labs, classrooms and environmental areas, there are quiet areas for reading and natural beauty to inspire poetry and art. The site as a whole is an organic and evolving classroom, one that the students themselves can shape.

HONORING L'ENFANT

In addition to the restoration of the 10th Street cartway as a new pedestrian route, the historic context of the school and the neighborhood will be honored with acknowledgments of the L'Enfant Plan, Benjamin Banneker, and Robert Shaw through the art programming throughout the site. Related artwork will ideally include decorative fence panels / gates and sculpture. Ground plane patterning will reinforce the 10th street corridor connection with monumental columns at entrance points.

HISTORIC TREE PRESERVATION

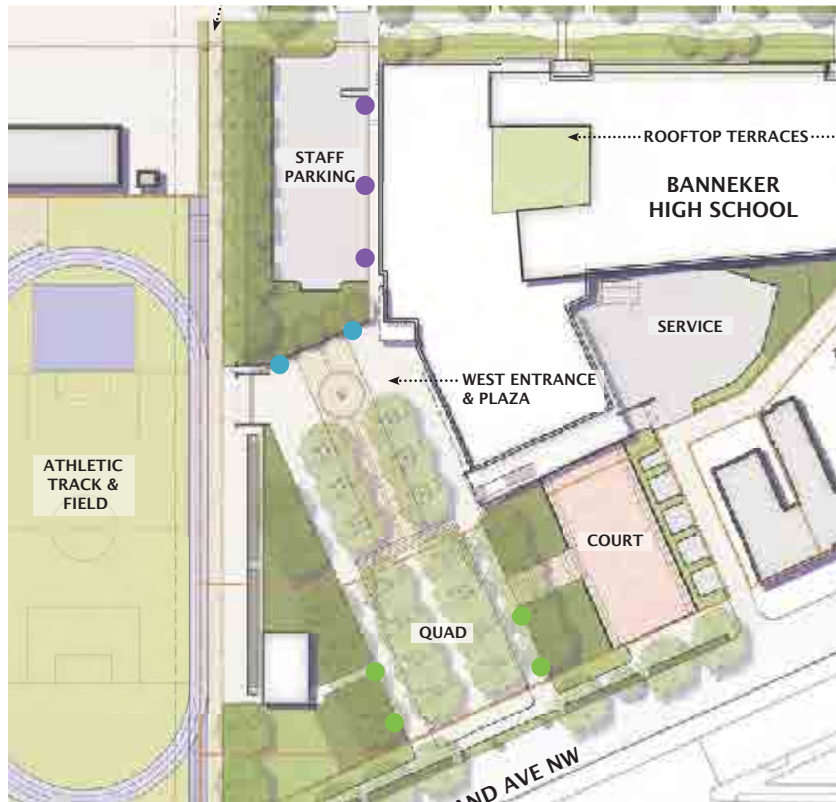
The design team, ownership and construction management walked the Banneker site with Urban Forestry's Ward Arborist and Landscape Architect to review the health of significant existing trees and discuss goals. The priority trees for preservation were the Heritage Oak tree near the intersection of 11th Street NW and Rhode Island Avenue NW and the Special Oak in the existing field near 11th Street NW. A third Heritage Oak was identified near the skate park that would be a potential for preservation but had many indicators of damage. A significant tree was identified at the alley access along 9th Street to be monitored and pruned during the construction process. Several Crape Myrtle and Honeylocust trees were recently planted at the dog park and the Ward Arborist expressed a desire to transplant the trees.

Through the site development, the design team was able to orient site programming and elements to preserve the two preferred trees with minimal disturbance to their Critical Root Zones. The construction management and project Landscape Architect believe the Crape Myrtles at the dog park can be moved due to their planting in above grade planters and that the Honeylocust can be replaced in-kind.

site plan



site historical integration



SIGNAGE TYPE 1: VERTICAL FREESTANDING

(4) FREESTANDING SIGNS LOCATED NEAR THE GATEWAY ENTRANCES AT RHODE ISLAND AVENUE



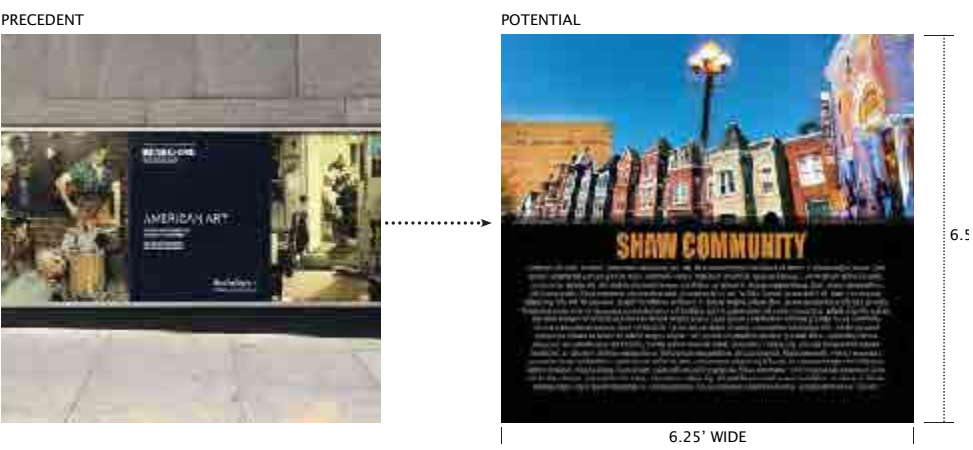
SIGNAGE TYPE 3: VERTICAL MOUNTED

(3) VERTICAL SIGNS BUILDING MOUNTED ALONG THE 10TH STREET CORRIDOR CONNECTION FROM R STREET

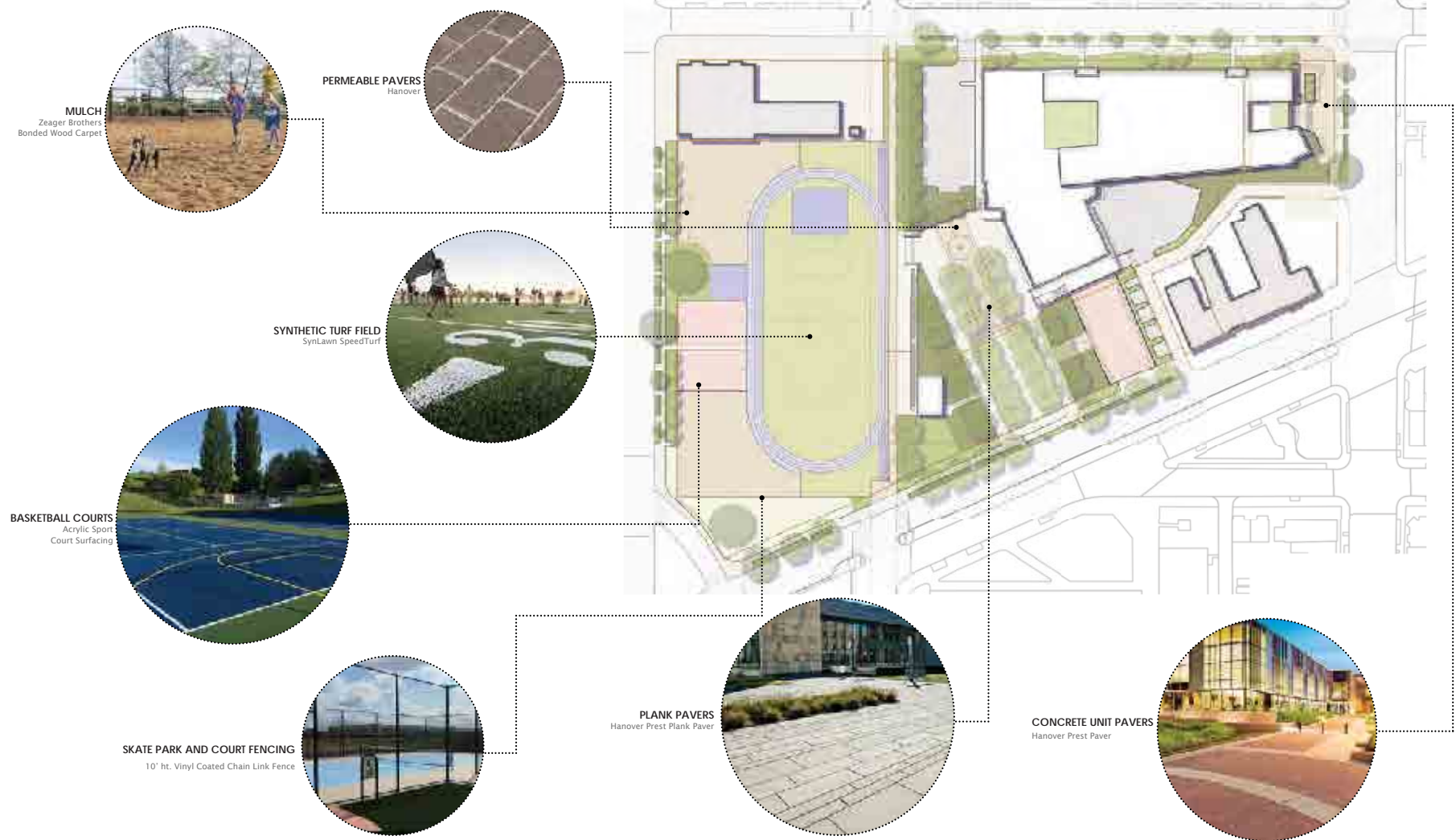


SIGNAGE TYPE 2: HORIZONTAL MOUNTED

(4) SIGNS MOUNTED TO THE BACK SIDE OF THE BLEACHERS WITH INTEGRATED PLANTING



landscape materials



landscape precedents - east



ROOFTOP TERRACES
Flexible Lawn Space
Mixed Modern Seating
Urban Agriculture
Views to the City



INTEGRATED PLAZA CIRCULATION
Gathering Space
Addresses Intersection



ENTRANCE PLAZA
Art Feature
Seating
Large Gathering Area
Special Paving Pattern
Bioretention



landscape precedents - west



10TH STREET CORRIDOR
10' Wide Oversized Pathway
Tree Allee
Distinguished Score Lines



WEST PLAZA
Art Feature Framed by View
Tree Bosque
Distinguished Paving
Large Gathering Space
Combination Seating - Fixed & Movable



QUAD
Flexible Lawn
Casual Seating
Gathering Space



FITNESS PLAZA
HIIT Equipment
Suited for High School Students



spring/summer seasonality palette



Cercis canadensis 'Forest Pansy'
Eastern Redbud



Fothergilla gardenii
Dwarf Fothergilla



Viburnum dentatum
Arrowwood Viburnum



Astilbe chinensis 'Heart & Soul'
Astilbe



Hakonechloa macra 'All Gold'
Japanese Forest Grass



Magnolia virginiana
Sweetbay Magnolia



Cornus florida 'Cloud Nine'
Flowering Dogwood



Skimmia japonica
Japanese Snowball



Viburnum dentatum
Arrowwood Viburnum



Echinacea purpurea 'Magnus'
Purple Coneflower



Pennisetum alopecuroides
Fountain Grass



Quercus phellos
Willow Oak



Weigela florida 'Wine & Roses'
Weigela



Itea virginica 'Henry's Garnet'
Virginia Sweetspire



Perovskia atriplicifolia
Russian Sage



Rudbeckia fulgida 'Goldsturm'
Black-eyed Susan

fall/winter seasonality palette



Quercus imbricaria
Shingle Oak



Ginkgo biloba 'Princeton Sentry'
Ginkgo Tree



Ilex verticillata 'Sparkleberry'
Winterberry



Jasminum nudiflorum
Winter Jasmine



Panicum virgatum 'Prairie Fire'
Prairie Fire Switchgrass



Schizachyrium scoparium 'The Blues'
Little Bluestem



Lagerstroemia 'Natchez'
Crape Myrtle



Ilex crenata 'Soft Touch'
Japanese Holly



Cornus sericea 'Arctic Fire'
Red Twig Dogwood



Nasella tenuissima
Mexican Feather Grass



Crataegus viridis 'Winter King'
Green Hawthorn



Juniperus virginiana 'Grey Owl'
Grey Owl Juniper



Cornus sericea 'Arctic Fire'
Red Twig Dogwood

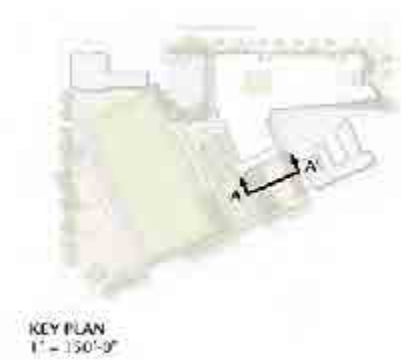


Symphotrichum macrophyllum 'Twilight'
Aster

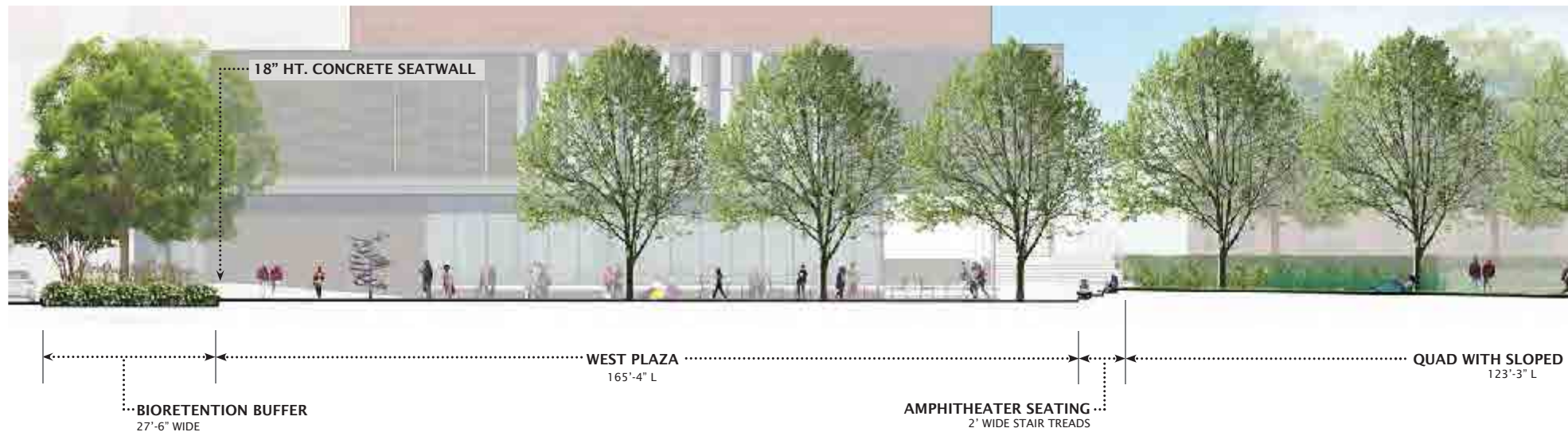


Solidago rugosa
Goldenrod

landscape sections



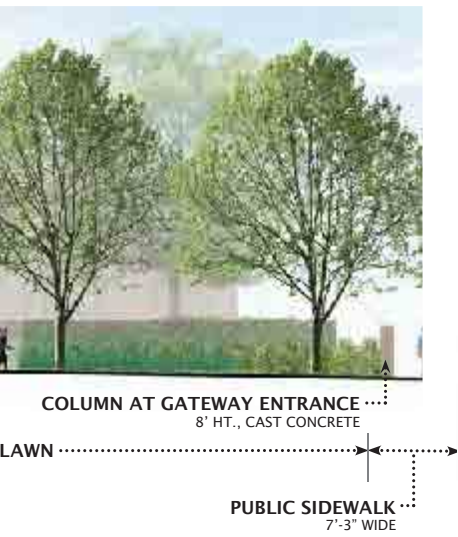
east-west tennis section



north-south pathway section



north south entry plaza section



*Section A : Not to Scale





ornamental gates mark the entrances off of Rhode Island Avenue NW

perimeter security

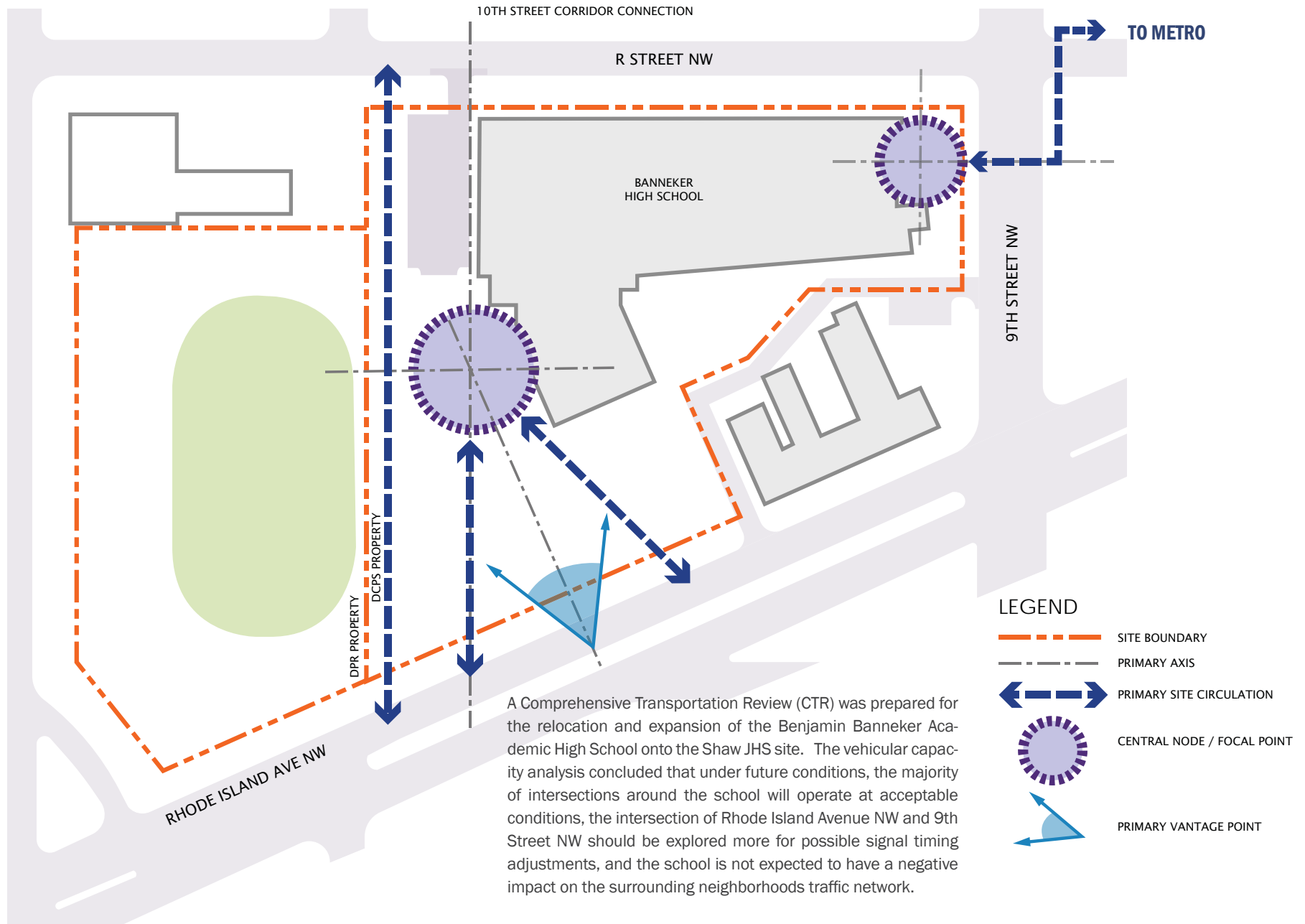
The perimeter security of the site will occur completely within private space, and will not impact the public right-of-way. 42" high ornamental metal fencing is being proposed to secure the parking lot off of R Street NW, and along the south edge of the school yard at Rhode Island Avenue NW. Ornamental fencing will also be employed at the large playing field.

A 10'-0" high fence is proposed to screen off the loading dock and trash compactors adjacent to the public alley. Vinyl coated chain link fencing, in a variety of heights, will be used to secure the basketball and tennis courts, dog park, and skate park facilities.

The Department of General Services, DC Public Schools, and DC Department of Parks and Recreation are developing a Memorandum of Understanding among all parties related to the sharing of the courts and fields, and will include the hours of operation and access procedures for school and the community.



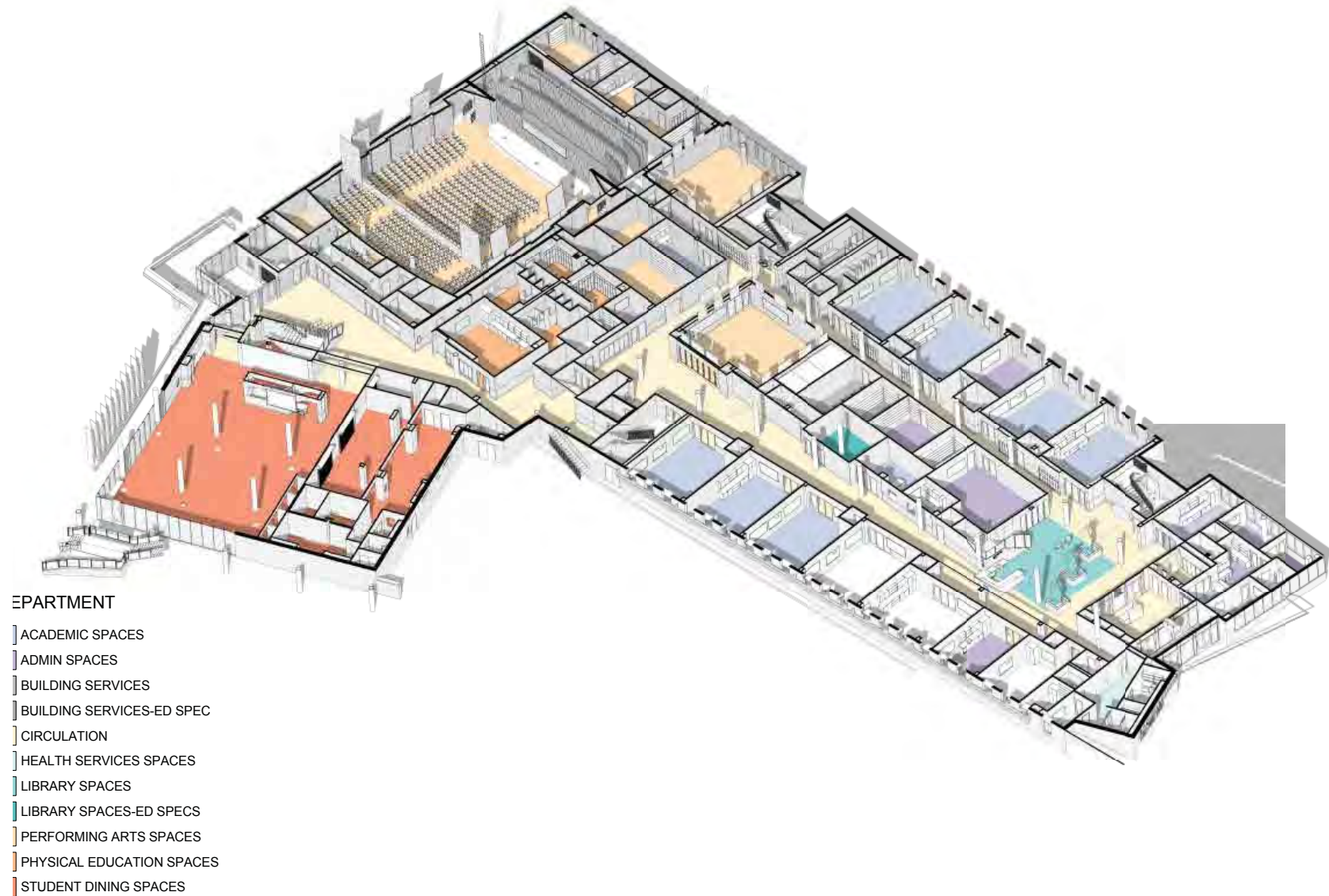
transportation & circulation



photographs



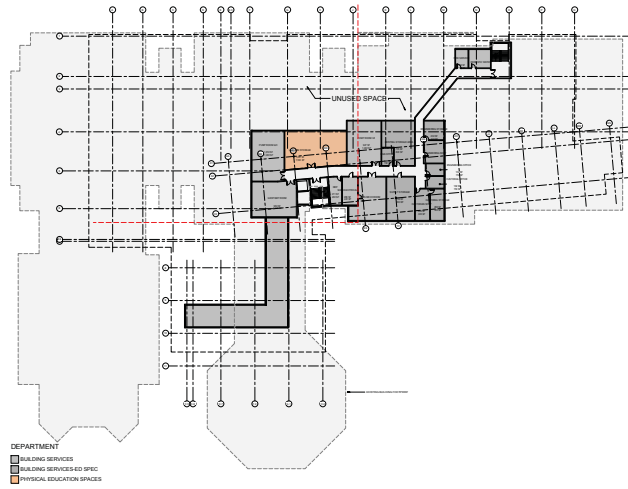
floor plans



DEPARTMENT

- | ACADEMIC SPACES
- | ADMIN SPACES
- | BUILDING SERVICES
- | BUILDING SERVICES-ED SPEC
- | CIRCULATION
- | HEALTH SERVICES SPACES
- | LIBRARY SPACES
- | LIBRARY SPACES-ED SPECS
- | PERFORMING ARTS SPACES
- | PHYSICAL EDUCATION SPACES
- | STUDENT DINING SPACES

FIRST FLOOR PLAN

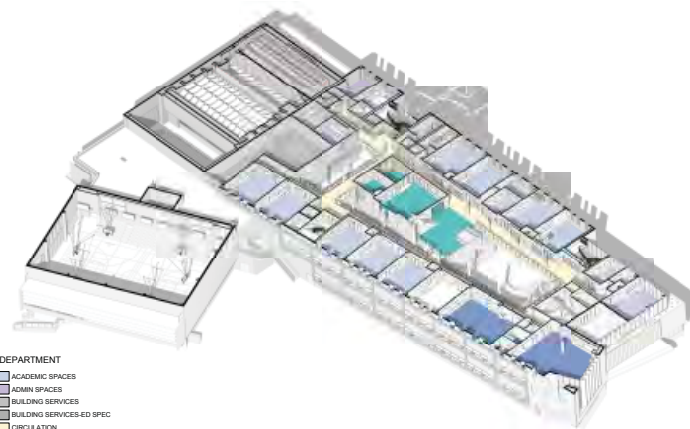


Basement Plan



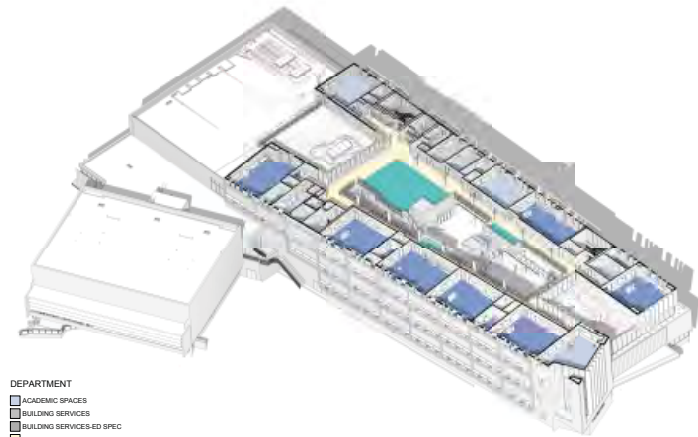
SECOND FLOOR PLAN

Second Floor Plan



THIRD FLOOR PLAN

Third Floor Plan



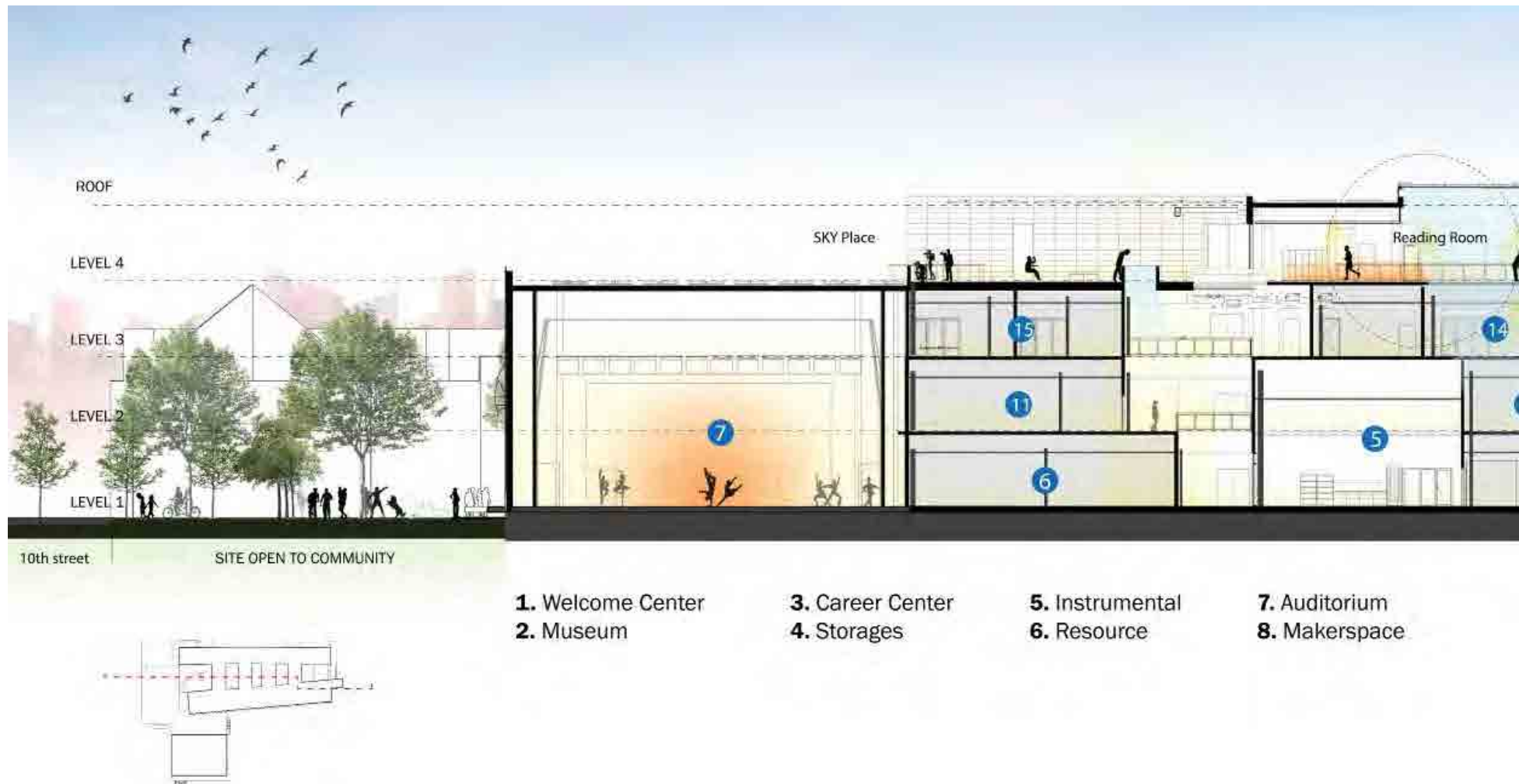
FOURTH FLOOR PLAN

Fourth Floor Plan

west-east longitudinal section

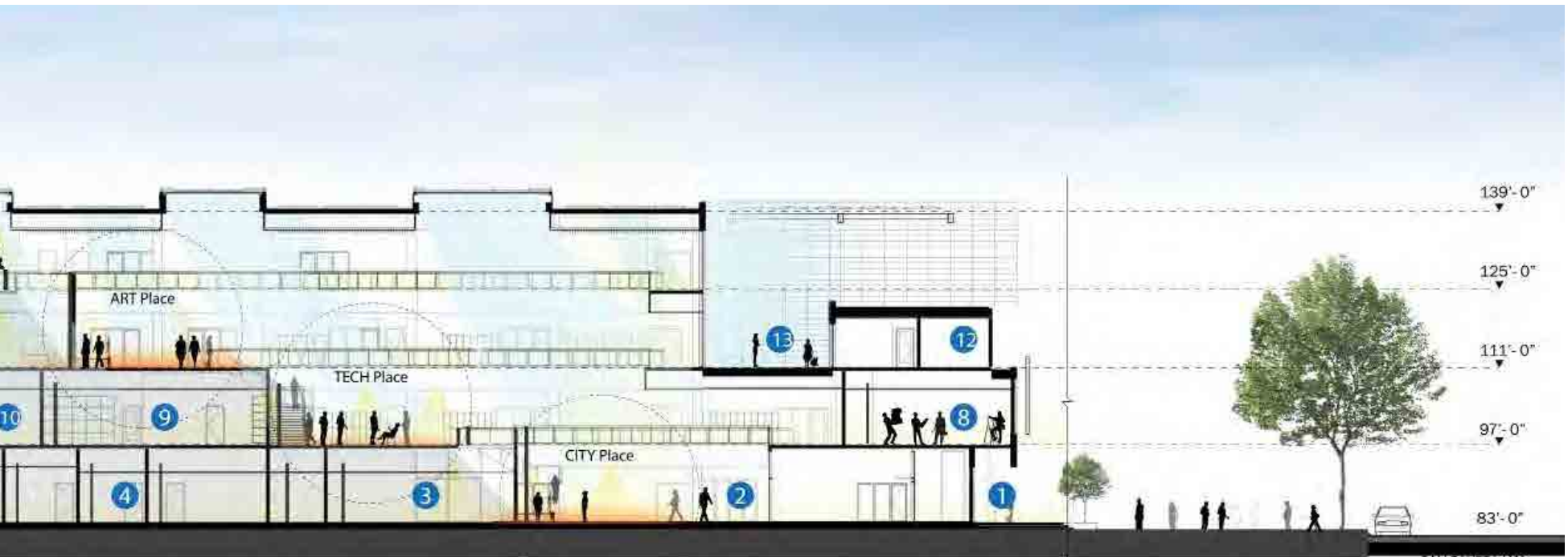
Note: The building sections presented in this report are not to scale and are intended to suggest general design intent for building massing and spatial relationships.

Refer to drawing set, issued in conjunction with this report, for scaled architectural drawings.





KEY PLAN



- 9. Clean Tech Lab
- 10. Collaboration

- 11. Distance Learning
- 12. Counselor

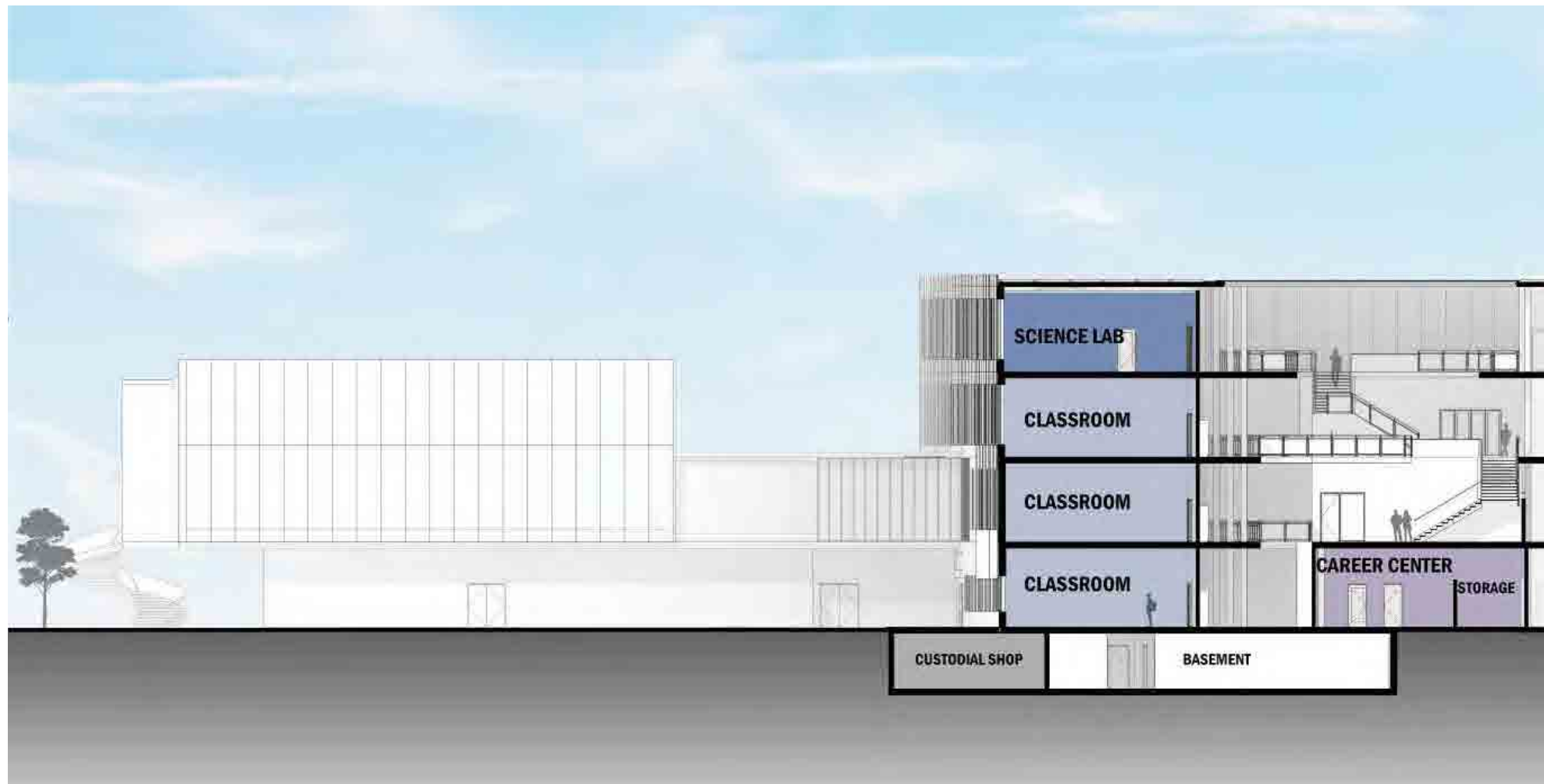
- 13. Outdoor Classroom
- 14. Reading Room

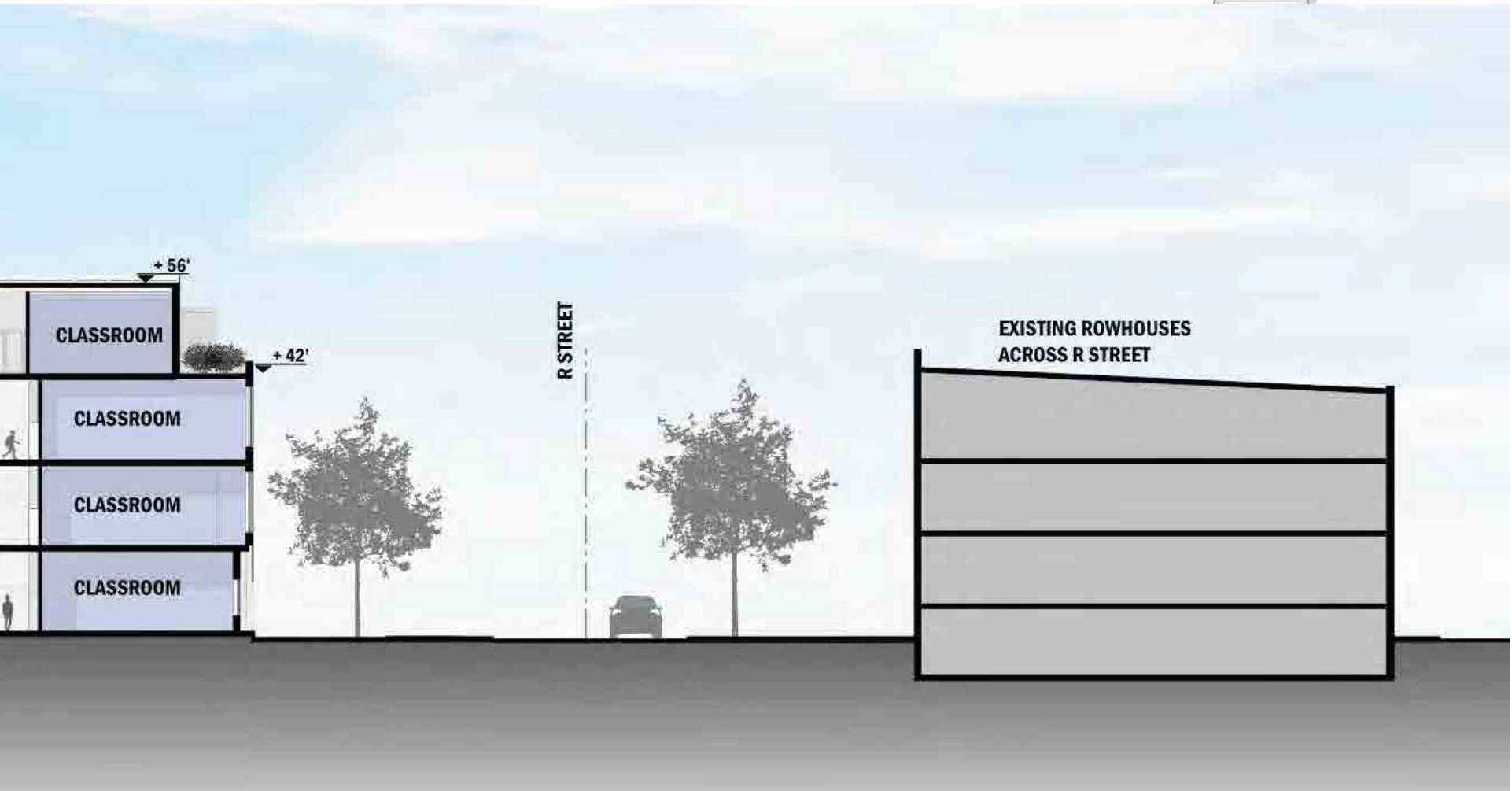
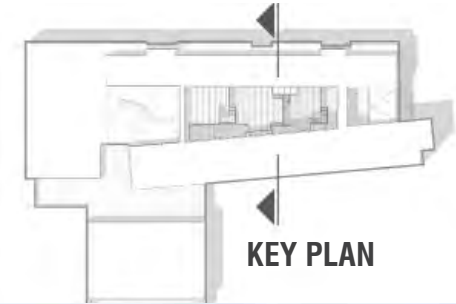
- 15. Publication Room
- 16. Science Labs and Classrooms

north-south cross section

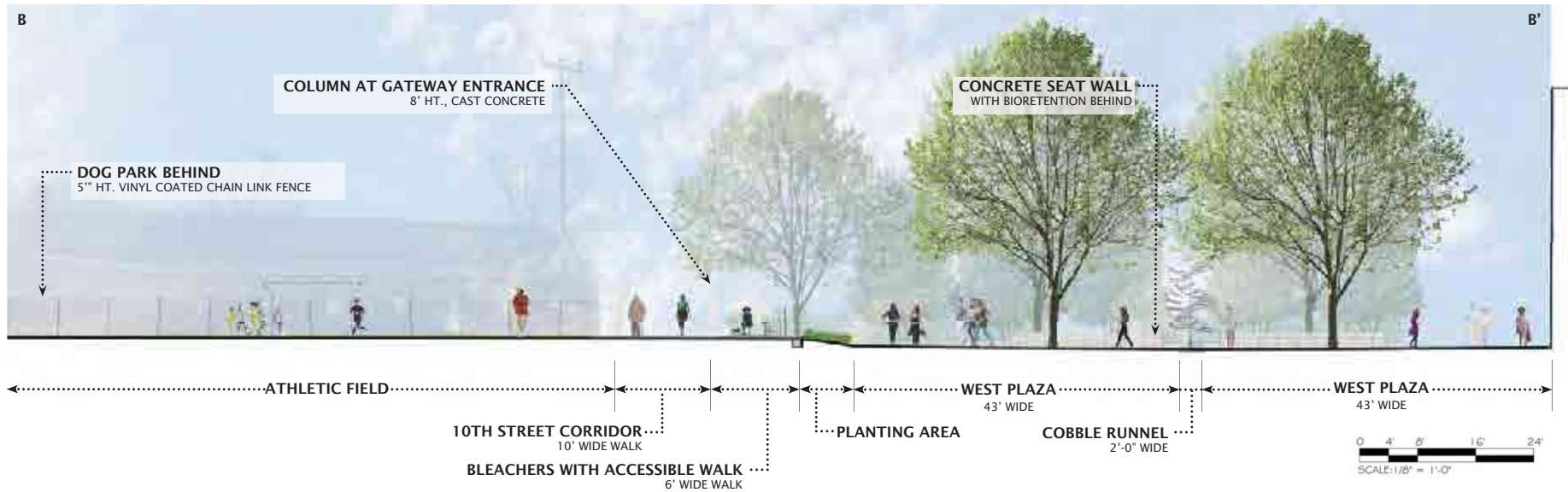
Note: The building sections presented in this report are not to scale and are intended to suggest general design intent for building massing and spatial relationships.

Refer to drawing set, issued in conjunction with this report, for scaled architectural drawings.





east-west section at plaza



north-south section at tennis court



facade design principles

The facade design principles are a subset of the overall project design principles. They define the design approach towards the exterior envelope, and building facade, as they relate to the urban context. They should reinforce the overall project design principles.

The building envelope must negotiate the academic goals of the interior learning environments, the energy performance goals set forth in the projects sustainability imperatives, and the contextual aspirations related to its civic function in the Shaw neighborhood.



1 CIVIC PRESENCE

- The building massing, and the articulation of the facades, should be of appropriate civic and urban scale and character.
- The articulation of massing and materials should clearly designate public entrances.
- The building should be situated in relation to urban context and enhance existing site relationships.
- Quality of materials should be appropriate for civic building. They should be durable, particularly where the building meets the ground.



2 RESPONSE TO CONTEXT

- Massing and scale respond to adjacent residential row house scale and rhythm
- Fenestration uses vertical proportions that relate to residential context
- Material palette relates to immediate and regional context



3 ENERGY PERFORMANCE

- Punched architectural windows that provide high performance related to air infiltration and thermal performance
- Integration of windows and weather barrier
- WWR and daylighting respond to building orientation
- Balance performance and cost; consider life cycle
- Systems and installation support QA/QC for high performance goals

massing



ENTRANCES

- Distinct material palette including curtain wall and storefront glazing designate civic entrances.
- Screen elements contribute to civic presence and control heat gain.



BIG BOX PROGRAM

- Modulate material patterns, modules, and/or texture to create distinction from other massing elements.
- In support of energy performance goals, east or west facing facades should have minimal glazing to respond to environmental conditions.
- Glazing or screen elements add articulation to large facades.



ACADEMIC BARS

- Typical facade condition should respond to adjacent residential context.
- Fenestration should be contextual, but should reflect civic institutional use.
- Modulation of cladding should allow for flexible placement of fenestration.
- R Street facade may use rhythm of structural bay and classroom sizes to relate to the rhythm of the adjacent row houses.



STAIRS

- Modulate massing and materials to create contrast with other massing elements.
- Use vertical massing to break up long horizontal facade.

exterior material selections

The material palette for the Banneker Academic High School building and site will support the project's design principles (see Concept Design Report), be compatible with the surrounding urban context, and help achieve the project's Net Zero Energy and other sustainability goals.

Materials will be attractive and durable to provide a building and campus that are high in quality, easy to maintain, safe for children, and aesthetically pleasing.

The design team will work with the general contractor to incorporate recycled, up-cycled, and salvaged materials into the project without sacrificing quality or durability.

Given that this is a full building replacement and not a renovation/addition, there is more flexibility in the choice of material types, colors, and textures. However, the design team will be selective and cost-conscious. Our aim is a rich and curated palette of materials that will enhance the civic presence of Banneker in the Shaw community.



1

PANELIZED RAINSCREEN FACADE

An open-joint rainscreen facade system offers maximum design flexibility and contributes to a high-performance building envelope. Fiberglass z-girts or equivalent will be used to anchor the facade panels back to building structure (sheathing on metal studs), preventing thermal bridging between the exterior and interior.

Options being considered for this system include UHPC concrete panels, fiber cement panels, and metal panels.



2 MASONRY

Stone and brick are defining building materials of the Mid-Atlantic region. Durable and cost-effective, masonry offers myriad opportunities for facade patterning and texture and is appropriate for civic structures.

Masonry is being considered to provide a durable exterior material where the building meets the ground.

Non-traditional colors and textures are being considered to distinguish this 21st-century civic building apart from the adjacent masonry buildings.



3 CURTAINWALL & STOREFRONT

Aluminum-framed curtainwall and storefront systems will be used for glazed openings. These systems accommodate different glazing types (clear, spandrel, opaque) and can achieve good U-values in conjunction with high-performance insulated glazing.

Where openings span 10' or more, curtainwall will be used; locations include entrances, the gym south wall, cafeteria walls facing the field, and double-height stairwells. Smaller openings can be constructed with thermally broken storefronts or unitized architectural windows.

exterior material selections



4 PREFAB ALUMINUM SUNSHADES

Thoughtful solar orientation and daylighting are key to achieving Net Zero Energy. Windows will be optimized for daylighting, high-quality views, and occupant health and wellness. Sunshades are critical for admitting daylight while reducing glare and heat gain.

Prefabricated aluminum sunshades are designed and engineered to be compatible with typical curtainwall and storefront assemblies, and can offer significant cost and labor savings over custom sunshade systems. Horizontal sunshades will be deployed at the building's south-facing facades; if any large west-facing glazed openings are necessary, vertical fins can be used for solar control.



5 PERFORATED SCREEN PANELS

Perforated screen panels (UHP concrete or metal panel) will be used, selectively, at civic entrances to the school. Perforated screens may also be used to filter daylight at curtain wall glazing locations.



6 SKYLIGHTS

Skylights will be strategically located in the central learning commons to bring daylight into the building interior, reducing artificial lighting loads and increasing occupant health and well-being.

Optimal design for skylights will be studied in the design development phase. The skylight assembly may include clear insulated glazing, translucent insulated panels, or a combination of both.



7 PHOTOVOLTAIC PANELS

Photovoltaic panels are a key element of the project's overall Net Zero Energy design strategy. The vast majority of the PV panels will be mounted on the building's flat roofs. To highlight the building's high-performance design and serve as a teaching tool on renewable energy, a small number of PV panels will be incorporated at select highly visible locations.

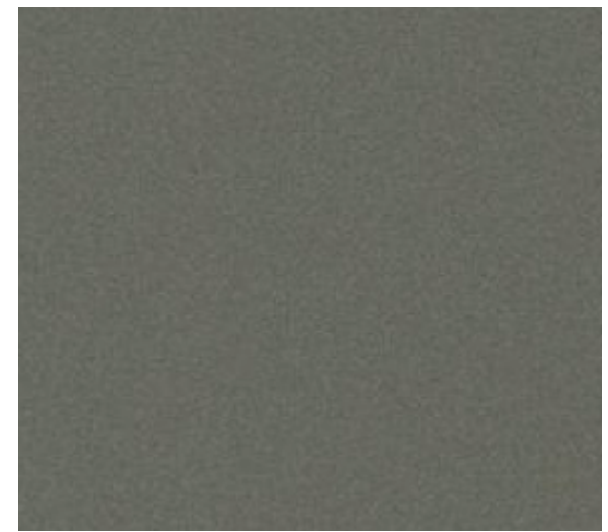
exterior material selections



GFRC RAINSCREEN COLORS: "Bricky"



GLASS RAINSCREEN PANEL: "Subdued Gray"



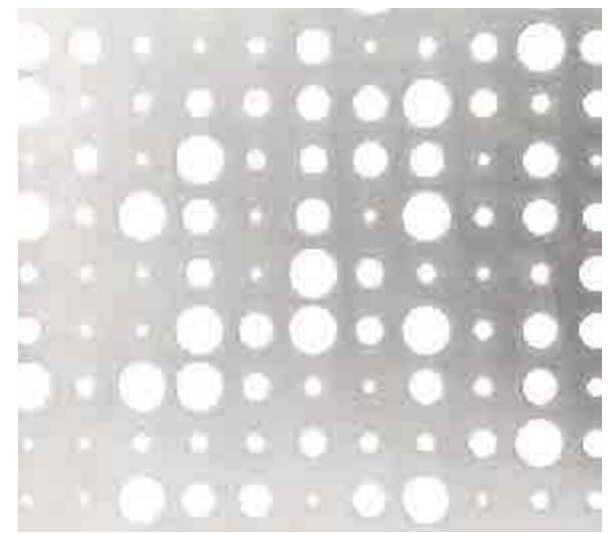
MULLIONS, COPING AND TRIM: "Medium Gray XL (Metallic)"



GFRC RAINSCREEN COLORS: "Cool Grays"

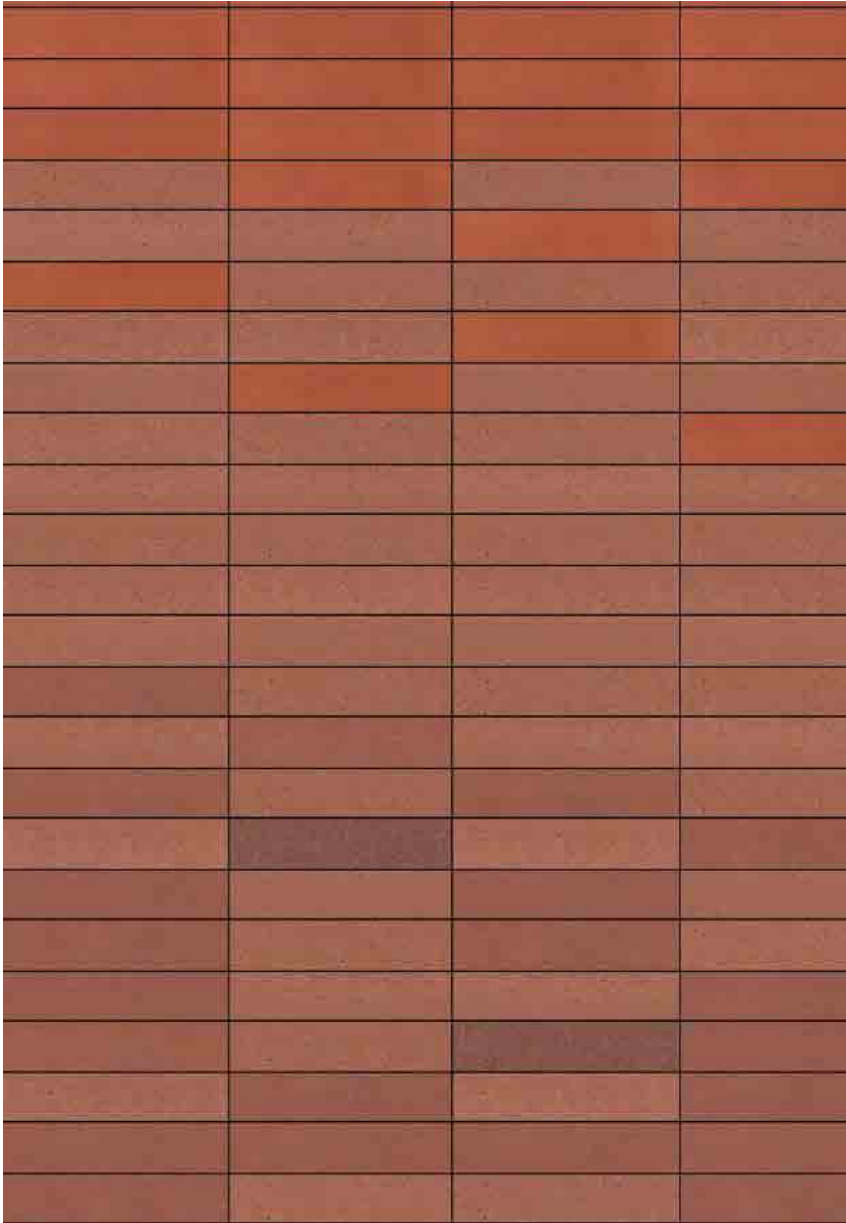


FACE BRICK: "Dark Ironspot, Artisan Modular"

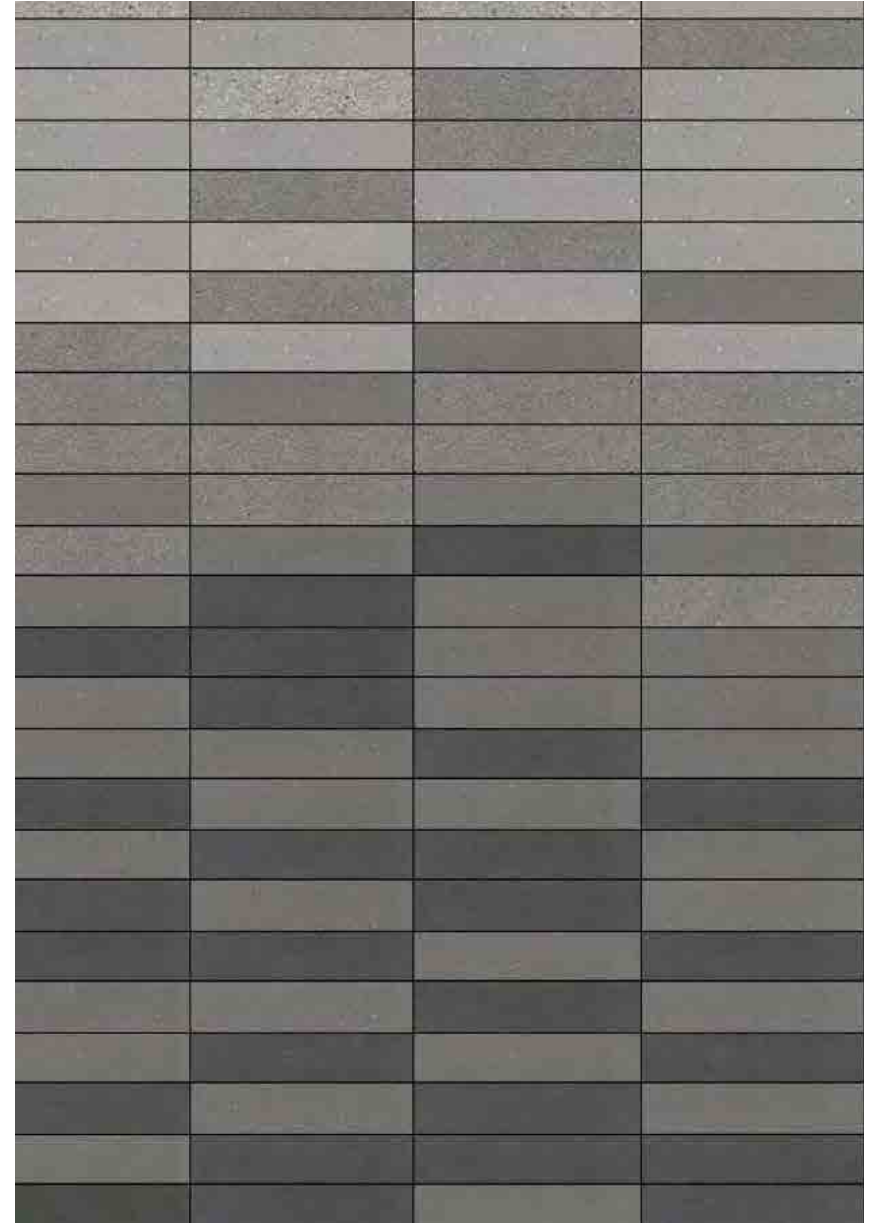


SUNSHADES AND SUNSCREENS: Perforated Aluminum

cladding gradient layouts



TYPICAL "BRICKY" CLADDING LAYOUT (PRIMARY)



TYPICAL "COOL GRAY" CLADDING LAYOUT (SECONDARY)

view at 9th street entrance



view down r-street



view southwest at r-street



view northwest at 9th street



view from Rhode Island Ave



approach from Rhode Island Ave



west entrance



view at cafeteria



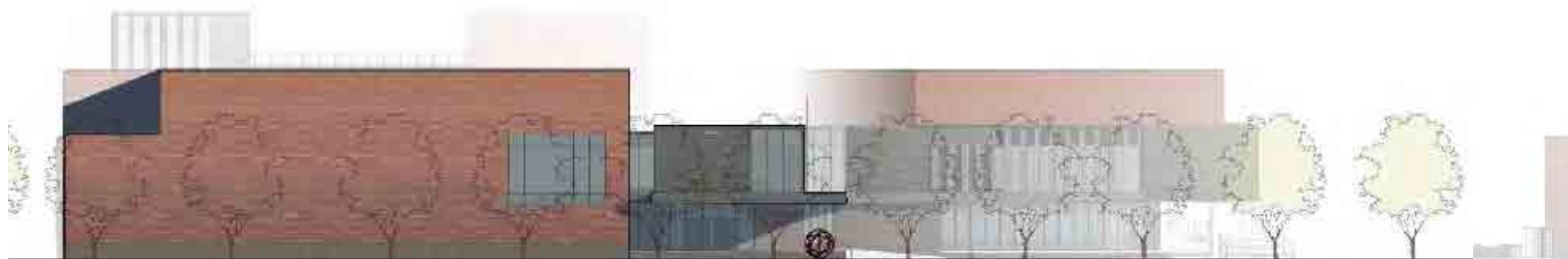
approach from Rhode Island Ave and fields



east elevation



north elevation



west elevation

view at 9th street entrance

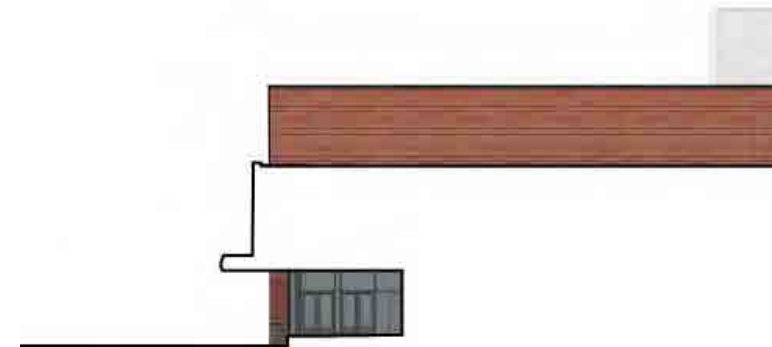


southwest elevation

approach from Rhode Island Ave and fields



south elevation



southeast elevation

view at 9th street entrance





& HIS

The image features a modern architectural rendering of a building with a prominent glass facade and a green landscape below. The building has a multi-story structure with a large glass window area that reflects the sky and surrounding environment. The facade is composed of light-colored panels, possibly stone or concrete, with a grid-like pattern. Below the building, there is a lush green landscape with trees and a body of water. The text "ENVIRONMENTAL HISTORICAL CONSIDERATIONS" is overlaid in large, white, bold letters across the bottom half of the image.

ENVIRONMENTAL HISTORICAL CONSIDERATIONS

net positive education

The activities taking place in a thriving school can consume tremendous amounts of energy (electric, gas, and other sources) if an energy-conscious, integrated approach is not taken in architectural and building systems design. This is why the design team has been focused from project kickoff on achieving a truly sustainable, high-performance learning environment targeting Net Zero Energy (NZE).

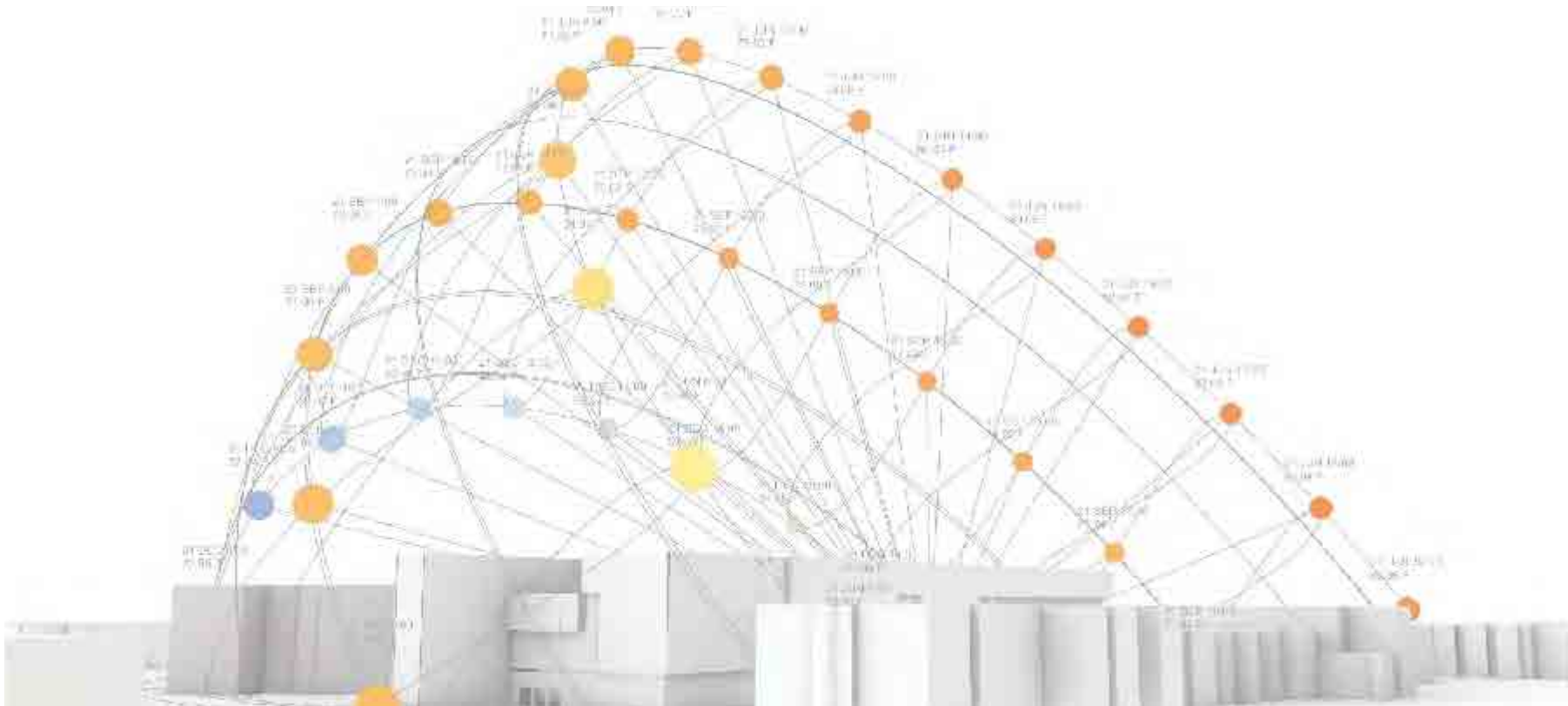
Beyond striving to reach the owner's goal of Net Zero Energy for this building, we are also aligning our pursuit of Net Zero Energy with strategies that will improve the indoor environment from the daylight, thermal comfort, acoustic, and air quality perspectives. Pursuing Net Zero Energy on this project is helping us to also pursue what we call "Net Positive Education"—the creation of a high-performance learning environment that will positively support the health and education of all Banneker High School students, teachers, and staff.

Although the project is still in an early stage of development, we've outlined the current status of how the concept design supports our targets of Net Zero Energy and Net Positive Education in this section.



This photo was taken in a DCPS facility.

solar analysis



The amount of heat from the sun that impacts the building envelope will be a key factor in achieving net-zero energy. If solar heat gain through the building can be reduced, the building's mechanical system can be smaller and require less energy to maintain indoor comfort. In the outdoor play areas, solar heating in the winter and swing seasons will be desired to improve outdoor thermal comfort, while in the summers it should be avoided. Finally, the expanse of flat, unshaded roof area, and the

amount of solar heat hitting this surface, provides the potential for energy generation through the placement of solar photo-voltaic panels on the roof.

Envelope Solar Radiation Impact

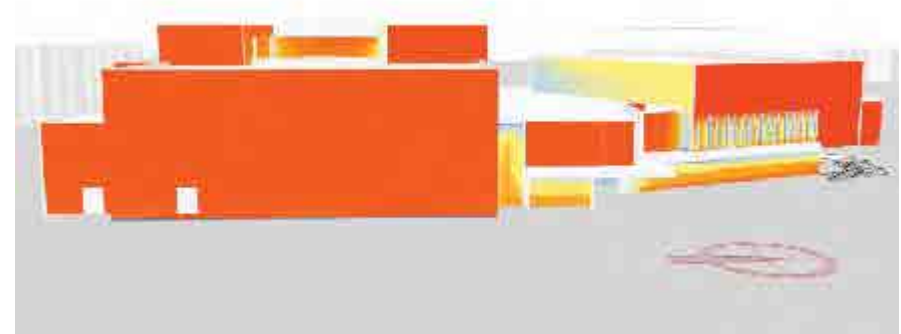


South Facade



SPRING	669,260 kWh	46.24 kWh	FALL	761,601 kWh	54.01 kWh
TOTAL RADIATION: 3,038,800 kWh					
TOTAL RADIATION PER SQFT: 212.44 kWh					

West Facade



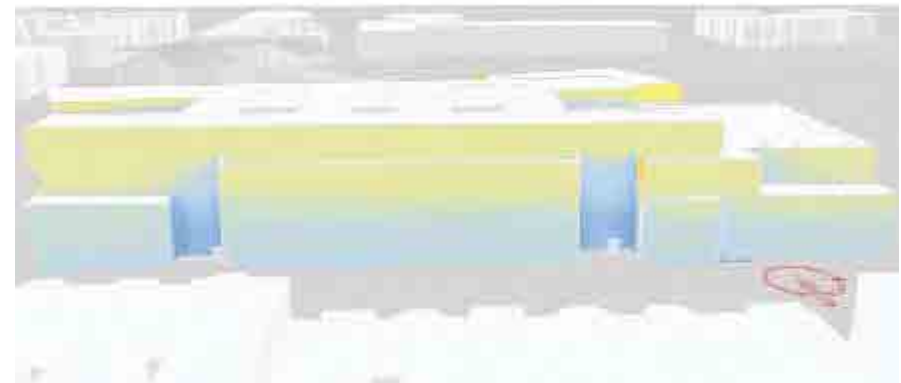
SPRING	295,483 kWh	50.05 kWh	FALL	86,766 kWh	18.36 kWh
TOTAL RADIATION: 803,700 kWh					
TOTAL RADIATION PER SQFT: 142.80 kWh					

East Facade



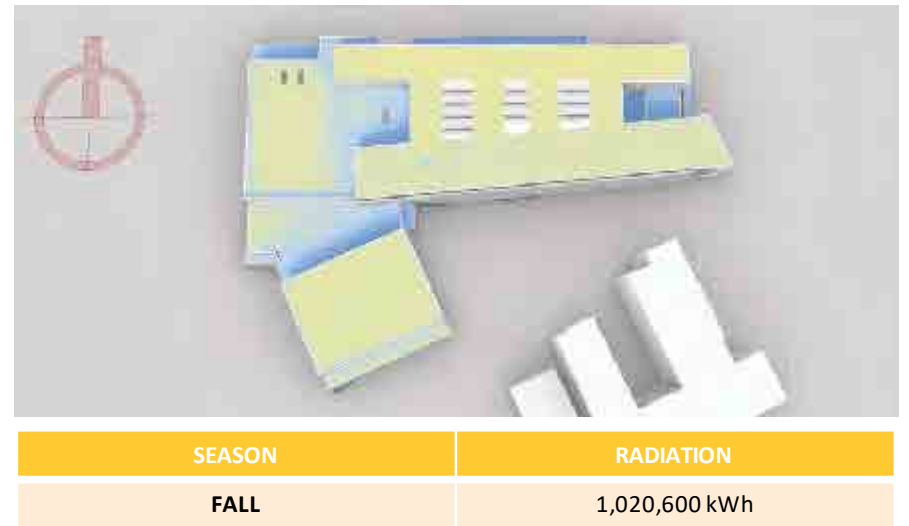
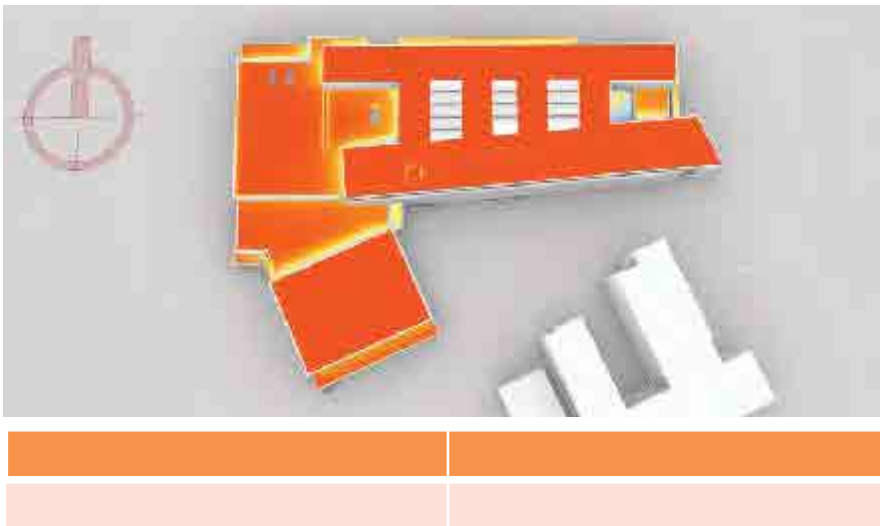
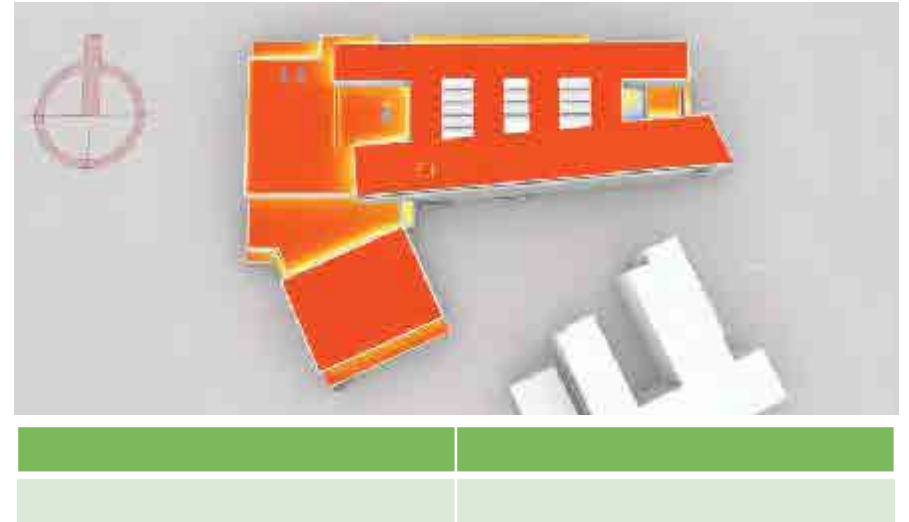
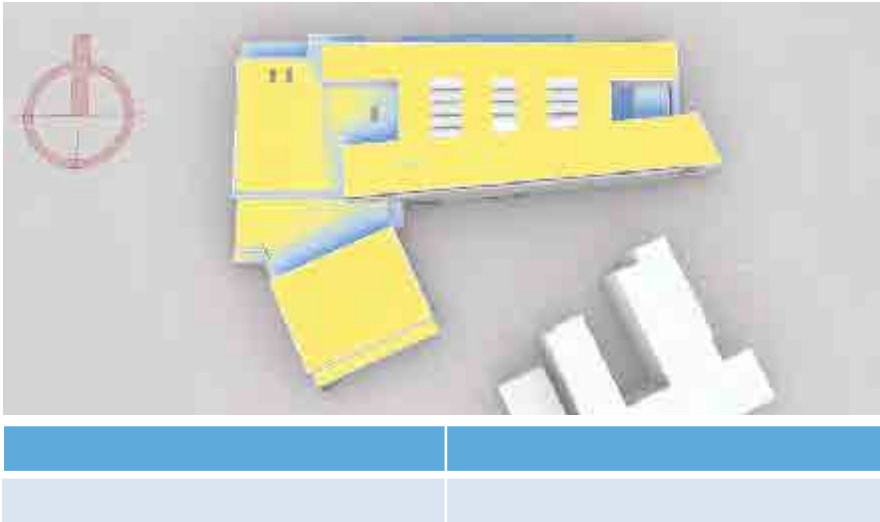
SEASON	RADIATION	RADIATION X SQFT	SEASON	RADIATION	RADIATION X SQFT
WINTER	79,338 kWh	17.18 kWh	SUMMER	205,225 kWh	36.27 kWh
SPRING	205,180 kWh	36.26 kWh	FALL	29,761 kWh	9.67 kWh
TOTAL RADIATION: 919,506 kWh					
TOTAL RADIATION PER SQFT: 99.402 kWh					

North Facade



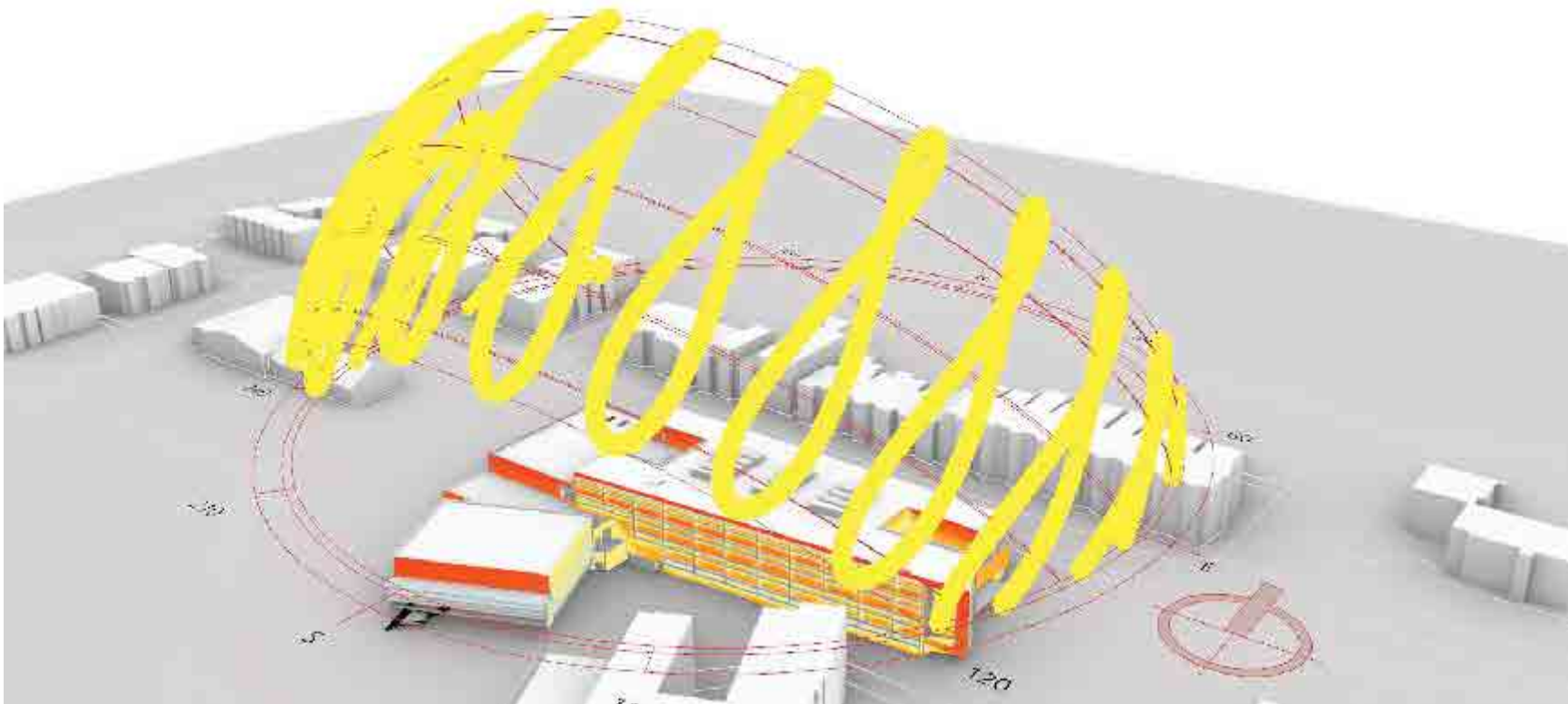
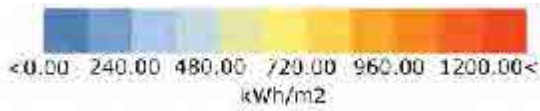
SEASON	RADIATION	RADIATION X SQFT	SEASON	RADIATION	RADIATION X SQFT
WINTER	37,239 kWh	6.30 kWh	SUMMER	176,588 kWh	14.73 kWh
SPRING	221,828 kWh	17.46 kWh	FALL	17,146 kWh	5.08 kWh
TOTAL RADIATION: 852,759.83 kWh					
TOTAL RADIATION PER SQFT: 43.58 kWh					

Solar Energy Potential



solar analysis: conclusions

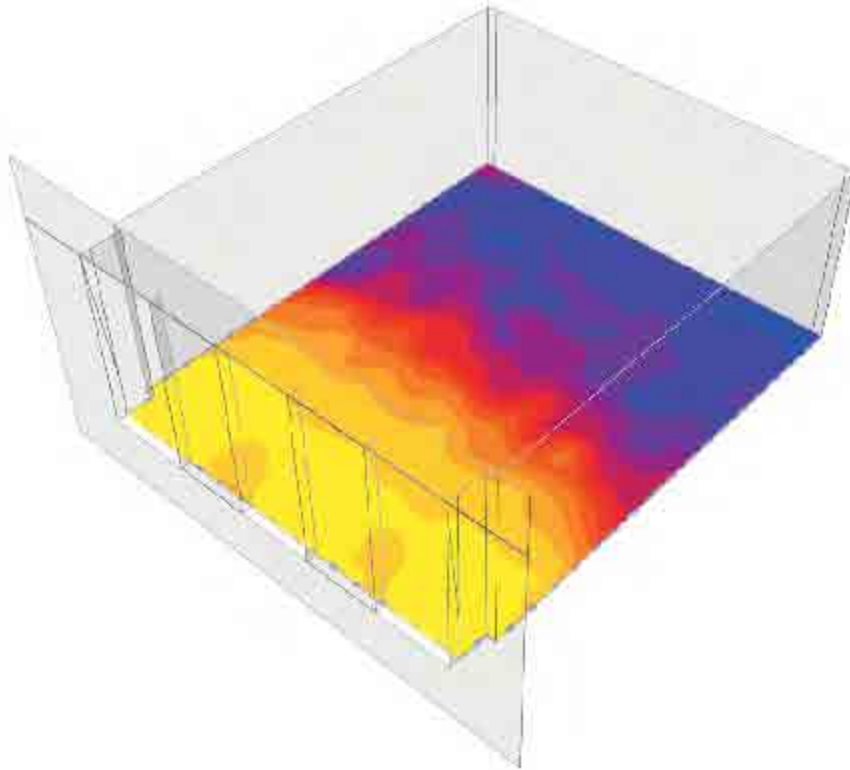
The design is optimized in such a way that solar heat gains are minimized in the summer and spring (cooling season) by limiting solar radiation through self shading and limiting the East and West exposures. The design is also optimized for the winter and fall (heating season), and also manages to capture the highest amount possible of solar radiation on the roof surface for PV generation potential.



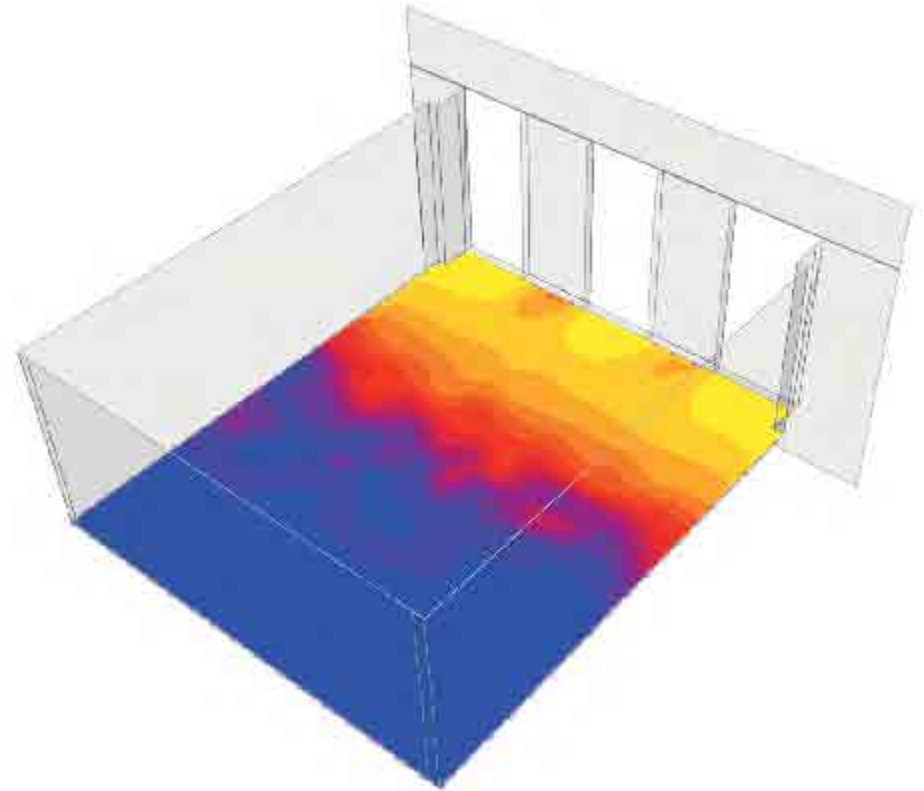
SEASON	TOTAL SUNLIGHT LEVELS	SUNLIGHT LEVELS/SQ.FT.
Winter	1,106,401 kWh	100.4 kWh
Spring	1,391,751 kWh	142.01 kWh
Summer	1,422,393 kWh	144.79 kWh
Fall	895,274 kWh	78.12 kWh
YEARLY	4,814,765 kWh	486.22 kWh

Solar Energy Potential	9,403,600 kWh
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classroom analysis



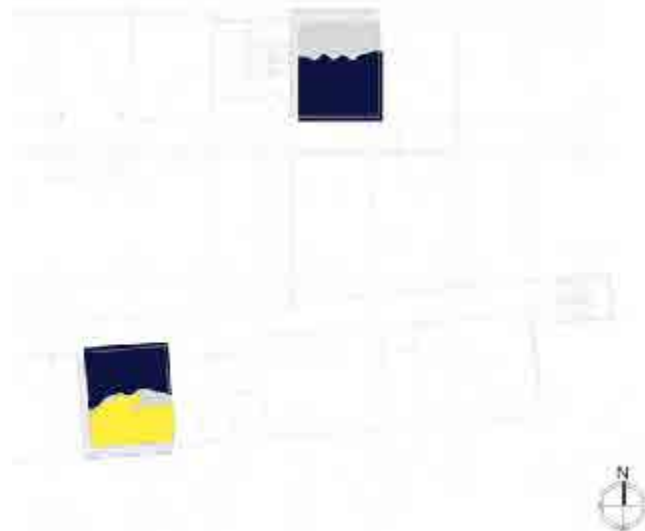
TYPICAL SOUTH CLASSROOM



TYPICAL NORTH CLASSROOM

Massing orientation is a key element to achieving our goal of Net-Zero-Energy and Net Positive Education. By orienting the building properly the amount of useful daylight hours in core learning spaces can be improved, while reducing glare exposure. This will also lead to significant energy savings through reductions in heating and cooling loads. To achieve these targets, classrooms were oriented facing North and South whenever possible.

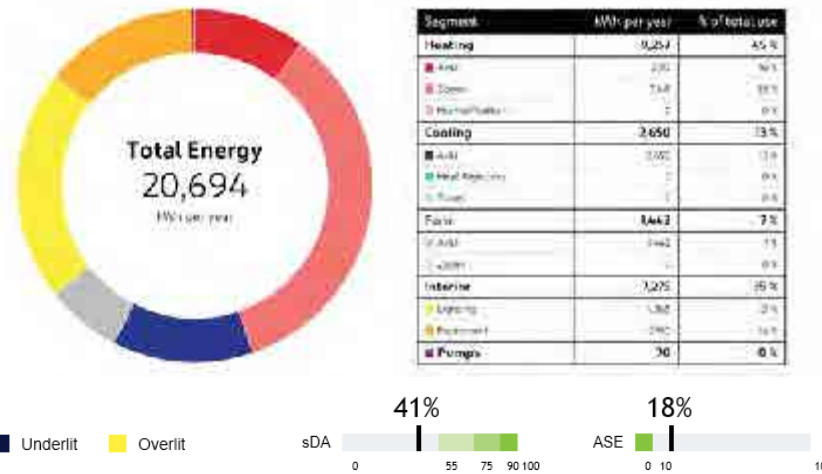
OPTION 1: NORTH + SOUTH CLASSROOMS



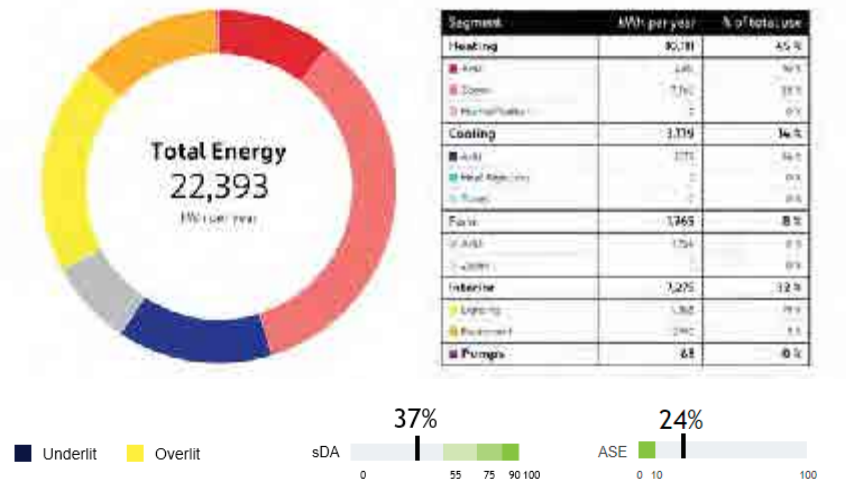
OPTION 3: EAST + WEST CLASSROOMS



Annual Energy Use



Annual Energy Use



The design was developed by orienting the building along the East-West axis (with classrooms facing North/South), allowing for better daylight distribution into classrooms and reduced glare levels and solar heat gains. Orienting the building on the opposite way (along the North-South Axis) would require either interior shades to be pulled for ½ the day (compromising daylight quality and views outdoors) or an extensive exterior shading system to block direct light (compromising views and adding first cost). Finally, this orientation sacrifices energy efficiency and possibly thermal comfort by allowing unwanted heat gains through eastern and western facing glazing, which will compromise the projects ability to achieve Net Zero Energy.

thermal comfort strategies

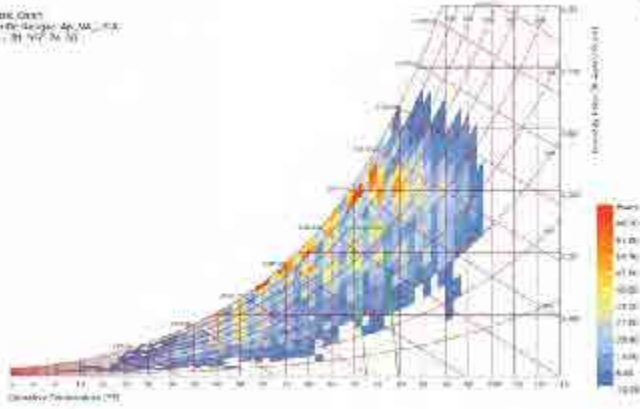
There are several factors that influence thermal comfort, and architecture can play a significant role. The way in which the building is laid out can impact elements such as wind speeds, mean radiant temperature, dry bulb temperature, and the overall thermal sensation of the environment. In a micro-climate urban map, like the one at Banneker, 1°F temperature differentials can have a considerable impact in the thermal comfort of an occupant, and affect the way in which he or she perceives that space throughout the year. It will be important to study options during schematic design for optimizing outdoor and indoor thermal comfort levels during the year to improve the use of the outdoor spaces.

Multiple passive design strategies can have a significant impact in the thermal comfort feeling both inside and outside the building, and might also represent saving in terms cooling and heating loads.



PASSIVE DESIGN STRATEGIES

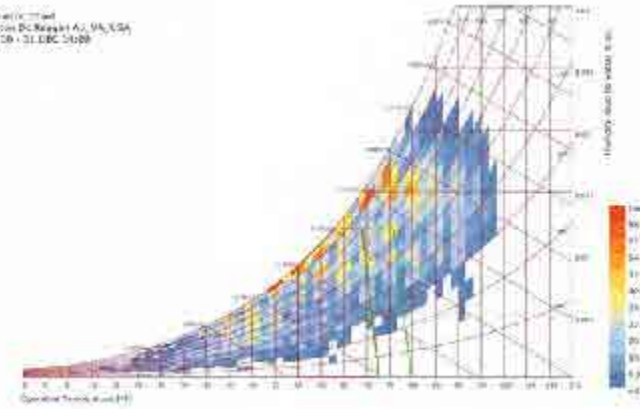
Psychrometric Chart
Washington DC Region, DC, USA
1,740,141 - 31,197,363



TOTAL THERMAL COMFORT: 6%

Comfort - 0%

Psychrometric Chart
Washington DC Region, DC, USA
1,740,141 - 31,197,363

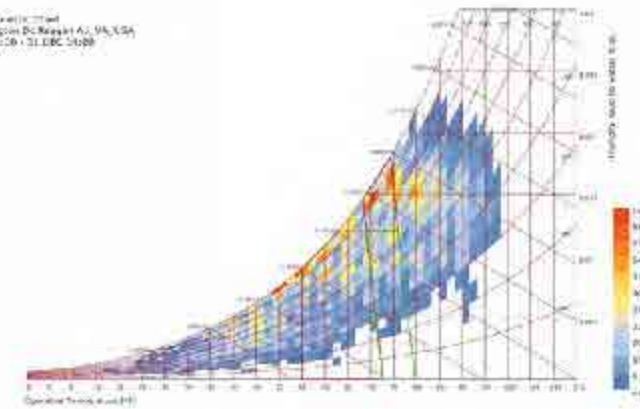


TOTAL THERMAL COMFORT: 28%

Comfort - 67%
Internal Heat Gain - 22.8%



Psychrometric Chart
Washington DC Region, DC, USA
1,740,141 - 31,197,363



TOTAL THERMAL COMFORT: 35%

Comfort - 67%

Internal Heat Gain - 22.8%
Dehumidification Only - 6.9%



TOTAL THERMAL COMFORT: 39%

Comfort - 69%
Thermal Mass - Night Vent - 8%
Internal Heat Gain - 22.8%
Dehumidification Only - 6.9%



STRATEGIES LEGEND



DEHUMIDIFICATION



INTERNAL HEAT GAINS



THERMAL MASS

PSYCHROMETRIC CHART

Although mechanical heating and cooling will still be needed to maintain indoor thermal comfort in this climate, passive design strategies will be employed to reduce the amount of mechanical cooling necessary. While passive cooling strategies such as evaporative cooling, thermal mass and night ventilation, and the use of fans can reduce mechanical cooling needs, the climate predominantly requires heating, so passive heating strategies will be the focus of the architectural design in order to have more impact on energy performance. Passive heating strategies such as utilizing a well insulated and airtight building envelope to capture internal heat gains will provide added comfort for 28% of the year, significantly reducing the need for mechanical heating.

OUTDOOR THERMAL COMFORT

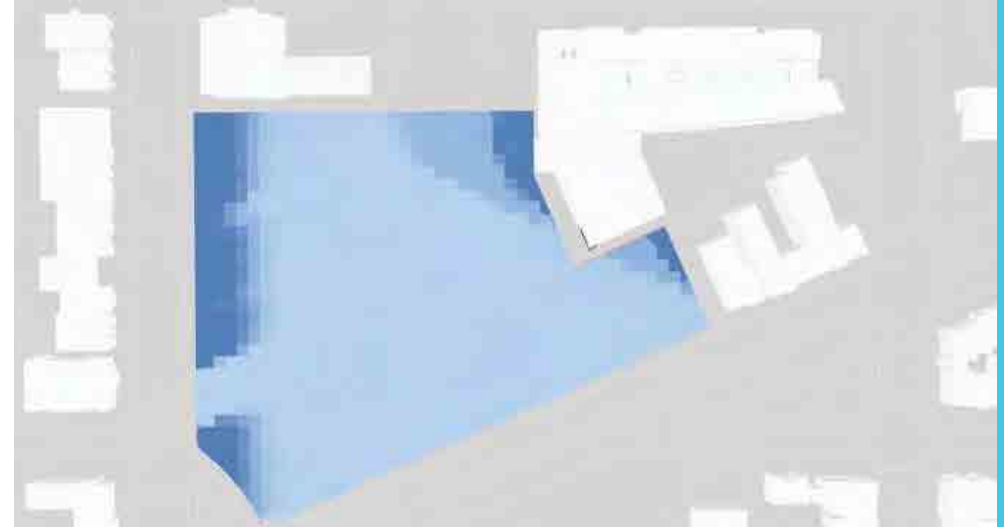
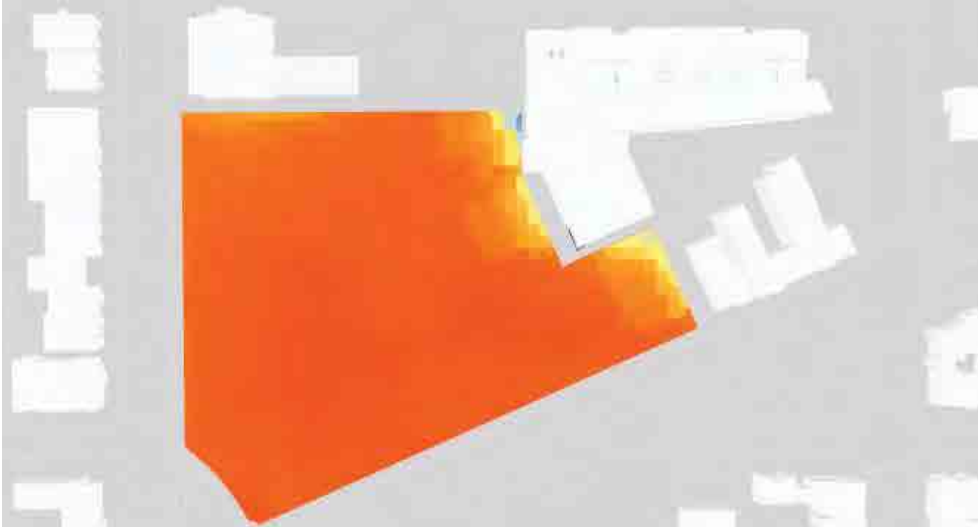
Looking holistically at outdoor thermal comfort (taking into account wind and solar impacts), all the outdoor spaces have very similar thermal sensations. However, there are some areas close to the school building and the surrounding neighbor structures, that have slightly different micro climate maps, by being slightly cooler in the summer and the winter. These areas will provide some thermal comfort during the summer due to the amount of shading they are generating, but will also be thermally uncomfortable during the winter due to the lack of sun during this part of the year.

SUMMER

Thermal Sensation: 83.41 °F

WINTER

Thermal Sensation: 26.68 °F



SUMMER TEMPERATURE SCALE:



WINTER TEMPERATURE SCALE:



LEED Certification

Preliminary Checklist

LEED Project #: 1000119165 Banneker High School

LEED GOLD & BEYOND

The project's LEED checklist shows that the design of Banneker Academic High School is targeting 74 points, well within the LEED Gold range of 60-79. Banneker's strategic location, the goal of Net Zero Energy, and a focus on occupant health and well-being all assist with the achievement of LEED points.

Credits that assist with meeting the project's Net Zero goals, as well as those that focus on occupant health, such as the Pilot Credit for Integrative Process for Health Promotion, have been prioritized. The District has started the process of obtaining a Power Purchase Agreement (PPA) with a power provider to assist in the procurement of photovoltaic panels for the building. The project's goal of Net Zero Energy will make Energy Star certification a highly achievable certification for Banneker High School as well.

There are still an additional 19 points shown as "Maybes" on the LEED checklist, showing that LEED Platinum is well within reach, if the Design Team, Owner, and Contractor choose to implement the additional strategies. The final tally will become more clear as the project wraps up design and moves into construction.





LEED v4 for BD+C: Schools

Project Checklist

Project Name: Banneker High School

Date: 17-Oct-19

Y	?	N			
1			Credit	Integrative Process	1

12	1	17	Location and Transportation		15
		15	Credit	LEED for Neighborhood Development Location	15
1			Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
5			Credit	Surrounding Density and Diverse Uses	5
4			Credit	Access to Quality Transit	4
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

5	4	3	Sustainable Sites		12
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
		3	Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
		1	Credit	Site Master Plan	1
1			Credit	Joint Use of Facilities	1

5	3	4	Water Efficiency		12
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
3	2	2	Credit	Indoor Water Use Reduction	7
		2	Credit	Cooling Tower Water Use	2
	1		Credit	Water Metering	1

28	1	2	Energy and Atmosphere		31
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
6			Credit	Enhanced Commissioning	6
16			Credit	Optimize Energy Performance	16
1			Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
1	1		Credit	Green Power and Carbon Offsets	2

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

8	7	1	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Prereq	Minimum Acoustic Performance	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
1	1	1	Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
	3		Credit	Daylight	3
1			Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

6	0	0	Innovation		6
5			Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

4	0	0	Regional Priority		4
1			Credit	Regional Priority: Optimize Energy Performance	1
1			Credit	Regional Priority: Access to Quality Transit	1
1			Credit	Regional Priority: Bicycle Facilities	1
1			Credit	Regional Priority: Outdoor Water Use Reduction OR Renewable energy product	1

74	19	32	TOTALS	Possible Points: 110
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Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

energy model

ENERGY MODELING COVER SHEET

Project Name: **Buncker High School**
 Project Address: **925 Rhoda Island Ave, NW**
Washington, DC

Energy Model Information

Date of Energy Model: **November 26, 2019**
 Design Phase of Energy Model (choose one): **DD**
 Party Responsible for Energy Model (choose one): **Design Engineer**
 Company: **CMTA, Inc**
 Energy Modeler Name: **Benjamin Hobbs**

Energy Modeling Tool Used: **Trace TRACES 700**
 Climate Zone (choose one): **4A**
 Weather File Used: **Washington, DC**

Source Footage Information

Square Footage (uncondensed space): **157,104** **sf**
 Square Footage (uncondensed space): **8661** **sf**

Energy Results

ECU or Energy Use Intensity in this section is referring to Site EUI, instead of Source.
 Baseline Used: **ASHRAE 90.1-2010**
 Baseline EUI - Defined by the energy model: **66.85** **kBTU/sf/yr**
 CBECs Baseline EUI - Calculated from the Baseline: **66.85** **kBTU/sf/yr**
 Predicted EUI: **20.19** **kBTU/sf/yr**
 Net Predicted EUI - With renewable contributions if applicable: **0** **kBTU/sf/yr**

2030 Commitment

Current Architecture 2030 Target: **15** **%** Predicted Percentage Energy Reduction (with renewables): **75** **%**

Building Envelope Assumptions

Please provide energy modeling assumptions in the following basic table or attach a more detailed input table.

	BASELINE	PROPOSED
Roof R-value (R ² Ft ² /Btu)	21	10
Wall R-value (R ² Ft ² /Btu)	cavity = 21 c.o.t.	cavity = 40 c.o.t.
Effective Wall R-value (R ² Ft ² /Btu)	15.4	28
Ground Floor R-value (R ² Ft ² /Btu)	10	10
Envelope Air Tightness (Airper. of Envelope)	0.1	0.1
Window to Wall Ratio (%)	22.2	22.2
Glazing U-factor (Btu/Ft ² h°F)	0.42	0.3-0.35 (curtain wall)
Glazing SHGC*	0.4	0.23-0.26 (curtain wall)

*If glazing varies by facade, please provide an additional table outlining facade specific glazing values.

Schedule Assumptions

Please explain the energy modeling assumptions in the following basic table or attach a more detailed table explaining the occupancy and scheduling assumptions.

	PROPOSED
Weekday/Typical Operation	Admin 7A-5P; Classrooms 7A-7P; Gym 7A-7P; Kitchen 6A-5P; Au
Weekend/Holiday/Seasonal Operation	Event Modes and Community Use represented in this time for Classr
Occupied Setpoints	72 F Cooling/70 F Heating
Unoccupied Setpoints	80 F Cooling/60 F Heating

Energy End Uses

Please explain the energy modeling assumptions in the following basic table or attach a more detailed table explaining the occupancy and scheduling assumptions.

	BASELINE	PROPOSED
Lighting Power Density (W/sf)	Admin 1.11; Auditorium 2.43; Caf	Admin .8; Auditorium .5; Cafeter
HVAC System Description	VAV w/Reheat and Parallel Fan P	Geothermal WSHP w/DOAS
Plug Load Power Density (W/sf)	0.5	0.5

Please provide a table showing the breakdown of energy end uses for both the baseline and proposed energy models, and a breakdown of energy usage by fuel type (electricity, gas, renewable, etc.).

WELL building standard

THE WELL BUILDING STANDARD

In addition to LEED, other rating systems such as the WELL Building Standard, which focuses on occupant health and wellness, or the Zero Energy Certification, which requires verified Net Zero Energy performance, might be additional standards well within reach for the new Banneker Academic High School.

The WELL Building Standard has three levels of certification, with Silver certification requiring a minimum of 50 points, Gold requiring a minimum of 60 points, and Platinum a minimum of 80 points. The WELL Standard includes design strategies, as well as policy and operations measures. We have completed a preliminary WELL checklist for the Banneker project, which currently identifies 70 achievable points, with an additional 100 potential points that will require further discussion concerning feasibility and alignment with project goals. The current status gives the project a comfortable rating of WELL Gold with the potential to achieve Platinum should we opt to use this additional criteria to help create an extraordinary, sustainable, healthy and high performance learning environment.

We believe that the WELL standard—used formally or informally—could complement the Net Zero energy goals to help us create a healthy, high-performance learning environment and achieve a design for Banneker that achieves Net Positive Education.

Concept	Maximum Available Points	Yes	Maybe	No
Air	18	7	8	6
Water	9	6	3	0
Nourishment	17	6	11	0
Light	14	8	4	2
Movement	20	11	10	6
Thermal Comfort	12	5	0	7
Sound	11	6	3	2
Materials	22	3	18	4
Mind	24	3	17	6
Community	31	9	22	4
Innovations	18	6	4	8
Totals*		70	100	45

*A total of up to 100 points may be submitted for certification
(Between 2-12 points may be earned per concept)

WELL Silver Certification	50 points
WELL Gold Certification	60 points
WELL Platinum Certification	80 points

We all rely on the Earth's natural resources for food, shelter, clothing, transportation, and energy. Some resources are renewable (plants & animals, energy from the sun, wind & water), while others are non-renewable ("fossil fuels" like oil, natural gas & coal).

It is important to conserve our natural resources for future generations. There are many ways we can reduce the size of our environmental footprint:

RESPONSIBLE FORESTRY
 The wood used in this building (in furniture, built-in cabinets, and doors) was grown in sustainably managed forests. These forests have trees of all ages. When a mature tree (20-30 years old) is harvested, a seedling is planted to take its place, beginning the life cycle again.

COOL ROOFING & LANDSCAPING
 Cities are warmer than surrounding rural areas because streets and buildings capture more heat than open land and vegetation. "Cool" white-colored roofs bounce light and heat from the sun back into the sky. Green roofs and trees also help keep the city cool, through shading and evaporation.

THE 3 "R"s: REDUCE, REUSE & RECYCLE
 All of us can find ways to keep trash out of the landfill. You can refill your water bottle at the drinking fountain instead of buying a new one. You can use the back side of your paper to draw on instead of using a new sheet. You can recycle your milk cartons & juice boxes. The building itself is made with many recycled materials, including the steel that holds it up!

WALKING, BIKING & PUBLIC TRANSIT
 "Green" commuting means getting around with a smaller environmental impact. Walking, biking, and taking the bus all use less energy than riding to school in a car. More than half of Washingtonians have a green commute to work or school: 38% take public transportation (buses, trains, etc.), 12% walk, 3% bike, and 5% work from home.

Geographic Labels: north america, south america, north atlantic ocean, south atlantic ocean, pacific ocean, caribbean sea, greenland, europe, africa, north, south, west, east, EQUATOR.

Text Boxes:
 - The Atlantic Ocean covers 20% of the planet's surface. It is the world's saltiest sea. Some animals that live in the Atlantic are whales, dolphins, turtles, sharks, and sea lions.
 - Africa is home to the longest river in the world, the Nile (4,132 miles). It also has the world's largest desert, the Sahara, which is almost as big as the United States.
 - South America is home to the second longest river in the world, the Amazon. The Amazon rainforest is one of the most biodiverse places on earth, with 40,000 plant species and 2.5 million insect species.
 - The Equator is an imaginary circle around Earth. It divides Earth into two equal parts: the Northern and Southern Hemispheres.

Bottom Text: natural resources, reducing our environmental footprint, District of Columbia Public Schools

civil engineering narrative

EXISTING CONDITIONS

The site is located north of Rhode Island Avenue NW and south of R Street NW, between 11th Street NW and 9th Street NW. The property is within Square 336 and 364, comprised of Lots 828, 835, 837, 840, 841 and 842, totaling 6.5 acres. Zoning is primarily RF-1 with a small portion of MU-4 along the 11th Street frontage. The site consists of an existing structure, previously known as Shaw Junior High School, a dog park, a playground and a garden center. Topography is generally flat with a slight fall from west to east. Existing utilities surround the site, including water, storm, sewer, gas and electric.

SITE CONCEPT

Improvements to the site include a new school building located in the northeast corner of the site. Athletic fields and courts will be designed in the southwest portion of the property. Vehicular access and parking will be provided off R Street NW and the existing service alley that connects 9th and Rhode Island Avenue NW. The site layout and programming will be designed to facilitate the needs of students and faculty while also engaging the community with shared space. Some of the public space improvements will include street tree planting, upgraded lighting, and bicycle parking.

UTILITIES

New fire and domestic water connections for the proposed structure will be made to DC Water existing infrastructure. Currently the existing structure is serviced off an existing 8 inch water main in R Street

NW. This location is suited for the new connections as well. Sanitary outfall for the proposed structure can be made to R Street NW or 9th Street NW. There is an existing DC Water easement running west-east and south-north through the site which encompasses a large combined sewer. These existing pipes are required to be carefully protected during construction and there will be certain limitations for development within the easement. The property will have several new storm drain outfalls to convey collected runoff from the site. Storm water management design will comply with the District's new 2019 guidelines. Both retention and detention requirements will be met with green infrastructure, such as bioretention, green roof and/or rainwater harvesting being processed through DCRA. Permit cannot be procured without full SWM approval from DOEE.

STORM WATER MANAGEMENT

This project development is categorized as Major Land Disturbance, requiring a storm water retention volume (SWRV) based on the 1.2 inch storm, per the 2019 SWM Guidebook for the District of Columbia. In addition to the required retention volume on-site, the designed SWM facilities will provide 2-year and

15-year storm control for peak discharge to the pre-development and pre-project rate, respectively.

Land disturbance within the public right of way will be treated to the maximum extent practicable (MEP), following DOEE guidelines set forth in Appendix B.

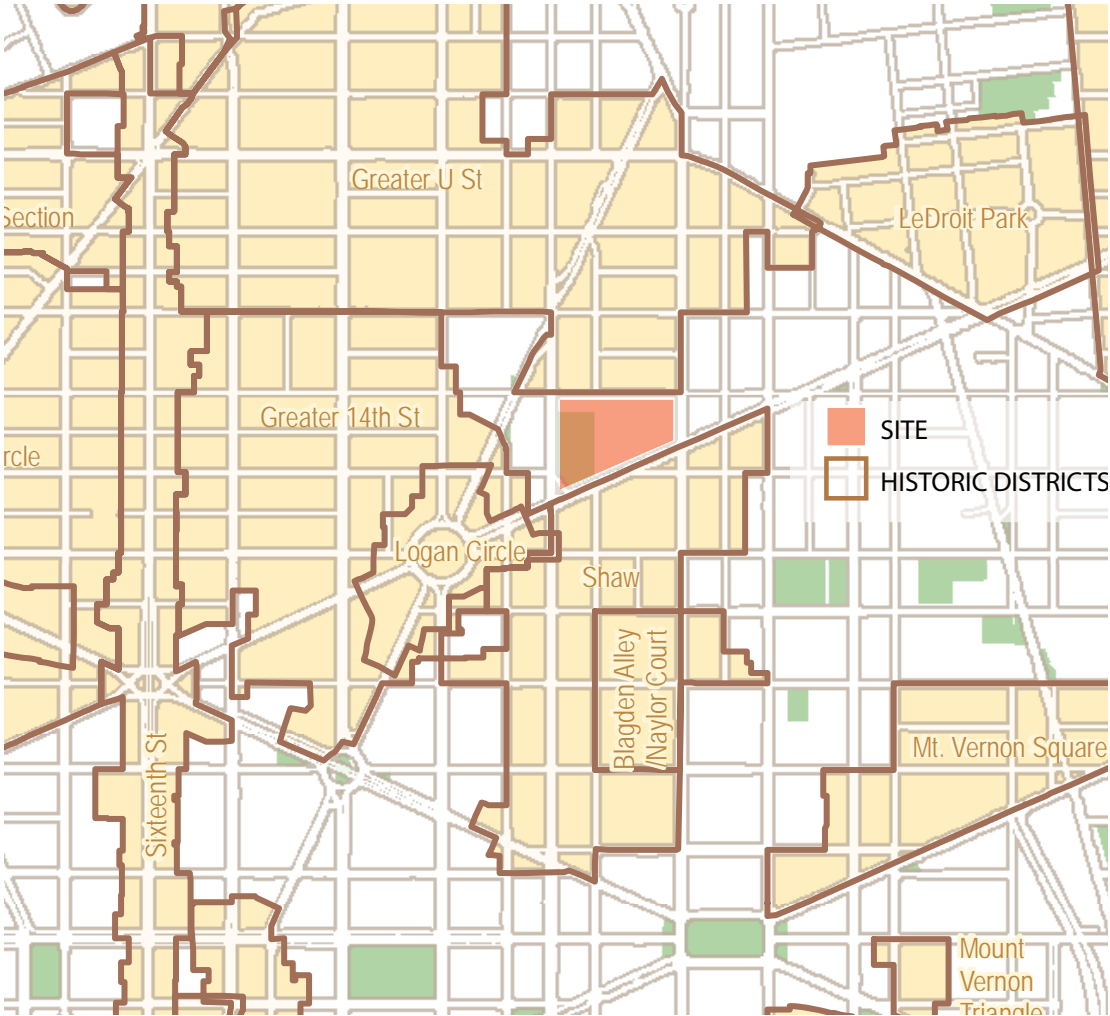
management for this project development will be achieved on site through traditional bioretention areas and tree planting/preservation.

Bioretention adjacent to the parking lot off R Street NW captures roof runoff from the western portion of the building roof as well as sheet flow from the surface parking. The plaza area drains to the bioretention via slot drain running down the center of the plaza.

Bioretention adjacent to the tennis courts captures roof runoff from the middle and southern portion of the building roof as well as the adjacent sidewalk path.

Bioretention adjacent to the public alley captures roof runoff from the eastern portion of the building roof as well as the surface parking and loading/service area.

Overflow inlets and storm drain network for each site drainage connects to the existing public storm sewer system which outfalls toward R Street NW, Rhode Island Ave NW and 9th Street NW.



Surrounding Historic Districts

historical preservation

The site for the new Benjamin Banneker Academic High School is not included in any historic district, but is surrounded by the Greater U Street historic district to the north, the Greater 14th Street and Logan Circle historic districts to the west, and the Shaw historic district to the south and southeast. Due to the close proximity of these districts, the design team has engaged the Office of Planning Historic Preservation Office for feedback, to make sure that the massing, site orientation, and design of the new school building serves as a good neighbor to the historic structures across the street.

At the request of the Office of Planning Historic Preservation Office, a Phase 1A Archaeological Survey was performed. The report indicated a potential presence of pre-Civil War foundations and other building remnants, therefore a Phase 1B Archaeological Survey was considered necessary. The subsequent site work uncovered pottery, a pre-civil war kiln, and several building foundations. Phase 2 and Phase 3 surveys have been performed to further explore the areas with artifact findings, and to further research the inhabitants that worked and lived in that block.

The Historic Preservation Office has also requested that the team acknowledge the historic L'Enfant plan rights-of-way (ROW) for 10th Street NW in the site design, and preserve the view corridors of the former street. The current site plan keeps major built elements out of the ROW and includes a walkway along what would have been the original location of the streets eastern sidewalk. New trees will line the walkway, creating a pleasant pedestrian experience across the site.

