Westwood Public Schools

Hanlon Elementary School Building Project

School Building Committee

04.17.2020

Agenda

- Sustainable Design
- Updated Options
- Evaluation Criteria – Round 2
- Next Steps

Sustainable Design

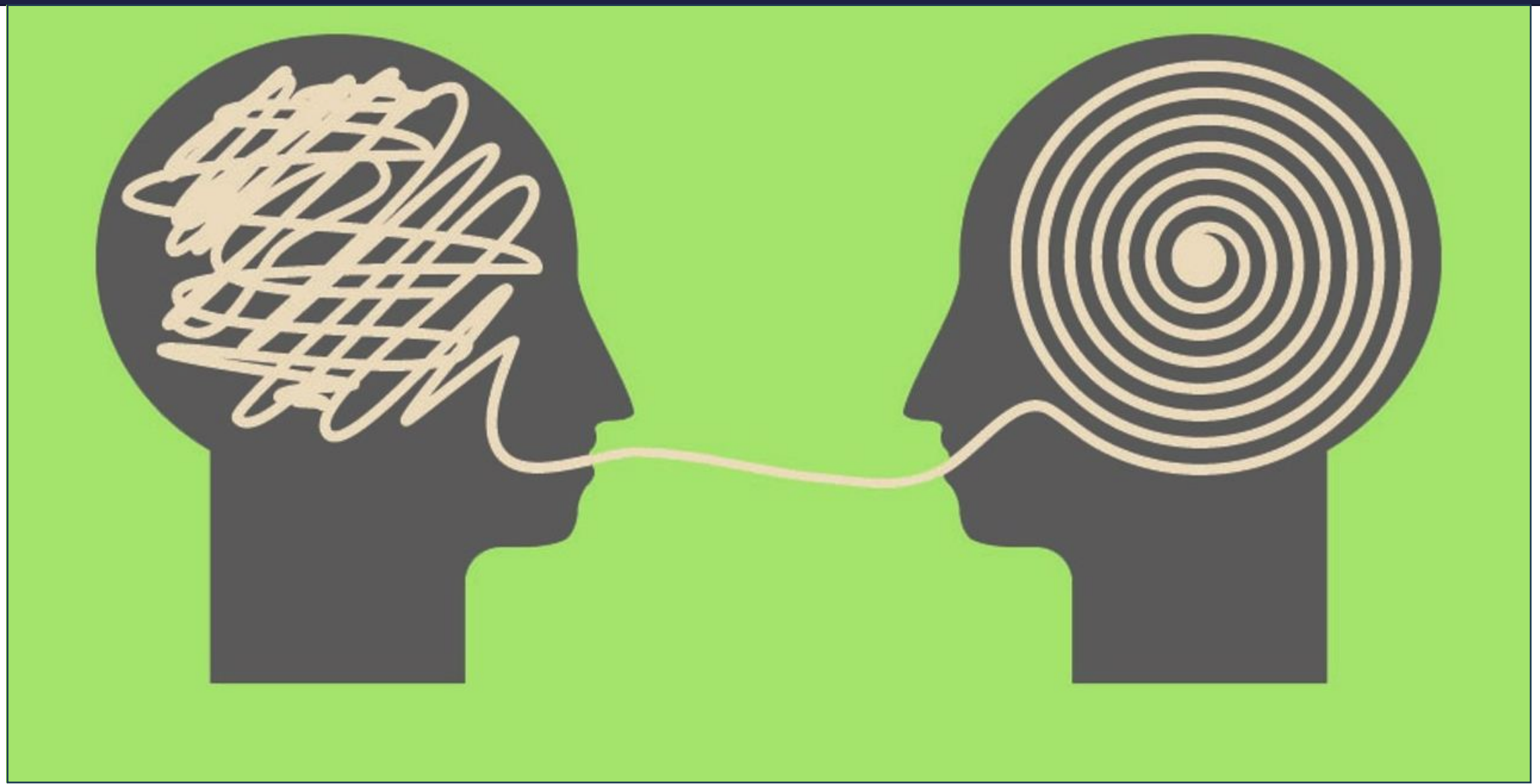
Westwood School Project

At conclusion of the PSR Phase, the following need to be completed:

1. **LEED Checklist for submission to MSBA**
2. **Owner's Project Requirements (OPR)**
3. **Basis of Design (BOD) documentation for cost estimating**

In order to achieve this, we need Owner input and guidance

Understanding the Jargon

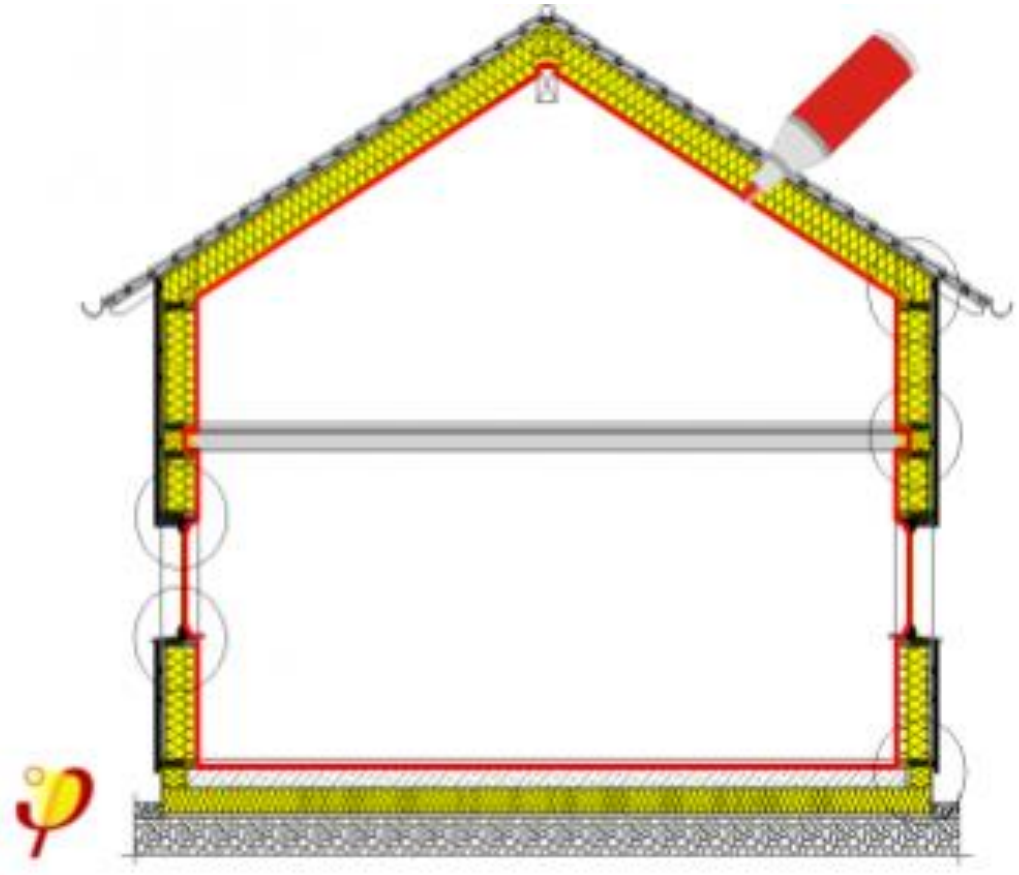


Understanding the Jargon

- **Exterior Envelope**: exterior walls, windows, doors, roof
- **Heat Pumps**: Air, Water, Ground Source (Geo-thermal)
- **Net Zero Energy (NZE or ZNE)**: Energy used = energy offset by renewables
- **Energy Use Intensity (EUI):** energy consumed per square foot/year
- **Carbon:** Generated by fossil fuel use / greenhouse gas
- **OPR and BOD**: Owner's Project Requirements and Basis of Design

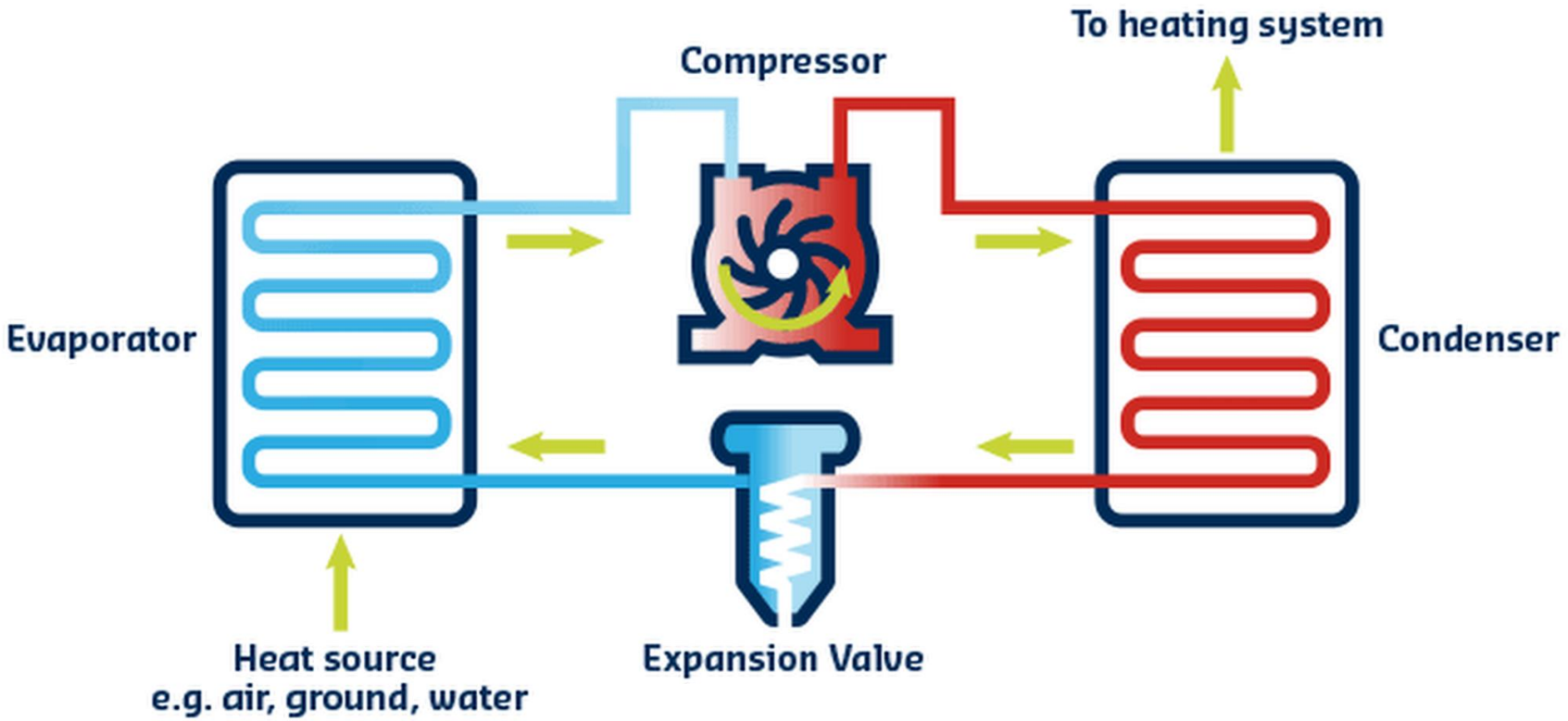
Understanding the Jargon

- **Exterior Envelope:** Exterior walls, windows, doors, roof, floor



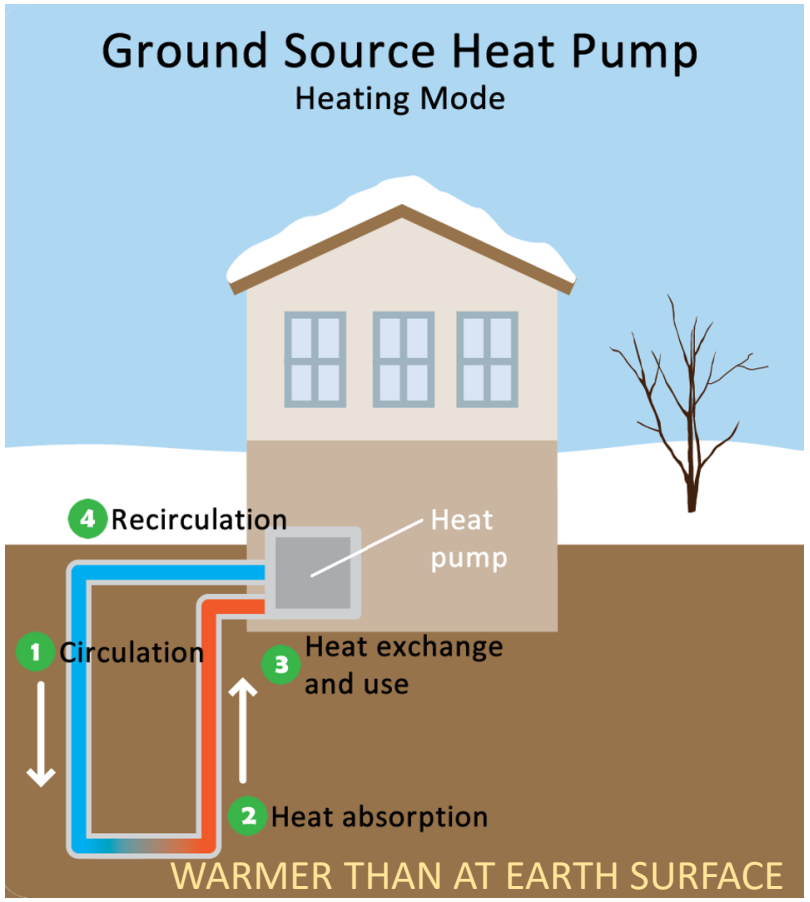
Understanding the Jargon

Air/Water/Ground Source Heat Pumps:



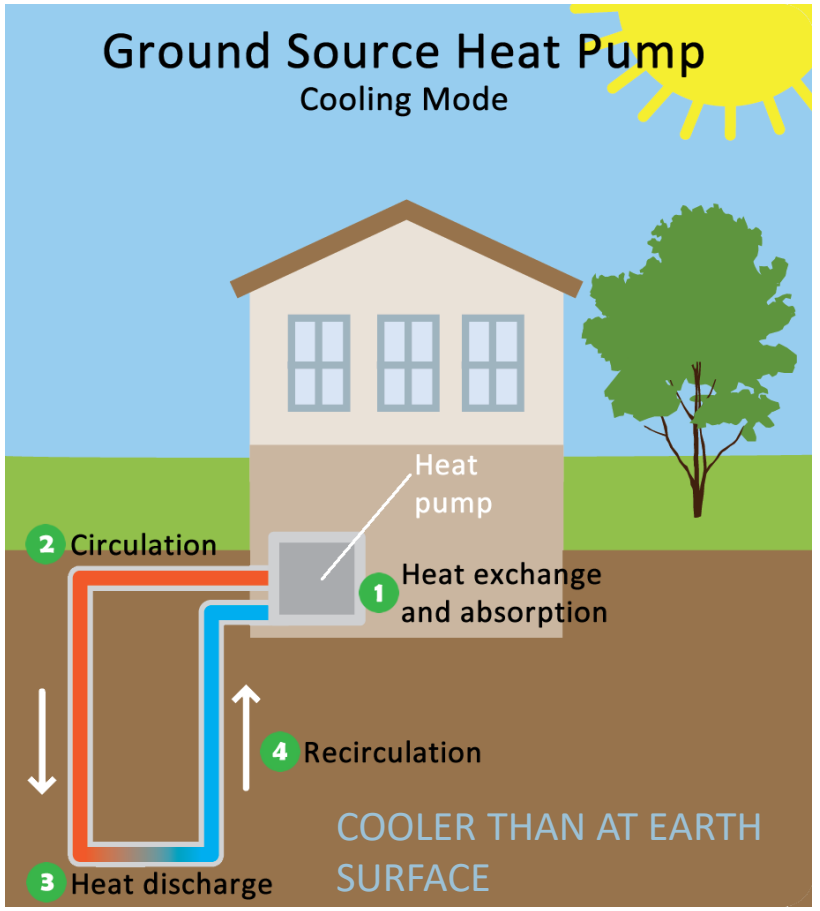
Understanding the Jargon

Geothermal or Ground Source Heat Pump:



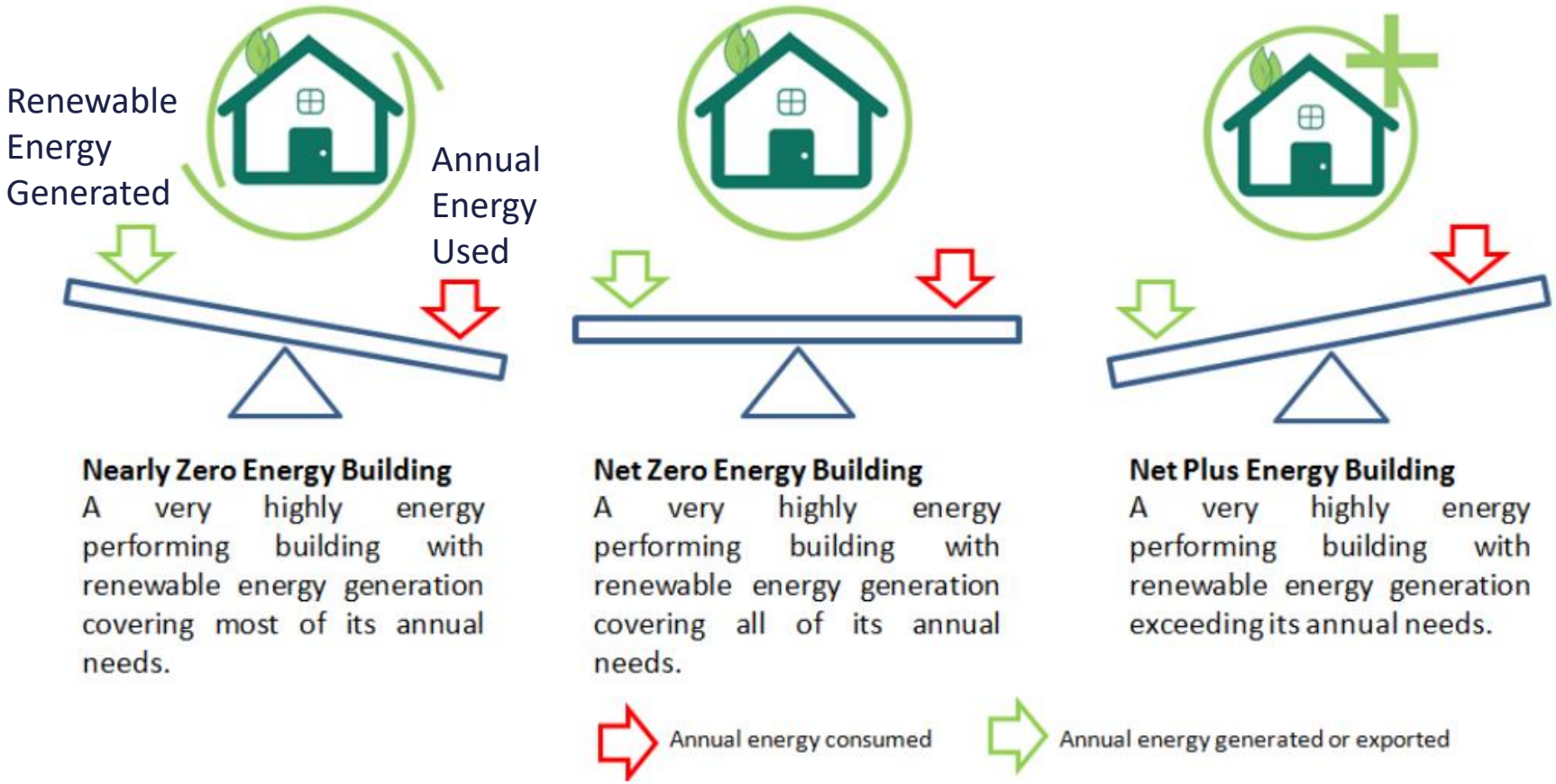
Using photovoltaic panels to provide electricity to power the heat pumps = fossil fuel free

Earth temperature remains at a constant 50 deg F.



Understanding the Jargon

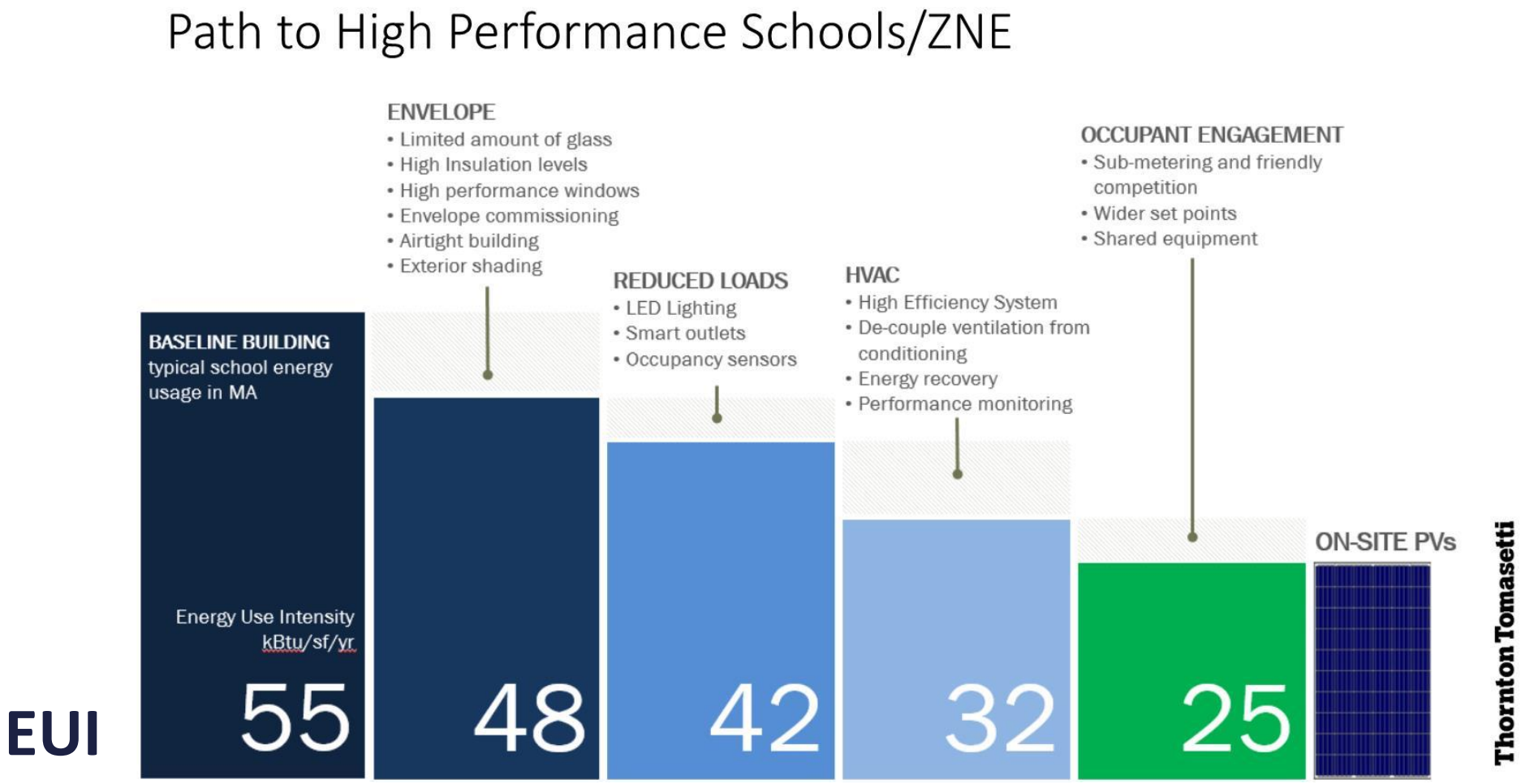
Net Zero Energy: equal amount of energy consumed, and energy generated by renewable sources, annually



Courtesy of EGBC

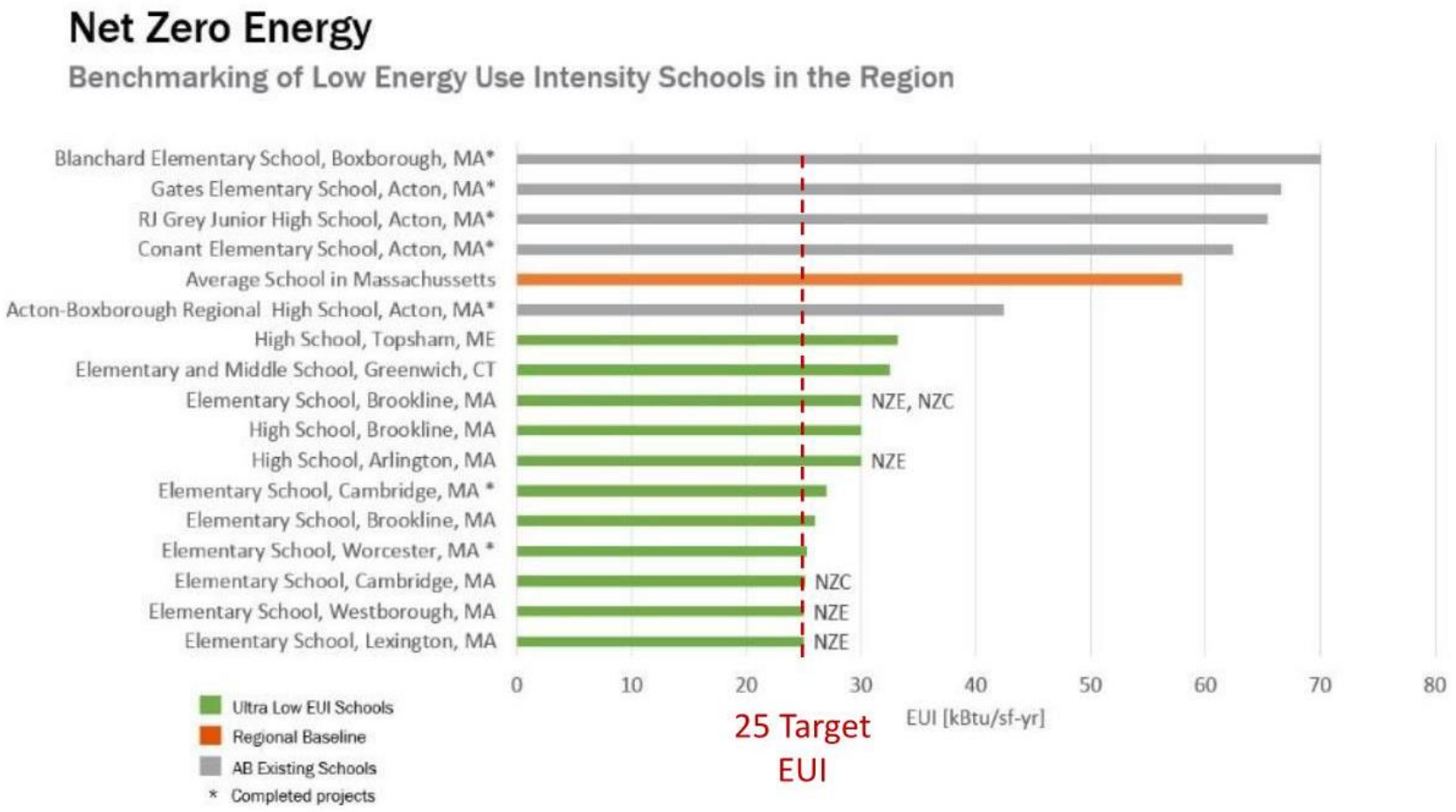
Understanding the Jargon

Energy Use Intensity (EUI): energy consumed per square ft / year



Understanding the Jargon

EUI – Frame of Reference / Benchmarking



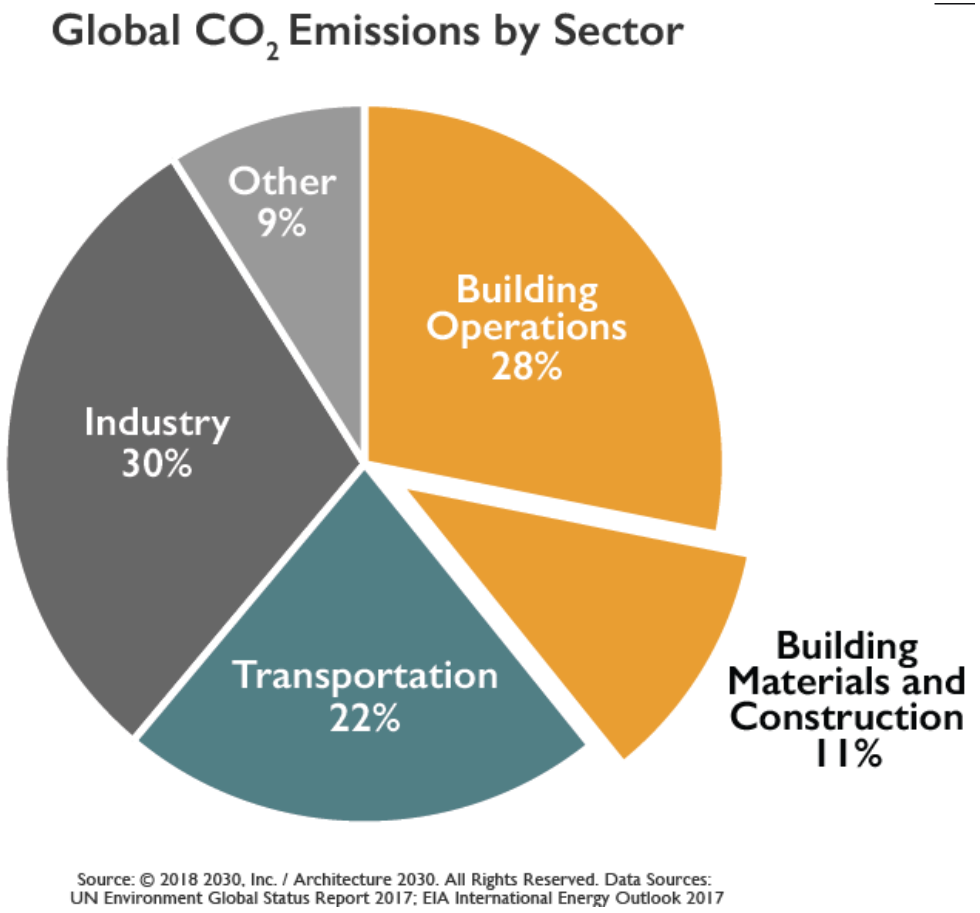
Thornton Tomasetti

Understanding the Jargon

Carbon: Why is Carbon Management Important?

- **Operational** Carbon: released through fossil fuels
- **Embodied** Carbon: amount of carbon used to create a material

i.e. steel has high amount of embodied carbon, meanwhile wood has a very low amount)



Understanding the Jargon

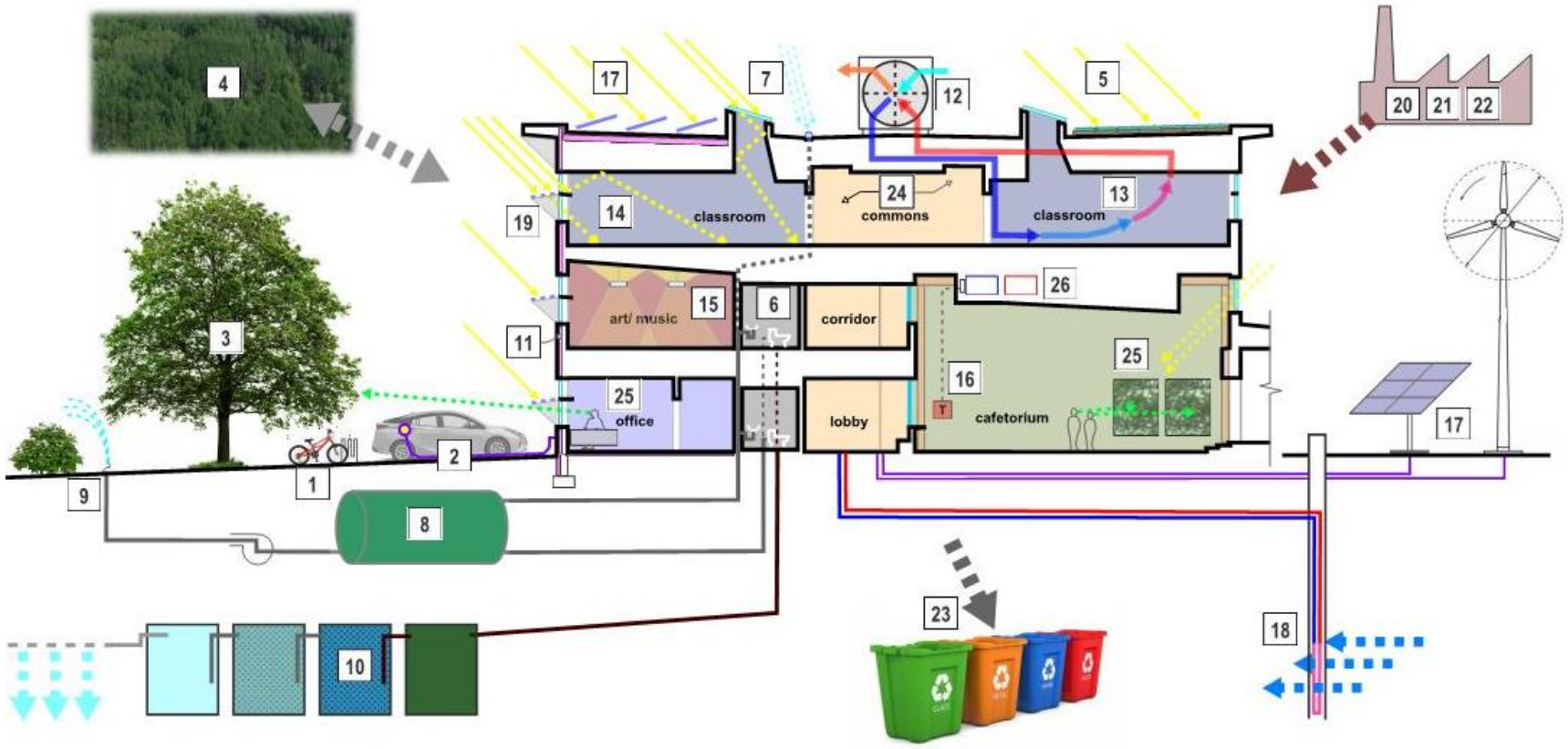
Owner's Project Requirements (OPR): high-level outline of the goals and requirements that are deemed by the owner to be important for the success of the project.

Basis of Design (BOD) document is developed by the design team to define how the OPR is to be achieved in the design:

- HVAC systems and building envelope narratives, design strategies, and technical information that respond to each category, goal, and requirement specified in the OPR.

Sustainability – LEED

(Leadership in Energy and Environmental Design)



6 Primary Categories:

1. Location & Transportation
2. Sustainable Sites
3. Water Efficiency
4. Energy & Atmosphere
5. Materials & Resources
6. Indoor Environmental Quality

LEED v4 for BD+C: Schools
Project Checklist

Project Name: **Westwood Hanlon ES**
Date: **1/30/2020**

Y	?	N			
1	0	0	**Integrative Process**		1
1			Credit	Integrative Process	1

Y	?	N			
1	14	0	**Location and Transportation**		15
		N	Credit	LEED for Neighborhood Development Location	15
1			Credit	Sensitive Land Protection	1
	2		Credit	High Priority Site	2
	5		Credit	Surrounding Density and Diverse Uses (RP@4)	5
	4		Credit	Access to Quality Transit (RP@1)	4
	1		Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

Y	?	N			
3	9	0	**Sustainable Sites**		12
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
	2		Credit	Site Development - Protect or Restore Habitat (RP@2)	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

Y	?	N			
4	8	0	**Water Efficiency**		12
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	1		Credit	Outdoor Water Use Reduction	2
2	5		Credit	Indoor Water Use Reduction	7
	2		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

Y	?	N			
22	9	0	**Energy and Atmosphere**		31
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
5	1		Credit	Enhanced Commissioning	6
14	2		Credit	Optimize Energy Performance (RP@8)	16
	1		Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
3			Credit	Renewable Energy Production (RP@2)	3
	1		Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

Y	?	N			
3	9	1	**Materials and Resources**		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
	5		Credit	Building Life-Cycle Impact Reduction (RP@2)	5
1	1		Credit	BPDO - Environmental Product Declarations	2
	2		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1		1	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit	Construction and Demolition Waste Management	2

Y	?	N			
5	11	0	**Indoor Environmental Quality**		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
Y			Prereq	Minimum Acoustic Performance	Required
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
1	1		Credit	Interior Lighting	2
	3		Credit	Daylight	3
	1		Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

Y	?	N			
4	2	0	**Innovation**		6
1			Credit	Innovation: Resonsible Purchasing - Lamps	1
1			Credit	Innovation: Economic and GHG Analysis of Mechanical Systems	1
1			Credit	Innovation: Pilot - Integrative Analysis of Building Materials	1
	1		Credit	Innovation: TBD	1
	1		Credit	Innovation: TBD	1
1			Credit	LEED Accredited Professional	1

Y	?	N			
2	2	0	**Regional Priority (max of 4 points) Credit Names have been underlined**		4
		x	Credit	Surrounding Density and Diverse Uses (RP@4)	
	1		Credit	Access to Quality Transit (RP@1)	1
	1		Credit	Site Development - Protect or Restore Habitat (RP@2)	1
1			Credit	Optimize Energy Performance (RP@8)	1
1			Credit	Renewable Energy Production (RP@2)	1
	x		Credit	Building Life-Cycle Impact Reduction (RP@2)	

45	64	1	**TOTAL**	Possible Points: 110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

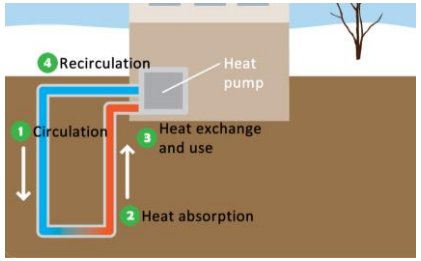
The Green Engineer
Sustainable Design Consulting

Benefits of GREEN Building (Sustainable Design)

The adoption of **Sustainable Design** leads to:

1. minimizing impact on the environment
2. improving human health and well-being
3. reducing economic impact over the life of the building

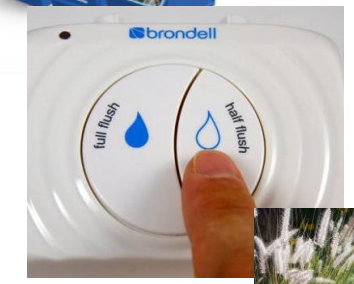
1. Minimizing Impact on the Environment



- Energy and Carbon use:
  - Maximize daylight to reduce electricity
  - Use heat from the ground - without burning fossil fuels
  - Use controls for efficient use of HVAC, electricity (lights and outlets)

- Materials and Resources
  - Use materials with low carbon footprint
  - Use wood from sustainably harvested forests
  - Use materials made from recycled materials and/or can be recycled

- Waste
  - Separate and recycle construction waste (96% avoid landfill)



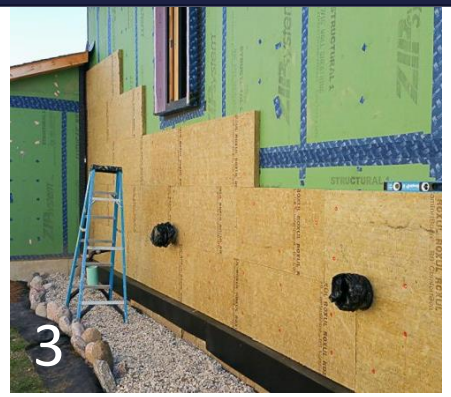
- Water
  - Use low-flow plumbing fixtures
  - Use rainwater cistern for irrigation or gray water (toilets)

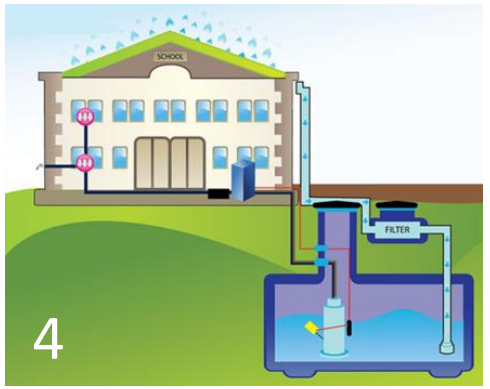
- Ecology
  - Use native, drought tolerant, low maintenance plants, trees and shrubs
  - Limit construction footprint to preserve existing trees

2. Improving Human Health and Well Being

- Indoor Air Quality and monitoring
- Materials made of non-toxic substances
- Daylighting and views
- Using the building and site as teaching tools: help children (and teachers) understand the impact of their decisions

3. Reducing Economic Impact - $$





1. Use Renewable Energy = Photo Voltaic (Solar) Panels
2. Well-planned daylight use = reduced need for artificial lights/electricity
3. Increased thermal envelope = less energy to heat/cool
4. Reducing water from municipal supply = more efficient use of resource
5. Careful management by End User so **actual** energy savings achieve **designed** energy savings

Westwood School Project

Baseline Project:

a. Green Schools Program: Achieve LEED-S v4 “Certified” and exceed MA Energy base code by 10%.

b. Additional 2% reimbursement: Achieve above but exceed MA Energy base code by 20%.

Study in Progress:

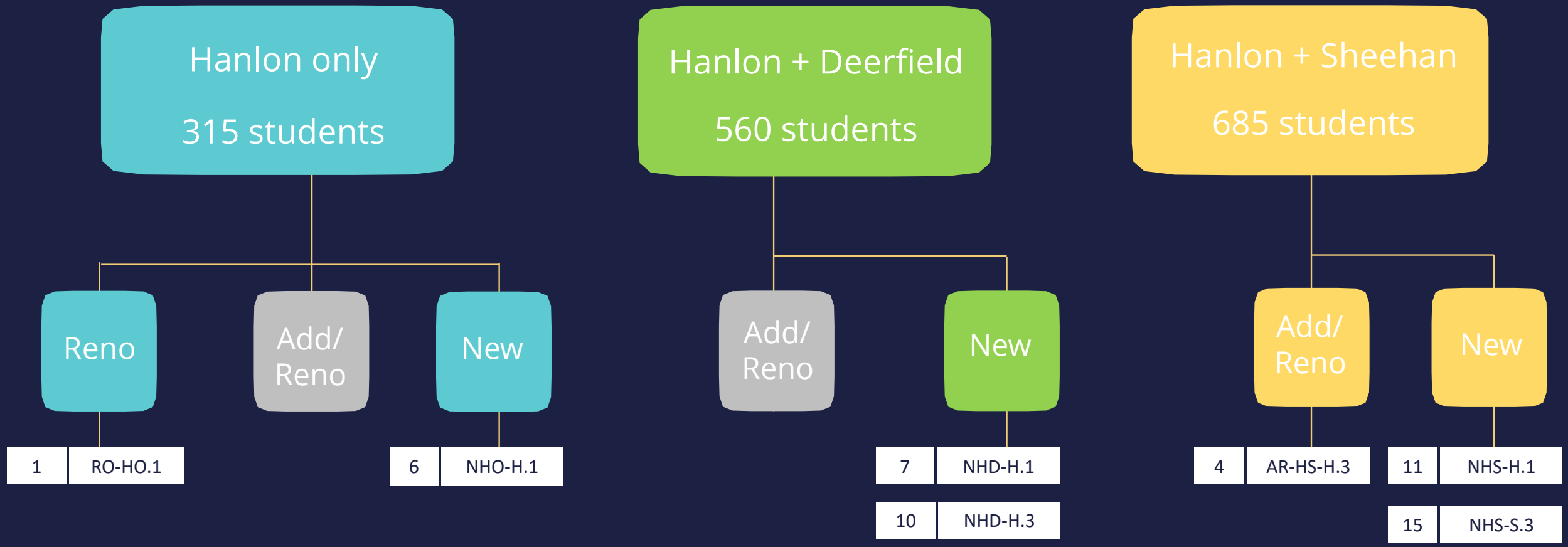
- Baseline: Natural Gas heating system
- Two Alternate Tiers: Two different approaches to being fossil fuel free
- Alternate Structural Frame Analysis: Use Timber Frame Construction in lieu of Steel Frame (Carbon)

GOAL: Determine best approach for Return on Investment (ROI) over the life of the building

Next Steps:

- **Review with Sustainability Subcommittee on April 23, 2020**
- **Determine additional dates or meetings**

Options Review


Hanlon only
315 students
Reno
Add/ Reno
New
1
RO-HO.1
6
NHO-H.1
Hanlon + Deerfield
560 students
Add/ Reno
New
7
NHD-H.1
10
NHD-H.3
Hanlon + Sheehan
685 students
Add/ Reno
New
4
AR-HS-H.3
11
NHS-H.1
15
NHS-S.3

Recommended Short-Listed Options*

*** Includes Base Repair, Option #1 - $25 M**

4

Add/Reno @ Hanlon
685 Students
121,000 sf

6

All New @ Hanlon
315 Students
87,545 sf

7

All New @ Hanlon
560 Students
120,903 sf

10

All New @Hanlon
560 Students
120,903 sf

11

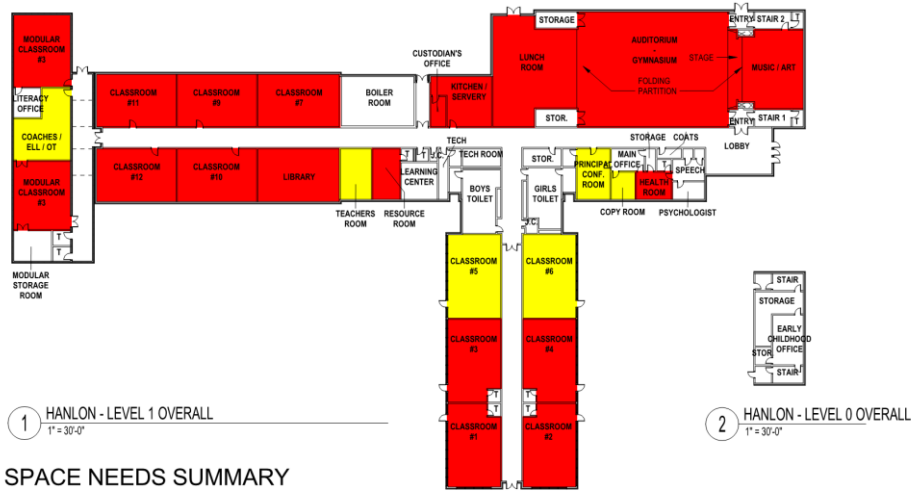
All New @ Hanlon
685 Students
139,571 sf

15

All New @ Sheehan
685 Students
139,571 sf

1 Base Repair @ Hanlon

Hanlon Only – 315 Students



MSBA SPACE NEEDS SUMMARY

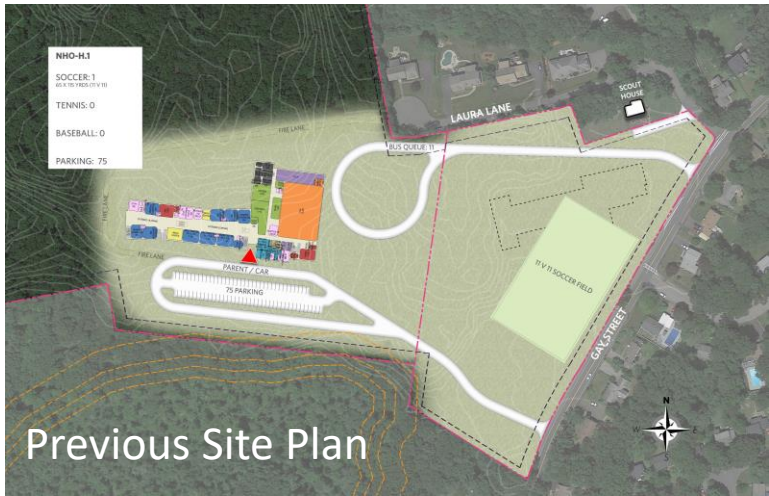
- Between 90% & 100% MSBA Guideline
- Less than 90% MSBA Guideline
- Between 900sf - 1000sf MSBA Classroom Guideline
- Less than Min Classroom sf MSBA Guideline

Floor Plan

6 All New @ Hanlon (Hammer tacker)

Hanlon Only – 315 Students

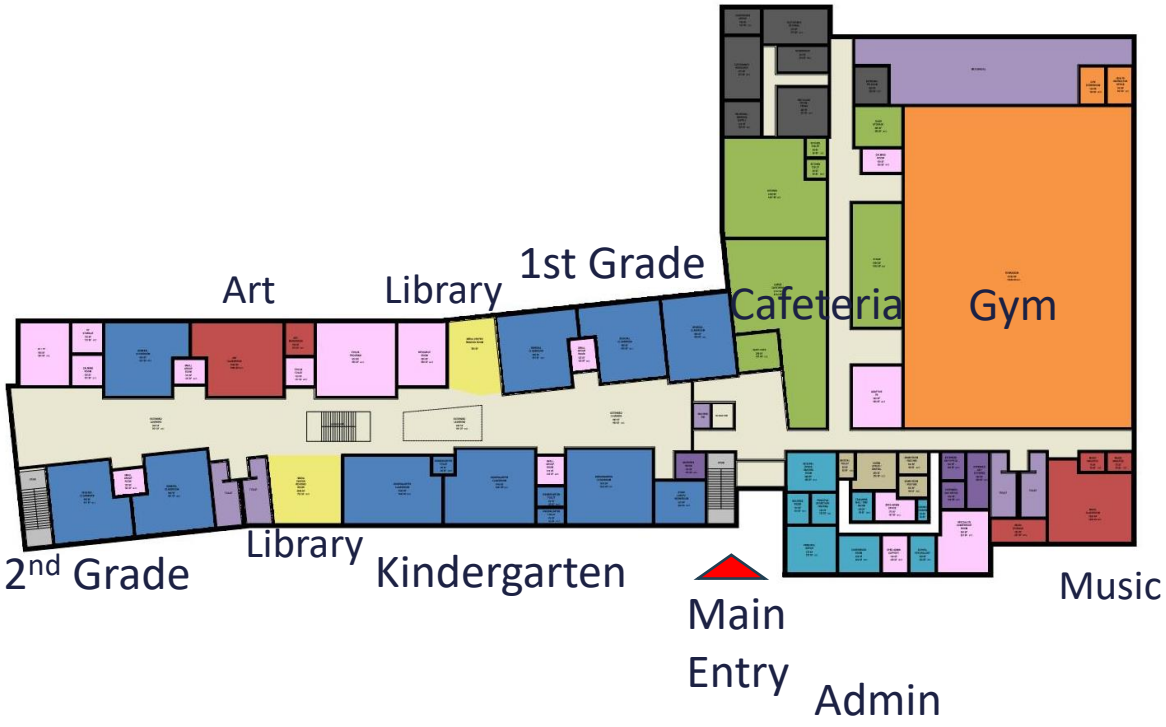
Site Plan



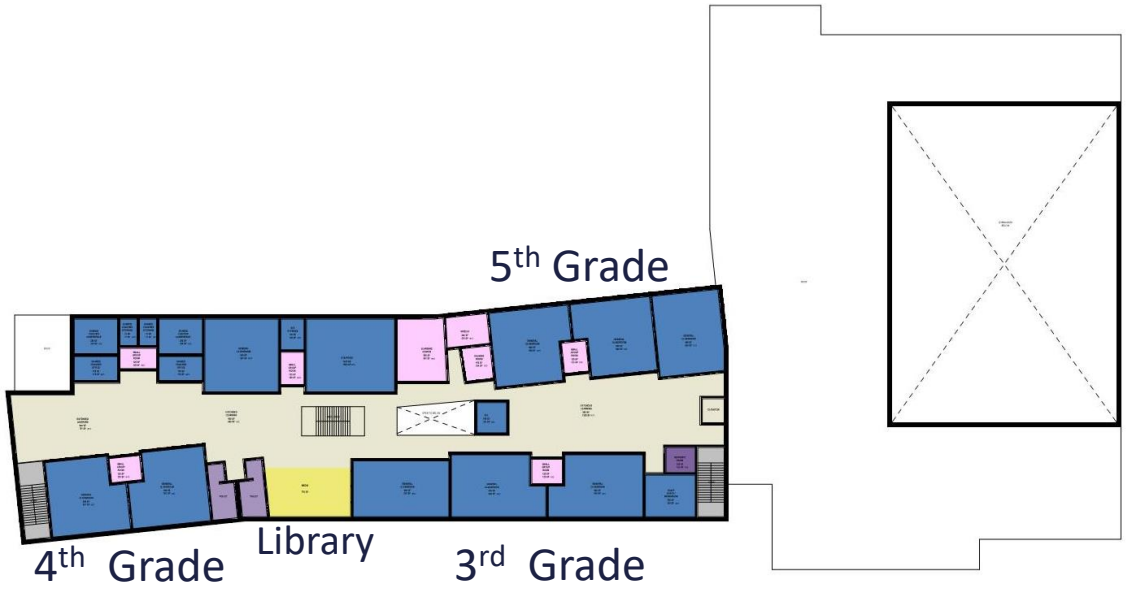
Previous Site Plan

6 All New @ Hanlon (Hammer tacker)

Hanlon Only – 315 Students



1st Floor Plan



2nd Floor Plan

7 All New @ Hanlon (Tree)

Hanlon Deerfield – 560 Students

Site Plan –north entry

Previous Site Plan

7 All New @ Hanlon (Tree)

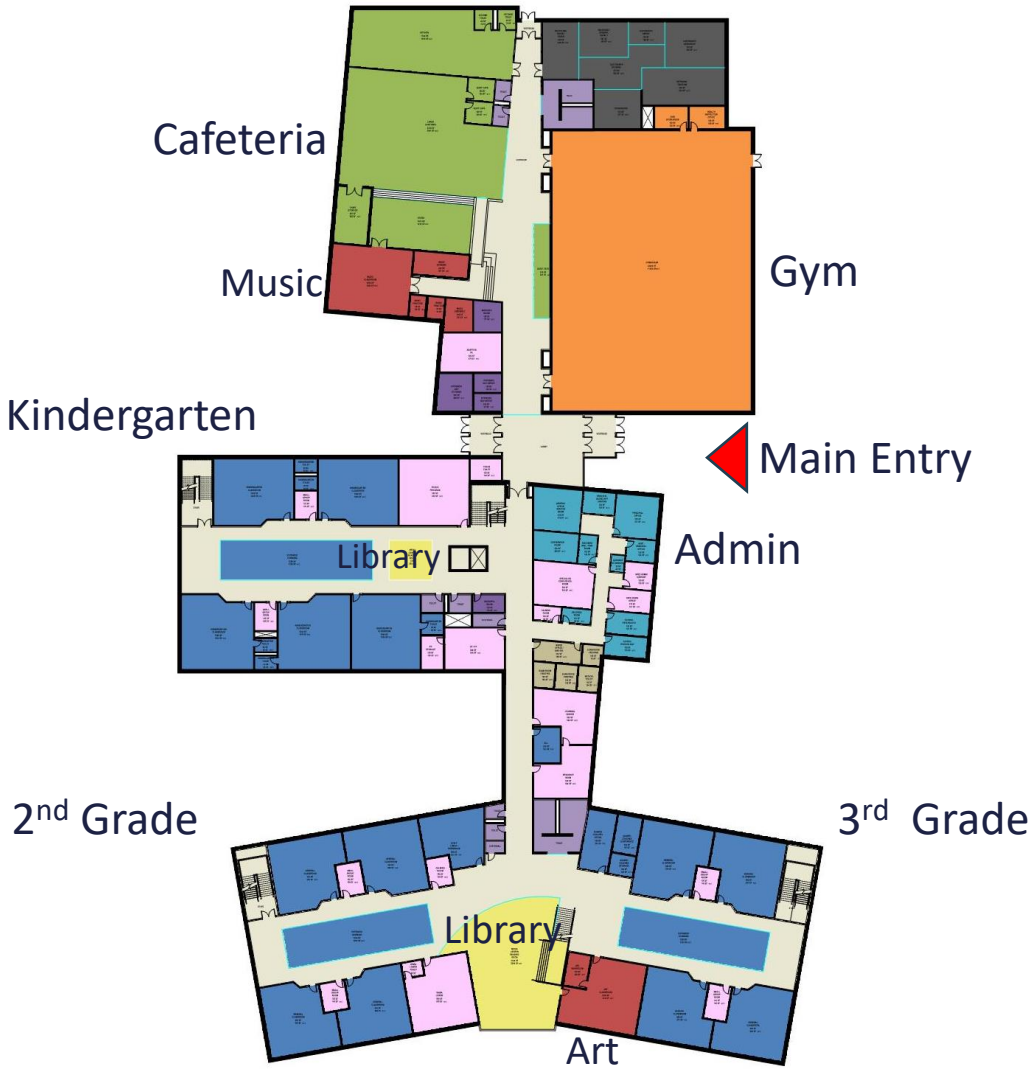
Hanlon Deerfield – 560 Students

Site Plan – south entry

Previous Site Plan

7 All New @ Hanlon (Tree)

Hanlon Deerfield – 560 Students



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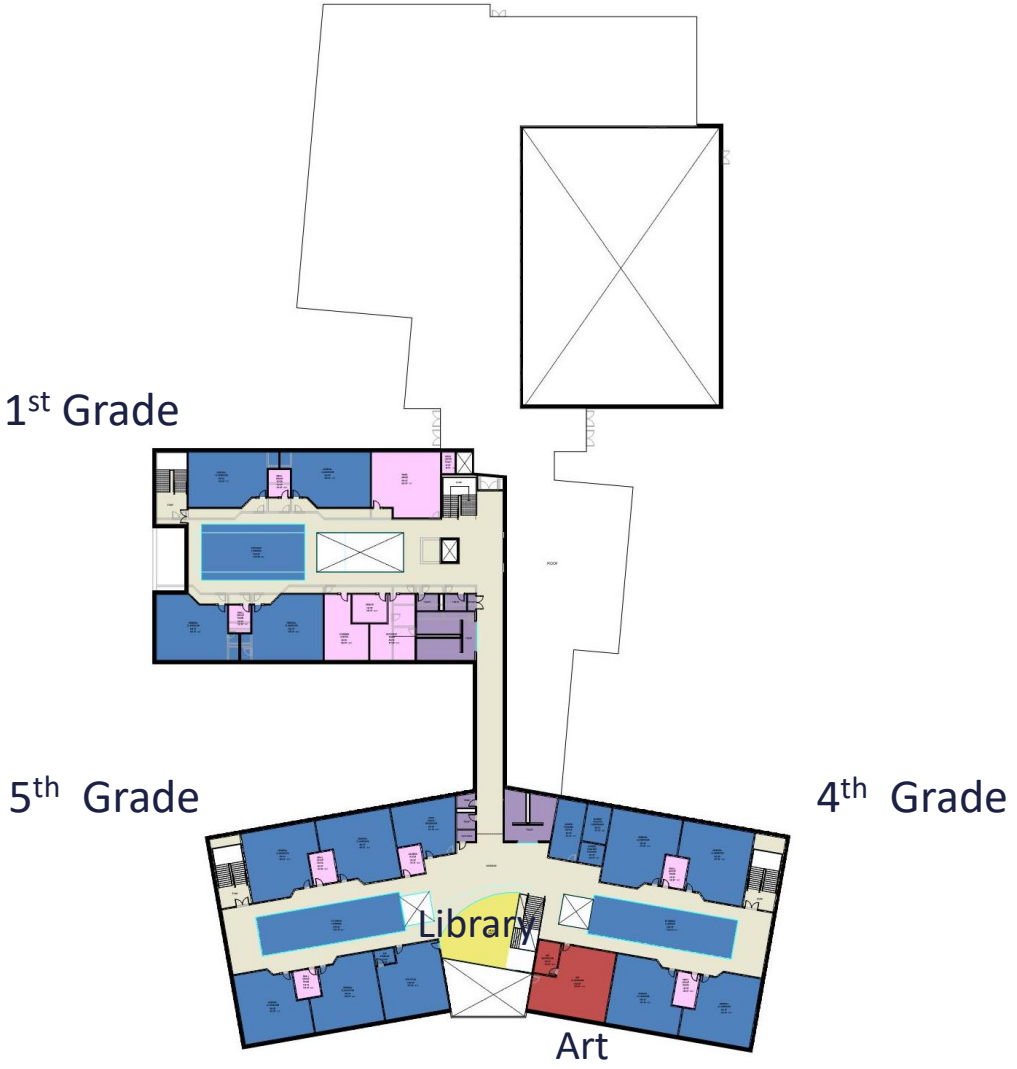


2nd Floor Plan

10 All New @ Hanlon (Backwards E)

Hanlon Deerfield – 560 Students

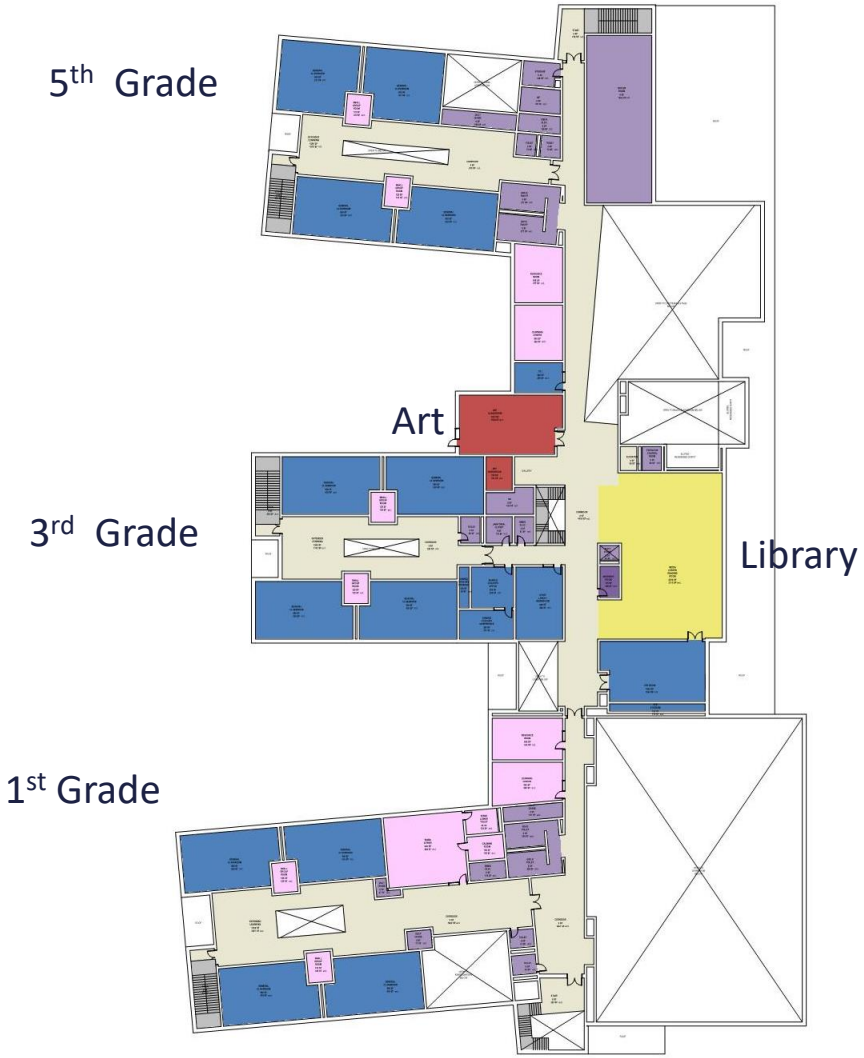
Site Plan

Previous Site Plan

All New @ Hanlon (Backwards E)

Hanlon Deerfield – 560 Students

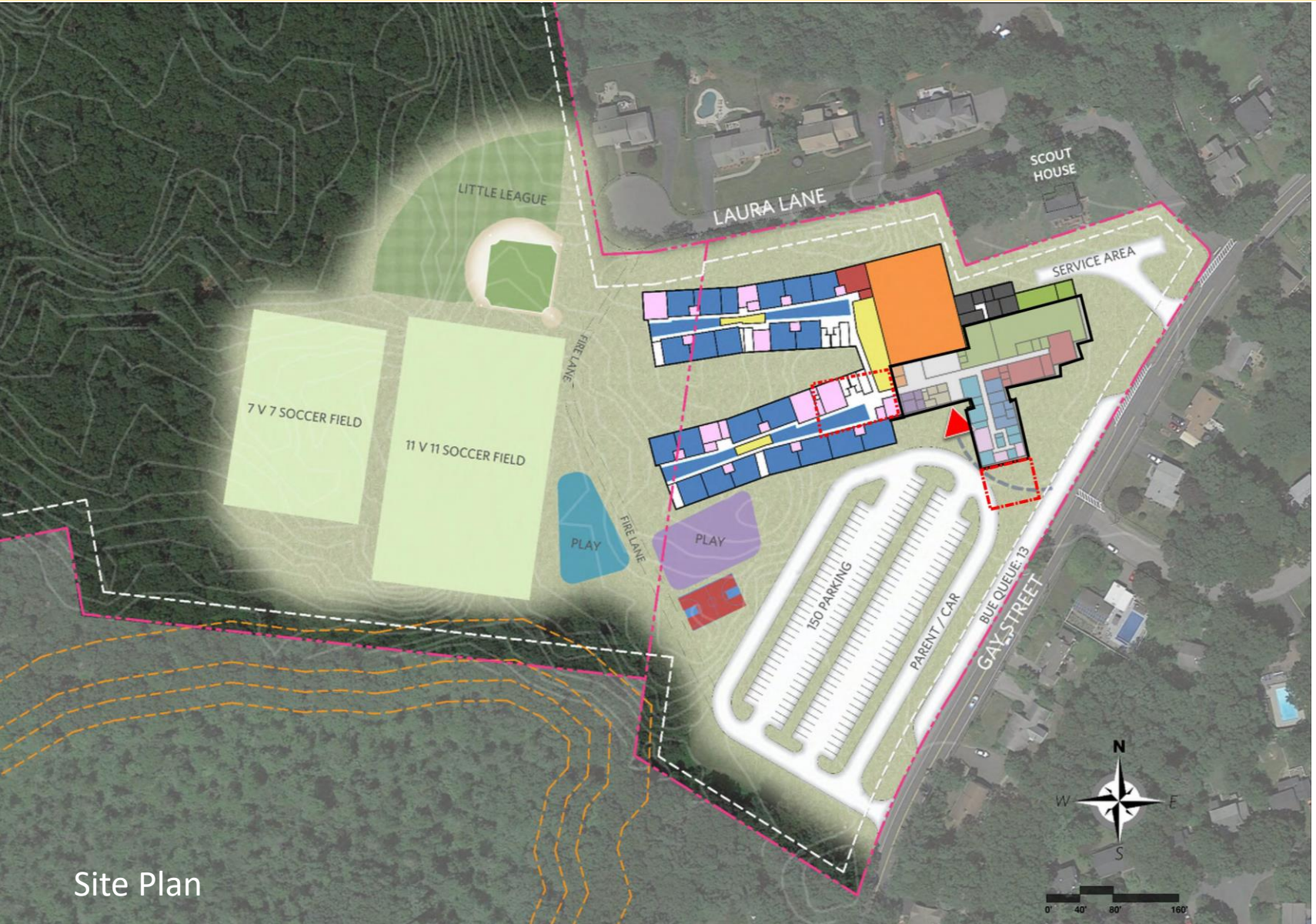
1st Floor Plan



2nd Floor Plan

4 Add/Reno @ Hanlon (Linear)

Hanlon Sheehan – 685 Students

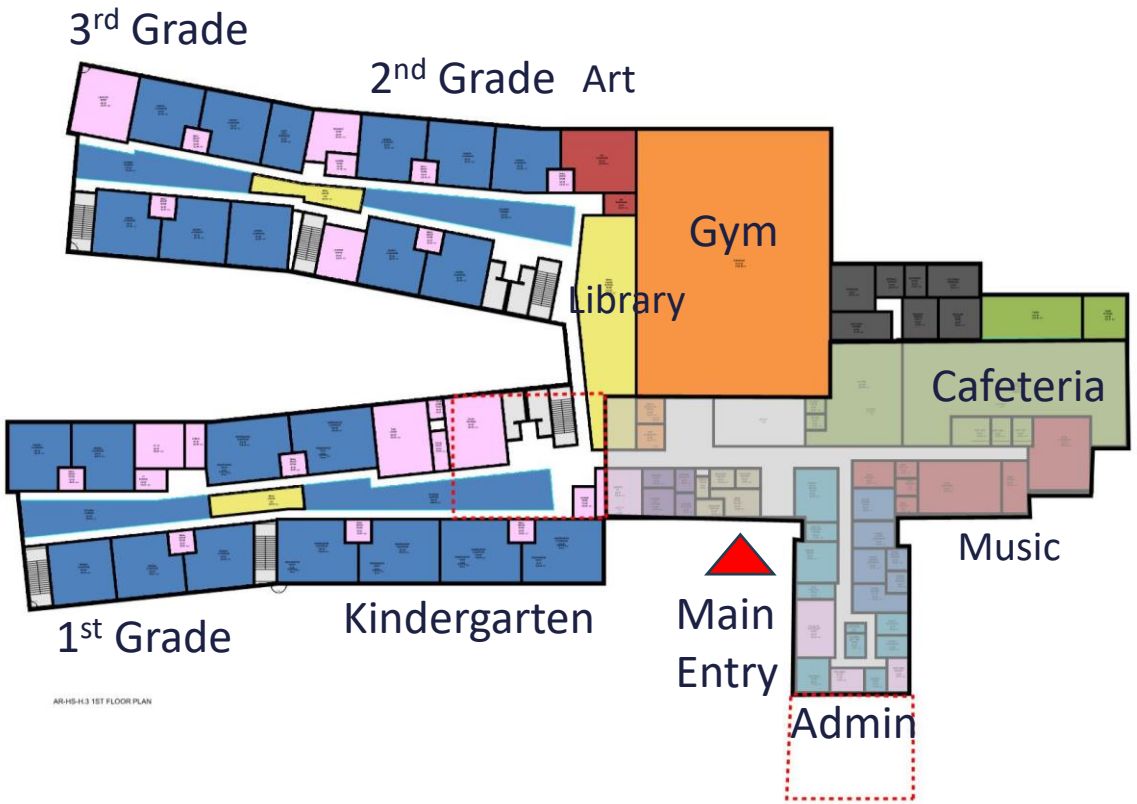


Site Plan

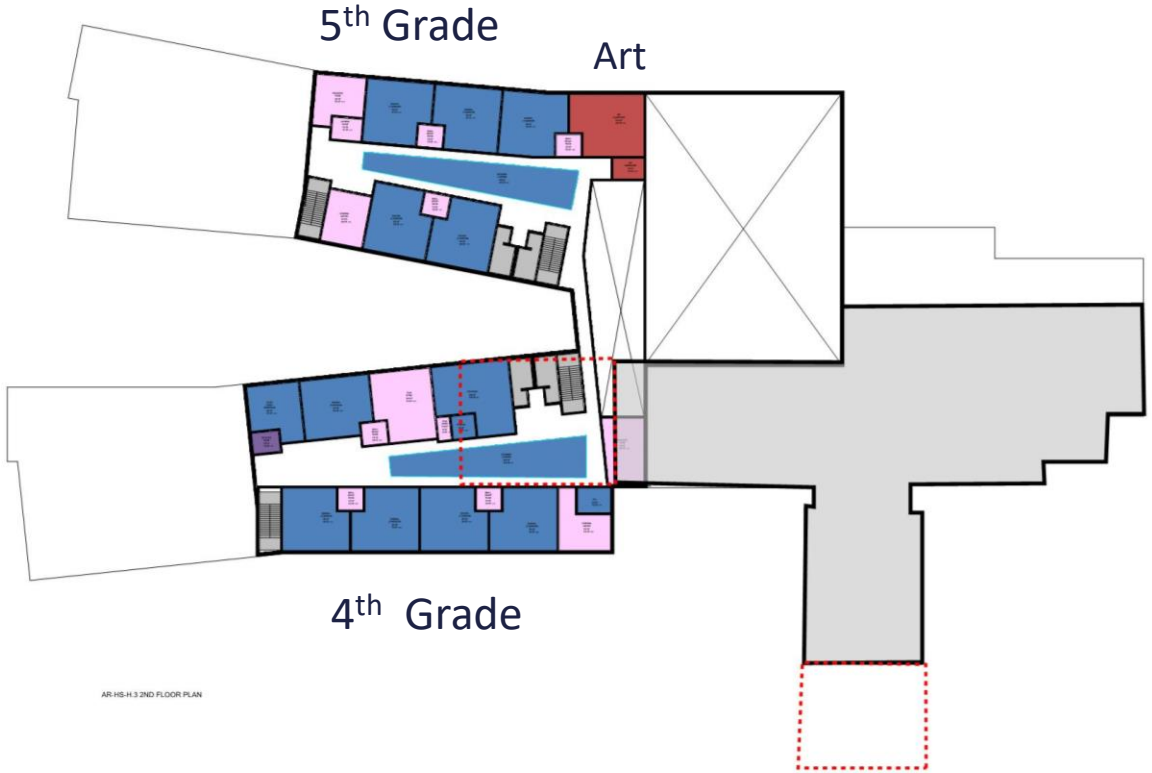
Previous Site Plan

4 Add/Reno @ Hanlon (Linear)

Hanlon Sheehan – 685 Students



1st Floor Plan



2nd Floor Plan

11 All New @ Hanlon (Tree)

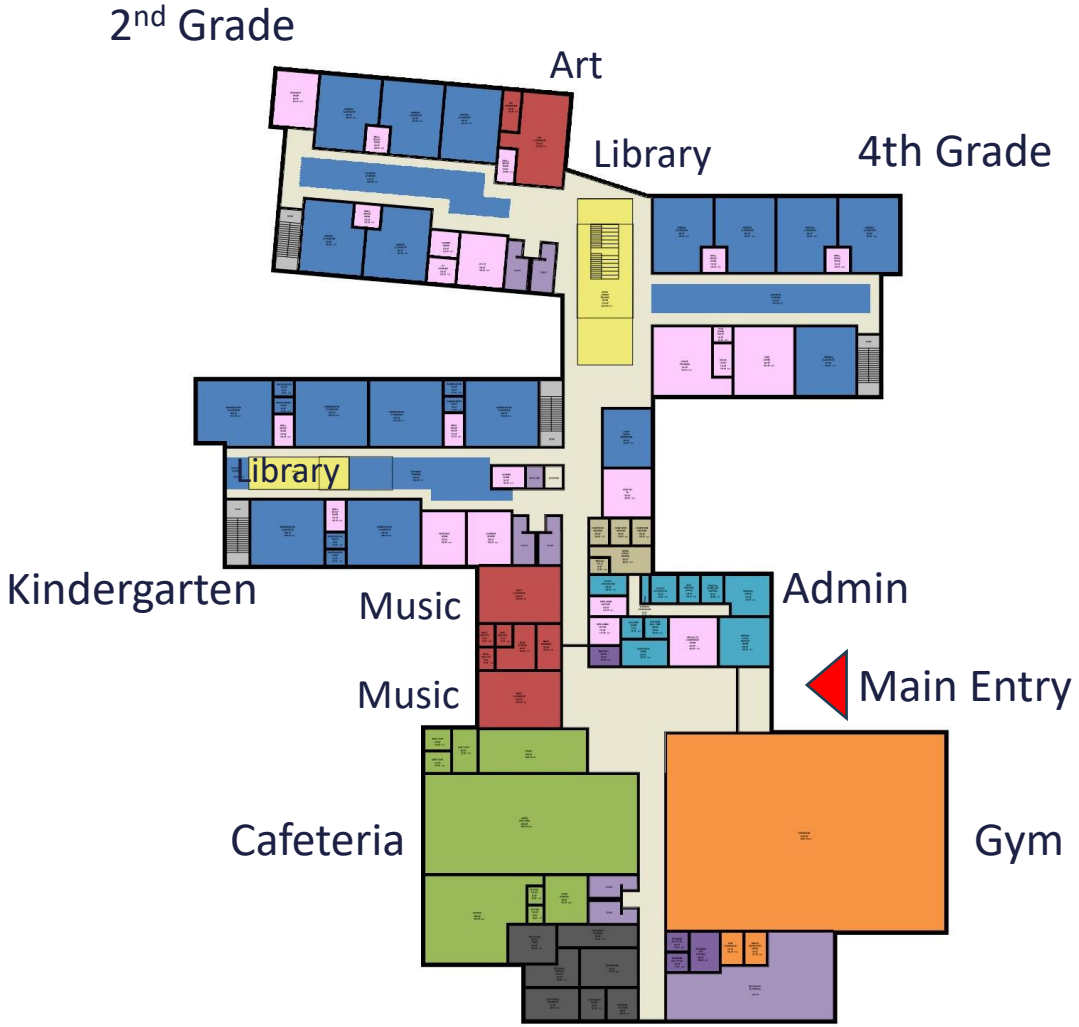
Hanlon Sheehan – 685 Students

Site Plan

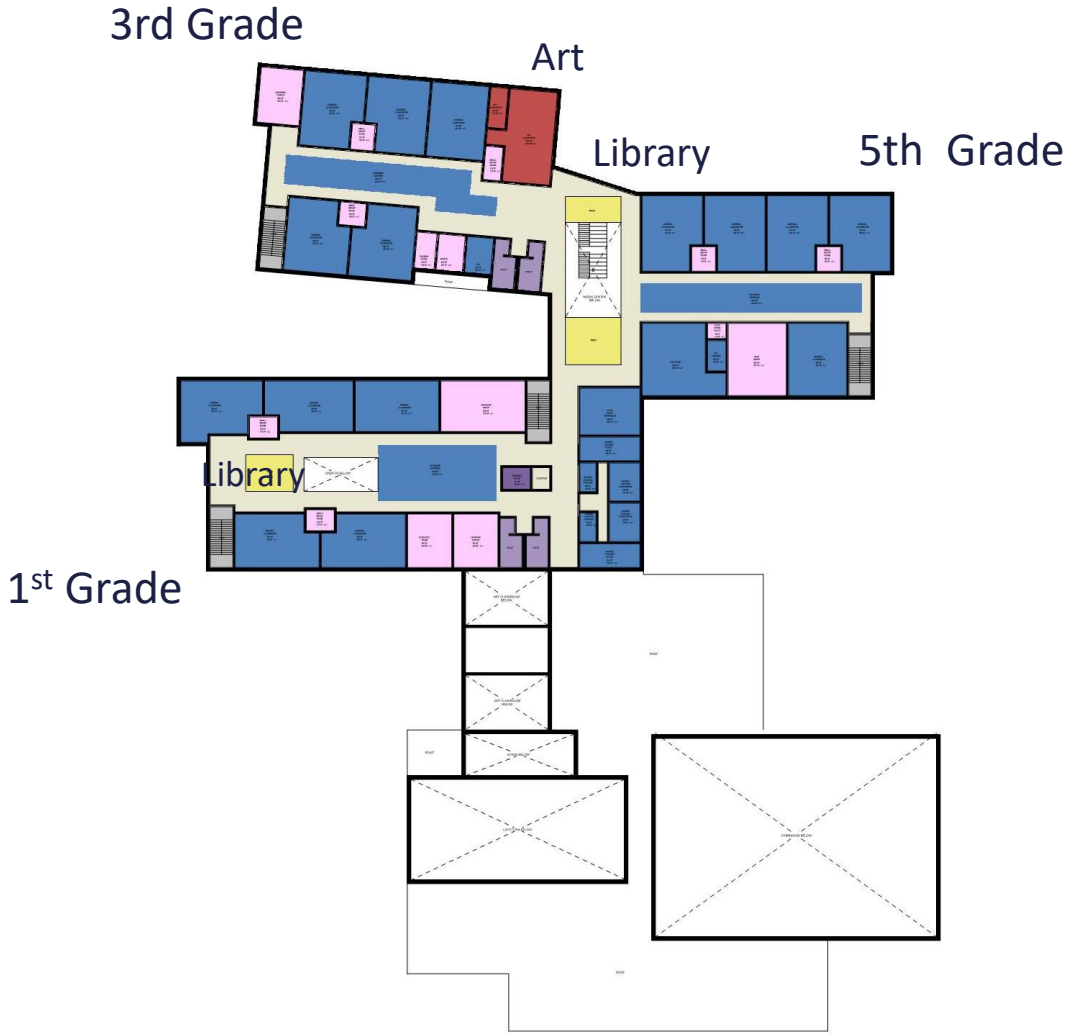
Previous Site Plan

All New @ Hanlon (Tree)

Hanlon Sheehan – 685 Students



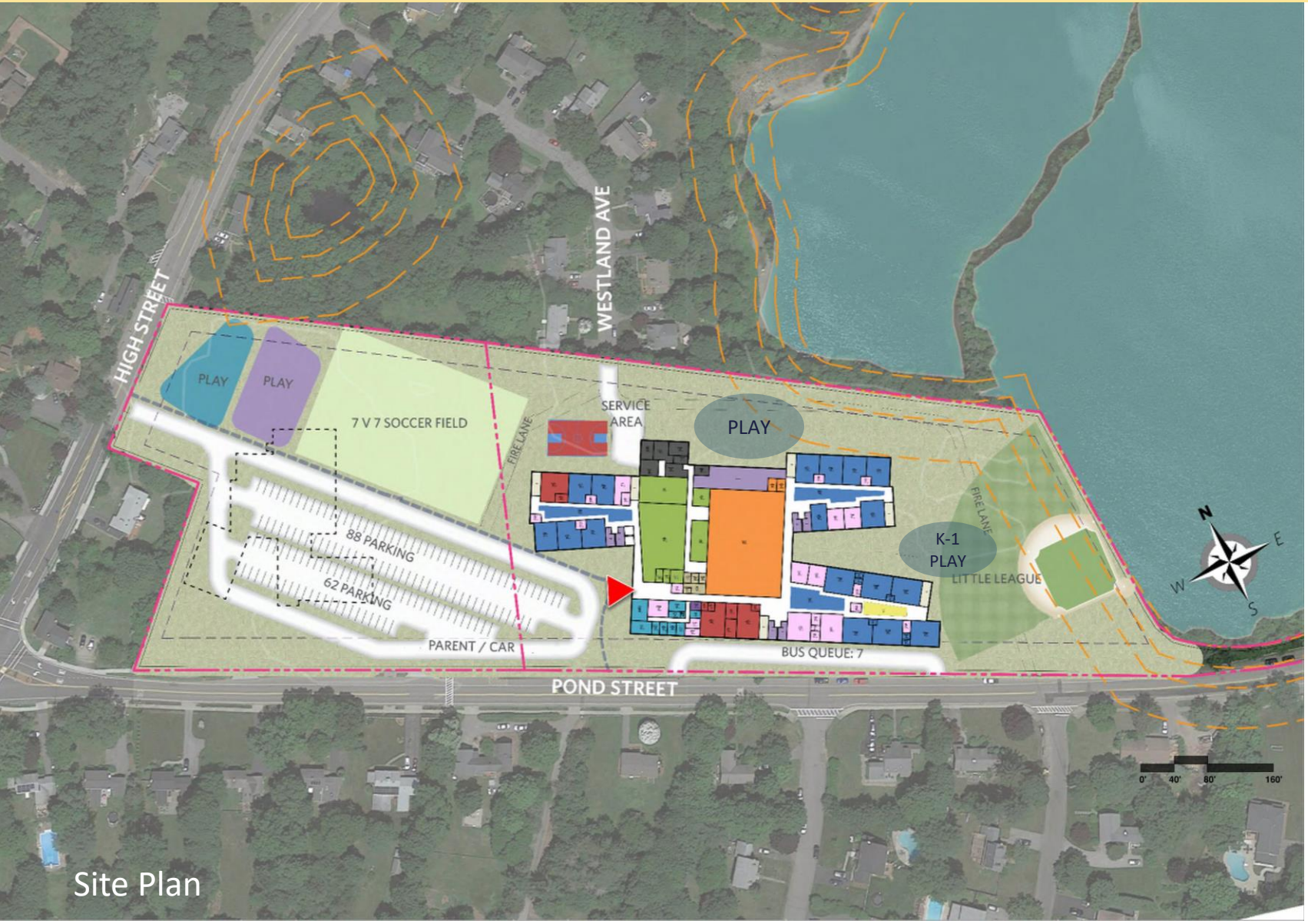
1st Floor Plan



2nd Floor Plan

15 All New @ Sheehan (Butterfly)

Hanlon Sheehan – 685 Students

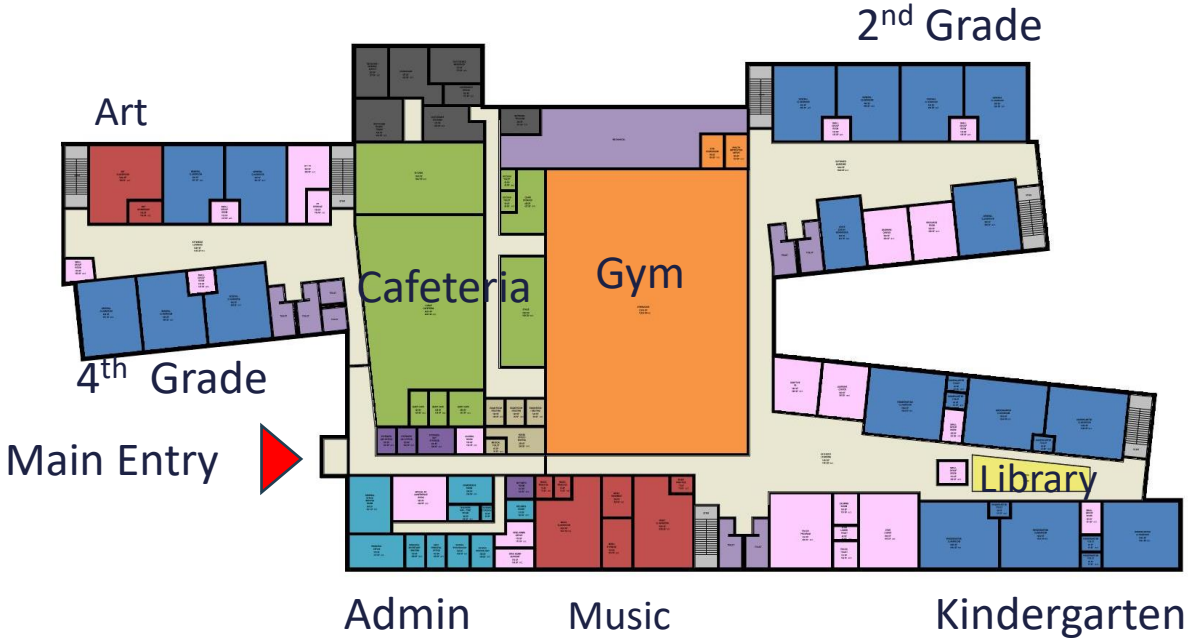


Site Plan

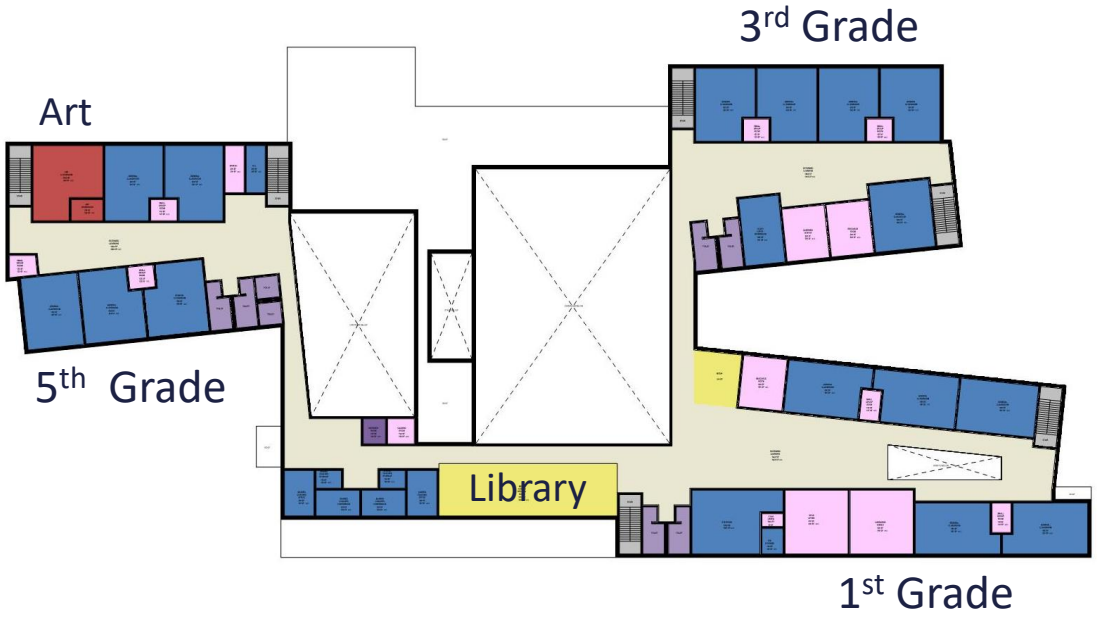
Previous Site Plan

All New @ Sheehan (Butterfly)

Hanlon Sheehan – 685 Students



1st Floor Plan

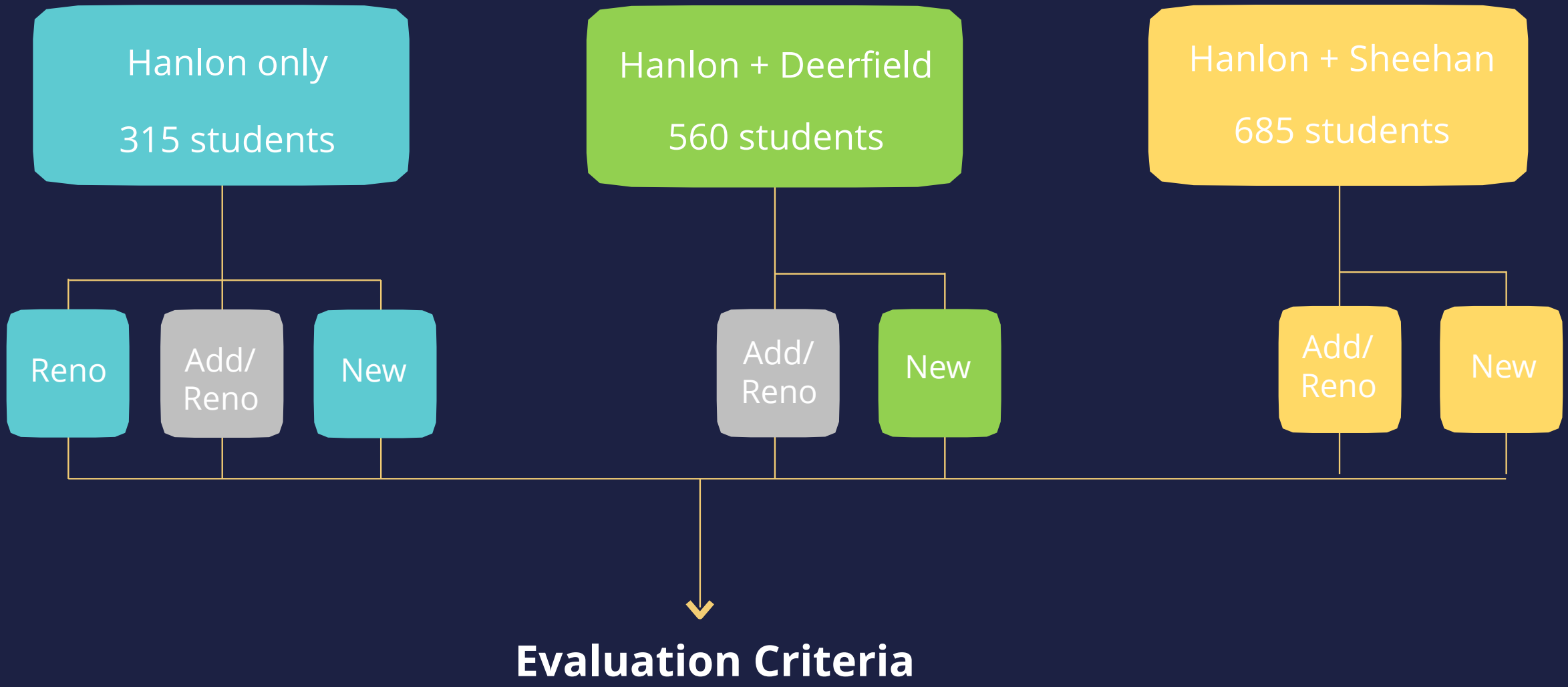


2nd Floor Plan

Evaluation Criteria

Round 2

Scenarios


Hanlon only
315 students
Hanlon + Deerfield
560 students
Hanlon + Sheehan
685 students
Reno
Add/ Reno
New
Add/ Reno
New
Add/ Reno
New
Evaluation Criteria

Next Steps

- ❑ April 30th: Community Presentation: Redistricting
- ❑ May 29th: School Building Committee – Review Options with Cost
- ❑ June 2nd: Community Presentation: Review Options with Cost
- ❑ June 11th: School Committee: Enrollment/Redistricting Vote
- ❑ June 12: School Building Committee: Sustainability Decisions
- ❑ June 19: School Building Committee: Preferred Option and PSR Vote