

# EDUCATION CENTER REUSE

David M. Brown Planetarium  
Arlington Public Schools  
1426 North Quincy Street

**ARLINGTON PUBLIC SCHOOLS**

1426 N QUINCY ST



STUDIOTWENTYSEVENARCHITECTURE

ENVIRONMENT & ENERGY CONSERVATION COMMISSION 4/22/2019 1

# COMMISSION MEETING: AGENDA

ENVIRONMENT & ENERGY CONSERVATION COMISSION (E2C2)

1. Welcome
2. Project Parameters
3. Proposed Use Permit
  - a. Site Design
  - b. Building Design
4. Questions
5. Next Steps & Adjourn



A woman with long, wavy blonde hair, wearing a white lace top and a lanyard, is smiling warmly at a young child with curly hair. They are seated at a table with various items, including a can of 100% Orange Juice, a container of TruMoo Chocolate Gel-Free Milk, and a small bowl. The background shows other people seated at tables, suggesting a social gathering or event. The entire image has a warm, orange-toned overlay.

# 1 Welcome





## 2 Project Parameters

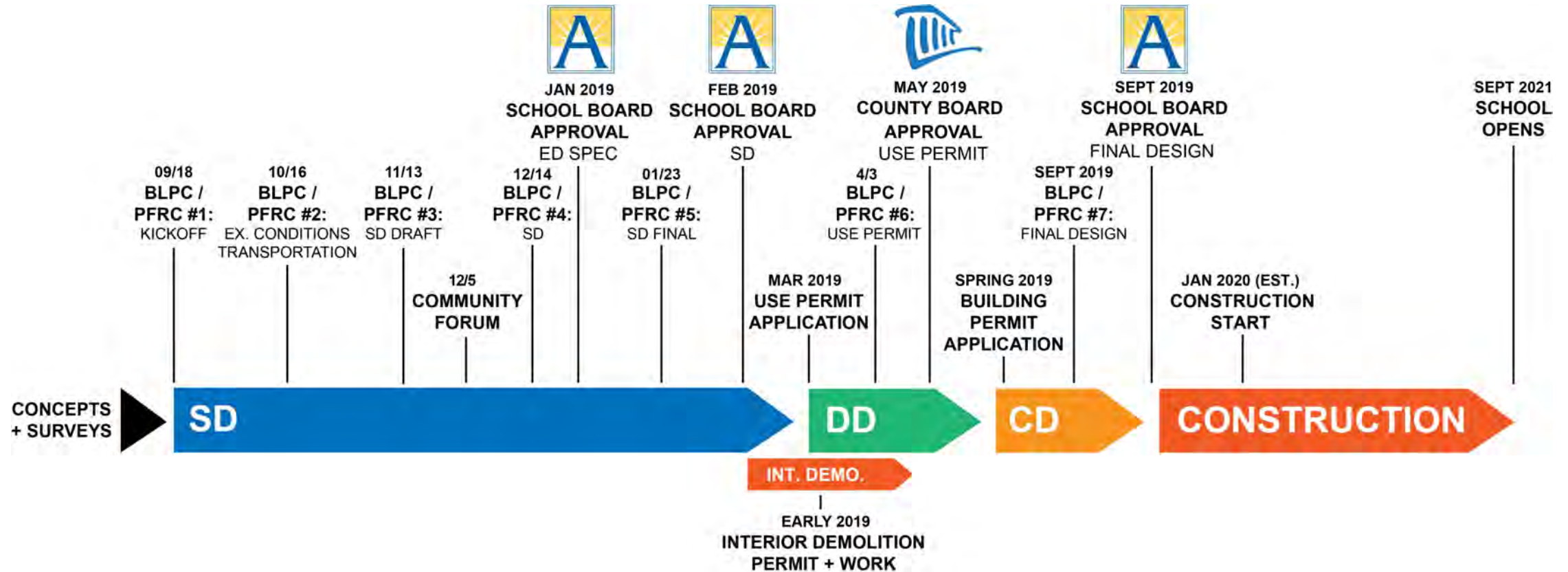
# Project Parameters

- Project included in the FY2019-28 Capital Improvement Plan (CIP)
- Renovate the Education Center to both increase the capacity of Washington-Lee initially, and later to adapt to possible future instructional and grade level changes
- Support APS Strategic Plan Goals, specifically for Healthy, Safe, and Supported Students
- Address capacity by providing 500-600 high school seats
- Open by start of school 2021
- Spend a maximum project cost of \$37 million, using every effort to spend less

APS project website:

<https://www.apsva.us/education-center-reuse/>

# Schedule and Interior Demolition Phase



UPDATES

# Use Permit Process

- APS submits application and accompanying drawings to County
- Multiple revisions typically occur responding to County staff/commission review
- APS will present the project to County commissions each of which has an opportunity for public comment
  - April 22, 2019 – ENVIRONMENT & ENERGY CONSERVATION COMMISSION meeting
  - May 2, 2019 – Transportation Commission meeting
  - May 6 or 8, 2019 – Planning Commission meeting
- May 18, 2019 – County Board hearing which has an opportunity for public comment



# 3 Proposed Use Permit

David M. Brown Planetarium  
A  1426 North Quincy Street



# Arlington County Principles of Civic Design

- Intended to inform the design of civic facilities
- Ensure facilities meet community goals and are attractive, durable, & functional
- Supplement existing County planning documents & policies
- Each project reviewed individually- certain principles may be stressed over others

## Civic Values

- Context
- Bold Architecture
- Sustainable Design
- Universal Design
- Adaptive Reuse
- Open Space
- Mixed Use

## Siting & Orientation

- Building Entrances
- Emphasize Pedestrians, Bicycles, Mass Transit
- Circulation
- Outdoor Spaces

## Building Form

- Massing
- Scale
- Hierarchy

## Building Details & Materials

- Pedestrian Scale
- Public art & Architecture
- Durable Materials
- Consistency
- Sense of Place

# APS Strategic Plan - Design Principles



## APS STRATEGIC PLAN 2018-2024 GOALS

**Student Success:** Multiple Pathways To Student Success

**Student Well-Being:** Healthy, Safe, And Supported Students

**Engaged Workforce**

**Operational Excellence**

**Partnerships:** Strong And Mutually Supportive Partnerships

## DESIGN PRINCIPLES

### Safety + Security

Maintain safe, secure spaces while creating environments which enrich learning and emphasize transparency and community

### Short-Term Agility + Long-Term Adaptability

Create spaces which are agile in their day to day use, while being adaptable to future changes in program and learning methods

### High-Performance Learning Environments

Spaces are to perform at the highest levels for the following:

- Thermal comfort
- Indoor air quality
- Acoustics
- Daylight + views
- Transparency
- Technology
- Community use
- Active schools

### Universal Design

Spaces should be designed and composed so they are accessible, understood and useful for all

### Adherence To Budget

Building elements should be assessed for meeting the required design function through economical means

### Sustainability

To the greatest extent possible the final design should minimize the impact on the environment through thoughtful site design, carefully managed water use, innovative energy and exterior envelope solutions, selective material use and a holistic approach to the interior design.



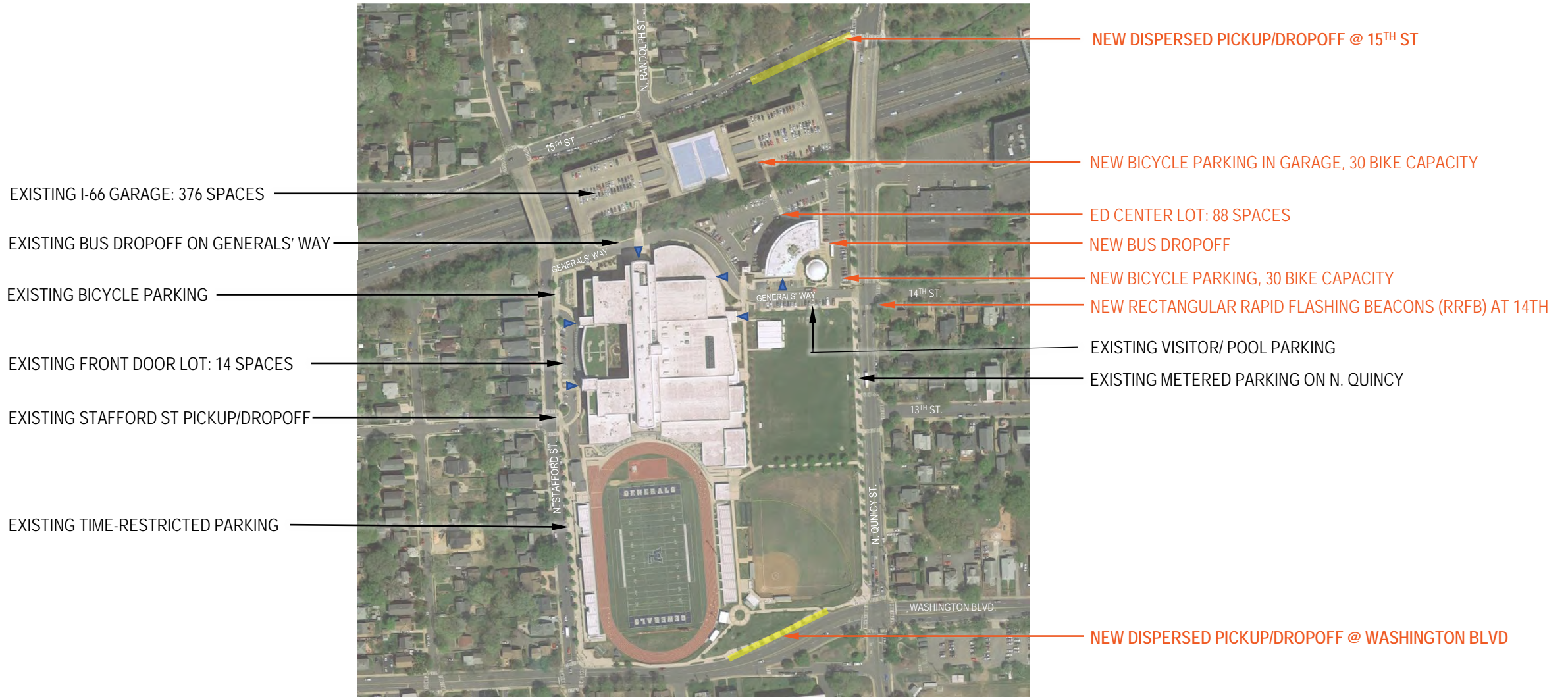
# Site Design

# Existing Campus





# Revised Site Design - Campus



# Revised Site Design – Ed Center Area

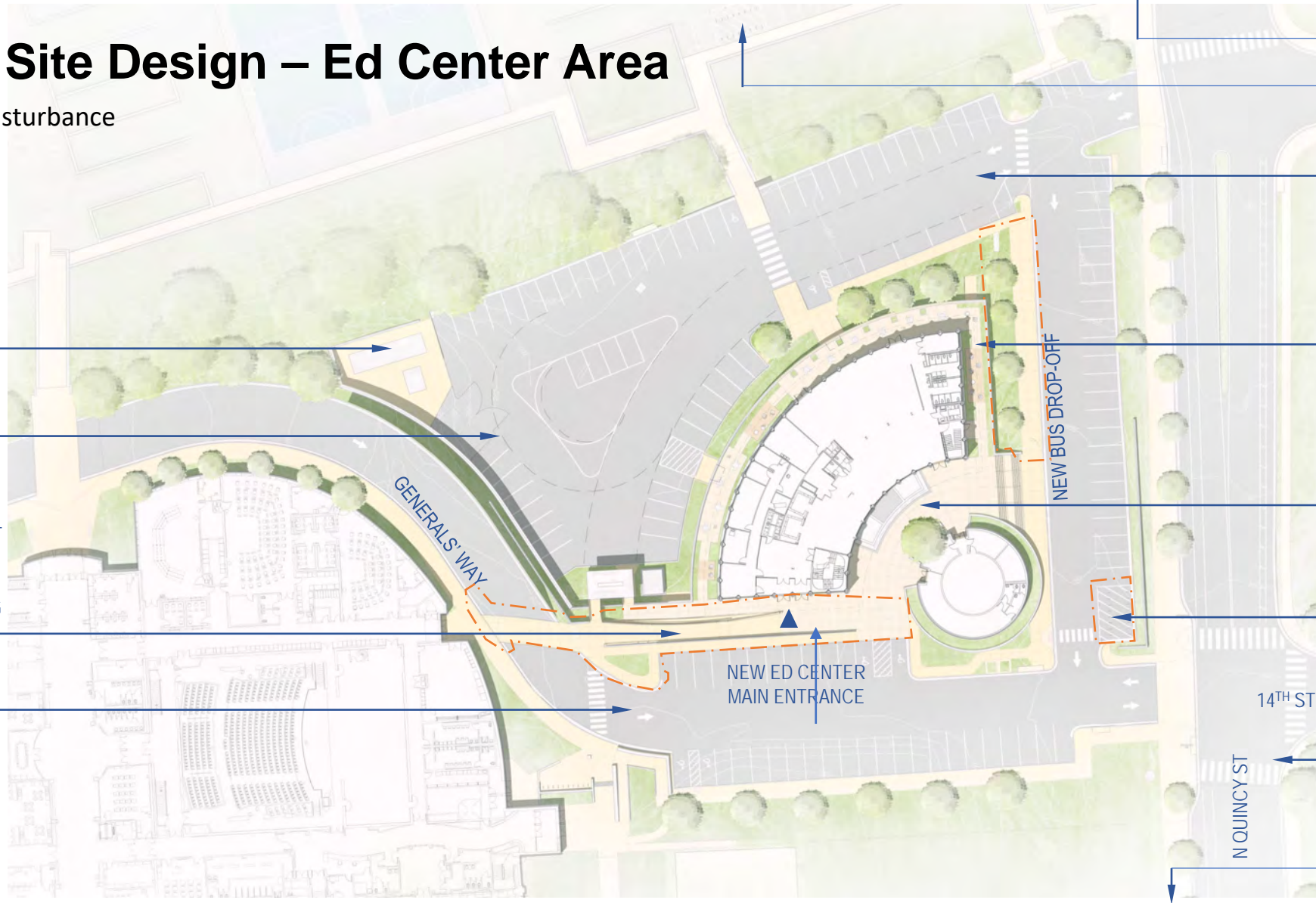
--- Limit of Disturbance

EXISTING GENERATOR, DUMPSTERS AND NEW COOLING TOWER

DASHED LINE = FIRE TRUCK ACCESS

NEW GROUND CONNECTION RAMP (SLOPE 1:12) AND FLUSH PAVING AT GENERALS' WAY. GRADE DROPS 6.5' BETWEEN ROAD CROSSING AND MAIN ENTRANCE

NEW "DO NOT ENTER" SIGNS



NEW 15<sup>TH</sup> ST. PU/DO

NEW BICYCLE PARKING IN GARAGE, 30 BIKE CAPACITY

88 PARKING SPACES (18 MORE THAN ORIGINALLY PLANNED, TO OFFSET THE SPACES RESTRICTED ON 15<sup>TH</sup> STREET

NEW TERRACE IMPROVEMENTS

NEW PLAZA IMPROVEMENTS

NEW BICYCLE PARKING, 30 BIKE CAPACITY

14<sup>TH</sup> ST

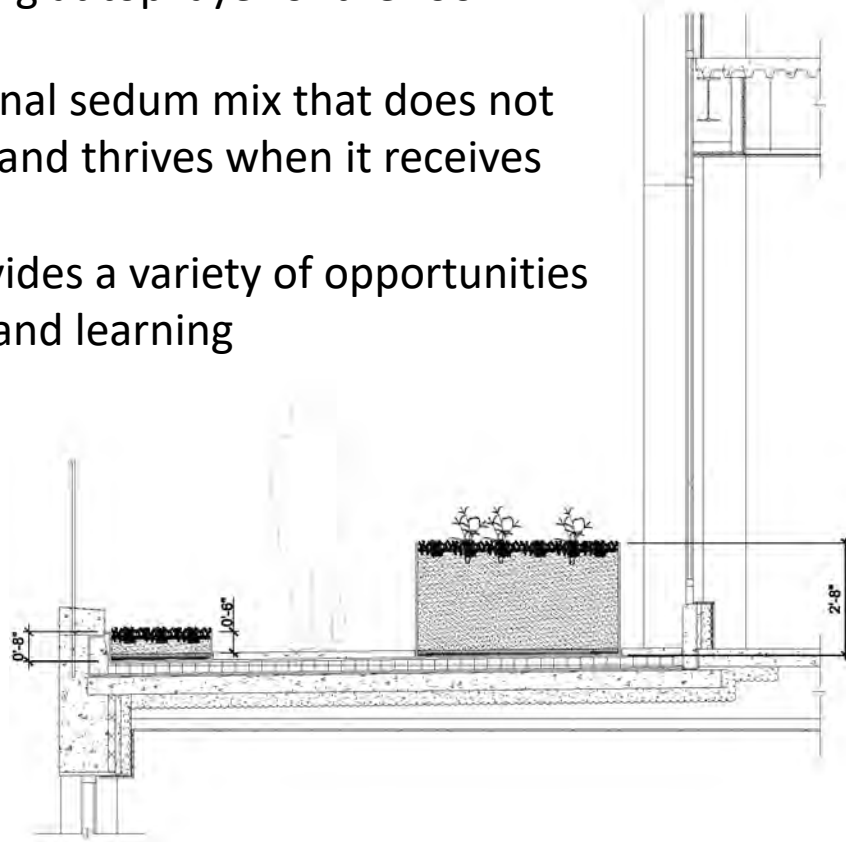
NEW RECT. RAPID FLASHING BEACONS (RRFB) AT 14<sup>TH</sup>

NEW WASH. BLVD. PU/DO



# Proposed Roof Terrace

- Existing paved terrace roof assembly replaced with inverted roof membrane assembly, including paving and planting at top layer of the roof assembly
- Planting is a regional sedum mix that does not require irrigation and thrives when it receives water
- Environment provides a variety of opportunities for collaboration and learning







# Tree Preservation and Addition

- All existing trees protected, not removed
- (4) new canopy trees added

TREE PRESERVATION TABLE

TREE #	BOTANICAL NAME	COMMON NAME	TRUNK (DIAMETER) (INCHES)	CROWN RADIUS (FEET)	CRITICAL ROOT ZONE RADIUS (FEET)	CONDITION RATING	COMMENTS
8101	TILIA AMERICANA	AMERICAN LINDEN	8	10	8	75	GOOD CONDITION, POOR BRANCHING ANGLE, INCLUDED BARK
8102	TILIA AMERICANA	AMERICAN LINDEN	10	10	10	75	BUTTED ROOT COLLAR
8103	TILIA AMERICANA	AMERICAN LINDEN	8	8	8	75	MULTIPLE LEADERS, LEANING TRUNK
8104	TILIA AMERICANA	AMERICAN LINDEN	8	8	8	75	MULTIPLE LEADERS, VINE COVERAGE
8105	TILIA AMERICANA	AMERICAN LINDEN	10	6	10	72	MULTIPLE LEADERS, VINE COVERAGE
8106	TILIA AMERICANA	AMERICAN LINDEN	4	9	4	72	SPROUTING AT TRUNK BASE, DAMAGE BY PARKING LOT (RUB)
8107	TILIA AMERICANA	AMERICAN LINDEN	6	9	6	76	CANOPY INDETERMINED
8108	ACER FACHACHINUM	SILVER MAPLE	5	8	5	75	
8110	TILIA AMERICANA	AMERICAN LINDEN	8	12	8	72	SPROUTING AT TRUNK, SMALL BROKEN BRANCHES
8111	ACER FACHACHINUM	SILVER MAPLE	4	10	4	72	MULTIPLE LEADERS, LEAF OVERHANG
8112	ACER FACHACHINUM	SILVER MAPLE	4	8	4	72	
8113	QUERCUS PHILLOIDES	WILLOW OAK	8	8	8	72	EPICORMIC SPROUTING
8114	QUERCUS PHILLOIDES	WILLOW OAK	8	10	8	72	EPICORMIC SPROUTING, POOR ROOT STRUCTURE
8115	QUERCUS PHILLOIDES	WILLOW OAK	8	12	8	72	SHEDDING ROOTS
8116	ACER FACHACHINUM	SILVER MAPLE	4	6	4	69	LEAF OVERHANG
8117	QUERCUS PHILLOIDES	WILLOW OAK	7	9	7	63	SHAD LEADER
8118	QUERCUS PHILLOIDES	WILLOW OAK	8	8	8	74	SHEDDING ROOTS, ANIMAL NEST
8119	QUERCUS PHILLOIDES	WILLOW OAK	8	10	8	72	PIECE OF ROOT, BRANCHING SPROUTING
8120	QUERCUS PHILLOIDES	WILLOW OAK	12	12	12	72	SHEDDING ROOTS
8121	FRAXINUS SP.	ORNAMENTAL CHERRY	6	10	6	72	POOR ROOT STRUCTURE, MULTIPLE LEADERS
8122	FRAXINUS SP.	ORNAMENTAL CHERRY	8	8	8	72	MECHANICAL DAMAGE TO ROOTS, MULTIPLE LEADERS
8123	FRAXINUS SP.	ORNAMENTAL CHERRY	4	8	4	69	ROOT SUCKERS
8124	FRAXINUS SP.	ORNAMENTAL CHERRY	4	8	4	69	CANOPY OVERHANG
8125	FRAXINUS SP.	ORNAMENTAL CHERRY	8	8	8	72	MULTIPLE LEADERS
8126	FRAXINUS SP.	ORNAMENTAL CHERRY	8	10	8	72	MULTIPLE LEADERS
8127	ACER PALMATUM	JAPANESE MAPLE	8.6	12	8	72	MULTIPLE LEADERS, BROKEN BRANCH, LEAF SCORCH
8128	TILIA OCCIDENTALIS	ARBORESCENT	8	8	8	72	LEANING TRUNK, LEAF SCORCH
8129	TILIA OCCIDENTALIS	ARBORESCENT	6	8	6	72	LEANING TRUNK, LEAF SCORCH
8130	TILIA OCCIDENTALIS	ARBORESCENT	4.8	8	4	69	MULTIPLE LEADERS, INCLUDED BARK, LOW LIVE CROWN RATIO
8131	TILIA OCCIDENTALIS	ARBORESCENT	6	8	6	72	LEANING TRUNK, LEAF SCORCH
8132	TILIA OCCIDENTALIS	ARBORESCENT	6	8	6	72	
8133	TILIA OCCIDENTALIS	ARBORESCENT	6	10	6	72	
8134	QUERCUS TRILOBATA (VAR. INEMUS)	HONEY LOCUST	2	8	2	72	LEAF OVERHANG
8135	TILIA AMERICANA	AMERICAN LINDEN	4	8	4	69	EPICORMIC SPROUTING, CANOPY OVERHANG
8136	TILIA AMERICANA	AMERICAN LINDEN	8	8	8	69	RUBBER BRANCHES, DEAD LEADER
8137	JUGLANS NIGRA	BLACK WALNUT	12.8	15	12	69	
8138	FRAXINUS CALLEPANA	BRADFORD PEAR	10.8	18	10	36	TRAP DOOR, POOR FORM, SIBBING
8139	TILIA AMERICANA	AMERICAN LINDEN	8	10	8	69	CANOPY OVERHANG, EPICORMIC SPROUTING, POOR ROOT STRUCTURE ON SOUTH
8140	TILIA AMERICANA	AMERICAN LINDEN	8	8	8	69	INCLUDED BARK, MULTIPLE LEADERS, EXTENSIVE VINE COVERAGE
8141	TILIA AMERICANA	AMERICAN LINDEN	8	10	8	69	BROKEN BRANCHES, VINE COVERAGE
8142	MORUS ALBA	WHITE MULBERRY	8.5	18	8	39	MULTIPLE LEADERS, VINE COVERAGE
8143	MORUS ALBA	WHITE MULBERRY	8.5	18	8	39	MULTIPLE LEADERS, VINE COVERAGE
8144	QUERCUS TRILOBATA (VAR. INEMUS)	HONEY LOCUST	4	15	4	69	POOR FORM, VINE COVERAGE
8145	TILIA AMERICANA	AMERICAN LINDEN	8	12	8	69	EPICORMIC SPROUTING
8146	FRAXINUS CALLEPANA	BRADFORD PEAR	18	18	18	63	MULTIPLE LEADERS, OLD LARGE WOUND IN TRUNK, EPICORMIC SPROUTING
8147	TILIA AMERICANA	AMERICAN LINDEN	6	8	6	69	SPROUTING AT TRUNK BASE, UNDESIRABLE CANOPY WITH ADJACENT TREE
8148	PINUS TAEDA	LOROUILL PINE	12	15	12	69	POOR FORM, CANOPY OVERHANG
8149	PINUS TAEDA	LOROUILL PINE	18	18	18	63	CANOPY OVERHANG



# Building Design



# Summary of Sustainable Building Features

- Adaptable and agile high performance learning environments
- Extensive building envelope improvements:
  - Replace existing roof membrane and insulation
  - Adding exterior wall/soffit air barrier and insulation
  - Adding insulation below existing roof terrace
  - Replacing existing single-pane windows with energy efficient glazing
  - Adding operable windows
  - Using glazing frit that responds to annual sun exposure and solar orientation
- Replace existing HVAC with water-source distributed two-stage/variable heat pumps
- Estimated EUI between 30-40
- Projected LEED v4 BD+C: Schools Silver Level certification

# High Performance Learning Environments

Spaces are to perform at the highest levels for the following:

- Thermal comfort
  - Indoor air quality
  - Acoustics
  - Daylight and views
  - Transparency
  - Technology
  - Community use
  - Active schools
- Daylight and views boost learning capacity, but not all daylight and views are the same.
    - The benefits of daylight and views are related to the perception of time of day
    - Natural daylight shifts color over the course of a day from cool to warm. The body and brain sense this.
  - To realize high performance daylight and views:
    - The color of glass should be as clear as possible for good color rendering
    - Glare, and the need for blinds obscuring the daylight and views, should be minimized

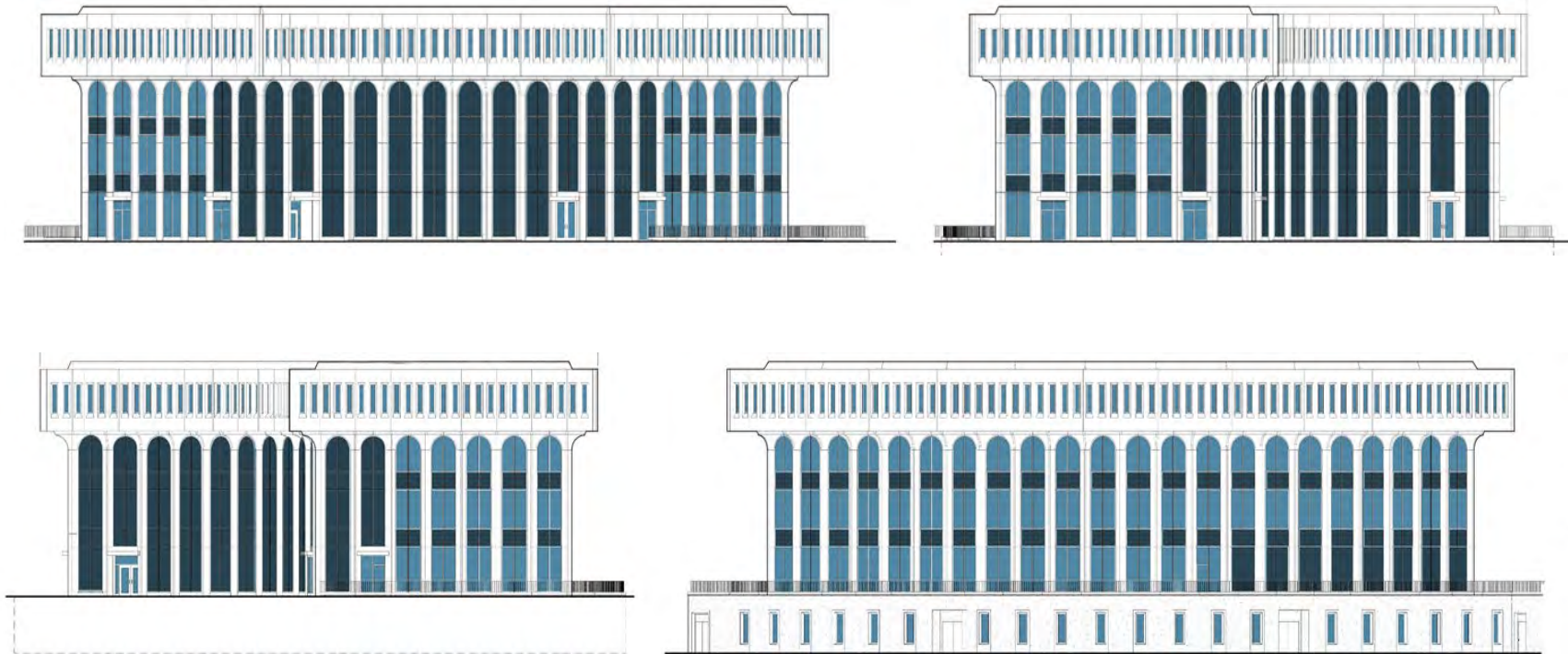


SCHEMATIC DESIGN



# Current Glass Painted Black

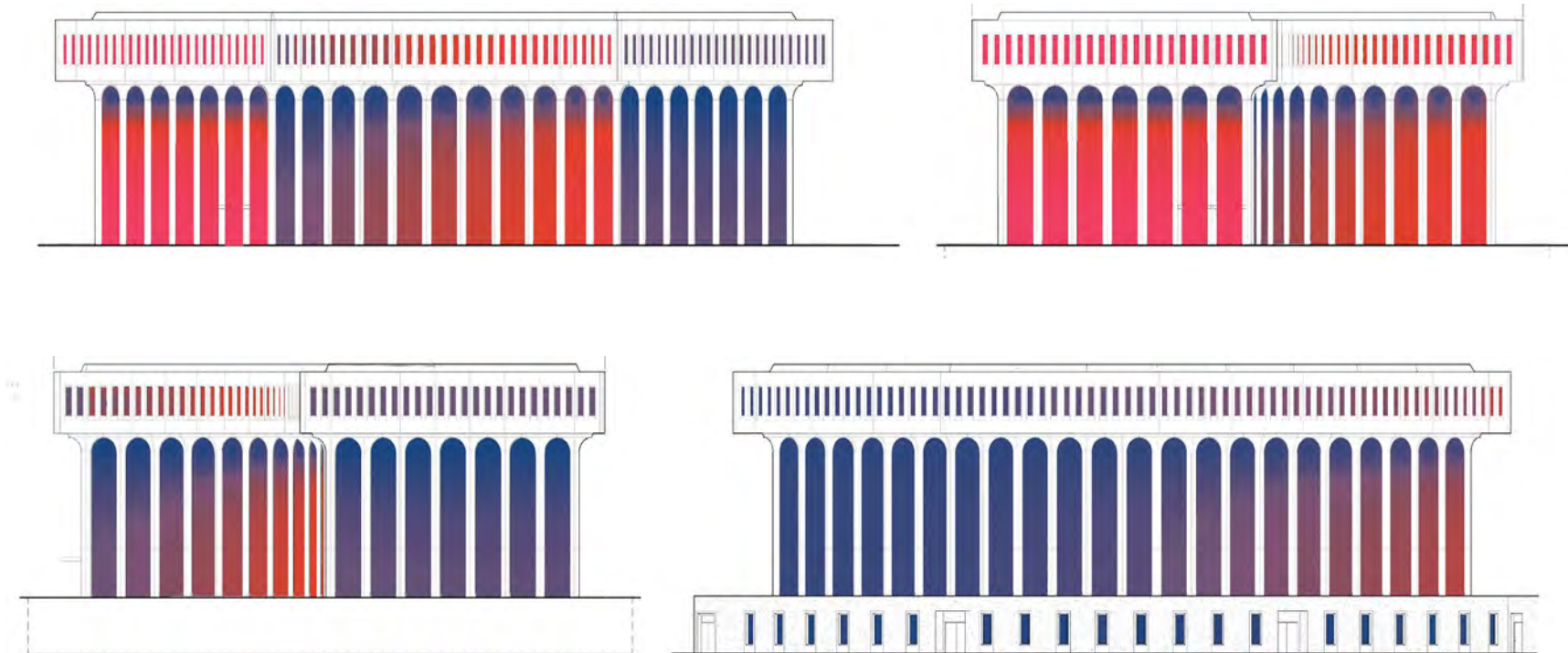
- Some of the original single-pane glazing has black paint covering the interior glass surface
- Example locations are first floor restrooms and the stairs
- The black paint acts as a heat sink, radiating heat to the interior



SCHEMATIC DESIGN

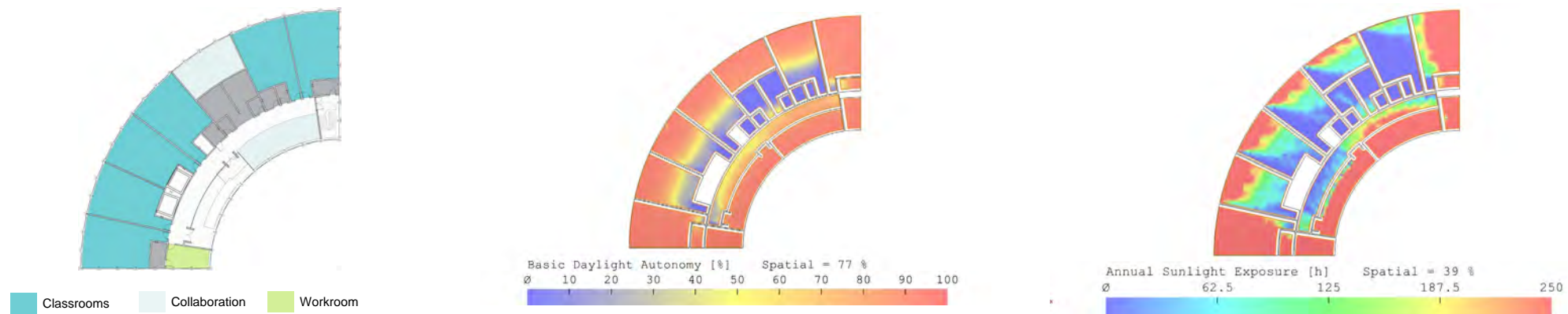
# Solar Insolation

- This diagram shows the cumulative annual sun exposure on each façade
- Impacts Energy Use Intensity through heat gain
- Impacts Daylight and Views through glare



# Daylight and Views

- Spatial Daylight Autonomy (sDA)
  - sDA correlates to getting sufficient daylight for the space
  - sDA is what % of the floor receives 300 lux (27.87 foot-candles) of daylight for at least 50% of the time between occupied hours (8AM-6PM) for the entire year.
- Annual Sunlight Exposure (ASE)
  - ASE represents glare or too much daylight.
  - ASE is what % of floor area received 1000 lux (92.9 foot-candles) or more for at least 250 occupied hours.
- The preferred balance is higher sDA with lower ASE
- These diagrams show preliminary modeling of sDA and ASE in the 2<sup>nd</sup> floor spaces





# Frit Pattern Example

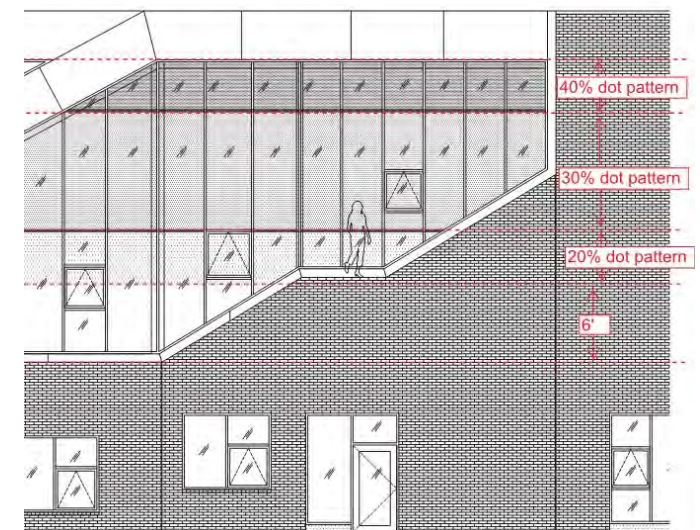
- Achievement Prep Middle School in the District with frit on the south-facing glass
  - Located at 908 Wahler Place SE, Washington DC
- The frit is subtly visible as it shifts in a gradient from 40% to 0%
- Frits allow for relatively clear glass while mitigating solar heat gain



DAY VIEW



NIGHT VIEW



GRADIENT DIAGRAM

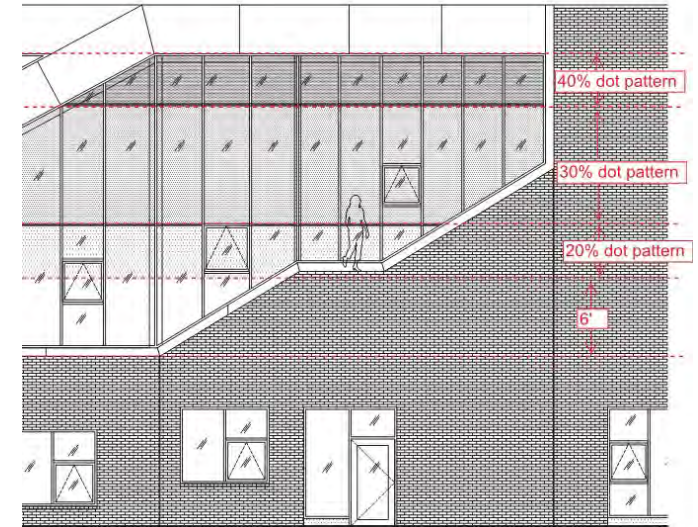
SCHEMATIC DESIGN

# Frit Pattern Example

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INTERIOR VIEWS



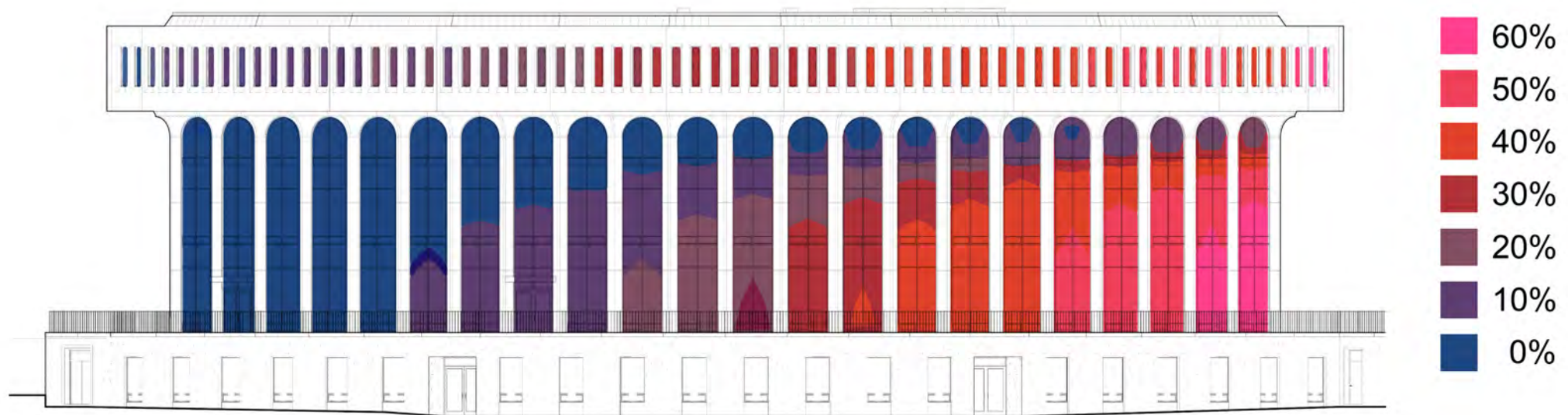
GRADIENT DIAGRAM

SCHEMATIC DESIGN

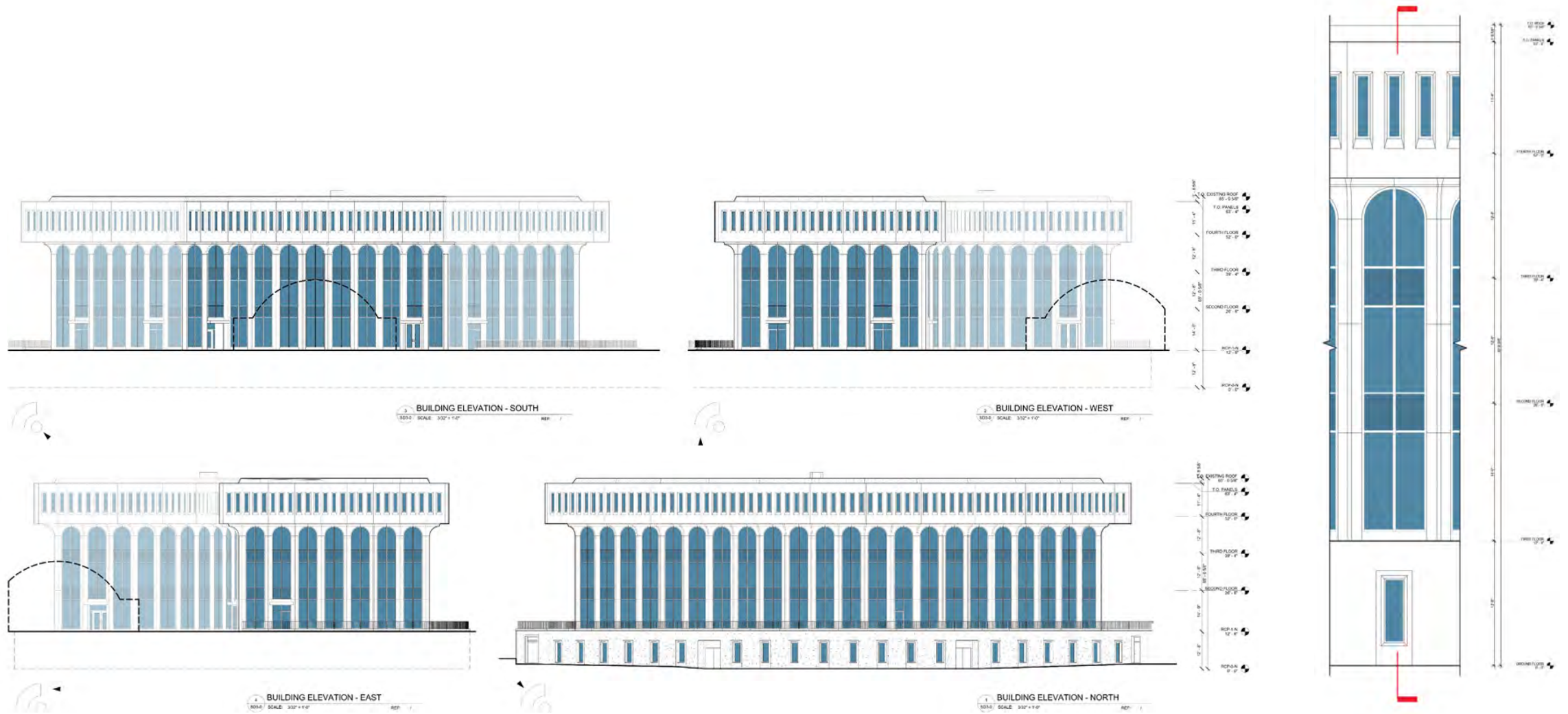


# Frit Pattern Approach

- Frit will only be visible up close.
- Frit will not impact the view from within the classrooms to the outdoors
- Frit will help avoid overuse of shades which would have greater visual perception and impact to views.
- The frit density varies in response to solar exposure at each facade: each color in the diagram below represents a different frit density. This diagram is not an illustration of the actual visual condition; it is a quantitative documentation of the variations of the frit density.
- The subtle pattern provides a learning opportunity for students.



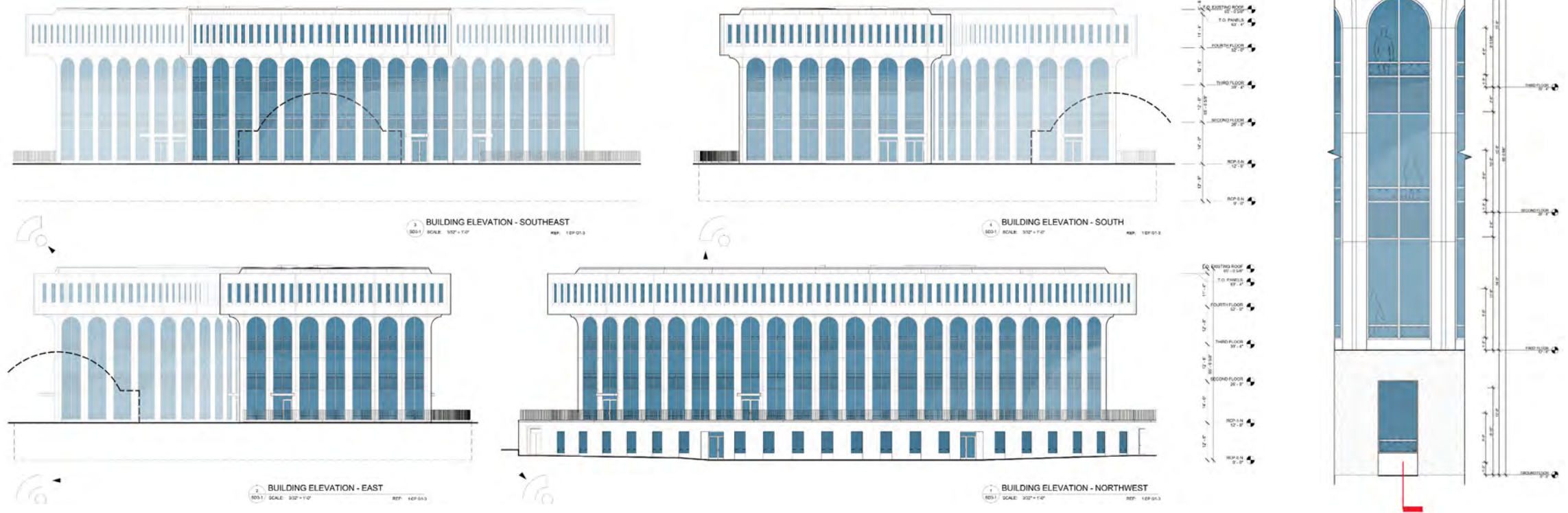
# Elevations - Existing



SCHEMATIC DESIGN

# Proposed Elevations

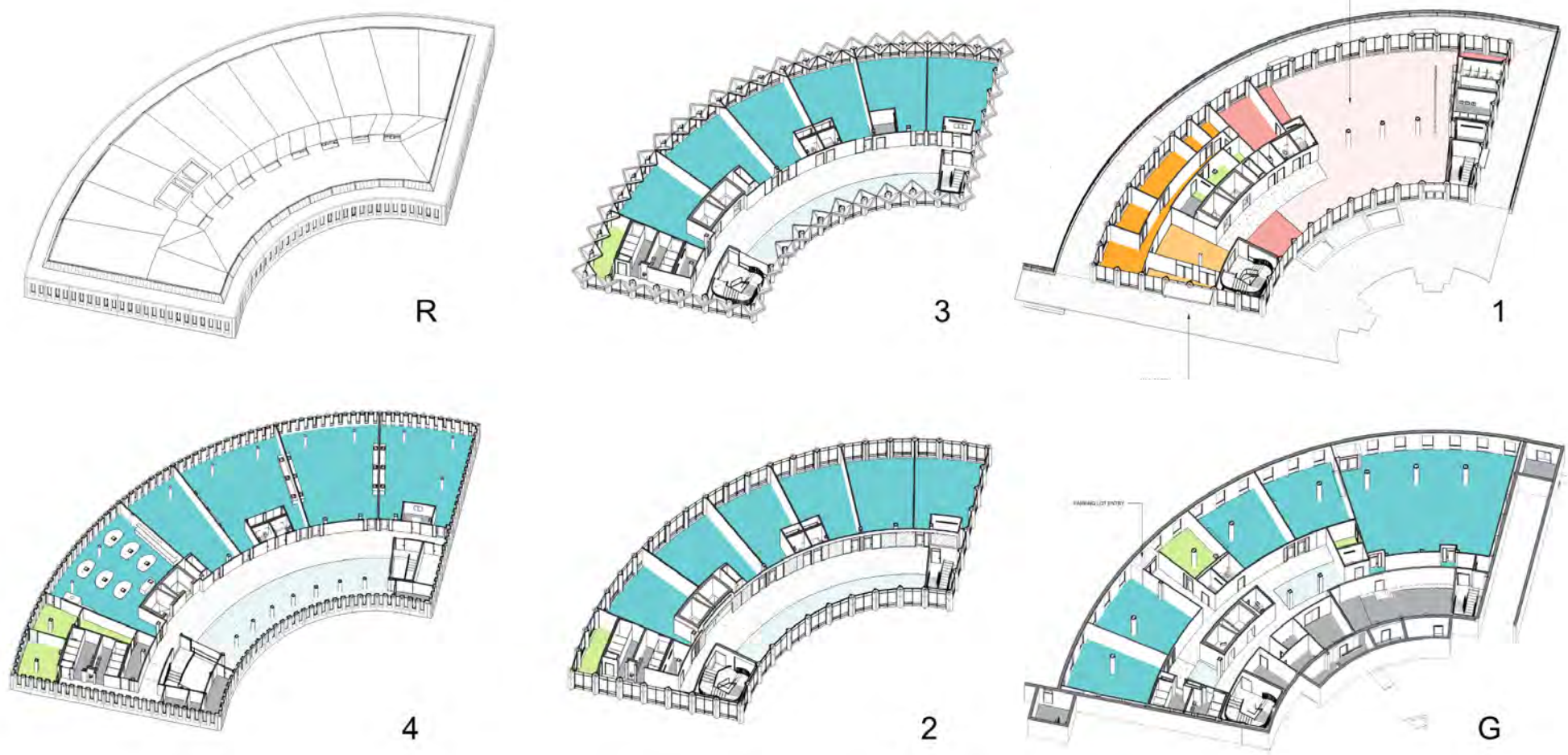
- Frit will only be visible up close.
- Frit will not impact the view from within the classrooms to the outdoors
- Frit will help avoid overuse of shades which would have greater visual perception and impact to views.



SCHEMATIC DESIGN



# Floor Plans

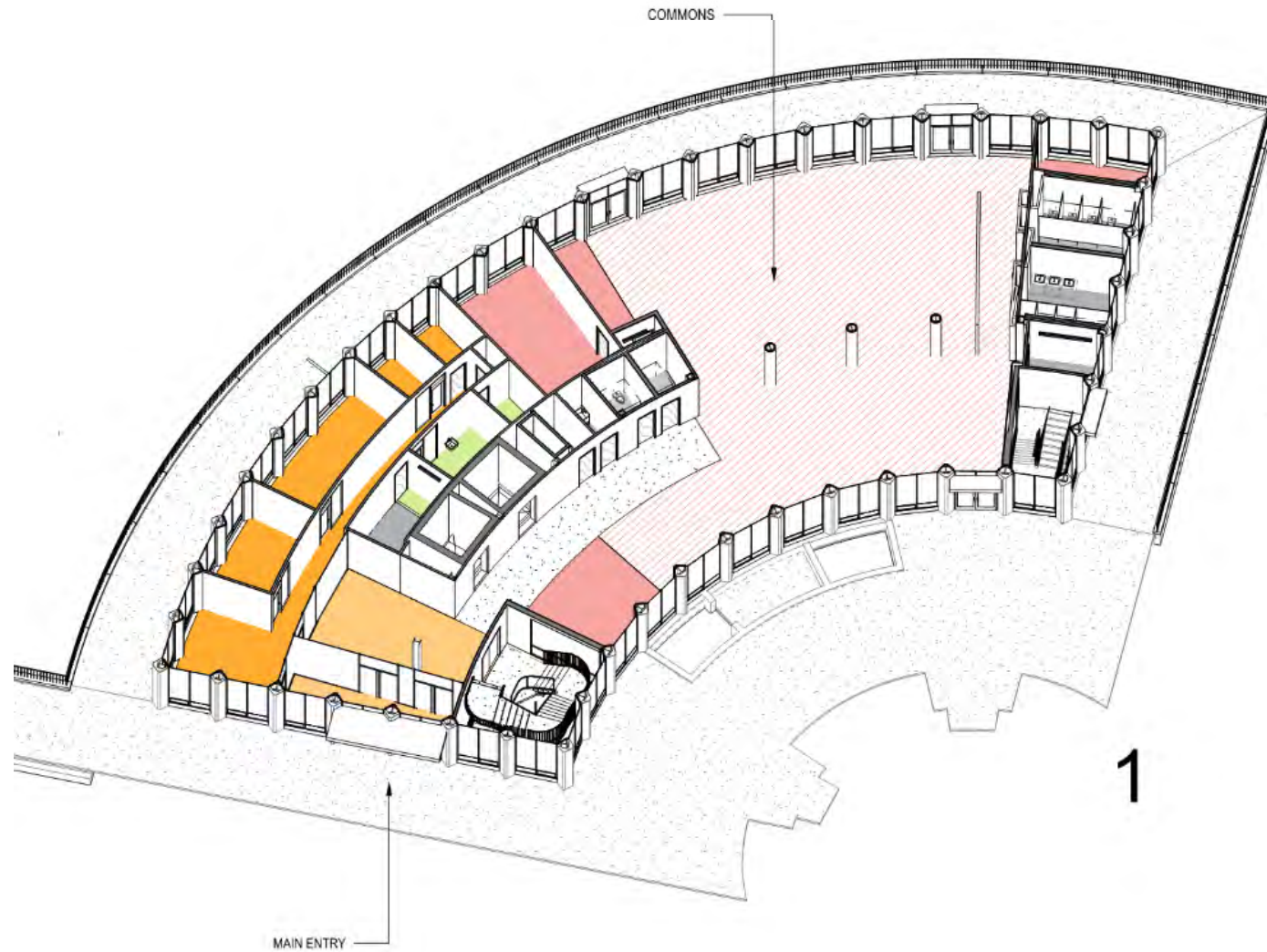


Classrooms / Collaboration
  
 

 Commons / Support
  
 
 Instructional Support
  
 
 Administration
  
 
 Building Support

BUILDING DESIGN

# First Floor



Classrooms / Collaboration    Commons / Support    Instructional Support    Administration    Building Support



# Preliminary LEED Checklist

LEED v4 for BD+C: Schools		Project Checklist		Project Name: Arlington Education Center	
				Date: March 4, 2019	
Y	?	N			
1			Credit	Integrative Process	1
<b>7 8 15 Location and Transportation 15</b>					
	15		Credit	LEED for Neighborhood Development Location	15
1			Credit	Sensitive Land Protection	1
1	1		Credit	High Priority Site	2
1	4		Credit	Surrounding Density and Diverse Uses	5
1	3		Credit	Access to Quality Transit	4
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1
<b>2 7 3 Sustainable Sites 12</b>					
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
2			Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
3			Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
1			Credit	Site Master Plan	1
1			Credit	Joint Use of Facilities	1
<b>7 5 0 Water Efficiency 12</b>					
			Prereq	Outdoor Water Use Reduction	Required
			Prereq	Indoor Water Use Reduction	Required
			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
4	3		Credit	Indoor Water Use Reduction	7
2			Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1
<b>20 2 9 Energy and Atmosphere 31</b>					
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
6			Credit	Enhanced Commissioning	6
10	6		Credit	Optimize Energy Performance	16
1			Credit	Advanced Energy Metering	1
2			Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2
<b>2 11 0 Materials and Resources 13</b>					
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
5			Credit	Building Life-Cycle Impact Reduction	5
2			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2
<b>13 3 0 Indoor Environmental Quality 16</b>					
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Prereq	Minimum Acoustic Performance	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
3			Credit	Daylight	3
1			Credit	Quality Views	1
1			Credit	Acoustic Performance	1
<b>1 0 0 Innovation 6</b>					
1			Credit	Innovation	5
1			Credit	LEED Accredited Professional	1
<b>2 2 0 Regional Priority 4</b>					
1			Credit	Regional Priority: WE - Outdoor Water Use Reduction	1
1			Credit	Regional Priority: EA - Optimize Energy Performance	1
1			Credit	Regional Priority: LT - Access to Quality Transit	1
1			Credit	Regional Priority: LT - Bicycle Facilities	1
<b>55 38 27 TOTALS</b>				<b>Possible Points: 110</b>	
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110					

SCHEMATIC DESIGN





BUILDING DESIGN





CANIS WORLD  
NO  
PARKING  
EXCEPT  
LANE  
FOR  
BUSINESS PURPOSES ONLY

BUILDING DESIGN

















# 4 Questions



# 5 Next Steps + Adjourn

David M. Brown Planetarium  
AEC  
1426 North Quincy Street

# Next Steps

- May 2, 2019 – Transportation Commission meeting
- May 6 or 8, 2019 – Planning Commission meeting
- May 18, 2019 – County Board hearing

# Adjourn

1. The APS Project Manager is:  
**Robin Hodges**  
(703) 872-9175  
[robin.hodges@apsva.us](mailto:robin.hodges@apsva.us)
2. Public meeting dates and past presentations are posted on the APS project website:  
<https://www.apsva.us/education-center-reuse/>
3. To provide feedback and/or comments to APS use: [engage@apsva.us](mailto:engage@apsva.us)