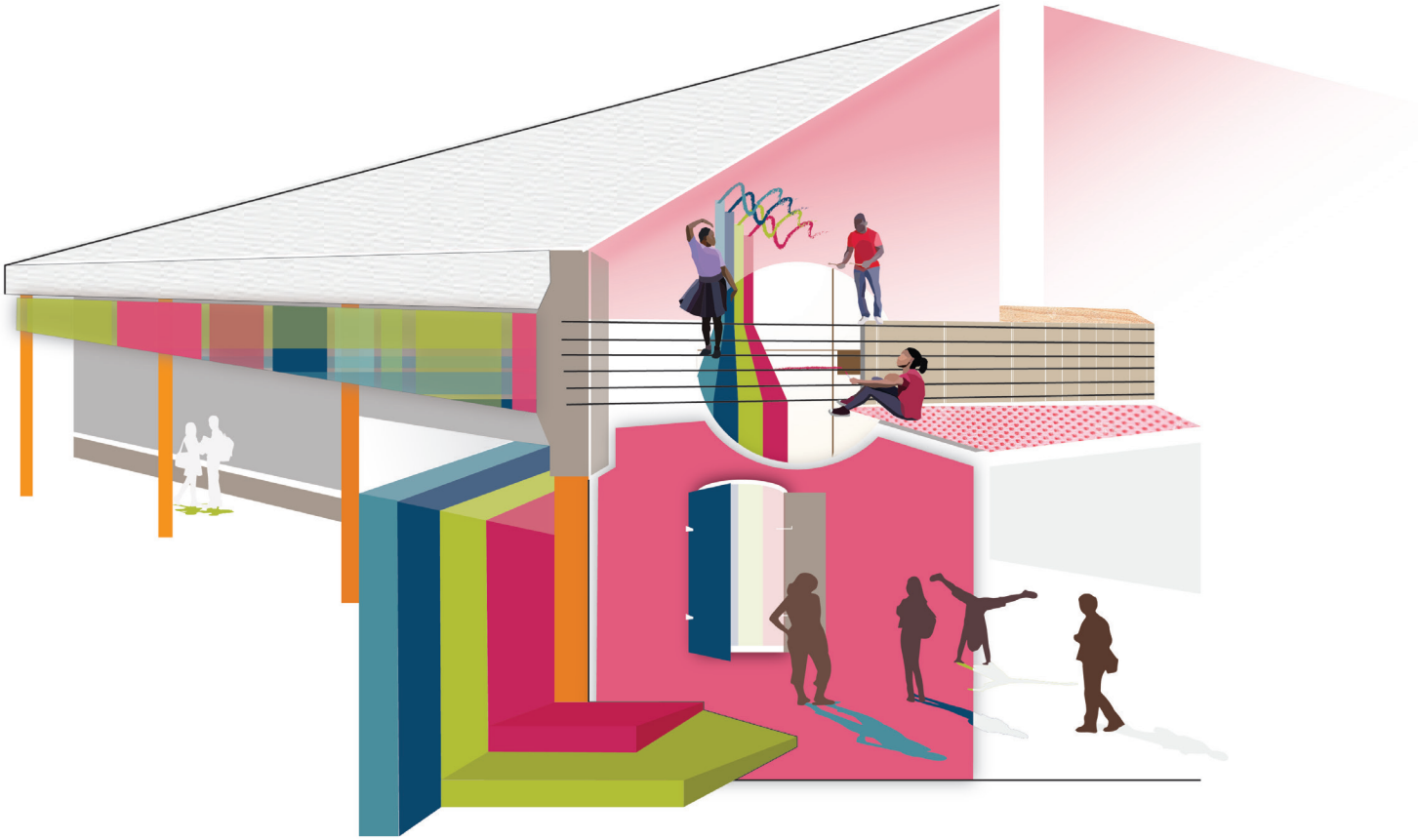

Bridging Documents Design Booklet

St. Croix Central High School A Fine Arts Magnet Program

The Virgin Islands Department of Education embraces ALL students and empowers them to achieve their fullest potential.

www.newschoolsvide.com July 16, 2021

THE VIRGIN ISLANDS DEPARTMENT OF EDUCATION

WITT O'BRIEN'S PART OF THE SEACOR FAMILY

DLR Group

VIDE Student-Focused Goals

Each student, by the end of kindergarten, will be socially, emotionally and academically prepared for learning success.

Each student will meet or exceed their annual targeted growth in core academic subjects.

Each student will graduate with the technology, career, and personal competencies to succeed in careers, college and as citizens in a globally diverse world.

VIDE Organization-Focused Goals

VIDE will model effective, efficient and relevant processes and procedures to build a systemic approach to improving performance so all students will receive a high quality education.

THE VIRGIN ISLANDS DEPARTMENT OF
EDUCATION

Values Statement

The VIDE believes our students are the nucleus of everything we do, and through high quality instruction, ALL students achieve their full-est potential.

We Value...

Active Family & Community Engagement
Adaptability
Commitment
Competency
Continuous Professional Growth
Honesty & Integrity
Passion
Proactivity
Respect for the Unique Culture of the Virgin Islands
Teamwork

Scope & Overview The United States Virgin Islands Department of Education is an executive branch of the Government of the U.S. Virgin Islands mandated under Titles 3 and 17 of the Virgin Islands Code. It is the largest governmental entity in the Virgin Islands and it functions as both a Local Education Agency (LEA) and a State-level Education Agency (SEA). The Department is headed by a Commissioner at the SEA level and a District Superintendent at the two LEAs.

The Department's role as stipulated by Title 3, Chapter 7, Section 96, V.I. Code, encompasses the authority to exercise general control over the enforcement of laws relating to free public education in the Virgin Islands. Its responsibilities include the development, implementation and monitoring of instructional programs for all k-12 students and adult learners, as well as, provision of support services such as child nutrition, pupil transportation, library services, and the maintenance of educational facilities and offices under its purview. Services are provided at 33 buildings supporting 40 activity centers.

It is through the combination of the general budget and federal funds that the Department is able to execute its programs and carry out its mandates under local and federal law. The Department employed a workforce of three thousand, one hundred twenty-four (3,124) employees which accounts for most of the funds received from the General Fund. From October 2009 to the end of FY 2010, there were two hundred eighteen (218) separations territory wide.

In Fiscal year 2010, the Department endeavored to address the needs of the 15,493 students enrolled in the system. 1,176 students territory wide were identified as students with disabilities and 519 as English Language Learners. Of the 1,056 students who were enrolled in 12th grade, 912 earned high school diplomas and an additional 16 graduated with certificates of completion.

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St. Croix Central High School

A Fine Arts Magnet Program

VIDE Bridging Documents

The Virgin Islands Department of Education embraces ALL students and empowers them to achieve their fullest potential.

A New Framework for Education Enabled by Architecture and Design

We need the best for our kids.

When you have a learning environment that is conducive, it's better for our teachers, administrators, and most importantly our students.

Governor Albert Bryan Jr.

The United States Virgin Islands are a group of islands that collectively form a territory of the United States. The main islands of St. Croix, St. John, and St. Thomas support a resident population of approximately 107,000 people. The Virgin Islands Department of Education (VIDE) supports all public schools on the islands, providing resources and leadership for more than 10,000 students territory-wide, across the St. Croix and St. Thomas/St. John school districts.

In June of 2020, the Virgin Islands Department of Education, in conjunction with Witt O' Brien's and DLR Group, completed a comprehensive Educational Facility Master Plan for US Virgin Islands public schools.

The upheaval and devastation of Hurricanes Irma and Maria in 2017 required new conversations around resiliency and student and community needs. Coupled with new funding opportunities provided by the Bipartisan Budget Act of 2018, the VIDE was positioned to plan for the replacement of infrastructure damaged by the storms to meet current industry standards.

The master plan reduced 32 existing educational facility sites to 18 over a span of five years. The modernization of the existing Bertha C. Boschulte 6-8 to a PreK-8 School; the new construction of the Arthur A. Richards PreK-8 School, on the existing Evelyn M. Williams Elementary School site; and the new construction of the Charlotte Amalie High School were the first three projects to progress through design. The Julius E. Sprauve PreK-12 School on the island of St. John, and the new St. Croix Central High School were the next two projects to follow.

Bridging Documents have been developed for each of these facilities, that relate the findings of the master plan to formal, research based architectural design, for pricing studies in coordination with available FEMA funding.

Bridging Documents have been crafted in three parts:

1. **Outline Specifications**
   Technical Requirements

2. **Drawings**
   Design Intent

3. **Design Booklet**
   Design Narratives and Concepts

These documents outline design thinking focused on creating healthy, innovative spaces for teaching and learning, that align with national standards and VIDE values rooted in Equity and Inclusion, Health and Comfort, Resiliency and Systems, and Spaces and Resources.

The outline specifications should be referenced for technical requirements and functional/equipment basis of design. The drawings should be referenced for overall design intent and the design booklet for design narratives and concepts.

High Performance Design and Net Zero Energy

Per the Educational Facility Master Plan, to achieve the VIDE's goal of 14-28 days of function off-grid after a hazard event, new and modernized facilities must be designed to be net zero energy ready.

In order to assess the viability of achieving net zero energy for Bertha C. Boschulte PreK-8 School, Arthur A. Richards PreK-8 School, Charlotte Amalie High School, Julius E. Sprauve PreK-12 School, and St. Croix Central High School, energy models were constructed, various energy conservation measures applied, and the results assessed.

The following list summarizes the variables studied and the assumed values which must be maintained in order to achieve a target EUI of 20-25 KBtu/SqFt/Yr and to meet the projects' net zero goals:

Window-to-wall ratio of 25% window/75% wall

Orientation of the building with long axis east-west

Increased cooling setpoint temperature and setback temperature

Reduction in lighting power density to 0.5 W/SF or less

Reduction in plug load density to 0.75 W/SF or less

Increased r-value in walls and roof (r-19 walls, r-38 roof)

Decreased u-value (.57) and Improved solar heat gain coefficient (.25) in windows

Decreased solar absorptance of roof and walls
Shading over windows equal to 1.5' sunshade on east/south and west

Daylight harvesting lighting sensors

High-efficiency HVAC systems (including VRF system for each conditioned zone)

Passive ventilation strategies in certain areas (spaces not used as classrooms or offices)

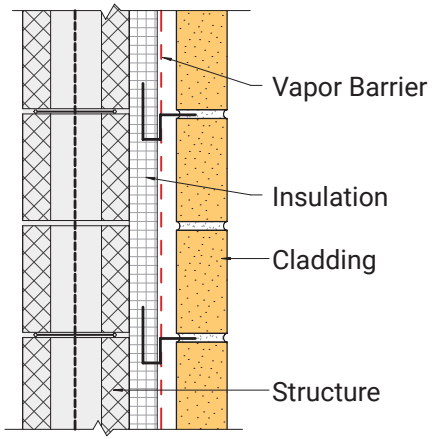
Reduction in air infiltration between outside/inside or conditioned/unconditioned space

All cooling loads have been determined by these variables for exterior wall assemblies and their designs strategically developed with thermal and passive conditioning strategies to balance conditioned and semi-conditioned space. (Reference the Mechanical Narrative in this design booklet for definitions of the assumed conditioning space types and the Conditioned Space Plans in the drawings for design intent.)

In conjunction with the values listed (R/U-values and solar heat gain coefficient,) wall assemblies have been developed to call out exterior insulation and vapor barrier locations that put the dew point, and any potential condensation, outside of wall structures, to minimize potential for mold growth.

Wall Assembly Best Practices:

The dew point should occur outside of the vapor barrier.



If continued design development deviates from the standards established in these bridging documents, the design will require additional performance analysis including hygrothermal analysis (WUFI) and energy load calculations.

Extensive studies in the following categories have informed design strategies for Bertha C. Boschulte PreK-8 School, Arthur A. Richards PreK-8 School, Charlotte Amalie High School, Julius E. Sprauve PreK-12 School, and St. Croix Central High School:

Climate Analysis

Daylighting Analysis

Energy Analysis

Solar Studies

Thermal Comfort Analysis

Reference the High Performance Design Narrative in this design booklet and Division 01 of the outline specifications for required net zero energy objectives and additional supporting data.

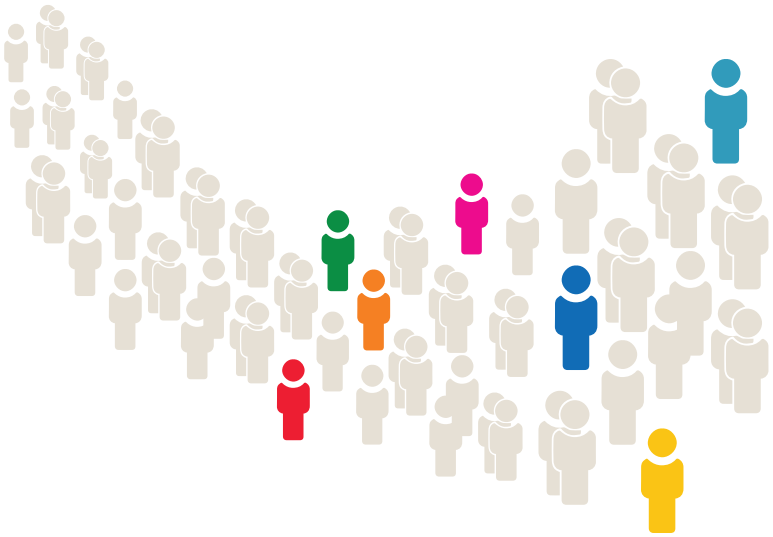
St. Croix Central High School Design Team

Roles and Responsibilities

The work presented in this document reflects the dedication and investment of many contributors.

The Witt O'Brien's/DLR Group team recognizes those invested in this process and appreciates the continued focus and support of each contributor.

United in Pride and Hope.



VIDE Leadership

Racquel Berry-Benjamin ..... Commissioner of Education

Dr. Dionne Wells-Hedrington ..... Ed. D., VIDE Chief Operations Officer

Chaneel Callwood-Daniels ..... AIA, Architect of New School Construction

Joseph Sibilly ..... Territorial Facilities Manager

James Bernier ..... Director of Engineering

Alan Fleming ..... Territorial Project Engineer

Educational Leadership

Through the design process, the DLR Group/Witt O'Brien's design team collaborated with the VIDE to lead focus groups in review of the ideas and strategies that informed this bridging documents deliverable.

Dionne Donadelle ..... Territory Performing Arts Coordinator

Sacha Alexander ..... VIDE Music Educator

Niarus Walker ..... VIDE Visual Arts Educator

Otis Gibbs ..... VIDE Music Educator

WITT O'BRIEN'S
PART OF THE SEACOR FAMILY

Experience is vital when you're responsible for your community's safety and welfare.

We've prepared for and managed all types of disasters, from terrorism and cyber attacks to hurricanes and wildfires. Many of us have done so in government roles.

Our effectiveness is built on front-line experience across national, state, territorial, tribal, and local governments. We're currently helping the US Virgin Islands rebound from back-to-back Category 5 hurricanes in 2017. We've led response and recovery from virtually every major disaster over the past 20 years. We've built resilience in local communities from Hawaii to Virginia, from North Dakota to Texas—and around the world.

www.wittobriens.com

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Ralph Lawrence ..... Director, SME Public Assistance

Tim Snyder ..... SME Construction

Earl Henrikson ..... SME Cost Estimating

Brian Donovan ..... SME Cost Estimating

Yvonne Tseng ..... SME Cost Estimating

St. Croix Central High School Design Team

Roles and Responsibilities

DLR Group

DLR Group is a global design firm specializing in purposeful, sustainable architecture. DLR Group approaches educational design thoughtfully and holistically. Using survey data, pedagogical research, and community engagement, DLR Group creates adaptable, budget-conscious spaces reflective of today's collaborative, forward-thinking learning models.

www.dlrgroup.com

#1 K-12 School Design Firm
Building Design + Construction, 2019

#1
"Education Design"
BD World Architecture 2019

1st
Architectural Firm to win the MacConnell Awards for Innovative School Design 3 Times

100%
Employee-Owned
We're literally invested in your success.

2,000+
School Projects in the Last Ten Years
Total of 18M Square Feet
Total Construction Value: $6.5 Billion

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Paul Kweton, AIA — Architect

Jacob Laha, AIA — Architect

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Jillian Diffee — Interior Designer

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Michael Markley — ITDG: AV Systems Designer

Patrick Barrett, ASTC — Senior Theater Design Specialist

Kascey Haslanger — ITDG: Senior Theater Design Specialist

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David Manley, PE, LEED AP BD+C — ITDG: Senior Acoustician

Logan Pippitt — ITDG: Acoustician

St. Croix Central High School Collaborators:

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Cullen Chapman — Logan Simpson

Alex Buckley — Logan Simpson

Raymond Berkeley — Structural Engineer, Antillean Engineers Incorporated (AEI)

Michael Penn, PE, ENV SP — Civil Project Manager, Stanley Consultants

Jesse Tisdale — Stanley Consultants

Chad Newton — Stanley Consultants

Carly Divine — Stanley Consultants

Luke Green — Contract and Design Specialist, Advanced Foodservice Consulting

Christy Hodnefield — Advanced Foodservice Consulting

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233616	VAV SINGLE DUCT TERMINAL UNITS
233713	DIFFUSERS, REGISTERS & GRILLES
233716	FABRIC AIR-DISTRIBUTION DEVICES
233723	HVAC GRAVITY VENTILATORS
233813	COMMERCIAL-KITCHEN HOODS
236423.13	AIR-COOLED ROTARY-SCREW WATER CHILLERS
237313	CENTRAL STATION DEDICATED OUTSIDE AIR - AIR HANDLER
238219	TERMINAL HEATING & COOLING UNITS - BLOWER COIL UNITS

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260526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
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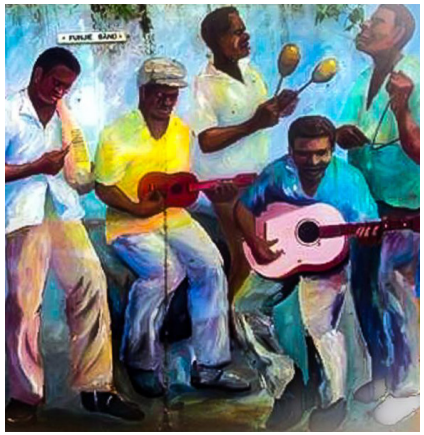
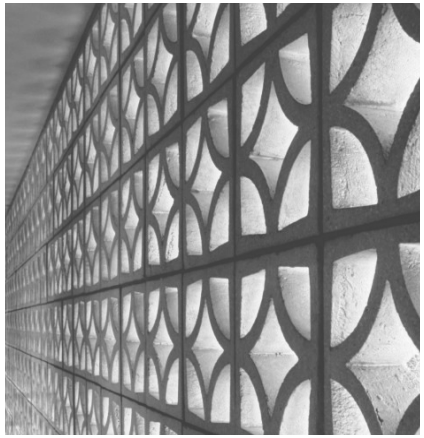
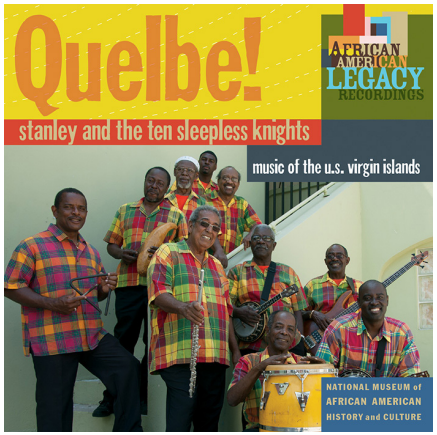
United States Virgin Islands Colors and Textures of St. Croix

Mood Board:: History, Culture, and Colors of the Islands













Vernacular Architecture in the Islands

How has the Educational Facility Master Plan informed design and decision making for these bridging documents?

Design Guidelines for a Vernacular Architecture
Key components of architecture in the U.S. Virgin Islands from a historic perspective.

Guiding Principle:
Cultural, Local and Economic Competence and Resilience

Planning, design and construction efforts will embody cultural, local and economic competence and resilience by:

Vernacular architecture being incorporated into designs

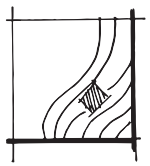
Local and M/WBE participation in design and construction being encouraged and tracked with goals.

Vocational programs and opportunities for certification

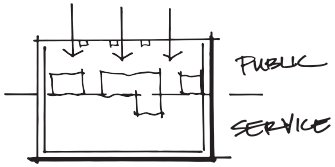
The design of the St. Croix Central High School campus is the result of divergent thinking that explored ways of recreating historic shapes, forms and materials through modern interpretations of key design principles exhibited in the historic Danish architecture of the islands.

Referencing the Educational Facility Master Plan, the design team has integrated elements of the following 10 criteria that reflect historic design principles in the USVI.

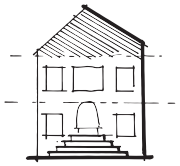
Images Left to Right
1. Christiansted, St. Croix, Credit: Wikipedia Common Media
2. Downtown Christiansted, St. Croix
3. Historic Arcade King Street, Christiansted, St. Croix, Credit: Pinterest: Taller Larjas LLC
4. Claude O. Markoe Elementary School, Credit: DLR Group Site Visit, January 2020.
5. A Typical Colonial 5-Foot Way in Christiansted, St. Croix, Credit: Foodwalkers.com
6. Building Structure in Christiansted, Credit: Foodwalkers.com



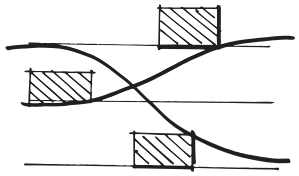
1. Topography & Site Orientation



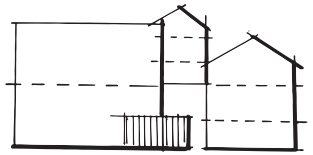
2. A Civic Presence



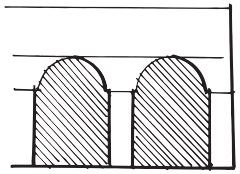
3. An Arrival Sequence



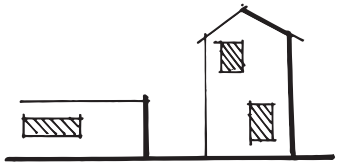
4. Pathways, Patios & Courtyards



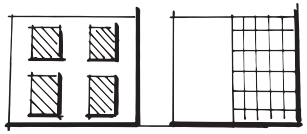
5. Volumes & Forms



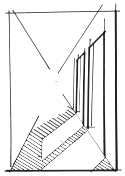
6. Solids & Voids



7. Horizontals & Verticals



8. Punched Openings, Shutters & Curtain Walls



9. Light & Shadow

10. Scale, Materials, Texture & Color

Educational Vision Guiding Principles and Design VALUES

How has the Educational Facility Master Plan informed design and decision making for these bridging documents?

VIDE has a unique opportunity at this crossroads to leverage resources by facing forward.

VIDE's educational vision for the territory is built upon nurturing success in the following areas.[1]

1. **Student achievement**
2. **Organizational culture**
3. **Teacher and leader effectiveness**

The following guiding principles launched the community engagement used to further develop the Educational Facility Master Plan and its recommendations on the number, size, location and programming of USVI Public Schools.

Whole child

Equity

Addressing the needs of all students and integrating technology

Using technology to assess the impact of practices

Health, safety, and security

Cultural, local, and economic competence and resilience

Integrated design, assessment, operation, and management

A Changing Educational Vision for USVI Public Schools:

School as Ignitor

To fully enable the potential of human capital on the island, school must become a place that ignites passion for life-long learning to serve each child holistically.

School as Community

The schools must build community within each campus, each neighborhood, each island, and within the Territories through an equitable use of resources grounded in the local context.

School as Nexus

Only then will schools become a nexus for an economic return using integrated best practices, improved operations, and the use of technology to track impact. A nexus becomes a two-way connection between the school system and the broader community.

Given the funding that is possible for Virgin Islands educational facilities, damaged or destroyed by Hurricanes Irma and Maria... now is the time...to change the footprint of education as we know it, to provide flexible learning and community spaces that support 21st century learning for all students.

Chaneel Callwood-Daniels, VIDE Architect of New School Construction

[1] Chaneel Callwood-Daniels, VIDE Architect of New School Construction
USVI Meetings Summary

VIDE Design VALUES

Collaboration and visioning through the Educational Facility Master Plan informed conversations about the impact of the built environment on the user experience, considering expressed VIDE VALUES through a sustainability lens.

The findings of the master plan identify four key VIDE values that relate to priorities of community, access, flexibility and adaptability, and maintenance.

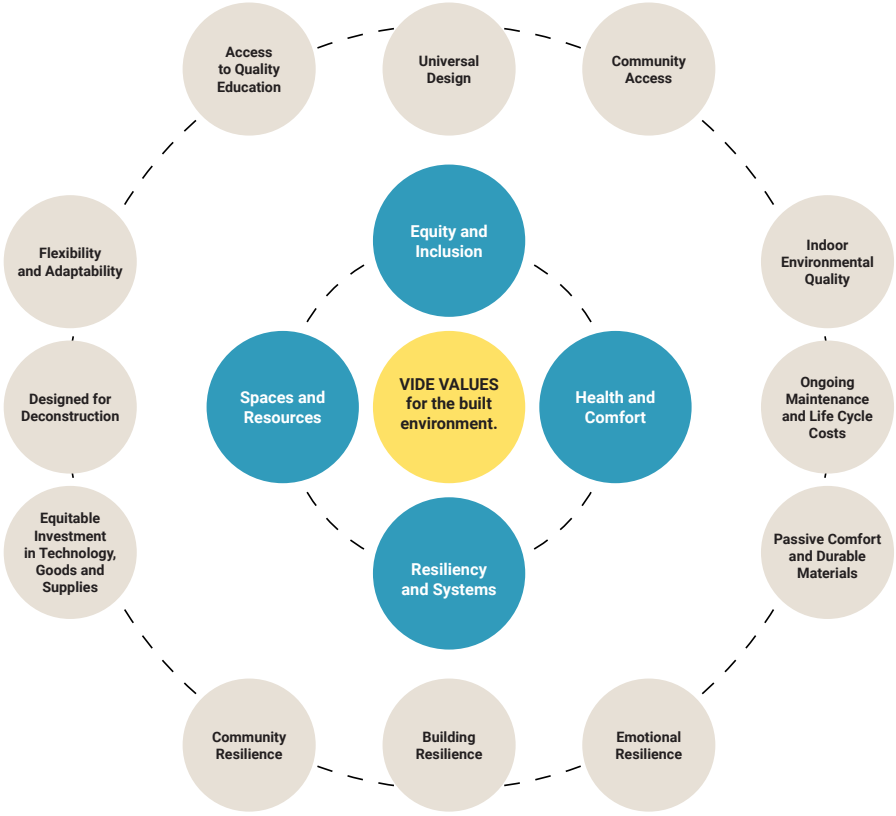
Equity and Inclusion

Health and Comfort

Resiliency and Systems

Spaces and Resources

These values have informed the design process and development of ideas for the new St. Croix Central High School.



Inquiry-Based Learning in the USVI

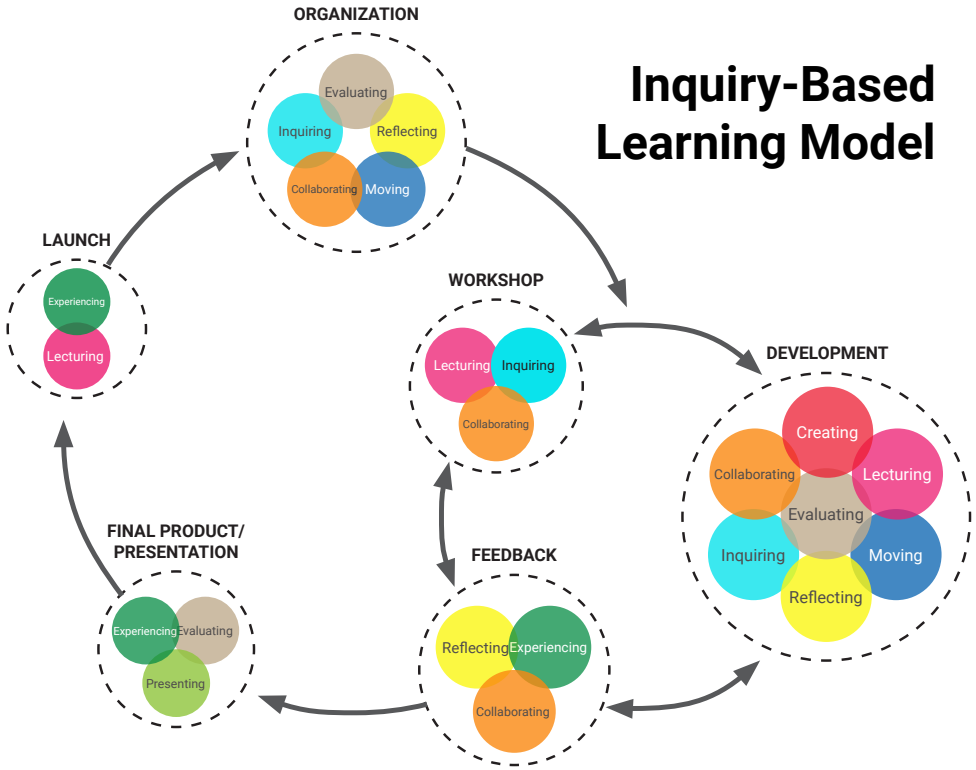
How has the Educational Facility Master Plan informed design and decision making for these bridging documents?

VIDE Teaching and Learning Priorities:

> *What teachers do and how they do it is critically important and has a profound impact on the quality of the educational experience for children. Building a common language and consistency in systems allows for high quality teaching and learning.*
>
> Dr. Marilyn Denison, Educator, Educational Planner at DLR Group

Through the Educational Facility Master Plan visioning process, the VIDE established the following priorities for teaching and learning throughout the territory.

- Inquiry-Based learning
- Authentic/real-world learning
- Interactive technology devices
- Flexible technology
- Outdoor learning
- Easily adapted/changed spaces
- Cyber safety
- Health and wellness/sustainability



Archetypes of Space:

The Educational Facility Master Plan looked to relevant research linking space, human emotional needs, and educational practice, with attention to David Thornburg's Archetypes of Space. These archetypes spurred conversation around serving the whole child through different types of space.

Campfires in Cyberspace
Primordial Metaphors for Learning in the 21st Century

David Thornburg

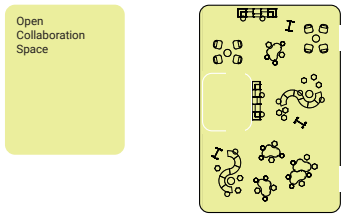
*The sandbox archetype is not original to David Thornburg's Archetypes of Space. It was added by DLR Group to represent places that are designed for discovery and hands-on application.

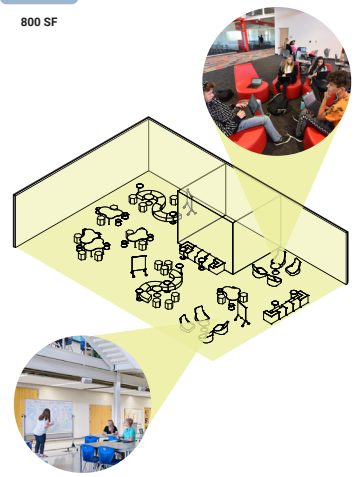
A dynamic form of active learning that begins with inquiry, problems, or scenarios. Students then identify, investigate, and research issues and respond to challenges or complex problems.

An Activity Approach to Programming:

DLR Group facilitated a series of visioning workshops to infuse innovation and research into the VIDE's approved industry standard space programs and identified priorities for teaching, learning, technology, space types, and security throughout the territory.

Open Collaboration Space
SIZE 1,000 SF





Top *Canyon View High School I Waddell, Arizona*
Bottom *Center for Advanced Professional Studies I Overland Park, Kansas*

Enrollment and Capacity

St. Croix Central High School

Enrollment Projections and Capacity Calculations

The overall student population in USVI public schools was drastically affected by impacts of Hurricanes Irma and Maria, and ultimately saw a reduction in enrollment at all age levels. Following the aftermath of the hurricanes, overall island population and student enrollment has started to rebuild, but projections are still significantly lower than the previous all-time highs that drove the build out of many VIDE schools.

The following summary outlines details about existing enrollments and calculated capacities for a representative sample of elementary, middle, K-8, and high school programs.

The functional capacity at the new St. Croix Central High School is 1,000 students and the maximum capacity is 1,200 students.

	2019-2020 Enrollment	**+20%** PreK-8 **+25%** 9-12
St. Croix		
PreK-8 Enrollment	3,741 Students	4,490 Students
9-12 Enrollment	1,742 Students	2,178 Students
SubTotal	5,483 Students	6,668 Students
St. Thomas		
PreK-8 Enrollment	3,738 Students	4,486 Students
9-12 Enrollment	1,705 Students	2,132 Students
SubTotal	5,443 Students	6,618 Students
Total	10,926 Students	13,286 Students

Note: The assumption for a 20% increase in PreK-8 student enrollment is based on overall population growth and an anticipated recapture of students currently attending private schools. A 25% increase was calculated at the high school level. A 10% growth rate was also reviewed in conjunction with phasing and funding considerations.

Guiding Principle

Using Technology to Assess the Impact of Practices

Space will be provided that is adequate in relation to not only enrollment projections, but also suitable to support educational innovation and advancements for 21st century learning environments. Schools are nexus points that shape our communities which in-turn shape our schools. To strengthen this nexus it will be important to collect and maintain relevant data.

Virgin Islands Department of Education

Office of Planning, Research and Evaluation

Public Schools Enrollment by Grade

2019-2020 (2/17/2020)

Districts\Schools	PK	KG	01	02	03	04	05	06	07	08	09	10	11	12	Total
St. Thomas-St. John District		**367**	**359**	**419**	**390**	**409**	**474**	**458**	**474**	**388**	**565**	**399**	**400**	**341**	**5,443**
Jane E. Tuitt Elementary School		42	43	52	35	28	26								226
Joseph Gomez Elementary School		89	79	87	75	93	105								528
Joseph Sibilly Elementary School		25	22	28	34	42	41	45							237
Lockhart Elementary School		79	79	111	90										359
Ulla F. Muller Elementary School		50	60	58	78	64	68	86							464
Yvonne E. Milliner-Bowsky Elementary School		60	60	65	54	61	90								390
Julius E. Sprauve School		22	16	18	24	29	35	23	20	25					212
Bertha C. Boschulte Middle School								170	219	177					566
Addelita Cancryn School						92	109	134	235	186					756
Charlotte Amalie High School											345	241	240	193	1,019
Ivanna Eudora Kean High School											220	158	160	148	686
St. Croix District	**30**	**386**	**380**	**397**	**399**	**430**	**479**	**430**	**429**	**381**	**561**	**393**	**367**	**421**	**5,483**
Alfredo Andrews Elementary School		74	71	60	65	71	84	66							491
Juanita Gardine		49	31	42	38	38	55	37	41	34					365
Claude O. Markoe Elementary School	13	70	56	57	51	67	63	59							436
Eulalie Rivera		49	35	42	43	53	56	48	48	24					398
Lew Muckle Elementary School		33	42	50	63	35	66	44							333
Pearl B. Larsen	17	31	50	36	41	52	40	60	47	45					419
Ricardo Richards Elementary School		40	59	71	65	70	59	75							439
Arthur A. Richards		40	36	39	33	44	56	41	111	90					490
John H. Woodson Junior High School									182	188					370
St. Croix Central High School											277	185	174	187	823
St. Croix Educational Complex High School											284	208	193	234	919
Virgin Islands	**30**	**753**	**739**	**816**	**789**	**839**	**953**	**888**	**903**	**769**	**1,126**	**792**	**767**	**762**	**10,926**

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Image: *Virgin Islands Department of Education Social Media*
St. Croix Educational Complex Marching Band Facebook, January 10, 2017

How have the VIDE's Design VALUES for the built environment informed the solutions and outcomes for the St. Croix Central High School Campus Fine Arts Program?

Equity and Inclusion

Space model that provides distributed space for the arts in every campus building with support for Inquiry-Based Learning at all grade levels.

Site design that provides equitable access to campus resources and outdoor learning.

Health and Comfort

Diversity of spaces for collaboration and respite.

Sustainable design for natural cooling and daylighting.

Resiliency and Systems

Thoughtful use of materials for hurricane resistance and reduced maintenance.

Net zero ready infrastructure.

Spaces and Resources

Flexible spaces that can change to accommodate different arts activities with consideration for large and small scale performance.

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St. Croix Central High School Program Summary

USVI Fine Arts Magnet High School Program | ***Revised 07/15/2021*** | ***900 Target Capacity***

Program Area					Max Capacity	Functional Capacity	Utilization Factor	
1.0	Administration			9,590				
2.0	Core Academic			45,110			*87.5%*	
3.0	Fine Arts Spaces			54,225			*75.0%*	*Other Shared Spaces" @ 50%
4.0	Commons Building			12,825				
5.0	Physical Education, Press Box, and JROTC			25,125			*50%*	
6.0	Building Support			1,950				
	Total Useable Area (Net Square Feet- NSF):			***148,825***	1,200 Students	1,000 Students		
	General Building Area: Walls, Partitions, Mech. Elec., Circulation:	*25% of Net SF*		***37,206***	*(20% of Gross SF)*			
	Total Building Area (Gross Square Feet- GSF):			***186,031***				
	**Additional Covered Outdoor Learning Spaces*	*5% of Net SF*		*7,441*				
	TOTAL BUILDING AREA WITH OUTDOOR LEARNING			**193,473**				

*Based on Industry standards that include outdoor circulation

St. Croix Central High School

	Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement
1.0 Administration				
1.1 Administration Offices				
	Main School Lobby	1	600	600
	Open Office Space	1	1,000	1,000
	Principal's Secretary Office	1	150	150
	Principal Office	1	200	200
	Assistant Principal Office	1	150	150
	Principal's Conference Room	1	250	250
	Conference Room	1	350	350
	Workroom	1	350	350
	Break Room	1	350	350
	SRO Office	1	125	125
	Monitors' Office	1	200	200
	ISS Room	1	450	450
	ISS Restroom	1	75	75
	Toilet	2	75	150
	Security (Technology) Room	1	75	75
	Book Room	1	200	200
	IT Office	1	125	125
	Mother's Room	1	100	100
	Parent Center	1	375	375
	Family Restroom	1	65	65
	MDF	1	150	150
	Subtotal			5,490
1.2 Counselor Suite 1				
	Reception/Waiting (Shared with Health)	1	200	200
	Counselors Office	1	150	150
	Clerk Office	1	150	150
	Registrar Office	1	150	150
	Vault/Records	1	300	300
	Conference Room	1	275	275
	Storage Room	1	100	100
	Subtotal			1,325
1.3 Counselor Suite 2				
	Counselors Office	2	130	260
	Registrar Office	1	145	145
	Conference Room	1	145	145
	Subtotal			550

	Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement
1.4 Health Clinic				
	Waiting (Shared with Counseling)	1	200	200
	Treatment/Cot Area	1	450	450
	Office	1	250	250
	Exam Room	2	100	200
	Storage	1	50	50
	Toilet	1	75	75
	Subtotal			1,225
1.5 Special Education Suite				
	SPED Clerk/Itenerant	1	300	300
	SPED Records Room	1	100	100
	SPED Chair Office	1	200	200
	SPED Office	1	200	200
	Conference Room	1	200	200
	Subtotal			1,000

St. Croix Central High School

Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
2.0 Core Academic							
2.1 Learning Suites							
Learning Suite 1							
Learning Suite 1-- Classroom	9	850	7,650	9	27	243	213
Learning Suite 1-- SPED (Self-Contained Classroom)	1	850	850	1	27	27	24
Learning Suite 1-- Science Lab	2	1,200	2,400	2	27	54	47
Learning Suite 1-- Science	1	1,000	1,000	1	27	27	24
Chem Prep Room	1	200	200				
2D Art Room	1	1,700	1,700	1	27	27	20
2D Art Storage	1	300	300				
Flex Studio	1	850	850	1	27	27	24
Open Collaboration Space/ArtsSpace	1	3,700	3,700	1	27	27	24
Small Group Instruction	1	150	150				
Distance Learning	1	150	150				
Teacher Planning	1	1,025	1,025				
Mother's Room	1	100	100				
Staff Restroom	1	60	60				
Learning Suite Storage	1	325	325				
Learning Suite Storage	1	75	75				
Student Restrooms (Gang)	2	400	800				
Student Restrooms (Private)	2	50	100				
Custodial Closet	1	65	65				
Mechanical	1	350	350				
MEP/ITAV Mezannine	1	350	350				
IDF	1	80	80				
Outdoor Learning Space							

Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
Learning Suite 2							
Learning Suite 2-- Classroom	**9**	**850**	**7,650**	9	27	243	213
Learning Suite 2-- SPED	**1**	**850**	**850**	1	27	27	24
Kitchenette	**1**	**350**	**350**				
Kitchenette Pantry	**1**	**100**	**100**				
Shared Laundry Room	**1**	**100**	**100**				
Restroom	**1**	**200**	**200**				
Learning Suite 2-- Science Lab	**2**	**1,200**	**2,400**	2	27	54	47
Learning Suite 2-- Science	**1**	**1,000**	**1,000**	1	27	27	24
Chem Prep Room	**1**	**200**	**200**				
3D/Ceramics Art Room	**1**	**1,500**	**1,500**	1	27	27	20
3D Art Storage	**1**	**150**	**150**				
Kiln	**1**	**150**	**150**				
Flex Studio	**1**	**850**	**850**	1	27	27	24
Open Collaboration Space/ArtsSpace	**1**	**3,700**	**3,700**	1	27	27	24
Small Group Instruction	**1**	**150**	**150**				
Distance Learning	**1**	**150**	**150**				
Teacher Planning	**1**	**1,025**	**1,025**				
Mother's Room	**1**	**100**	**100**				
Staff Restroom	**1**	**60**	**60**				
Learning Suite Storage	**1**	**325**	**325**				
Learning Suite Storage	**1**	**75**	**75**				
Student Restrooms (Gang)	**2**	**400**	**800**				
Student Restrooms (Private)	**2**	**50**	**100**				
Custodial Closet	**1**	**65**	**65**				
Mechanical	**1**	**350**	**350**				
MEP/ITAV Mezannine	**1**	**350**	**350**				
IDF	**1**	**80**	**80**				
Outdoor Learning Space							
Subtotal			**45,110**			**864**	**749**

St. Croix Central High School

	Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
3.0 Fine Arts Spaces								
3.1 Music								
	Jazz/Chamber Studio	1	1,000	1,000	1	20	20	15
	Storage	1	125	125				
	Practice Room (Option for one to serve as office.)	2	125	250				
	Steel Pan Studio	1	1,100	1,100	1	30	30	23
	Practice Room (Option for one to serve as office.)	2	225	450				
	Choir Room	1	1,400	1,400	1	41	41	30
	Choir Office/Practice	1	100	100				
	Choir Uniform Storage	1	250	250				
	Choir Music Storage/Library	1	250	250				
	Practice Room	1	75	75				
	Distance Learning	1	150	150	1	15	15	11
	Piano/Keyboard Studio	1	1,200	1,200	1	15	15	11
	Practice Room (Option to serve as office.)	1	125	125				
	Piano Storage	1	125	125				
	Piano Room	1	125	125				
	Ensemble Room	1	400	400	1	15	15	11
	Ensemble Room	1	275	275				
	Band/Orchestra Learning Hall	1	2,800	2,800	1	54	54	41
	Percussion Room/Storage	1	550	550				
	Instrument Storage	1	850	850				
	Band/Orchestra Office	1	350	350				
	Band/Orchestra Uniform Storage	1	250	250				
	Band/Orchestra Music Library	1	250	250				
	Teacher Work Center	1	475	475				
	Conference Room	1	150	150				
	Faculty Lockers/Showers	1	125	125				
	Restrooms	2	350	700				
	MEP/ITAV Mezannine	1	1,000	1,000				
	Outdoor Covered Area							
	Subtotal			14,900			54	41

Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
3.2 Visual Arts/Dance							
Dance Studio	**1**	**2,900**	**2,900**	1	41	41	30
Storage	**1**	**325**	**325**				
AV	**1**	**175**	**175**				
Quelbe Dance Studio	**1**	**1,900**	**1,900**	1	30	30	23
*Shares Dance Storage Spaces							
Large Gallery	**1**	**850**	**850**				
Drama Movement Learning Center	**1**	**1,600**	**1,600**	1	27	27	20
AV	**1**	**25**	**25**				
Metals Lab	**1**	**900**	**900**	1	15	15	11
Storage	**1**	**150**	**150**				
Printmaking Lab	**1**	**950**	**950**	1	15	15	11
Teacher Work Center	**1**	**475**	**475**				
Conference Room	**1**	**150**	**150**				
Faculty Lockers/Showers	**1**	**125**	**125**				
Storage	**1**	**200**	**200**	1	30	30	23
Student Art Lockers	**1**	**500**	**500**				
Laundry	**1**	**100**	**100**				
Restrooms	**2**	**350**	**700**				
Custodial	**1**	**75**	**75**	1	30	30	23
MEP/ITAV Mezannine	**1**	**1,000**	**1,000**				
Outdoor Covered Area	**1**	**0**	**0**				
Subtotal			**13,100**			**187.5**	**141**

St. Croix Central High School

Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
3.3 Theater							
Lobby	1	1,200	1,200				
Ticket Booth	1	75	75				
Concessions	1	250	250				
Concessions Storage	1	100	100				
Flexible Performance Theater (Levels 01 and 02)	1	6,800	6,800	1	27	27	20
Stage	1	1,600	1,600				
Retractable Bleacher Storage	1	300	300				
Control Booth	1	250	250				
Lighting Rack Room	1	100	100				
AV Rack Room	1	175	175				
Sound/Light Locks	4	150	600				
Outdoor Stage	1	1,100	1,100				
Outdoor Amphitheater	1						
Scene Shop	1	1,100	1,100				
Stage & Scene Storage (Props & Furniture)	1	500	500				
Tool Storage	1	250	250				
Music Stand Chair and Audience Chair Storage	1	200	200				
Multipurpose Sewing Lab (Costume Lab/Laundry)	1	1,100	1,100	1	27	27	20
Costume /General Storage	1	400	400				
Career Center	1	500	500				
Audio Recording Studio	1	500	500				
Sound Lock Vestibule	1						
Audio Recording Control Room	1						
Audio Recording Booth	1						
Lighting Lab/Sound & Light Storage	1	700	700	1	15	15	11
Artist/Teacher ADA Dressing Room (With ADA Toilet)	1	275	275				
Women's Dressing/Make-up Room	1	500	500				
Women's Lockers/Showers	1	450	450				
Men's Dressing/Make-up Room	1	500	500				
Men's Lockers/Showers	1	450	450				
Audience Restrooms	2	350	700				
Piano Storage	1	75	75				
Custodial	1	75	75				
MEP/IT/AV Support Spaces	1	1,250	1,250				
Subtotal			22,075			69	52

	Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
4.0 Commons Building								
4.1 Shared Resources and Food Service								
	Cafeteria Dining	1	4,300	4,300				
	Outdoor Eating Area							
	Digital Library	1	1,000	1,000				
	Digital Maker Space	1	800	800	1	27	27	14
	Digital Maker Space Storage	1	175	175				
	Distance Learning	1	225	225				
	Serving Area and Kitchen	1	3,100	3,100				
	Grab & Go Serving Area	1						
	Dishwashing Room	1						
	Kitchen Receiving	1						
	Office	1	75	75				
	Dry Storage	1	250	250				
	Walk-In Freezer/Walk-In Cooler	1	525	525				
	Break Room	1	250	250				
	Break Room Toilet	1	50	50				
	Servery Storage	1	175	175				
	Utility	1	125	125				
	Commons Building Restrooms	2	350	700				
	Fire Riser	1	50	50				
	MEP/IT/AV Support Spaces	1	1,025	1,025				
	Subtotal			12,825				

St. Croix Central High School

Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement	# of Teacher Stations	# of Students per Teaching Station	Max Capacity	Functional Capacity
5.0 Physical Education, Press Box, and JROTC							
5.1 Physical Education							
Gymnasium (Primary Shelter)	1	13,225	13,225	1	27	27	14
Concessions	1	200	200				
Restrooms	2	425	850				
Spectator Family Restroom	1	75	75				
Laundry Room	1	100	100				
Custodial	1	50	50				
Womens Locker Room	1	800	800				
Womens Showers/Restrooms	1	250	250				
Womens Coaches Office	1	150	150				
Womens Coaches Restroom	1	75	75				
Mens Locker Room	1	800	800				
Mens Showers/Restrooms	1	250	250				
Mens Coaches Office	1	150	150				
Mens Coaches Restroom	1	75	75				
MEP/IT/AV Support Spaces and Storage	1	3,300	3,300				
Subtotal			20,350			27	14
5.2 Press Box							
Press Box Rooms (10 Seating Positions)	5	125	625	5	27	135	101
Subtotal			625			135	101
5.3 JROTC							
***Existing shooting range to remain. Coordinate any improvements with owner.**							
JROTC Classroom	2	1,000	2,000	2	27	54	41
JROTC Changing Rooms	2	250	500				
JROTC Armory	1	400	400				
JROTC Uniform Storage	1	600	600				
JROTC Office	2	75	150				
Student Restrooms	2	250	500				
Outdoor Drill Space							
Subtotal			4,150			54	41

	Description of Department, Program, or Unit	# of Units	Unit Area (nsf)	Total Area (nsf) Requirement
6.0 Campus Support				
6.1 Utility Building				
	Emergency Electrical	1	875	875
	Electrical	1	550	550
	Mechanical	1	375	375
	Fire Pump	1	150	150
	Subtotal			1,950
7.0 Site				
7.1 Site				
	Parking for 280 (196 Student Spaces and 84 Staff)			
	*24 of which are accessible.			
	Field and Track Grandstand (Seatingfor 500 Min)			
	*Pre-fabricated Utility Building			

**Additional coordination needed in next phase of design to specify a small pre-fabricated utility building for protection of lift station equipment at South end of site.*

St. Croix Central High School

What might these spaces in the program look like?

Open Collaboration Space

SIZE 1,000 SF

Supporting Characteristics
1. Flexible furnishings as affordances supporting choice and control. 2. Include vertical writing surfaces supporting thinking out loud opportunities. 3. Furnishings that have multiple heights encourage postural changes.

Arts/Performance Characteristics

1. Large tables allow for enhanced areas to create art.
2. Open areas for music practice.
3. Near-by storage for supplies.
4. Easily reconfigurable to host variety of impromptu critiques, performances, and rehearsals.

Topeka Center for Advanced Learning and Careers I Topeka, Kansas

Maker Space

SIZE 400 SF

Supporting Characteristics
1. Access to multiple tools encourages personal responses to figuring out solutions. 2. Adding vertical writing surfaces encourages thinking out loud opportunities

Top: *Center for Advanced Professional Studies I Overland Park, Kansas*

Bottom: *Dickinson Middle School I Dickinson, North Dakota*

Missouri Innovation Campus I Lee's Summit, Missouri

St. Croix Central High School

What might these spaces in the program look like?

Outdoor Learning Space

Supporting Characteristics
1. Connections to nature calms the mind and restores a sense of wellbeing.

Arts/Performance Characteristics

1. Visibility to nature inspires creativity.

Classroom

SIZE 850 SF

CAPACITY 25-30 Students

Supporting Characteristics
1. Different configurations allows for student agency over where and how they choose to engage. 2. Providing different venues allows for a range of learning activities from focused to larger-group.

Maury Elementary School I Washington DC

Meeker Elementary School Remodel I Greeley, Colorado

Flex Classroom

SIZE 800 SF

CAPACITY 25-30 Students

Supporting Characteristics
1. Visual connections allows for learning to be on display.
2. Multiple furnishings and vertical writing tools encourage individuals to work in different group sizes.

Arts/Performance Characteristics

1. Increased number of vertical pin-up surfaces allow for impromptu critiques and art shares.

Ottawa High School Additions and Renovations I Ottawa, Kansas

Small Group Space

SIZE 200 SF

CAPACITY 4-6 Students

Supporting Characteristics
1. Small-group spaces encourages learners to dig deeper into particular issues. 2. Adding acoustic properties means active engagement noises are more contained. 3. Adding options to think out loud are important in visualizing ideas.

Arts/Performance Characteristics

1. Bold colors stimulate creativity.
2. Enhanced acoustics offer areas for individual or one-on-one musical practice.

Omaha Central High School I Omaha, Nebraska

St. Croix Central High School

What might these spaces in the program look like?

Science Lab

SIZE 1,000 SF

CAPACITY 27 Students

Supporting Characteristics
1. Lab spaces are high discovery zones, with lots of experimentation. Here permission is given to experiment. 2. Demonstration is key to help students see what there discovery sessions should look like.

Inspiration View Elementary I Colorado Springs, Colorado

Teacher Planning Space

SIZE 450 SF

CAPACITY 10-12 Faculty

Supporting Characteristics
1. A variety of seating and zones for relaxing, planning and collaborating with peers.

Yorkville Teacher Center for Innovation I Yorkville, Illinois

Arts Lab

SIZE 850 - 1,200 SF

CAPACITY 25 Students

Supporting Characteristics
1. Multiple furnishings at different heights encourages learners to move to areas that support what they need to do at that time.
2. Visual changes in heights of furnishings allows for changes in behavior from focused to small-group interactions.

Arts/Performance Characteristics
1. Flexible mobile furnishings allow for individual or group art.

Image Below: *Salina Central High School I Salina, Kansas*
Image Right: *Eastwood High School I El Paso, Texas*

Landscape Narrative

St. Croix Central High School

Landscape Design Objectives:

Develop a plant palette consisting of regionally appropriate, low water use, low maintenance, disease and pest resistant plant materials that are visually interesting and attractive

To develop a theme that: celebrates the performing arts focus of the school, incorporates local and native materials, and works hand in glove with the architecture and civil engineering to create a visually strong project with a unique "sense of place"

To create a school site that is cost effective, easy to maintain and whose visual impact builds off of the architecture and greater site design

To create shade at the nodes where students gather through the use of trees.

To develop a safe, functional and visibly accessible site through landscape view corridors

To use plant materials that are tough enough to resist the stresses inherent to schools

To take advantage of the site's unique location

To celebrate the conditions that make this site unique

Landscape Development Areas:

1. Harmony Walk
2. North Parking Lot/Parent Drop-off/Harmony Promenade
3. Stadium Play Field and Stadium Court
4. Entry Court
5. Harmony Walk Interlude
6. Exterior Gathering
7. Theater Amphitheater
8. South Parking Lot
9. General Landscape Areas

Image: *Virgin Islands Department of Education Social Media*
Ivanna Eudora Kean High School Marching Band Facebook April 1, 2016

The performing arts focus of St. Croix Central High School is reflected and celebrated via the musically themed “Harmony Walk.”

Harmony Walk

The site hardscape, walkways and seating are designed as rectangular shaped “keys” that loosely emulate the keys on a piano keyboard laid out in a loose “sonic wave” pattern. The theme is manifested by juxtaposing the rectangular keys next to one another but offsetting them in such a way that they form a sinuating wave that moves throughout the site. This wave represents both the technical and harmonic sound waves produced by music.

The tempo changes throughout the walk, with the more active “people places” utilizing smaller scale elements in Allegro, or up tempo rhythm and the areas of less activity utilizing larger scale elements in Adagio, or down tempo rhythm.

The keys are stretched and extended into the exterior gathering spaces and buildings throughout the project, symbolizing the magical way that music can unify and bring people closer together.

The hardscape flatwork of the Harmony Walk is intended to be colored via a penetrating stain with vibrant colors in high profile areas and areas of the building entries and more muted colors use throughout the balance of the site. Concrete seat walls will “rise up” from the hardscape bands that represent the darker sharp and flat keys on a piano keyboard and will match the color, texture and finish of those bands.

Landscape will be integrated into the area by creating voids amongst the Harmony Walk keys for the placement of plant material. Shade will be accomplished through the use of shade trees and adjacent building overhangs.

North Parking Lot/ Parent Drop-Off/Harmony Promenade

The parent drop-off has been provided via a dedicated drive separated from the rest of the parking lot. This is intended to minimize pedestrian and vehicle interactions and therefore potential conflicts. Where pedestrians cross the drives, “speed tables’ have been provided to given prominence to foot traffic and to serve as a visual and physical cue.

A pedestrian walkways of a minimum width of eight feet has been provided for students to exit vehicles onto and allow for safe, free movement from the drop-off area and into the campus.

The drop-off walkway leads directly to the entry court, Administrative building and gymnasium and then onto the greater site.

The Harmony Walk theme and landscaping will be extended into the north parking lot in keeping with the project goal of having the user experience start the moment pedestrians and/or vehicles enter the project site. A strong north-south pedestrian spine will be established to create a safe, enjoyable and easily understood procession through the parking lot to the main school campus.

Seat walls provide a place for students to rest as they wait to be picked. Trees will provide shade to make the area more comfortable in the heat of the day.

The site offers an opportunity for a long queuing distance for drop-off eliminating challenges with vehicles backing up onto adjacent streets.

Landscape Narrative Cont.

St. Croix Central High School

Permaculture Gardens

The permaculture garden is located at the end of the main northwest courtyard just south of the gymnasium and serves as the visual terminus to the space.

The design approach for the permaculture gardens will follow the three main ethics provided through the Permaculture Association within the Virgin Islands; including Earth Care, People Care, and Fair Shares.

Permaculture focus points:
1. Sustaining an environment for those to come in future generations; 2. Helping others meet their basic needs of water, nutrition, shelter, etc.; 3. Distribute resources fairly among people, animals and plants; 4. Work with nature – not against it

The gardens will follow the three ethics as guiding principles and the ultimate goals of the gardens will be to propagate native and endangered plants of the US Virgin Islands and endeavor to build an appreciation of native plants among students, staff, parents and the community as a whole.

Built amenities that will be located in the garden are steel frame trellises, raised planter beds, seating nodes and garden paths. An outdoor learning area will provide focused learning opportunities for garden users.

Storage for garden equipment, tools and materials is planned to be accommodated via a small shed located within the garden area.

On-Site Irrigation

No permanent, underground irrigation is intended for this school site. The option of temporary irrigation will be explored later in the design process should concerns arise regarding establishment concerns, etc..

Stadium Play Field and Stadium Court

A full scale stadium play field and track with grandstands are planned at the north of the site, just west of the north parking lot.

The Stadium Court, located south of the stadium and north of the gymnasium, is designed to integrate the stadium with the greater school site as well as serve as an informal gathering space for athletic participants. The Harmony walk theme will be extended into the Stadium Court and turned ninety degrees to give the space an interesting visual twist. The strong north-south connection between the gym and stadium will be reflected in the orientation of the Harmony Walk keys.

Seating in the form of concrete seat walls will be provided in the Stadium Court and shade will be provided via trees. Landscape will be integrated into the area by creating voids amongst the Harmony Walk “keys” in the same manner as the rest of the Harmony Walk.

ADA access and spectator areas are planned in amenity areas for the field.

Entry Court

The entry court receives all patrons to the school coming from the north parking lot and community walkways. All walkways are ADA accessible.

The entry court will be the point of departure for patrons as it collects and then directs them toward the stadium to the west, Administration Building immediately to the east or all other campus destinations to the south.

Enhanced landscape will beautify the entry court and have a passive wayfinding function as it will draw attention to the entry node. Seat walls will offer respite to students waiting for their parents and friends and it's orientation toward the drive will allow students to converse without losing focus on nearby vehicles. Trees will shade this seating area to add to the user's comfort.

Harmony Walk Interlude

The Harmony Walk Interlude is the exterior space set between the Theater and Commons Buildings and while it's at the confluence of a number of different routes of travel through the site, it will offer a lushly landscape respite from the intense activities going on in the adjacent buildings.

The area will be in keeping with the Harmony Walk theme. Bistro style seating along with concrete tiers and benches set amongst the architecture and landscape areas will offer students places to congregate. Architectural shade canopies and adjacent trees will provide shade.

Exterior Gathering

The exterior gathering nodes serve as both information congregating places for students and outdoor classrooms. They are similar in design to the Interlude but their locations on-site in areas off the main path in lower traffic areas make them ideally suited for focused learning.

The hardscape and seating follow the Harmony Walk theme as the keys reach out from the main path to tie in and create these slightly more private nodes. Node seating occurs as portions of the flat and sharp keys rise up to vertical seating height.

Shade will be provided via a combination of trees and adjacent building overhangs.

Node areas are buffered from adjacent buildings by enhanced landscape areas.

The architectural "Follies" are brightly colored, open structures that serve as gathering spaces for creative collaboration, respite and social interaction.

Landscape Narrative Cont.

St. Croix Central High School

Theater Amphitheater

The Harmony Walk keys extend all the way to the west and integrate the Theater Amphitheater, quite possibly through the Theater building. The keys travel up the tiered amphitheater and into the adjacent maintenance drive to the west. The amphitheater is an architectural feature works with the natural grade of the site and is built into the slope of the hill.

The landscape surrounding the stair is intended to create a "nestled" feeling and make the amphitheater space function as both independent outdoor learning space as well as seating focused on the building functions/events taking place in the Theater building directly to the east. Nearby trees will provide shade to patrons as well as partially screening views from adjacent areas and site areas beyond.

South Parking Lot

The South Parking Lot's theme is identical to the north parking lot in that the intention is to extend the Harmony Walk keys out into the lot and create a promenade for users to experience the essence of the project from the moment they pull into the parking lot.

Landscape will be extended into the parking lot, especially along the Harmony Walk keys, in order to make the walk more pleasant.

A gathering node will be created north of the lot as a sort of South Entry Node and it will collect and then disperse users to all campus points north around the site.

General Landscape Areas

The design approach for the General Landscape areas will be to respond to the natural grade of the existing site and further the theme of the Harmony Walk. Trees will help to define open spaces and provide shade in courtyards, gathering nodes and along walkways.

Shrubs, accents and groundcovers will be used in highly visible areas to enhance the user's experience throughout the site. Visual screening will be used in maintenance/"back of house" areas where needed. Areas where the building roof drains are placed will have angular rock or scuppers for efficient drainage on site.

Mature size of plant material is to be considered with the placement of each and every plant.

Low maintenance, disease and pest resistant, durable plant materials are planned to be used in these spaces in keeping with the approach for the rest of the project site.

Nature Park

The design of the area at the southwest portion of the campus is intended to be a "Nature Park". The space consists of curvilinear walks, seat walls and plant material that are unique to the site's linear geometry of the Harmony Walk. The plant material will consist of natural and endangered plants of the US Virgin Islands and will be the landing place for the native plants cultivated in the Permaculture Gardens at the north courtyard of the project.

Trees

Autograph Tree – Clusia rosea
Bay Rum – Pimenta racemose
Black Olive – Budica buceras
Broom Palm – Thrinaz parviflora
Casha – Acacia macracantha
Christmas Palm – Adonidia merrillii
Cigar Box Cedar – Cedrela odorata
Divi-divi – Pinia coriaria
Dog Almond – Andira inermis
Famboyant – Delonix regia
Genip – Melicoccus bijugatus
Gumbo Limbo – Bursera simaruba
Hat palm – Sabal causiarum
Ironwood – Krugiodendron ferrerum
Jamacian Caper – Capparis cynophallophora
Kapak – Ceiba pentandra
Lignum-Vitae – Guaiacum officinale
Locust Berry – Byrsonima lucida
Mammee Apple – mammea Americana
Mango – Mangifera indica
Mangrove – Rhizophora
Maria (Galba) – Calophyllum calaba
Maricao – Byrsonima ‘spicata
Masitc – Pistacia lentiscus
Mesple (Sapodilla) – Manilkara zapota
Monkey No Climb – Hura crepitans
Orange Manjack – Cordia ricksecker
Pink Cedar (Pink Poui) – Tabebuia heterophylla
Queen Palm - Syagrus romanzoffiana
Rose Apple – Eugenia jambos
Royal Palm – Roystonea borinquena
Satinwood – Zanthoxylum flavum
Seagrape – occoloba uvifera
Soapberry – Sapindus saponaria
Sugar Apple – Annona squamosal
Tamarind – tamarindus indica
Tyre Plam – Coccothrinax argentea
Wild Cinnamon – Canella winterana
Willow Bustic – Dipholis salicifolia
Yellow Cedar – Tecoma stans
Yellow Prickle – Zanthoxyllum monophyllum

Understory

Bougainvillea – Bougainvillea
Bougainvillea “Miss Alice – Bougainvillea glabra
Bread and Cheese – Pithecellobium unguis-cati
Catch and Keep – Acacia retusa
Century Plant – Agave missionum
Christmas Bush – Comocladia dodonaea
Dog Caper – Capparis flexuosa
Frangipani – Plumeria
Ginger Thomas – Tecoma stans
Goatbuch – Castela erecta
Guinea Grass – Panicum maximum
Haiti Haiti – Thespesia populnea
Hand Leaf – Anthurium cordatum
Hibiscus – Malvaceae
Inkberry – scaevola plumerieri
Liana Fragante – Distictis lactiflora
Lobster-Claws – Heliconia
Locustberry – Byrsonima lucida
Night Blooming Cereus – Selenicereus Grandifloras
Prickly Pear – Opuntia dillenii
Sea Lavender – Argusia gnaphalodes
Sea Ox-Eye – Borrichia arborescens
Sea Purslane – Sesuvium portulacastrum
St. Croix Agave – Agave eggersiana
Turk’s Cap – Melocactus intortus
Wattapama – Poitea flordia
White Maran – Croton discolor
Wild Marrow – Croton astroites
Wild Plantain – Heliconia caribaea
Wild-Sage Lantana – Lantana involucrate
Wooly Nipple Cactus – Mammillaria nivosa

Cynodon datylon - “Midlron” Bermudagrass Turf

* Owner to verify that plants with thorns/sharp tips are approved for use on this project.

USVI Plant Palette Trees


Autograph Tree
Clusia rosea

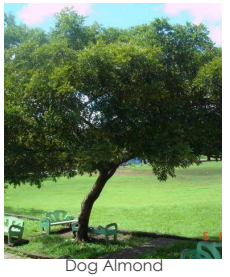

Bay Rum
Pimenta racemosa

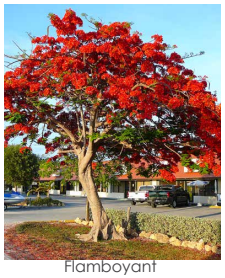

Black Olive
Budica buceras


Casha
Acacia macracantha

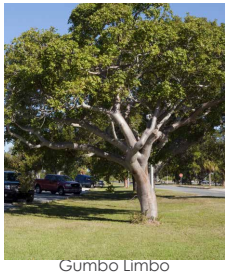

Cigar Box Cedar
Cedrela odorata


Divi-divi
Pinia coriaria


Dog Almond
Andira inermis


Flamboyant
Delonix regia

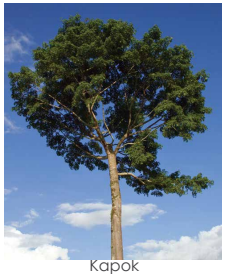

Genip
Melicoccus bijugatus


Gumbo Limbo
Bursera simaruba


Hat Palm
Sabal causiarum


Ironwood
Krugiodendron ferreum


Jamacian Caper
Capparis cynophallophora

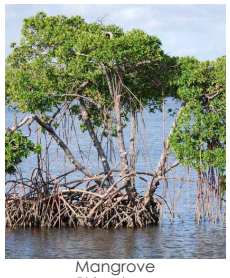

Kapok
Ceiba pentandra


Lignum-Vitae
Guaiacum officinale

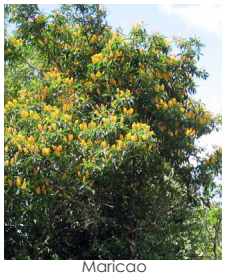

Locust Berry
Byrsonima lucida


Mammee Apple
Mammea americana


Mango
Mangifera indica


Mangrove
Rhizophora

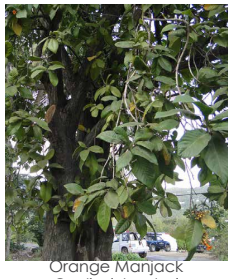

Maria (Galba)
Calophyllum calaba


Maricao
Byrsonima 'spicata


Mastic
Pistacia lentiscus


Mesple (Sapodilla)
Manilkara zapota


Monkey No Climb
Hura crepitans


Orange Manjack
Cordia ricksecker


Pink Cedar (Pink Poui)
Tabebuia heterophylla


Rose Apple
Eugenia jambos


Royal Palm
Roystonea borinquena


Satinwood
Zanthoxylum flavum


Seagrape
Coccoloba uvifera


Soapberry
Sapindus saponaria


Sugar Apple
Annona squamosa


Tamarind
Tamarindus indica


Tyre Palm
Coccothrinax argentea


Wild Cinnamon
Canella winterana


Willow Bustic
Dipholis salicifolia


Yellow Prickle
Zanthoxylum monophyllum

USVI Plant Palette Undercover


Bougainvillea
Bougainvillea


Bougainvillea "Miss Alice"
Bougainvillea glabra


Bread and Cheese
Pithecellobium unguis-cati

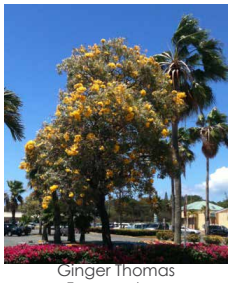

Catch and Keep
Acacia retusa


Century Plant
Agave missionum


Christmas Bush
Comocladia dodonaea


Dog Caper
Capparis flexuosa


Frangipani
Plumeria


Ginger Thomas
Tecoma stans

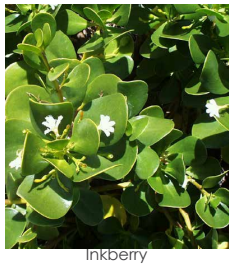

Goatbush
Castela erecta


Guinea Grass
Panicum maximum


Haiti Haiti
Thespesia populnea


Hand Leaf
Anthurium cordatum


Hibiscus
Malvaceae

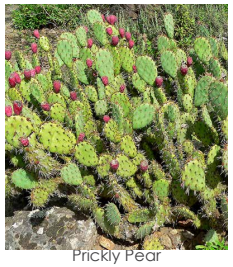

Inkberry
Scaevola plumerieri


Liana Fragante
Distictis lactiflora


Lobster-Claws
Heliconia


Locustberry
Byrsonima lucida


Night Blooming Cereus
Selenicereus grandiflorus


Prickly Pear
Optunita dillenii


Sea Lavender
Argusia gnaphalodes


Sea Ox-Eye
Borrichia arborescens


Sea Purslane
Sesuvium portulacastrum


St. Croix Agave
Agave eggersiana


Turk's Cap
Melocactus intortus


Wattapama
Poitea flordia


White Maran
Croton discolor


Wild Marrow
Croton astroites


Wild Plantain
Heliconia caribaea


Wild-Sage Lantana
Lantana involucrata


Woolly Nipple Cactus
Mammillaria nivosa

Site Athletics Narrative

St. Croix Central High School

Overview

The athletics and outdoor learning play areas are key for physical fitness, social and physical health and awareness of the environment. The following summarizes the outdoor sports and features and amenities to be included within those program spaces. These spaces are being coordinated with the indoor learning spaces to create strong connections to the outdoor learning studios and athletics. The high school athletics program will meet National Federation of High School Standards (NFHS) and be used for competition for a variety of sports. Refer to the following plans and precedent images that reflect the design intent for these amenities. Site areas needed for these types of spaces need to be fairly level with slopes of 0.6% to 1.5% percent maximum.

Site Program

Athletic Fields, & Outdoor Learning Studios.

*Refer to Schematic Site Plan and site sections for layout.

-Building Relationships
-Athletic Fields
-Outdoor Learning Studios
-Outdoor spaces shall have a direct relationship to the indoor learning studios.

8-lane 400 Meter Competition Running Track.
Design to NFHS standards.

a. Pole Vault
b. Long/Triple Jump
c. High Jump
d. Discus Sector (throw onto the turf football field)
e. Shot Put Sector (not shown due to limited site area)
f. Track Section: Provide 6-inch asphalt track section over 6" compacted aggregate.
g. Track Surfacing: Use the District's preferred ½-inch thick poured-in-place polyurethane resilient surfacing equal to Beynon Sports system BSS 1000 which is an impermeable shock absorbing cushion with SBR rubber granules.
h. Track Drainage: Provide a linear slotted track drain system with matching in-line catch basins around the inside perimeter of the track. The slot drain system will connect to the site storm system.

Multi-Use Athletic Field

a. Football/Soccer: Construct a regulation field size of (160' x 360') for football and a minimum field size of (165' x 355') for regulation soccer.
b. Softball: Due to site space limitations, the softball field striping markings are shown to be overlaid on the larger turf field.
c. Synthetic Turf Field: Provide a 2.25-inch dual fiber (50% monofilament and 50% slit film) over a 6-inch depth of drainage aggregate, over filter fabric, over a compacted and stabilized subgrade. The drainage system will consist of perforated HDPE panel drains and round pipe extending to the storm system. The field will be crowned at the field centerline and sloped at a minimum of 0.60% to a maximum of 1.0% percent.
d. Provide 4-feet high PVC-coated black chain link perimeter fencing around the field.
e. Field Lighting: Playfield will not be lighted but can have lighting added in the future if needed.
f. Scoreboard: Provide a multi-sport scoreboard and control console located in the press box.
g. Football Play Clocks: Locate at each end of the playing field. Will be controlled with the scoreboard system from the press box control console.
h. Goals: A combination football and international style soccer goal system will be provided.
i. Ball Netting: Provide posts and ball net system that can be raised and lowered to intercept football field goals and shots on the soccer goal. Netting would be accommodated within the "D" area of the track.
j. Drainage: The playfield will be surface drained via sub-drainage collector piping to a series of swales and storm inlets at the perimeter of the field. Alternate for synthetic turf, turf field will have a 5-inch thick aggregate drainage layer and subdrain system to positively drain the field into the storm system.
k. Sports Field Lighting (LED). Lighted to 50-foot candles average minimum per NFHS.
l. Outdoor Sound Reinforcement (speakers on building and on field light poles).
m. Provide power and cable to support TV/Camera/Radio broadcasting.
n. Track Storage Building: Provide 20-30 feet building-600-SF for field maintenance equipment and track mats and equipment storage.
o. Provide 4-feet high PVC-coated black chain link perimeter spectator and security fencing around the field.

3. Stadium Amenities

a. Seating: Provide a 500-seat minimum grandstand comprised of cast-in-place learning steps into the hillside. Use for sports spectators and possible outdoor learning stair.
b. Grandstand Construction Type: Reinforced cast-in-place concrete learning steps with surface mounted composite seat cap.
c. Press Box: Assume 10 seating positions and counter space for 4-Coaches, 2-Scorekeeper/Sound control, and 4-Press personnel. Provide equipment for sound and lighting control.

Electrical:
Provide electrical service and cable to the playing field surface.

Illustrated Site Plan

St. Croix Central High School

Exterior Space/Structure List

Accessible Parking and Ramps

Drop-off Pedestrian Spine with “Harmony Walk” Tie-In

Entry Court with Shaded Seating

Gym and Stadium Courtyard with Shaded Seating

Design Inspiration

“Meet me underneath
Our tree. The palm.
You will know her.”
She sheltered our eyes
She weathered the seas
She remembers our voices
Our trespasses, our vigils.

She reminds us of
everything.

Winifred “Oyoko” Loving
Creative Callaloo I Danica M. David

”Harmony Walk” themed hardscape walkways and courtyards. Walkway “Keys” are a metaphor for piano keys laid out in a sound wave pattern. Key rhythms alternate in scale to produce zones of “Allegro” fast, and “Adagio,” slow.

Harmony Walk elements integrated into interior architecture.

Outdoor Learning/Gathering Spaces (Small and Large)

Maintenance and Emergency Vehicle Access Road

“Park” Like Setting in South Courtyard Area.
Area focuses on native and endangered plants of St. Croix.

Parking Lot (196 Student Spaces and 84 Staff Spaces)

Accessible Parking Spaces with adjacent speed table access to the rest of the site at North/South.

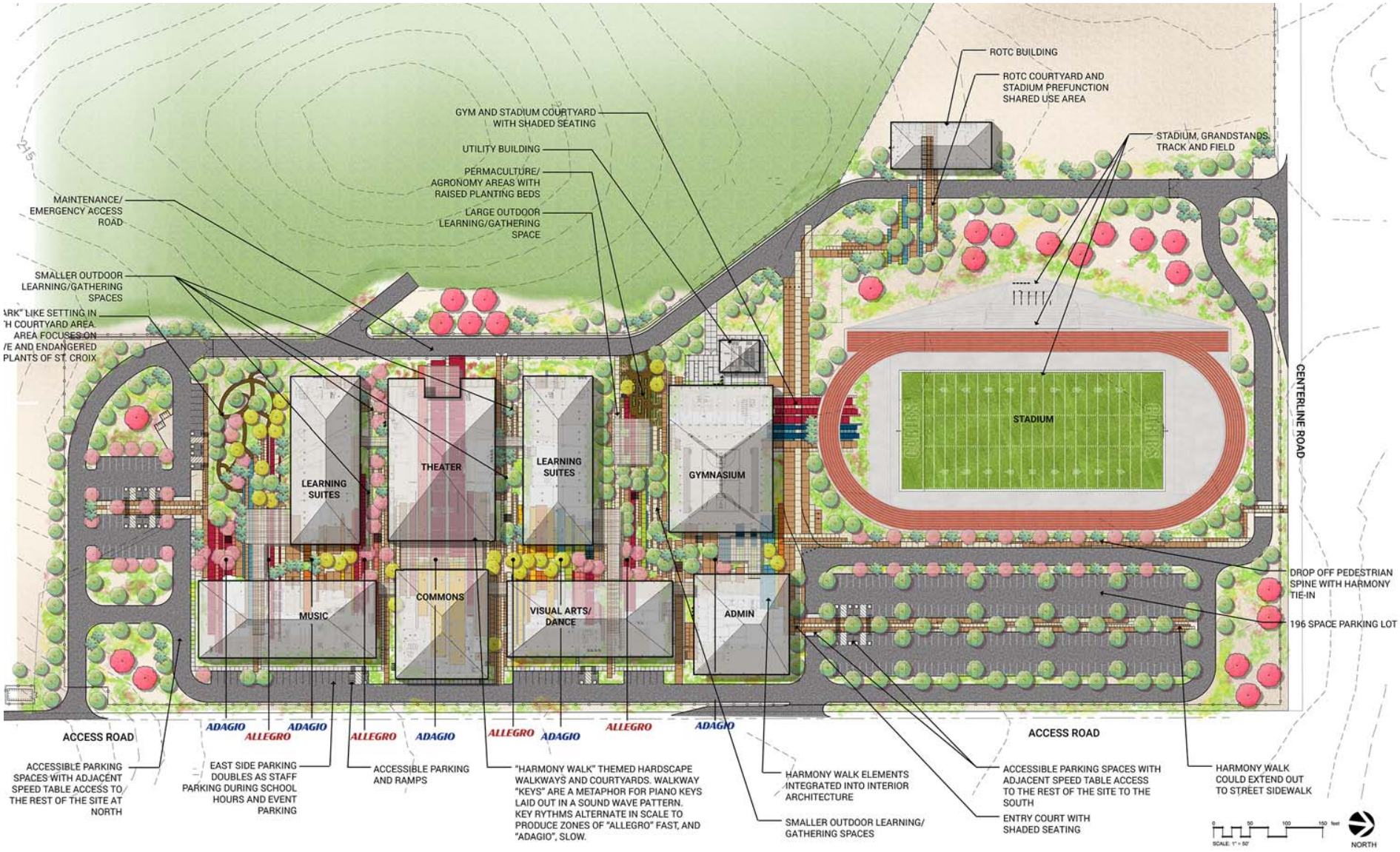
East Side Parking (Additional Spaces)
Doubles as Staff Parking during school hours and event parking.

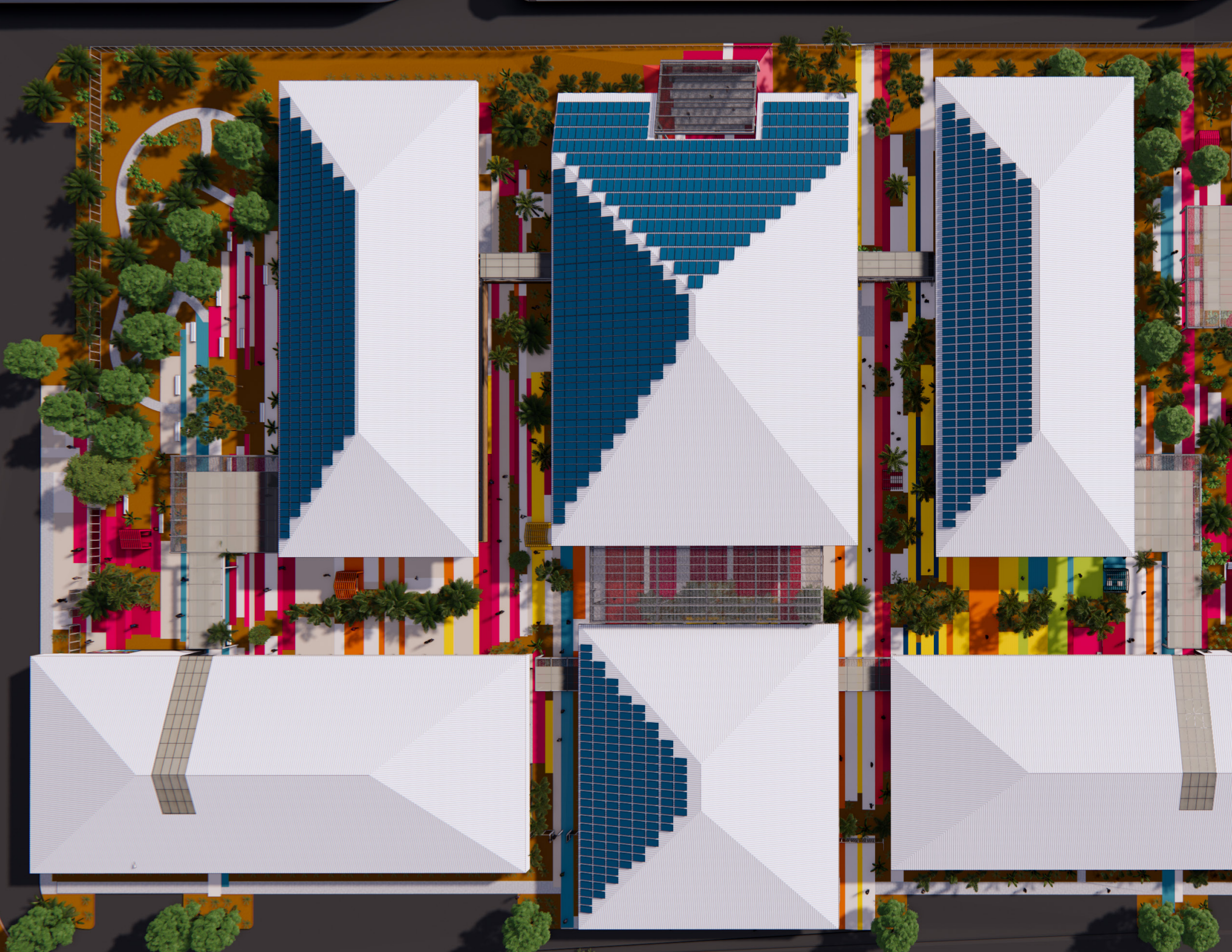
Permaculture/Agronomy Areas with Raised Planting Beds

ROTC Building and Courtyard
(Stadium Prefunction Shared Use Area)

Smaller Outdoor Learning/Gathering Spaces

Stadium, Grandstands, Track and Field





Top: *Aerial with View to Learning Suite Art Balcony and Theater*

Bottom: *Aerial View at North End of Campus, Looking South*

Architectural Narrative

St. Croix Central High School

Concept and Organization

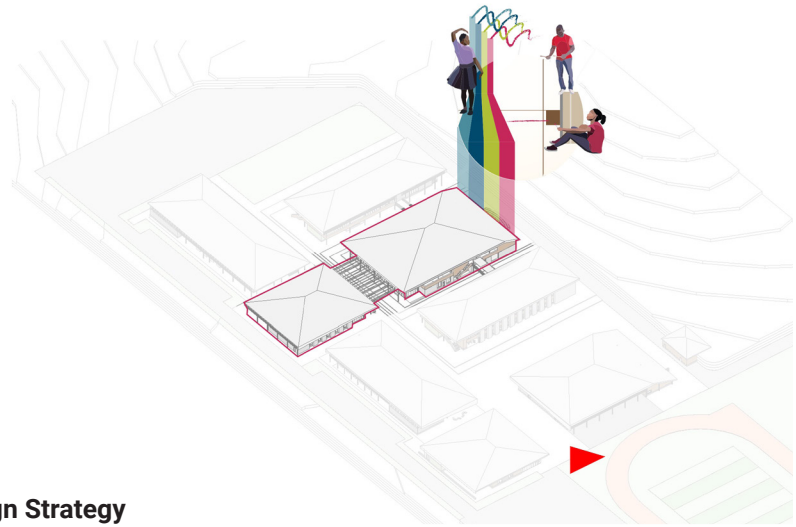
The design of the new St. Croix Central High School: Fine Arts Magnet Campus supports a changing educational vision for USVI Public Schools by focusing on teaching and learning for the whole student within a values system that prioritizes resilience, flexibility and adaptability, access to quality education, and sustainable/high performance design.

Dedicated to the celebration of the fine arts, the St. Croix Central Campus aspires to create a safe place of belonging, culture, and community for teaching and learning on the island of St. Croix.

The design framework for the eleven-building campus responds to the vernacular architecture of the islands and is inspired by traditional song form. The progression through the campus is informed by the parts of a song—an intro, chorus, and verse, that lead to the bridge, or architecturally speaking, the flexible performance theater and heart of the campus. A musical bridge is a passage that serves as a link between two sections of a song. Conceptually and with physical bridges, the theater links the North and South ends of the campus.

The campus is organized in a predominant N-S orientation but with strategic E-W avenues and breezeways to maximize opportunities for passive cooling. Buildings have been sited to reinforce desired teaching/learning adjacencies that create active space for the arts, with affordances for deep shade and covered work areas and walkways.

Upon arrival, one's journey through the campus is guided by the central 'Harmony Walk,' a lyrical passage that weaves through the campus, to provide space for casual interactions, outdoor learning, respite/reflection, assembly, and performance. Architectural follies, sprinkled the full length of the Harmony walk, provide playful, more sheltered zones for small group and individual work. To support greater comfort margins and provide shelter in inclement weather, shade structures have been thoughtfully integrated between buildings and all along the Harmony Walk.



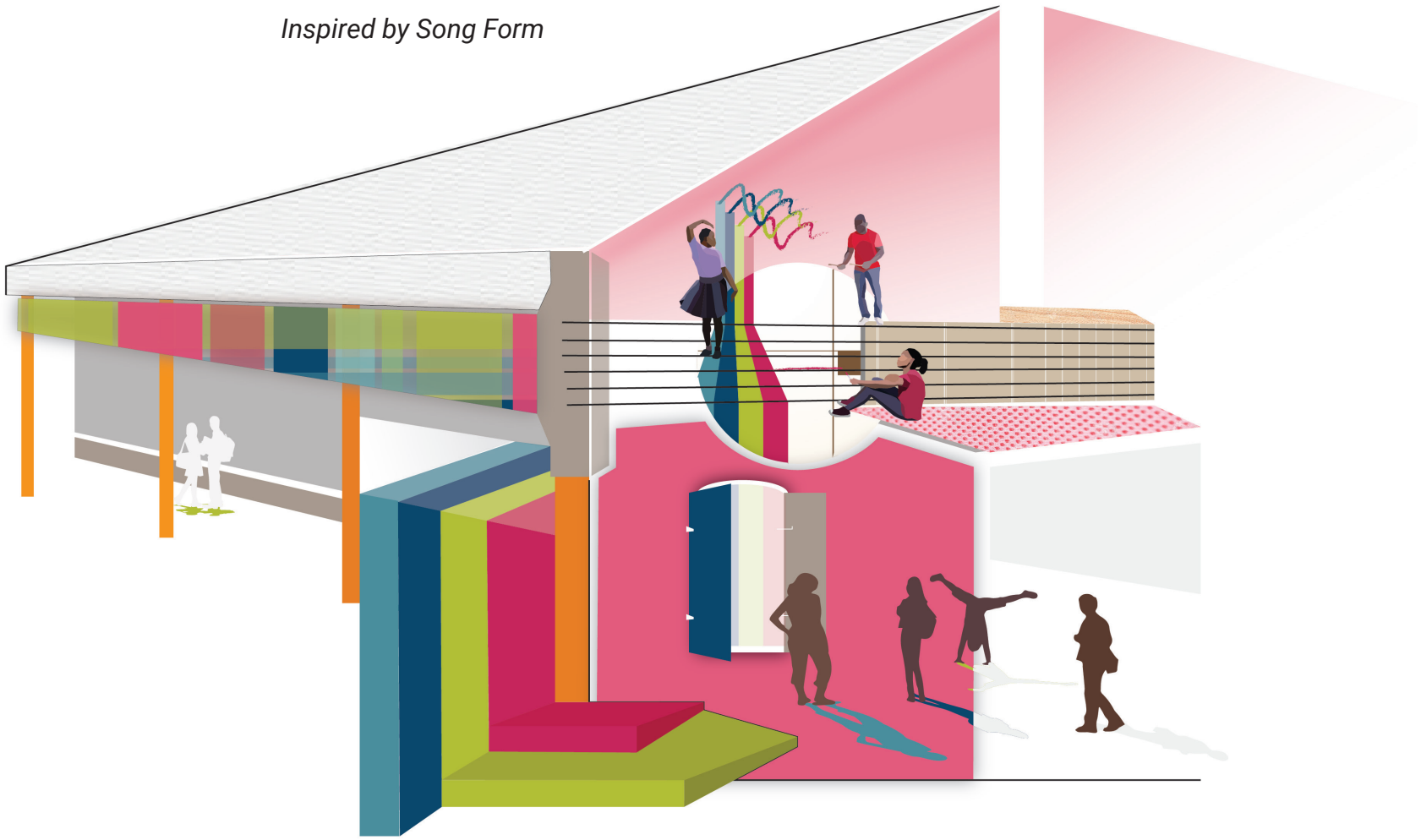
Design Strategy

"The intentional siting of the theater and supporting amphitheater, place arts and performance at the heart of the campus.

A campus of the islands to celebrate arts and music; a safe place of belonging, culture, and community.

Inspired by Island Vernacular

Inspired by Song Form



Architectural Narrative

St. Croix Central High School

The intentional siting of the theater and supporting amphitheater, place arts and performance at the heart of the campus. Site circulation and access to the theater, with parking on the North, East, and South sides, is designed to position the building as a community amenity.

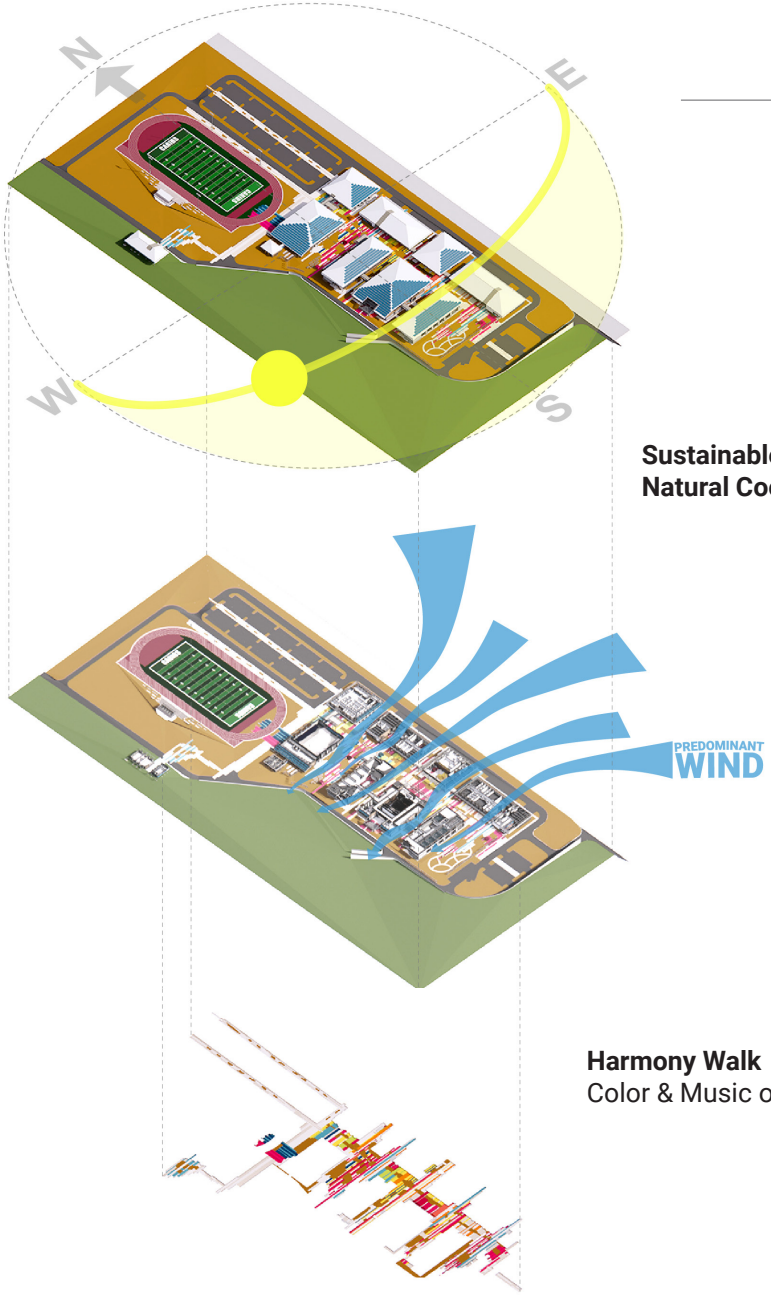
To reinforce a campus curriculum embedded in the arts, distributed space for arts and performance is provided in every building.

The primary entry to the Harmony Walk is at the North end of the campus, defined by an administrative building and the campus gymnasium. The admin building supports administrative, counseling, and health services.

The gymnasium will support athletics and physical education and serve as the primary storm shelter for the campus. Beyond the gymnasium, the West edge of the campus houses two learning suite buildings, one on either side of the flexible performance theater and amphitheater.

"Teaching to me is like the sun rising every morning. I approach each day as a new day.

2020 St. Croix District Teacher of the Year, Zahra O'Reilly-Bates



Sustainable Design for Natural Cooling & Daylighting

Harmony Walk
Color & Music of the Islands

The theater and learning suite buildings are connected by covered, overhead walkways. The learning suite buildings are designed to accommodate grades 9-12 in vertical or multi-grade learning communities and are organized to support an Inquiry-Based learning model. To promote flexibility and adaptability, conditioned classrooms are connected with operable walls.

On the East edge of the campus, South of the admin building, visual arts/dance and music buildings flank either side of a central commons and dining building, connected to the theater by an overhead shade canopy and colored pavement.

The visual arts/dance and music buildings provide a variety of venues, in scale and formality, to support learning and performance in the arts, with spaces ranging from a quelbe dance studio to a printmaking lab.

Image: *View of "Harmony Walk" looking South; standing on art balcony in North learning suite building, with direct connection to primary breeze corridor between the Visual Arts/Dance and Commons buildings.*

Design Inspiration

"We perform so you can
Dance! Laugh! Sing!

We are right in front of you
Wanting you to feel
The rhythm, the chant,
The beat, the duet, the thrill

We are right here!

Winifred "Oyoko" Loving
Creative Callaloo I Danica M. David

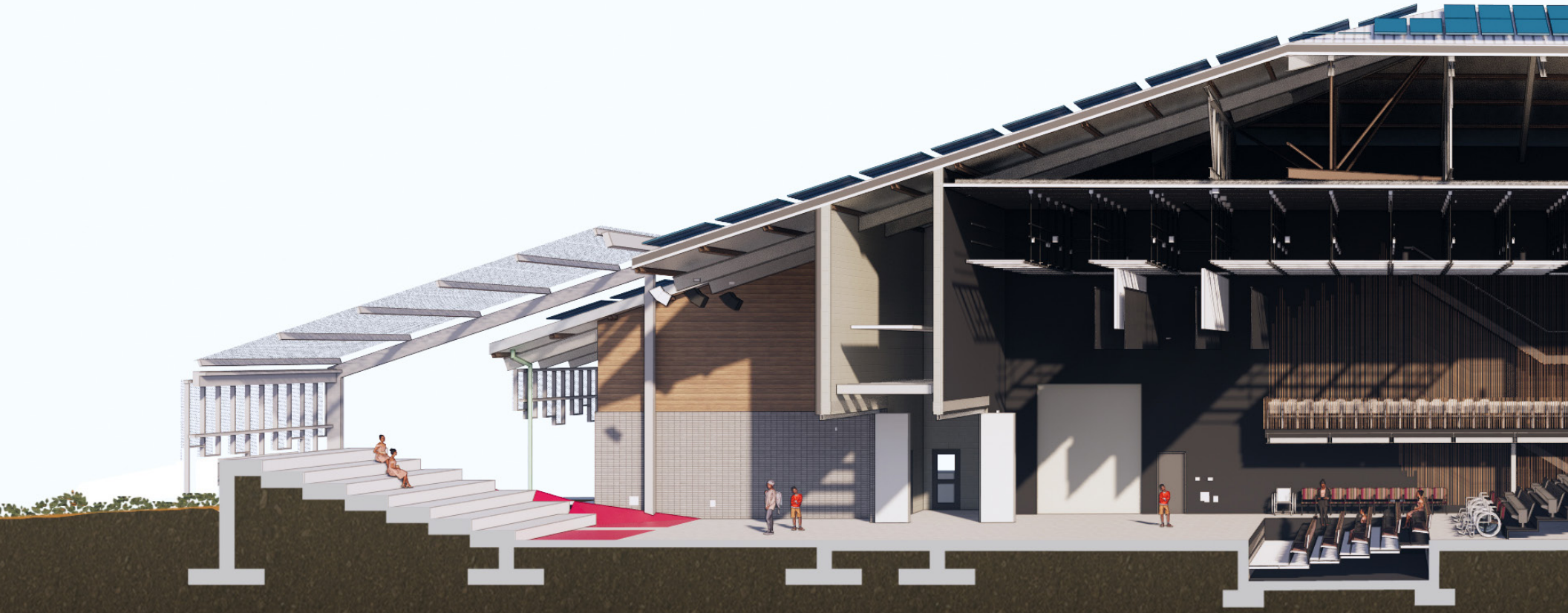
The new St. Croix Central campus is located on the current site of the existing campus, but new construction has been strategically located to allow the existing campus to remain operational while the new campus is constructed. Following building construction of the new campus proper, all existing buildings will be demolished, to make way for the field, press box, new JROTC building, and parking. The existing JROTC shooting range, West of the new structure, is to be maintained and any potential changes reviewed and implemented with approval of the VIDE.

The combined functional capacity of the campus is 1,087 students. Accounting for flex spaces increases that number to 1,134 students. Presently, staff planning stations will accommodate a core teaching staff of 68.

The St. Croix Central High School campus, in exception for the gymnasium, is designed to be net zero ready. The gymnasium, as the shelter, will be net zero-off the grid.

To the West of the gymnasium, connected by an above ground corridor, a small utility building and utility yard will house primary mechanical and electrical infrastructure for the site. This includes campus chillers, fire pump service, a new primary transformer, and battery storage for photovoltaics integrated on building roofs throughout the campus.

Image: *Interior Schematic of Flexible Performance Theater*



Design Inspiration

“ Our gifts to the world endure
The brave drum, the beating sun.
No ordinary culture
Fascinating island lore.

Winifred “Oyoko” Loving
Creative Callaloo I Danica M. David

Image: *Section Perspective View of Flexible Performance Theater*

Architectural Narrative Cont.

Architectural Kit of Parts/Materials

The new St. Croix Central High School adopts an Interpretive/ Revival expression of historical architecture on the islands.

The built language for the campus borrows stylistic elements from both the historic and vernacular styles but arranges them in ways that break the traditional forms and patterns previously used. The architectural kit of parts revives historic styles but reinterprets them into a new less formal architectural language.

The following elements comprise the basis of exterior design across all buildings on the campus:

1. **Hip Roof Design**
2. **Metal Screen Fascia**
3. **Covered Balcony Condition**
4. **Roof Cladding Fold Down**
5. **Punched Openings/Recessed Windows (Sun Protection)**
6. **Louvers for Fresh Air**
7. **Color and Protected Mural Artwork**

> ***"The great majority of houses in Frederiksted have hip roofs over the main structure. This design offers little resistance to hurricanes as there are no flat gables for the wind to exert pressure against.***
>
> *The Vernacular Architecture of Frederiksted* By Robert S. Brown (Page 08)

Stylistically, in the spirit of the islands, the design utilizes strong pattern language in the expression of volumes and forms, solids and voids, horizontals and verticals, punched openings, and light and shadow. The rich heritage of resilient building in the islands has informed the design of the building systems and preliminary material selections.

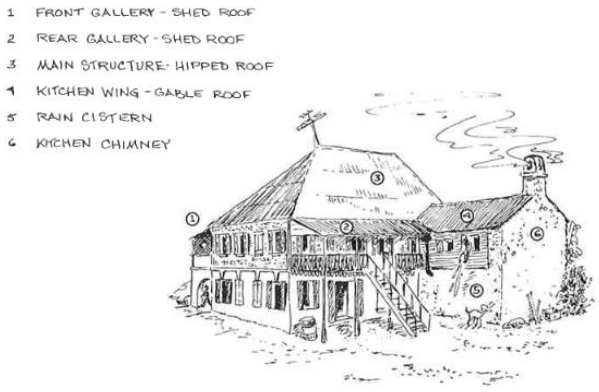
Materials are being considered for durability in a hot/humid, high seismic, high wind zone, ease of maintenance, and life cycle costs. Materials have been selected with respect for deconstruction and high regard for health, indoor environmental quality, and comfort. Primary building elements will be masonry, metal, metal that looks like wood, and high-pressure laminate panels.

Interior partitions have been designed to support conditioning requirements for a net zero ready design. Wall types and finishes are informed by conditioning adjacencies, a desire to reduce mass, wall heights, opportunity for mold/mildew, controlled acoustics, and cost/labor/install.

All wall types can be identified in one of three categories:

1. Exterior Thermal Wall
2. Interior Thermal Wall
3. Conditioned Non-Thermal Wall

The standard roof assembly is a composite metal deck with a standing seam metal finish. The exception is at the primary shelter (and any spaces rated the same as the shelter) and this assembly is poured in place concrete with standing seam metal finish.



The Vernacular Architecture of Frederiksted

Robert S. Brown (Figure 11, Page 27)

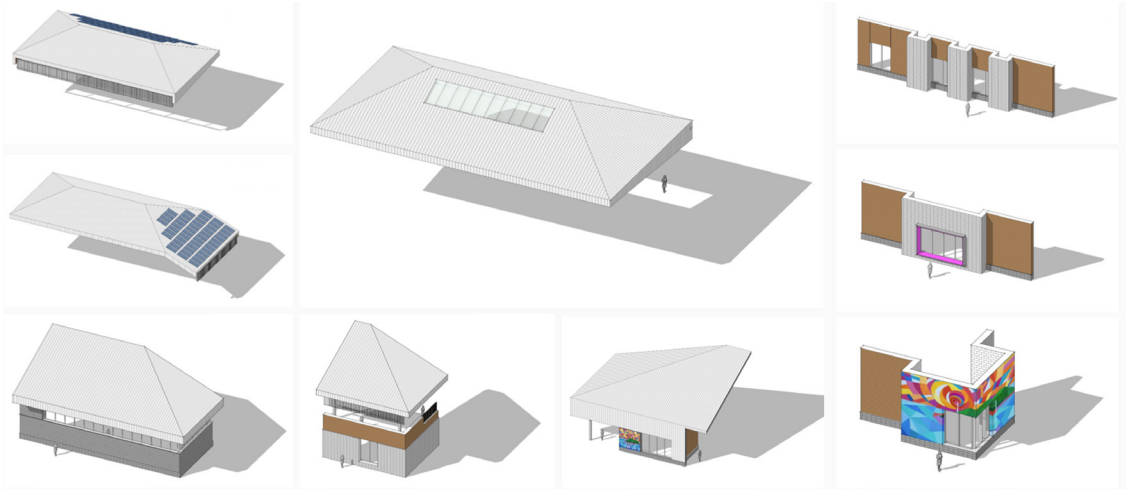


Image: *West Elevation of Visual Arts/Dance Building*

Architectural Narrative Cont.

St. Croix Central High School

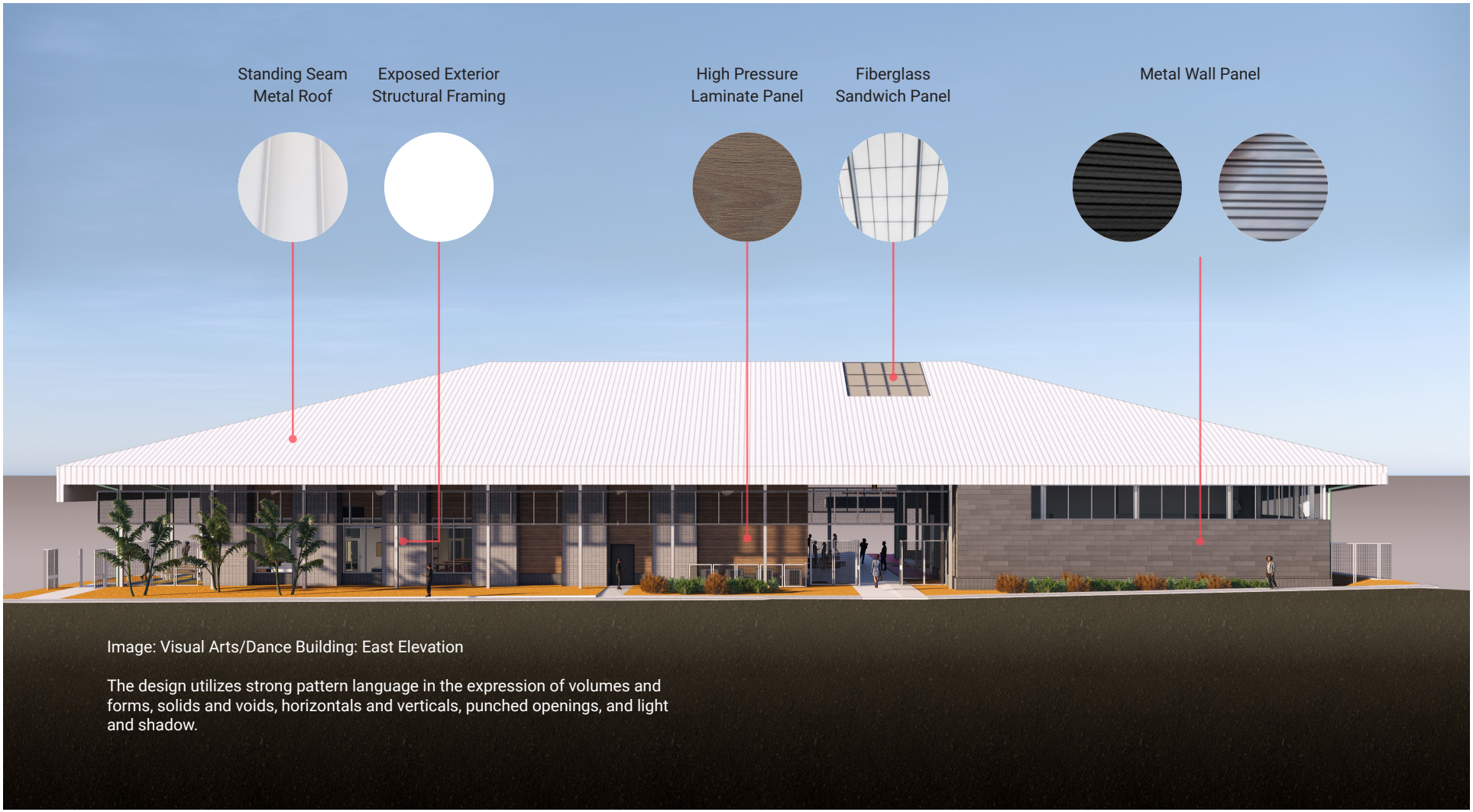


Image: Visual Arts/Dance Building: East Elevation

The design utilizes strong pattern language in the expression of volumes and forms, solids and voids, horizontals and verticals, punched openings, and light and shadow.

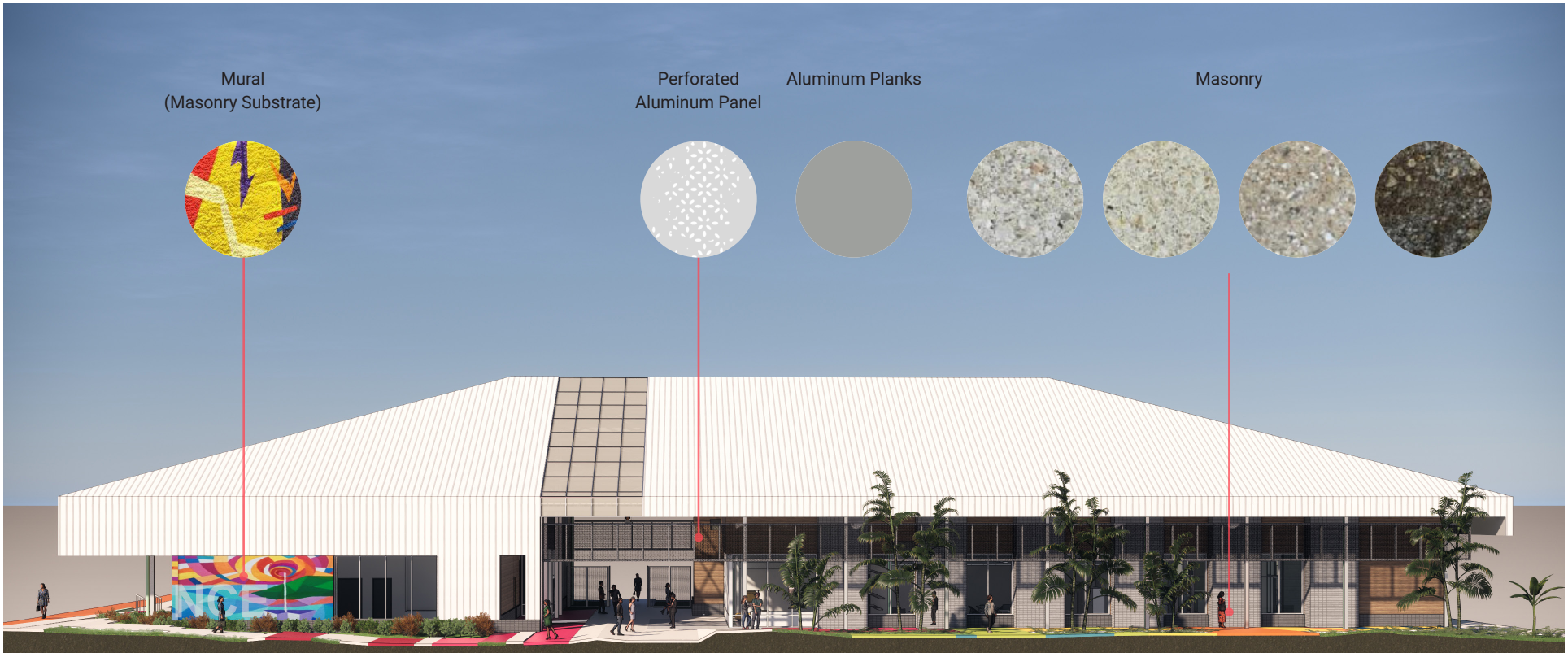


Image: Visual Arts/Dance Building: West Elevation

Materials have been considered for durability in a hot/humid, high seismic, high wind zone, ease of maintenance, and life cycle costs.

Primary building elements will be masonry, metal, metal that looks like wood, and high-pressure laminate panels.

The design for the new St. Croix Central High School: Fine Arts Magnet Campus is built upon nurturing student achievement, organizational culture, and teacher and leader effectiveness. It aspires to be a place that ignites passion for the arts and for life-long learning to serve each child holistically, with resources afforded to build community on the island of St. Croix and throughout the territory.

Building Information and Summary

VIDE St. Croix Central High School St. Croix, USVI

The St. Croix Central High School consists of (9) new buildings and (1) existing building separated with assumed property lines between them.

Five of the buildings have an E-Educational designation, three are A-Assembly, one is B-Business, and one is M-Mechanical.

Applicable Codes, Regulations, and Design Policies
Title 29 Of The Virgin Islands

2021 INTERNATIONAL BUILDING CODE
2021 INTERNATIONAL EXISTING BUILDING CODE
2021 INTERNATIONAL FIRE CODE
2021 INTERNATIONAL MECHANICAL CODE
2021 INTERNATIONAL PLUMBING CODE
2020 NATIONAL ELECTRIC CODE
2021 INTERNATIONAL ENERGY CONSERVATION CODE
2019 NFPA 13: STANDARD FOR THE INSTALLATION
OF SPRINKLER SYSTEMS
2017 ICC 117.1 STANDARD FOR ACCESSIBLE AND USABLE BUILDINGS
AND FACILITIES
2019 ASME A17.1 SAFETY CODE FOR ELEVATIONS
AND ESCALATORS

Image: *View of "Harmony Walk" looking East, from overhead bridge connecting learning suite building and theater.*

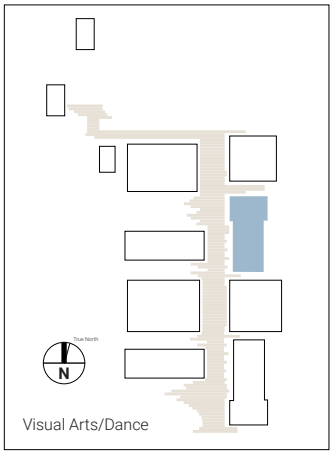
DLR Group

Primary Campus Entry (North End)

Harmony Walk with View to North Learning Suite Building

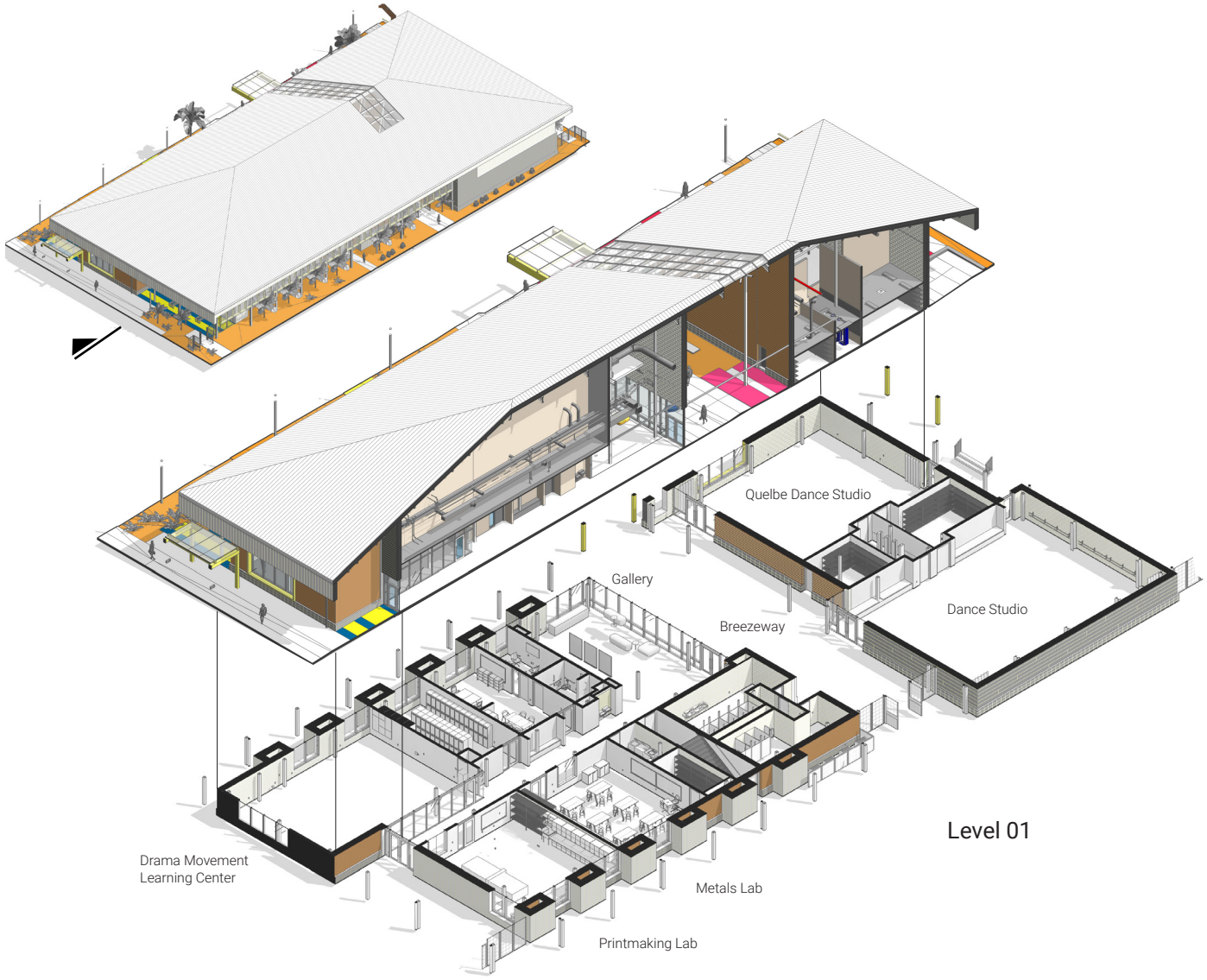
Architectural Drawings Visual Arts and Dance Building

St. Croix Central High School



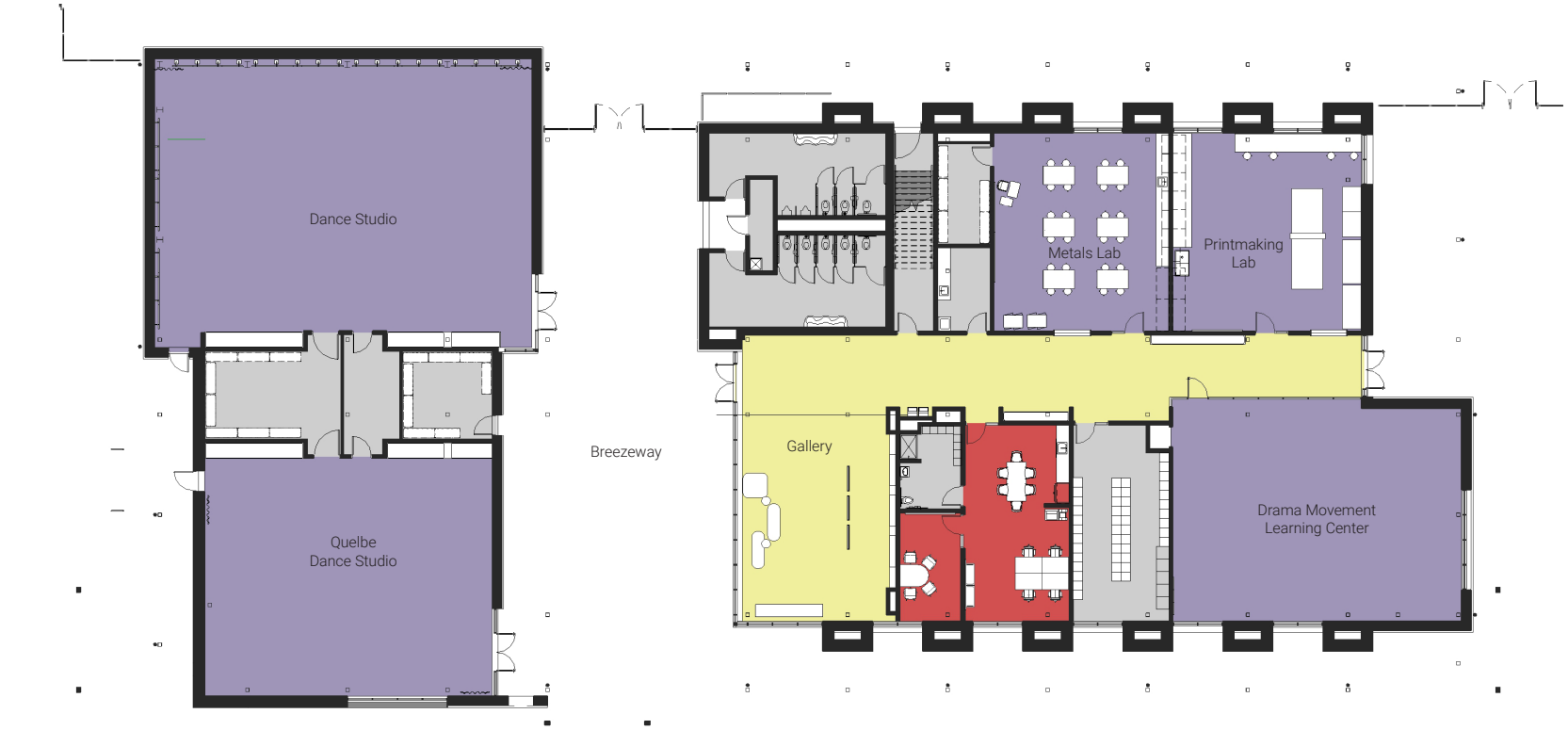
LEGEND

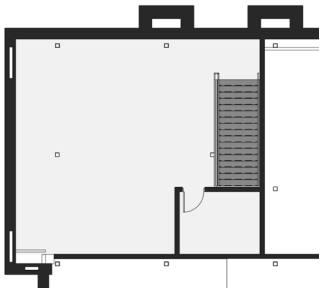
- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM



Visual Arts and Dance Building, Floor Plan

Not to Scale





Mezzanine

Architectural Drawings Visual Arts and Dance Building

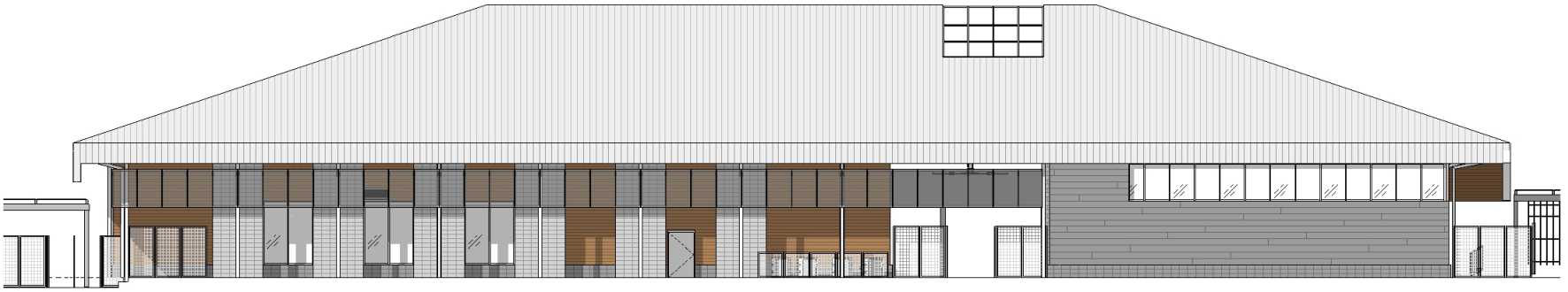
St. Croix Central High School

North Elevation

West Elevation

Not to Scale

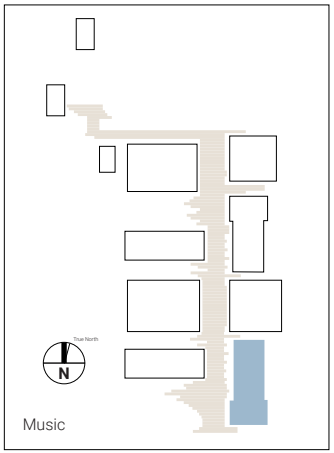
South Elevation



East Elevation

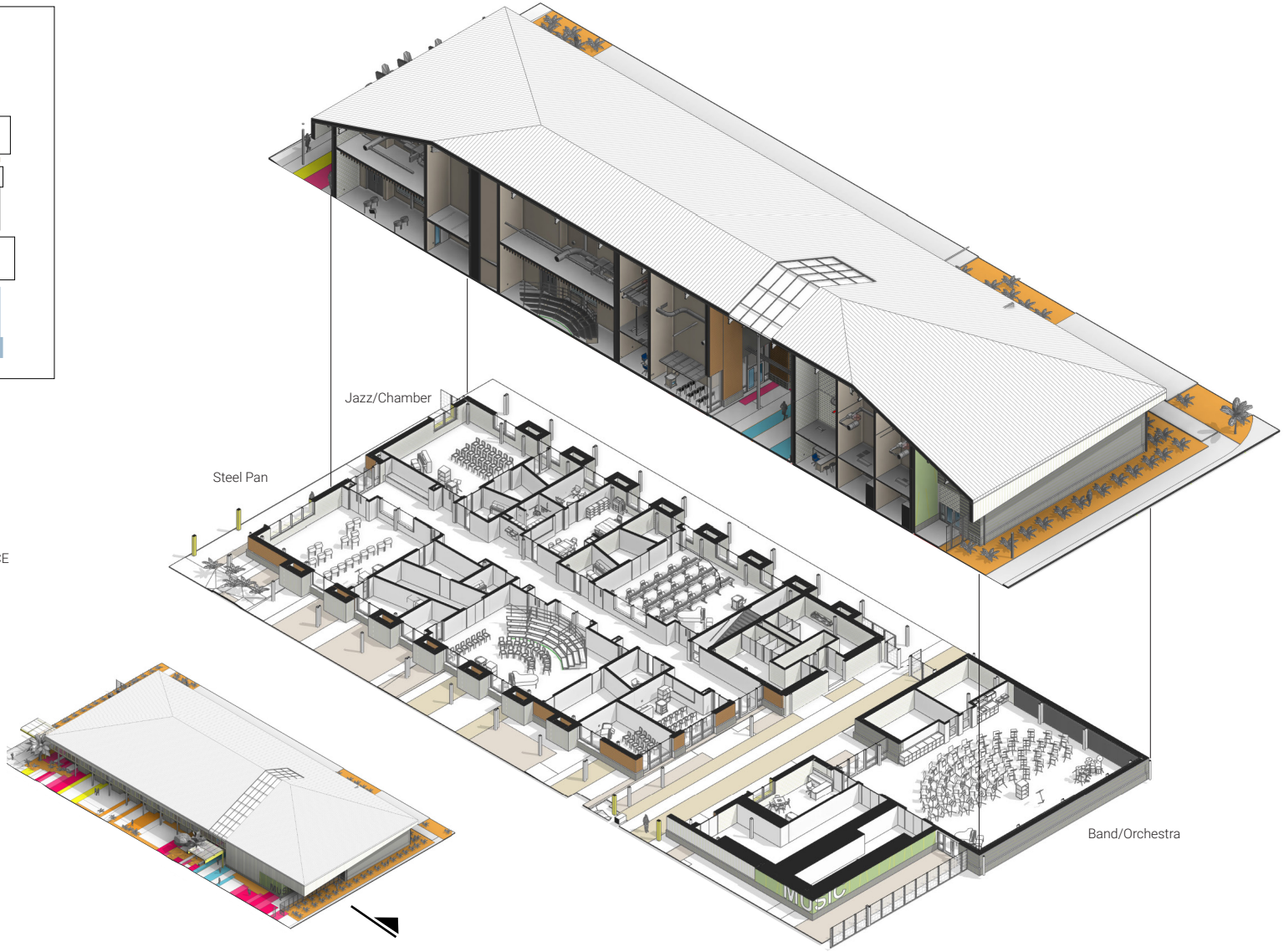
Architectural Drawings Music Building

St. Croix Central High School



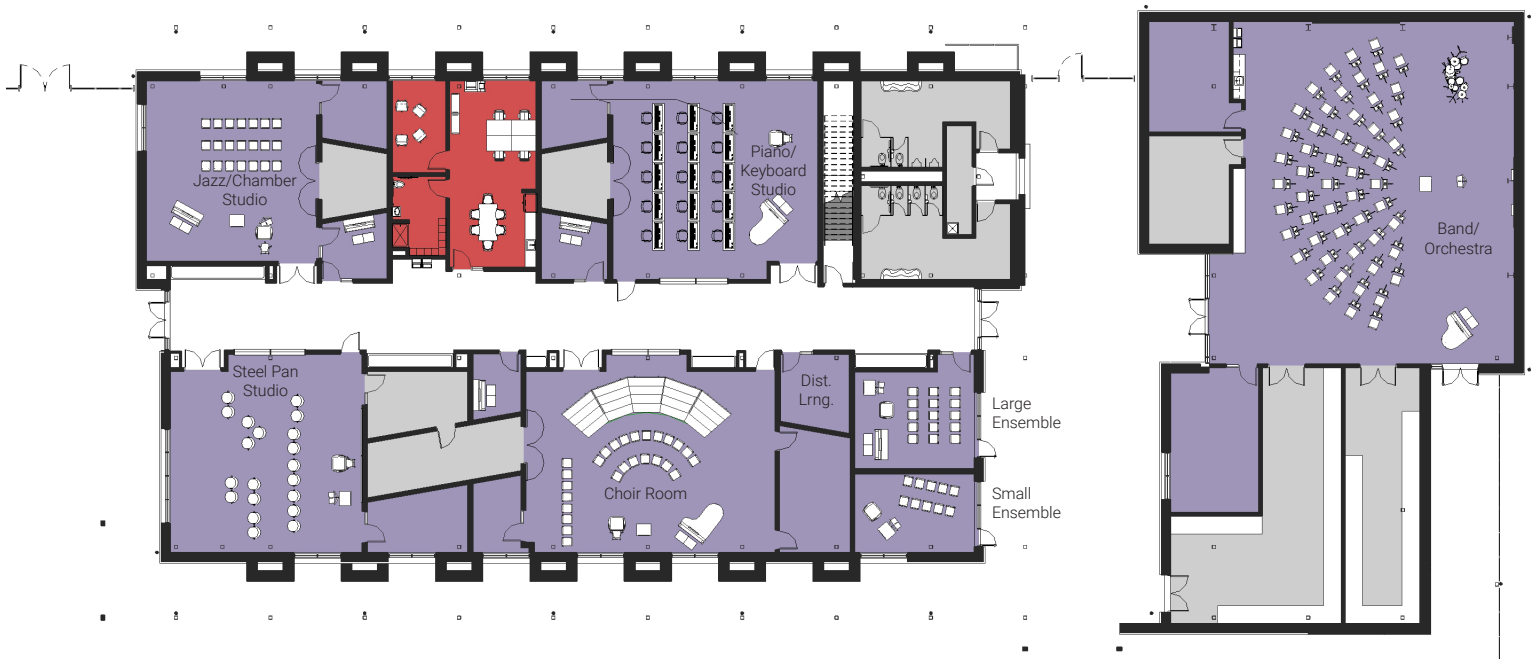
LEGEND

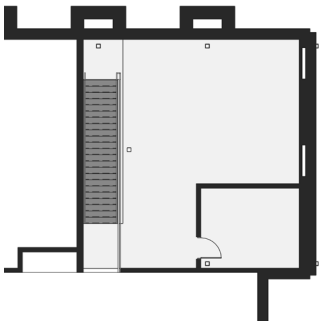
- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM



Music Building, Floor Plan

Not to Scale



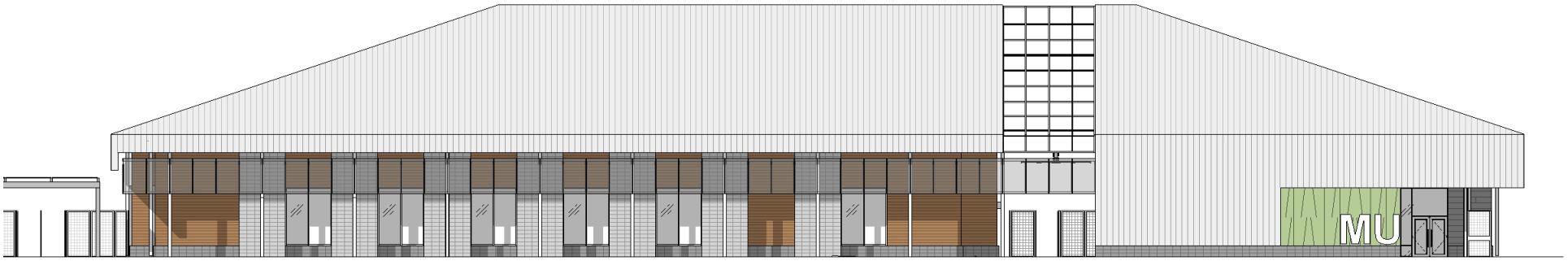


Mezzanine

Architectural Drawings Music Building

St. Croix Central High School

South Elevation



West Elevation

Not to Scale

North Elevation

East Elevation

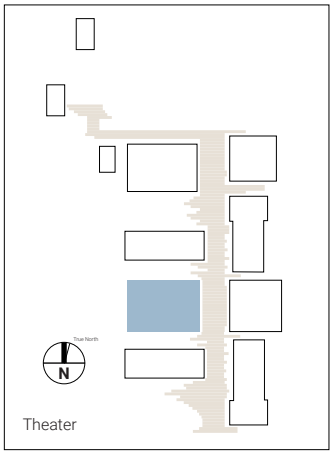
Breezeway with View to Harmony Walk Beyond

Top: *View to Music Building from "Harmony Walk"*

Bottom: *View to Visual Arts/Dance Building from "Harmony Walk"*

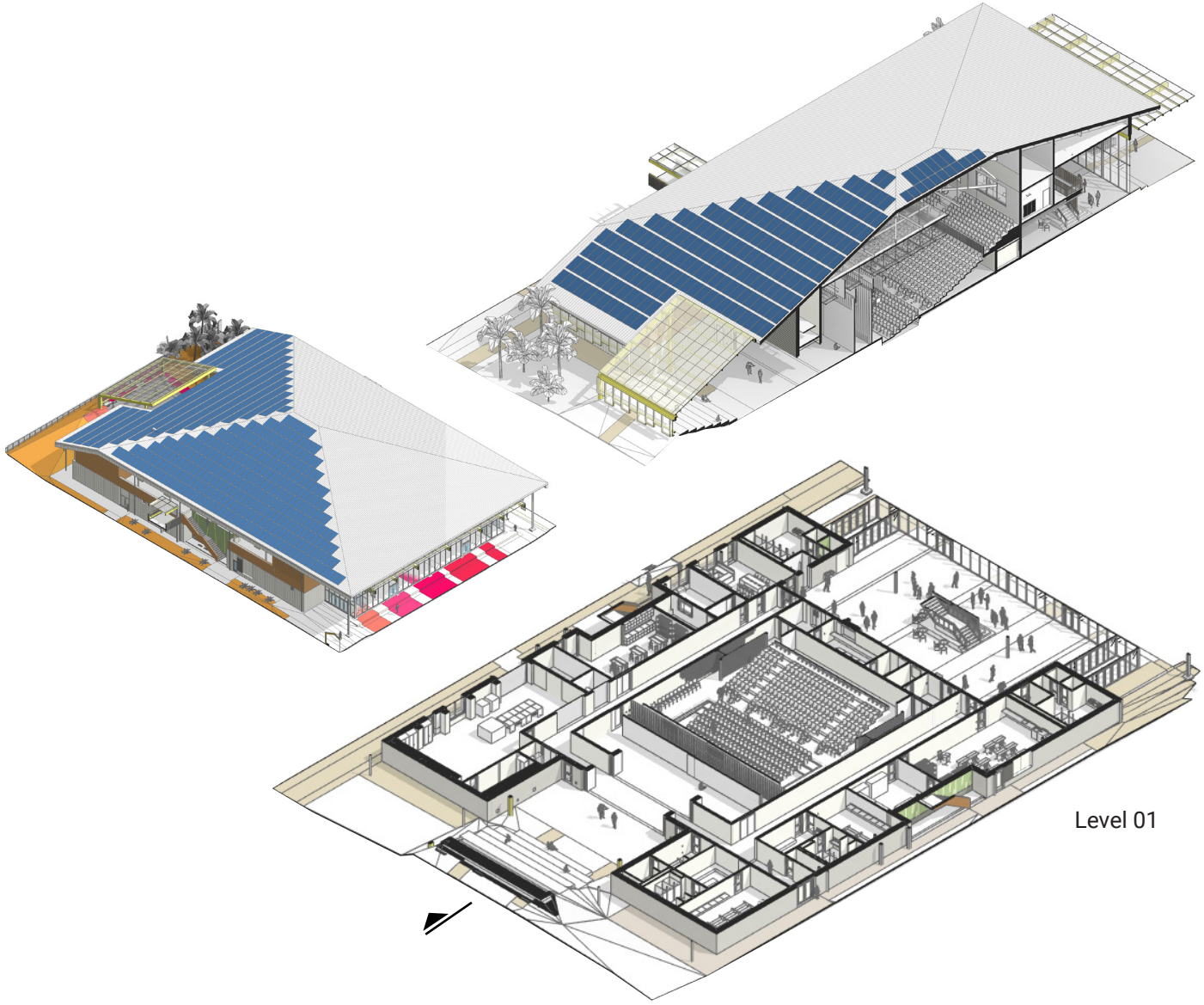
Architectural Drawings Flexible Performance Theater

St. Croix Central High School



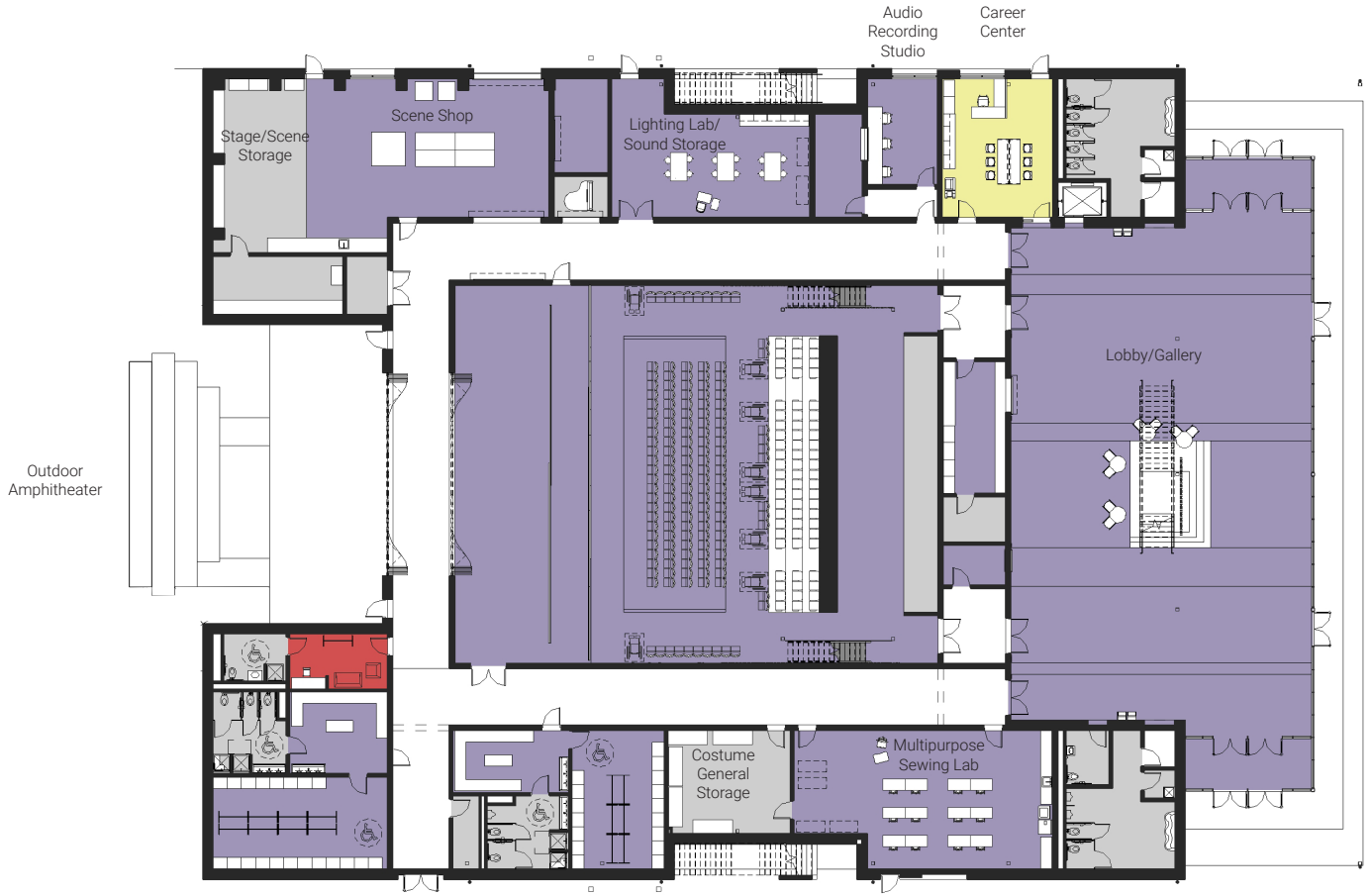
LEGEND

- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM



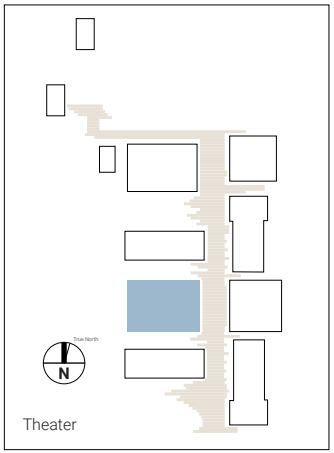
Level 01

Flexible Performance Theater, Level 01 Floor Plan



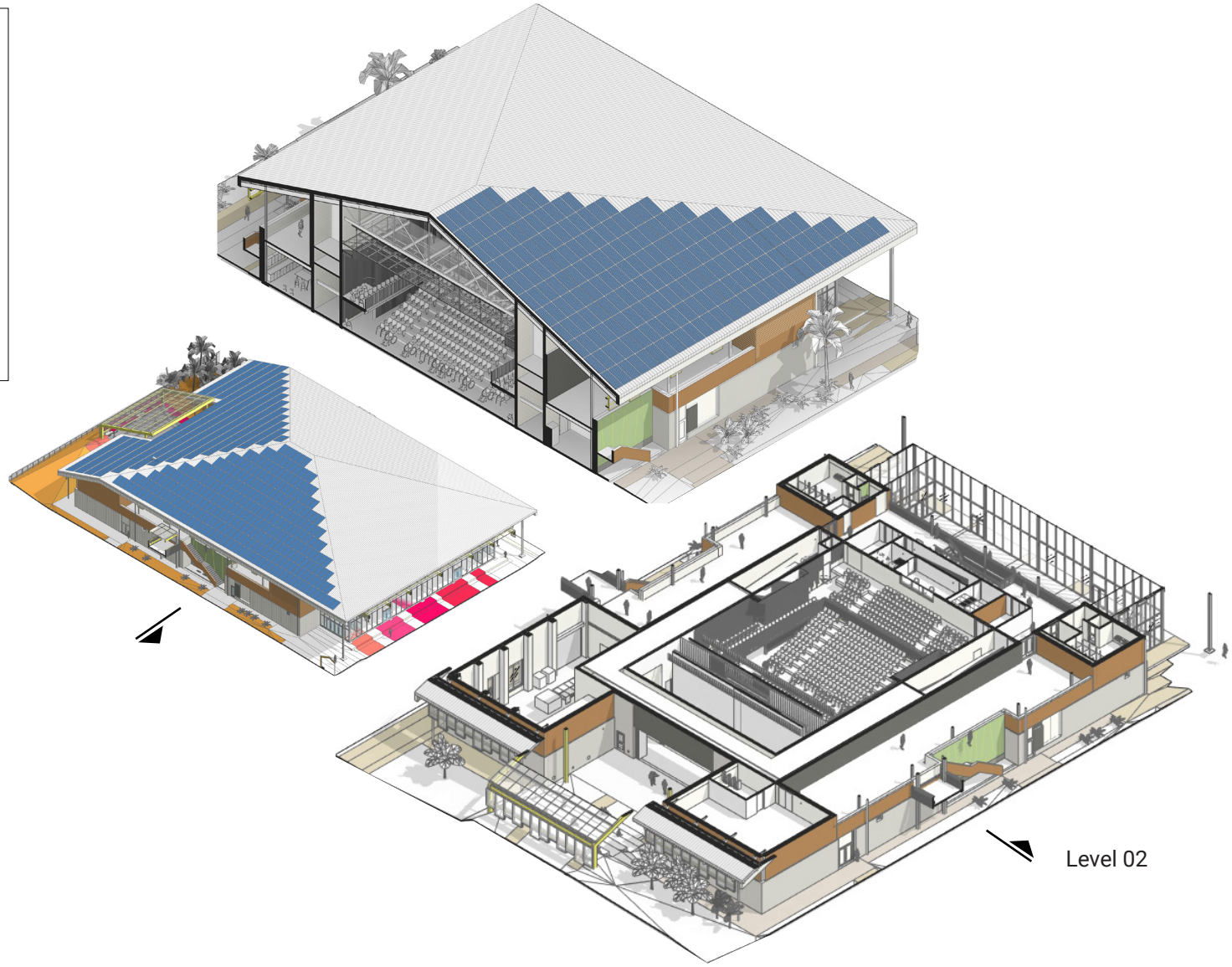
Architectural Drawings Flexible Performance Theater

St. Croix Central High School

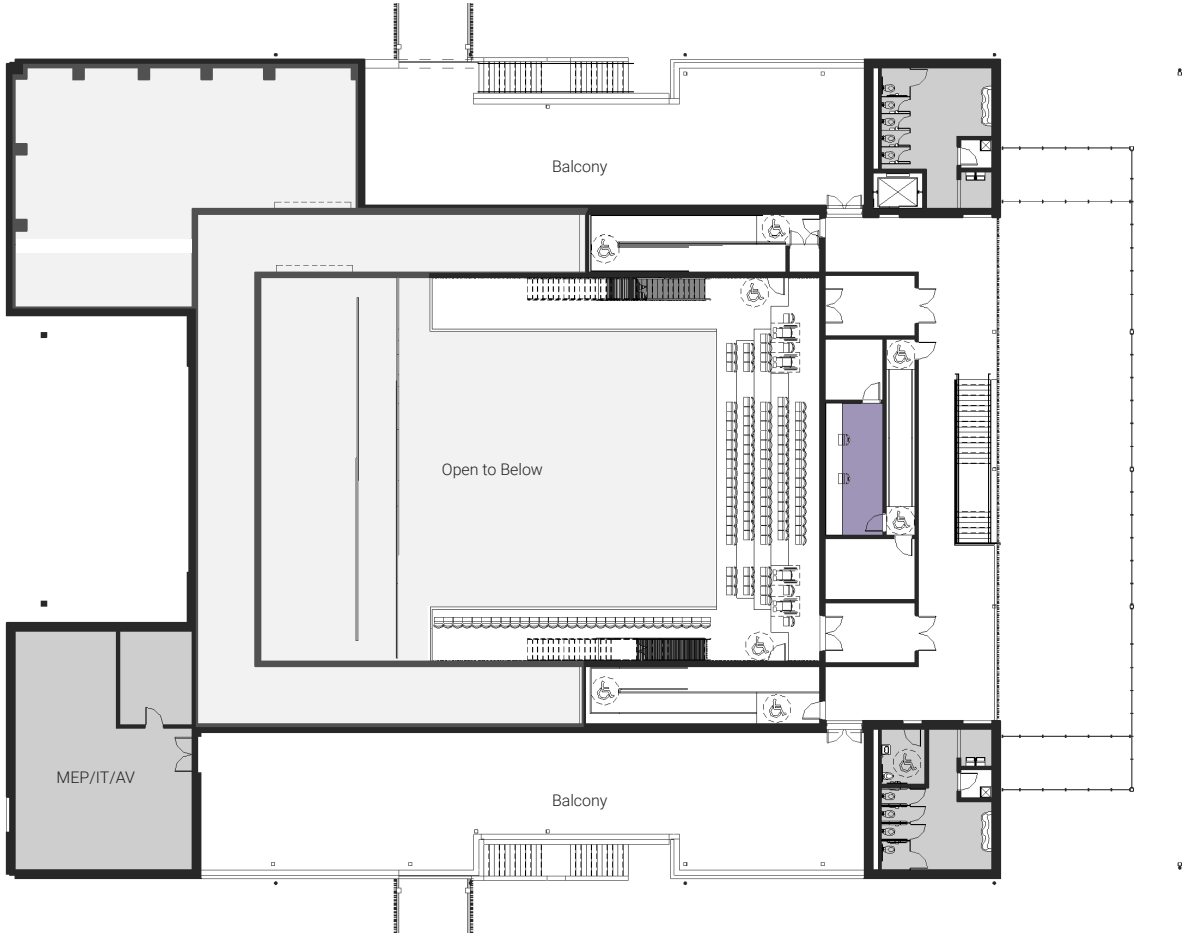


LEGEND

- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM

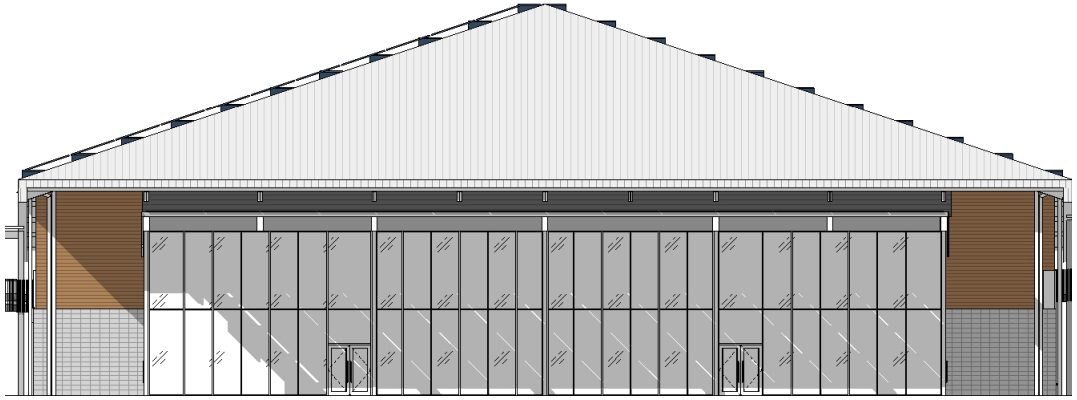


Flexible Performance Theater, Level 02 Floor Plan

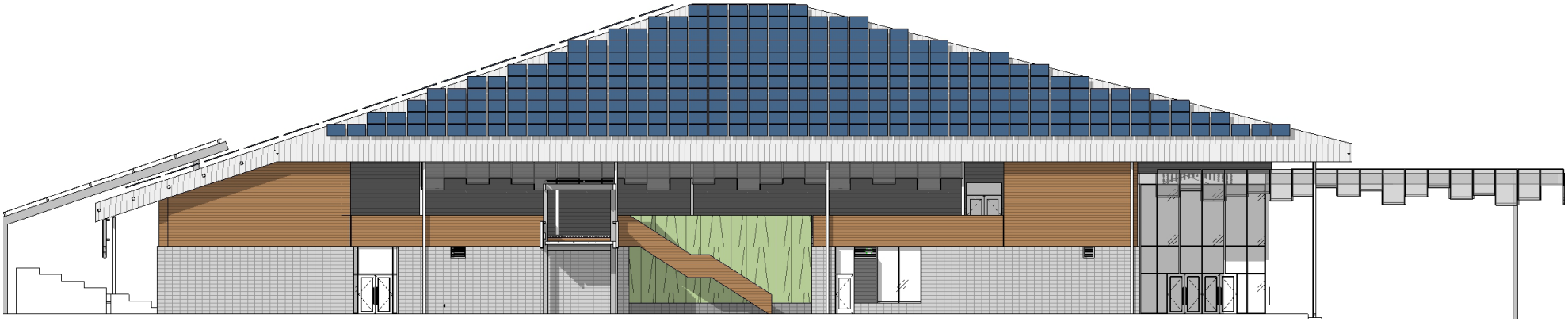


Architectural Drawings Flexible Performance Theater

St. Croix Central High School

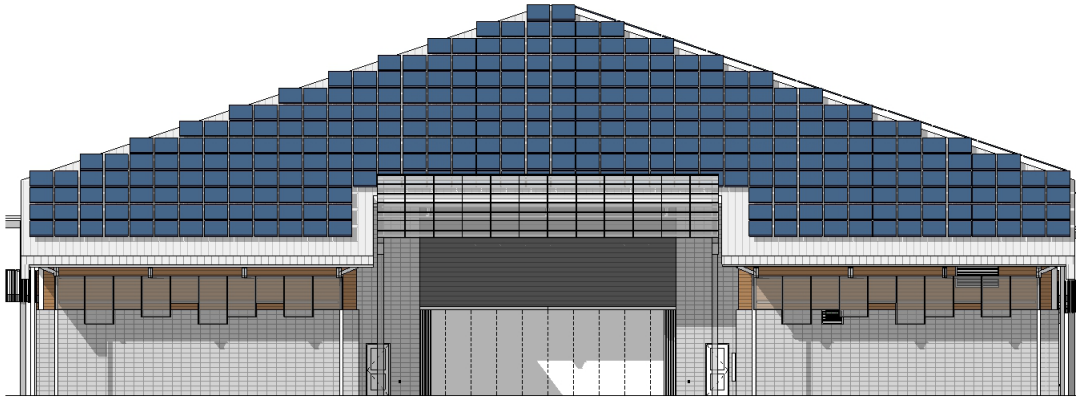


East Elevation

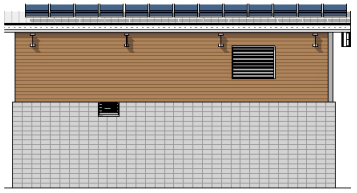


South Elevation

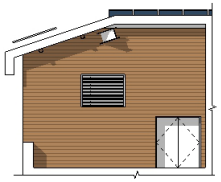
Not to Scale



West Elevation



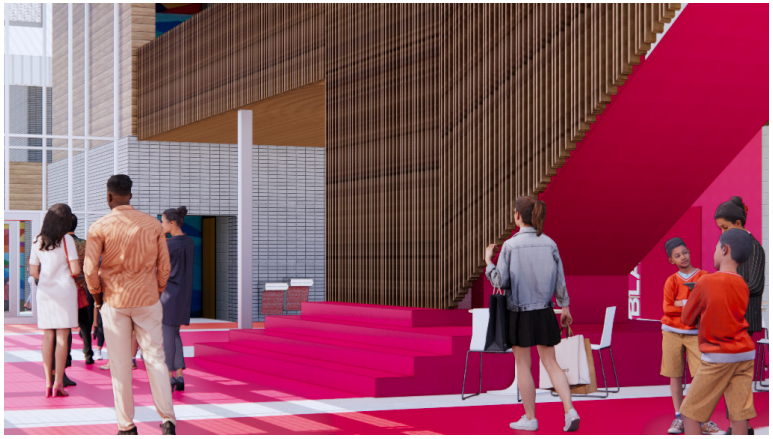
West Elevation
Behind Screen



West Elevation
Balcony

North Elevation

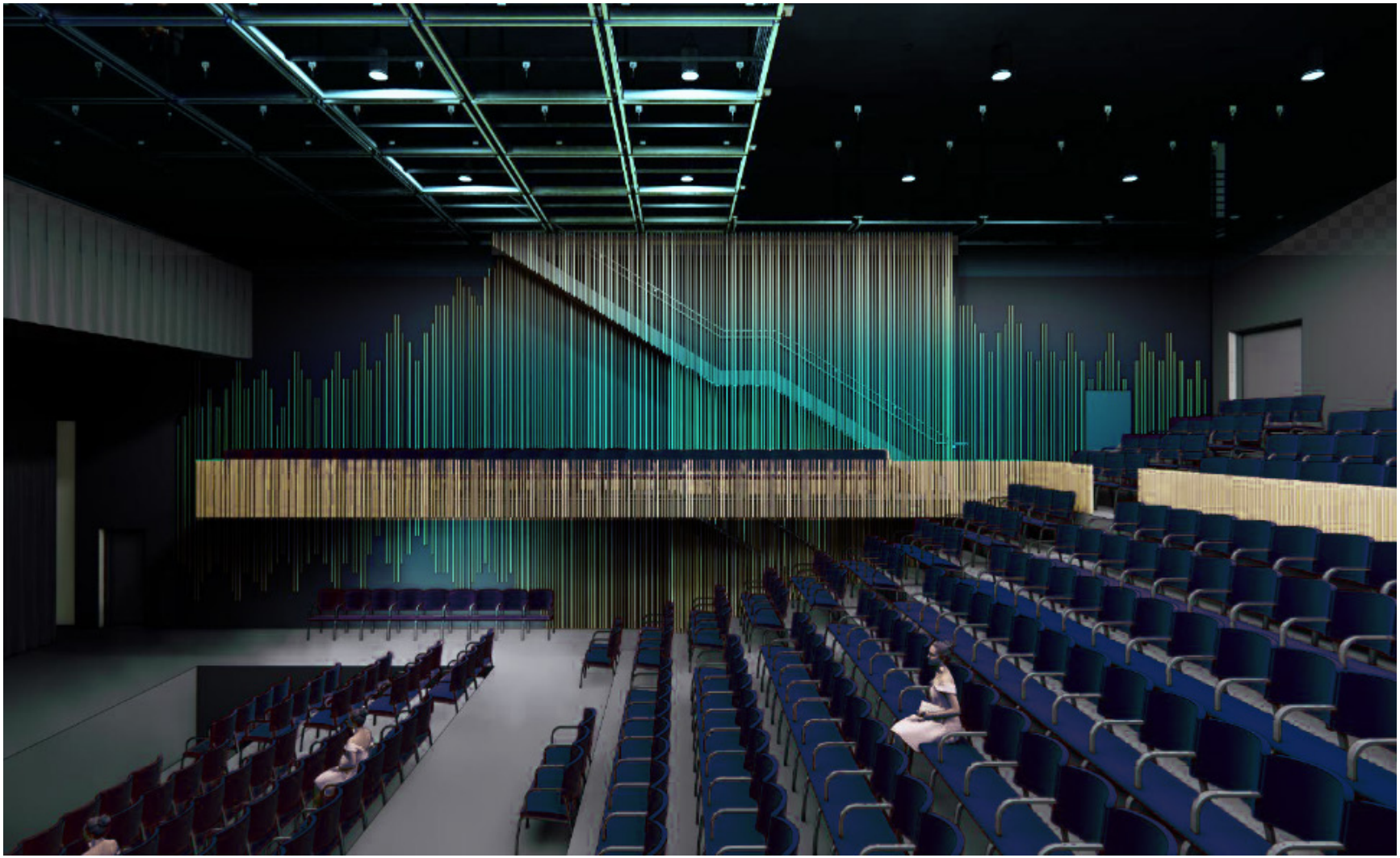
Interior Views of Theater Lobby



View of Theater Lobby from Commons Building

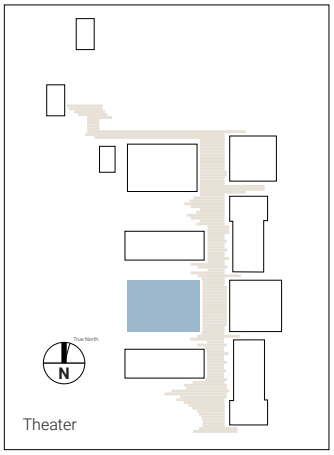
Flexible Performance Theater

Flexible Performance Theater



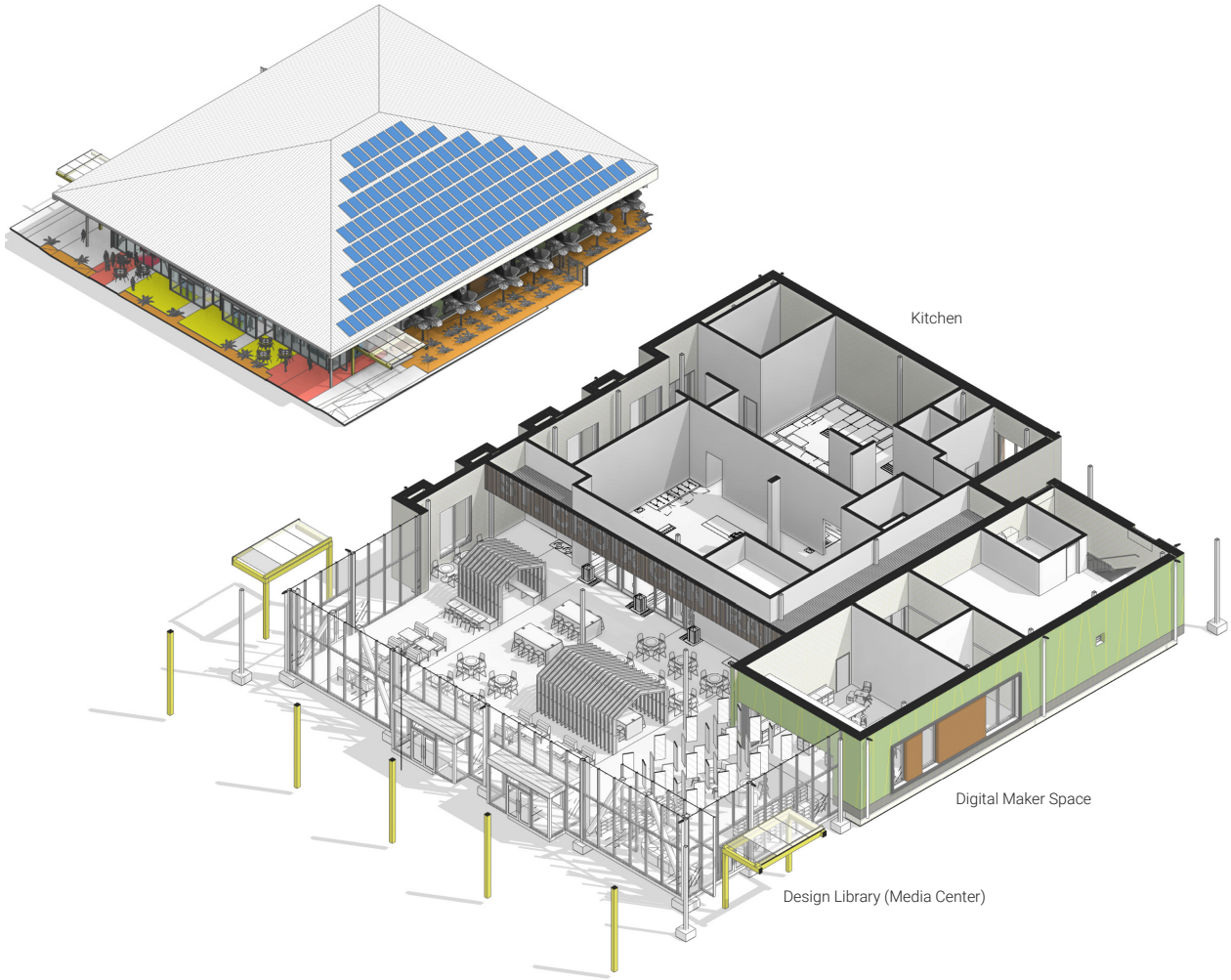
Architectural Drawings Commons Building

St. Croix Central High School

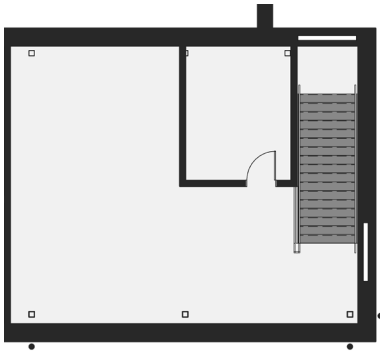


LEGEND

- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM



Commons Building, Floor Plan

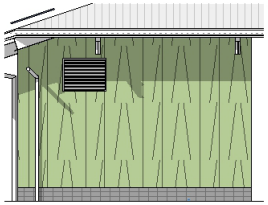


Mezzanine

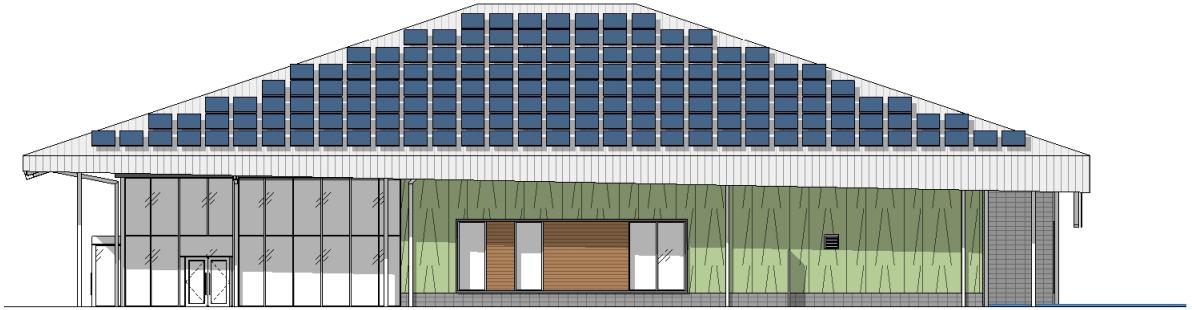
Architectural Drawings Commons Building

St. Croix Central High School

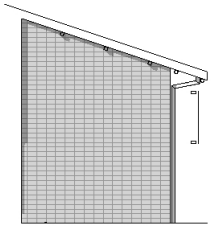
East Elevation



East Elevation
Behind Screen



South Elevation

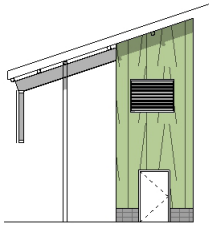


South Elevation
Niche

Not to Scale

West Elevation

North Elevation



North Elevation
Niche

Covered Connection Between Commons and Theater Buildings

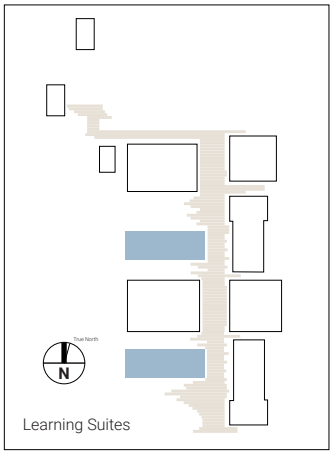
Top: *VIDE Music Students: November 28, 2017*
Virgin Islands Department of Education Social Media (Facebook)

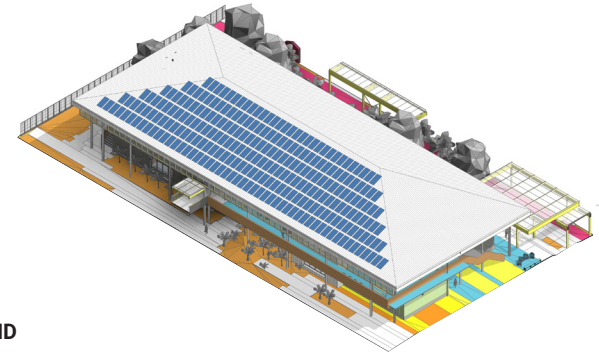
Bottom: *Music Building: Band and Orchestra Space (Rehearsal and Performance)*

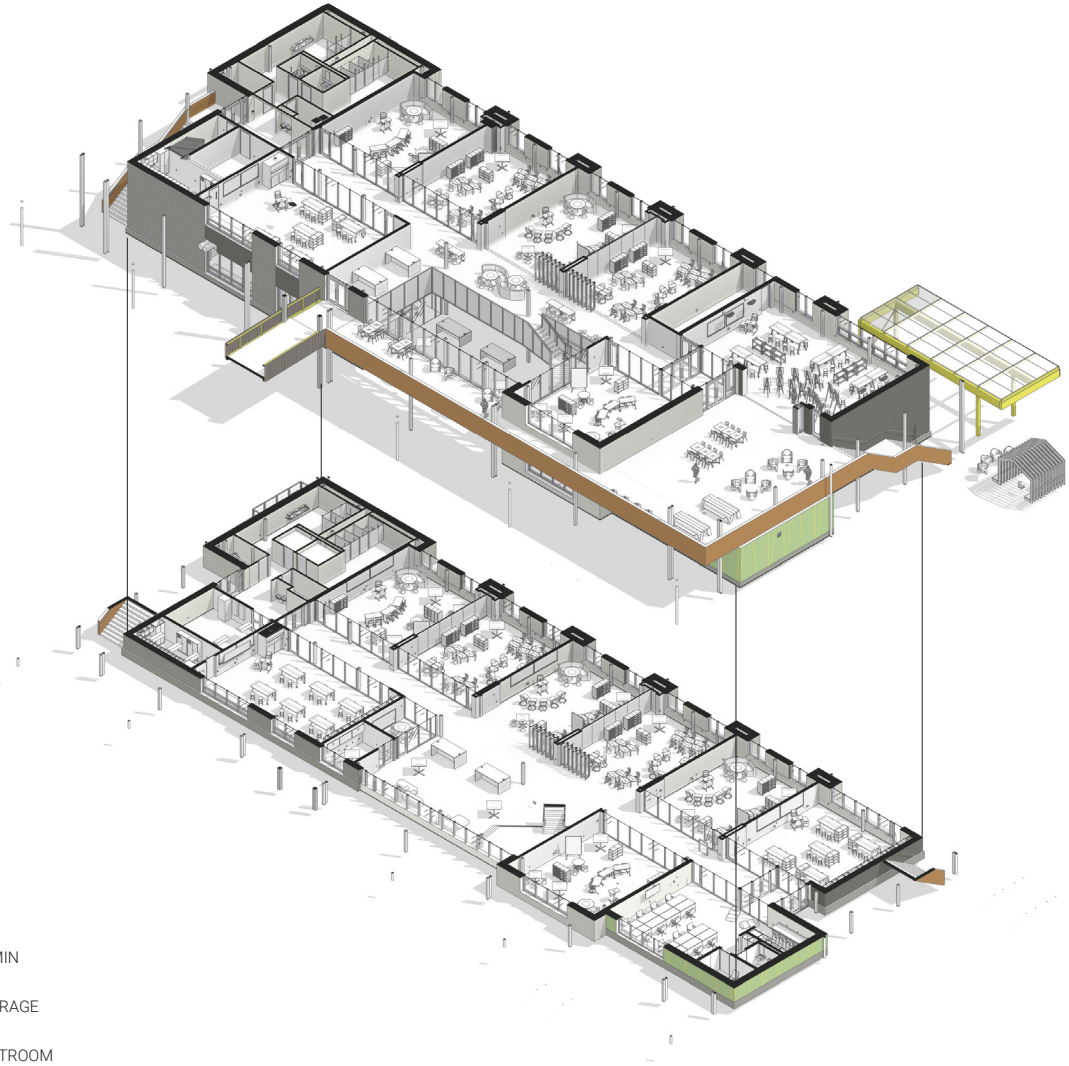
Architectural Drawings Learning Suite Building

St. Croix Central High School

*Typical of both Learning Suite Buildings



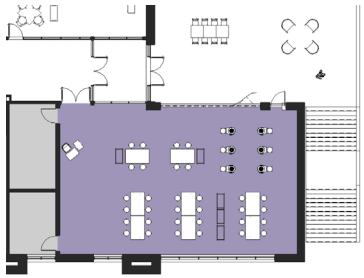




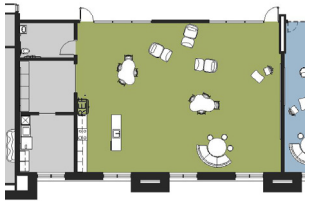
LEGEND

- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM

Learning Suite Building 01 (North), Floor Plans

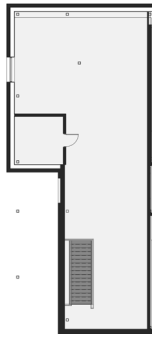


A: Learning Suite Building 02 (South) 3D Art

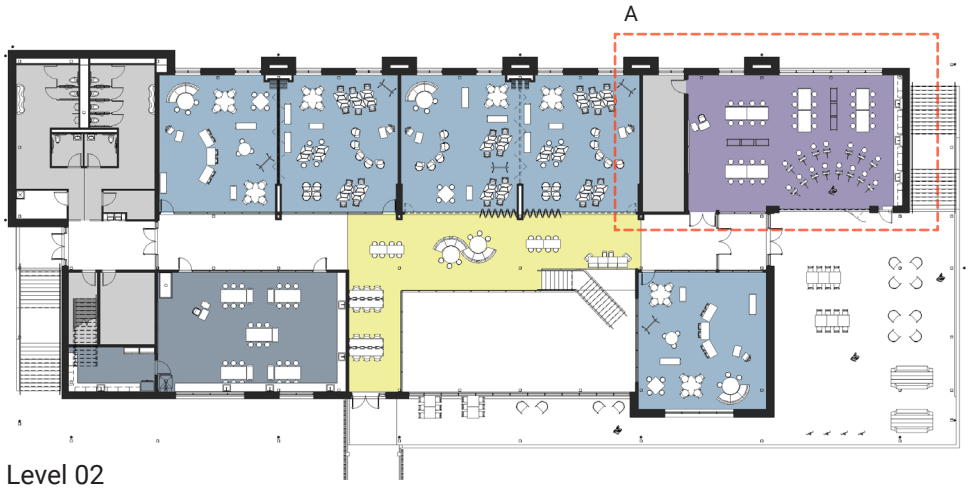


B: Learning Suite Building 02 (South) SPED Suite

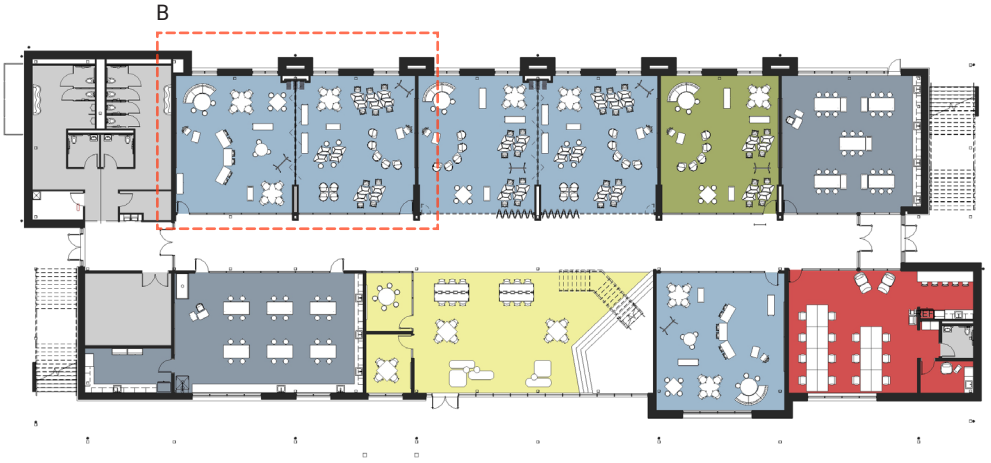
*In Learning Suite 02, two general classrooms are combined to provide a SPED suite.



Mezzanine



Level 02



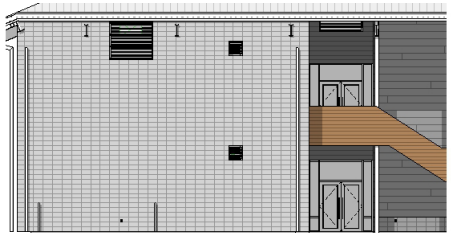
Level 01

Architectural Drawings Learning Suite Building

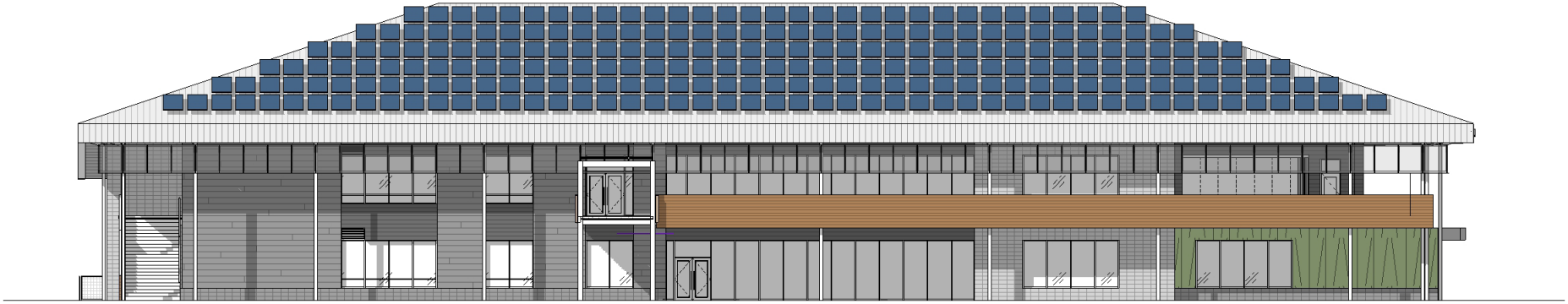
St. Croix Central High School

*Typical of both Learning Suite Buildings

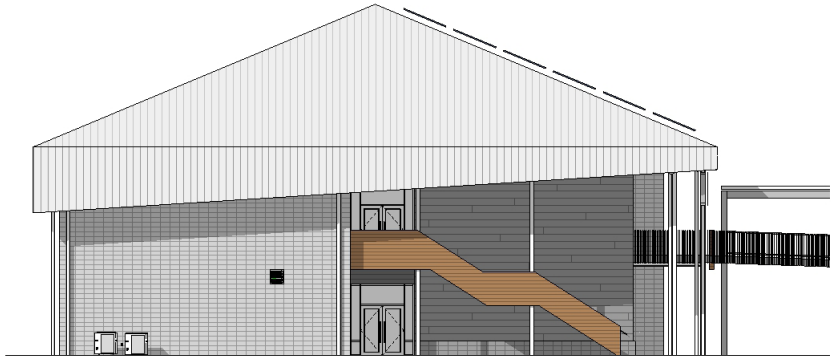
East Elevation



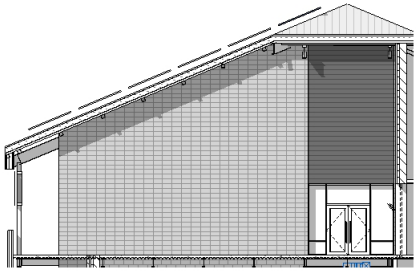
West Elevation
Behind Fascia



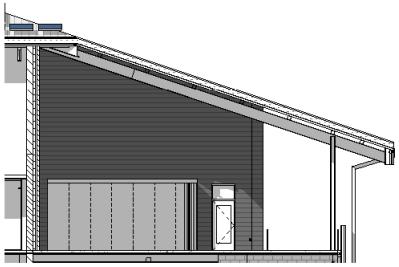
South Elevation



West Elevation



West Elevation
Art Veranda (2nd Floor)



North Elevation
Art Veranda (2nd Floor)

North Elevation

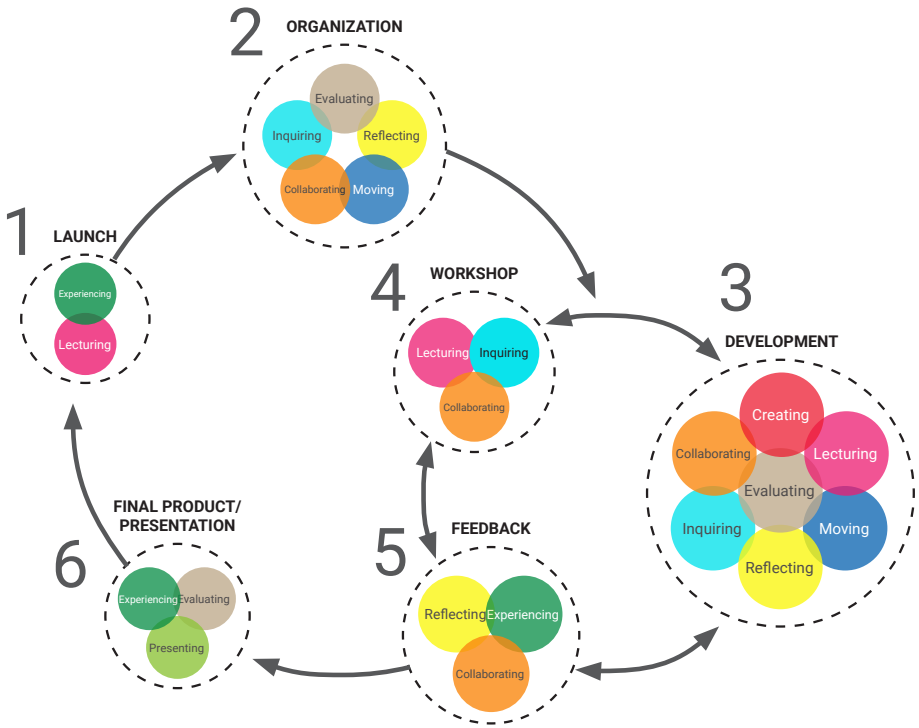
Inquiry-Based Learning Learning Suite Building

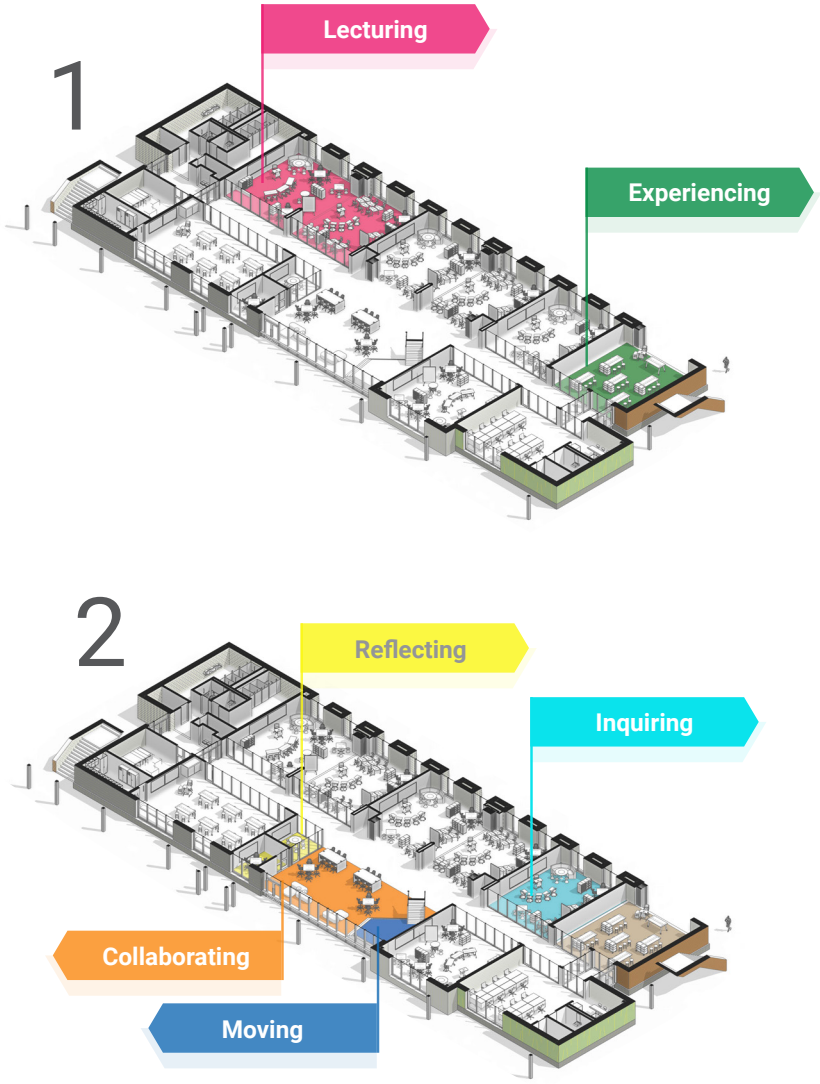
St. Croix Central High School

*Typical of both Learning Suite Buildings: Level 01

Inquiry-Based Learning at the Learning Suite Buildings

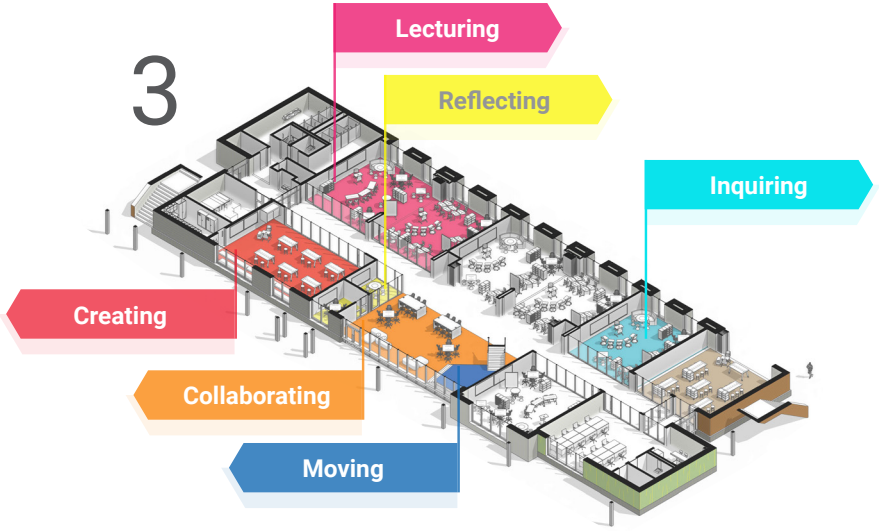
A dynamic form of active learning that begins with inquiry, problems, or scenarios. Students then identify, investigate, and research issues and respond to challenges or complex problems.





*Schematic Design Imagery: Included to support design concept. Reference drawings for final design.

3



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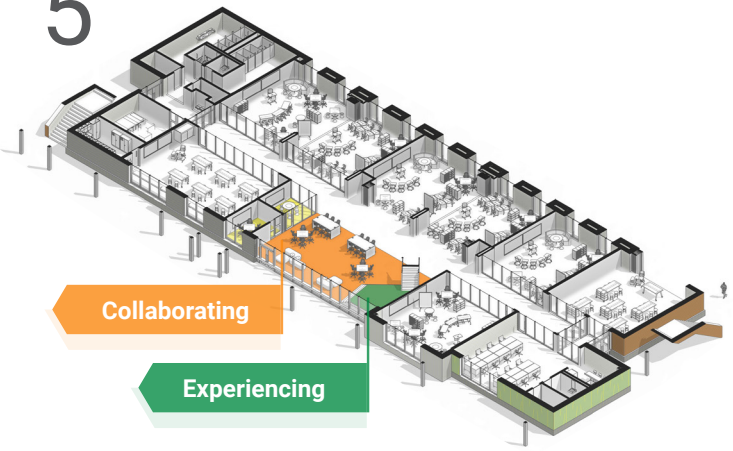

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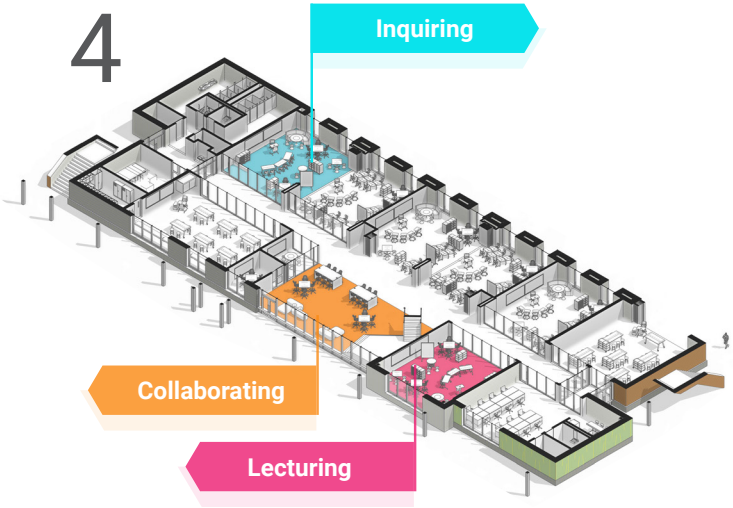

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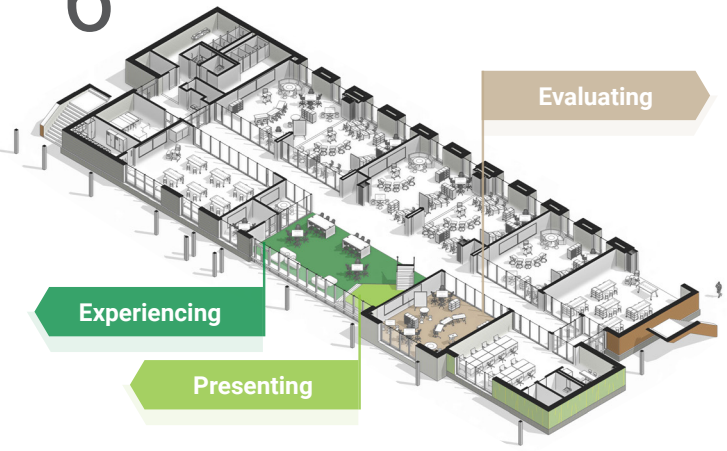


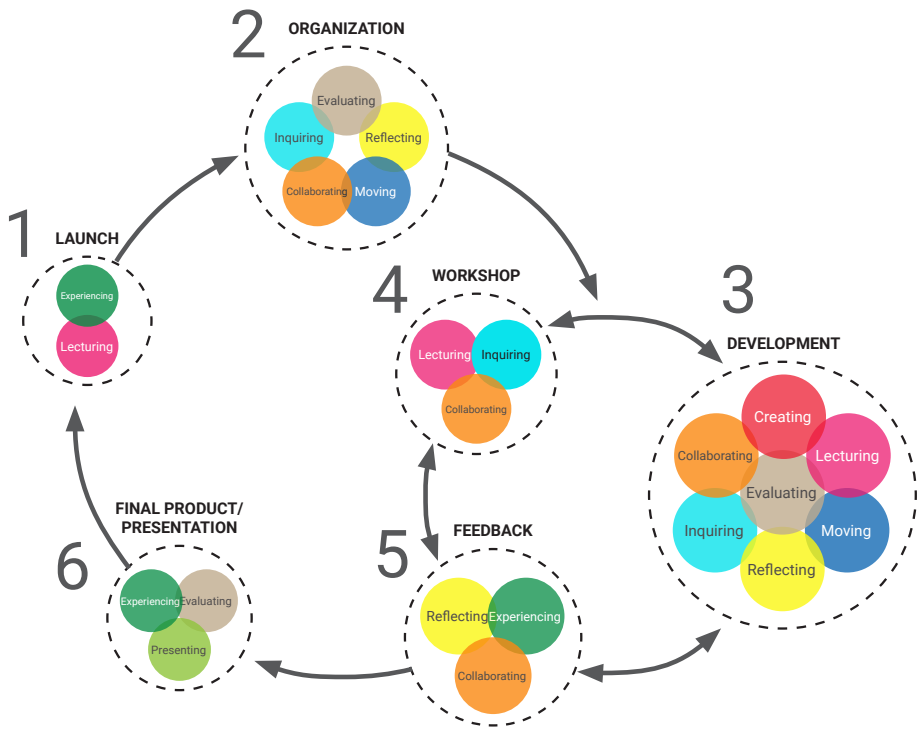
Inquiry-Based Learning Learning Suite Building

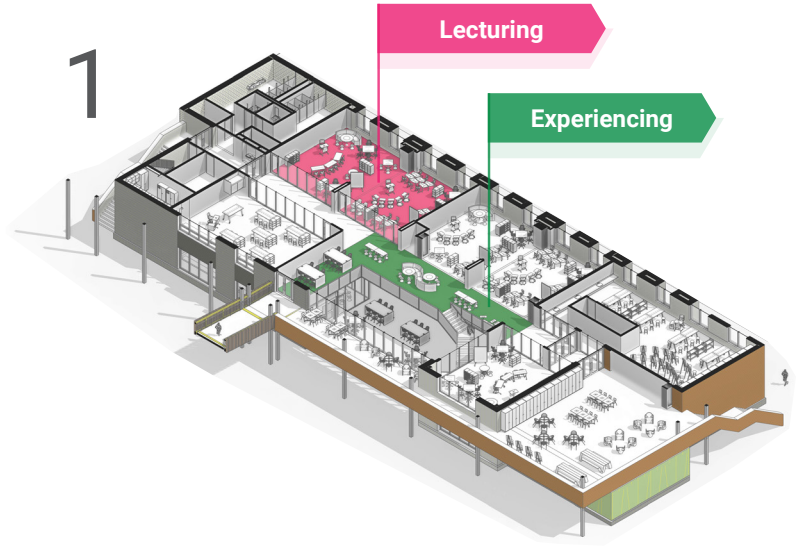
St. Croix Central High School

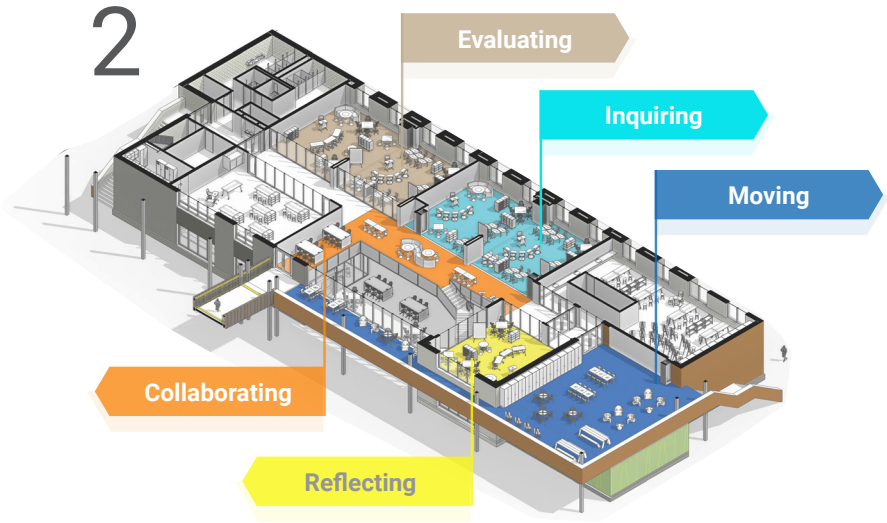
*Typical of both Learning Suite Buildings: Level 02

Inquiry-Based Learning at the Learning Suite Buildings

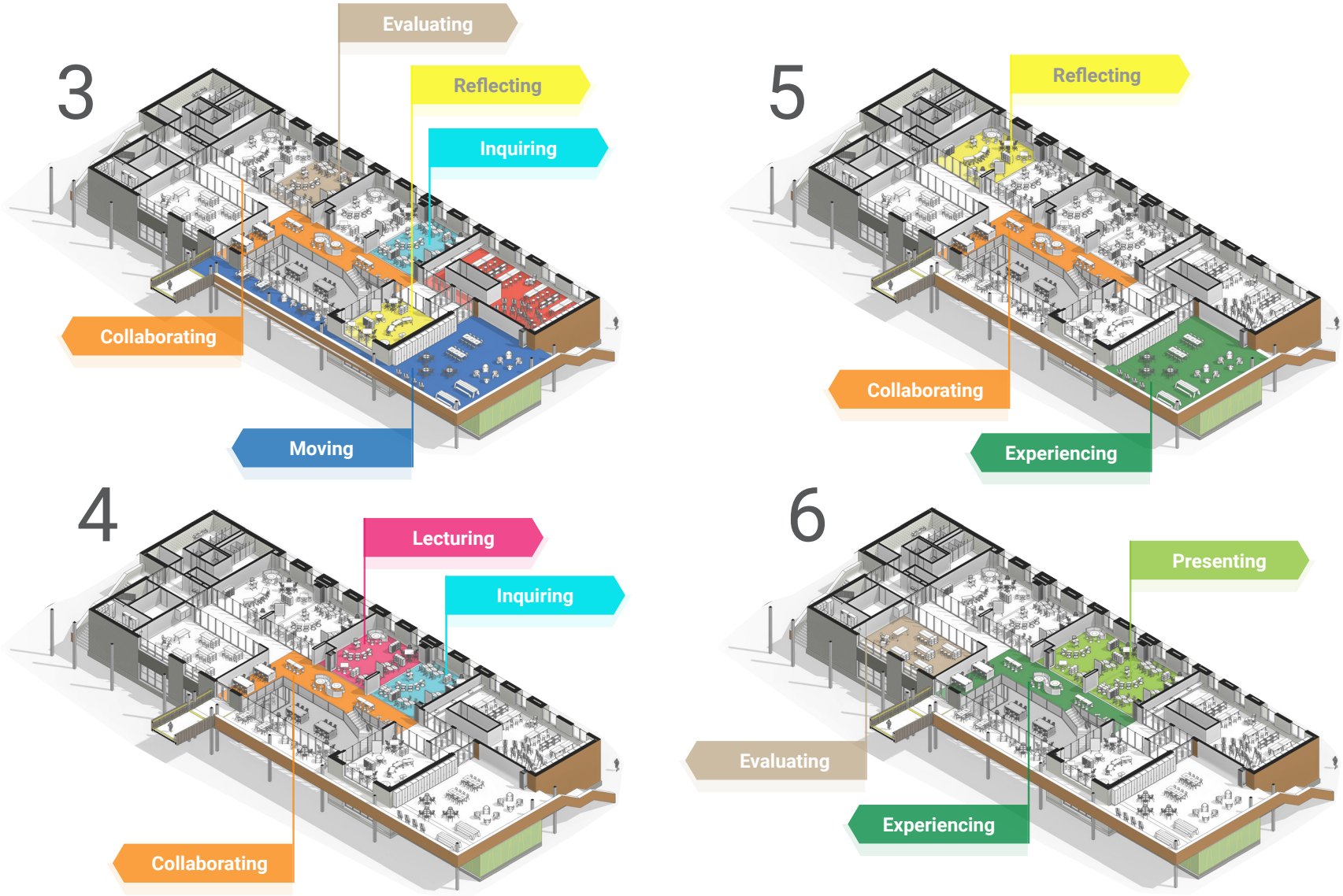
A dynamic form of active learning that begins with inquiry, problems, or scenarios. Students then identify, investigate, and research issues and respond to challenges or complex problems.







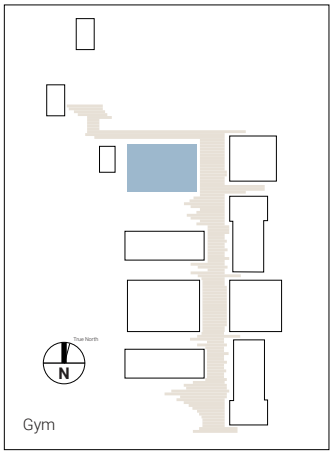
*Schematic Design Imagery: Included to support design concept. Reference drawings for final design.



Architectural Drawings Gym Building

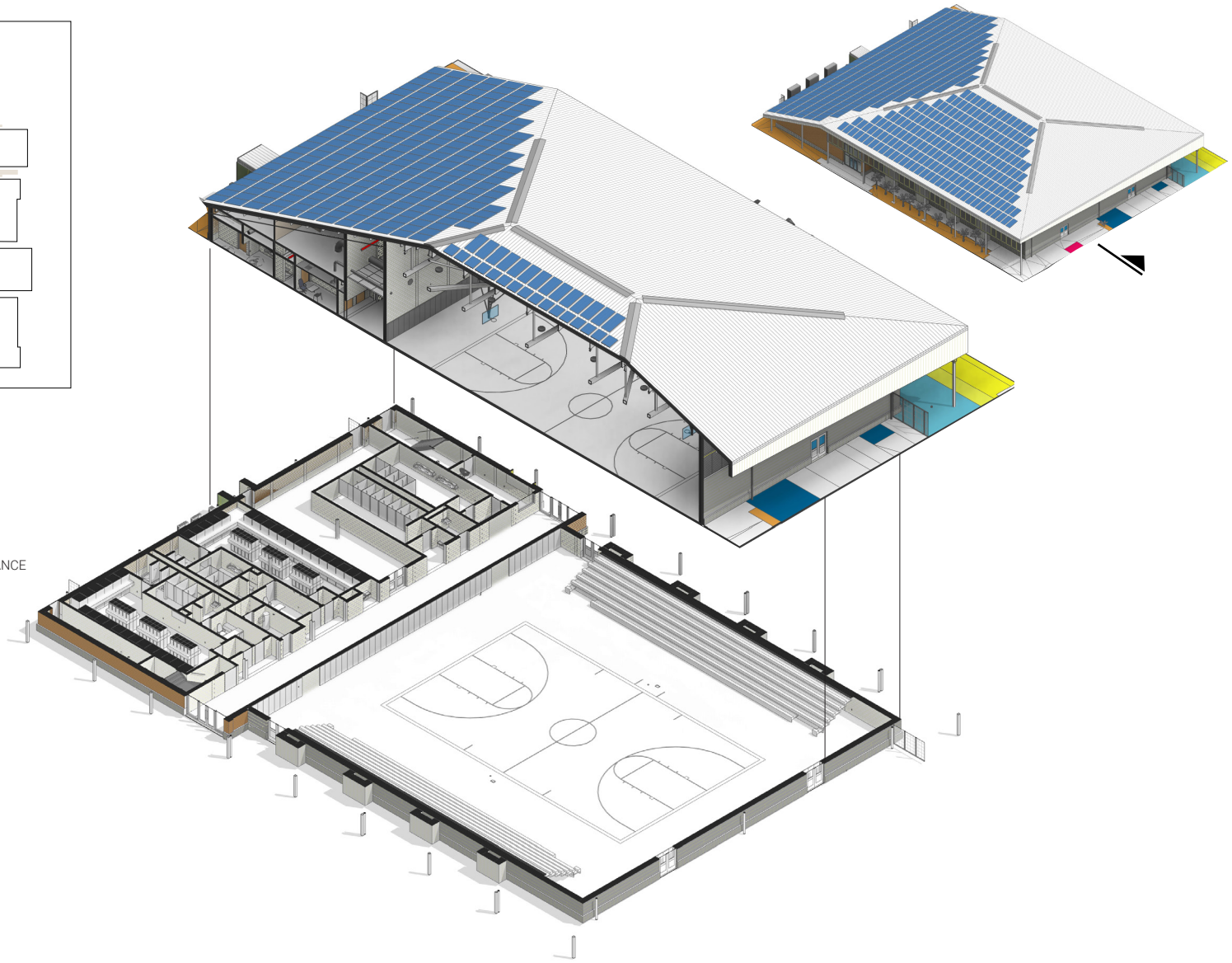
St. Croix Central High School

*Primary Shelter

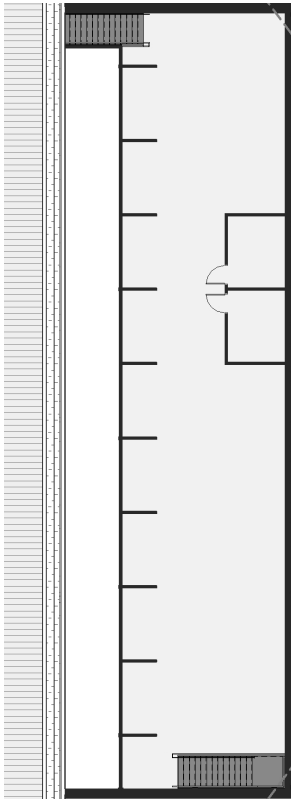


LEGEND

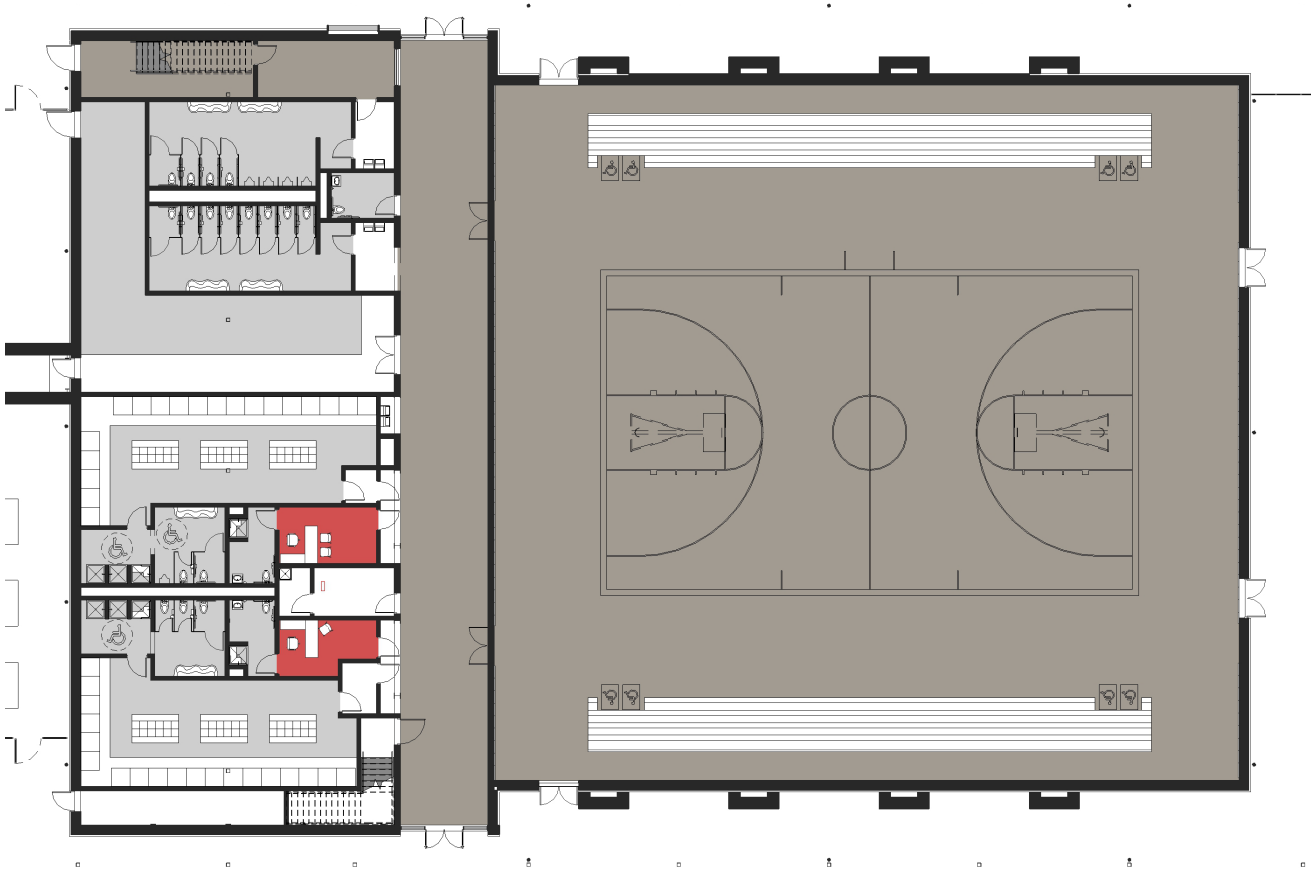
- MAIN ENTRY
- OUTDOOR
- ARTS AND PERFORMANCE
- LEARNING STUDIO
- SPED
- SCIENCE
- COMMONS/COLAB
- MEDIA/MAKER
- ATHLETICS
- ADMIN
- STORAGE
- RESTROOM



Gym Building, Floor Plan



Mezzanine



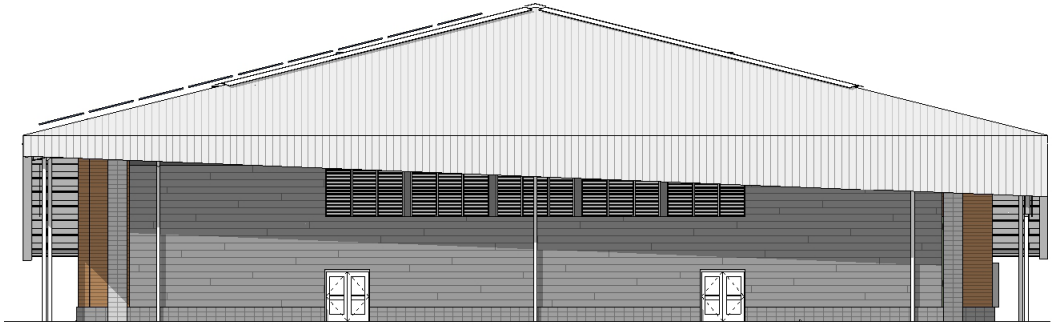
Primary Entry to Gym


CONCESSIONS

Architectural Drawings Gym Building

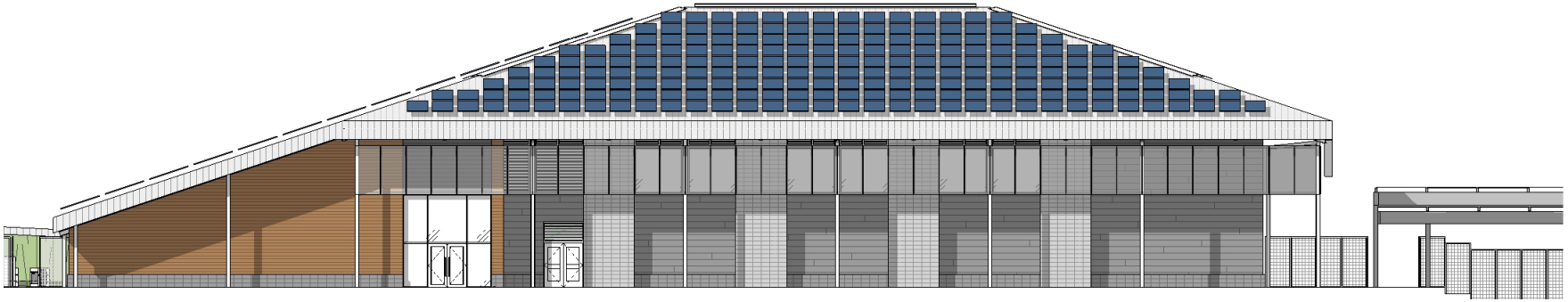
St. Croix Central High School

*Primary Shelter

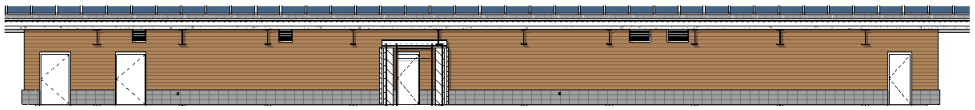


East Elevation

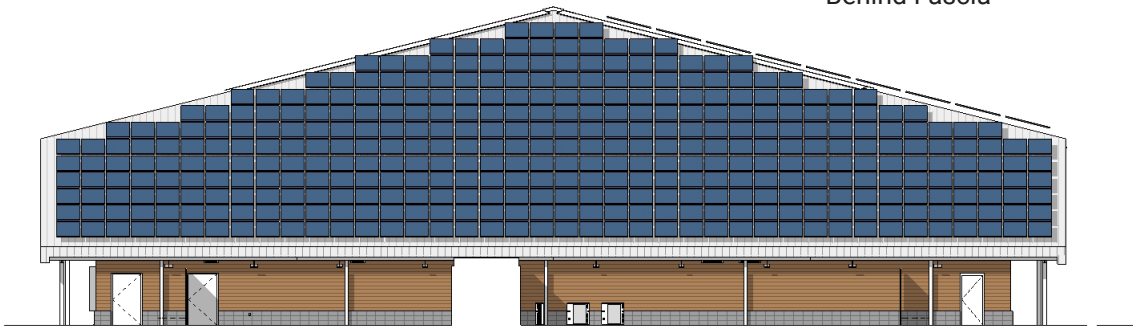
East Elevation
Behind Fascia



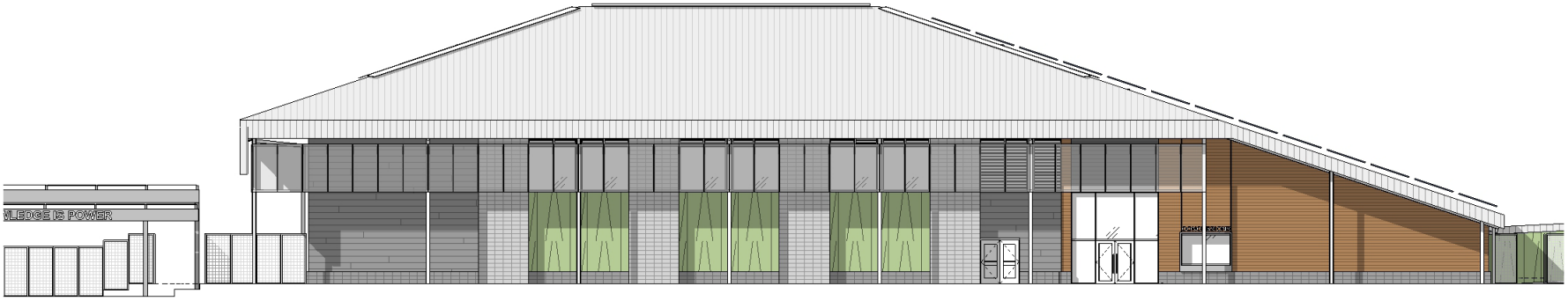
South Elevation



West Elevation
Behind Fascia



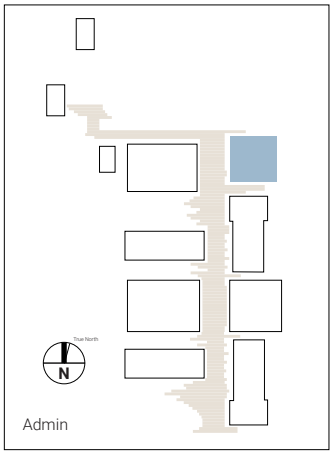
West Elevation

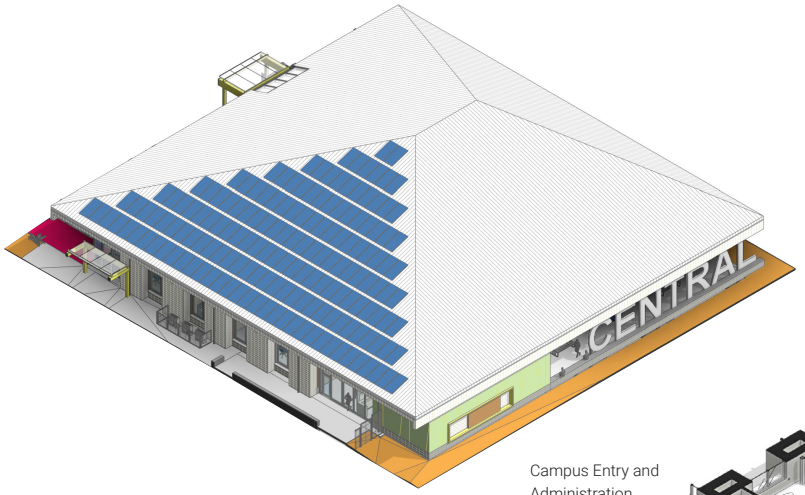


North Elevation

Architectural Drawings Administration Building

St. Croix Central High School





LEGEND

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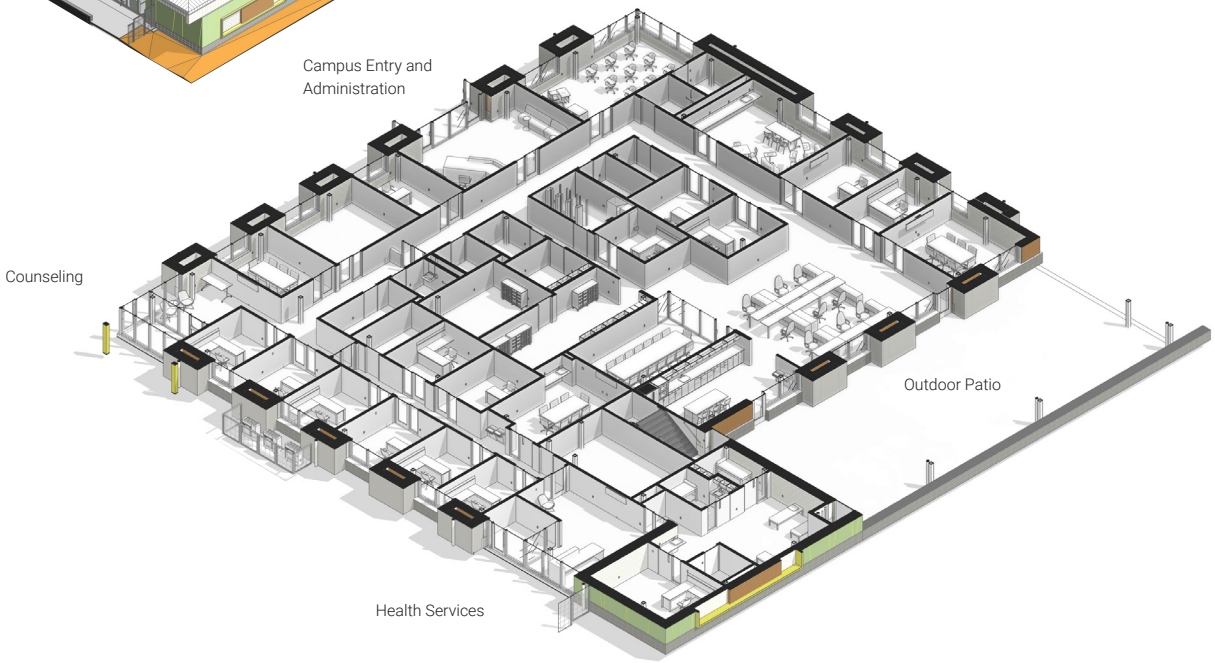
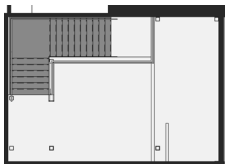
- STORAGE
- RESTROOM



Administration Building, Floor Plan

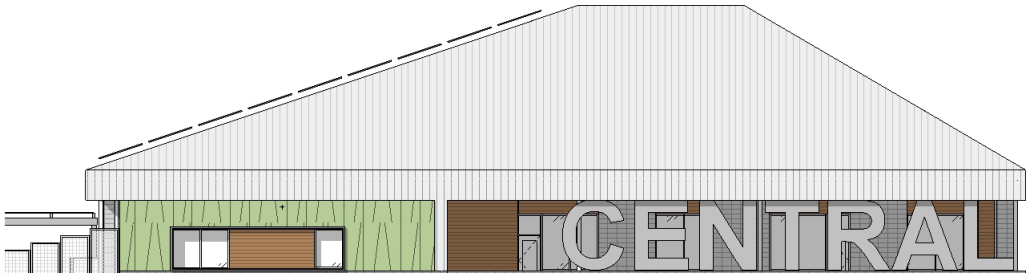
Not to Scale



Mezzanine

Architectural Drawings Administration Building

St. Croix Central High School



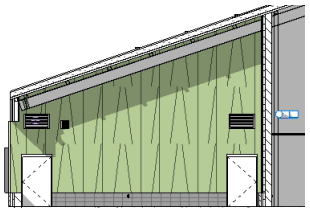
East Elevation

East Elevation
Under Roof

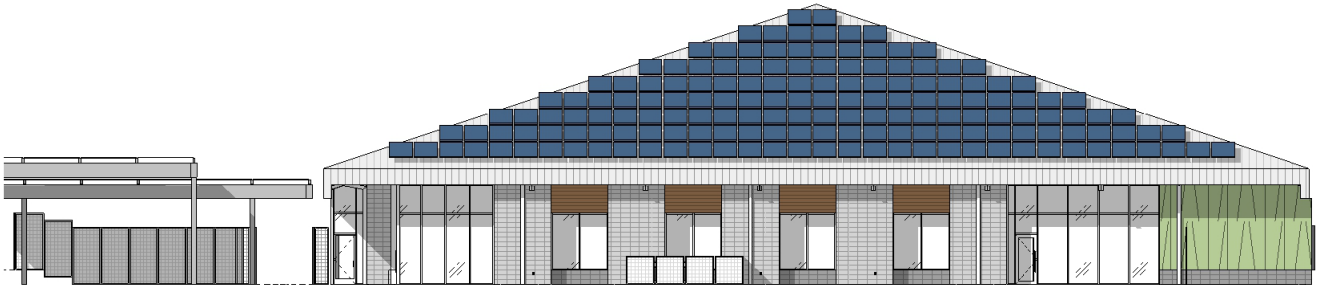
North Elevation

Not to Scale

West Elevation



North Elevation
Under Roof

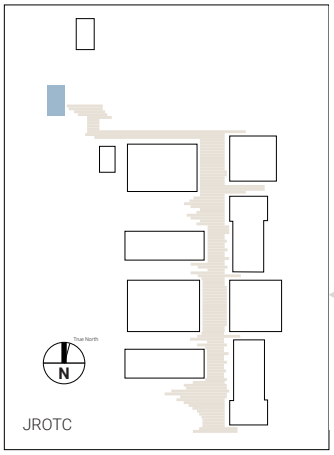


South Elevation

Architectural Drawings JROTC Building

St. Croix Central High School

Vision for Tomorrow



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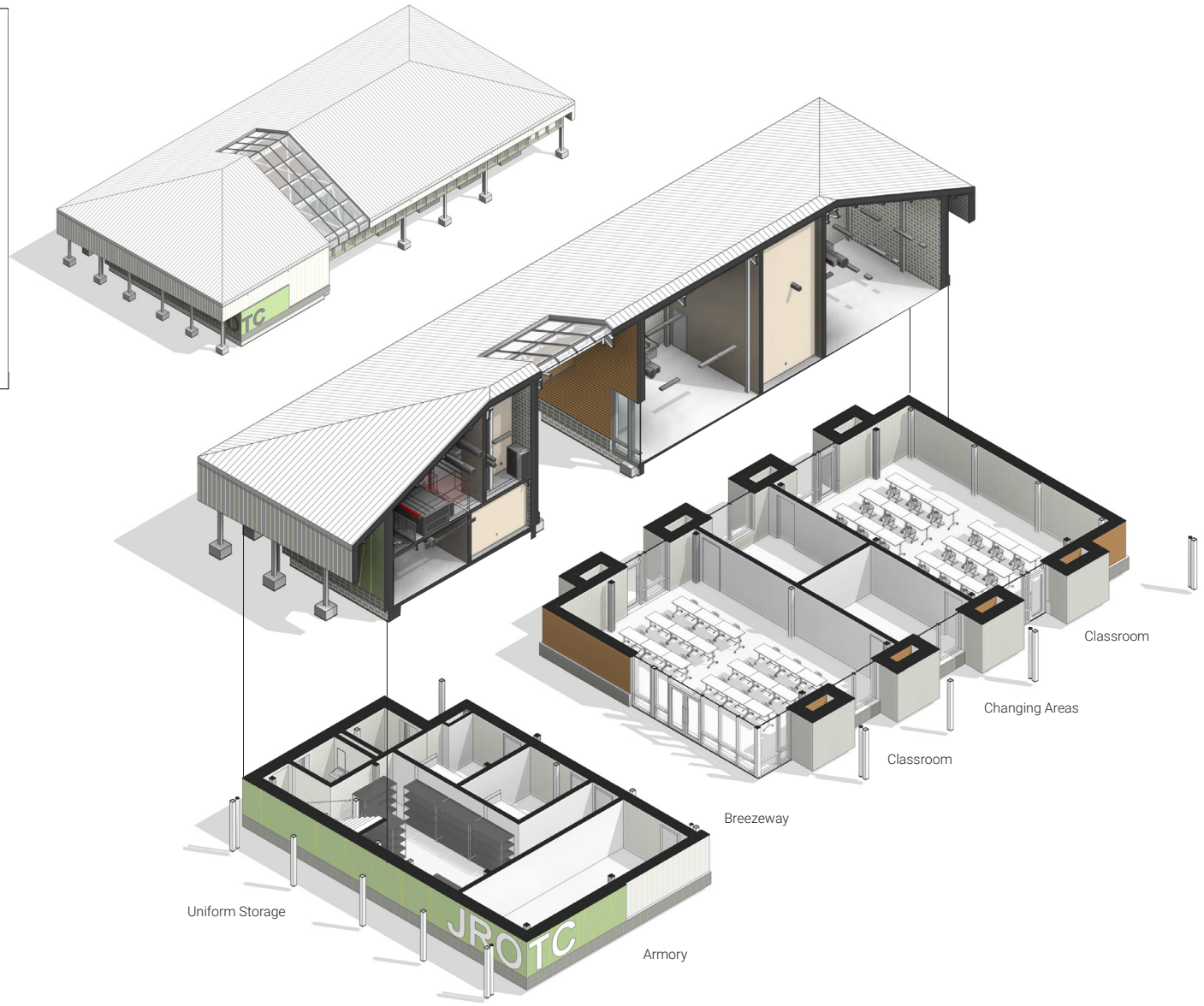

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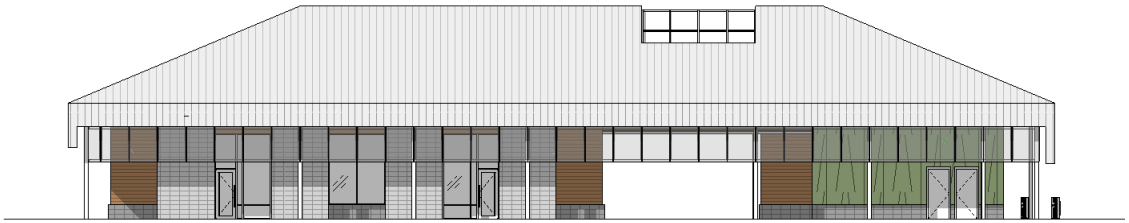
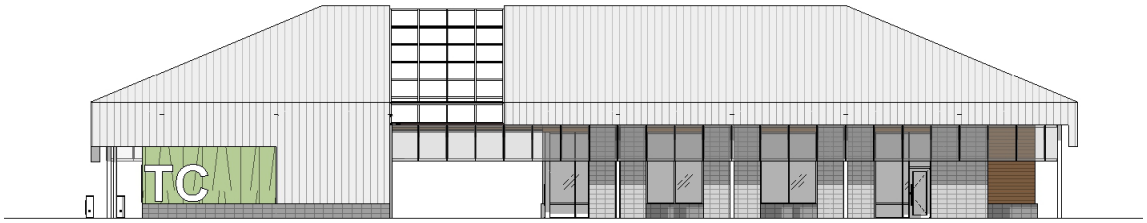
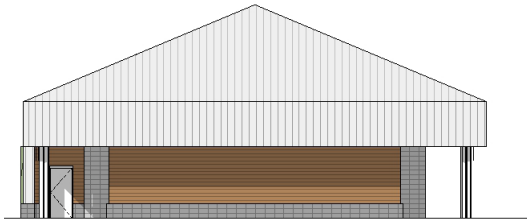


West Elevation



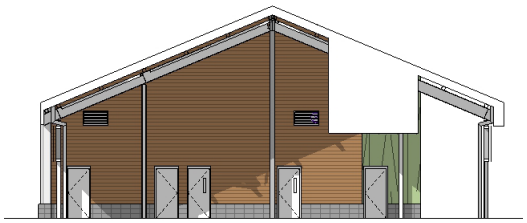
East Elevation



North Elevation

South Elevation

South Elevation Breezeway

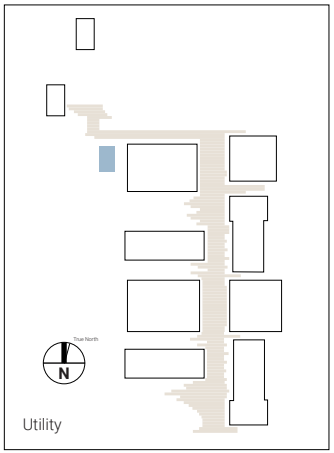


North Elevation Breezeway

Architectural Drawings Utility Building

St. Croix Central High School

Vision for Tomorrow



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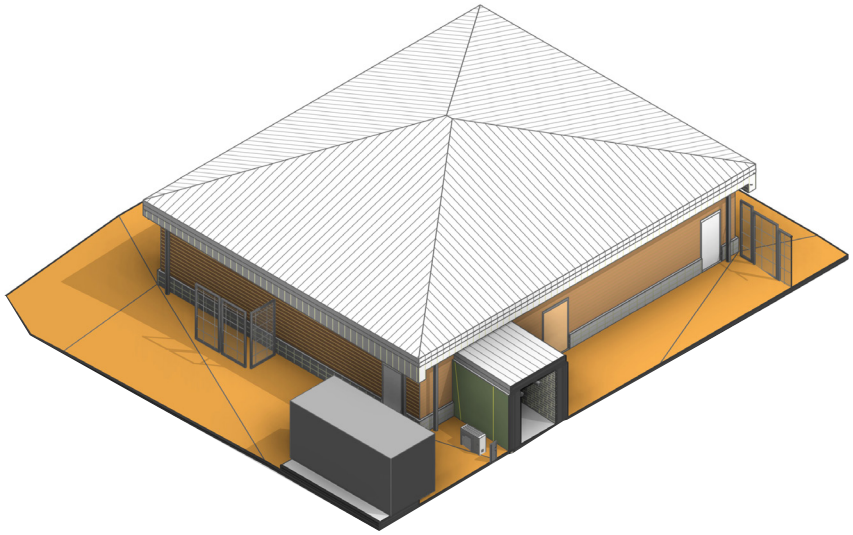

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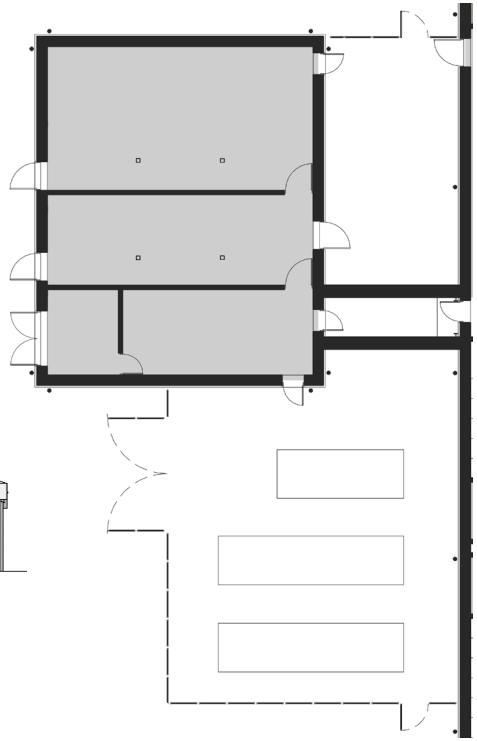
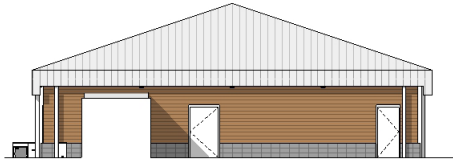
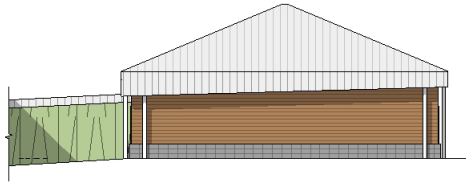


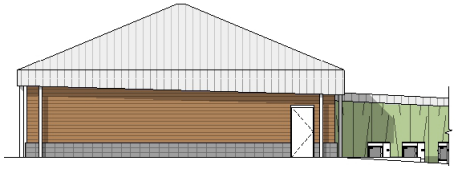


East Elevation

West Elevation

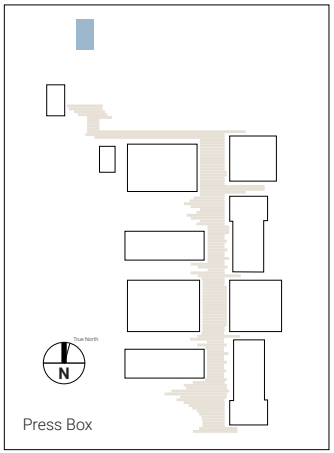


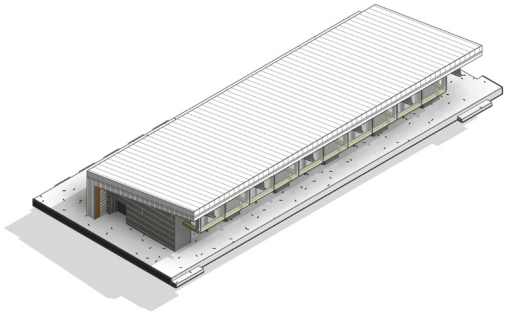
North Elevation



South Elevation

Architectural Drawings Press Box Building





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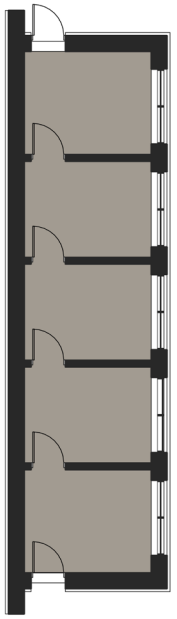

LEGEND

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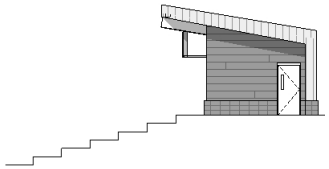
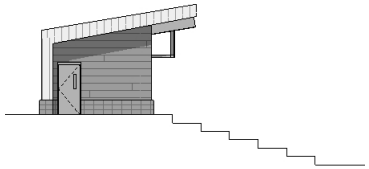
East Elevation

West Elevation



North Elevation



South Elevation

Architectural Shade Studies

While developing design studies for new and renovated VIDE schools, DLR Group asked the following question of Mr. Kennard Callen, the VIDE Director of Sports and Athletics.

From a learning standpoint, are there special Physical Education (PE) requirements (for space)?

Answer: "*Yes, Shade!*"

Across the St. Croix Central High School Campus, whether for athletics, outdoor learning, or general transit, shade is a necessary element of comfort and protection.

Independent of the building structures, shade structures have been incorporated along the full extent of the Harmony Walk. These structures are strategically located so that in the event of rain, a student will be able to move from one end of the campus to the other, under protection of a shade canopy.

The shade structures will have exposed structural steel framing, topped with a combination of insulated translucent fiberglass sandwich panels and perforated aluminum panels.

Additionally, and true to the island's architectural vernacular, each building has been equipped with deep roof overhangs to provide shade and protection at all building perimeters.

Image: *View to Visual Arts/Dance Building Breezeway from Underneath Shade Canopy*

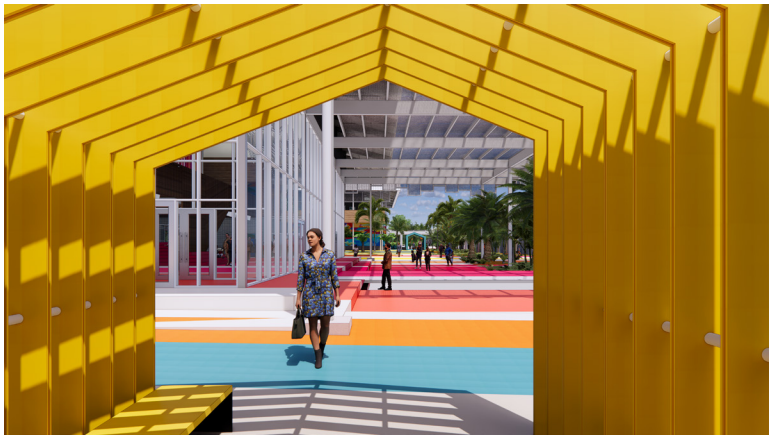
These shade strategies have been paired with architectural 'follies' distributed throughout the Harmony Walk. These small, covered enclosures will provide shaded outdoor work space. There are three variations of the folly, each with a different seating configuration. To extend the use of these spaces into evening hours, built-in benches will have integral lighting.

These structures are not intended to be permanent, long-term installations, but they should be able to sustain the high-force winds and seismic conditions of the site. Intended construction is color integrated, wood plastic composite lumber, 'connected' by a stainless steel rod.

Additional coordination and study is needed in the next phase of design to formalize a safe and secure construction that aligns with the above design thinking.

Top: *Aerial View of Harmony Walk*

Bottom: *Architectural Folly Adjacent to Gym*
Left: *Architectural Folly Outside of the Commons Building*



View to Harmony Walk from Main Entry Canopy (North End, Looking South)

Interior Design

St. Croix Central High School

Concept Narrative

The St. Croix Central High School design creates flexible, beautiful, and resilient learning environments that showcase active learning and flexible teaching scenarios with special emphasis on the unique needs of a fine arts magnet program.

As one thinks about place and the community of learners for which it supports, each building across the campus is centered around the creative nature of the arts. The interior concept is inspired by the journey an individual takes through the shared, immersive experience of music. Whether conscious or subconscious, the individual experiences a depth of creative energy while absorbing the art of a song. In the same way, traversing the campus takes the individual on a journey, celebrating the nuances and beauty of music. The following strategies are used to emphasize musical qualities by the design team:

Design Inspiration

> *"Teaching art is my passion. I cultivate art enthusiasts and creative world-changers.*
>
> *Danica M. David Artist Statement*
> Creative Callaloo I Danica M. David

Much like the effect music has on an individual, spaces throughout the buildings are designed to leave **IMPRESSIONS** on students, visitors, and faculty. Conversely, the spaces will be designed in a manner that allows the users to make impressions on the building in the form of influencing and effecting their environment. This is seen in the form of gallery walls, pin up spaces, and areas facilitating student interaction.

The design also aims to create **MOMENTS** of inspiration. The interior design will support the ability to reflect on your journey, inspire creativity, or cause a burst of energy. These moments will catch your eye in the form of a framed view and cause a reaction or pause in the existing architecture.

The art of Music is about celebration. **CELEBRATION** throughout campus will be manifested in the use of bold, vibrant colors in concentration to highlight spaces of performance, learning, or impromptu practice.

The interior design will speak to the pensive, thought provoking emotional and physical responses to music. **DEPTH** within the interior is used to draw users through the space with continuous elements spanning from one area to the next, framing a new perspective in the users' mind.

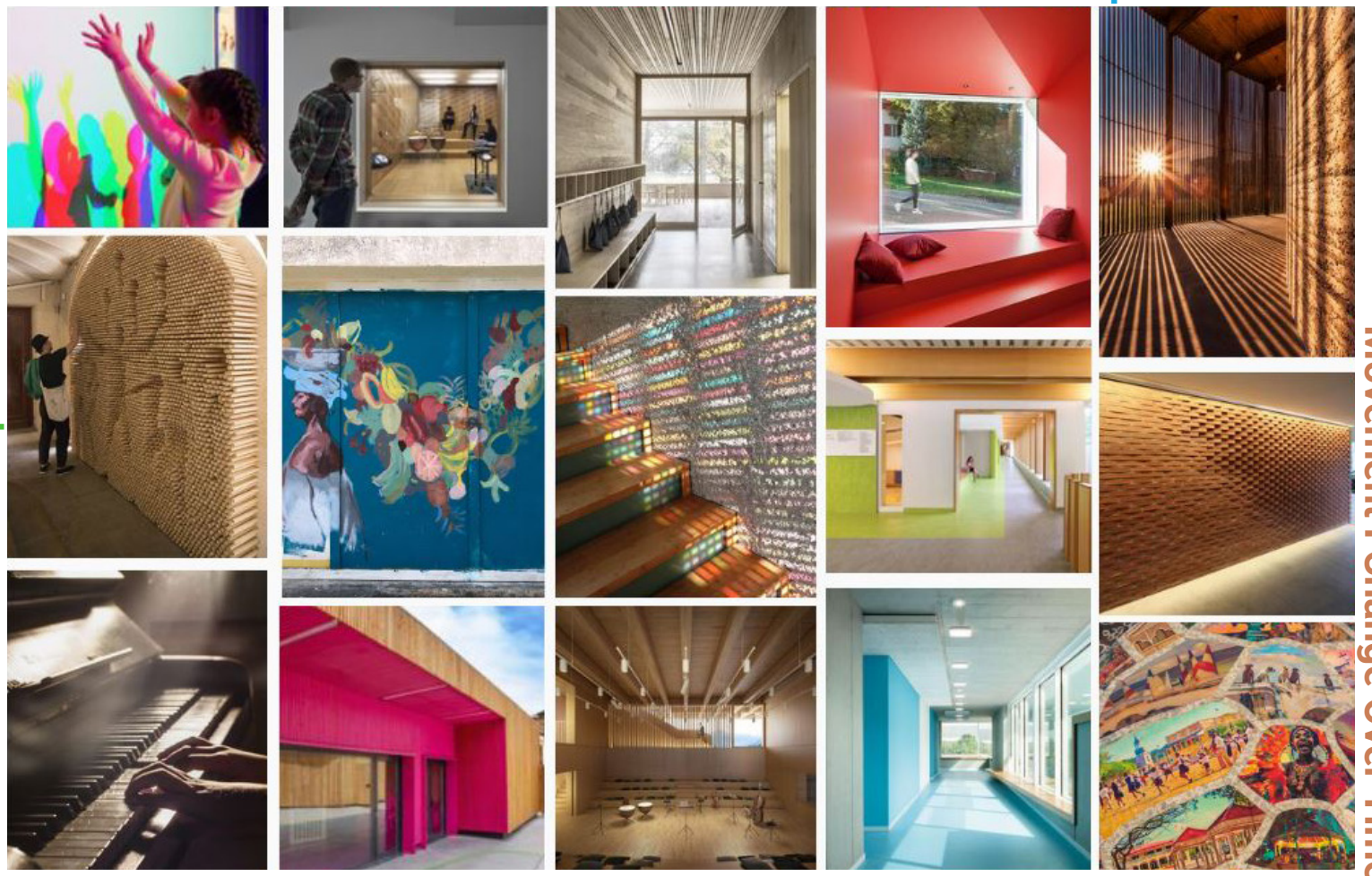
Music and the arts are in a constant state of change over time. This is shown on campus in the idea of **MOVEMENT** and texture. Used in the form of perforated screens that allow light to pass through and change throughout the day create inspiration and remind the users that the arts are not static. Fluid, ever-changing, innovative, full-bodied, more than what first meets the eye.

Image: *Interiors image study exploring the relationships between space and qualities of music. (Impressions, Moments, Celebration, Depth, and Movement)*

Moments I Reactions

Celebration I Expression

Impressions I Interactions



Movement I Change Over Time

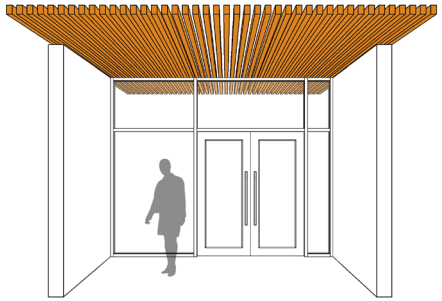
Extension of Space I Depth

Interior Design

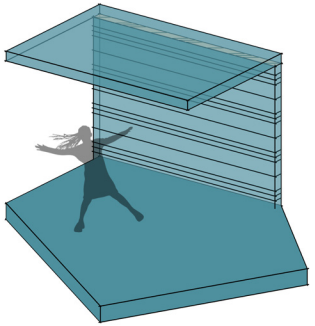
St. Croix Central High School

Interior Kit of Parts

IMPRESSIONS | DISPLAY



DEPTH | PERSPECTIVE

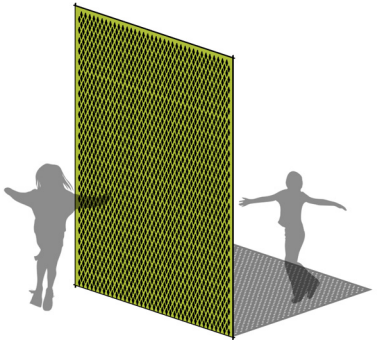


CELEBRATION | COLOR

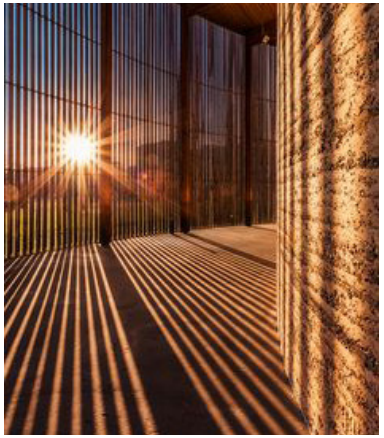
“Mere color can speak to the soul in a thousand different ways”

-Oscar Wilde

MOMENTS | VIEWS



MOVEMENT | TEXTURE



*VIDE Educational Facility Master Plan color studies.

Interior Design Palette

St. Croix Central High School

Color, Wayfinding, and Building Identity

The St. Croix Central High School color and material story is inspired by the natural landscapes of the islands. The color studies in the VIDE Educational Facility Master Plan informed the design and were grounded in natural elements like sand and sky, rain forest and sea, flora and fauna, and the sunset. The St. Croix Central High School campus uses the most vibrant hues from the master plan color studies. Each building has its own color story based on the function of the spaces it supports. The colors are organized based on the following conceptual categories: health and wellness, learning, collaboration, socializing, performance, creation, and exploration.

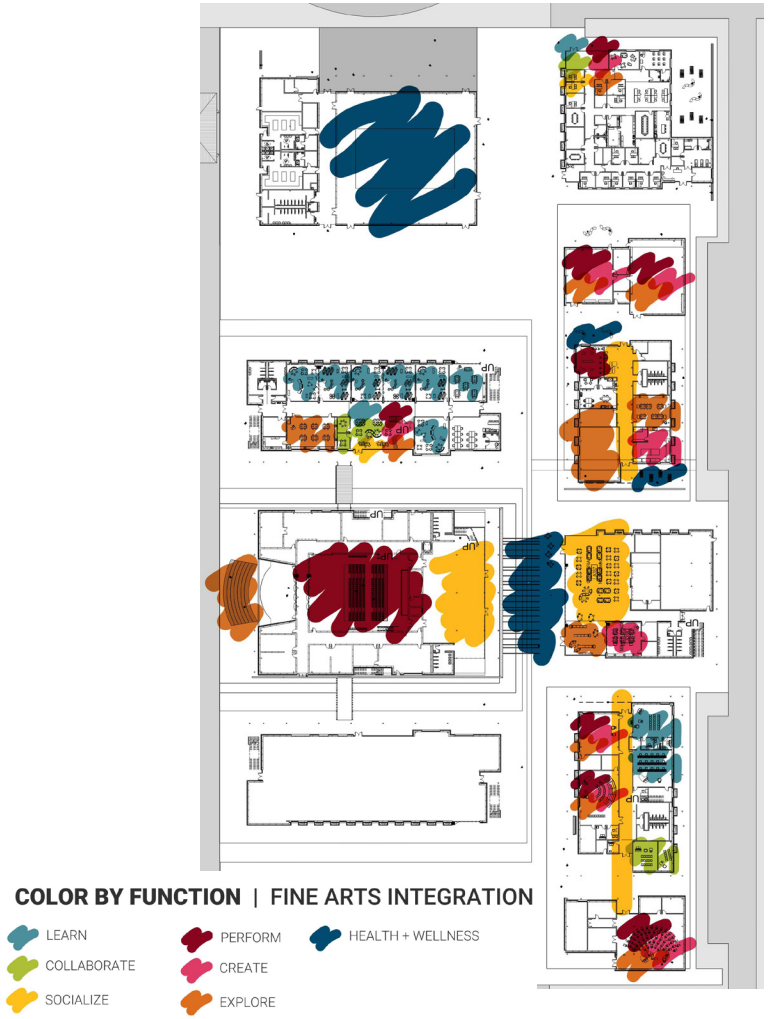
The St. Croix Central High School wayfinding strategy is inspired by the "distinctively Caribbean" and most traditional form of music on the islands, Quelbe. Instrumental themes, derived from Quelbe music, help organize the buildings. By giving each building their own identity, students, faculty, and visitors will navigate the campus efficiently and safely.

Theater and Commons Building: Flute and Voice
The flute and voice dance atop the beat of the song. These spaces are light, airy, and fun, with strong melodic qualities.

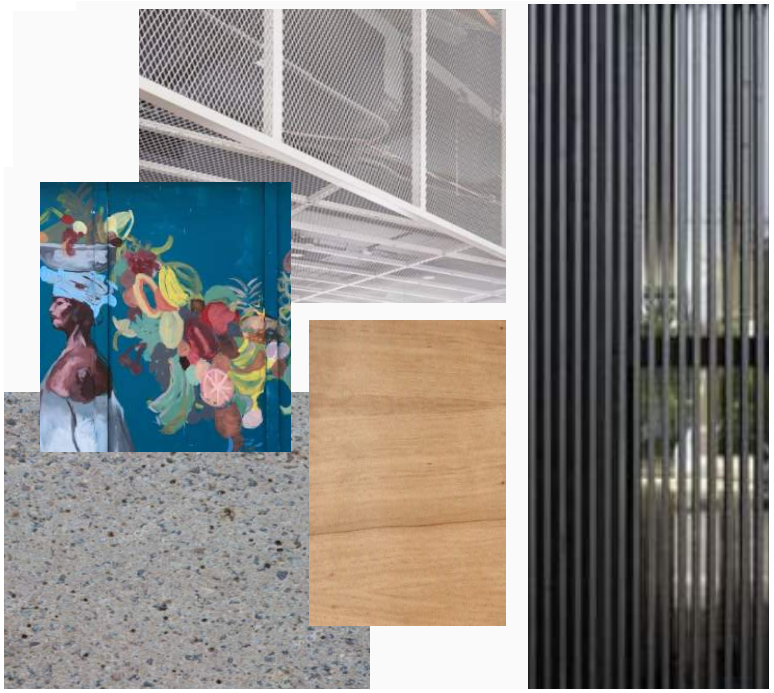
Learning Suite Buildings: Guitar and Banjo
Like the core curriculum supported in the learning suite buildings, the guitar and banjo lay a harmonic groundwork.

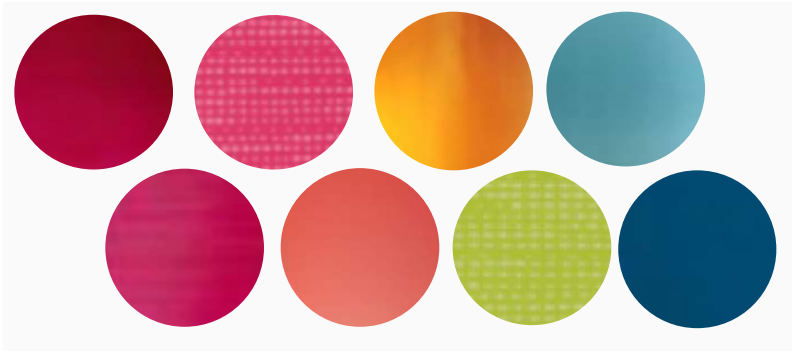
Visual Arts/Dance and Music Buildings: Tambourine and Squash
These percussion instruments provide exciting special effects, and accent the core melody.

Gymnasium and Admin Buildings: Steel and Conga Drums
The drums keep a strong steady beat.



*VIDE Educational Facility Master Plan color studies featured on previous spread.



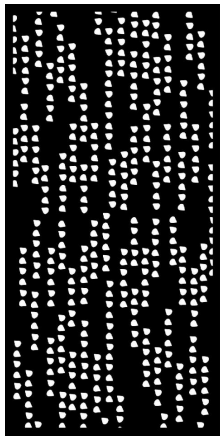


Top: *Dance studio with color applied at linear ceiling elements.*

Bottom: *Music classroom with multiple colors/patterns, used to compliment a warm linear ceiling.*

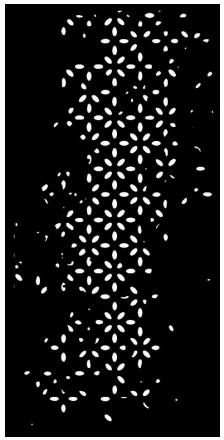
Interior Design Palette

St. Croix Central High School

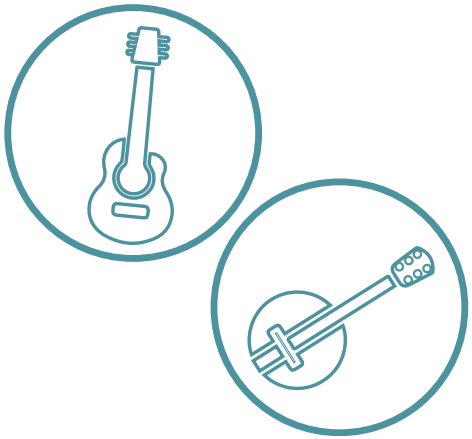


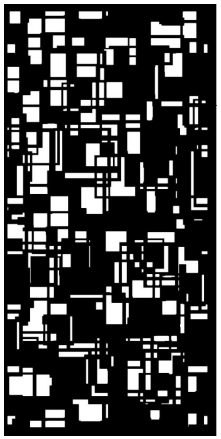
Top: *Gymnasium and Admin Buildings: Steel and Conga Drums*

Bottom: *Visual Arts/Dance and Music Buildings: Tambourine and Squash*



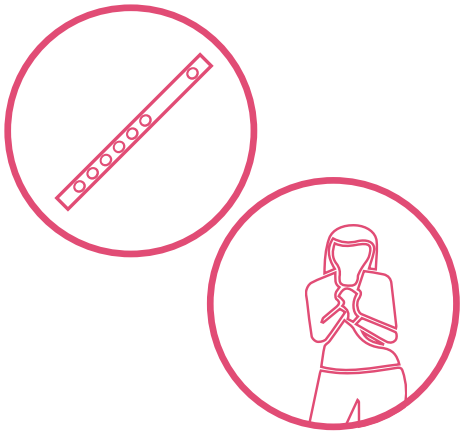
...the distinctively Caribbean, yet uniquely Virgin Islands, sound of quelbe music is an old but new dance music...that tells of historical events on the island of St. Croix and accompanies local traditions of quadrille dance.

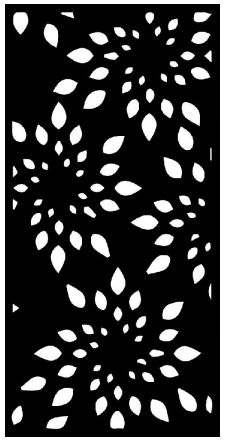




Top: *Learning Suite Buildings: Guitar and Banjo*

Bottom: *Theater and Commons Building: Flute and Voice*





Smithsonian Folkways Recordings: Quelbe! Music of the US Virgin Islands
Image: Folklore Wall Paintings, British Virgin Islands, Caribbean

Interior Materials and Finishes

Finish Sustainability
Interior finishes have been evaluated for their alignment with the project and district's sustainability goals. Specified products will create a healthy interior environment, will be easy to clean, and will not retain moisture. They will elevate the indoor air quality, minimize waste pre- and post-construction, and contain pre- and post-consumer recycled content, while concurrently maintaining durability, and meeting performance requirements. Product material ingredients should be evaluated to reduce the use of known harmful chemicals without compromising the products' durability, longevity and performance requirements.

All paints, adhesives, coatings, sealants, carpet, and wood to be low to zero VOCs

All wood to contain no formaldehyde and be FSC certified

Acoustic materials have been considered for each space. Acoustically absorptive finishes have been coordinated with the design team to control reverberation and satisfy aesthetic, durability, programming, and budgetary requirements. High-performing treatments have been incorporated throughout the campus, with special attention and consideration to sound control in all performance spaces.

In conjunction with material, color, and acoustic studies, interior and exterior lighting will be an important facet of the design. Spaces will be properly illuminated and have even light distribution with an emphasis on daylight.

*To reinforce the theater as the heart of the campus, colored lighting, will be featured at the theater roof and building interior.

Image: *Flexible Performance Theater: Level 02 Balcony with View to Harmony Walk*

Lighting Strategies

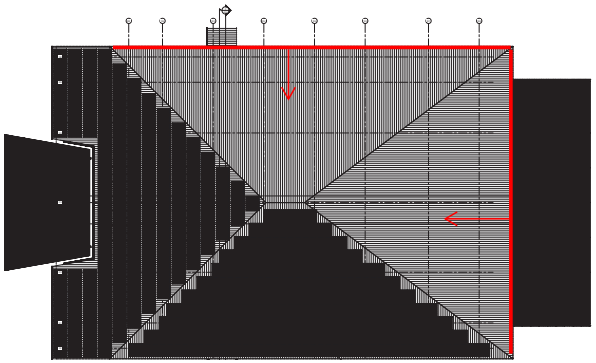
St. Croix Central High School

*Schematic Design Imagery: Included to support design concept. Reference drawings for final design.

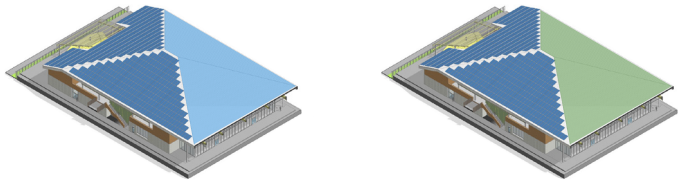
Across the campus, all buildings are to receive a standing seam metal roof finish in Bone White. This light colored finish is intentional to support the energy goals of the campus; it also balances the intense, saturated colors in the building murals and in the stained paving on the Harmony Walk.

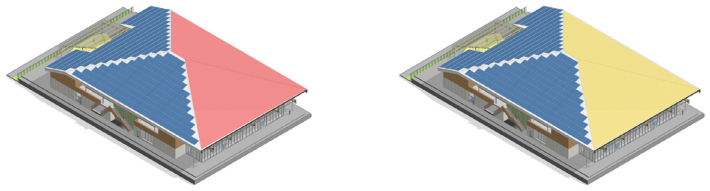
To provide additional opportunity for color, in a flexible application, the design team has coordinated for colored lighting at the roof of the theater building. This ability reinforces the notion of the theater as the heart of the campus and will allow various user groups to brand the building to their special event. From a campus perspective, it will provide a connection to the performance happening within the theatrical space and add ambiance to the campus during special events.

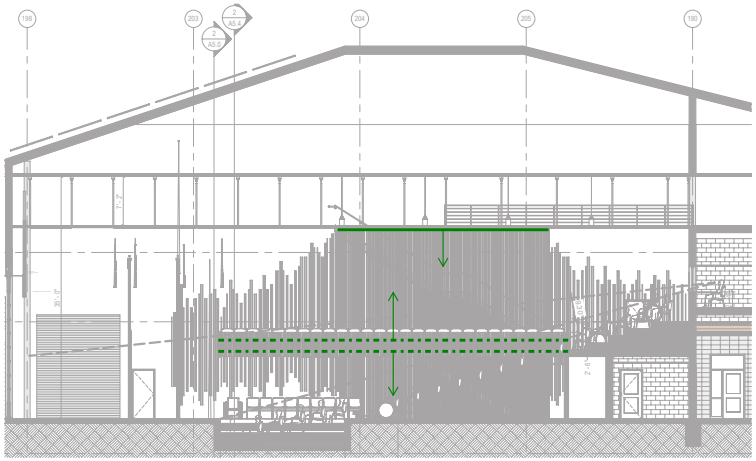
The specified fixtures will allow the users to adjust color on the roof with the addition of simple 'shows' including solid washes cycling or color chases.



Images: *Schematic studies of color application at theater roof and theater interior. Colors can coordinate to the palettes developed in the VIDE Educational Facility Master Plan or directly to school or community stakeholder branding.*







To coordinate with the roof lighting, a similar strategy has been employed on the theater interior. At the wings, integral to the composite paneling system, and at the ceiling plane, to highlight the traditional hip roof form, users will be able to adjust a color wash to give an illusion that the theater itself is glowing.

Design Strategy

> ***"Colored lighting has been added to the theater building to provide a connection to the performance happening within the theatrical space and add ambiance to the campus during special events.***








Flexible Performance Theater: View from the Harmony Walk to Theater Lobby


CONCESSION
BOX
CREATE

Interior Design

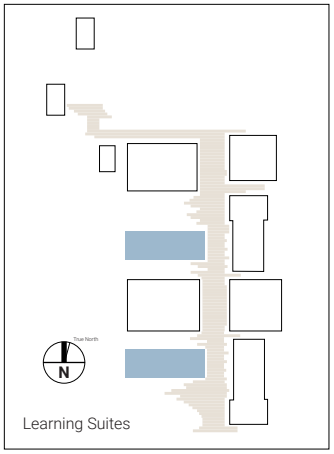
St. Croix Central High School

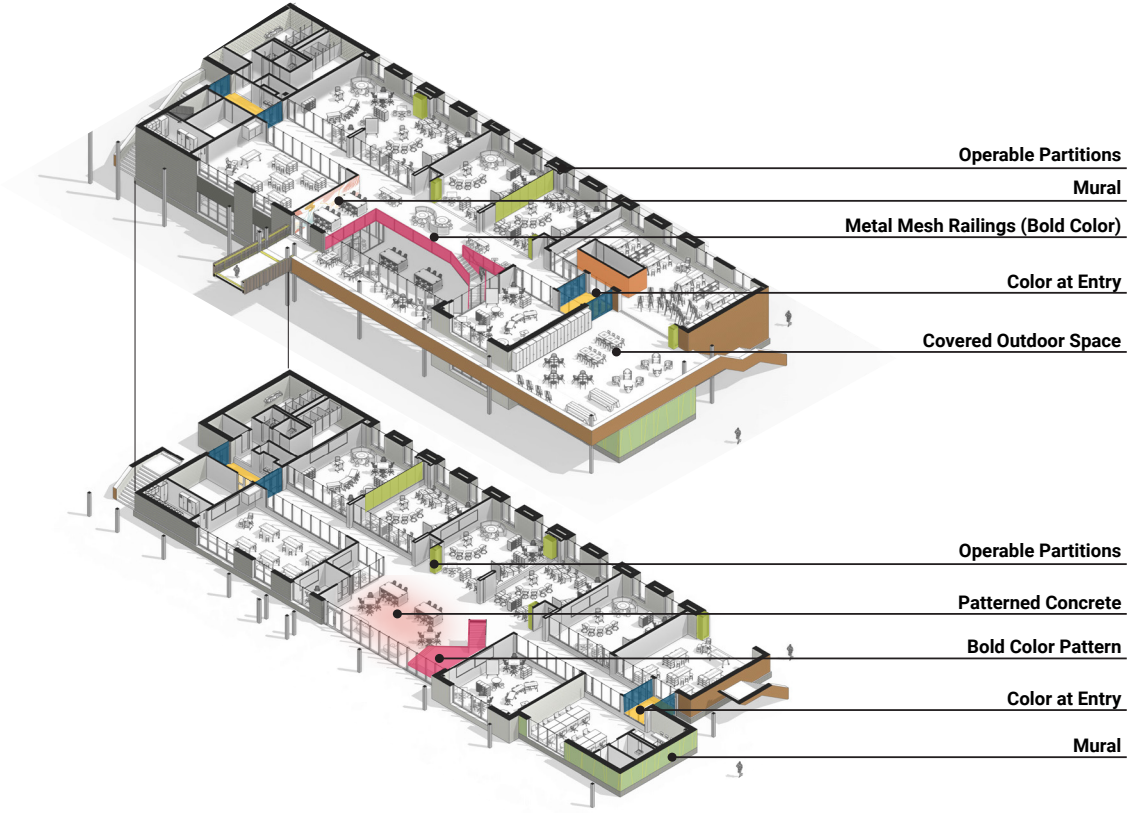
*Schematic Design Axons: Included to support design concept.
Reference drawings for final design. Typical of both Learning Suite buildings.

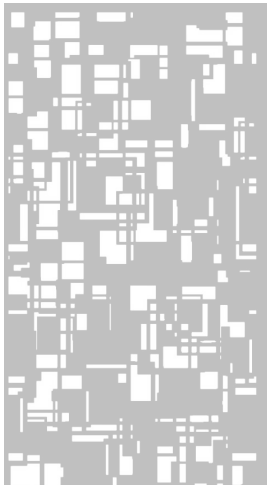
Learning Suite, Levels 01 and 02

*Learning Suite design strategies indicative of campus-wide approach.

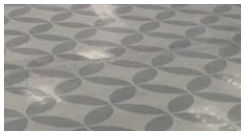
Not to Scale







Perforated Metal Panel



Patterned Concrete

Metal Mesh Railings

Mural

Student Display

Open Collaboration Areas

1 Collaboration zone defined by floor pattern.

2 Bright, saturated, metal-mesh railing, celebrating and calling attention to two-story connection.

3 Double height mural inspired by island culture.

4 Small group rooms, emphasized by color.

5 Stair platform highlighted with color accents.

Top Image: *View from Art Lab to Outdoor Balcony*
Bottom Images: *Learning Suite Collaboration Area, Level 01*

Interior Design

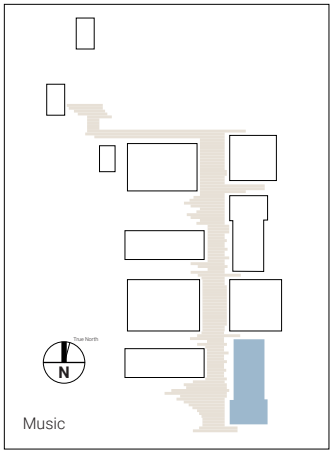
St. Croix Central High School

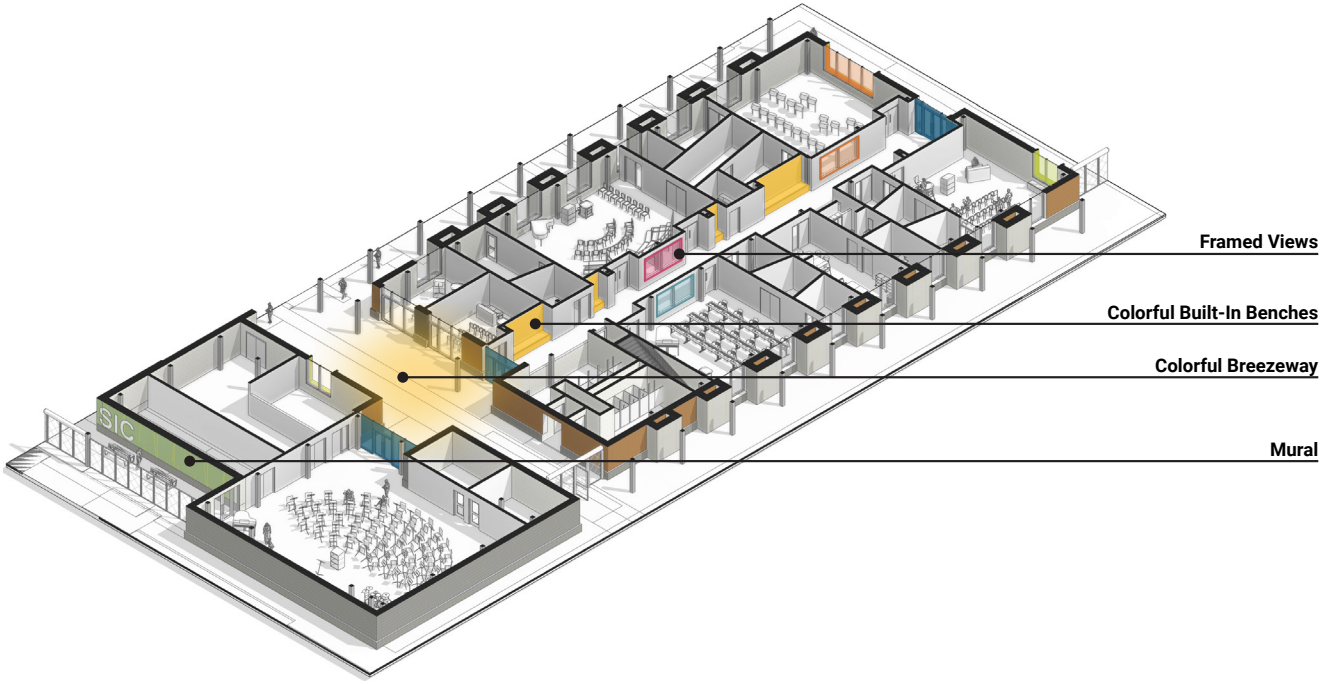
*Schematic Design Axons: Included to support design concept. Reference drawings for final design.

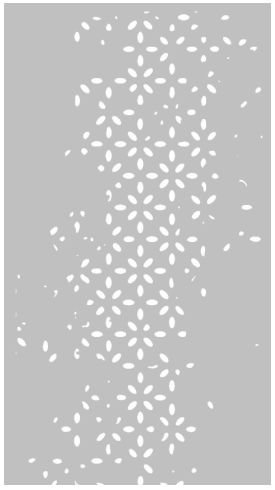
Music Building

*Music and Visual Arts/Dance design strategies indicative of campus-wide approach.

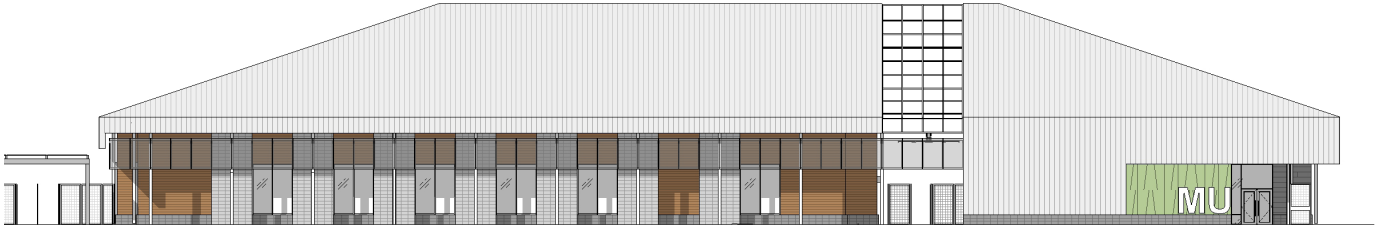
Not to Scale





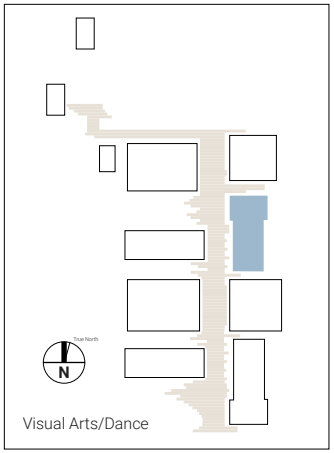


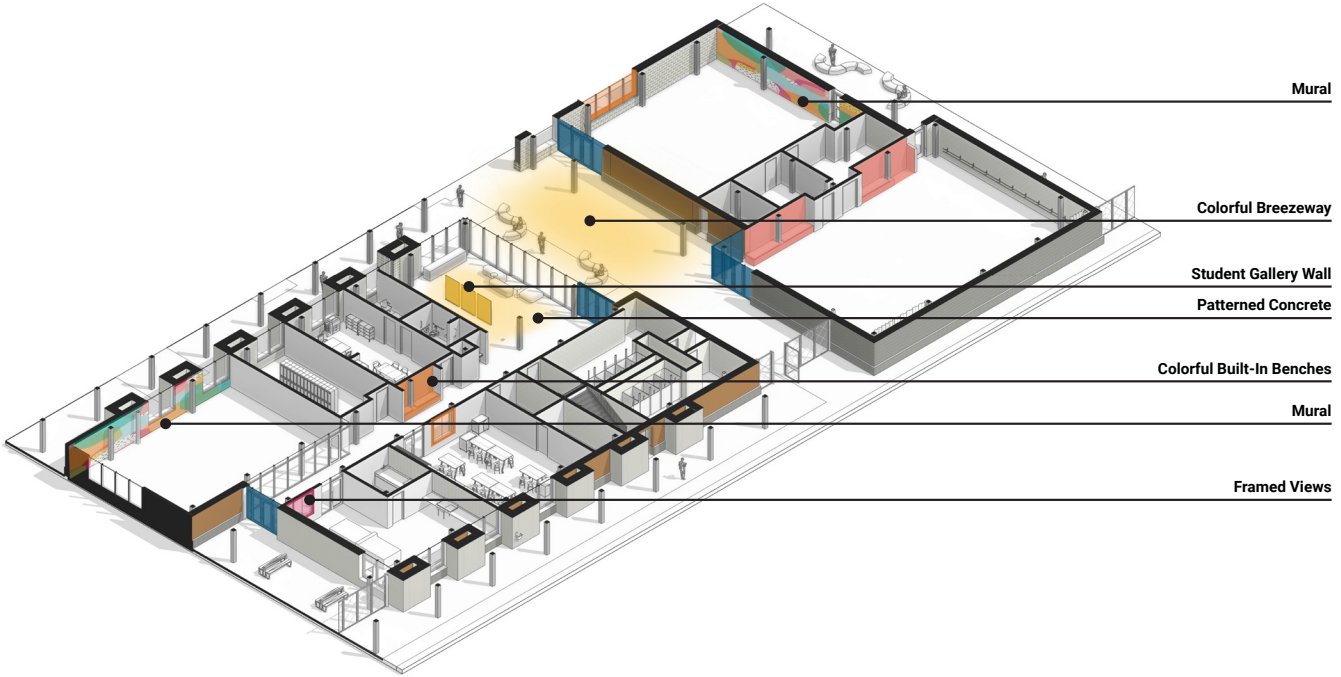
Perforated Metal Panel

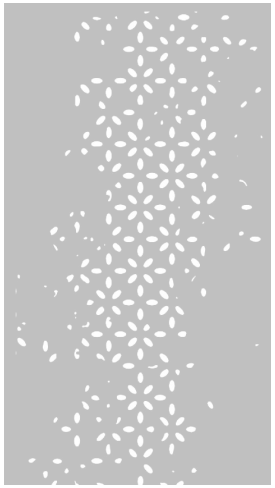


Visual Arts and Dance Building

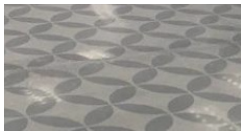
Not to Scale







Perforated Metal Panel



Patterned Concrete

Mural

Student Display

Colorful Built-In Benches

Framed Views

Interior Design

St. Croix Central High School

Commons Building

Dining Area

1. Maker Space anchored on South edge with colorful mural.
2. Acoustic panels to control sound and define Media Library footprint.
3. Architectural Folly for small scale, more focused interactions.
4. Plastic composite panel system, made to look like wood, with AV speaker equipment beyond, and an integral graphic signage element.
5. Brightly stained concrete connecting the Theater and Commons buildings across the 'Harmony Walk.'


IX CENTRAL
1
2
3
4

Design Strategy

"The gymnasium will support athletics and physical education and serve as the primary storm shelter for the campus. The St. Croix Central High School campus, in exception for the gymnasium, is designed to be net zero ready. The gymnasium, as the shelter, will be net zero-off the grid.

StxCentral Wall Assemblies

St. Croix Central High School

Exterior walls and interior partitions have been designed to support conditioning requirements for a net zero ready design. Wall types and finishes are informed by conditioning adjacencies, a desire to reduce mass, wall heights, opportunity for mold/mildew, acoustics, and cost/labor/install.

All wall types can be identified in one of three main categories:

Exterior Thermal Wall

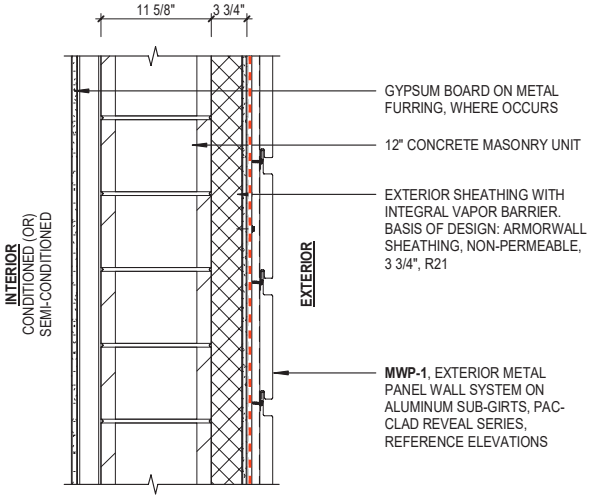
Interior Thermal Wall

Conditioned Non-Thermal Wall

The Exterior Thermal Walls integrate Armorwall sheathing into the assembly as a basis of design. Armorwall is a structurally insulated sheathing with an integral vapor barrier.

Please note, the vapor barrier should always be on the warm side of the insulation.

Exterior Thermal Walls

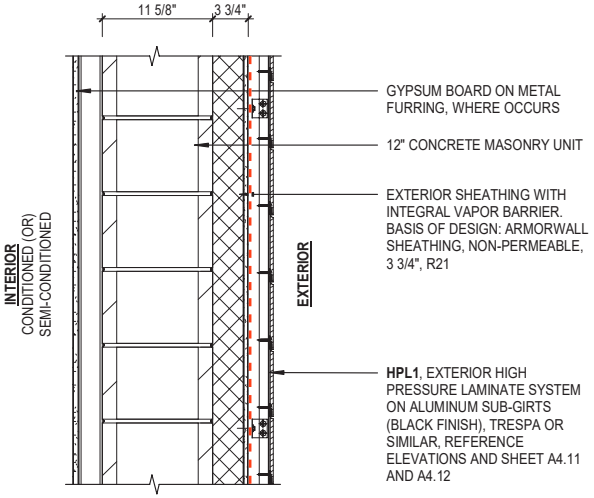


EXT4

EXT4: USE **MWP-1** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION

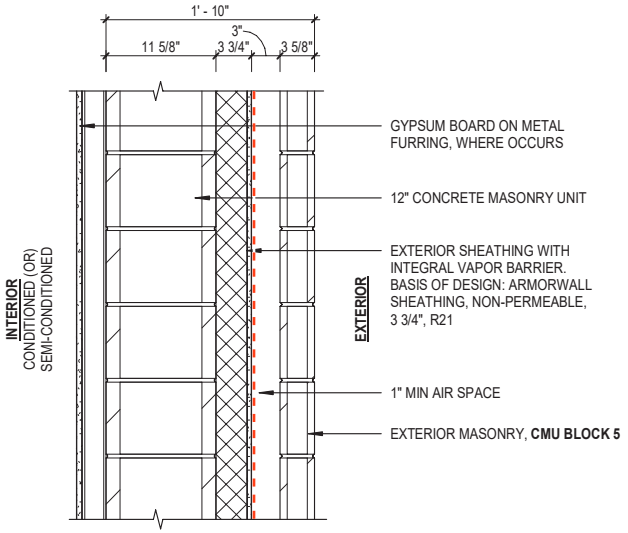
Exterior Thermal Walls (Cont)



EXT3W

EXTM: USE **HPL1** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION



EXTM

EXTM: USE **CMU BLOCK 5** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION

StxCentral Wall Assemblies

St. Croix Central High School

Exterior Thermal Walls (Cont)

Exterior walls and interior partitions have been designed to support conditioning requirements for a net zero ready design. Wall types and finishes are informed by conditioning adjacencies, a desire to reduce mass, wall heights, opportunity for mold/mildew, acoustics, and cost/labor/install.

All wall types can be identified in one of three main categories:

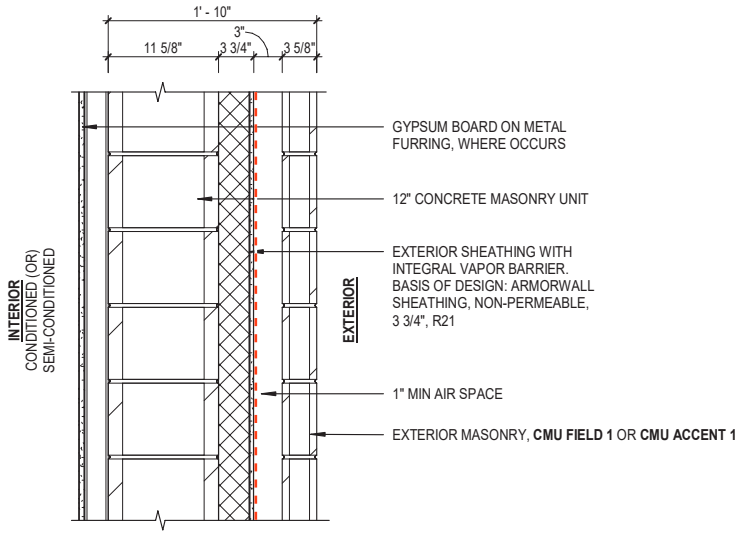
Exterior Thermal Wall

Interior Thermal Wall

Conditioned Non-Thermal Wall

The Exterior Thermal Walls integrate Armorwall sheathing into the assembly as a basis of design. Armorwall is a structurally insulated sheathing with an integral vapor barrier.

Please note, the vapor barrier should always be on the warm side of the insulation.

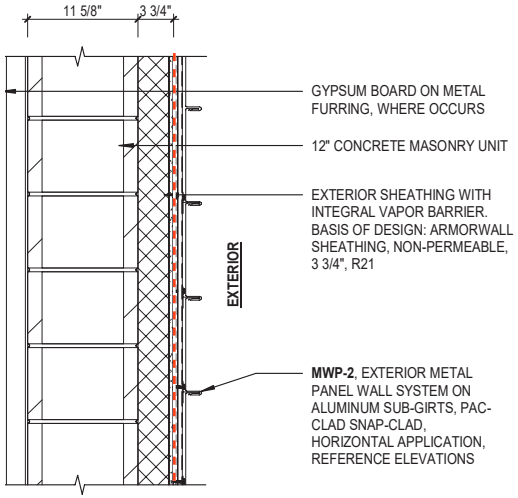


EXT1 / EXT2

EXT1: USE **CMU FIELD 1** FOR EXTERIOR FINISH
EXT2: USE **CMU ACCENT 1** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION

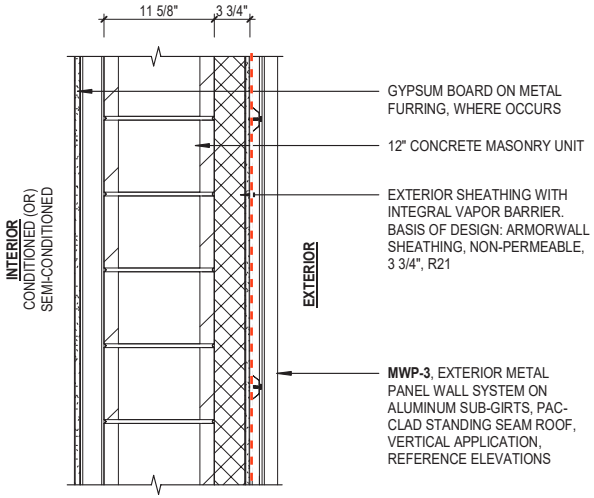
Exterior Thermal Walls (Cont)



EXT5

EXT6: USE **MWP-2** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION



EXT6

EXT6: USE **MWP-3** FOR EXTERIOR FINISH

REFER TO SHEET A4.11 FOR ADDITIONAL EXTERIOR FINISH MATERIAL INFORMATION

StxCentral Wall Assemblies

St. Croix Central High School

Exterior walls and interior partitions have been designed to support conditioning requirements for a net zero ready design. Wall types and finishes are informed by conditioning adjacencies, a desire to reduce mass, wall heights, opportunity for mold/mildew, acoustics, and cost/labor/install.

All wall types can be identified in one of three categories:

Exterior Thermal Wall

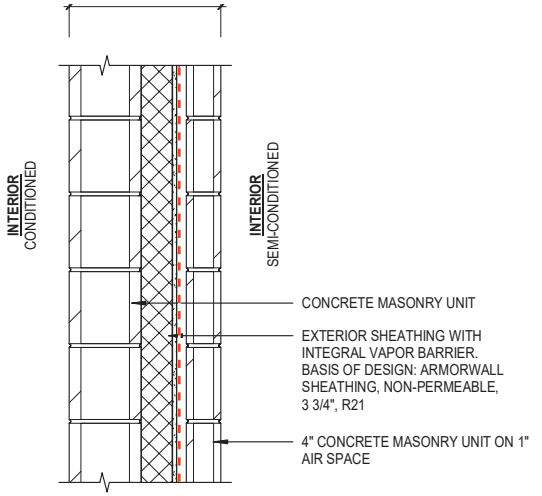
Interior Thermal Wall

Conditioned Non-Thermal Wall

Interior Thermal Walls are also designed to use the Armorwall product, to provide a sealed separation between conditioned and semi-conditioned and non-conditioned spaces.

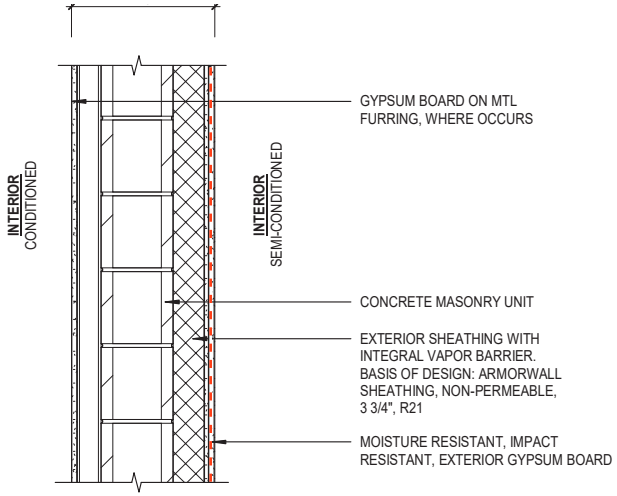
Please note, the vapor barrier should always be on the warm side of the insulation.

Interior Thermal Walls



MA.8.03

Interior Thermal Walls (Cont)



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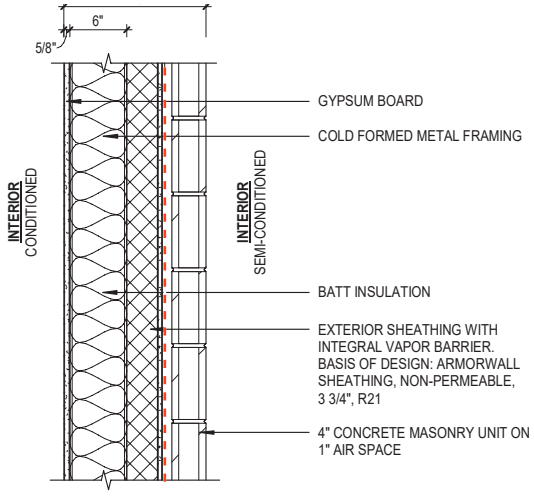

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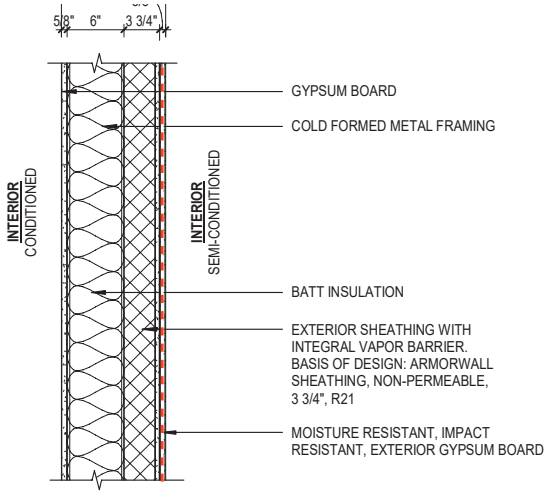


SA.6.32

StxCentral Wall, Floor, and Roof Assemblies

St. Croix Central High School

Exterior walls and interior partitions have been designed to support conditioning requirements for a net zero ready design. Wall types and finishes are informed by conditioning adjacencies, a desire to reduce mass, wall heights, opportunity for mold/mildew, acoustics, and cost/labor/install.

All wall types can be identified in one of three main categories:

Exterior Thermal Wall

Interior Thermal Wall

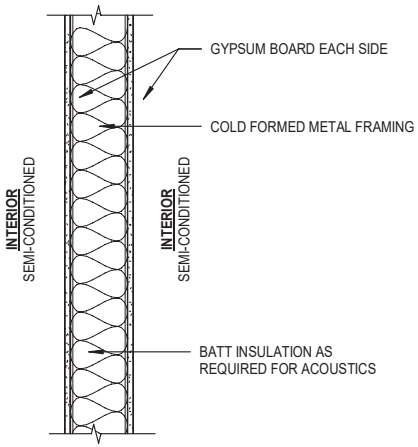
Conditioned Non-Thermal Wall

Roof and floor assemblies have been designed to support conditioning requirements for a net zero ready design. Thermal separation is required when there are different conditioning requirements above or below each other.

(At the Learning Suite Buildings, portions of the exterior balcony and adjacent semi-conditioned classroom sit on top of conditioned building spaces. In a similar fashion, at the Theater, exterior balconies on level 02 are above conditioned spaces below. In these spaces, and where the mechanical mezzanines are located above semi-conditioned restroom spaces, the floor will be insulated. These are the only instances in the project where there are differently conditioned spaces adjacent to each other requiring thermal separation in the wall and floor assemblies within the building envelope.)

The standard roof assembly is a composite metal deck with a standing seam metal finish. The exception is at the primary shelter (and any spaces rated the same as the shelter) and this assembly is poured in place concrete with standing seam metal finish.

Interior Conditioned Non-Thermal Walls



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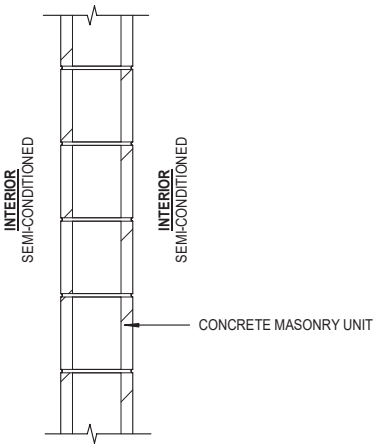

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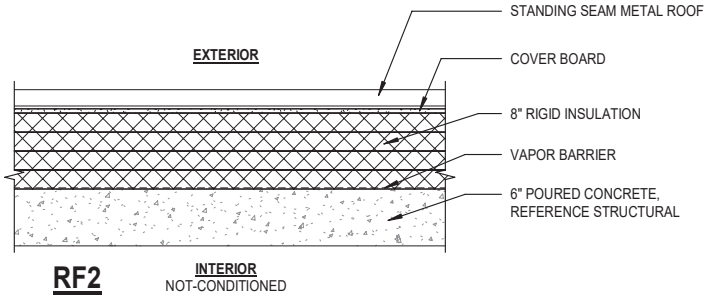
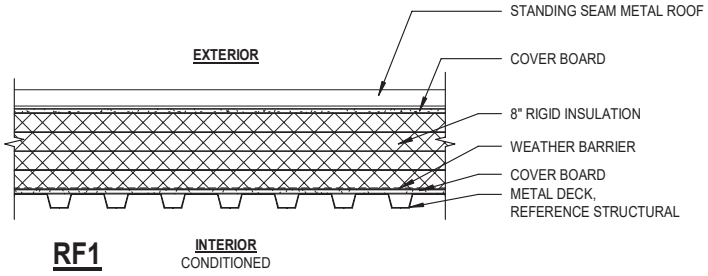
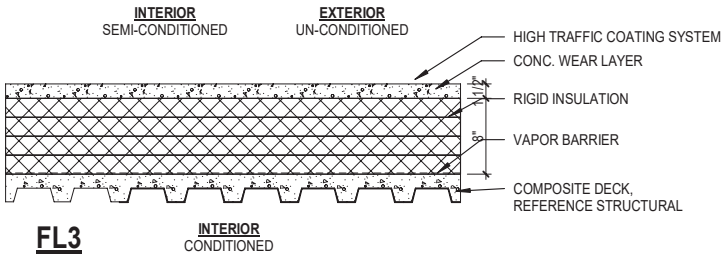
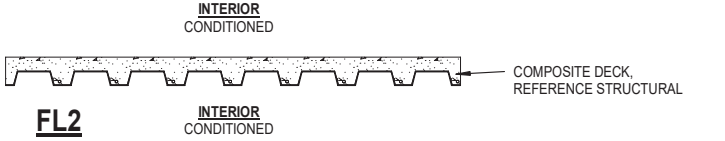
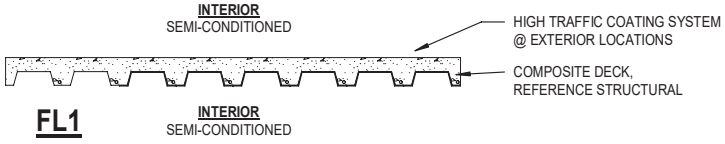
Roof and Floor Assemblies









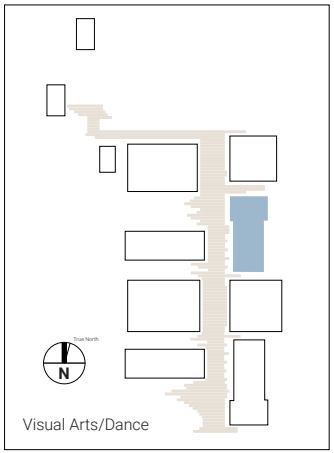


StxCentral Conditioning Studies

St. Croix Central High School

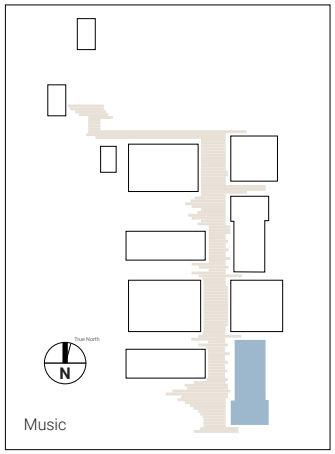
Visual Arts/Dance Building

Not to Scale



Music Building

Not to Scale



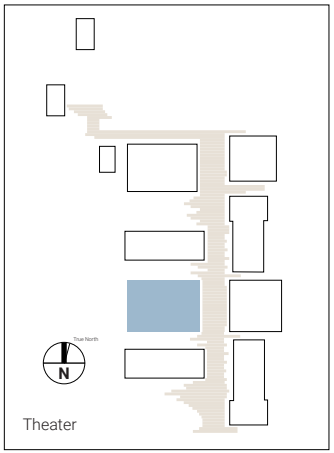
Unconditioned
Semi-Conditioned
Conditioned

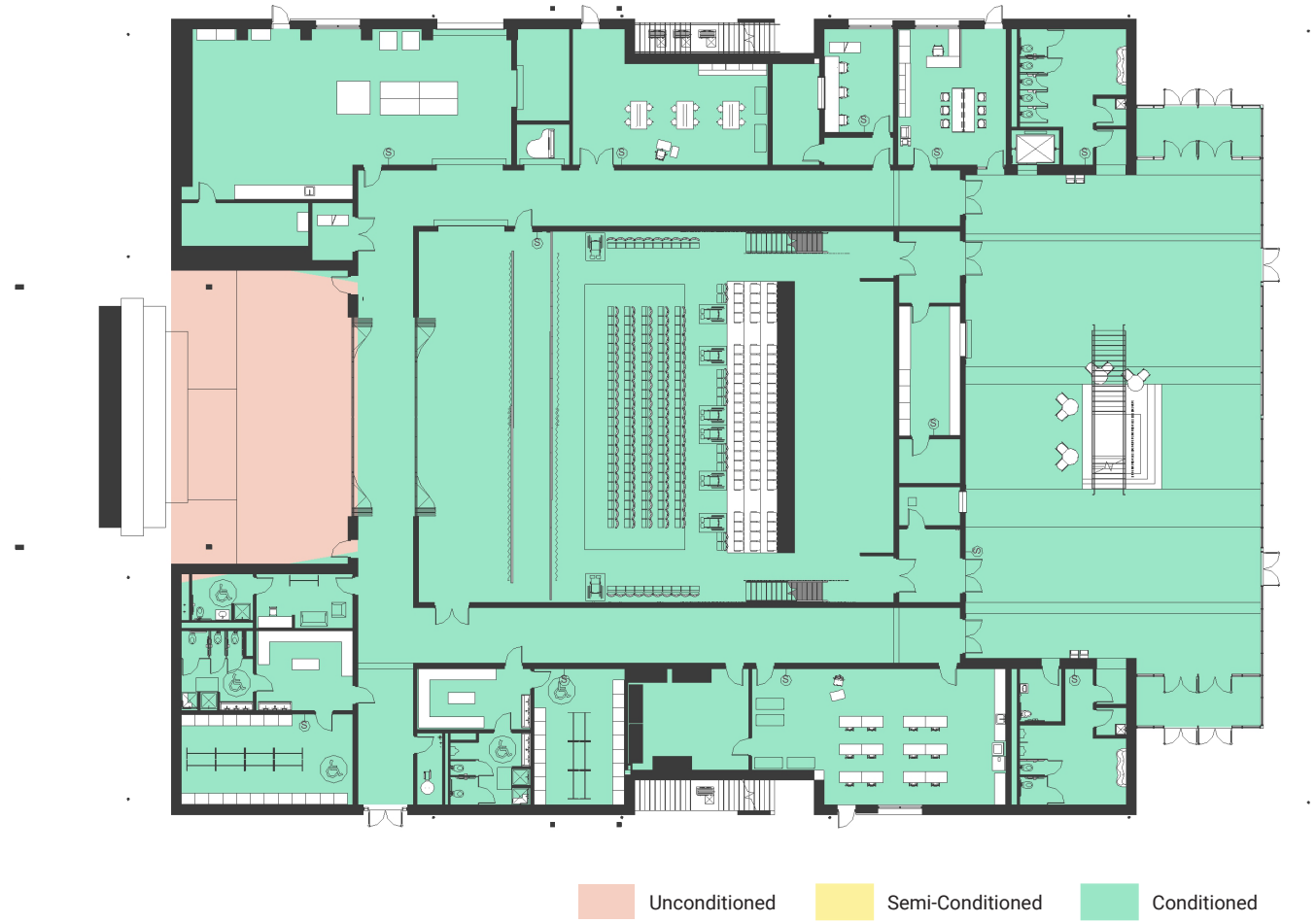
StxCentral Conditioning Studies

St. Croix Central High School

Flexible Performance Theater, Level 01

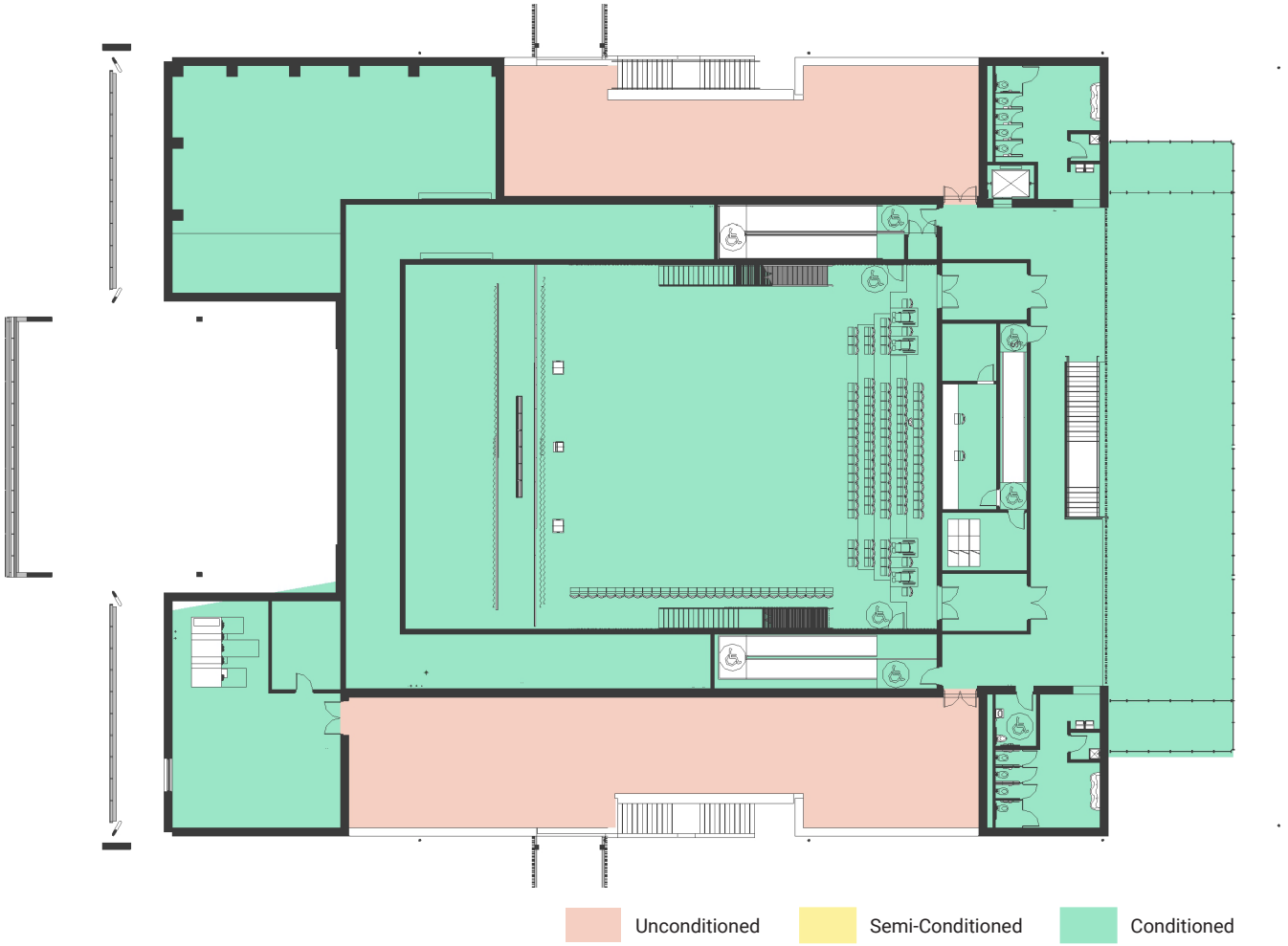
Not to Scale





Flexible Performance Theater, Level 02

Not to Scale

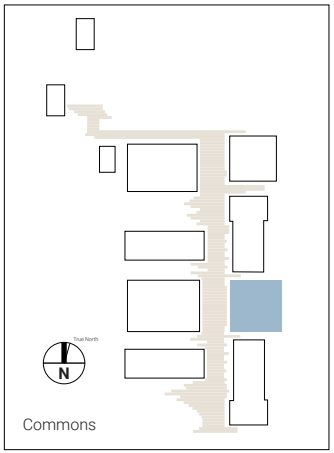


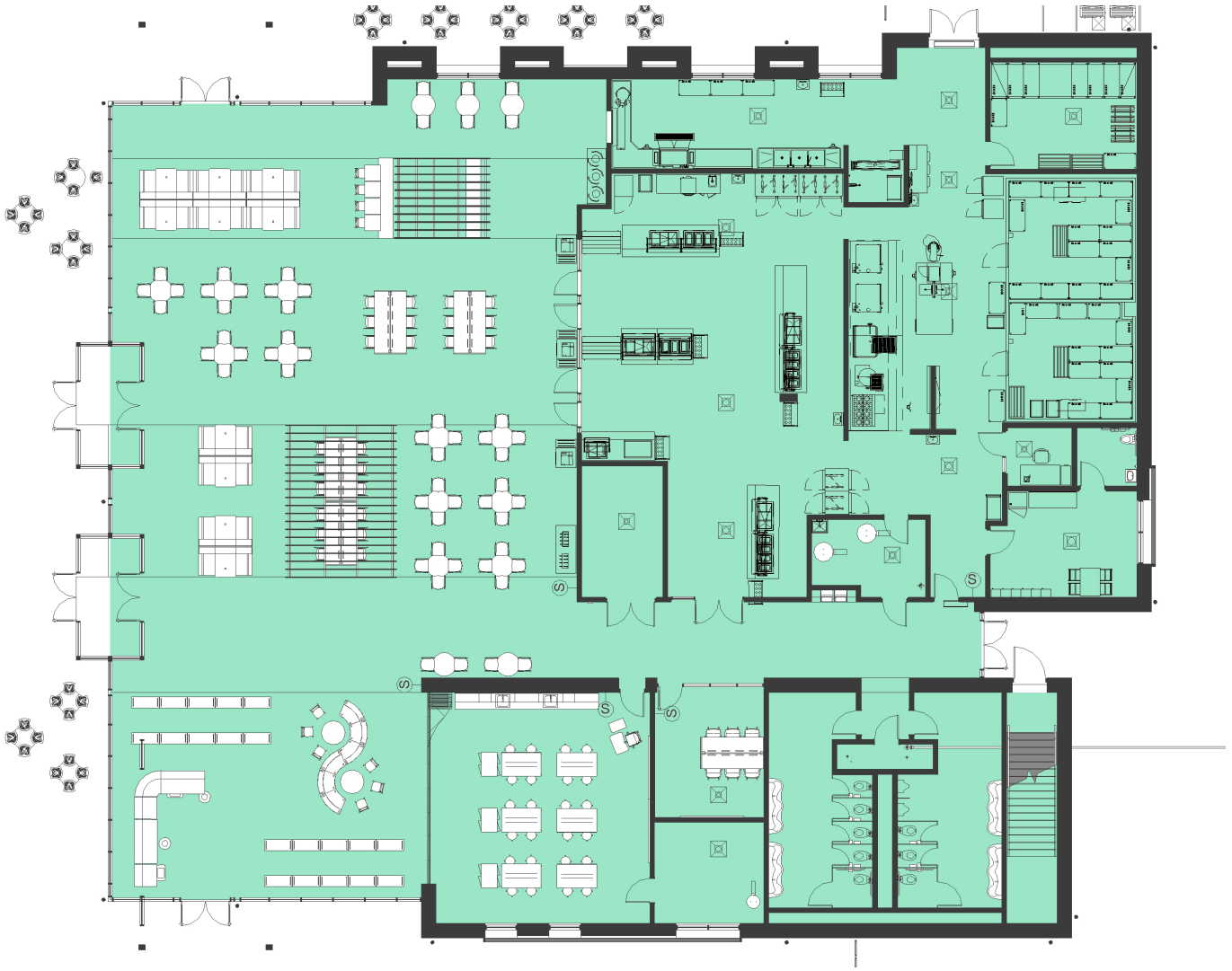
StxCentral Conditioning Studies

St. Croix Central High School

Commons Building

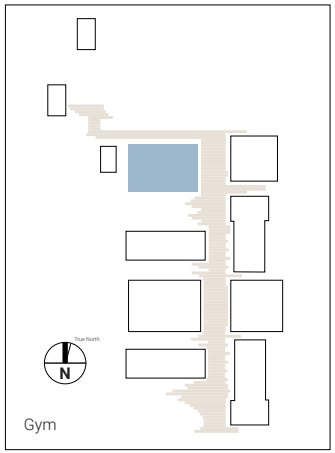
Not to Scale

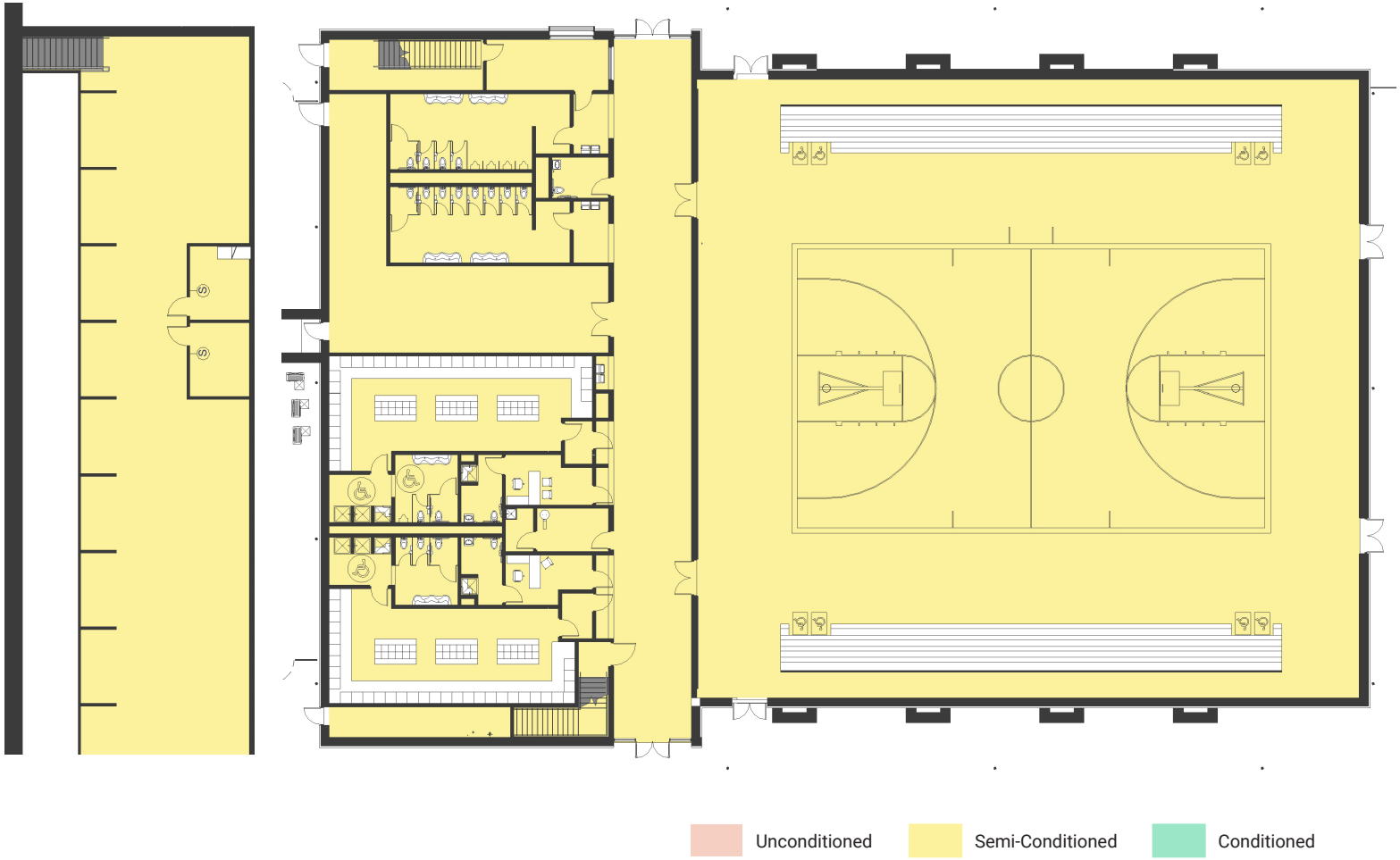




Gym

Not to Scale





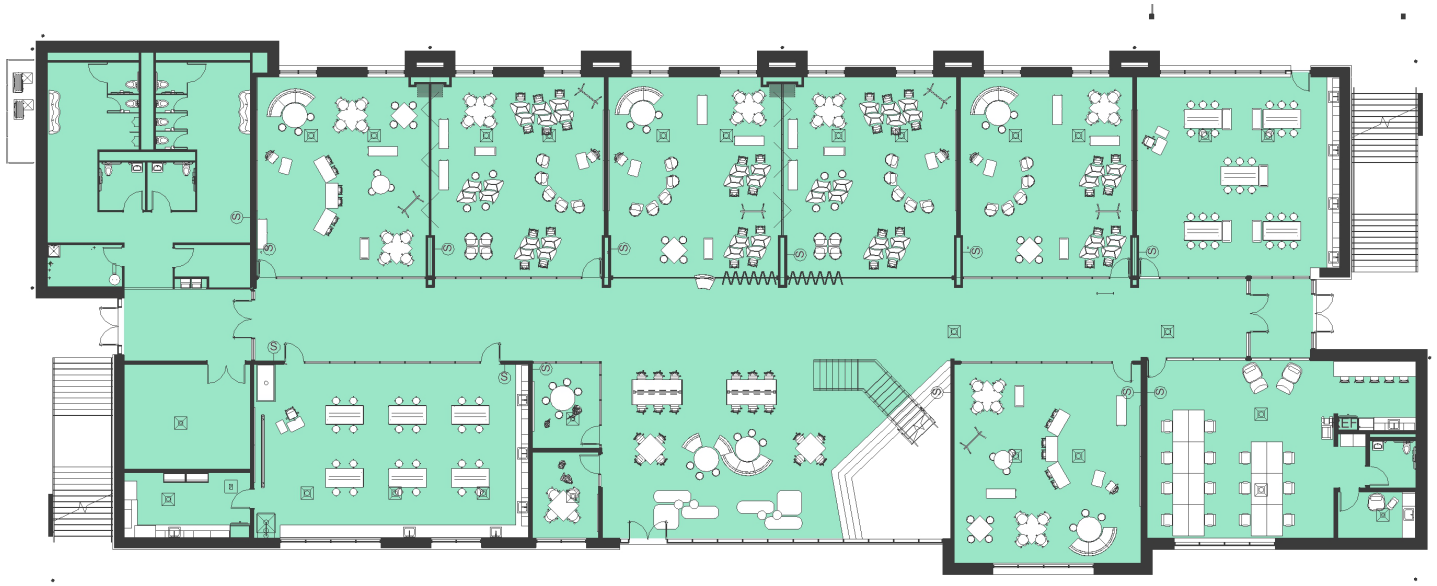
StxCentral Conditioning Studies

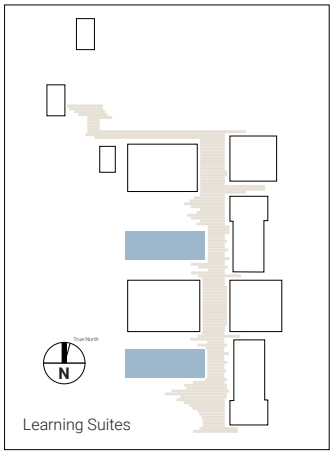
St. Croix Central High School

*Typical of both Learning Suite Buildings

Learning Suite 01 (North) Building, Level 01

Not to Scale





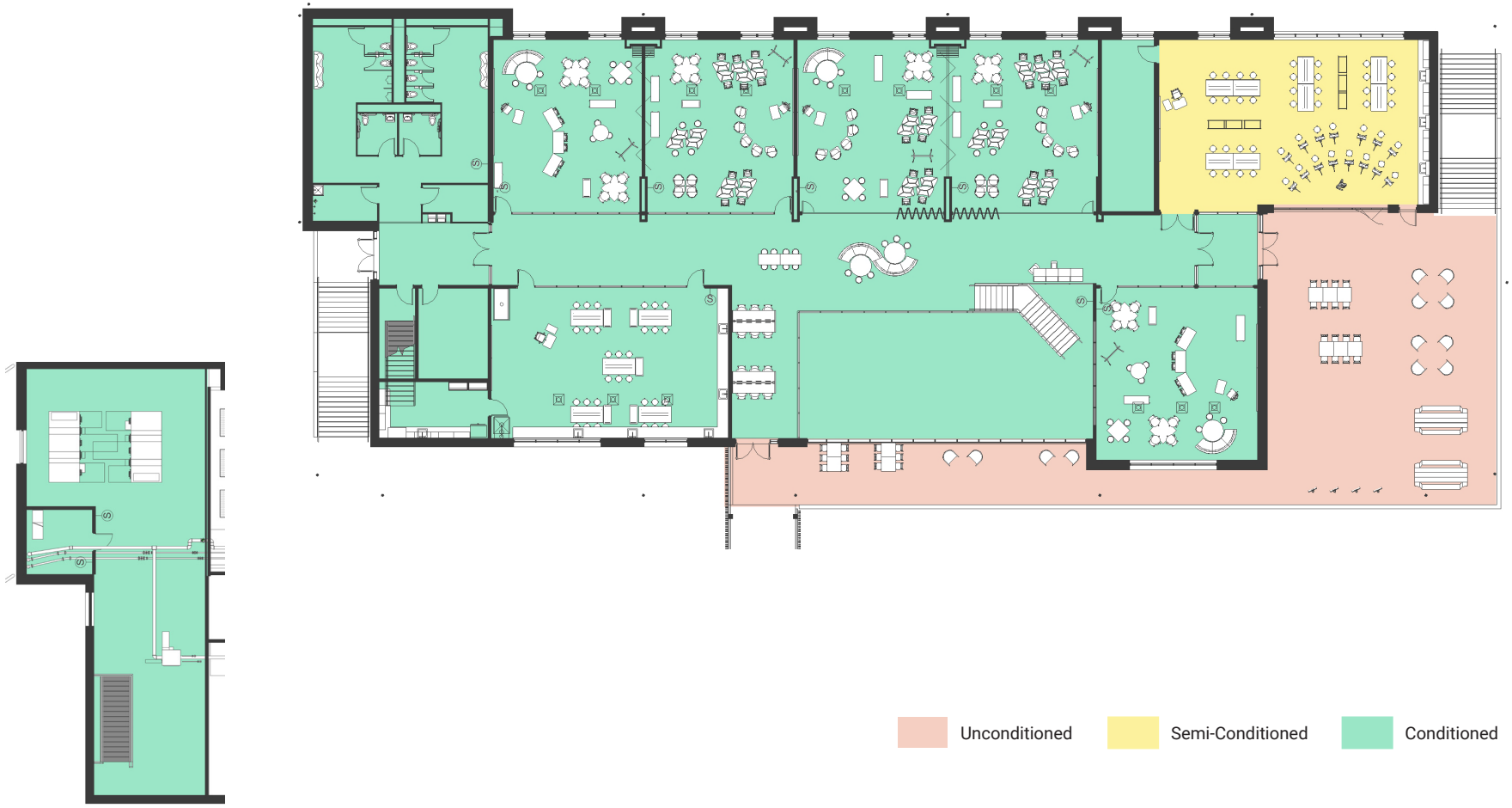
Unconditioned

Semi-Conditioned

Conditioned

Learning Suite 01 (North) Building, Level 02

Not to Scale



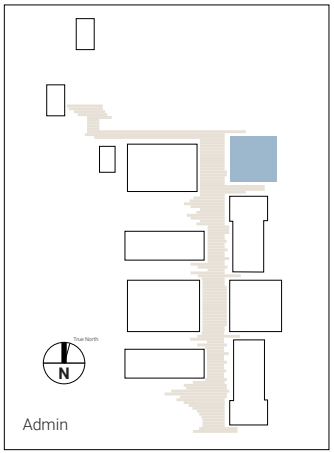
StxCentral Conditioning Studies

St. Croix Central High School

*Typical of both Learning Suite Buildings

Admin Building

Not to Scale

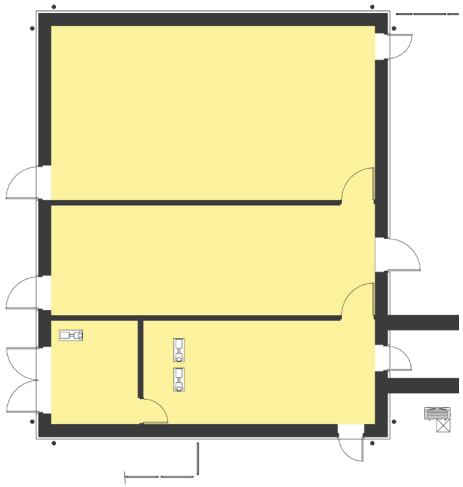


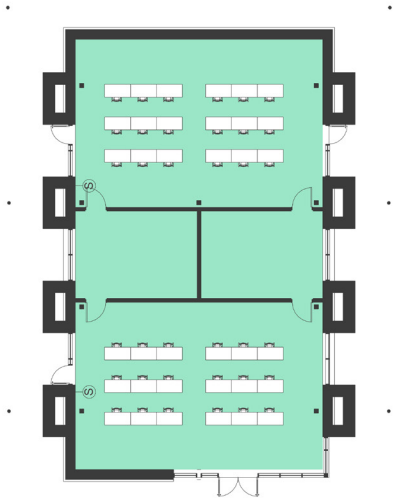
Utility Building

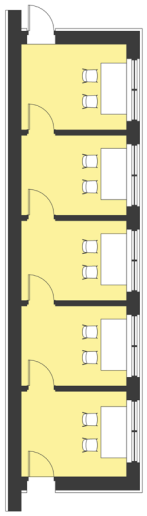
JROTC Building

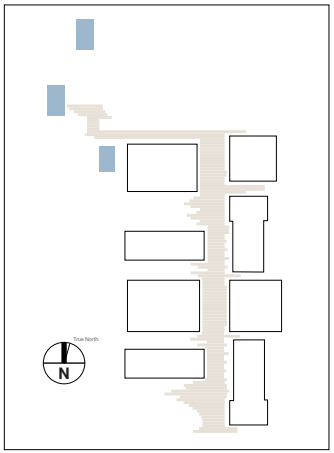
Press Box Building

Not to Scale









Unconditioned

Semi-Conditioned

Conditioned

Technical Narratives **176**

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Schedule **236**

Image: *Virgin Islands Department of Education Social Media*
St. Croix Educational Complex Marching Band Facebook, January 10, 2017

How have the VIDE's Design VALUES for the built environment informed the solutions and outcomes for the St. Croix Central High School Campus and Fine Arts Magnet Program?

Equity and Inclusion

Space model that provides distributed space for the arts in every campus building with support for Inquiry-Based Learning at all grade levels.

Site design that provides equitable access to campus resources and outdoor learning.

Health and Comfort

Diversity of spaces for collaboration and respite.

Sustainable design for natural cooling and daylighting.

Resiliency and Systems

Thoughtful use of materials for hurricane resistance and reduced maintenance.

Net zero ready infrastructure.

Spaces and Resources

Flexible spaces that can change to accommodate different arts activities with consideration for large and small scale performance.

High Performance Design Narrative

St. Croix Central High School

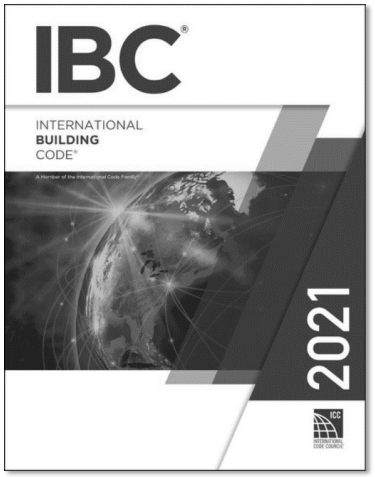
1. DESIGN CRITERIA

1.1. Codes and Standards

1.1.1. Building Code

Design and construction work shall be in accordance with the following codes:

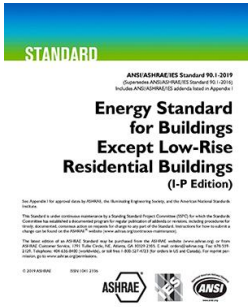
Building Code:	
US Virgin Islands:	2021 US Virgin Islands Code, Title 29 – Public Planning and Development, Chapter 5 – Building Code
International Code Council:	International Building Code (IBC), 2021 Edition, as adopted by the US Virgin Islands



1.1.2. Applicable Codes and Standards

The following codes and standards are to be implemented as referenced by the building code:

ASHRAE:	
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):	90.1-2019: Energy Standards for Buildings Except Low Rise Residential
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):	62.1: Ventilation for Acceptable Indoor Air Quality
IECC:	
International Energy Conservation Code (IECC)	International Energy Conservation Code-2021



1.2. General Project Information

DLR Group Project Name:	Julius E. Central High School PK-12
DLR Group Project Number:	68-20101-10
Project Address:	RFD #1, Kingshill, St. Croix, 00851 USVI
Latitude / Longitude:	17.725 N, -64.781 W
Local Jurisdiction:	US Virgin Islands / St. John
Owner / Owner Agent:	Virgin Islands Department of Education (VIDE)

1.3. Building HVAC Design

1.3.1. Space Conditions

HVAC System – Air Cooled Chiller + AHU/FCU w/ DOAS: Three air cooled chillers will provide chilled water to the air handling units and DOAS units. There will be individual split units for the electrical rooms.
The school has conditioned, semi-conditioned, and natural ventilation spaces.

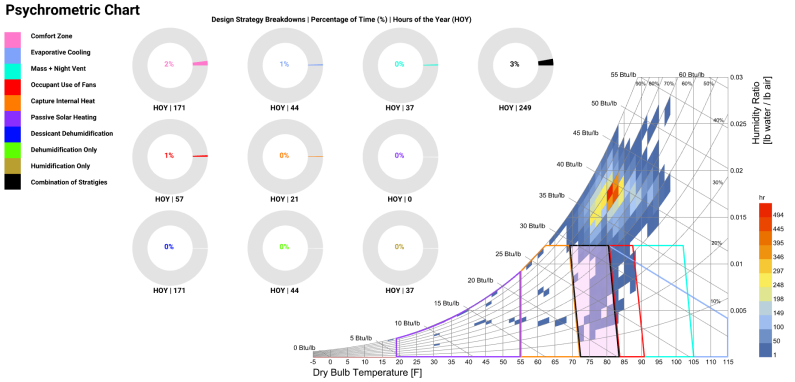
- Actively-Conditioned
  - Temperature: 78F upper limit – float no higher than 84F during unoccupied period.
  - Relative humidity: 60% RH typical, 63F dewpoint, 65% RH max per ASHRAE 62.1.
  - Conditioned ventilation air provided to each space.
  - Typical space types: classrooms, offices, media center, multi-purpose, commons, white box
- Semi-Conditioned
  - Temperature: 84F target, conditions will track with outdoor conditions and align with the ASHRAE Standard 55 Adaptive Thermal comfort range for naturally ventilated spaces.
  - Relative humidity: no direct control, but with a maximum target of 65% RH.
  - These spaces will rely on relief of ventilation air from actively conditioned zones through the semi-conditioned spaces to outdoors.
  - Typical space types: open collaboration, corridors, FEMA Shelter
- Natural Ventilation
  - No conditioned air provided to the space
  - Fans will be used to ventilate the space
  - Typical space types: gym, cafeteria

1.4. Climate Data and Analysis

St. Croix Central Central High School is located in the U.S. Virgin Islands or in Climate Zone 1. (Hot and Humid) with 9000 < CDD50°F

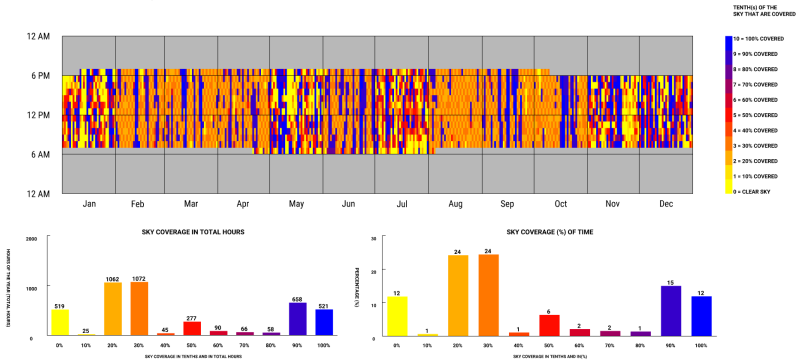
The weather data for the Virgin Islands can be represented on the psychrometric chart as shown below. The pink box shows the comfort zone of the building with no active or passive cooling. This means that the buildings will only be comfortable for 2 % of the year based on the climate. The black pie chart shows the combination of all of the passive cooling strategies and the buildings will only be comfortable for 3% of the year based on the ASHRAE 55 standard comfort model.

Psychrometric Chart



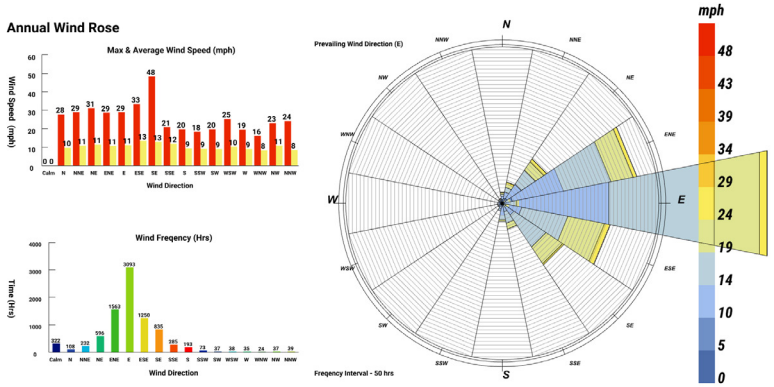
During the summer months, the campus may be exposed to sunlight for more than 12 hours a day.

Total Cloud Cover | Daylight Hours



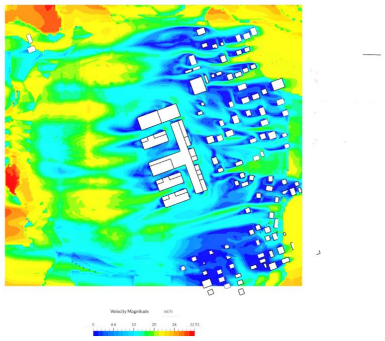
1.4.1. Wind Analysis

The prevailing wind direction is East with average wind speeds of 10 mph. This can be viewed on the annual wind rose shown below.

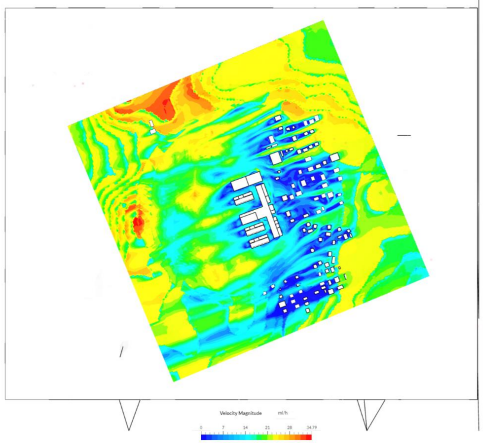


- East Wind Study - The wind velocity on the east side of the campus is approximately 12-15 mph.

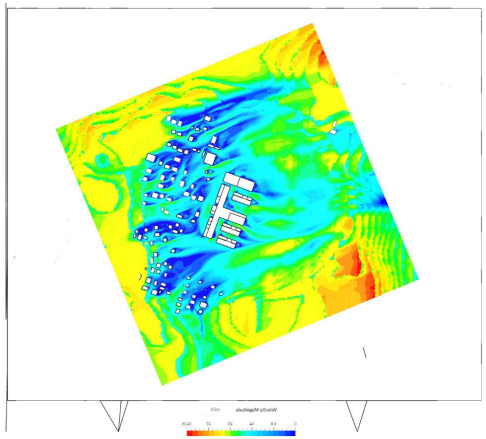
- Wind Study – East, ENE, and ESE representing the three most prevalent wind directions on site::



East Wind

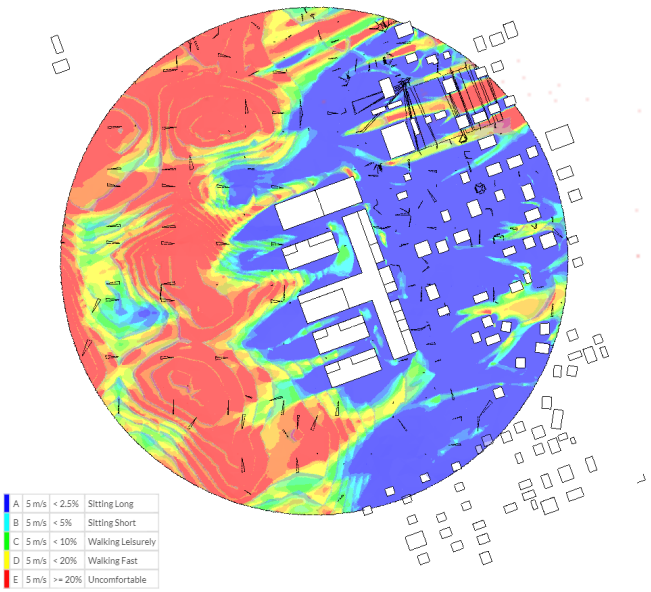


ENE Wind



ESE Wind

- Wind Comfort Analysis (Lawson) – The wind comfort analysis is based on the Lawson criteria which assesses the annual wind speed probability for 16 different wind directions and simulates the airflow for each condition. The velocities shown in blue will be comfortable for people sitting for extended periods of time. The middle velocity shown in green supports people who are walking at a relaxed pace. For wind velocities greater than 7.6 m/s (17 MPH), shown in red, the pedestrians on campus will be uncomfortable regardless of their activity level.



A	5 m/s	< 2.5%	Sitting Long
B	5 m/s	< 5%	Sitting Short
C	5 m/s	< 10%	Walking Leisurely
D	5 m/s	< 20%	Walking Fast
E	5 m/s	>= 20%	Uncomfortable

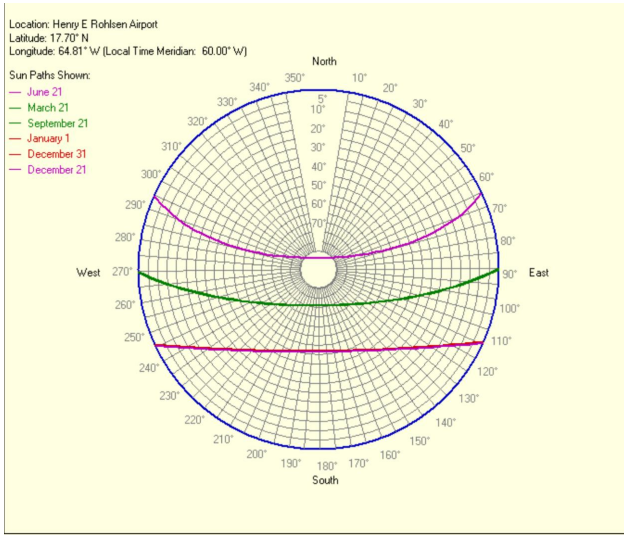
The perimeter of St. Croix Central High School campus shows a comfortable wind velocity for sitting and studying. The wind velocity may be uncomfortable in areas between the North Classroom building and Theater building. There will be a noticeable wind in between the buildings but it will generally not be uncomfortable. (Breezeways were added in the Visual Arts/Dance and Music buildings following completion of this study to improve margins of comfort.)

The analysis excludes vegetation on site which will likely reduce the wind velocities further.

The wind comfort analysis also excludes the impact of solar radiation. It is expected the site will be most comfortable when there is shade and a wind velocity of 5-10 MPH.

1.4.2. Sun Path

The figure below shows the annual sun path marking the solstices in pink, the equinoxes in green, and the year starting and end dates in red. The solstices occur in June and December and the equinoxes happen in March and September.



1.5. Energy Model Overview and Assumptions

1.5.1. Energy Analysis Overview

Analysis Methodology:

- In order to evaluate the performance of the proposed design, a preliminary energy analysis was conducted following the general simulation requirements as outlined in Appendix G of ASHRAE 90.1-2019.

Software Used:

- Building energy analysis was performed using IESVE 2021(Integrated Environmental Solutions) software version 2021.02.0. The Virtual Environment is an integrated suite of applications linked by a Common User Interface (CUI) and a single Integrated Data Model (IDM). IES-VE is a comprehensive design and analysis software that helps in comparing the energy and optimizing the design of an HVAC system based on the expected energy utilization and life-cycle costs. The calculation procedures used by IESVE are based on climatic data for all 8,760 hours in a year.

Weather Data

- The Typical Meteorological Year, version 3 (TMY3) data set was used for the building energy simulation. TMY3 contains data sets of hourly values of solar radiation and meteorological elements for a 1-year period. Their intended use is for computer simulations of solar energy conversion systems and building systems to facilitate performance comparison of different system types, configurations, and locations in the United States.

Software Calculation Methodology:

- Cooling and Heating Methodology – ASHRAE Heat Balance
  - In this method each room's solar and non-solar Radiant Time Series values were calculated based on the rigorous Heat Balance method described in the 2019 ASHRAE Handbook of Fundamentals using algorithms found in the ASHRAE Toolkit for Building Load Calculations. Solar energy is transmitted to the inside of the building through the window. Some of the heat is absorbed and reflected by the window, and the remainder is absorbed by the interior surfaces. When those surfaces later emit that heat by convection, cooling load is created in the room – there's a radiative delay. The Heat Balance Method calculates these time delay effects explicitly with some basic assumptions like uniform surface temperatures. There are no arbitrarily set parameters. Conductive, convective, and radiative heat balance is calculated directly for each surface within a room (IESVE, 2021).

1.5.2. Ventilation/Exhaust Per ASHRAE 62.1

Space	People Outdoor Air Rate (Rp) cfm/p	Area Outdoor Air Rate (Ra) cfm/sf
Classrooms	10	0.12
Lecture classroom	7.5	0.06
Art classroom	10	0.18
Science laboratories	10	0.18
Wood/metal shop	10	0.18
Computer lab	10	0.12
White Box	10	0.06
Multiuse assembly	10	0.06
Cafeteria	7.5	0.18
Kitchen (cooking)	7.5	0.18
Office	5.0	0.06
Conference/meeting	5.0	0.06
Corridors	0	0.06
Gym (play area)	20	0.18
Spectator areas	7.5	0.06
Laundry/Washing Area	5.0	0.12
Electrical/IDF/MDF	0	0
Locker Room	20	0.06
Lounge/Breakroom	5.0	0.06
Storage	0	0.12

1.5.3. Construction (ASHRAE Climate Zone 1A)

- External Walls
  - Concrete Wall with Insulation: U-0.0501, R-19
- Interior Partition
  - Concrete Block Interior: U-0.2761, R-2.2624
- Ground Contact
  - Exposed/Ground Floor U-0.0220
  - Lower Level Ground (Door Patch) U-0.0460
- Roof
  - Attic and other: U-0.27, R-38
- Fenestration
  - External Window: U-0.5, SHGC-0.20

1.5.4. Internal Loads

Lighting/equipment Per ASHRAE 90.1

Space	Equipment Load	Lighting Load
Classrooms	0.75 W/ft2	0.5 W/ft2
Offices	1.0 W/ft2	0.5 W/ft2
Conference/Meeting Rooms	1.0 W/ft2	0.5 W/ft2
Multipurpose room		
Kitchen	9.25 W/ft2	0.5 W/ft2
Dining facilities	0.75 W/ft2	0.5 W/ft2
Restrooms	0.75 W/ft2	0.5 W/ft2
Electrical/IDF/MDF	0.75 W/ft2	0.5 W/ft2
Gym (play area)	0.75 W/ft2	0.5 W/ft2
Corridors	n/a	0.5 W/ft2
Laundry/Washing	3 W/ft2	0.5 W/ft2
Locker Room	0.75 W/ft2	0.5 W/ft2
Lounge/Breakroom	1.0 W/ft2	0.5 W/ft2
Storage	0.1 W/ft2	0.5 W/ft2

Occupancy Per ASHRAE 90.1

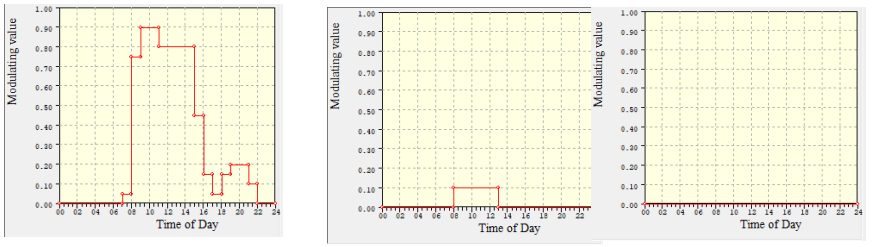
Space	Basis	Heat Gain Sensible/Latent
Classrooms	40 ft2/person	225/105 Btu/hr.
Offices	100 ft2/person	250/200 Btu/hr.
Conference/Meeting	100 ft2/person	250/200 Btu/hr.
Multipurpose room	Based on # of seats	
Kitchen	50 ft2/person	275/475 Btu/hr.
Dining	15 ft2/person	250/200 Btu/hr.
Restrooms	0	250/200 Btu/hr.
Corridors	0	250/200 Btu/hr.
Gym (play area)	100 ft2/person	710/1090 Btu/hr
Laundry/Washing	0	0
Locker Room	100 ft2/person	350/400 Btu/hr.
Lounge/Breakroom	40 ft2/person	250/200 Btu/hr.
Storage	0	0

1.5.5. Schedules

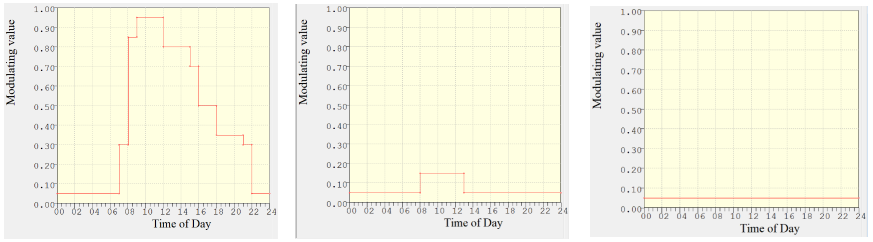
The following schedules show the daily profiles for occupancy, lighting, and Equipment assumptions for St. Croix Central High School. The school has reduced internal loads on the weekends and on holidays. The campus has no people, lighting, or equipment loads from June 1st -August 31st.

- Classrooms – Weekday (left), Saturday (middle), Sunday/Holidays (right):

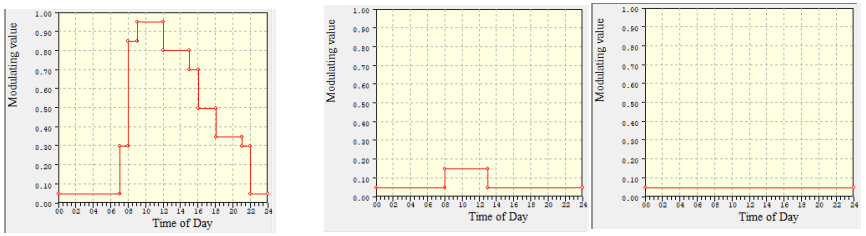
- Occupancy



- Lighting



- Equipment



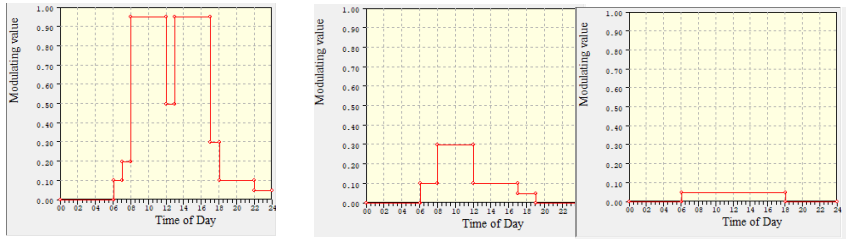
- Office – Weekday (left), Saturday (middle), Sunday/Holidays (right):

High Performance Design Narrative Cont.

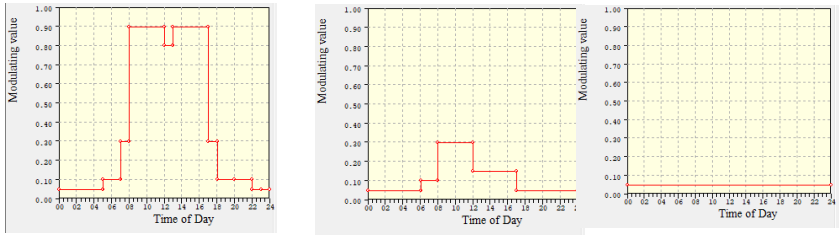
St. Croix Central High School

St. Croix Central High School | Architectural Design Criteria

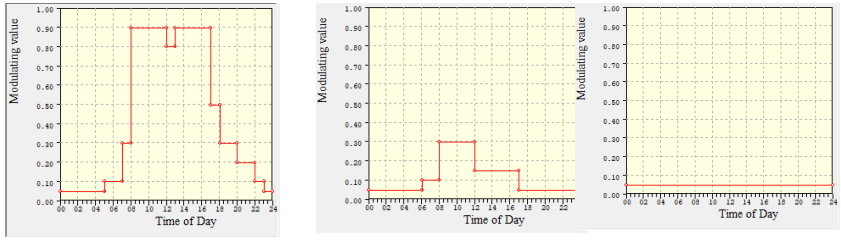
- Occupancy



- Lighting



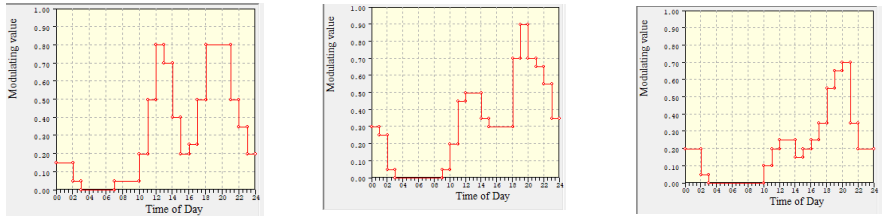
- Equipment



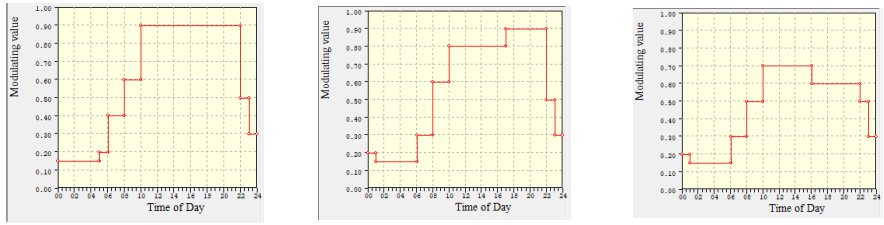
- Dining – Weekday (left), Saturday (middle), Sunday/Holidays (right):

St. Croix Central High School | Architectural Design Criteria

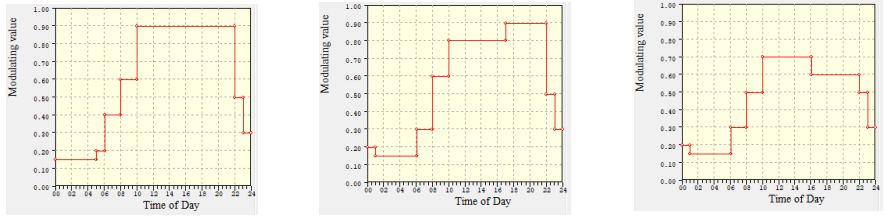
- Occupancy



- Lighting

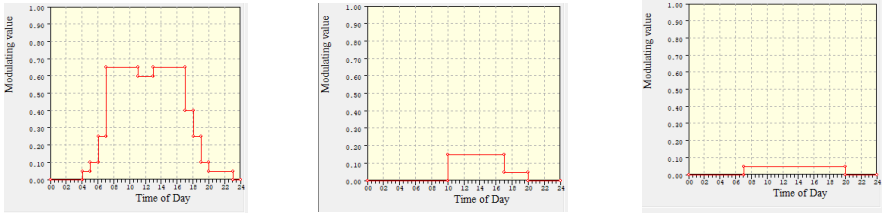


- Equipment

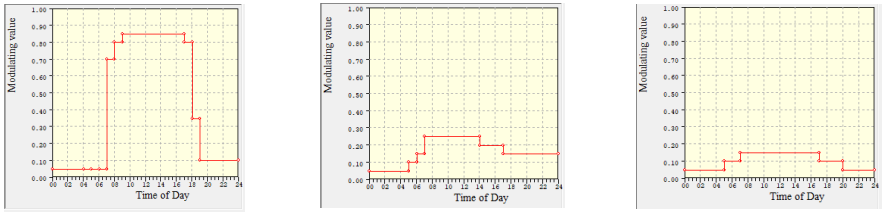


- Gym – Weekday (left), Saturday (middle), Sunday/Holidays (right):

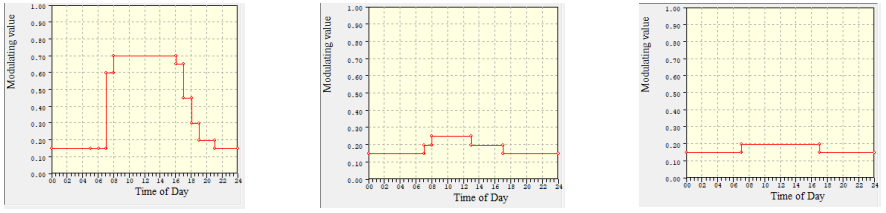
- Occupancy



- Lighting

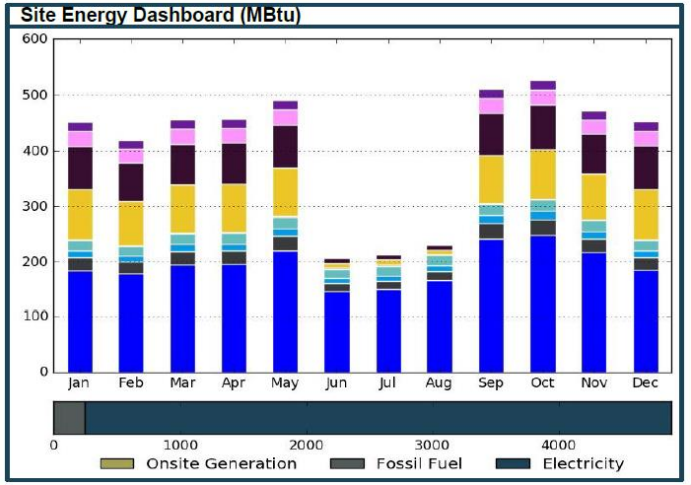


- Equipment



1.6. Annual Energy Use by Category

The site energy dashboard shows the annual energy consumption for St. Croix Central High School. This report was generated using IESVE 2021. Less energy is used in the summer months while classes are out of session. The peak energy used occurs in October when the weather is hot and the students are back on campus.



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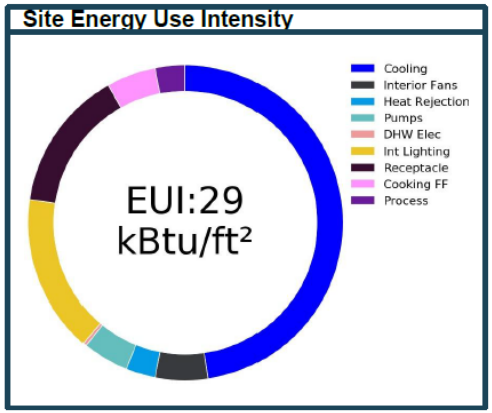
High Performance Design Narrative Cont.

1.7. Energy Model EUI Report

Central High School's energy use intensity (EUI) was calculated to be 29 kBtu/ft² using IESVE 2021. The EUI is slightly reduced from the SD report due to more detailed information about HVAC equipment selections.



1.8. Energy Model Energy Source for Electricity

Annual Energy Consumption (kBtu/ft²/year) & CO2 KgCO2/ft²/yr

Energy End Use	Site Energy	Source Energy	CO2 Emissions
Heating Fossil Fuel	0.0	0.0	0.0
Heating Electricity	0.0	0.0	0.0
Space Cooling	14.1	44.3	2.1
Fans Interior	1.6	5.1	0.2
Heat Rejection	0.9	2.8	0.1
Pumps	1.4	4.3	0.2
DHW Fossil Fuel	0.0	0.0	0.0
DHW Electricity	0.1	0.4	0.0
Interior Lighting	4.8	2.8	0.1
Exterior Lighting	0.0	0.0	0.0
Receptacle	4.3	13.5	0.7
Data Center	0.0	0.0	0.0
Cooking Fossil Fuel	1.5	1.7	0.1
Cooking Electricity	0.0	0.0	0.0
Elevators & Escalators	0.0	0.0	0.0
Refrigeration	0.0	0.0	0.0
Process	0.9	2.8	0.1
TOTAL (ex renewables)	29	77	3

Civil Narrative

St. Croix Central High School

Stanley Consultants

1. CIVIL NARRATIVE

1.1. Existing Conditions

The existing site of the Saint Croix Central High School is shown in figure 1. The school is on the island of Saint Croix located on Centerline Road across from Kingshill Lutheran Church.

The total school site is approximately 20.5 acres and has a total elevation change of 21 feet across the entire site. There are currently 20 buildings consisting of administrative and learning buildings as well as outlying structures. Currently the school administration and learning buildings are on the northern portion of the site, while the athletic field occupies the southern half of the site.

1.2. Site Plan

The proposed Saint Croix Central High School campus is a multi-building project to include new facilities on the site. The proposed site will move the administrative and learning buildings to the southern portion of the site where the current athletic field exists now. This will allow for continuous use of the existing school while the new education buildings are under construction. The proposed plan, figure 2, will provide for a newly imagined campus. The Proposed site plan includes new learning and administrative buildings as well as a new gymnasium, athletic field, and associated parking.

Left: Figure 1
Existing St. Croix Central High School

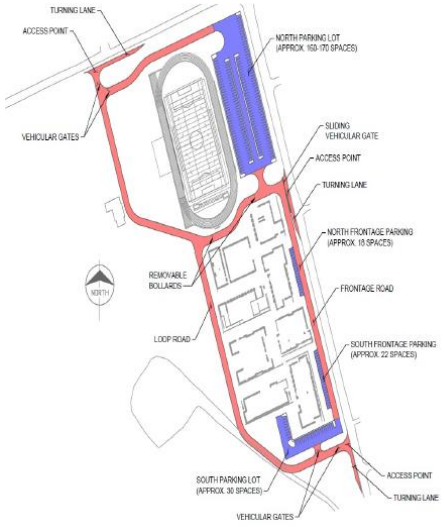
1.3. Site Access

Access to the site will be available from both Centerline Road and Route 663. There will be parking along Route 663 adjacent to the proposed athletic field location. Additionally, there will be more parking spaces at the southernmost end of the site. There will be a ring road around the site allowing for complete site access from all entry points for designated vehicles such as Emergency vehicles, maintenance vehicles, delivery vehicles, and others granted access by the school.

1.4. Proposed Grading Plan

The primary goal of the proposed grading will be to minimize the amount of required cut and fill sections on the site by maintaining elevations as close to existing conditions as possible. Some cut and fill will be necessary in order to provide flat areas in which to locate the new school buildings. Additionally, it will be critical to achieve flat grading in the area where the new athletic field is to be built.

While overall the current site is relatively flat, if it is found that it is not possible to maintain longitudinal grades within acceptable limits throughout the design. Retaining walls or other soil and stabilization methods will be placed along the western portion of the property to allow for any necessary cut without additional removal of the hillside. The retaining wall that will be used will include structures to allow for vegetative growth on the wall.

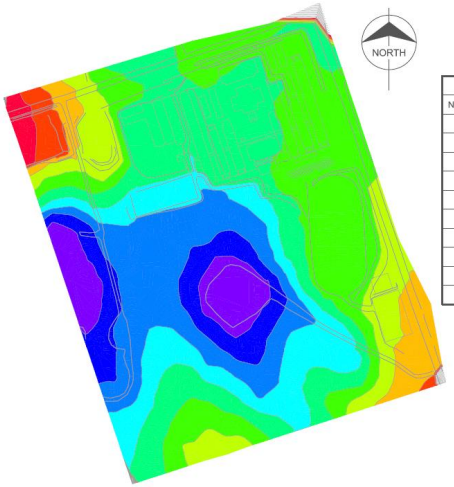


Right: Figure 2
Proposed St. Croix Central High School

1.5. Drainage

The existing topography for this Site generally slopes from the Southwest to the North and East across the site. This can be seen in the existing elevation map (Figure 3). Positive drainage will be designed around all proposed buildings as well as the site as a whole. This will be taken to a detention pond located on the site. Storm drains and subsurface drainage systems will be utilized to handle the surface runoff of the parking areas and walking areas between buildings and additional swale ditches will be designed where necessary to accommodate any additional proposed drainage improvements or runoff of undeveloped areas

A Drainage and Erosion Control Plan will need to be prepared that will need to be used by the contractor to obtain a Stormwater Discharge Permit.



Elevations Table

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	140,000	150,000	
2	150,000	160,000	
3	160,000	170,000	
4	170,000	180,000	
5	180,000	190,000	
6	190,000	200,000	
7	200,000	210,000	
8	210,000	220,000	
9	220,000	230,000	
10	230,000	240,000	

Figure 3: Elevation Map

1.6. Earthwork

The earthwork required on this site will be kept as limited as possible. Elevations of the proposed site buildings will be kept as close to existing elevations as possible to allow for the least amount of excavation and fill.

1.7. Utilities

The location, capacity, and condition of exiting off-site utilities are uncertain at this time. The proposed improvements are expected to require water, sanitary sewer, electrical power, stormwater, and communications.

The municipal water will run to the cistern located northwest of the utility building. The fire protection and non-potable water lines will run from this cistern directly to each building on site. An additional tank will be adjacent to the primary cistern for the treatment of potable water. This will then also be routed to all of the buildings.

The sanitary sewer will require the addition of a sewer lift station at the southern end of the property adjacent to the detention pond. The pump to run the lift station will be utilizing a local power connection, but the system will also include a diesel generator for emergency situations such as power outages.

1.8. Land Use

This site's land use will mainly consist of use for academic and support services. The site plan concept will create a full-service campus that allows for safe pedestrian use while also maintaining enough access and vehicle accommodations to account for school needs in case of events or emergencies. This school complex will include academic buildings, administrative buildings, athletic facilities, an athletic field, and maintenance support within a secure environment.

1.9. New Buildings

This campus will contain all new facilities. The campus buildings will be clustered around a pedestrian Thorofare. Incorporated among the buildings will be seating, outdoor learning classrooms (interludes), and an amphitheater.

1.10. Service Area Paving

The proposed vehicle pavements will be a combination of asphalt and concrete pavement sections with design sections adhering to the recommendations of the geotechnical investigation along with the civil engineering design. Generally, the high use, high traffic parking and service areas accommodating truck movements will be paved with Portland Cement Concrete Pavement (PCCP). The service road around the perimeter will be an asphalt pavement adhering to the recommendations of the geotechnical investigation along with the civil engineering design capable of supporting delivery trucks and emergency vehicles.

1.11. Accessibility

The proposed buildings will be accessible via exterior routes from all parking areas adjacent to the buildings as well as from the campus promenade and all parking and walkway perimeters. All access requirements delineated in the current ADA guidelines will be provided.

Structural Narrative

St. Croix Central High School

1. GENERAL PROJECT INFORMATION

1.1. Project Data

DLR Group Project Name:	St. Croix Central High School
DLR Group Project Number:	68-20101-10
Project Address:	RFD #1 927, Kingshill, St Croix 00851
Latitude / Longitude:	17° 43' 31.6" N / 64° 46' 48.5" W
Local Jurisdiction:	US Virgin Islands / St Croix
Owner / Owner Agent:	Virgin Islands Department of Education (VIDE)
Architect of Bridging Documents:	DLR Group
Structural Engineer of Bridging Documents:	DLR Group

1.2. Project Location

1.2.1. Site Map

1.2.2. Area Map

1.2.3. Region Map:

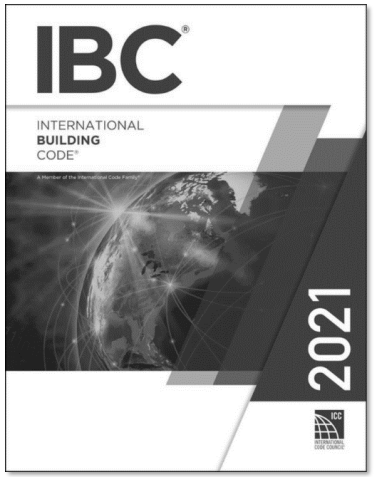
2. DESIGN CRITERIA

2.1. Codes and Standards

2.1.1. Building Code

Design and construction work shall be in accordance with the following codes:

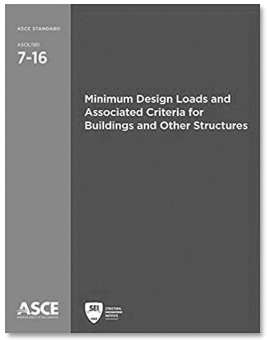
Building Code:	
US Virgin Islands:	2021 US Virgin Islands Code, Title 29 – Public Planning and Development, Chapter 5 – Building Code
International Code Council:	International Building Code (IBC), 2021 Edition, as adopted by the US Virgin Islands



2.1.2. Applicable Codes and Standards

The following codes and standards are to be implemented as referenced by the building code:

General:	
American Society of Civil Engineers (ASCE):	Minimum Design Loads for Buildings and Other Structures ASCE 7-16
Federal Emergency Management Agency (FEMA):	Safe Rooms for Tornadoes and Hurricanes FEMA P-361 (Third Edition / March 2015)
International Code Council (ICC) National Storm Shelter Association (NSSA):	Standard for the Design and Construction of Storm Shelters ICC 500-2020
Concrete:	
American Concrete Institute (ACI):	Building Code Requirements for Structural Concrete ACI 318-19
Masonry:	
The Masonry Society (TMS):	Building Code and Specification for Masonry Structures TMS 402/602-16
Steel:	
American Institute of Steel Construction (AISC):	Specification for Structural Steel Buildings ANSI/AISC 360-16
American Institute of Steel Construction (AISC):	Seismic Provisions for Structural Steel Buildings ANSI/AISC 341-16
Cold-Formed Metal Framing:	
American Iron and Steel Institute (AISI):	North American Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-16)
American Iron and Steel Institute (AISI):	North American Standard for Cold-Formed Steel Structural Members (AISI S240-15)



Structural Narrative Cont.

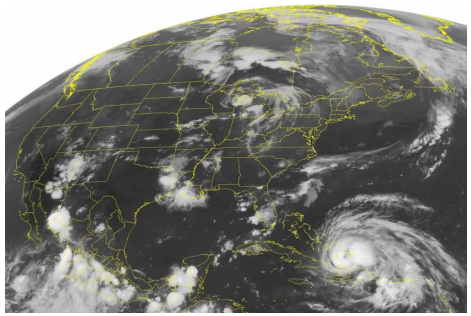
St. Croix Central High School

2.2. Building Risk Category

Buildings and structures are classified to a building risk category based on the risk to human life, health and welfare associated with their damage or failure (loss). The building risk category is proportioned based on the individual building occupancy use. Buildings which could pose a substantial hazard to the community and/or buildings containing hazardous materials (fuels, chemicals or waste) are considered essential facilities. Also, buildings and structure required to maintain the functionality of essential facilities, must also be classified as essential facilities.

The building has been assigned to the following risk category, in accordance with ASCE 7 Table 1.5-1.

Gymnasium:	IV (FEMA Storm Shelter)
Other Structures:	IV (Community Refuge)

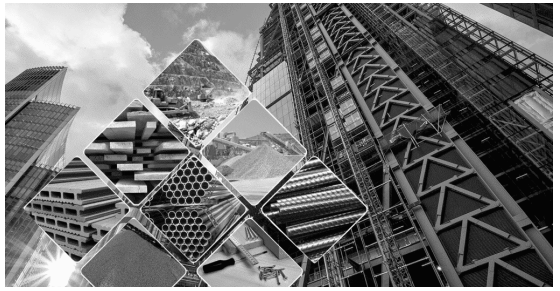


2.3. Applied Loads

The following loads have been used as a structural design criterion and have been incorporated into the structural design. The loads are based on the nature of the occupancy of the building.

2.3.1. Dead Loads

Dead load is the downward force on a building produced by all materials of construction incorporated into the different components of the building such as roofs, walls, stairways, ceilings, architectural cladding and fixed service equipment. The self-weight of the structure is included as part of the analysis.



Superimposed dead loads will be calculated per ASCE 7.

2.3.2. Live Loads

Live loads include any temporary or transient forces that act on a building or structural element. This can include people, furniture, movable partition walls, mechanical equipment, and anything else that can be moved throughout a building.

Based on the intended use or occupancy, minimum live loads will be applied in accordance with ASCE 7 Chapter 4:

Ground Level:

Classrooms:	40 PSF + 15 PSF for Partitions (Reducible)
Offices *(Recommended as a Minimum Load)*:	50 PSF + 15 PSF for Partitions (Reducible)
First Floor Corridors:	100 PSF (Reducible)
Lobbies:	100 PSF
Storage Rooms and Mechanical Rooms	150 PSF
Cafeteria:	100 PSF
Gymnasium:	100 PSF
Auditorium (Fixed Seats):	60 PSF
Library:	60 PSF + 15 PSF for Partitions (Reducible), 150 PSF (Stack)

Second Level and Mezzanines:

Classrooms:	40 PSF + 15 PSF for Partitions (Reducible)
Offices *(Recommended as a Minimum Load)*:	50 PSF + 15 PSF for Partitions (Reducible)
Corridors Above First Floor:	80 PSF (Reducible)
Lobbies:	100 PSF
Storage Rooms and Mechanical Rooms	150 PSF
Theater Catwalk	40 PSF

Roof:

Ordinary Roof:	20 PSF (Reducible)
FEMA Storm Shelter	100 PSF

2.3.3. Rain Loads

Rain load is the downward force on a building's roof caused by the weight of accumulated rain and ponding effects. Rain loads are based on the hydraulic head in addition to the static head associated with the design flow rate of the specified secondary drainage system. An adequate secondary drainage system is used to limit the depth of water on the roof in the event the primary drainage system is clogged or obstructed. Rainfall intensities are measured for a 15-minute duration with a 1% annual probability of exceedance (100-year MRI), using local meteorological data collected by the National Oceanic and Atmospheric Administration (NOAA).

Based on the project data and project location, rain loads have been applied in accordance with ASCE 7 Chapter 8.

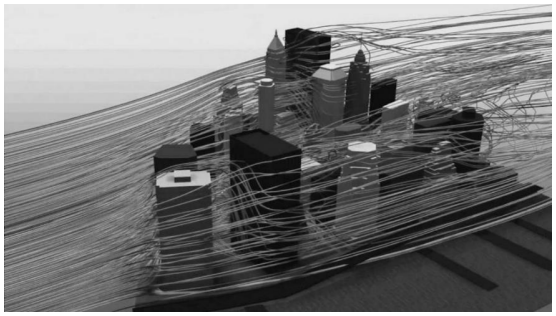
Rainfall Intensity (i): (15-min duration, 100-year MRI)	6.50 in/hr

Structural Narrative Cont.

St. Croix Central High School

2.3.4. Wind Loads

When moving air (wind) is stopped by a surface, the dynamic energy is transformed into wind pressure acting normal to the building surfaces. The respective wind pressures can be converted into transient building forces used for structural analysis and design. The basic wind speed is measured at a 3-second gust located 33 feet above the ground, using local meteorological data collected by the NWS. The performance criteria (probability of exceedance) changes for each building risk category and are noted below.



Based on the project data and project location, wind loads have been applied in accordance with ASCE 7 Chapter 26-27.

Wind Speed (3,000-Year MRI):	189 MPH (per the USVI Special Wind Region)
Wind Speed (25-Year MRI):	118 MPH (per the USVI Special Wind Region)
Wind Speed (10-Year MRI):	78 MPH (per the USVI Special Wind Region)
Wind Speed (V_{ASD}):	146 MPH
Exposure Category:	D (Required per 2019 USVI Building Code)
Topographic Factor (K_{zt}):	1.0 (Topographic effects implemented as part of the Special Wind Region for the USVI)
Wind Directionality Factor (K_d):	0.85
Ground Elevation Factor (K_e):	1.0
Internal Pressure Coefficient (GC_{pi}):	+/- 0.55 (Partially Enclosed Building)
Wind-Borne Debris Region:	Yes (Impact-protective system or impact-resistant glazing required)

Recommendations:

Cladding Connections:	*Increase strength level forces by 25% at connections of cladding elements to primary structure (including metal roof deck, metal cladding studs, steel trellis panels, solar panels and other elements) that may cause severe damage as windborne debris.*
Internal Pressure Coefficient (GC_{pi}):	*Partially Enclosed Building has been used for a worst-case scenario enclosure classification. This criterion may be relaxed at the discretion of the Structural Engineer of Record.*

2.3.5. Seismic Loads

Seismic loads are caused from an agitation to a building structure (or its model) from ground accelerations triggered by an earthquake. The ground accelerations are transformed into both static and dynamic design loads applied to the building structure. Mapped seismic ground motions are measured based on a target risk of structural collapse equal to 1% exceedance in 50 years.

Based on the project data and project location, seismic loads have been applied in accordance with ASCE 7 Chapters 11-12.

Seismic Design Criteria:

Importance Factor (I_e):	1.50
Mapped MCE_R Spectral Response at Short Periods (S_S):	0.837 g
Mapped MCE_R Spectral Response at 1-s Periods (S_1):	0.307 g
Site Class:	D *(May be Reduced Per Pending Geotechnical Report)*
Short Period Site Coefficient at 0.2-s (F_a):	1.2
Short Period Site Coefficient at 1.0-s (F_v):	2.0
MCE_R Spectral Response at Short Periods (S_{MS}):	1.004 g
MCE_R Spectral Response at 1.0-s Periods (S_{M1}):	0.614 g
Design Spectral Response at Short Periods (S_{DS}):	0.669 g
Design Spectral Response at 1.0-s Periods (S_{D1}):	0.409 g
Long-Period Transition (T_L)	12 sec
Seismic Design Category (SDC):	D

Seismic Analysis Criteria:

Analysis Procedure / Single Story Flexible Diaphragms:	Equivalent Lateral Force Procedure
Analysis Procedure / Other Structures:	Modal Response Spectrum Analysis
Seismic Force-Resisting System / Primary Structure:	Bearing Wall Systems / Special Reinforced Masonry Shear Walls
Response Modification Coefficient (R):	5.0
Overstrength Factor (Ω_0):	2.5
Deflection Amplification Factor (C_d):	3.5
Seismic Force-Resisting System / Canopies, Trellis and Bridges:	Cantilevered Column System / Steel Ordinary Cantilevered Column System
Response Modification Coefficient (R):	1.25
Overstrength Factor (Ω_0):	1.25
Deflection Amplification Factor (C_d):	1.25

Recommendations:

Site-Specific Response Spectrum:	*Site-Specific ground motion procedures are recommended to reduce seismic demands for Risk Category IV buildings.*
Extreme Torsional Irregularity	*Building strength and stiffness shall be proportioned to reduce the torsional dynamic response on the first and second modes in the Eigenvector (or Ritz-vector) analysis and to alleviate extreme torsional irregularities, as defined per ASCE 7, for Risk Category IV buildings.*
*Redundancy Factor (**ρ**)*	*Building strength and stiffness shall be proportioned to permit a redundancy factor (p) of 1.0 for Risk Category IV buildings.*
Seismic Force-Resisting System (Primary Structure): Building Frame Systems / Special Reinforced Masonry Shear Walls	*The seismic analysis criteria for specially reinforced masonry shear walls in building frame systems may be used where the maximum compressive axial force (including wall self-weight) at strength level for all shear walls within a specified building, generates a net tensile strain in the extreme tension reinforcement equal to or greater than 0.005 in/in. This criterion may be used only at the discretion of the Structural Engineer of Record. Where large, concentrated loads occur that would conflict with this criterion, it is recommended that steel columns or masonry wall piers are used to alleviate concentrated compressive loads on specially reinforced masonry shear walls.* *Response Modification Coefficient (R): 5.5* *Overstrength Factor (Ω_0): 2.5* *Deflection Amplification Factor (C_d): 4.0*

2.3.6. Storm Shelter Loads

Storm shelter loads result from high winds associated with tornados and hurricanes and are implemented to safeguard the public health, safety and general welfare of the occupants throughout the duration of and any resulting loss from the storm. Hurricane storm shelters also require an increase to the rain load due to the increased intensity of rainfall during a hurricane. Both the wind and rain loads are measured based on a probability of exceedance equal to 0.5% in 50 years (10,000-year MRI).

Tornado:

Shelter Wind Speed:	200 MPH
Exposure Category:	C (Required per 2014 ICC 500)
Rainfall Intensity (i): (15-min duration, 100-year MRI)	6.50 in/hr
Topographic Factor (K_{zt}):	1.0
Wind Directionality Factor (K_d):	1.0 (Required per 2014 ICC 500)
Internal Pressure Coefficient (GC_{pi}):	+/- 0.55

Hurricane:

Shelter Wind Speed:	190 MPH
Exposure Category:	D
Rainfall Intensity (i): (60-min duration, 100-year MRI)	9.86 in/hr (3.86 in/hr + 6.0 in/hr)
Topographic Factor (K_{zt}):	1.0
Wind Directionality Factor (K_d):	1.0 (Required per 2014 ICC 500)
Internal Pressure Coefficient (GC_{pi}):	+/- 0.55

2.4. Soils and Foundations

2.4.1. Geotechnical

Geotechnical study of a particular site is critical in defining the subsurface conditions at the site. The collection of subsurface data along with laboratory testing provide the necessary information to evaluate potential foundation systems for the proposed construction. A geotechnical report based on the subsurface exploration and corresponding laboratory study will provide recommended foundation systems, seismic site class identification, soil strength, site preparation recommendations, lateral earth pressures for below grade construction and groundwater information along with other information deemed critical for the safe construction and occupation of the proposed construction.

A geotechnical investigation has not yet been performed at this site and no geotechnical report or recommendations are yet available.

Geotechnical Report:	Pending at the time of this report
Site Class:	D (Assumed)
Foundation System:	Spread Footings (Assumed)
Allowable Bearing Pressure:	4,000 PSF (Assumed)
Active Lateral Earth Pressure (Unrestrained):	40 PSF (Assumed)
Active Lateral Earth Pressure (Restrained):	60 PSF (Assumed)
Passive Lateral Earth Pressure:	360 PSF (Assumed)

2.5. Building Performance

2.5.1. Deflection Criteria

The deflection criteria are the performance specifications that are used to measure the serviceability of the building structural elements, and can directly affect the human comfort as well as architectural, mechanical, plumbing, electrical and process equipment in the building.

At a minimum, structural members shall be sized to comply with the deflection criteria in Section 1604.3 and Table 1604.3 of the IBC.

General Deflection Limits:

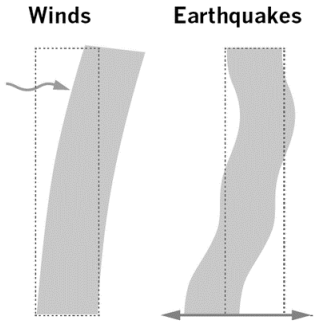
Roof Members:	
Supporting plaster or stucco ceiling:	l/360 (Lr), l/360 (S or W), l/240 (D + L)
Supporting non-plaster ceiling:	l/240 (Lr), l/240 (S or W), l/180 (D + L)
Not supporting ceiling:	l/180 (Lr), l/180 (S or W), l/120 (D + L)
Floor Members:	l/360 (L), l/240 (D + L)
Exterior Walls:	
With plaster or stucco finishes:	l/360 (S or W)
With other brittle finishes:	l/240 (S or W)
With flexible finishes:	l/120 (S or W)
Interior Partitions:	
With plaster or stucco finishes:	l/360 (L)
With other brittle finishes:	l/240 (L)
With flexible finishes:	l/120 (L)

Masonry Deflection Limits:

Beams and Lintels Supporting Unreinforced Masonry:	l/600 (D + L) or 0.3 in (for brick veneer only)
Reinforced Masonry Walls (Out-of-Plane):	0.007h (h = height of wall)

2.5.2. Story Drift

Story drift is the allowable amount of side sway between two adjacent stories of a building caused by lateral wind and/or seismic loads. The structure is designed to limit the distance that a building may drift in order to not cause issues with serviceability, architectural cladding, windows, and brick facade.



At a minimum, the structural design will adhere to ASCE 7 requirements for story drift.

Amplified Seismic Drift:

Bridges / Allowable Story Drift:	h/70 (h = story height)
Amphitheater Trellis / Allowable Story Drift:	h/70 (h = story height)
Gymnasium / Allowable Story Drift:	h/140 (h = story height)
Other Structures / Allowable Story Drift:	h/140 (h = story height)

Wind Drift:

Bridges / Allowable Story Drift (V_{ASD}):	h/400 (h = story height)
Amphitheater Trellis / Allowable Story Drift (V_{ASD}):	h/400 (h = story height)
Gymnasium / Allowable Story Drift (V_{ASD}):	h/400 (h = story height)
Other Structures / Allowable Story Drift (V_{ASD}):	h/400 (h = story height)

Recommendations:

Wind Allowable Story Drift:	*V_{ASD} has been used as the wind drift performance criterion for Risk Category IV buildings. This criterion may be relaxed at the discretion of the Structural Engineer of Record.*

2.5.3. FM Global

FM Global is an insurance company that provides property owners with property insurance and risk management. FM Global uses an engineering-based approach to provide coverage based on the specific business and property being insured. Each facility is evaluated based on construction, occupancy, protection and exposure to provide a program that aligns with the specific properties risk management objectives. With the engineering-based approach, specific structural criteria have been developed by FM Global to mitigate the potential of loss at the property. Among these criteria, design guidance is included for wind pressures, cladding design and roof attachment.

Is this an FM Global project?	Verification Pending
Design Wind Speed (100-year MRI):	145 MPH
RoofNav Wind Pressure:	
Zone 1:	116 PSF
Zone 2:	147 PSF
Zone 3:	193 PSF
RoofNav Roof Uplift Rating:	
Zone 1:	240 PSF
Zone 2:	300 PSF
Zone 3:	390 PSF

The following FM Global data sheets are to be reviewed and implemented as required:
- FM Global Property Loss Prevention Data Sheets 1-2, EARTHQUAKES
- FM Global Property Loss Prevention Data Sheets 1-28, WIND DESIGN
- FM Global Property Loss Prevention Data Sheets 1-29, ROOF DECK SECUREMENT AND ABOVE-DECK ROOF COMPONENTS
- FM Global Property Loss Prevention Data Sheets 1-54, ROOF LOADS FOR NEW CONSTRUCTION

Recommendations:

FM Global Design Criteria:	*These criteria may be used only at the discretion of the Structural Engineer of Record.*

Structural Narrative Cont.

St. Croix Central High School

3. MATERIALS

Materials have been selected with due regard to availability, cost, constructability, and architectural aspiration. All material properties are in accordance with American Society for Testing and Materials (ASTM) standards.

3.1. Concrete

Portland Cement:	
Not Subject to Sulphates:	Type I and II
Subject to Sulphates:	N/A (Type V Portland Cement Not Readily Available)
Concrete Compressive Strength:	
Footings:	4,000 PSI @ 28 Days
Footing Piers:	4,000 PSI @ 28 Days
Slab-On-Grade:	4,000 PSI @ 28 Days
Concrete Over Metal Deck:	4,000 PSI @ 28 Days
Reinforcing:	
Deformed and Plain Bars:	ASTM A615, Grade 60 (Fy = 60 KSI)
Low-Alloy-Steel (Weldable) Deformed Reinforcing Bars:	ASTM A706, Grade 60 (Fy = 60 KSI)
Welded Wire Fabric:	ASTM A1064, Grade 65 (Fy = 65 KSI)
Macro Synthetic Fiber:	ASTM D7508

3.2. Structural Steel and Metal Deck

Structural Steel:	
W-Shapes:	ASTM A992 (Fy = 50 KSI)
HSS (Square and Rectangular):	ASTM A500 Grade C (Fy = 50 KSI) or ASTM A1085 (Fy = 50 ksi)
HSS (Round):	ASTM A500 Grade C (Fy = 46 KSI) or ASTM A1085 (Fy = 50 ksi)
Channels:	ASTM A36 (Fy = 36 KSI)
Angles and Plates / Typical:	ASTM A36 (Fy = 36 KSI)
Angles and Plates / Braced Frames:	ASTM A572 Grade 50 (Fy = 50 KSI)
Anchor Rods / Typical:	ASTM F1554 Grade 55 (Fy = 55 KSI)
Anchor Rods / Braced Frames:	ASTM F1554 Grade 105 (Fy = 105 KSI)
Metal Deck:	
Cold Rolled Steel (Galvanized):	ASTM A653 (Fy = 50 KSI)
Cold Rolled Steel (Painted):	ASTM A653 (Fy = 50 KSI)

3.3. Masonry

Specified Compressive Strength of Concrete Masonry(f'm):	2,500 PSI (Unit Strength Method)
Minimum Net Area Compressive Strength of Concrete Masonry Units:	2,500 PSI (ASTM C90)
Mortar:	Type M or S (ASTM C270)
Grout:	Meet or Exceed 2,500 PSI (ASTM C476)
Reinforcing:	
Deformed and Plain Bars:	ASTM A615, Grade 60 (Fy = 60 KSI)
Low-Alloy-Steel (Weldable) Deformed Reinforcing Bars:	ASTM A706, Grade 60 (Fy = 60 KSI)

3.4. Cold-Formed Metal Framing

Main Component Members (Galvanized):	ASTM A653 (Fy = 50 KSI)
Bracing, Bridging and Blocking Members (Galvanized):	ASTM A653 (Fy = 50 KSI)

Mechanical Narrative

St. Croix Central High School

1. General Project Information

1.1. The approach to HVAC, plumbing, and fire suppression systems draws upon the VALUES identified with VIDE during the masterplan phase. This includes the overarching themes of Equity and Inclusion, Health and Comfort, Resiliency and Systems, and Spaces and Resources.

- Equity and Inclusion: the team's building system approach is to ensure consistency in the quality and performance of systems, while allowing sufficient flexibility for customization by project site.
- Health and Comfort: building systems shall support a healthy learning and teaching environment, meeting the standards and codes identified in this narrative and continue to build upon the core values identified in the masterplan. This includes special attention to space temperature and humidity control, as well as acoustics and ventilation.
- Resiliency and Systems: the climate of the US Virgin Islands places significant demands on building systems, both during normal operation due to a salt coast environment and high humidity, as well as during extreme weather events. The design approach focuses on reducing the quantity of exposed equipment, while utilizing systems that can be maintained and replaced with greater ease. Performance is achieved by the integration of simpler components, rather than using state-of-the-art systems that have a higher degree of inherent complexity.
- Spaces and Resources: the team, through an integrated approach, has focused on cooling and water demand reduction, given the high cost and scarcity of local resources. Buildings are designed to meet a classification of net zero energy ready or net zero energy, with a target site energy use intensity, before renewables, of under 25 kBTU per year per gross square foot.

2. Codes and Standards

2.1. Codes
- 2.1.1. 2021 International Mechanical Code
- 2.1.2. 2021 International Plumbing Code
- 2.1.3. 2021 International Fuel Gas Code
- 2.1.4. 2021 International Energy Conservation Code
- 2.1.5. 2021 International Fire Code

2.2. Applicable Standards:
- 2.2.1. ASHRAE 62.1-2019, Ventilation
- 2.2.2. ASHRAE 90.1-2019, Energy
- 2.2.3. ASTM
- 2.2.4. FEMA
- 2.2.5. NFPA
- 2.2.6. SMACNA

3. Utilities

- Provide domestic water service from the local utility system.
- Provide on site water storage for fire sprinkler systems and domestic water systems in conjunction with the local domestic water service from the local utility.
- Installation and connection to the utility shall be compliant with the regulation of the local utility.
- Provide multiple sanitary connections to the project site. At a minimum, each building shall have a dedicated connection to a manhole directly connected to the local municipal system. Provide two-way clean-out at the exterior of the building in addition to the other clean-outs required by the plumbing code.
- Provide propane storage and distribution on site as required for food service equipment.

4. Building Design Criteria

4.1. Climate Data

4.1.1. Design

4.1.1.1. Data Source

- 2017 ASHRAE Handbook of Fundaments
- Cyril E. King Airport, Virgin Islands (WMO: 785430)
- Lat: 18.336N, Long: 64.98W, Elev: 20 ft
- Time period: 1998-2014

4.1.1.2. Climatic Design Conditions

- 99.6% heating design: 70.3 db
- 0.4% cooling design: 89.5 db / 77.9 mcwb
- 0.5% dehumidification: 79.1F dewpoint / 83.5 mcdb

4.2. Space Conditions

4.2.1. Actively-Conditioned

- Temperature: 78F upper limit – float no higher than 84F during unoccupied period.
- Relative humidity: 60% RH typical, 63F dewpoint, 65% RH max per ASHRAE 62.1.
- Conditioned ventilation air provided to each space.
- Space types, unless otherwise noted in the program type matrix.
  - Classrooms
  - Offices
  - Media Center
  - Multi-Purpose
  - Commons
  - Performing Arts Center
  - Kitchen and Serving Area
  - Conference and Meeting Rooms

4.2.2. Semi-Conditioned

- Temperature: 84F target, conditions will track with outdoor conditions and align with the ASHRAE Standard 55 Adaptive Thermal comfort range for naturally ventilated spaces.
- Relative humidity: no direct control, but with a maximum target of 65% RH.
- Space types, unless otherwise noted in the program type matrix.
  - 2D Art
  - 3D Art
  - FEMA Shelter
  - Gym

4.3. HVAC System Design Criteria

4.3.1. Ventilation/Exhaust – Per ASHRAE 62.1 and IMC

Space	People Outdoor Air Rate (Rp) cfm/p	Area Outdoor Air Rate (Ra) cfm/sf
Classrooms	10	0.12
Lecture classroom	7.5	0.06
Art classroom	10	0.18
Science laboratories	10	0.18
Wood/metal shop	10	0.18
Computer lab	10	0.12
Music/theater/dance	10	0.06
Multiuse assembly	10	0.06
Cafeteria	7.5	0.18
Kitchen (cooking)	7.5	0.12
Office	5	0.06
Conference/meeting	5	0.06
Corridors	0	0.06
Gym (play area)	20	0.18
Spectator areas	7.5	0.06

4.3.2. Enclosure Construction (ASHRAE Climate Zone 1A)

4.3.2.1. Walls

- Steel-framed : U-0.124, R-13

4.3.2.2. Roof

- Attic and other : U-0.27, R-38

4.3.2.3. Fenestration

- 0-40% of wall (metal framing, fixed): U-0.57, SHGC-0.25
- 0-40% of wall (metal framing, operable): U-0.65, SHGC-0.25
- Assembly min VT/SHGC: 1.10
- Skylight (0-3% of roof): U-0.75, SHGC-0.35

4.3.2.4. Infiltration

- 90.1 Section 5.4.3.1 – Continuous Air Barrier required with compliance per one of the approaches below.
- Whole building: no more than 0.4 cfm/sf under 0.3" of water pressure differential per ASTM E779 or E1827.
- Assemblies: no more than 0.04 cfm/sf under 0.3" of water pressure differential per ASTM E2357, 1677, 1680 or E283.
- Materials: no more than 0.004 cfm/sf under 0.3" of water pressure differential per ASTM E2178.

Mechanical Narrative Cont.

St. Croix Central High School

4.3.3. Internal Loads

4.3.3.1.Lighting/Equipment

Space	Equipment Load	Lighting Load
Classrooms	0.75 W/ft^2	0.5 W/ft^2
Offices	0.75 W/ft^2	0.5 W/ft^2
Conference/Meeting Rooms	1.0 W/ft^2	0.5 W/ft^2
Multipurpose room	See Note	0.5 W/ft^2
Kitchen	Based on information from consultant	1.0 W/ft^2
Dining facilities	0.75 W/ft^2	1.0 W/ft^2
Restrooms	n/a	0.5 W/ft^2
Corridors	n/a	0.5 W/ft^2

4.3.3.2.Occupancy

Space	Basis	Heat Gain Sensible/Latent
Classrooms	40 ft^2/person	250/200 Btu/hr.
Offices	100 ft^2/person	250/200 Btu/hr.
Conference/Meeting	15 ft^2/person	245/145 Btu/hr.
Multipurpose room	Based on # of seats	
Kitchen	50 ft^2/person	275/475 Btu/hr.
Restrooms	200 ft^2/person	250/200 Btu/hr.
Corridors	300 ft^2/person	250/200 Btu/hr.

4.3.3.3.Design Diversity

- It is assumed that all actively conditioned classrooms will be at capacity simultaneously.
- Cooling demand calculations utilized to size central plant sizes shall consider diversity across the building site at no less than 90% of the sum of individual building peaks. The estimated building cooling load density is 175 sf per cooling ton, based on net active conditioned area.

4.4. Building Risk Category

4.4.1. Buildings have been assigned to the following risk category, in accordance with ASCE 7 Table 1.5-1, based on use or occupancy of the building, for Flood, Wind, Snow Earthquake and Ice Loads.

Risk Category:	IV (Community Hurricane/Tornado Shelter)

4.5. Rain Loads

4.5.1. Rainfall Intensity - Based on the project data and project location, rain loads have been applied in accordance with ASCE 7 Chapter 8.

Rainfall Intensity: (15-min duration, 100-year MRI)	5.75 in/hr

4.6. Wind Loads

4.6.1. Wind Speeds - Based on the project data and location, wind loads have been applied in accordance with ASCE 7 Chapter 26-27.

Wind Speed (3,000-Year MRI):	180 MPH (per the USVI Special Wind Region)
Wind Speed (25-Year MRI):	112 MPH (per ASCE 7-16 which controls over 109 MPH velocity per the USVI Special Wind Region)
Wind Speed (10-Year MRI):	74 MPH (per ASCE 7-16 which control over 72 MPH velocity per the USVI Special Wind Region)
Wind Speed (V_{ASD} 3,000-Year MRI):	139 MPH
Exposure Category:	D (Required per 2019 USVI Building Code)
Wind-Borne Debris Region:	Yes (Impact-protective system)

4.6.2. Equipment and System Mounting and Restraining

4.6.2.1.Delegated Design Requirements.

4.7. Seismic Loads

4.7.1. Ground Accelerations

Site Class:	D (Assumed)
Seismic Design Category (SDC):	D
Component Importance Factor (I_P):	1.0 or 1.5 (Dependent upon hazard or use) Component Importance Factor for each piece of equipment & system should be listed in the equipment schedule

Note: I_P = 1.5 If the component or system is required to function for Life-Safety purposes after an earthquake, this includes fire protection sprinkler systems. Any piping, ductwork, power, and/or control cables that are attached to such a system will also have a Component Importance Factor, I_P = 1.5

4.7.2. Equipment and System Mounting and Restraining

4.7.2.1. Delegated Design Requirements.

4.8. Soil Conditions

4.8.1. Excavation Information

Geotechnical Report:	No report has been obtained for this specific site (Assumed – Rock.)

4.8.2. Frost Depth - most commonly the depth at which the groundwater in the soil is expected to freeze.

Geotechnical Report:	No report has been obtained for this specific site. Freezing would not be present at this site. (Assumed – Rock.)

5. Mechanical Systems

5.1. HVAC

5.1.1. Ventilation Air and Dedicated Outside Air Systems

Application of ASHRAE Standard 62.1 requires consideration by the mechanical engineer of record. When multiple spaces are included into the same zone, calculations must be performed to identify the correct ventilation rate that ensures adequate distribution to all spaces and zones for all operating conditions. Depending on the zoning configuration, the multiple space calculation corrections can increase the minimum required outside air quantity.

The ability to right-size ventilation will have a significant impact on cooling load and the subsequent selection of equipment and plant solutions. For the high humidity climate of the US Virgin Islands, maintaining positive pressurization of buildings, utilizing dehumidified ventilation air, and a contiguous adequate air / vapor barrier, allows maintenance of a healthy environment.

With a traditional all-air system, excess subcooling of spaces is possible, if an adequate reheat source is not provided. Dedicated outdoor air systems (DOAS) provide a creative solution that addresses multiple issues:

- The DOAS approach allows the outside air latent load to be decoupled from the space sensible load. The outside air path can be conditioned based on dew point control to deliver neutral or cold air to a parallel space sensible cooling system. Space temperature can then independently be controlled by the sensible cooling system in the space.
- The DOAS air path is 100% outside air, not mixed, and can be delivered at the prescribed quantity directly to the space based on the people and area factor ventilation rates. Multiple space calculations do not need to be considered.
- Since no mixing is involved, ventilation rate delivery to the space/zone can be verified and continuously monitored.
- The new requirement in ASHRAE Standard 62.1 that requires occupied spaces be held below 65% relative humidity now becomes achievable at part-load cooling conditions

5.1.1.1. CHW, Indoor DOAS

The Dedicated Outdoor Air Systems (DOAS) will consist of an air handling unit (AHU) with chilled water coil and closed loop run around coils for energy recovery and conditioning to neutral air. Units will be installed indoors within the building in floor-by-floor mechanical rooms. Conditioned ventilation air will be ducted to each space and delivered through a variable air volume air valve to the dedicated space fan coil unit return duct. The target ventilation unit coil leaving air temperature is 55F. Ventilation relief air from conditioned spaces will be relieved from the conditioned spaces to the outdoors with variable speed inline exhaust fans. Relief openings to the outdoors will have motorized dampers or other means of closure and sealing off during storm events.

5.1.1.2. Air Control

Ventilation air will be ducted from the DOAS to variable air volume terminal units (VAV boxes). VAV's will be ducted to the upstream side of zone level fan coil units and will modulate the amount of ventilation air delivered to the space based upon occupancy (Demand Control Ventilation based on CO2 sensors in each space). In no case will ventilation air be less than the exhaust air plus 5% of maximum to maintain positive building pressurization. The expected ventilation air will be 0.5-0.6 cfm/sf under full occupancy and 0.12 cfm/sf during unoccupied conditions.

5.1.2. Space Conditioning

5.1.2.1. Thermal Zoning

ASHRAE's terminology page defines a control zone as a space or group of spaces within a building with heating or cooling requirements sufficiently similar that comfort conditions can be maintained by a single controlling device. The HVAC engineer zones the building by grouping together spaces that will have similar cooling needs with the purpose of reducing the number of pieces of HVAC equipment and/or control devices to reduce system installation costs.

The goal will be to provide as many zones and as much control as feasible, a thermostat in each space. Where it makes sense, small spaces with similar load profiles will be combined with no more than three rooms per zone. Zones will be determined based on different space thermal demands, ASHRAE and general industry practices. Factors used to determine zoning include the following:

- Space size and proximity to similar spaces
- Space exposure (interior versus exterior)
- Space functionality (classroom, office, storage, gym, etc.)
- Space internal heat gains (office equipment, mechanical and electrical equipment, lighting)
- Glazing and orientation

Zoning the building based on these methods will give the occupants maximum thermal control over their spaces and simultaneously optimize HVAC system operation.

Classrooms will be individually controlled, will be an independent zone, and will not be combined with any other space

5.1.2.2. Terminal Devices

5.1.2.2..1. CHW and DOAS

Each zone will be served by a chilled water fan coil unit with EC motor, ducted through above ceiling insulated ductwork to diffusers. Each FCU will have a ducted return with a filtered ceiling return or wall grille. With the chilled water DOAS providing 55-65 °F ventilation air, the ventilation air will be ducted into the return of each FCU and mix with the room return air before being delivered to the space. This will require the FCU fan to run continuously during occupied hours. For sound attenuation and mitigation, fan coils will be installed in concealed locations (soffits, etc.) and the supply duct from the fan coils will be lined with acoustic insulation. The FCU cooling coil valve shall be modulated by the room thermostat to maintain the room at set point. If the room begins to sub cool to 3 degrees F below room set point and the FCU chilled water valve is closed the DOAS supply temperature shall be increase slightly using reheat.

5.1.3. Central Plant

5.1.3.1. Chiller Design Criteria

- Chillers will be packaged air-cooled rotary screw type.
- The chiller plant will be configured for one central chilled water plant with all units in a chiller yard.
- Chiller plant will include two 250 ton chillers, and one 150 ton chiller. Each chiller will have multiple circuits, compressors and power connections for redundancy and serviceability.
- Chillers shall have equivalent to 1000 hour salt spray coating of all exposed surfaces.
- Chillers shall include factory prewired and preprogrammed, complete and functional controls with direct digital BACnet controller and all control devices for a complete and functional system. Field quick connects are acceptable. BACnet controller shall be Tridium Jace Niagara or similar. Chiller plant / chiller controls shall be compatible with and completely integrated into campus building automation and controls system.
- Each chiller plant shall include air separator, expansion tank particulate filters if required due to sediment in the water service, and water service connection.
- Chiller plant shall be installed on ballasted 5 inch reinforced concrete pad including component tie downs and screen/sound walls complementary to architectural style to withstand the required zone wind force plus a minimum of 10% safety factor above code total wind load. Radiated Sound from a chiller plant shall be limited to 60 db maximum 30 feet from the chiller module or adjacent building whichever is the shortest distance.
- Chiller plant shall be ARI certified to meet the energy code energy efficiency requirements.
- Chiller plant and any associated devices shall be installed a minimum of 5 feet above the 100 year flood plain.

5.1.4. Hydronic Distribution

5.1.4.1. Site

Pumping for site distribution will be setup in a variable primary configuration utilizing two pumps from the chilled water plant, each sized for 100% of design flow. Pumps will be located in a covered building near the chiller plant and will include all necessary accessories such as variable frequency drives, air separators, expansion tanks and chemical feeders. Piping will be distributed to each building, and coordinated with the building architecture.

5.1.4.2. Building Level

Isolation valves will be provided at each building entrance for service shutoff. Chilled water piping will be routed to the DOAS within the mechanical mezzanine and to individual fan coil units.

5.1.5. Specialty Spaces

5.1.5.1. IT Rooms

Dedicated technology rooms shall be conditioned with independent air-cooled ductless split-system units.

5.1.5.2. Kitchen

Commercial cooking areas shall be provided with Type I and/or Type II hoods in coordination with the team's food service design consultant and VIDE. 50% of make-up air should be transferred from adjacent zones or a kitchen demand controlled ventilation (KDCV) shall be provided to allow turn-down to 50% of demand flow. Dedicated make-up air shall be provided by units with a similar configuration to base building DOAS units, sized to deliver make-up air at no more than a 10F delta from the space target temperature. Dedicated exhaust fans and grease exhaust ductwork shall comply with the IMC and meet applicable UL listings.

5.1.6. Building Automation System (BAS)

5.1.6.1. System Description: The site building management system (BMS) will have digitally based components, a graphical interface, and accessible via the World Wide Web. The site building automation system is for diagnostics and real time system operation verification. Programming shall be at district headquarters by district performed at the system wide master HMI. Refer to specification section 230923.01 for additional requirements. The following is a summary of the anticipated control points associated with the equipment scheduled for this project. This list is a summary and not intended to be all inclusive:

5.1.6.1..1. DOAS Units:
- Outside air temperature
- Air filter pressure drop
- Chilled water coil control
- Supply air fan enable/disable
- Supply air fan speed
- Supply air fan current
- Supply air temperature
- Supply air duct static pressure

5.1.6.1..2. Air Terminal Units
- Primary air flow
- Primary air damper position
- Room Temperature
- Room CO2 for demand ventilation

5.1.6.1..3. Server Room Units:
- Unit enable/disable
- Room temperature
- Room humidity

5.1.6.1..4. Kitchen Make Up Air:
- Make up air unit fan status
- Kitchen hood fan status

5.1.6.1..5. Fire Alarm and Sprinkler System
System status/alarm
Trouble
Water flow

5.1.6.1..6. Main Restrooms:
Exhaust fan enable/disable

5.1.6.1..7. Small Restrooms (Under two water closets):
No BMS interface
Local control

5.1.6.1..8. Domestic Hot Water:
No BMS Interface
Local control of water heaters and circulation pumps

5.1.6.1..9. Chilled Water System:
Chiller enable/disable
Chiller trouble/failure
Chilled water pump enable/disable
Chilled water supply temperature
Chilled water return temperature
Water make-up alarm

5.1.6.1..10.
Fan Coil Unit FCU:
On / Off
Chilled Water Coil (on / off or modulating)

5.1.6.2. The BMS will include a graphical interface with dedicated screens for the following equipment: DOAS units, fan coils, air terminal units, chillers, chilled water pumps, plumbing domestic water systems, plumbing potable water systems, and overall building parameters (temperature, relative humidity, static pressure).

5.1.6.3. The BMS will be monitored by off-site vendor.

5.1.6.4. The BMS will include trending software designed to monitor the control points of a specified period of time.

5.1.7. Duct, Piping, Equipment Installation

5.1.7.1. All duct, piping, equipment, etc. shall be routed and installed concealed from view and as aesthetically pleasing as possible

5.2. Plumbing

Plumbing systems shall include all propane, potable and non-potable water, sanitary sewer and vent piping systems to serve all plumbing fixtures including showers, water closets, urinals, lavatories, mop sinks, service sinks, food service equipment, drinking fountains and hose-bibs. Domestic hot water shall be provided by electric storage type or electric instantaneous heaters. Solar thermal hot water heating may be considered as an enhancement in support of project resilience and energy goals.

5.2.1. Water

Domestic and fire protection water will be delivered from a site distribution system which will include roof rainwater collection, storage, filtration, pumps, backflow preventers and control valves. Non-potable water will be distributed to toilets, lavatories, showers, etc. Potable water will be distributed to water fountains and food service equipment. Non-potable water storage will be sized for minimum 40 gallons per person per day. Potable water storage will be sized for minimum 10 gallons per person per day. Non-potable water will have 30 micron filter only. Potable water is to have 30 micron filter, carbon filter, RO membrane, HDPE or underground epoxy lined concrete storage tank, distribution pumps, polishing UV filter. Water feed from the local water utility, WAPA, will be piped to the water storage systems as a backup source of water. HDPE storage tanks will be installed above ground if used. Concrete cisterns will be installed below grade and will have two coat epoxy coatings with each coat being a different distinct color.

Sanitary Waste & Vent

- Floor drain locations shall be designed to meet Plumbing Code requirements and the minimum requirements set forth in the Space Program & Space Criteria Data Sheet Section of the Design Criteria Package (whichever is more stringent). Coordinate all floor drain locations with the Owner during the design phase.
- Sanitary waste and vent system shall be designed to provide connection to each plumbing fixture. Plumbing fixtures shall be drained by gravity through waste and vent stacks, house drains and house sewers, to five feet outside building and will be connected to the site utility connection.
- Horizontal drainage piping shall be run in a practical alignment and a uniform slope of not less than two percent toward the point of disposal.
- Floor drains shall be provided in all toilet rooms having three or more plumbing fixtures.
- Mechanical equipment rooms shall be provided with floor sinks with minimum 3" trap. Each mechanical room shall have as a minimum one general floor drain. HVAC condensate drainage piping shall be provided to each HVAC unit. Such piping shall drain to an indirect waste connection at the nearest floor sink or storm drain.

- Sanitary drainage vent piping shall be provided to each domestic plumbing fixture or trap.
- Floor drains with trap primers shall be provided in each toilet room.
- Floor sinks shall be provided at each ice machine. One floor sink for each two pieces of mechanical equipment requiring drains shall be provided.

5.3. Fire Protection

5.3.1. Wet Systems

- Provide a fire sprinkler system complete in place, tested and approved, as specified, and as needed for a complete, usable and proper installation. All equipment shall be installed per the criteria documents and manufacturer's recommendations. Fire protection water will be provided from the water capture and storage cisterns described above. The capacity of water storage shall be based on that required by the largest building on the site.
- The fire protection system will contain a diesel fire pump.
- Provide design, engineering, installation, start-up, testing, adjusting of complete and operational plumbing system. Design shall be prepared by a firm and professional licensed in the US Virgin Islands.
- Provide detailed engineering calculations for all systems prior to construction to confirm final sizes and equipment configurations and submit for review for compliance with the Design Criteria. Design Criteria shall identify minimum levels of quality, materials and workmanship.
- The entire fire sprinkler system design must be based on an overall level of quality and maintainability commensurate with a public owned, long term investment. The design shall incorporate proven technology and equipment.
- The fire sprinkler system shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines published.
- All fire sprinkler equipment and materials shall be installed to not be damaged or cause damage to other systems during a seismic event.

5.4. FEMA Storm Shelter Requirements

- Shelters will be designed to comply with 2021 IBC, 2014 ICC 500, and FEMA 361 with emergency ventilation and a water service entrance from below grade into the shelter.

6. General Design Criteria

6.1. Air Distribution Sheet Metal

- Ductwork will be constructed of galvanized sheet metal to SMACNA standards based upon the operating pressure of the ductwork. Exposed ductwork will be double-wall spiral or round. Concealed ductwork will be rectangular with external flexible blanket insulation.
- Early consideration of overall fan power is required, to ensure compliance with ASHRAE Standard 90.1 fan power criteria.
- Design supply duct down stream of variable air volume air valves with a maximum static pressure drop of 0.08" per 100 lineal feet of ducting and a maximum air velocity of 1800 FPM.
- Design supply duct up stream of variable air volume air boxes with a maximum air velocity of 2000 fpm, but not in excess of the supply pressure drop criteria.
- Return and exhaust air ductwork: Design maximum static pressure drop of 0.08" per 100 lineal feet of ductwork.
- Outdoor air ductwork shall be designed with a maximum static pressure drop of 0.06" per 100 lineal feet of ductwork.
- All ductwork downstream of terminal units shall be constructed in compliance with SMACNA one-inch W.G. pressure class construction.
- All other low-pressure ductwork shall be constructed in compliance with SMACNA two-inch W.G. pressure class construction.
- Supply and return trunk duct from air handling units to terminal units shall be constructed in compliance with SMACNA to a pressure class rating in excessive of maximum system operating pressure to at least one inch greater than required.

6.2. Hydronic Piping

- A direct return system shall be used for all piping systems reverse return shall be used where practical.
- Maximum water pressure loss for hydronic systems = 4 feet of head per 100 ft of pipe.
- Minimum pipe size of 3/4 inch, except for gage or control piping.
- Maximum velocity of 8 fps for 3" pipe size and larger.
- Maximum velocity of 5 fps for 2½" pipe size and smaller.
- Minimum velocity of 2 fps.

6.3. Chemical Resistant Waste and Vent Piping

Chemical resistant waste and vent piping above ground will be pipe, fittings and solvent cement supplied together as a system, equal to Charlotte Pipe ChemDrain chemical waste system manufactured by Charlotte Pipe and Foundry. One-and-a-half-gallon point of use acid neutralization tanks equal to Orion Style 8 will be provided at each sink where acid waste may be disposed.

Mechanical Narrative Cont.

St. Croix Central High School

6.4. Refer to the specifications for other piping, duct, equipment, materials, etc.
6.5. Equipment and piping installation.
6.5.1. All piping, equipment, etc., shall be routed and installed concealed from view and as aesthetically pleasing as possible.

7. Sustainability Framework Targets

7.1. Energy

Each project is designed with a low overall site energy use intensity of 25 kBTU/yr-gsf or less, to align with net zero energy ready or net zero energy as a target. This is achieved through a combination of strategies:

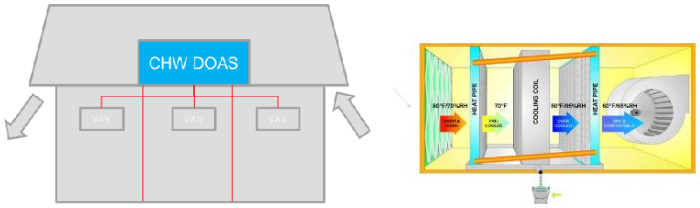
- Cooling demand control: window-to-wall ratio control, thermal insulation in excess of ASHRAE 90.1-2016 requirements, solar control measures, and internal heat gain control (lighting/equipment).
- Emphasis on ventilation air conditioning and control: ventilation air treatment will be decoupled from space cooling, to allow consistent delivery of dehumidified air in proportion to occupancy.

Cascade air system: conditioned air will be transferred to semi-conditioned spaces, before being relieved to the outdoors. This cascading approach is an indirect form of energy recovery, reducing demand for high energy intensity production of chilled water cooling.

Central Cooling Plant Schematic

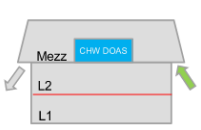
Notes:
1. Chilled Water Supply and Return Piping circuit to be installed on site, either buried or overhead, and routed to each building.
2. Chillers are all located in one location, adjacent to Utility Building.

DOAS (Dedicated Outside Air Unit) Schematic

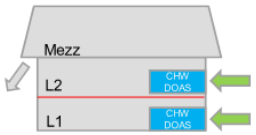


Notes:
1. Intake air louvers to be installed and ducted to DOAS units. Relief air louvers to be installed and ducted to inline exhaust fans.
2. DOAS supply will discharge to terminal boxes throughout building.
3. Heat Pipe Reheat can be installed for dehumidification.

Location Options:
1. Units installed on mezzanine; one unit serving each floor
   a. Access will be required to attic areas to service units if installed on mezzanine.
   b. Insulation to be installed on underside of roof or part of a composite system.



2. One unit installed per floor; one unit serving each floor
    a. Mechanical Equipment Room required on each floor for units.

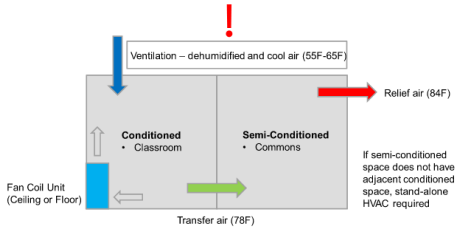


Space Conditioning Approach

Notes:

3. Chilled water fan coil units; one installed in each space.
4. Due to acoustics, fan coil units need to be installed concealed if in occupied space.

Conditioned to Semi-Conditioned Airflows



Air Cooled Chiller

Chilled Water Pumps

Ducted Fan Coil Units

Mini Split Condensers

Electrical Narrative

St. Croix Central High School

1. PROJECT INFORMATION

1.1. General

St. Croix Central High School is a new construction, Fine Arts Magnet High School Program campus-style school with approximately 199,000 sq. ft. of interior conditioned and semi-conditioned space coupled with 5,700 sq. ft of outdoor learning space. The campus is being constructed on the existing St. Croix Central High School site.

1.2. Gym/Shelter

The gym/shelter building will serve as a FEMA storm shelter. With connected photovoltaics (PV) and battery energy storage systems (BESS), the building will be able to run off-grid in an islanded mode for 14-28 days during a prolonged power outage after a storm event.

1.3. Site

The site will be net zero ready with electrical equipment sized for future, additional roof-mounted PV and will have areas on buildings designated for that same future use.

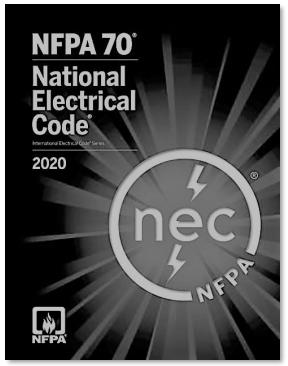
2. GENERAL DESIGN CRITERIA

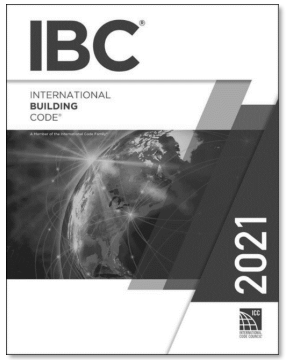
2.1. Codes and Standards

2.1.1. Codes

Design and construction work shall be in accordance with the following codes:

Building Code:	
National Fire Protection Association (NFPA)	2020 National Electrical Code (NFPA 70)
US Virgin Islands:	2021 US Virgin Islands Code, Title 29 – Public Planning and Development, Chapter 5 – Building Code
International Code Council:	2021 International Building Code (IBC)
International Code Council	2021 International Fire Code (IFC)
International Code Council	2021 International Energy Conservation Code (IECC)

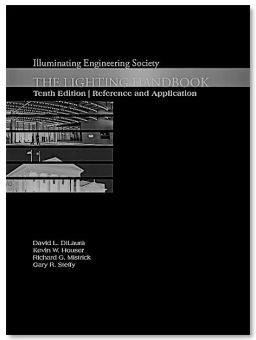


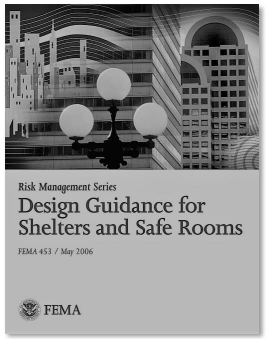


2.1.2. Applicable Standards

The following standards are to be implemented as referenced by the building code:

National Fire Protection Association (NFPA)
Illuminating Engineering Society of North America (IES)
Building Industry Consulting Service International (BICSI)
Americans with Disabilities Act (ADA)
National Electrical Manufacturer's Association (NEMA)
Electrical Industries Alliance (EIA)
Telecommunications Industry Association (TIA)
FEMA 453 Design Guidance for Shelters and Safe Rooms
FEMA P-424 Design Guide for Improving School Safety in Earthquakes, Floods, and High Winds





3. BUILDING DESIGN CRITERIA

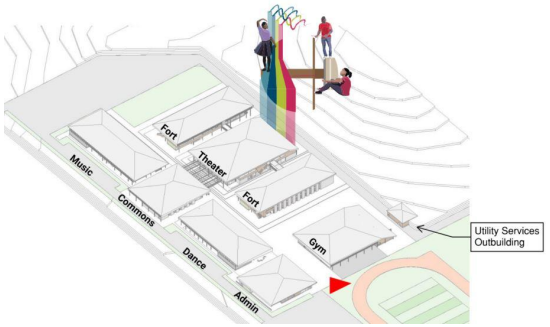
3.1. Power

3.1.1. Electrical Service

3.1.1.1. Utility

Provider: The Virgin Islands Water and Power Association (WAPA).

Connection Location: The west side of the project southwest of track & field.



Capacity Availability: To be confirmed.

Metering Rate Structure: Service is planned to be net metering, subject to confirmation by WAPA.

3.1.1.2. Site

The new underground service to the campus will likely be from an existing riser pole along Centerline Rd to the north.

The new underground service will be an approximately 3000 kVA NEC demand load (to be verified) radial feed type on the west side of campus that will serve all buildings. From the utility pole pot head down is the responsibility of the Electrical Contractor, including pole riser, medium voltage conductors, conduit, pull boxes and medium voltage transformer.

Electrical utility plans, transformer specifications and cable specifications are required to be submitted to WAPA for comment and approval. The Electrical Contractor will also be responsible for performing a Hi-pot test on the service that is witnessed by WAPA.

With the PV production and BESS, the project will have to apply for a Net Energy Billing (NEB) system through the energy office and be subject to hosting capacity studies.

Electrical Narrative Cont.

St. Croix Central High School

3.1.2. Power Distribution

3.1.2.1. Distribution System

The service from the west medium voltage transformer will feed a 4000A main switchboard with a 4000A main circuit breaker. The switchboard will be located inside the Utility Building. Underground feeders will serve 480Y/277V distribution panelboards in each building. These distribution panelboards will serve both 480Y/277V lighting and mechanical equipment loads and local dry-type transformers to derive 208Y/120V power for plug loads and other miscellaneous loads.

The gym/shelter switchboard separates shelter loads and non-shelter loads to allow shedding of non-shelter loads in an active shelter scenario. The shedding of those loads allows the shelter to remain powered for the code-required 24 hours and/or for the designed 14-28 days (with on-site PV production).

Distribution Equipment Available Manufacturers – Eaton, Square D, Siemens, GE

3.1.2.2. Switchboards

Switchboard bussing will be copper. Switchboards in all spaces will have stainless steel enclosures with heaters to reduce condensation inside the gear. The switchboard main breaker will be electronic trip and include an Energy Reduction Maintenance Switch and Ground Fault Protection.

Switchboards and other distribution panelboards will have the following molded case circuit breakers:
- Thermal-Magnetic Circuit Breakers: Up to 200 Amps.
- Adjustable Instantaneous-Trip Circuit Breakers: 250 Amps and Larger.

3.1.2.3. Panelboards

Panelboards will include door-within-door stainless steel enclosure construction, copper bussing and bolt-on circuit breakers. Panelboards will be sized with a minimum 25% spare capacity.

3.1.2.4. Surge Protective Devices (SPD)

Main switchboards will be provided with a 240kA internal SPD unit. The unit shall offer 10 modes of protection and shall be provided with a surge counter.

Panelboards serving plug loads (with computers and other sensitive equipment likely to be plugged in) will be provided with an integral 80kA SPD. The unit shall also offer 10 modes of protection.

3.1.2.5. Dry-Type Transformers

Transformers will be wound with copper or aluminum bussing and shall meet the DOE 2016, 10 CFR Part 431 transformer efficiency requirements.

3.1.2.6. Emergency Generator/Standby Distribution

3.1.2.6.1. Generator

No permanent generators are planned. Distribution equipment will allow temporary connection of a portable generator.

3.1.2.6.2. Manual Transfer Switch(es)

Design intent – A manual transfer switch and quick connect cabinet will allow a portable generator connection to replace or supplement the off-grid battery system. Control connections will be provided to integrate the portable generator with any off-grid controls.

Basis of Design - ASCO series 300 Manual Transfer Switch with Camlock quick connect cabinet. Quick connects may be integral to switch if size permits or in a separate piece of equipment

3.1.2.6.3. Central Battery Equipment for Storm Shelter

At the gym/shelter building, a central UL924 battery inverter will provide power to NEC 700 life safety loads (emergency egress lighting, exit signage, and other life safety systems) and ventilation motors as required by storm shelter code. The inverter will provide 120 minutes of egress lighting and ventilation on loss of normal power. One inverter will be provided for the storm shelter building.

Basis of Design: Myers Emergency Power Systems IE or C-III based on required size and loads.

3.1.2.6.4. Central Battery Equipment for Other Buildings

At all buildings excluding the gym/shelter, UL924 battery inverters in each building or structure will provide power to NEC 700 life safety loads (emergency egress lighting, exit signage, and other life safety systems). The inverter will provide 90 minutes of egress lighting on loss of normal power.

Basis of design: Myers Emergency Power Systems CM, EM, or IE based on required size..

3.1.2.7. Power Metering

Design Intent: Power metering will be provided on all main switchboards, and all switchboards or panelboards. The main switchboard meter shall be a power quality meter such as a Square D Ion PM8000. For other switchboards or panelboards, power quality data is not required. Metering may be separate from distribution equipment, utilizing current transformers (basis of design: eGauge) or metering functions in electronic trip units (basis of design: Square D micrologic trip units) with metering gateways.

3.1.3. Photovoltaic (PV) System and Battery Energy Storage System (BESS)

3.1.3.1. Photovoltaic system

The Gymnasium building (FEMA shelter) will be net zero. Photovoltaic modules and the remainder of the balance of system components (inverter(s), disconnects, combiners, etc.) will be provided during initial construction. The modules will be supported on the roof via a flush mounting system. The PV system will interconnect to the PV+BESS combiner switchboard specified in section 3.1.3.8.

The rest of the campus will be net zero ready. The remainder of the photovoltaic panels will be spread across the rooftops of all the buildings. Each sub-array will interconnect via a load side connection into the distribution panel feeding the associated building.

3.1.3.2. Sizing

The PV+BESS system sizing included in the bridging documents are sized to provide the following intent:

Provide continuous energy for Gymnasium building (FEMA shelter) when in shelter mode (operated without cooling and the rest of the buildings shed from the load). This is based on 5 days of battery autonomy (250kWh/day).

Provide 1.5-2 hours of energy for the whole site to ride through short term, non-extreme weather related power outages by the utility

System shall be Zero Net Energy ready. Electrical systems are sized to allow for enough additional, future PV to offset 100% of annual electrical energy use. Areas on each building roof totaling 50,000 sq. ft. will be reserved to support this size of roof mounted array.

3.1.3.3. Equipment

The Photovoltaic and storage system electrical equipment shall be as follows:

Minimum 72kW DC of photovoltaic modules.

Minimum 60kW AC of photovoltaic inverters. Inverters are to be installed in protected areas and not exposed outdoors.

625kW/1250kWh battery storage with integral inverter, HVAC, and controls.

250kWh of the system storage capacity is code required for the gym building (FEMA shelter) to operate for 24 hours in the event of a power outage.

Battery Isolation transformer (if Required by system manufacturer)

Motor operated circuit breakers (provided as part of main switchboard construction as specified in section 262413)

Electricity meters to feed metering data to control system.

Manual "Shelter mode" button and indicator lights will manually put system into shelter mode when building is to act as shelter (i.e. hurricane). When in shelter mode, upon loss of utility power, the system will shed non-shelter loads to allow the BESS and PV systems to provide enough power to operate the shelter off-grid for 14-28 days. The button shall be a switch or similar to an E-stop button with a "twist to reset" function. Provide indicator lights or similar remote annunciator near button showing the following:

Grid power status (available/unavailable)

Grid connection(Connected/Disconnected) – based off of main circuit breaker position (open/closed).

Non-shelter connection ((Connected/Disconnected) – based off of circuit breaker position (open/closed).

Control system to balance load and provide required functionality as described in the sequence of operations. This includes conduits for RS485 communications between inverters (both those installed during initial construction and those in the future).

3.1.3.4. Uninterruptible Power System (UPS)

The Battery Energy Storage system for the PV system is not a UPS, thus there will be a 30-100ms gap in power upon loss of normal utility power. Local UPS's shall be provided for all critical electronic loads, such as those in MDF or IDF rooms to bridge the power switch over.

3.1.3.5. Commissioning

Battery system, PV inverters, and controls shall be part of, and be commissioned as, a turnkey system.

3.1.3.6. Interconnection

The PV system and BESS will interconnect to main switchboard MSB opposite the main breaker. A bolted pressure switch will allow for disconnection of the PV and BESS from the rest of the power distribution system and shall act as the utility disconnect if required by WAPA. The main utility breaker for MSB, as well as the breaker feeding the non-shelter loads will be motor operated to allow for load shed and grid disconnection via the control system.

A production meter, separate from the control system meter, shall be provided if required by the utility.

3.1.3.7. Sequence of Operations

Normal Operation: BESS will operate in "grid following" mode and charge/trickle charge to maintain capacity. PV will act as a typical grid connected system, feeding the distribution system when system is active.

Battery Charging (grid connection): Significant battery charging beyond trickle charging shall be coordinated with WAPA to ensure low grid impact. Ideally it should occur outside of heavy grid use hours, such as between 12AM and 6AM. Coordinate with WAPA for ideal charging hours. Reduced charging rates during the day can be considered.

Battery Charging (off-grid): Battery charging will occur when loads are being met and there is excess solar energy to charge the BESS.

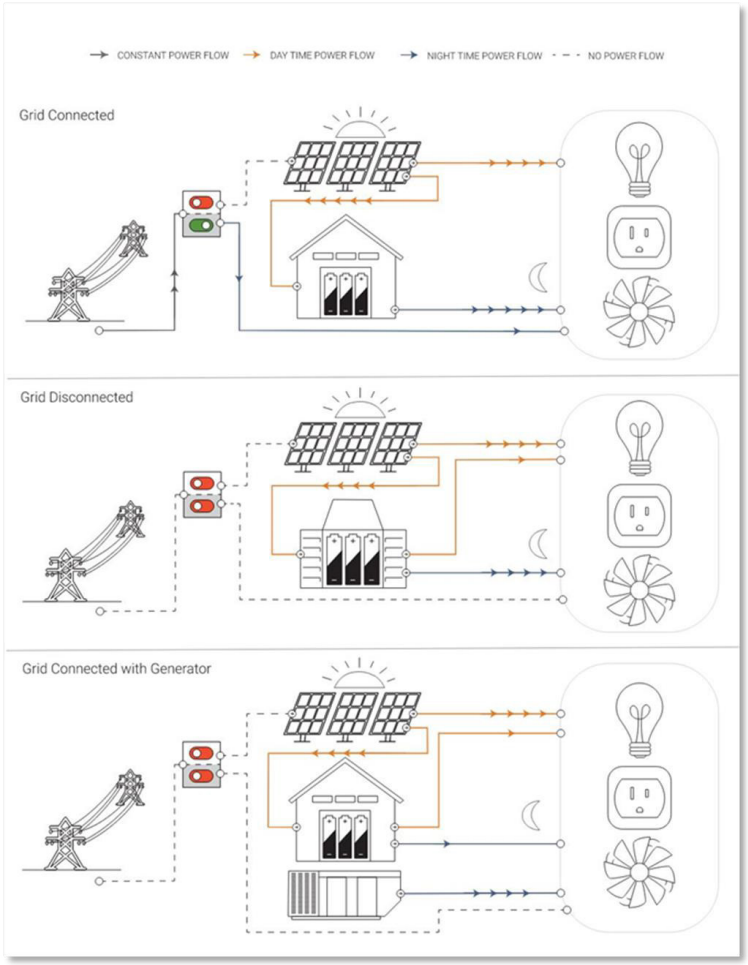
Non-Event outage (automatic) - Upon sensing loss of utility power, the motor operated grid isolation circuit breaker will open up to isolate the system from the grid. The BESS will switch from "grid following" to "grid forming" (duration around 100ms). During this time, the PV system will drop offline. The BESS will start feeding loads to the entire site. After 5 minutes of seeing the new microsystem grid (from the BESS) the PV inverters will reconnect and start feeding loads as well. Should the PV system be capable of producing more energy than the load demand, the control system shall curtail the PV production to match the load demand plus battery charging demand. Should the batteries discharge to the point where they only have 250kWh of remaining capacity, the non-shelter motor operated circuit breaker shall open to shed the non-shelter buildings to ensure there is 24 hours minimum back up power for the gym (shelter).

Storm Event outage (semi-automatic): Sequence 4 shall be followed unless the "Shelter Mode" button is closed or the system automatically sheds the non-shelter building when the 250kWh limit is reached. With either event, the non-shelter motor operated circuit breaker will open to shed the non-shelter loads. This may happen under grid power (button actuation) or off grid (automatic when 250kWh capacity reached). This will shed the non-critical loads so the PV and BESS will only feed the shelter loads.

Restoration of utility power: Upon restoration of utility power, the motor operated main circuit breaker will close. At this point the BESS will return to "grid following" and charge per sequence 2. If the non-shelter breaker is open, it shall close after the main circuit breaker has closed to limit inrush on the battery system. The PV inverters will act as UL1741 devices, dropping offline during the power switch and reconnect to the grid after 5 minutes.

Electrical Narrative Cont.

St. Croix Central High School



3.1.3.8. Electrical Gear for PV and BESS

A 600A switchboard will be provided to collect approximately 400A (300kW AC) of solar inverters (basis of design).

A 1200A switchboard will be provided to collect the BESS inverters. This size may increase if the BESS inverter size increases to support additional campus loads during short outages.

Roof mounted solar inverters will collect PV arrays at each individual building with solar provisions.

3.1.3.9. Location

The BESS systems will be installed in the hardened utility building to provide protection from the elements. This building will provide the system resiliency required per FEMA guidelines.

3.1.4. Seismic Controls for Electrical Systems

All electrical equipment, raceways, lighting fixtures, electrical devices, and supports shall be seismically rated to meet seismic requirements for the site class per the Geotechnical Investigation Report, the assigned Seismic Use Group or Building Category as Defined in the IBC, and the site-specific Design Spectral Response Accelerations.

The design calculations and details for all seismic restraints shall be a delegated design submittal.

3.1.5. Identification of Electrical Systems

All panelboards and other equipment will be provided with Arc Flash labels and phenolic labels with panelboard IDs, 'served from' information, voltage, and current.

All receptacles, light switches, and other end-use devices will be labeled with circuit numbers.

3.1.6. Raceways and Boxes

For non-shelter buildings, Interior raceways shall be EMT with compression fittings for line voltage equipment. Low voltage cabling such as data wiring, controls wiring, etc. will use cable trays, J-hooks, etc. where concealed above ceilings. Low voltage cabling shall be in EMT in finished areas with painted exposed structure, and in areas with baffle systems or floating clouds.

For shelter buildings, all interior line and low voltage cabling, including data, BMS and lighting control cabling shall be in pathways. Covered cable trays may be used as well for data cabling. Conduit shall be IMC with threaded fittings.

Exterior conduits shall all be IMC with threaded fittings above ground. PVC conduits with steel elbows shall be used for underground raceways.

3.1.7. Hangers and Supports

Electrical hangers and supports shall meet the seismic design requirements set forth by the structural engineer.

If the soils report requires it, conduits below slabs on grade shall also be seismically supported from the underside of the slab.

3.1.8. Grounding and Bonding

A complete grounding system shall be provided in compliance with NEC. Insulated equipment grounding conductors shall be provided in all feeders and branch and lighting circuit raceways.

A dedicated grounding system shall be provided for telecommunications systems. Telecommunication Grounding Bus (TGB) shall be provided in all MDF and IDF rooms. All TGBs shall be bonded to the ground bus in the nearest electrical panel. All equipment, racks and cable trays shall be bonded to the TGBs in IDF and MDF rooms.

3.1.9. Cables and Conductors

All feeder conductors shall be copper up to 100A and copper or compact aluminum above 100A; aluminum conductors shall not be allowed in DOAS unit or chiller feeds, or branch circuit wiring.

Cables with Type XHHW-2 insulation will be provided for service entrance conductors and feeder conductors to panelboards.

Cables with Type THHN-THWN insulation will be used for other feeders and all branch circuit conductors.

Multi-Conductor Cable (MC) will be allowed for branch circuit wiring within the interior walls and for short lighting fixtures whips to a common J-box above accessible ceilings. All homeruns shall be installed as single conductors in raceways.

3.1.10. Wiring Devices

General wiring devices will be white.

3.1.10.1. Receptacles

Receptacles that are automatically switched via occupancy sensors (for reduction of vampire loads) will be identified via a switched power symbol and will be green.

Convenience Receptacles:
Tamper-resistant, specification-grade, 125V, 20A rated devices shall be provided throughout buildings and within 25 feet of all ground-mounted HVAC equipment as required by the National Electrical Code. There shall be a maximum of six duplex devices per 20-ampere branch circuit.

Dedicated Receptacles:
Provided for cord-and-plug connected equipment requiring more than 10 amperes of connected load such as refrigerators, microwave ovens, and copy machines. Receptacles for dedicated service shall utilize dedicated 20-ampere branch circuit wiring to the serving panelboard.

GFCI Receptacles:
Provided in all exterior locations, kitchens, bathrooms, and wherever a receptacle is located within six feet of a sink. GFCI receptacles will be specification-grade, 5mA sensitivity, 125V, 20A rated and limited to a maximum of six duplex devices per 20A branch circuit. Where a GFCI circuit is located behind a hard-to-move device, such as a refrigerator, a standard receptacle with a GFCI circuit breaker shall be used.

Controlled Receptacles:
To be confirmed with the publishing of the 2021 IECC: provided in all conference rooms, break rooms, classrooms, and private offices. Receptacles will be split-wired such that the top is not controlled and the bottom is controlled via a plug load controller tied into the lighting control system occupancy sensors in the same space.

Special Receptacles:
Provided for equipment requiring special voltages or ampacities not listed above. Specific requirements will be coordinated with equipment manufacturer.

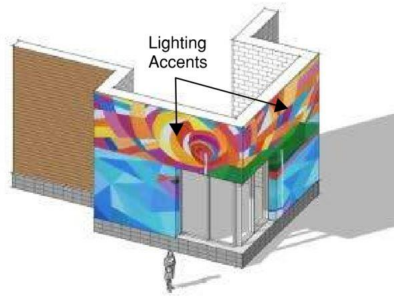
3.1.10.2. Face Plates

Single and combination wall plates, of types, sizes and with ganging and cutouts will be provided. All face plates will match wiring devices and be attached with metal screws colored to match face plate finish.

Wall plates will be white thermoplastic or stainless steel and labeled with the associated circuit number.

3.2. Lighting

To support a campus celebrating art and music, lighting will accentuate and highlight visual and artistic cues.



3.2.1. Interior

3.2.1.1. Requirements

Interior lighting consisting primarily of LED light fixtures with electronic dimming drivers shall comply with 2021 International Energy Conservation Code. All interior luminaires will be specified with a 3500-degree K color range and a color rendered index of 80.

All day lit spaces shall have daylight photocell sensors and light fixtures with continuous dimming drivers. Continuous dimming shall be standard for all LED fixtures.

Lighting levels shall be in accordance with recommendations of the Illumination Engineering Society (IES). Energy usage, however, shall not exceed the requirements of the IECC. Illumination levels shall be as follows:

Space	Min Footcandles
Classrooms	35
Art classroom	35
Science laboratories	40
Computer lab	30
Music	30
Multiuse assembly	30
Cafeteria	30
Kitchen (cooking)	50
Office	35
Conference/meeting	30
Corridors	15
Theatre/Music/Dance	30
Gym (play area)	50
Spectator areas	30

Electrical Narrative Cont.

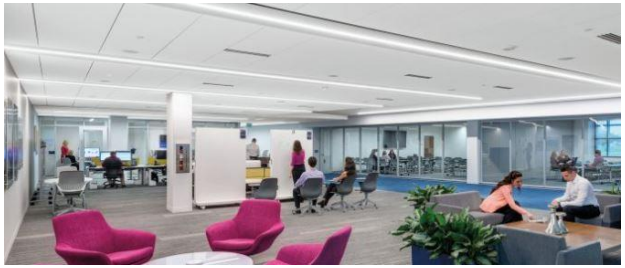
St. Croix Central High School

3.2.1.2. Luminaires

Interior fixtures in conditioned spaces will be standard commercial grade, LED fixtures. Emergency lighting shall be provided via a central lighting inverter.

Fixtures in conditioned classrooms, workrooms, offices, planning centers and corridors with ACP will be volumetric lay-in, recessed 2x2 or 2x4 troffers.

Fixtures in classrooms and other partially exposed spaces donning suspended ceiling panel systems in semi-exposed structure will be continuous linear pendant slotlights.

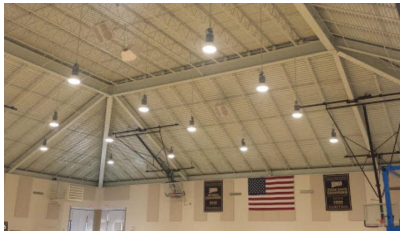


Fixtures in areas with wood slat ceiling systems will be recessed linear slotlights.

Fixtures in occupied, semi-conditioned exposed structure spaces will mostly be surface-mount or swivel-pendant mount architectural cylinder fixtures attached to the bottom side of sloped structure above.

Fixtures in specialty spaces such as dance studios will be a combination of task lighting and aimable systems:

Gymnasium fixtures shall be monopoint high output LED fixtures.



Fixtures in unoccupied, conditioned or semi-conditioned spaces will be linear industrial type light fixtures.
Interior fixtures in unconditioned and semi-conditioned spaces shall be designed to withstand the environment of the islands.

Fixture finishes shall be tested via the following:
- ASTM B117 Corrosion test
- ASTM D522 Cracking and loss of adhesion
- AAMA 2604 salt spray test.

3.2.2. Exterior

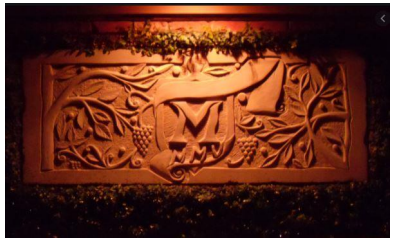
3.2.2.1. Requirements

Lighting levels shall be in accordance with recommendations of the Illumination Engineering Society (IES). Energy usage, however, shall not exceed the requirements of the IECC.

Exterior Lighting Distribution – Efforts shall be made to reduce lighting pollution to the best extent possible. Guidelines set by the International Dark Sky Association shall be considered while designing the exterior lighting. Fixture glare will also be considered and minimized to the best extent possible while still achieving the desired aesthetic. The minimum light output to achieve lighting guidelines set forth by the Illuminating Engineering Society shall be used to minimize light pollution and energy use.

3.2.2.2. Luminaires

Building mounted fixtures will be a combination of cans recessed in soffits, linear wall washers to accentuate visual cues, and cylinders in covered areas with exposed structure.



Exterior parking lot fixtures shall be standard area lights. Pathways shall utilize light columns.

The track and field will require a four-pole exterior athletic lighting system.

Portions of the gated service road west of campus will not require roadway lighting. Where easily accessible, exterior fixtures shall be vandal resistant.

Exterior fixtures shall be designed to withstand the environment of the islands. Fixture finishes shall be tested via the following:
- ASTM B117 Corrosion test
- ASTM D522 Cracking and loss of adhesion
- AAMA 2604 salt spray test.

3.2.3. Controls

Lighting controls shall be a distributed digital networked system.

The system network shall be controlled by a head end that will integrate with the BMS system and the school network. This will allow for a single point of access to make control updates both on site, and from central district locations. Interior spaces shall consist of distributed room controllers with the appropriate quantity of relays for the room. The room controllers shall connect to control devices, including switches, occupancy sensors, and photocells, with CAT5 cabling. The room controllers shall all network together via CAT5 cabling or wireless means.

All classrooms, work rooms, planning centers and offices will have occupancy sensors operating in the vacancy sensor mode with manual on and automatic off function for lighting control. Occupancy sensors will be low voltage with power packs and have auxiliary relays providing the ability to communicate with the mechanical BAS system. Auxiliary relay will operate in occupancy sensor mode with automatic on and off control of the mechanical unit serving the space.

Small interior spaces such as storage closets, restrooms may utilize wall box occupancy sensors that are not connected to the lighting network.

Exterior lighting shall be controlled via relay panels that will also connect to the digital lighting network. Networked exterior occupancy sensors will be provided as required to meet IECC 2021 requirements. Basis of design shall be Acuity nLight and shall comply with the 2021 IECC requirements.

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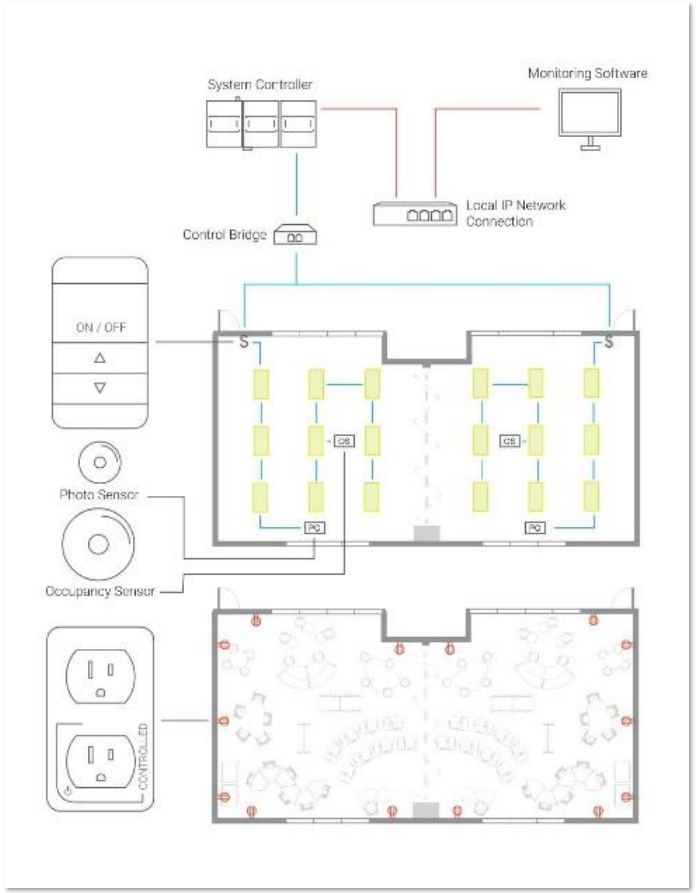

3.3. Fire Alarm

A digital, addressable fire alarm system will be provided. Extra care shall be taken when specifying the system to make sure that the system being specified is not proprietary, spare parts are readily available, and a local certified service provider is available. Basis of design to be Notifier.

Current assumption is that the fire alarm system only needs to comply with IBC, IFC, and NFPA, which requires only manual fire alarm pull stations with speaker/strobes for notification devices. A meeting with fire marshal is required to determine any additional local jurisdiction requirements that may be above and beyond the building and fire codes, such as full coverage automatic detection.

Speaker/Strobes shall be provided in all classrooms, corridors, common spaces, offices, and all areas required by ADA.

Pull stations shall be provided at all exit doors.

Smoke detectors shall be provided in the corridors, storage rooms, in front of the fire alarm control panel, and in the egress path.

Duct smoke detectors will be installed in all mechanical units exceeding 2,000 CFM. Smoke/fire dampers will be interlocked with their associated air handler to close when de-energized due to duct smoke detection or a fire event.

The fire alarm system will monitor valves of the sprinkler system and sprinkler flow and tamper switches on all zones of the sprinkler system.

All fire alarm wiring and cables shall be installed in metallic raceways.

IT/Security Narrative

St. Croix Central High School

1. DESIGN CRITERIA

The following narrative is a summary of scope for Virgin Islands District of Education (VIDE) St. Croix Central High School. It is based on the current layout of the spaces and how they are programmed. This narrative must be reviewed with the other Bridging Documents and is an adjunct to those documents. The design presented here has been based on similar size and type projects and best practices and may be revised to meet specific needs or changes in technology prior to construction. As system designers of technology-based solutions, it is understood that solutions that meet program needs may evolve over the course of design and construction, and where possible and feasible within budget accommodations shall be made to support known future technologies. This document is a team effort between the design team and the Department of Education to validate the systems provided will meet curriculum and operational needs of the school.

The following buildings are involved in this project for the IT Network and low voltage scope of work:

- Athletic Fields, Press Box, and Gymnasium
- JROTC Building
- Outdoor Learning Studios
- Admin Building
- Visual Arts/Dance and Music Buildings
- Learning Suite Buildings
- Commons Building
- Flexible Performance Theater

These spaces shall be designed under the following Applicable Codes and Standards:

- Americans with Disabilities Act
- National Electric Code 2020
- BICSI Telecommunications Distribution Methods Manual, current edition.
- FEMA 424
- DHS/FEMA 428

Complete IT network and low voltage design and installation shall meet or exceed the latest edition of following standards.

- EIA/TIA-568: Commercial building telecommunications wiring standard.
- EIA/TIA-569: Commercial building standard for telecommunications pathways and spaces.
- EIA/TIA-606: Administration standard for telecommunications infrastructure of commercial buildings.
- EIA/TIA-607: Commercial building grounding and bonding requirements for telecommunications.
- ANSI, ASTM, UL, NEMA, IEEE and FCC standards as applicable.
- BICSI Telecommunications Distribution Methods Manual, current edition.

All trades shall coordinate to establish and accommodate the power, heat, and structural needs of these spaces as it relates to equipment, and the deployment of this equipment shall be coordinated with Data and Content needs of AV equipment. Further coordination will be required with the school's IT staff as well as the staff that manages the equipment interfaces.

2. IT Network Spaces

General IT Network Space Consideration

IT spaces shall be configured to provide clean, secure, temperature and humidity-controlled spaces which accommodate current needs in addition to considering future needs. Future needs shall be accommodated, such as ongoing "moves, adds and changes" (MACs) without compromising conditions or requiring major construction. Since the Classroom Buildings are arranged into several levels with outdoor corridors, network interconnectivity requires non-typical construction arrangements. As secure spaces IT rooms will also house security equipment and may house controllers and Audio Video equipment (which do not need student access).

IT Network rooms

MDF

The main distribution frame (MDF) room is a School Campus serving room. It shall house the "School" Entrance Facility, the main distribution rack, all building specific servers, and the local intermediate distribution frame (IDF) for the rooms/areas surrounding the MDF. The MDF shall serve the IDFs in a radial (star) arrangement of fiber optic connectivity. The MDF rack shall house the ISP modem(s), firewall(s), the main distribution switch, Wi-Fi controllers, school telephone controller(s) and data servers for local storage.

IDF

Each intermediate distribution frame (IDF) room shall be located to allow connection of all critical data outlets within the "Standards" 90-meter horizontal cable length limit. The 90-meter limit is necessary to assure proper equipment operation. IDF's will house data switches, cable patch bays, and network UPS units.

Exceptions to length limit:

All critical communications outlets shall be PoE from an IDF which houses a UPS. Non-critical devices and outlets which are beyond the 90-meter limit shall be fiber optic with local power. Critical connections beyond the 90-meter limit shall be hybrid fiber optic/power cable which receives its power from the IDF UPS.

3. Classroom/Learning Spaces

Classrooms/Learning Studios:

Classroom/learning spaces represent the majority of the spaces for the School including Classrooms, Learning Studios and other miscellaneous learning environments. Every space shall be provided with a Wi-Fi access point to assure connectivity for the teacher and the students. Additional cabled work area outlet (WAO) faceplate connectivity shall be provided for the teacher connectivity, the instructional white board and for the computer workstations in each space. This cabled connectivity is to assure that the teacher can continue teaching if the Wi-Fi connectivity becomes problematic. The teacher faceplate shall be co-located with the video input plate noted in the AV narrative. In addition to the teacher station and the display locations, each typical classroom shall have data ports to connect 4 local workstations. Each independent display shall have 2 data ports behind each display.

Classroom Work Area Outlet (WAO) infrastructure shall be provided in 4-11/16" square boxes with single or 2-gang tile and plaster rings at appropriate heights above the finished floor with 1 ¼" conduit stub to ceiling space for data cables. Every classroom shall be provided with an educational intercommunication function or station with 2-way communication between the office and each classroom/learning space. Each classroom shall also be provided with a "system" clock.

Collaboration/Seminar Rooms/Conference Rooms/Meeting Rooms:

Every space shall be provided with a Wi-Fi access point to assure connectivity for the teacher and the students. Each display and IWB shall have 2 data ports behind each display/IWB. Each space shall also be provided with a minimum of 2 data ports per presentation location and a minimum of 4 ports per seminar and meeting room for general use.

Every collaboration, seminar, conference, meeting shall be provided with an educational intercommunication station with for 2-way communication between the space and the office. Each room shall also be provided with a "system" clock.

Digital Signage:

Each digital signage display shall have 2 data ports behind every display.

4. IT System Criteria

Cabled Infrastructure System

The cabled infrastructure system shall be a CAT6A cabled system. All cable in air handling spaces and open air in indoor spaces shall be plenum type cable. All ports shall be tested after final installation and labeled at both ends with origination and termination locations. All cable which leaves the building shall be indoor/outdoor cable, unless an appropriate conversion from indoor to outdoor occurs in an IT space within 50 feet of entry into the building.

Cable Pathways

The cabled infrastructure shall be supported in a standards compliant "continuous" support system. Cable runs of fewer than 50 cables may be supported by CAT6A rated J-hooks. Cable runs 50 cable and larger shall be supported by cable tray, such as basket tray. Basket tray in un-conditioned spaces shall be stainless steel or other equally corrosion resistant materials. Basket tray in conditioned spaces may be galvanized steel basket tray. Cable supports inside IT spaces shall aluminum, not galvanized steel, to eliminate zinc "finger" development.

Fiber optic cabling

Fiber optic cabling for main distribution runs shall be OS2 single mode fiber optic cable. Lower bandwidth runs, such as to an individual device, may be OM4 multi-mode fiber. All fiber runs shall be a minimum of 2 active strands. In addition to the active strands provide 2 spare terminated strands and 4 spare terminated strands.

5. Security Systems

Surveillance Security Television (SSTV/CCTV)

Cameras shall be video over IP high definition cameras. The cameras shall be powered via power over ethernet PoE, everywhere possible. The PoE will be supported by power from the IT room network UPS units. There will be a centrally located video server located in the MDF for image management with storage for 30 days of video images. Outdoor cameras will be weatherproof and vandal resistant. Remote access to the video recordings will via a password protected web interface within the video server. The video server shall provide "Evidence" quality data and image output.

Video intercom Systems

A video intercom system will be provided to "screen" daytime visitors to the school. The system will be comprised of door stations with video and audio from the entry door and the delivery door(s) to the main office and remote offices such as food service office for food deliveries.

Intrusion Detection System

Intrusion detection shall be provided at the exterior entries to the buildings by door contacts. Security Credential Readers shall be provided at staff entries to deactivate the alarm system for school open hours. Multiple zones will be provided as determined by the after-hours usage of the buildings; this will alarm to the staff any unauthorized access to "off limits" areas.

General Access Control and Compartmentalization

Building entry and compartmentalization doors shall be remote controlled to limit access of an intruder into the buildings. Remote lock down shall be manually controlled by a pushbutton in the office and a secondary "retreat" location. Upon initiation the doors shall be released to close and the hardware set (or strike) shall lock in the direction of entry. Where doors are intended to be held open, the doors shall be held on fire alarm type magnetic door holders (or similar hardware) and released upon initiation. Typical classroom doors locksets shall be non-electrified "Modified Classroom Lockset" allowing the teacher/staff member to lock the classroom door without leaving the room.

Other Low Voltage Systems

Every classroom and Staff space shall have a talk-back speaker/sound system and clock, refer to AV narrative section.

Digital connectivity for Educational Systems, refer to AV narrative section.

Audiovisual Narrative

St. Croix Central High School

9. DESIGN CRITERIA

9.1. Introduction

The following narrative is a summary of scope for Virgin Island District of Education (VIDE) based on the current understanding of the spaces and how they are programmed. Assumptions have been based on similar projects, best practices, or industry standards, and it shall be the responsibility of the school district to verify if any of the proposed solutions must be revised to meet specific needs prior to construction. As system designers of technology-based solutions, it is understood that solutions that meet program needs may evolve over the course of design and construction. Where possible, and feasible within budget accommodations, provisions shall be made to support known future technologies. It will be the responsibility of the client to review the design as it progresses and validate prior to an issue of contract documents for bid and identify if the systems provided will meet curriculum and operational needs of the school.

The following buildings are involved in this project for the audiovisual scope of work:

- Academic Classroom Building(s)
- Gymnasium Building & Athletic Fields
- Performing Arts Building(s)
- Administration Building(s)
- Common or Cafeteria Building(s)

9.2. Codes and Standards

These spaces shall be designed under the following Applicable Codes and Standards:

9.2.1. Applicable Codes and Standards

The following codes and standards are to be implemented as referenced by the building code:

AVIXA (formally Infocomm):	
Audiovisual Systems Performance Verification:	ANSI-Infocomm Standards (10:2013)
Electronic Symbol Files Audio, Video, and Control Architectural Drawing Symbols:	CEA/CEDIA/AVIXA ANSI-J-STD-710
Energy Management for Audiovisual Systems:	AVIXA S601.01:201X (revises ANSI/INFOCOMM 4:2012)
Cable Labeling for Audiovisual Systems:	AVIXA F501.01:2015 (formerly INFOCOMM F501.01:2015)
Projected Image Contrast Ratio:	AVIXA V201.01:2018
Audio Coverage Uniformity in Listener Area:	AVIXA A102.01:2017 (formerly A103.01:2017)
Display Image Size for 2D Content in Audiovisual Systems:	AVIXA V202.01:2016
Standard Guide for Audiovisual Systems Design and Coordination Processes:	ANSI/AVIXA D401.01:2018
Rack Building for Audiovisual Systems:	AVIXA F502.01:2018

Society of Motion Picture and Television Engineers (SMPTE):	
Digital Cinema Distribution Master:	SMPTE ST 428-7:2014
Audio Engineering Society (AES):	
AES Standard for Audio Applications of Networks – High performance streaming audio-over-IP interoperability:	AES67-2018

9.3. Coordination Requirements of ALL Trades

Coordination shall be required between all trades to establish and accommodate the power, heat, and structural needs of these spaces as it relates to AV equipment, and the deployment of this equipment shall be coordinated with the telecommunications designer to confirm Data and CATV needs of AV equipment. Further coordination will be required with the school's IT staff as well as anyone that manages AV equipment to determine how AV equipment interfaces and lives on the school's network.

Complete audiovisual design installation, including cabling and infrastructure, shall meet or exceed the latest edition of following standards.

Commercial Building Telecommunications Wiring Standard:	EIA/TIA-568
Commercial Building Standard for Telecommunications Pathways and Spaces:	EIA/TIA-569
Administration Standard for Telecommunications Infrastructure of Commercial Buildings	EIA/TIA-606
Commercial Building Grounding and Bonding Requirements for Telecommunications	EIA/TIA-607
ANSI, ASTM, UL, NEMA, IEEE and FCC standards as applicable	
BICSI Telecommunications Distribution Methods Manual, current edition	

9.4. Academic Classrooms (all Buildings)

9.4.1. Audiovisual Design Narrative

The Classroom Buildings are arranged into several levels (based on location and curriculum requirements), each having a variety of spaces for Education, Student Activities, Administrative use, and general building utility. It is our understanding that there are currently no written design standards for the deployment of audiovisual technology, and that the specification of displays, ceiling mounted projectors, Interactive technologies, loudspeakers, and the associated equipment to control and drive audiovisual applications will be selected based on industry guidelines and best practices for the integration of technology in an academic setting. The following are our current assumptions based on similar spaces we have designed in the past and our current understanding of the plans and programming of each space.

9.4.2. Design Criteria

Classrooms/Learning Studios:

The basic classroom represents most of the learning spaces for the VIDE campuses including typical Learning Studios, SPED classrooms, Flex Classrooms, Open Collaboration spaces, ISS Spaces, Media Center (Commons), and other miscellaneous learning environments. The basis for this design consists of a mixture of owner furnished and new LED/LCD Displays or projectors, each of which shall be installed and secured to mobile carts. Teaching spaces and rooms, such as Science Rooms, Labs, JROTC spaces, Art Labs, Maker Spaces, Metals Lab, and certain presentation spaces based on size and functional requirements, all have mounted Projectors and Projection Screen systems as a standard video solution. Projectors shall use either a projection screen or an Interactive Whiteboard attached to the teaching wall of the space depending on the size and function of the classroom. Infrastructure shall be provided to connect the LED/LCD Display or Projector back to media equipment which will contain the active electronics for video source management. A video input plate shall be mounted on the wall for the teacher/guest to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K source and scaling to the highest resolution of the either device. Audio source playback for the classrooms and teaching space systems will be provided via owner furnished source, as well as an interface for ceiling microphone(s) in spaces large enough to require amplified voice reinforcement. The audio system will consist of ceiling mounted loudspeakers powered by an audio amplifier in each classroom, teaching environment, or within a media cabinet/rack. There are some spaces shown to be learning studios with divisible partition walls. Unless directed otherwise these spaces shall be planned to have equipment that supports room combining of audio, video, and control technology for the basic classroom presentation equipment.

Distance Learning Studio

The Distance Learning Studio(s) shall be dual purposed, the first will be to act as a small group study room. The second and primary purpose is for presentation and recording of educational content, or classroom work sessions, to be streamed or accessed on-line by students. Connectivity for user brought devices, such as a PC or Tablet device, will provide the soft-codec or Video Conference Call engine necessary for recording or sharing of content. The user provided device will then connect to the room displays and provide the instructor the ability to see far-end participants, local camera (confidence monitor) and shared video content in a collaborative environment. Each space shall have THREE (3) wall mounted displays, and ONE (1) integrated sound bar, microphone, and camera for collaboration and instruction. Use of the manufacturers' display remote is recommended for controlling the power, volume, and video source of the displays in the room.

Collaboration/Seminar Rooms/Conference Rooms/Meeting Rooms:

Various small gathering spaces shall have wall mounted displays (standard or interactive displays) with the ability for a local video source to be plugged in for viewing video content in a collaborative environment. Larger rooms will have a control panel for AV system management, smaller rooms will utilize the manufacturers' display remote for controlling the power, volume, and video source of the display. A wireless collaboration device can be installed, in the future, in key locations to allow for use of the display with mobile devices (cell phone, tablet, laptop, etc.)

Digital Signage:

A digital signage solution is recommended for any public area where information is desired to be shared and can regularly be updated. This solution shall consist of a wall mounted display, signage player hardware, network infrastructure for regular updates and maintenance, and an owner provided software solution for managing all the signage on campus. In lieu of a turnkey solution as part of this project, network infrastructure can be planned for key locations to accommodate this equipment in the future. Locations may include but are not limited to, the Main Office, Administrative Offices, Athletic Buildings, Library/Media Center, Reception areas, and any public circulation areas where school information may be necessary. In addition, digital signage shall provide the opportunity to integrate visual alarms/event info for emergency situations. This shall require review and coordination with fire alarm and security systems on campus.

9.5. Gymnasium Building

9.5.1. Audiovisual Design Narrative

The Gymnasium Building is a two-story space, and it is assumed that there will be limited AV scope in this building. Audio playback and speech reinforcement capability shall be provided in the Main Gymnasium, Lobby, and Concession's area. Smaller spaces should be discussed to determine if they may also have AV system needs, if anything at all. The following are our current assumptions based on similar spaces we have designed in the past and our current understanding of the plans and programming of each space.

9.5.2. Design Criteria

Gymnasium:

For the gymnasium, a system will be required for speech reinforcement for activities such as assemblies, pep rallies, and sporting events where voice announcements will be directed to patrons at sporting events. The intent will be to provide speakers which can produce high SPL of audio playback to be intelligible above the typical environmental noise that occurs in these events. Wireless and wired microphones will provide voice reinforcement for anyone speaking within the gymnasium space itself, as well as wired connectivity for anyone in the press box located at the athletic field(s). In addition, to comply with ADA standards a quantity of hearing assistance receivers and a hearing assistance transmitter must be provided for a quantity of patrons based on the seated capacity of the space. There are no anticipated video needs for this space currently. An electronic scoreboard shall also be required for display of visual info for the event taking place.

Locker Rooms/Team Rooms:

A wall mounted display with local wired input can be provided for sharing video content for coaching applications. An option for wireless sharing from a mobile device can be provisioned with the existing infrastructure. This option should be discussed with the client prior to construction to confirm the needs and use of the space.

Audiovisual Narrative Cont.

St. Croix Central High School

Athletic field/Track:

For the Athletic field, a general voice reinforcement sound system shall be provided for announcers to talk to visiting seated patrons. A system for this type of location and application would target regular speech reinforcement only for announcers in the press box, and sporting event officials on the field. Wired infrastructure will be required to feed a microphone or mixed microphone signals into the amplification for these speakers. Wired connections will also be required at the track for announcing during track events. In addition, to comply with ADA standards a quantity of hearing assistance receivers and a hearing assistance transmitter must be provided for a quantity of patrons based on the seated capacity of the space. An electronic scoreboard shall also be required for display of visual info for the event taking place, head end equipment for the scoreboard shall be in the press box.

Digital Signage:

A digital signage solution is recommended for any public area where information is desired to be shared and can regularly be updated. In the gymnasium building this applies specifically to the Lobby area(s). This solution would consist of wall mounted display(s), signage player hardware, network infrastructure for regular updates and maintenance, and an owner provided software solution for managing all the signage on campus. In lieu of a turnkey solution as part of this project, network infrastructure can be planned for key locations to accommodate this equipment in the future. In addition, digital signage shall provide the opportunity to integrate visual alarms/event info for emergency situations. This shall require review and coordination with fire alarm and security systems on campus.

9.6. Performing Arts Building

9.6.1. Audiovisual Design Narrative

The Performing Arts building includes a flexible performance hall/auditorium and an outdoor amphitheater with support spaces as well as spaces for the music program and technical arts. These spaces will all have unique technical requirements which should be discussed with an advanced technical user prior to procurement of ANY equipment but shall be designed based on best practices and level of proficiency and technical aptitude for professional equipment in an academic setting. The following are our current assumptions and recommendations based on similar spaces we have designed in the past, as well as our current understanding of the plans and programming of each space.

9.6.2. Design Criteria

Teaching spaces:

Some spaces within the Performing Arts building will be utilized as teaching spaces and will require the typical classroom technology found in the main classroom building. These spaces include the Lighting Lab and Multipurpose Sewing Lab. These spaces may also include additional AV support based on their program. Infrastructure shall be provided to connect the LED/LCD Display or Projector back to media equipment which will contain the active electronics for video source management. A video input plate shall be mounted on the wall for the teacher/guest to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K

source and scaling to the highest resolution of the either device. Audio source playback for the classrooms and teaching space systems will be provided via owner furnished source, as well as an interface for ceiling microphone(s) in spaces large enough to require amplified voice reinforcement. The audio system will consist of ceiling mounted loudspeakers powered by an audio amplifier in each classroom space, teaching environment, or within a media cabinet/rack.

Audio Recording Studio

The Audio Recording Studio will be used for multi-track recording, editing, mastering, and will also serve as a teaching space for recording classes. The room shall be configured for a desktop 2.1 mixing and monitoring system. An audio workstation and control surface shall be provided to support recording using modern DAW software. The system shall utilize a digital audio network backbone and allow for network audio I/O for the system. In addition, a system of standard analog audio patching shall be provided for flexible recording options and functions and include the ability to record audio from the Flexible Performance Hall and the Amphitheater over the digital audio network.

Flexible Performance Hall and Outdoor Amphitheater:

It is our understanding that the Performing Arts building will be programmed as a home for a variety of performance types including instrumental music, vocal music, and dance, with some provisions for theatrical performances planned for future expansion of course offerings. Safe and easy-to-operate technical systems are required based on anticipated staffing and educational use of the spaces. Systems to be designed with access and maintenance in mind, and accommodations will be considered to require limited staff and/or faculty to changeover between uses.

The Flexible Performance Hall is to be configurable to seat up to 500 seats with loose and retractable seating risers, while allowing these seats to store away to provide an open room with a flat floor.

The rear wall of the Flexible Performance Hall shall have an operable partition, allowing access to an accompanying retractable partition that opens to an Outdoor Amphitheater. This will provide a two-sided performance setup to increase total seat count and provide a unique experience for both audience and performers. Performance system infrastructure (in rated enclosures) shall connect the spaces, and portable equipment will serve some functions in both the Flexible Performance Hall and Outdoor Amphitheater.

The Flexible Performance Hall will host a variety of performance types and general uses, including the following:

- Primary function is unamplified music ensembles.
- Secondary function is dance with amplified music playback.
- Tertiary functions include:
  - Lectures / presentations / assemblies (amplified)
  - Functions requiring flat floor configurations such fairs, banquets, general assembly, and classes.

Video support for the space shall include a large venue projector with a lumen output suitable for the size of the projected image in the ambient lighting conditions intended for its regular operation. The image shall be projected on a permanently mounted motorized projection screen mounted near the stage. A single video input shall be provided to allow multiple video sources to be routed to the projector output as well as other desired video output locations in the facility. A control processor and control panel shall be

provided for operation of audio and video equipment within the space. For audio reinforcement a left, right, and center loudspeaker line array system with subwoofers shall be provided for voice amplification and audio source playback.

The Amphitheater is a 150-200 seat, end stage/proscenium outdoor space with fixed seating, serving musical performance (acoustic & amplified), dance, and presentations.

To facilitate varied types of productions, AV production panels are located throughout the stage deck providing infrastructure required by the production. A permanent house mix position shall be provided for a portable mixing console that can be used as needed. For audio reinforcement an outdoor rated left, right, and center loudspeaker line array system shall be provided for voice amplification and audio source playback.

Performance Support:

Support spaces which may include dressing rooms, scene shop, and associated storage spaces will require a means of communication and monitoring for the theater during rehearsal and performances. Typical provisions include wall or ceiling loudspeakers that can monitor the theater audio program and receive pages. The production intercom system shall be shared between the Amphitheater and the Flexible Performance Hall to allow for communication across both venues.

Digital Signage:

A digital signage solution is recommended for any public area where information is desired to be shared and can regularly be updated. This solution would consist of a wall mounted display, signage player hardware, network infrastructure for regular updates and maintenance, and an owner provided software solution for managing all the signage on campus. In lieu of a turnkey solution as part of this project, network infrastructure can be planned for key locations to accommodate this equipment in the future. In addition, digital signage shall provide the opportunity to integrate visual alarms/event info for emergency situations. This shall require review and coordination with fire alarm and security systems on campus.

9.7. Commons Building

9.7.1 Audiovisual Design Narrative

The Commons building includes a full cafeteria with support spaces as well as spaces for the Makerspace and Digital Library. These spaces will all have unique technical requirements which should be discussed with an advanced technical user prior to procurement of ANY equipment but shall be designed based on best practices and level of proficiency and technical aptitude for professional equipment in an academic setting. The following are our current assumptions and recommendations based on similar spaces we have designed in the past, as well as our current understanding of the plans and programming of each space.

9.7.2 Design Criteria

Commons

The Commons space serves as the primary thoroughfare for students, staff, and visitors as they make their way through school. This space also may serve as a lobby and overflow for the Flexible Performance Hall, Gymnasium, and a congregating space for students during lunch periods, or in between classes. Distributed audio feeds from the Flexible Performance Hall and Gymnasium, as well as video feeds and both will be made available in the Commons space for monitoring of all school events, or internal and external broadcast signals. Control for both systems is through a control panel, located in a lockable wall cabinet. The space will also include provisions for small presentations using video and audio. Voice amplification shall be provided using a wireless microphone system and distributed loudspeakers. A wall mounted display shall be used to present video content and provide video feeds from the Flexible Performance Hall and Gymnasium.

9.8. JROTC Building

9.8.1. Audiovisual Design Narrative

The JROTC Building is a separate space that will be utilized by the JROTC program for educational purposes centric to the military. This space shall have several classroom spaces that will be outfitted with the traditional classroom AV technology described in this document.

9.8.2. Design Criteria –

JROTC Classrooms:

The basis for this design consists of a ceiling mounted projector with a contractor furnished and installed mount, and a manual or electrical wall mounted screen attached to the teaching wall of the space for video projection. Infrastructure shall be provided to connect this projector back to a media cabinet which will contain the active electronics for video source management. Video input plates shall be mounted on the wall for the instructor or facilitator to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. Audio source playback for these spaces will be provided via owner furnished source. The line level input of this amplifier will be fed from audio signal processing used to mix and tune the audio sources. A video input plate shall be mounted on the wall for the teacher/guest to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K source and scaling to the highest resolution of the either device. Audio source playback for the classrooms and teaching space systems will be provided via owner furnished source, as well as an interface for ceiling microphone(s) in spaces large enough to require amplified voice reinforcement. The audio system will consist of ceiling mounted loudspeakers powered by an audio amplifier in each classroom space, teaching environment, or within a media cabinet/rack.

Audiovisual Narrative Cont.

St. Croix Central High School

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9.9. Music Building

9.9.1 Audiovisual Design Narrative

The Music Building shall consist of several types of music centric classrooms and music studio spaces with a focus on music practice and production. These spaces include the Band/Orchestra Hall, Ensemble Rooms, Piano/Keyboard Room, Jazz Studio, and Steel Drum. These spaces will all have unique technical requirements which should be discussed with an advanced technical user prior to procurement of ANY equipment but shall be designed based on best practices and level of proficiency and technical aptitude for professional equipment in an academic setting. The following are our current assumptions and recommendations based on similar spaces we have designed in the past, as well as our current understanding of the plans and programming of each space. The building shall also include some administration spaces for faculty use and a Distance Learning Classroom.

9.9.2 Design Criteria

Music Studios / Choir Room / Band/Orchestra Learning Hall:

Some spaces within the Music building will require the typical classroom technology found in the main classroom building. The basis for this design consists of a ceiling mounted projector with a contractor furnished and installed mount, and a manual or electrical wall mounted screen attached to the teaching wall of the space for video projection. Infrastructure shall be provided to connect this projector back to a media cabinet which will contain the active electronics for video source management. Video input plates shall be mounted on the wall for the instructor or facilitator to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. In addition, for the music classrooms, analog audio I/O shall be provided for recording and audio playback. Audio source playback for these spaces will be provided via owner furnished source, as well as an interface for microphone(s) in spaces large enough to require amplified voice reinforcement. The audio system will consist of ceiling/wall mounted performance loudspeakers mounted near the teaching wall powered by an audio amplifier in an AV/media cabinet. The loudspeakers shall provide sufficient audio reinforcement for music education and practice. The line level input of this amplifier will be fed from audio signal processing used to mix and tune the audio sources. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K source and scaling to the highest resolution of the either device. In addition to typical classroom technology, it is common that archival audio recording be provided in spaces like these to allow instructors to save and evaluate student performance. If required, contractor shall install a solid-state recording device integrated into the classroom system as well as additional microphones to capture the audio in the room. This option should be discussed in detail to confirm the needs and use of the space prior to construction.

Ensemble Rooms

The basis for this design consists of a mixture of owner furnished and new LED/LCD Displays, video wall(s), or projectors, each of which shall be installed and secured to mobile carts or permanently mounted on the wall**.** Projectors shall use either a projection screen or an Interactive Whiteboard attached to the teaching wall of the space depending on the size and function of the learning environment. Infrastructure shall be provided to connect the LED/LCD Display(s), video wall, or Projector, with a pathway back to media equipment which will contain the active electronics for video source management. A video input plate shall be mounted on the wall for the teacher/guest to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the

teaching wall for AV system management and source selection. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K source and scaling to the highest resolution of the either device. Audio source playback for the classrooms and teaching space systems will be provided via owner furnished source, as well as an interface for ceiling microphone(s) in spaces large enough to require amplified voice reinforcement. The audio system will consist of ceiling mounted loudspeakers powered by an audio amplifier in each classroom or teaching environment, or within a media cabinet/rack. In addition to typical classroom technology, it is common that archival audio recording be provided in spaces like these to allow instructors to save and evaluate student performance. If required, contractor shall install a solid-state recording device integrated into the classroom system as well as additional microphones to capture the audio in the room. This option should be discussed in detail to confirm the needs and use of the space prior to construction.

9.10. Visual/Dance Building

9.10.1 Audiovisual Design Narrative

The Dance Building shall consist of several types of dance centric studios and Visual Lab Art spaces These spaces include the Dance Studio, Quelbe Dance Studio, Metals Lab, and Drama Movement Learning Center. These spaces may also include additional AV support based on their program. These spaces will all have unique technical requirements which should be discussed with an advanced technical user prior to procurement of ANY equipment but shall be designed based on best practices and level of proficiency and technical aptitude for professional equipment in an academic setting. The following are our current assumptions and recommendations based on similar spaces we have designed in the past, as well as our current understanding of the plans and programming of each space. The building shall also include some administration spaces for faculty use.

9.10.2 Design Criteria

Dance Studios/Movement Learning Center

The Dance Studio spaces within the Visual/Dance building will require the typical classroom technology found in the main classroom building. The basis for this design consists of a mixture of owner furnished and new LED/LCD Displays or projectors, each of which shall be installed and secured to mobile carts**.** Projectors shall use either a projection screen or an Interactive Whiteboard attached to the teaching wall of the space depending on the size and function of the classroom. Infrastructure shall be provided to connect the LED/LCD Display or Projector back to media equipment which will contain the active electronics for video source management. A video input plate shall be mounted on the wall for the teacher/guest to plug an owner furnished PC or other owner furnished source, and a control panel shall be installed on or near the teaching wall for AV system management and source selection. It is anticipated by the time of construction that native 4K resolution shall be the standard and at minimum all displays and projectors shall be capable of receiving a 4K source and scaling to the highest resolution of the either device. Audio source playback for the Dance Studios will be provided via owner furnished source, as well as a Bluetooth transmitter for an additional audio input. The audio system will consist of wall mounted performance loudspeakers in each corner of the room to provide sufficient audio reinforcement for dance education and practice.

Acoustic Narrative

St. Croix Central High School

1. DESIGN CRITERIA

1.1. Codes and Standards

1.1.1. Applicable Codes and Standards

Acoustic criteria listed in this report are based on our understanding of owner programmatic requirements as well as typical industry standards and guidelines, including but not limited to:

Table 1: Standards and Guidelines

General:	
ANSI:	Standard S12.60.2010 Performance Criteria, Design Requirements, and Guidelines for Schools
ASHRAE:	HVAC Applications Handbook
NRC-CNRC	Construction Technology Update No. 51, Acoustical Design of Rooms for Speech (2002)

Acoustic design is integrated into Architectural and MEP drawings, including the development of acoustic isolation/partitions/doors, MEP noise and vibration control, and room shaping and finishes.

1.2. Reverberation Time Criteria

Reverberation time (T60) is the time in seconds it takes sound to decay 60 decibels (dB) in a room. Reverberation time is a critical factor related to speech intelligibility in classrooms and learning spaces and musical instruction and performance in fine arts spaces. Lower reverberation times lead to better speech intelligibility. Reverberation Time criterion is met by providing an adequate area of adequately absorptive material to a space.

Table 2: Reverberation Time Criteria (500-1,000 Hz)

Room	T60 (s)
Core Learning Space, Volume < 10,000 cf	0.6
Core Learning Space, Volume < 20,000 cf	0.7
Core Learning Space, Volume > 20,000 cf	0.7-1.0
Collaboration	1.0
Teacher Planning	0.7
Admin Private Offices	0.5
Conference Rooms	0.6
Clinic Treatment Areas	0.6
Cafeteria	1.0
Design Library, Digital Maker Space	0.6
Gymnasium	1.4
Dance Studios	0.9
Drama Movement Learning Center	0.8
Band/Orchestra Learning Hall	1.1

Choir Room	1.2
Piano/Keyboard Studio	0.9
Jazz/Chamber	0.9
Steel Pan Studio	1.1
Ensemble Rooms	0.5
Music Practice Rooms	0.4
Flexible Performance Hall	1.5
Lobby/Gallery	1.2
Audio Recording Studio	0.3
Career Center	0.6
Sewing Lab	0.7

1.3. Sound Isolation Criteria

Sound Isolation Design is based on programmatic functionality and intended to fully allow the building to function with all spaces' in simultaneous use. Laboratory wall STC rating is a function of total layers of gypsum board, insulation, stud depth, gauge, spacing, and criteria based on industry and ANSI standards. In general, demising partitions without doors are more acoustically critical and are typically shown with multiple gypsum board layers, batt insulation, and deeper stud cavities to meet criteria. Sound isolation test data is not available for all configurations, and as such, partition design has been interpolated from industry-standard data.

Table 3: Sound Isolation Design Criteria

Room	Adjacent Room	Wall STC Rating
Core Learning Space	Core Learning Space	50
	Restroom	53
	Corridor/Staircase/Open Collab Space	45
	Office/Conference Room/Teacher Planning	45
Admin Private Offices	Admin Private Offices	50
	Conference Rooms	50
	Lobby	45
	Mothers Room	50
	Restroom	50
Clinic Exam/COT Areas	Treatment/COT	50
	Indoor Break Room	55
	Waiting	45
Flexible Music Hall	Corridor	60
	Lobby/Gallery	60
Audio Recording Studio	Career Center	65
	Corridor	65
	Storage	55
Music Practice Rooms	Music Practice Room	60

	Office	60
	Music Studio	50
Gymnasium	Classroom	60
	Locker Rooms	55
Dance Studio	Storage, Lockers	50

1.4. Background Noise Criteria

Note that many criteria use the A-weighted decibel (dBA) as their metric for background noise in Core Learning Spaces, whereas it is more common in industry standard to use Noise Criteria, NC. We have provided both criteria types for clarity

Table 4: Background Noise Level Criteria

Room	NC	dBA
Core Learning Space	35	40
Open Collaborative Learning Space	40	45
Admin Private Offices / Conference Rooms	30	35
Teacher Planning Rooms	35	40
Clinic Treatment Areas	30	35
Flexible Music Hall	25	30
Audio Recording Studio	25	30
Music Studios / Music Practice Rooms	25	30
Dance Rooms	30	35
Gymnasium	45	50
Cafeteria	40	45
Lobbies	40	45

HVAC noise control design includes maintaining separation between suspended FCU's and core learning spaces, duct lining, and duct length between FCU's and inlets/outlets. FCU models must be selected for low noise performance - FCU substitution, shortening duct lengths, or removal of internal lining could cause increases in background noise level.

2. ACOUSTIC DESIGN NARRATIVE

2.1. Classrooms (all Buildings)

The Classroom Buildings are arranged into several levels (based on location and curriculum requirements), each having a variety of spaces for Education, Student Activities, Administrative use, and general building utility. Acoustic design focuses on core learning spaces to provide good speech intelligibility for learning, minimize potential disruptions, and maintaining an adequately low background noise to allow for focused learning.

Classroom either include suspended and wall-mounted PET acoustic felt treatment or drop ACT ceilings to provide acoustic absorption.

FCU's are enclosed in gypsum board soffits to contain radiated noise.

Partitions demising core learning spaces include multiple layers of gypsum board and batt insulation to meet criteria. Operable partitions separating core learning spaces are STC rated and include plenum barrier construction around track to maintain isolation performance.

2.2. Collaboration/Office/Conference Rooms/Teacher Planning

Collaborative space, offices, and teacher workspaces include acoustically absorptive ceilings to improve speech intelligibility. As well, multi-layer gypsum board partitions separate them from other acoustically sensitive spaces to minimize disruptions.

2.3. Gymnasium Building

The Gymnasium will host sporting events as well as large student gatherings and events. Acoustic design includes nearly complete coverage of the Gymnasium ceiling with an acoustically absorptive finish to meet reverberation time criteria. This treatment allows for greater audio system clarity for events, public and emergency announcements, and reduces overall sound power from large events.

2.4. Music and Performance/Gathering Spaces

2.4.1 Flexible Music Hall

The Flexible Music Hall is envisioned as a flexible space that serves as the Dance, Theater, and Music Performance space with an emphasis on music performance. The space accommodates various events with retractable seating and floor platforms. Acoustic design includes absorptive treatments on the ceiling above the theatrical tension wire grid system and at side and rear wall areas to promote speech intelligibility for events and control overall noise levels when the space is active with patrons or students.

Concrete walls with buffer corridors and sound and light lock vestibules have been designed for the space for proper sound isolation from adjacent spaces.

2.4.2 Audio Recording Studio

The Audio Recording Studio is designed to include acoustically absorptive and diffusive treatments to allow for high-quality audio recordings. High sound isolation to adjacent spaces and low noise levels from HVAC systems is also critical to the recording studio's function and should be integrated into architectural and HVAC designs.

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2.4.3 Music and Dance Rehearsal Spaces

The Music Building and Visual Arts/Dance Building contain a variety of sizes of spaces for music and dance rehearsal and instruction. Rehearsal spaces are designed to promote effective listening for the student, both the ability to hear themselves clearly and group intonation and blend.

Large rehearsal rooms such as Band/Orchestra and Dance include gypsum board ceiling diffuers with acoustically absorptive panels distributed evenly above the diffusers and on walls.

Mid-sized rooms such as Choir, Steel Pan, and Jazz/Chamber include gypsum board ceilings with acoustically absorptive baffles and acoustically absorptive and diffusive panels distributed on walls.

Small music practice rooms will include absorptive acoustic wall and ceiling treatments to provide a space with a low reverberation time to control loudness, promote clarity, and provide an effective music instruction environment.

Buffer storage spaces have been placed between larger rehearsal rooms, when possible, to allow for more cost-effective wall assemblies. Where buffer spaces cannot be used, wall partitions between Music Rooms will include double stud construction to control noise transfer.

2.5 Dining Areas

The dining areas include acoustically absorptive ceilings to provide overall noise level control when full of students.

Theatrical Narrative

St. Croix Central High School

1. DESIGN CRITERIA

1.1. Introduction

1.1.1. Summary

The following narrative is a summary of scope for Virgin Island District of Education (VIDE) based on the current understanding of the spaces and how they are programmed. Assumptions have been based on similar projects, best practices or industry standards. It will be the responsibility of the school district to verify if any of the proposed solutions must be revised to meet specific needs prior to construction. As system designers of technology-based solutions, it is understood that solutions that meet program needs may evolve over the course of design and construction. Where possible and feasible within budget accommodations, provisions will be made to support known future technologies and program development. It will be the responsibility of the client to review the design as it progresses and validate prior to an issue of contract documents for bid and identify if the systems provided will meet curriculum and operational needs of the school.

The following buildings are involved in this project for the theatrical scope of work:
- Theater

Systems described herein pertain to theatrical equipment for facilitating performances and uses in specific spaces. The project scope includes:
- Theatrical lighting control systems
- Theatrical lighting fixtures and accessories
- Theatrical wiring devices
- Theatrical rigging and tension grids
- Theatrical drapery and track
- Acoustic drapery and track
- Telescopic seating risers with integral chairs
- Scissor lift seating risers (with loose chairs, refer Arch / Interiors drawings for further information)

1.1.2. Applicable Codes and Standards

The following codes and standards are to be implemented as referenced by the building code. Refer elsewhere in these design narratives for specific building code references.

General:
American Society for Testing and Materials (ASTM)
American National Standards Institute (ANSI)
Entertainment Services and Technology Association
National Electrical Manufacturers Association (NEMA)
National Fire Protection Administration (NFPA)
Occupational Safety and Health Administration (OSHA)
Underwriters Laboratory (UL)

Coordination shall be required between all trades to establish and accommodate the power, heat, and structural needs of these spaces as it relates to theatrical equipment, and the deployment of this equipment shall be coordinated with the telecommunications designer to confirm Data and CATV needs of theatrical equipment.

1.2. Theatrical Design Narrative

It is our understanding that the Theater building will be programmed as a home for a variety of performance types including instrumental music, vocal music and dance, with some provisions for theatre performance planned for future expansion of course offerings and program development. Safe and easy-to-operate technical systems are required based on anticipated staffing and educational use of the spaces. Systems to be designed with access and maintenance in mind, and accommodations will be considered to require limited staff and/or faculty to changeover between uses. Operationally, schedule must allow time for space reconfiguration. For example, in the Flexible Performance Hall, while we anticipate the "permanent" stage area may typically remain clear for classroom use during the day, the seating area and technical systems may require more time to reconfigure between events.

The Flexible Performance Hall is to be configurable to seat up to 500 seats with loose and retractable seating risers, while allowing these seats to store away to provide a flat floor configuration in the space.

The rear wall of the Flexible Performance Hall will have an operable partition, allowing access to an accompanying retractable partition that opens both spaces to the Outdoor Amphitheater. This will provide a two-sided performance space to increase total seat count and provide a unique experience for both audience and performers. Performance system infrastructure connects the spaces, and portable equipment will serve some functions in both the Flexible Performance Hall and Outdoor Amphitheater.

The Flexible Performance Hall will host a variety of performance types and general uses, including the following:
- Primary function is unamplified music ensembles (steel drum ensembles will perform in the Music building, see below)
- Secondary function is dance with amplified music playback
- Tertiary functions include:
  - O Lectures / presentations / assemblies (amplified)
  - O Functions requiring flat floor configurations such as fairs, banquets, general assembly and classes

1.2.1. Theatrical Lighting Control System

Control

All spaces that are intended to be used for performances or video production are to be controlled through a theatrical networked lighting control system. The lighting control system serves production / theatrical lighting and architectural lighting needs. Combining control of architectural lights, work lights, and theatrical lighting into one network realizes the following benefits:
- Ability to control house lights from the stage lighting console and write them into lighting cues
- Ability to recall basic stage lighting presets from architectural pushbutton stations, allowing simple lighting looks to be recalled for classes, lectures or film screenings without the use of the stage lighting console
- Ability to lock-out architectural pushbutton stations during performances
- Ability to interface with other systems such as AV (audio, video, lighting with one preset) and/or BAS systems as required
- One point of contact for all lighting service issues in "performance" spaces

The theatrical lighting system will use an Ethernet backbone. This Ethernet distribution connects all theatrical lighting control equipment and relay panels to a central lighting network control rack. Ethernet taps will be distributed at all theatrical lighting positions and control locations. Any of these taps will be used for the following purposes:
- Input for stage lighting control console
- Input for portable touchscreen
- Output for DMX control of stage lighting fixtures and equipment, via Ethernet-to-DMX gateways

Integrated architectural lighting controls consist of:
- Preset recall pushbutton stations at each entrance to the stage or audience chamber, as well as control booths and technical access areas
- Wall-mount color LCD touchscreens with pin code lockout and multiple authorization levels, located at critical locations such as backstage common entry
- Portable color LCD touchscreen, similar to above, for use at house mix or control booths
- Integral system time clock will control all architectural lighting and power controls, with manual user override available at LCD touchscreens when after-hours operation is required.

Each station has customizable interface capable of controlling any combination of house lights, work lights or basic stage lighting. The stations allow room partitioning so lights in adjacent or "digitally connected" spaces remain unaffected during performances.

We recommend limiting stage lighting playback to color-changing LED fixtures, not moving lights with programmable focus positioning. If moving lights are used in the space, a stage lighting console and trained operator should be utilized.

Power

Architectural lighting fixtures and stage circuits will be routed to pass through DMX-enabled relays for power control. Required 0-10V control outputs are integral to the relay panels for control of architectural lighting fixtures. Additional 0-10V control outputs may be required pending zoning and controls noted in the electrical drawings. DMX-controlled architectural lighting fixtures also to be controlled by the theatrical control system. Lighting control Emergency Bypass equipment is provided to override architectural lighting when triggered by firm alarm or loss of power.

Outdoor Amphitheater

Dry category cable connections are provided between an operator position and performance area to facilitate setup of control equipment. Control of site lighting at this area may be overridden by pushbutton station located in the corridor between the Flexible Performance Hall and Outdoor Amphitheater.

Uncontrolled, convenience power receptacles in rated enclosures will be located at performance area and operator position. Additional equipment may be powered by portable cables routed through exterior cable pass from backstage.

1.2.2. Theatrical Lighting Fixtures

Portable theatrical lighting fixtures can be located as needed for performance lighting. All theatrical lighting fixtures will be LED, color-changing fixtures. This allows easy programming of dynamic theatrical lighting scenes. A variety of fixture types will provide systems of stage lighting including profile fixtures, wash fixtures, and cyc fixtures. Fixture quantities will be provided assuming 7 areas across and 4 areas deep, as well as spare fixtures for specials and dance booms.

Portable studio fixtures will be specified if video production is a critical component. Fresnel fixtures will be used for key light, 1x1 panels will be used for fill, and cyc fixtures will light a green screen.

Accessories for the above fixtures include template holders, lenses, power cable, data cable, mounting hardware, safety cables, etc. It should be noted that while portable fixtures may be connected to the lighting infrastructure at the Outdoor Amphitheater, they are not intended to be outdoor rated fixtures for long-term setup outdoors.

1.2.3. Theatrical Wiring Devices

Theatrical wiring devices are receptacle boxes and connector strips designed to be used exclusively by theatrical lighting equipment, designed for repeated plugging and unplugging, and marked with circuit numbers. Recess and surface mount devices occur at the stage perimeter, permanent box boom positions and catwalk lighting positions. Device types and locations will be verified

1.2.4. Theatrical Rigging

A wire tension grid in the Flexible Performance Hall will provide a working platform for adjustment of theatrical lighting fixtures, overhead static rigging equipment and building systems. This grid is comprised of modular 6'-0" by 6'-0" panels with columns connecting to building structure above. The walk surface will be designed for 40 lbs/sqft capacity, and a point load of 300 lbs.

These tension grid panels form a walking-working surface by which a technician can access the pipes and structure above to mount stage equipment. Architectural lighting and HVAC may be maintained from this platform as the design allows.

Theatrical lighting beams can pass through these small wire cables relatively unobstructed. The flexible pipes above this tension grid can be used for any combination of scenery, lighting, AV equipment, etc. An inventory of pipes and adjustable (swivel) cheeseborough couplers would be provided to increase the flexibility of this system.

Anticipate approximately 4500 SF of tension grid, with (12) horizontal pipes, and intermediary spanning pipes and connection hardware.

A motorized rigging system of (4) motorized fixed speed hoists / linesets are provided for raising and lowering drapery or scenery pipes at the stage. Supporting equipment for the motorized rigging system includes: rigging control station with pushbutton in/out, remote control pendant for line-of-sight operation, and emergency stop stations distributed at stage perimeter.

Each music space to also present performances and recitals may have a dead-hung pipe to mount portable "theatrical" equipment for performances to light soloists, conductors, etc.. Lighting position to meet the following loading criteria:

- Uniformly distributed load of (30) pounds per linear foot of pipe.
- Grid hangers and anchorages to be designed to support no less than (600) pounds.

1.2.5. Theatrical Drapery and Track

All theatrical drapery is constructed of inherently flame retardant (IFR) fabrics, eliminating the need for periodic retreatment. A full complement of drapery consists of the following:

- "House Drapery" i.e. House Curtain and House Valance (teaser), in Architect's selected color, bi-parting with associated heavy-duty curtain track
- Manually-operable, bi-parting black velour traveler with associated heavy-duty curtain track

1.2.6. Telescopic Risers with Integral Chairs

A telescopic seat bank with fixed, upholstered seating will be provided for the rear area of the main floor of the audience chamber. When deployed, the seat bank seamlessly connects the balcony seating area with the main floor. By motorized actuation, the seats may be folded flat and the platforms retracted into a storage area under the balcony to provide a large flat floor area.

1.2.7. Scissor Lift Seating Risers

A system of scissor lift platforms will be provided at the main floor seating area to allow fast changeover from stepped seating to flat floor configuration and to allow other configurations to be created. Adjustment will be by portable drill operation, adjusted to any riser height. Standard rise of steps will be provided per seating layout at 500, but additional steps may be built by faculty or staff to support various riser heights.

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1. DESIGN NARRATIVE

Servery Space

The serving space for St Croix Central High School will focus on providing breakfast and lunch for all students in the commons building.

There are three lines available for use when students enter and queue in the Commons Space. Two lines are designed for a typical hot and cold food lunch program with the north third line having additional food options of a salad bar type set up. All typical food lines will have (3) cold wells and (4) hot wells. Additionally, there is an action station at the far end where students will be able to have made to order Sandwiches, pasta, burrito bowls, or something of the similar built to order type.

Once students have gathered their meal, they have an opportunity to visit the milk cooler then head out to the condiment stations to complete their meal. Upon completion of the meal, students will then take their trays to the dish drop off station where they will pre-scrap then leave the trays on the soiled dish table for staff to clean and return to the Servery via transport carts.

Anticipated students being served through the Servery is roughly 900 plus staff, done in several shifts and separated by age groups.

Receiving/Back of House

When staff first arrives to the building, they have access to lockers for their valuables and small break room where they will get ready for the day to the right. The kitchen manager's office is centrally located near the exterior door to supervise staff as well as deliveries coming in for the day.

When deliveries are made, the driver will check in with the Manager and head directly to the Dry Storage, Walk in Cooler/Freezer or down into the kitchen to pick up their meals for students. If any soiled carts are returned, they have the option to drop off in the trash and cart wash are in a conveniently located area as to not cross contaminate clean and soiled.

Walk In Units and Dry Storage

225 square feet of freezer space, 225 square feet of refrigerated space and 230 square feet of dry/ambient temperature storage will give abundant storage space for weekly deliveries of commodities. Vertical air curtains have been placed inside the walk-in entry doors to aid in preserving proper temperatures. Remote type refrigeration has been specified for maintaining proper temperatures.

Tiered wire shelving used throughout these areas will allow for product to be easily accessed and cataloged for inventory. The dry storage space will also house two can racks for high density gravity feed storage. Dunnage racks have also been placed in each respective space for storage of heavy and bulky items.

Warewashing and Cart Wash

A large conveyor type electric dish machine has been specified to continuous cleaning of trays from the students and soiled wares from the kitchen. A three-compartment sink has also been included in this space for large pots and pans along as acting as a back-up for wash/rinse/sanitizing should the dish machine ever be down for maintenance.

Cookline

Five pieces of heavy duty propane gas cooking appliances have been utilized for this kitchen that will be able to take care of any menu items offered: an eight burner range with a standard oven, 40 gallon kettle, 40 gallon tilting braising pan and two double stack combi ovens. An exhaust hood with Fire Suppression system has been included to ensure all cooking affluent exits the kitchen and fire safety.

Behind the cookline, kitchen staff will find a double-sided Chef's Counter with double sinks, over and under shelves for storage, tiered drawers for utensils, undercounter storage for waste cans and a space for a microwave.

Once food is cooked and ready to be served, staff will then place the pans in sheet pan racks to be wheeled into pass through warmers and coolers located in the servery. These units have been located in the Servery space for staff to quickly access for restocking or pulled to be served to students.

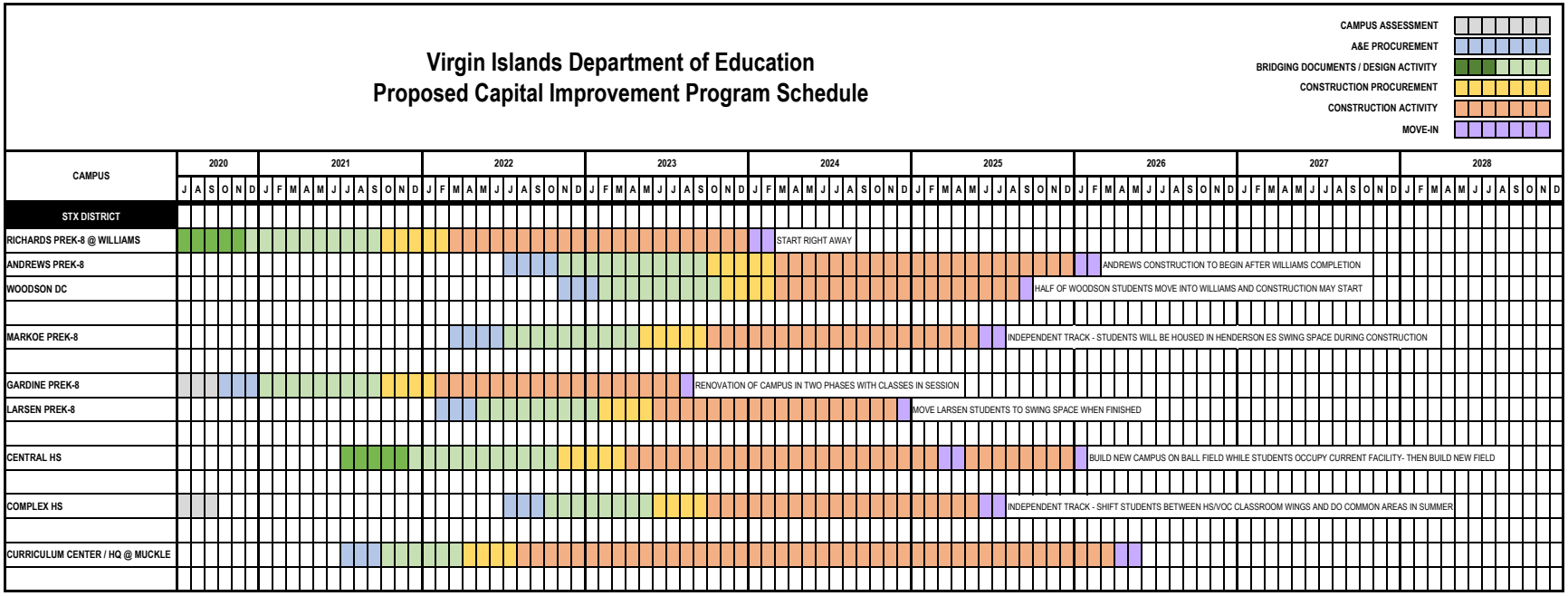
For food that is being delivered outside of the Servery, large tables have been located in the prep areas as a landing space for food to be portioned and stored for transport in mobile heated cabinets.

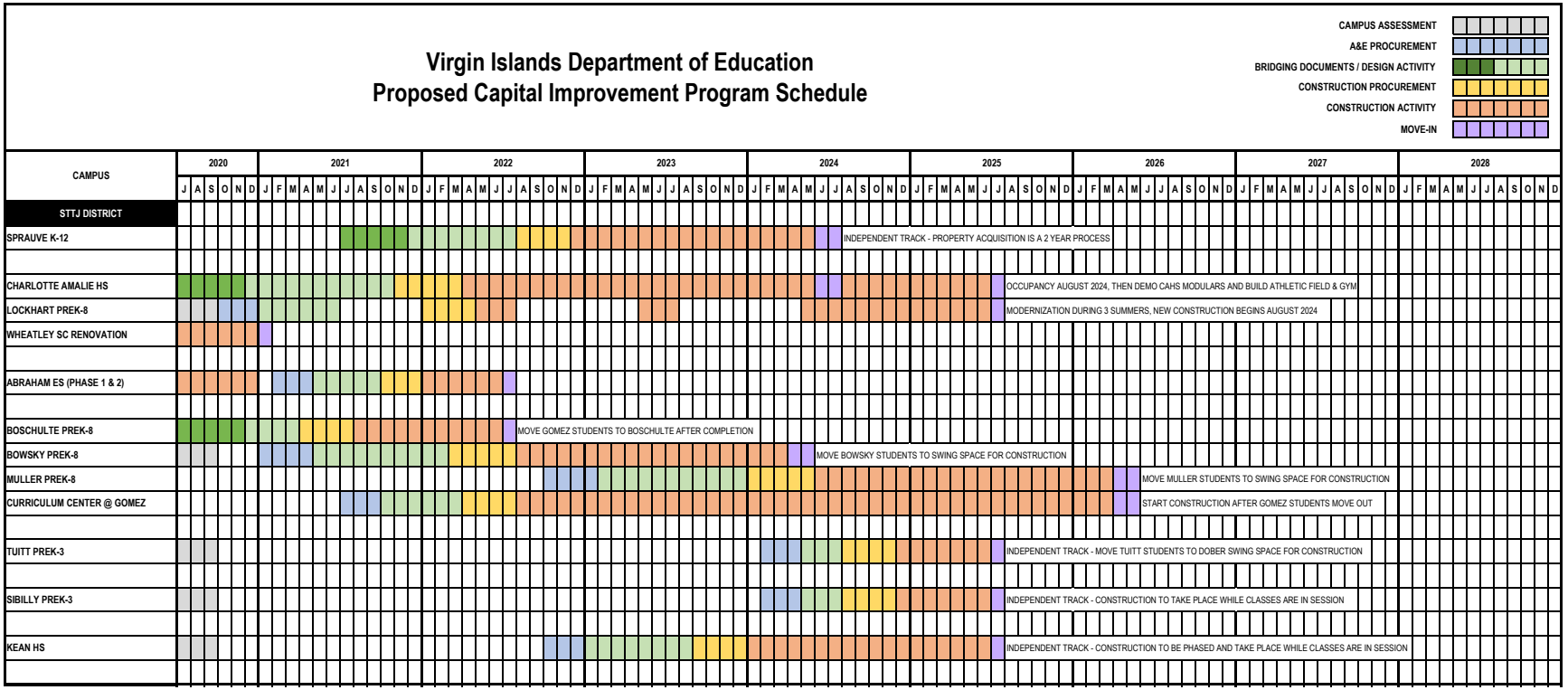
The Prep area of the kitchen will include two large work table with a single compartment sink with ample counter top space. A bakery work table with mobile ingredient bins for mixing is available in the prep area. A 40-quart mixer and additional wire shelving for storage are located in this same area.

Hand sinks have been scattered throughout the space in each area to ensure staff has quick, easy access for washing. Kitchen staff also has separate areas to perform their duties for the day to encourage Social Distancing.

Logistics, Planning, and Timeline

Arthur A. Richards PreK-8 School





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