



# Overcoming Cost Constraints

Designing 21<sup>st</sup>-Century Spaces  
When Aged Buildings and Tight  
Budgets Are a Challenge

A4LE Chapter Conference  
Virginia Beach, VA  
March 27, 2023

*How many of YOU have undertaken school renovations with one of the primary goals of infusing 21<sup>st</sup> Century design elements?*

*How many of YOU had such a healthy budget that you were able to get exactly what you wanted, without needing to consider alternatives, scope reductions, or value engineering?*

# Who We Are



**Maureen McElfresh**  
**Project Manager / Associate**  
**Woolpert**

Experienced K-12 school designer and architectural project manager with a passion for the educational programming and planning process. Works closely with school administrators from inception of a project through construction. Over 25+ K-12 projects over 28-year career.



**Emily Strelitz**  
**Certified Interior Designer**  
**Woolpert**

Certified Interior Designer with 8 years of experience in public, private and federal project. She has a passion for creating cleanable, durable, and engaging learning environments. She likes to work with users on developing comprehensive theming designs in educational projects to create a sense of place for students.



**Melissa Bunting**  
**Principal, Poquoson Middle School**  
**Poquoson City Public Schools**

A graduate of Poquoson City Public Schools, Melissa has brought her 20+ years of experience in education back home as Principal of Poquoson Middle for the past 7 years. She was a valued member of the building committee and instrumental in the planning process. She has taught middle school mathematics and was an Assistant Principal in the York County Schools.



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Learning Objectives

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Renovations on the Rise

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Why 21c Design and how can it be  
Incorporated into Existing Buildings?

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21c Components

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Case Study: Poquoson Middle School

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Q&A

# Agenda

# Learning Objectives

1

Understand that designing 21st Century Schools isn't an "all or nothing" approach – learn about the critical components of 21st Century learning environments.

2

Learn ways to optimize existing facilities through renovations designed to maximize square footage and provide more flexibility.

3

Be inspired to create new opportunities for student collaboration within your existing footprint.

4

Understand how a building addition paired with renovation can create a sense of a whole new 21st Century learning environment.



# School Renovations on the Rise

2021 Infrastructure Report Card indicates:

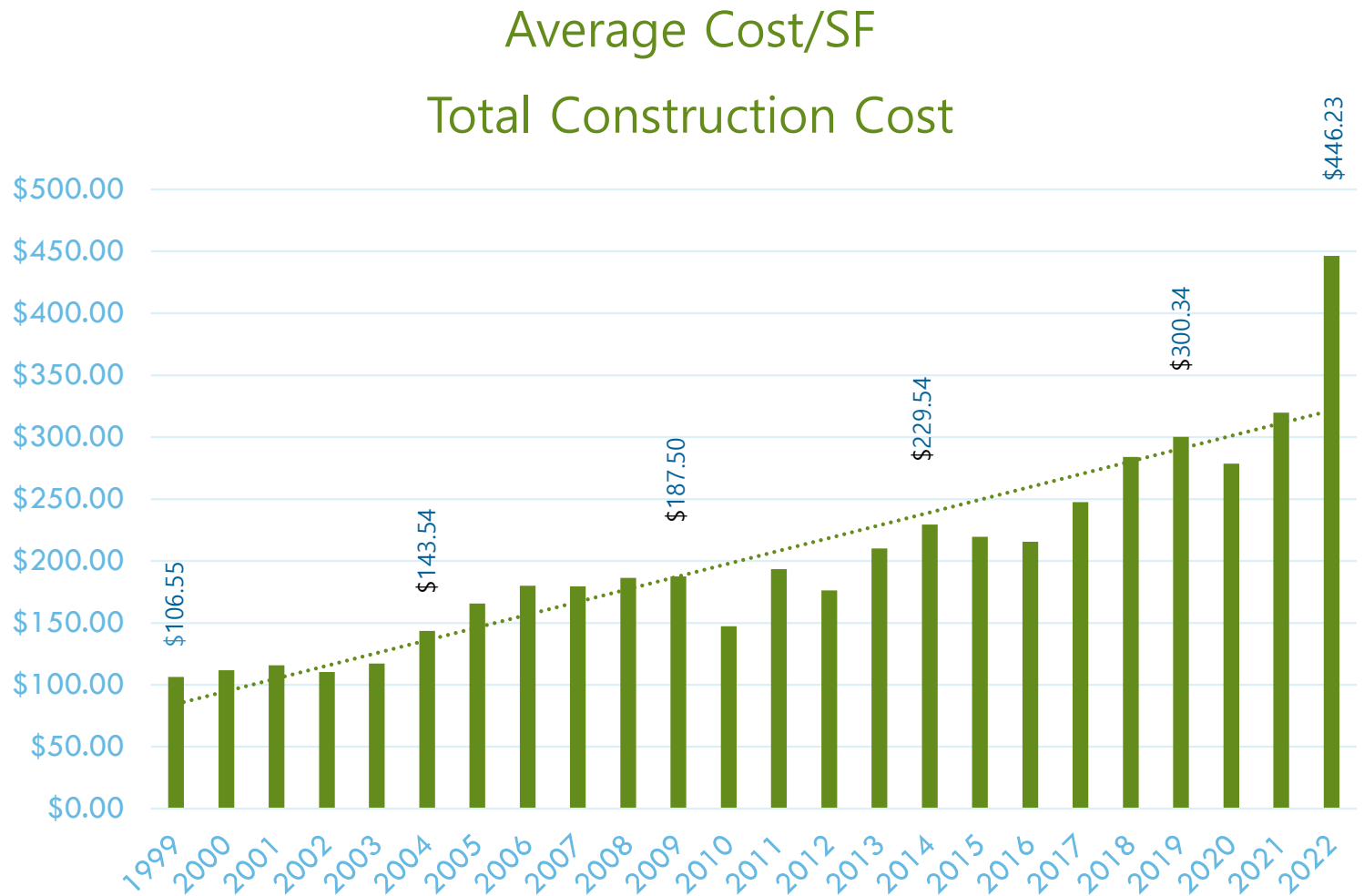
- Schools = second largest sector of public infrastructure spending (after highways)
  - Schools frequently serve multiple purposes (emergency shelters/centers and community resources)
- Grade = D+
- 53% of public schools need repairs, renovations, and modernizations
- Major annual funding gap for public school facilities (\$38B) to cover necessary major repairs and upgrades, reduce backlog and **alter facilities to respond to the new pedagogies for 21st C learners**

**SPEND PRECIOUS RENOVATION \$\$\$ VERY STRATEGICALLY!**



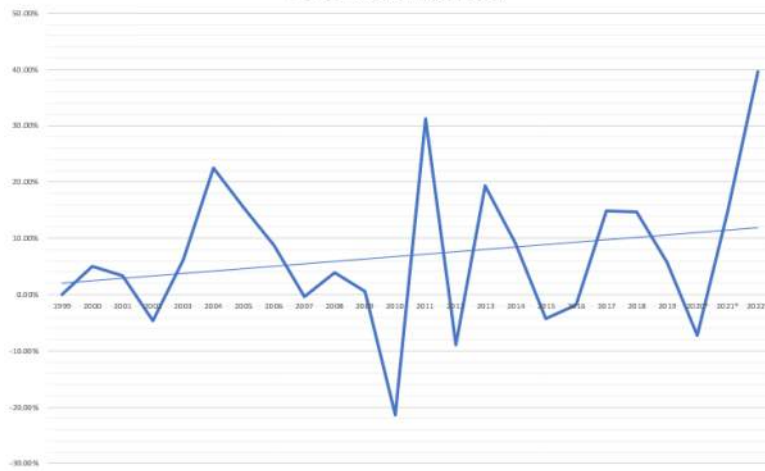
# Virginia Dept of Education Historical Cost Data

COMPILED DATA			
VA DOE Construction Data			
All New School Construction Projects			
Year	Average Cost/SF Total Cost	Inflation Rate	No. Schools bid this year
1999	\$106.55		6
2000	\$111.95	5.07%	25
2001	\$115.79	3.43%	19
2002	\$110.40	-4.66%	27
2003	\$117.15	6.11%	22
2004	\$143.54	22.53%	11
2005	\$165.63	15.39%	15
2006	\$180.12	8.74%	28
2007	\$179.51	-0.33%	25
2008	\$186.42	3.85%	15
2009	\$187.50	0.58%	9
2010	\$147.45	-21.36%	7
2011	\$193.39	31.15%	13
2012	\$176.22	-8.88%	9
2013	\$210.27	19.32%	10
2014	\$229.54	9.17%	10
2015	\$219.56	-4.35%	9
2016	\$215.48	-1.86%	10
2017	\$247.59	14.90%	6
2018	\$283.98	14.70%	14
2019	\$300.34	5.76%	15
2020	\$278.60	-7.24%	4
2021	\$319.73	14.77%	5
2022	\$446.23	39.56%	4



# Virginia Dept of Education Historical Cost Data

VA DOE Inflation Rate (Total)



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## Construction Data Notes:

- Data compiled from VA Department of Education actual bid costs, as reported by school districts. Includes all new construction for Elem, Middle and High school projects.
- Inflation rate year per year is calculated by percentage difference from the previous average cost/SF to the next years cost/SF
- Inflation from 1999-2022 is calculated by taking the percentage difference between 1999 to 2022

## Summary of Findings

- ❑ VA DOE inflation rate peaks and valleys follows global economy and other construction cost indexes
- ❑ 2008-2009 – Federal Design-Build projected delayed recession (most of these projects completed construction in 2011/12)
- ❑ 2013 – New Energy Code Adopted
- ❑ Last 5 years – Major Focus on Safety and Security
  - ❑ Wind/Seismic effecting structural systems, glass, etc
  - ❑ Door hardware upgrades
  - ❑ Security upgrades
- ❑ 2020-2022– COVID and global supply of materials increased costs





**Why 21c and how can it be Incorporated into Existing Buildings?**

# Flexibility is Key

*"School facilities are designed to last 50 years. We cannot be certain about teaching and learning techniques that educators will utilize over that next 50 years. Therefore, we need facilities that are as flexible as possible so they can be easily reconfigured to accommodate the broadest spectrum of education techniques."*

**20<sup>th</sup> Century "rigid"**



**21<sup>st</sup> Century "flexible"**



The world is changing at a faster pace than ever before  
Technology and early access to it  
Multimedia and multi-tasking  
Global awareness - Schools/books/teachers are no longer primary source of info  
Technology allows us to be flexible in ways that weren't possible in the 20<sup>th</sup> century.  
We're 23 years into the 21<sup>st</sup> century and many schools are still modeled around designs from the 19<sup>th</sup> century.



## Set goals to create.....



- A world-class 21<sup>st</sup> century learning environment that develops high-achieving students, who become life-long learners
- Environments that allow for:
  - ☞ Student centered learning
  - ☞ Sharing ideas / collaboration
  - ☞ Technology integration
  - ☞ Transparency
  - ☞ Flexibility
  - ☞ Safety and security
- Excitement and Inspiration

# 21c Building Components





# Building Components



# Student Presentation Space





# Building Components

Huddle Space / Multi-purpose





# Building Components

Commons/Cafeteria Multi-Purpose



- Gathering Stair
- Double sided stage with Gym
- Space opens to Cafeteria with acoustical partition

# Building Components

## Auditeria (Shared Auditorium / Cafeteria)



### Cafeteria Use

- Kitchen / Serving lines in rear
- Tiered floors sized to accommodate lunch tables
- Storage provided for lunch tables
- Natural light from clerestory windows with motorized shades



### Auditorium Use

- Acoustically designed for both performance use and to minimize noise during lunch
- Shades cover serving lines openings
- Tiered floors for better view of stage



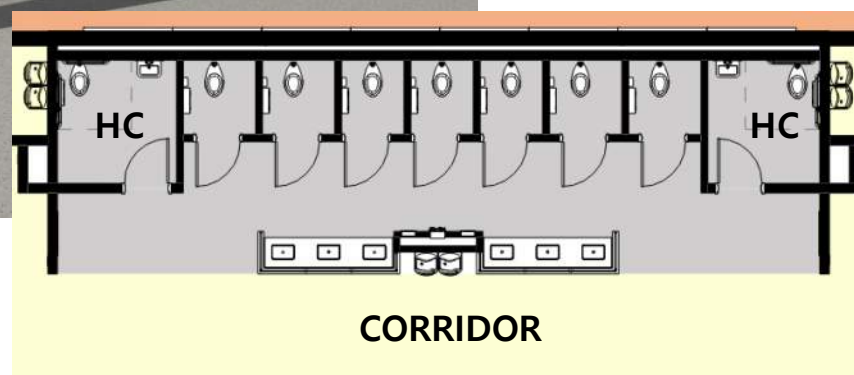
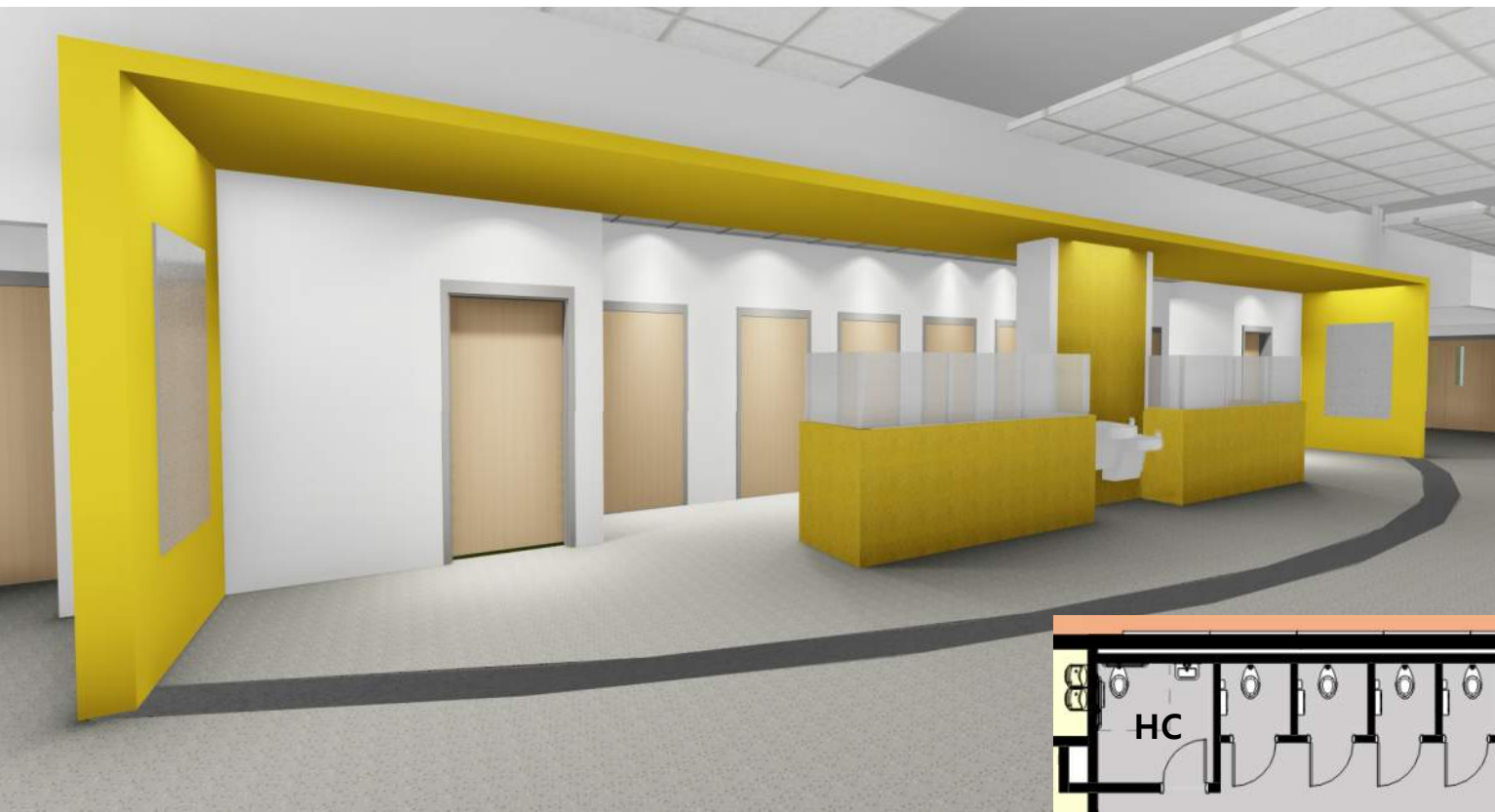
# Building Components

## Gathering Stair



# Building Components

## Inclusive Restrooms





# Building Components

Info / Media Center



- Courtyard access
- Flex lab with operable partition to create larger gathering space
- Movable stack to reconfigure space



# Building Components

# Makerspace





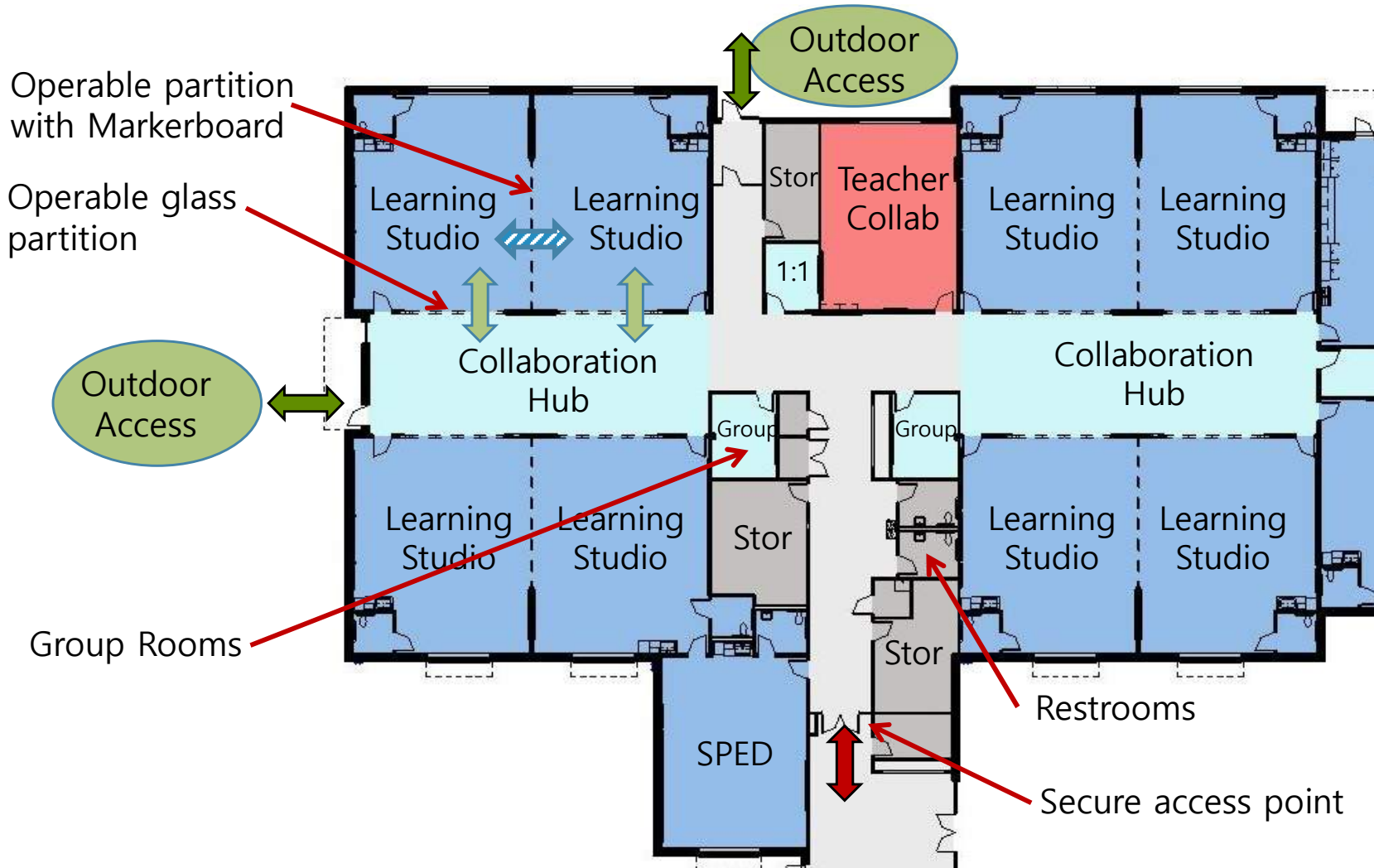
# Building Components

## Outdoor Learning Spaces



# Building Components

## Learning Neighborhood





Moveable walls between classrooms





Moveable walls between classrooms



Moveable walls between classrooms



# Building Components

# Collaboration Hub





# Building Components

# Transparency & Flexibility





# Building Components

# Learning Studios



Moveable walls  
Adaptable

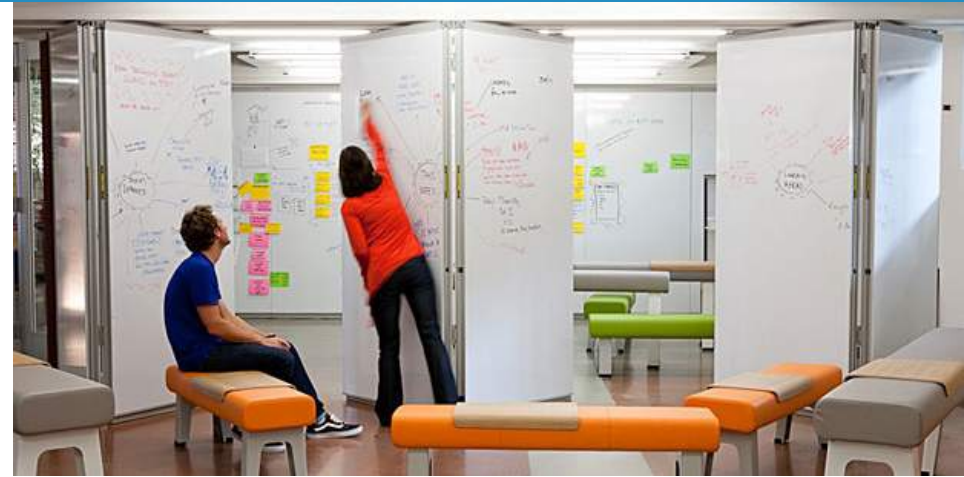
Different configurations  
Transparency



# Building Components

- Breakout / Intervention spaces
- Flexible
- Co-teaching opportunities
- Shared between classrooms

## Breakout Spaces



# Building Components

- Professional office space
- Teacher desk and storage
- Dedicated collaboration space

## Teacher Collaboration Rooms



# How to Integrate 21<sup>st</sup> Century Components into your school renovations?

Balance goals with financial, space and time constraints

Prioritize those TYPES of SPACES that are most important to your District/Division

Doesn't have to be all or nothing!

21st Century can get introduced in many ways:

- Minor Renovation
- Medium-sized Renovation and/or Additions
- New Transitional School with only select components
- New 21st C School with many or all components





# 21<sup>st</sup> Century Design on a Spectrum

Cells and Bells

Extend Learning Spaces

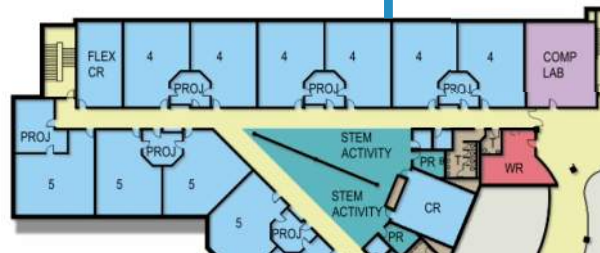
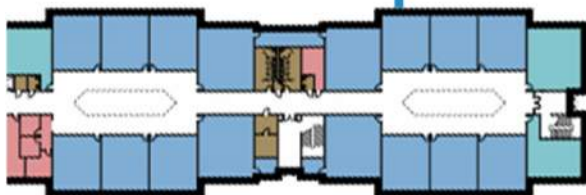
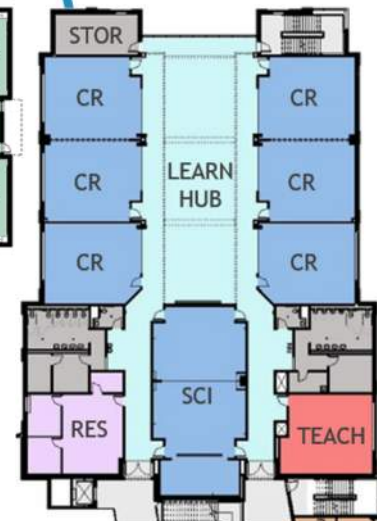
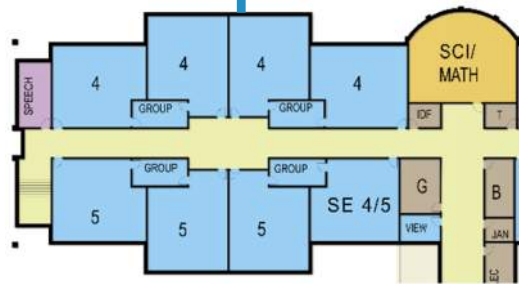
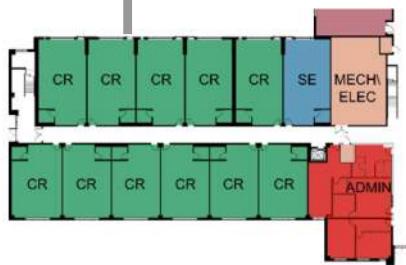
Group Rooms and Transparency

Group Rooms, Transparency, Collaboration Spaces (formal/informal)

Flexible Neighborhoods with Hubs, Flexible Classrooms, Transparency, Group Rooms, Staff Collaboration

Traditional

21st Century



# Target dollars in areas with largest impact

Strive for largest impact on learning outcomes for most students

Identify shared areas for flexible Collaboration Spaces

- Gathering Stairs
- Performance / Presentation Space

Commons/Cafeteria – utilize for many purposes

Transform existing Med spaces

- STEM Lab
- Maker Space



Think  
MAXIMIZE USAGE  
and  
FLEXIBLE spaces





# Case Study

## Poquoson Middle School

*Poquoson, VA*

**Building Size:** 35,044 SF Addition  
66,044 SF Renovation

**Student Capacity:** 650 Students

**Final Construction Cost:** \$17,315,000

**Adjusted Cost/SF:** \$171/SF  
(overall project)

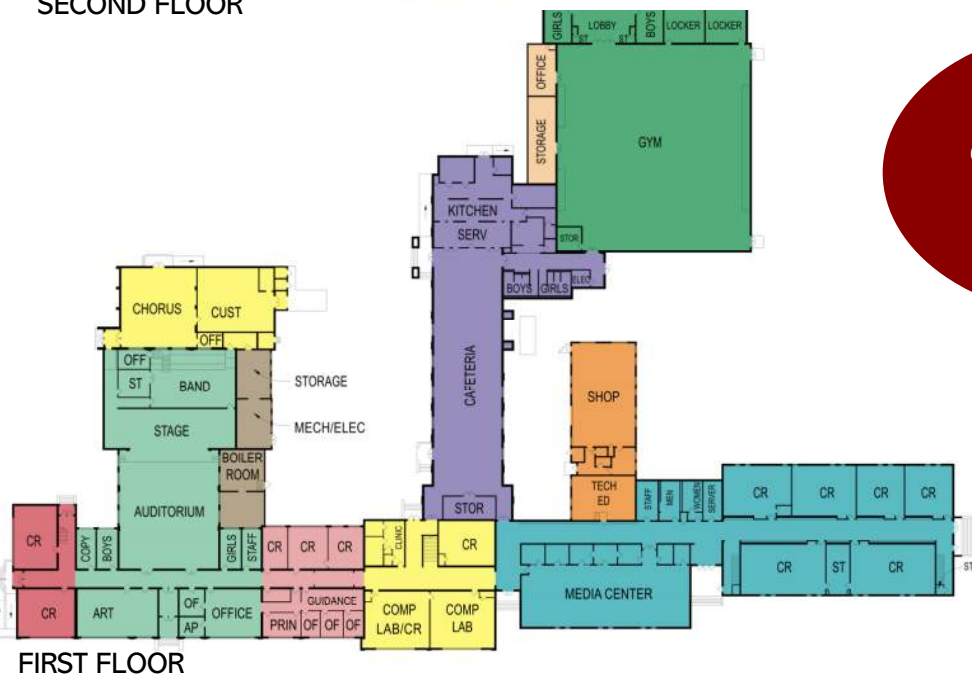
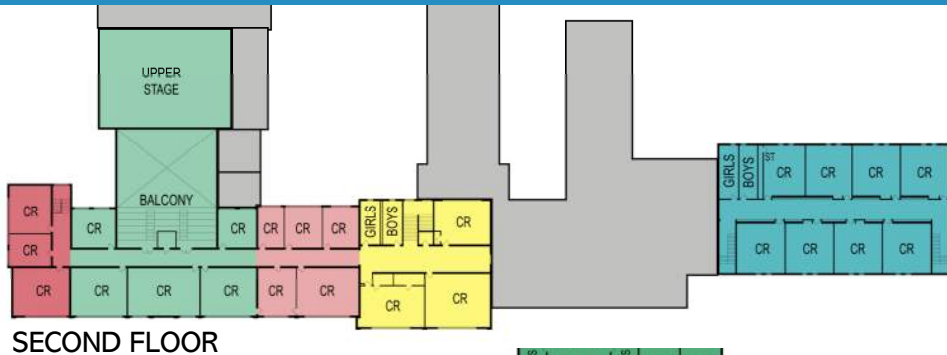
**Bid Date:** December 2020

**Building Opening:** September 2022





# History of Existing Building

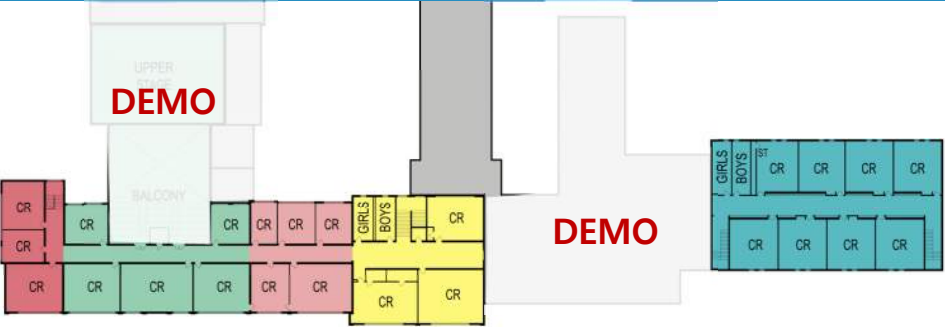


10 Phases  
construction  
over 90  
years

## LEGEND - YEAR CONSTRUCTED

- 1932
- 1945
- 1949
- 1957
- 1961
- 1963
- 1965
- 1970
- 1994
- GYM STORAGE (AFTER 1994)

# Existing Floor Plan – Demolition



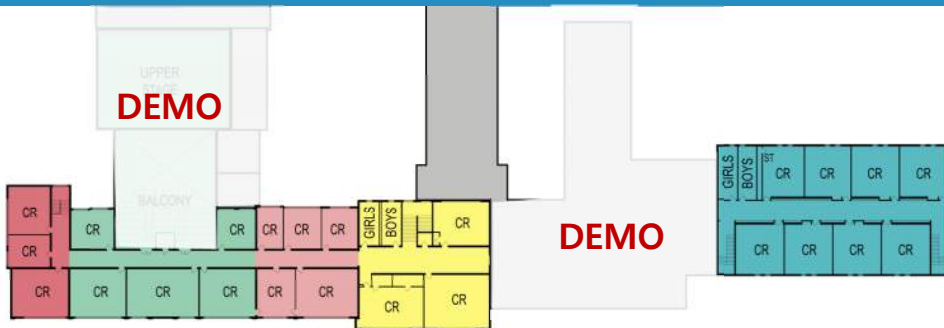
SECOND FLOOR



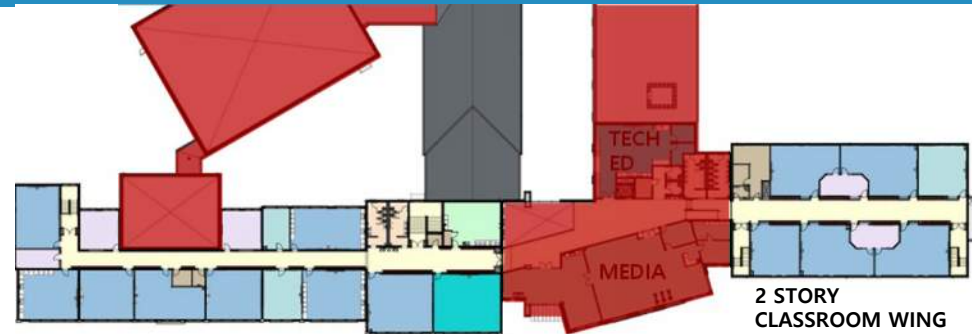
FIRST FLOOR



# Floor Plans – Demo and New Additions

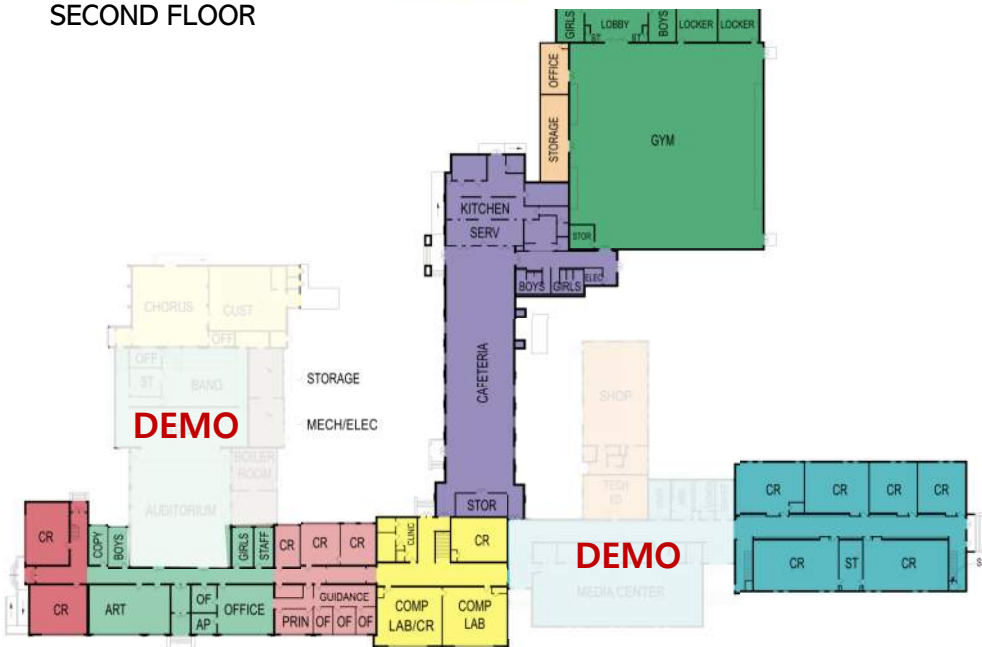


SECOND FLOOR

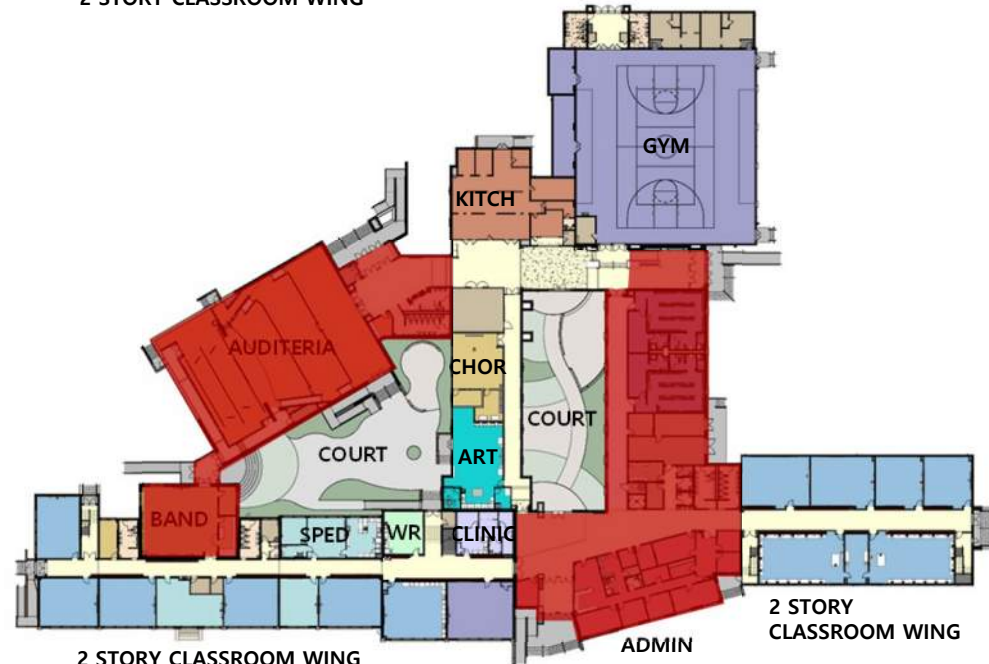


2 STORY CLASSROOM WING

2 STORY CLASSROOM WING



FIRST FLOOR



2 STORY CLASSROOM WING

ADMIN

2 STORY CLASSROOM WING

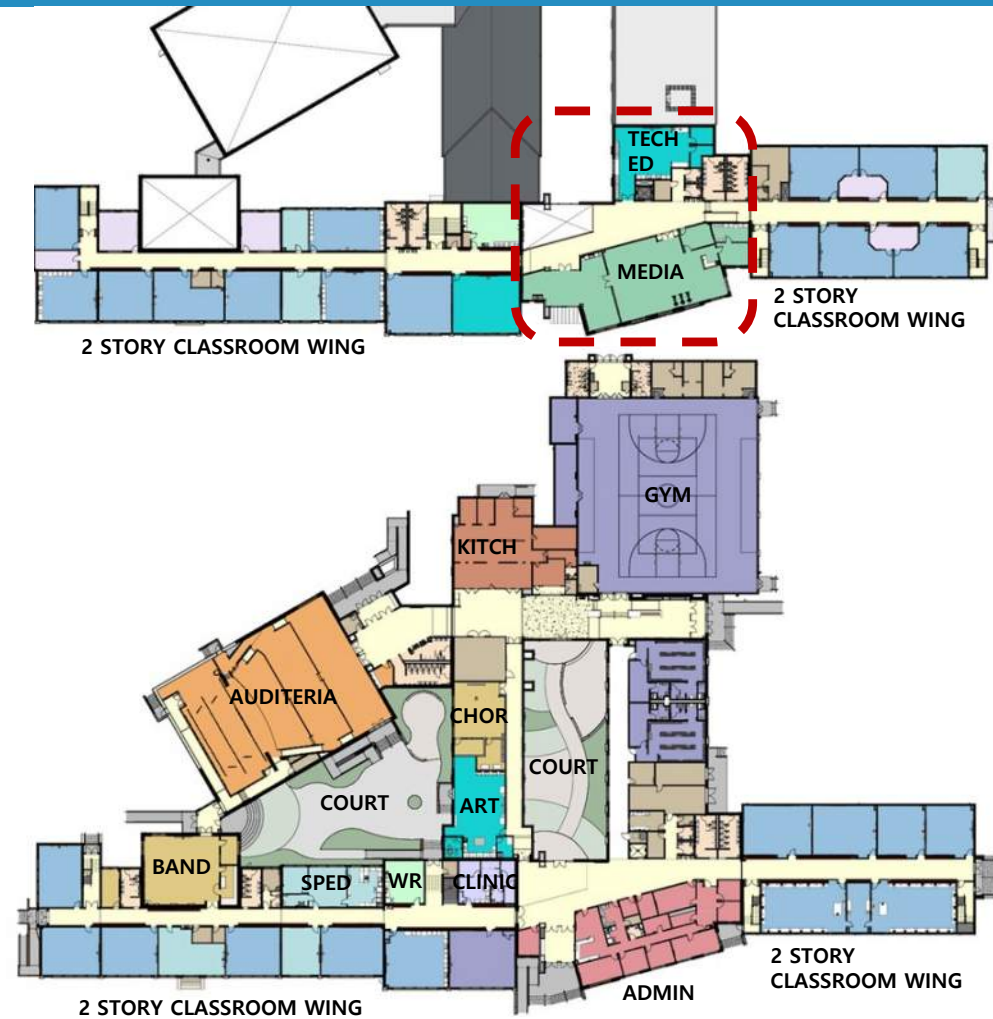
# Floor Plans – New Work

## SECOND FLOOR

- Addition connects the existing second floors. Floors were at different elevations, added ramp in corridor
- Reconfigured 1970's Classroom, Added group rooms
- Created collaboration space and

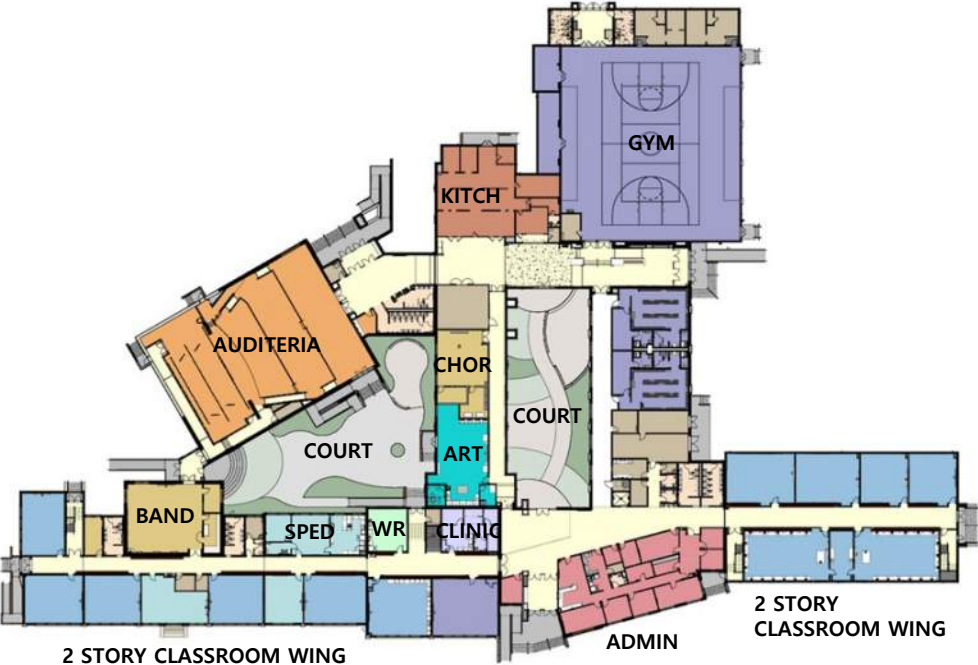
## FIRST FLOOR

- Secure building entrance





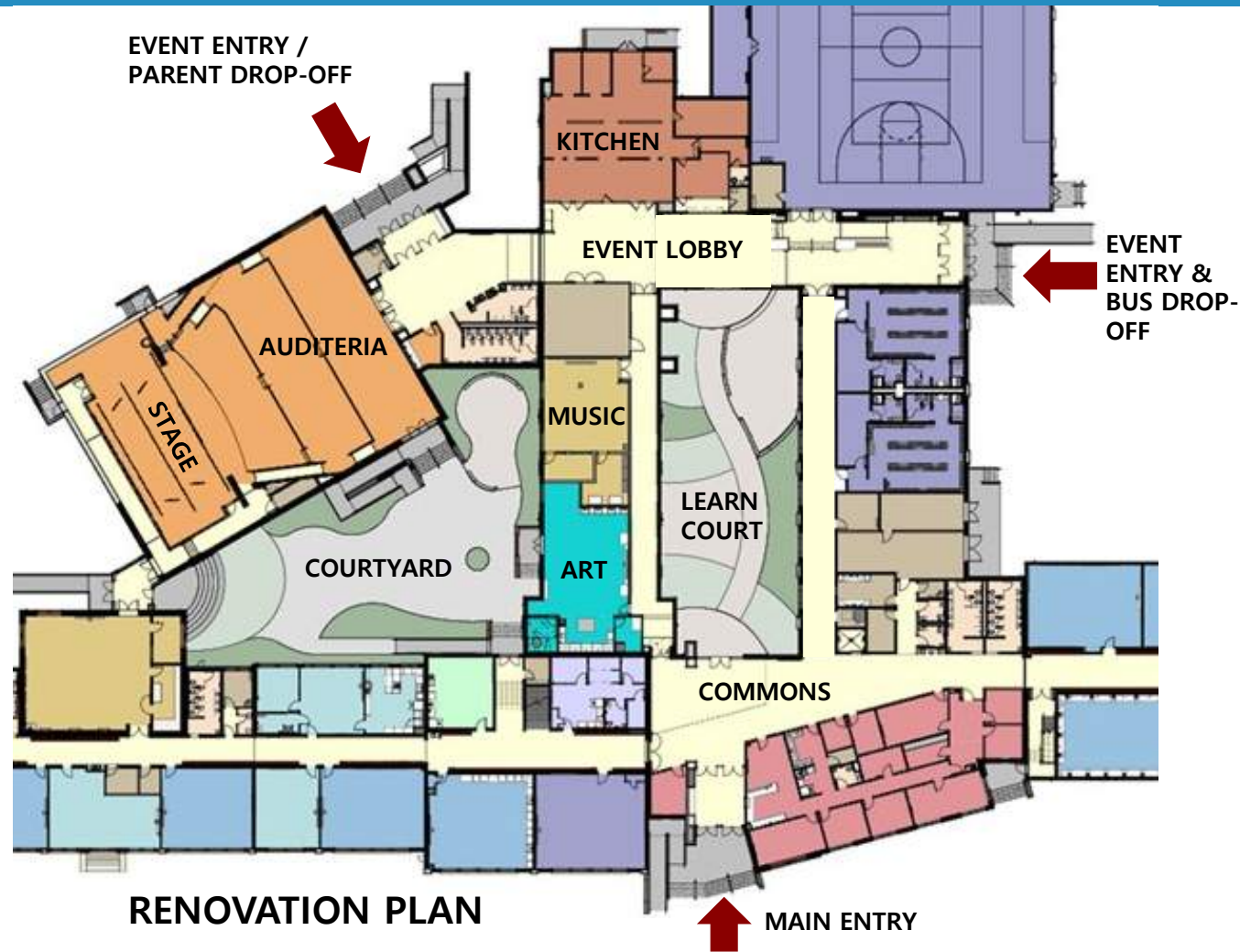
# First Floor Plan – Demo and New



# Infusing 21c Components

Reconfiguration of Major Spaces

## *Floor Plan - Before and After*





# Infusing 21c Components

Reconfiguration of Major Spaces

*Repurpose Old Cafeteria Wing*





# Infusing 21c Components

Reconfiguration of Major Spaces

*Auditeria*

*Dining and Performance Space*



Existing 1932 Auditorium

Reconstructed in New Addition

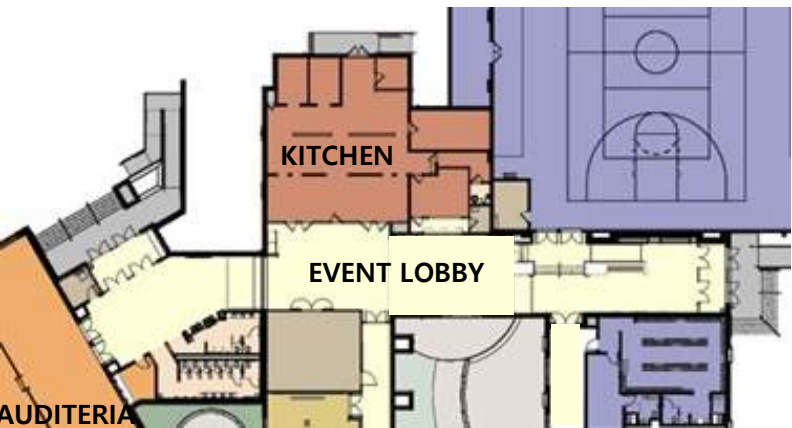
# Infusing 21c Components

Reconfiguration of Major Spaces

*Gym / Public Event Lobby*



**EXISTING PLAN**



**RENOVATION PLAN**



Renovated in Place



# Infusing 21c Components

Reconfiguration of Major Spaces

*Gym / Public Event Lobby*



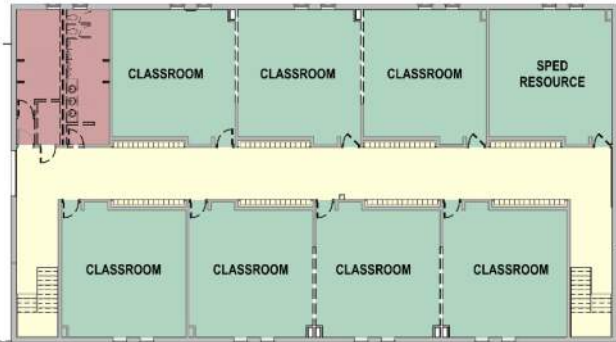
Renovated in Place



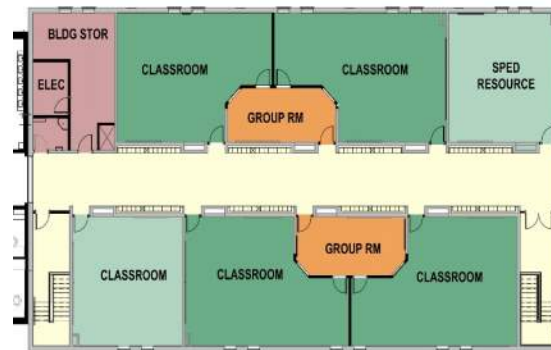
# Infusing 21c Components

Minimal Cost, Maximum Impact

## Group Rooms



Demo Floor Plan



New Floor Plan

- Reconfigured 3 small Classrooms into 2 large Classrooms and one Group Breakout Room
- Doors and windows between Classrooms and Breakout Rooms create easy access and good supervision
- Did not impact structural walls, existing doors or corridor lockers



View from Classroom to Group Room

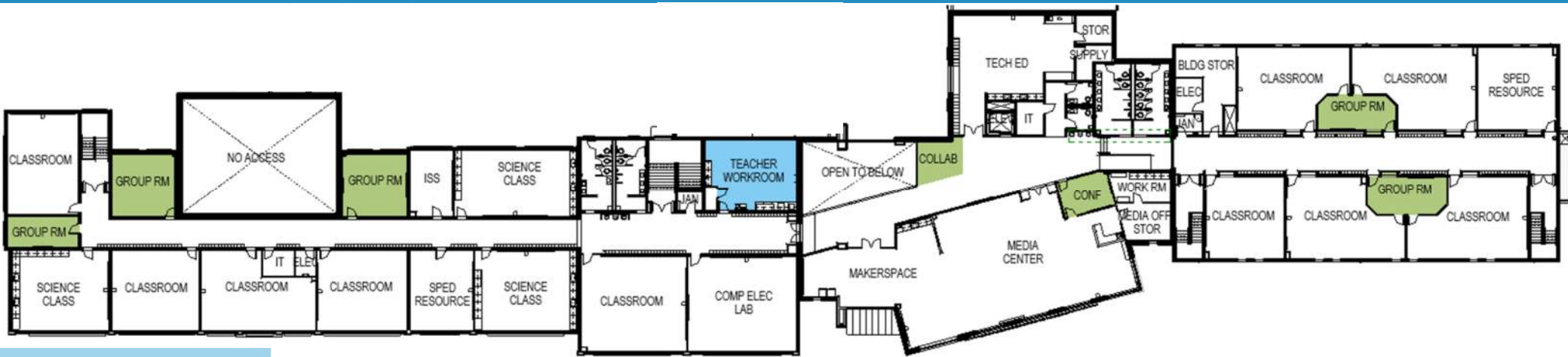


View from Group Room to Classroom

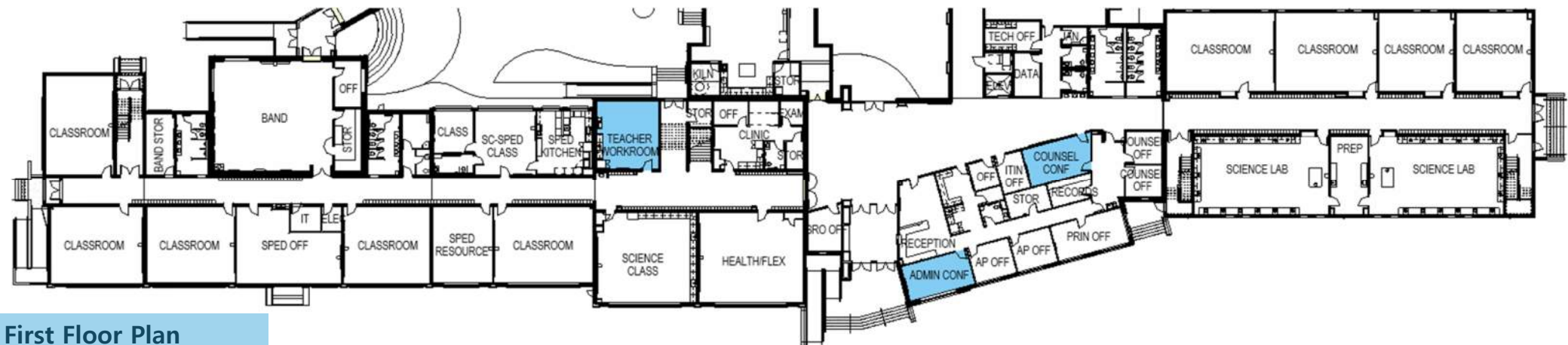
# Infusing 21c Components

Minimal Cost, Maximum Impact

## *Collaboration Spaces*



Second Floor Plan



First Floor Plan

# Infusing 21c Components

Minimal Cost, Maximum Impact

## *Outdoor Learning/Gathering Spaces*



OUTDOOR DINING /  
ART COURT



OUTDOOR LEARNING COURT





# Infusing 21c Components

Minimal Cost, Maximum Impact

*Technology Education*



Went from a “wood shop” environment - to a technology-integrated education

Existing 1965 Wing

Reconstructed in New Addition

# Infusing 21c Components

Minimal Cost, Maximum Impact

## *Media Center and Makerspace*



Existing 1965 Wing

Reconstructed in New Addition



# Infusing 21c Components

Minimal Cost, Maximum Impact

*Light and Color*





# Design Objective

*Preserving Original Elements*

Original 1932 High School



1970s Era Renovation





## Design Objective

*Update Façade and Integrate New Additions*





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*Update Façade and Integrate New Additions*





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## Design Objective

*Update Façade and Integrate New Additions*



# Poquoson Middle for the next generation

Provided 21c Learning Environment

Improved building circulation:

- Access to Gym, Music and Second Floor

- Added elevator

Address ADA issues

Updated finishes

Updated all building systems

- Power, Data, Mechanical systems

- Replaced windows

- Building envelop / Energy Efficiency

- Addressed structural issues

- Replaced roof





# Commons: Create connections and unity

Second Floor Commons



Collaboration Space



First Floor Entry



Connection to 1970 Wing



# Renovated Classrooms



Existing 1932-60 Wing



Renovated in Place



# Renovated Classrooms



Existing 1970 Wing

Renovated in Place

# Renovated Science Labs



Existing 1970 Wing

Renovated in Place



# Renovated Corridors



Existing 1932-60 Wing

Renovated in Place

# Band Room



Existing 1932 Wing



Reconstructed in New Addition



# Special Ed & Life Skills Lab



Existing 1949 Wing

Renovated in Place

# Locker Rooms



Existing 1960's Wing



Reconstructed in New Addition



# Key Takeaways



- Focus money on shared/public spaces used by majority of students
- Find opportunities to share space usage to minimize square footage
- With additions, consider tweaks to existing facility to help integrate “newer” teaching methods & blend
- Look for places to infuse adaptable spaces and transparency
- Create opportunities for informal learning / socialization
- Leverage furniture to add flexibility and promote collaboration

*Small changes can have BIG impacts!  
If it ain't broke, don't fix it!*

# Questions?

## Contact us

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