

# Massachusetts School Building Authority

## MA Schools Embrace a Sustainable Future

## Hanlon-Deerfield Elementary School Building Project

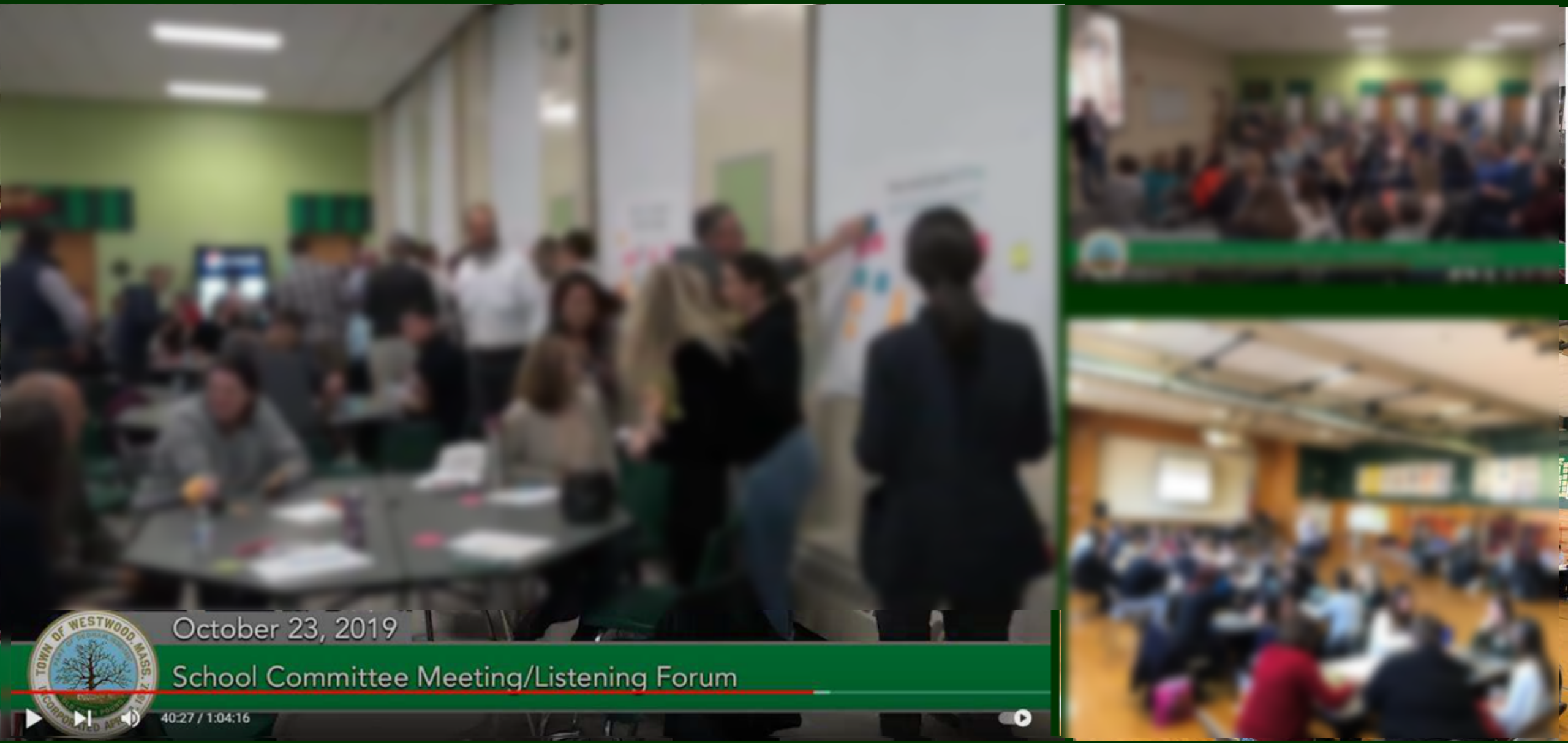
## “A SCHOOL IN THE WOODS”

Westwood, MA

12.02.2021

DORE + WHITTIER

# Collaborated with Community Stakeholders



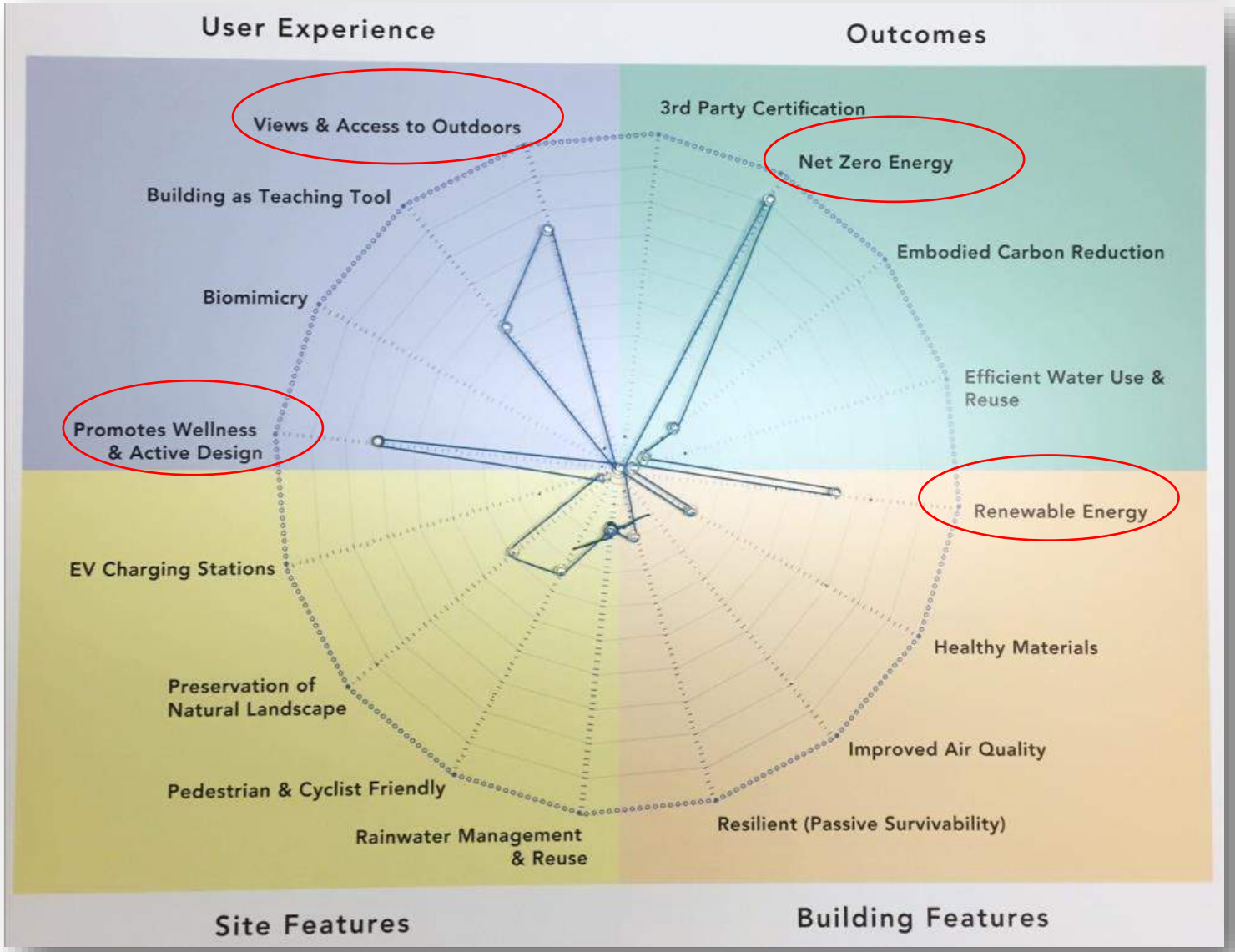
# 1st Charette: Identified Community Priorities

## Westwood Resiliency & Sustainability Draft Comprehensive Plan

- **Importance of this project:**

  **Schools are the largest energy consumers/emitters**

- **Prioritize Carbon reductions**
- **Net Zero energy standards for new Town buildings**
- **Phase out fossil fuel use**
- **Discourage new natural gas hookups**
- **Install EV chargers**




*Courtesy of: The Green Engineer*

# Iterative Investigation, Modeling and Analysis

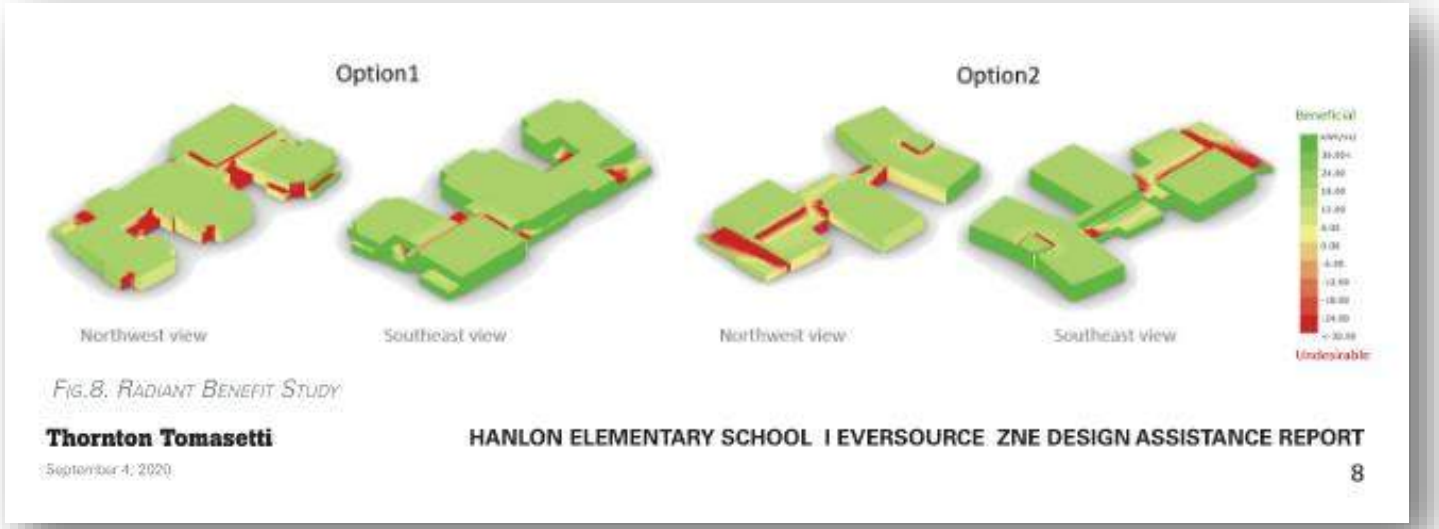



FIG.8. RADIANT BENEFIT STUDY



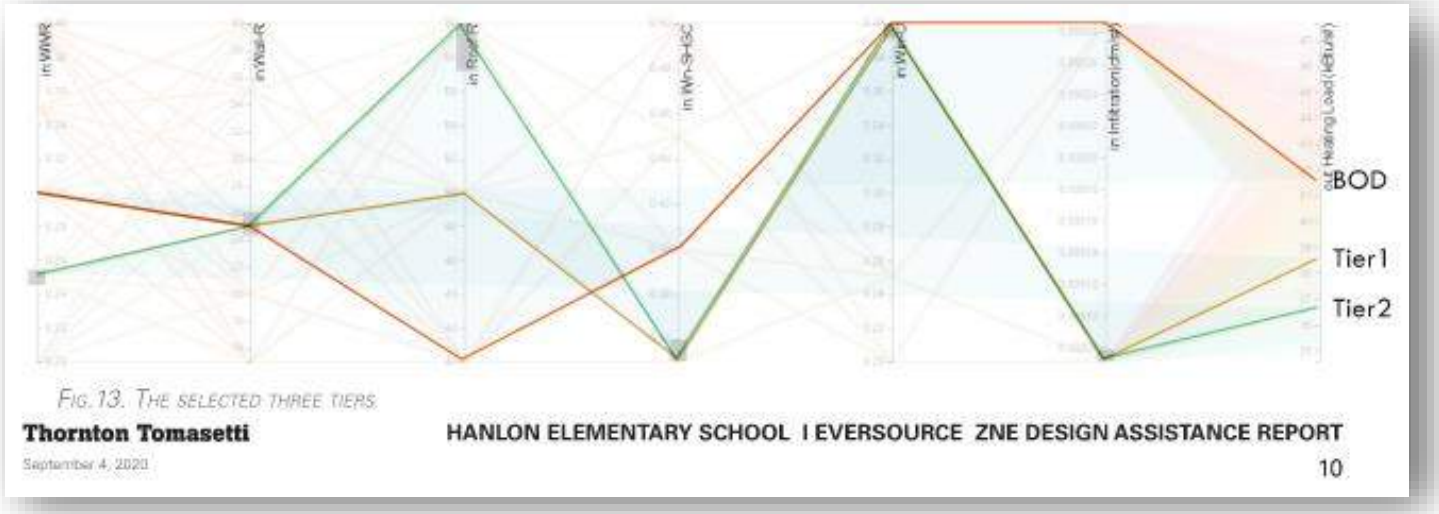
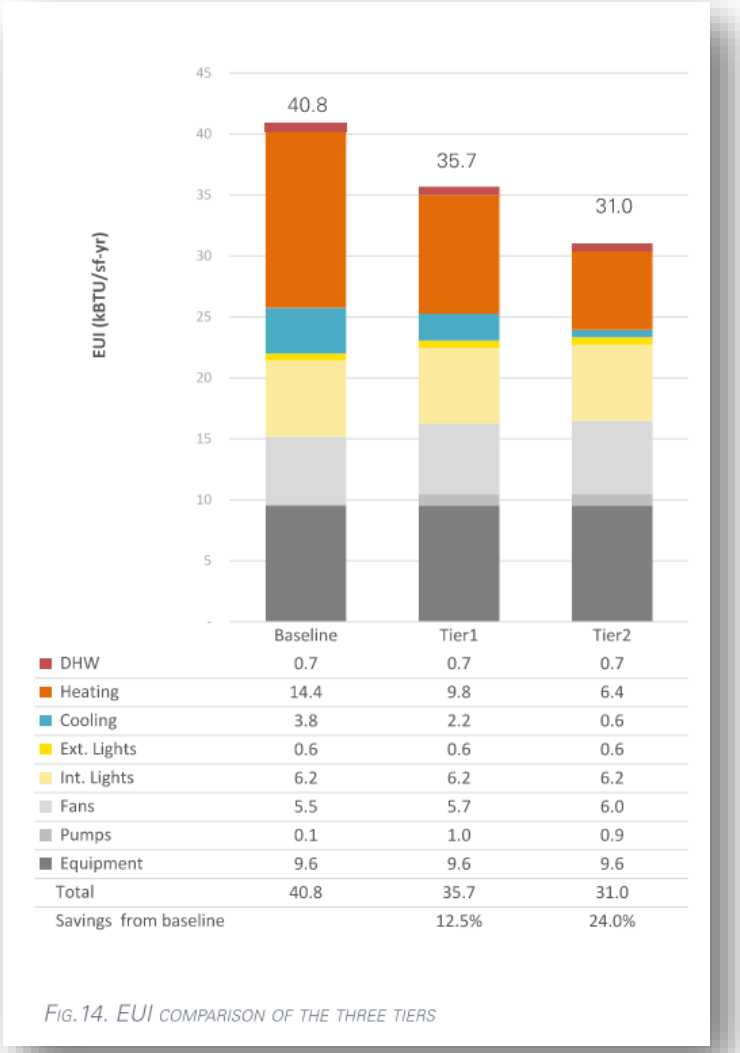



FIG.13. THE SELECTED THREE TIERS






| | Baseline | Tier1 | Tier2 |
|---|---|---|---|
| DHW | 0.7 | 0.7 | 0.7 |
| Heating | 14.4 | 9.8 | 6.4 |
| Cooling | 3.8 | 2.2 | 0.6 |
| Ext. Lights | 0.6 | 0.6 | 0.6 |
| Int. Lights | 6.2 | 6.2 | 6.2 |
| Fans | 5.5 | 5.7 | 6.0 |
| Pumps | 0.1 | 1.0 | 0.9 |
| Equipment | 9.6 | 9.6 | 9.6 |
| Total | 40.8 | 35.7 | 31.0 |
| Savings from baseline | | 12.5% | 24.0% |

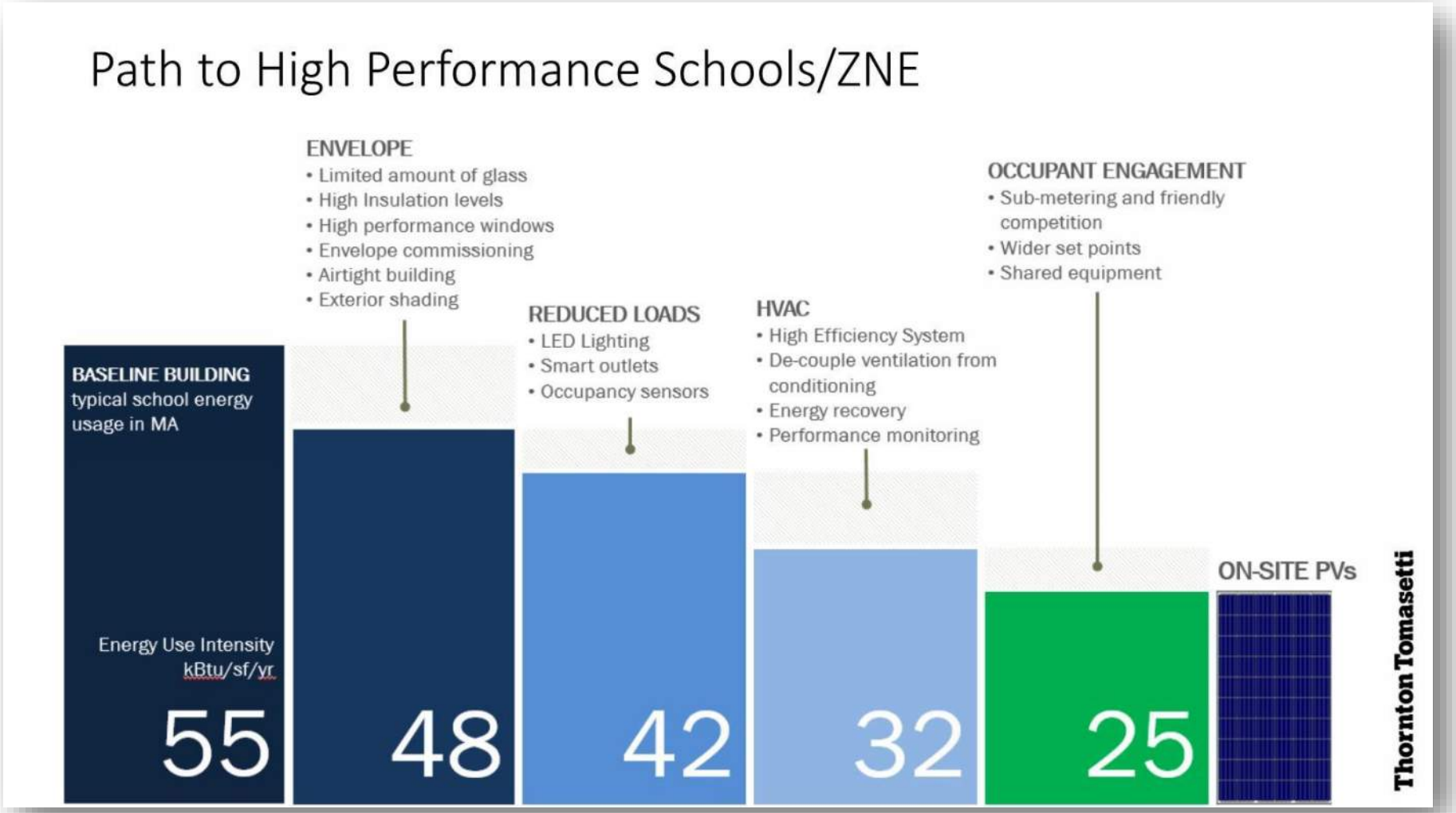
FIG.14. EUI COMPARISON OF THE THREE TIERS

*Courtesy of: Thornton Tomasetti*

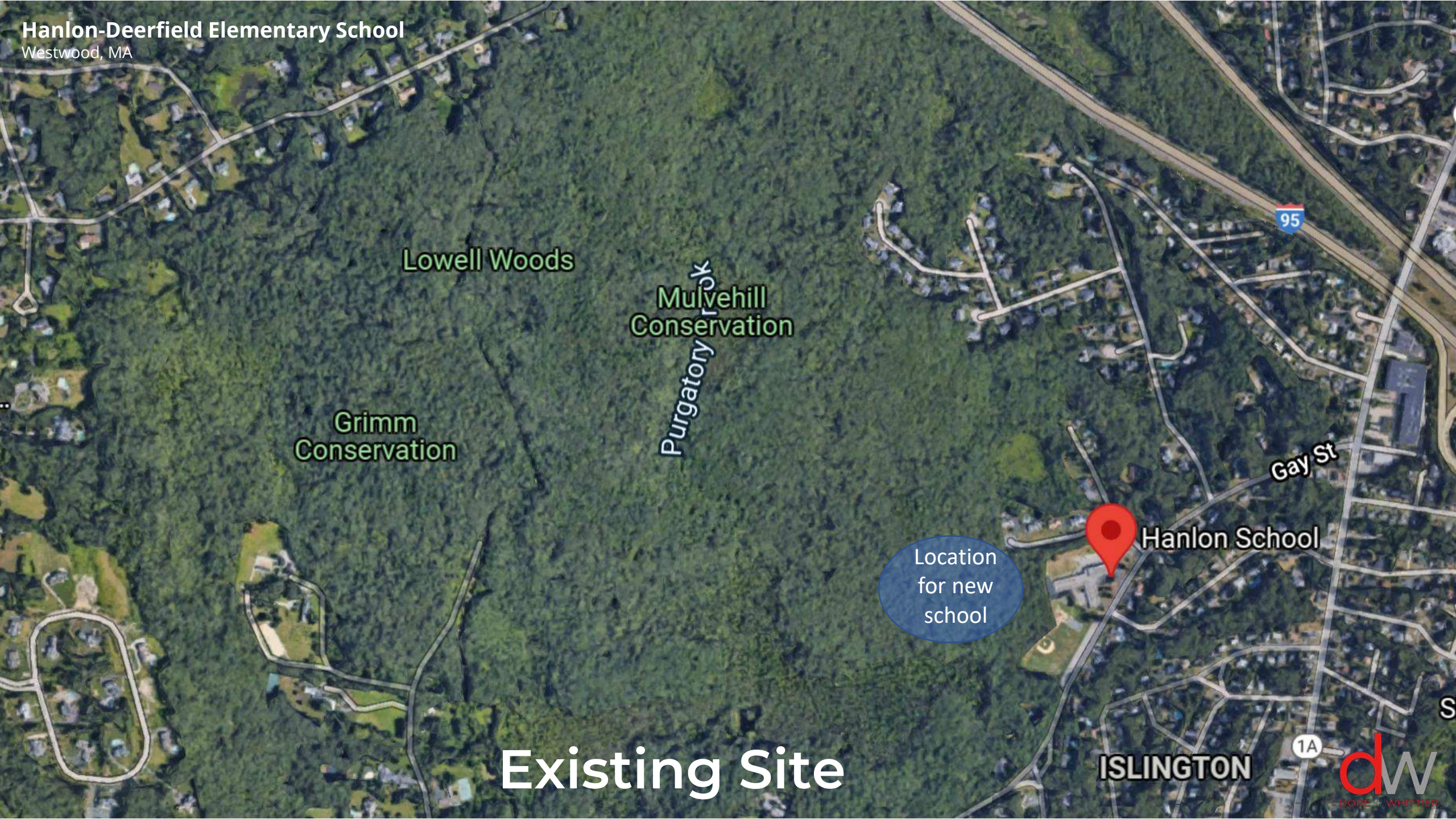
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# Identified Goals and Direction

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




EUI


Hanlon-Deerfield Elementary School
Westwood, MA
Lowell Woods
Mulvehill Conservation
Purgatory Brook
Grimm Conservation
95
Gay St
Hanlon School
Location for new school
ISLINGTON
1A
Existing Site

**Hanlon-Deerfield Elementary School**
Westwood, MA



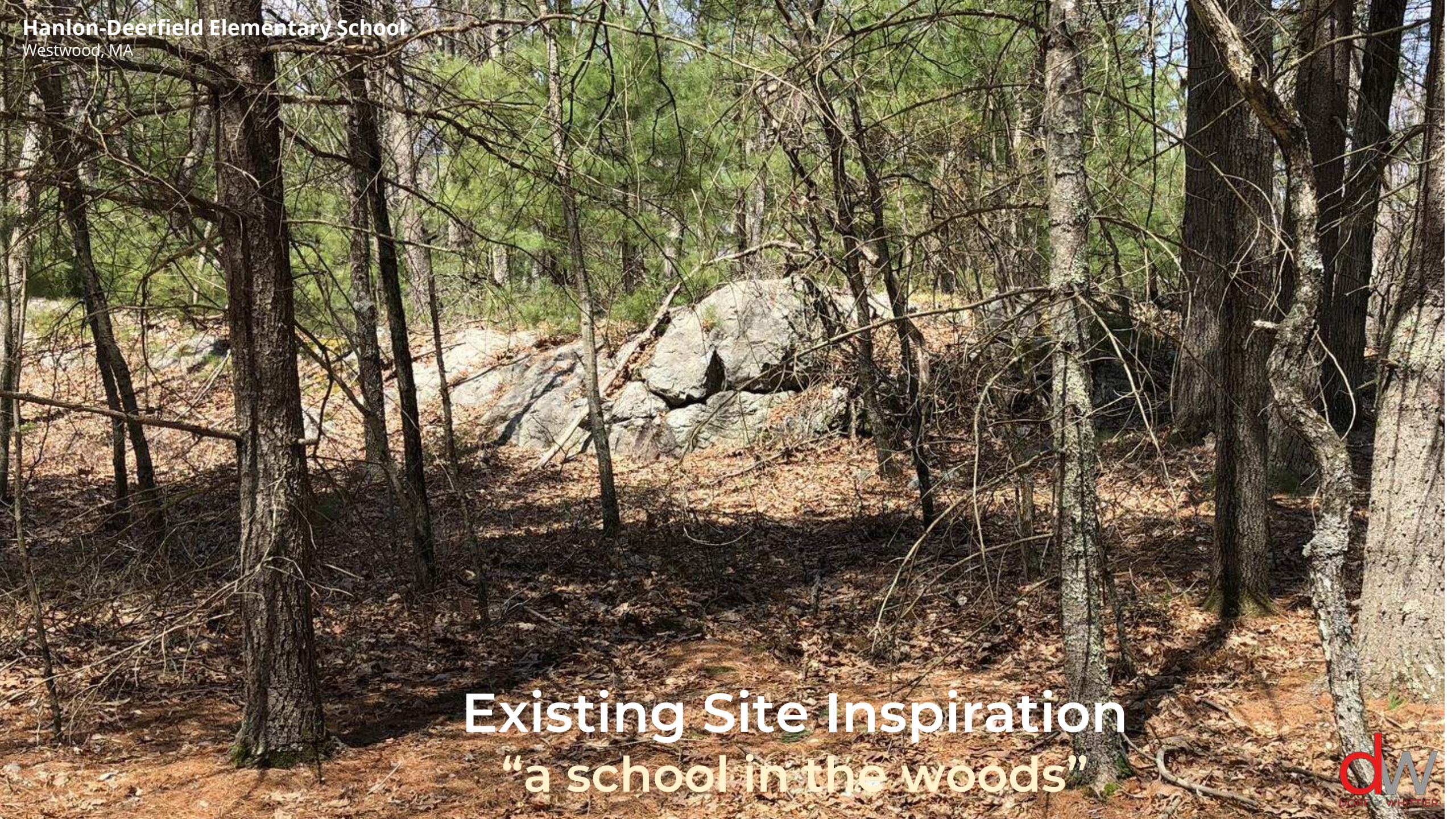
# Existing Site Inspiration
## “a school in the woods”

**Hanlon-Deerfield Elementary School**
Westwood, MA



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# Site Plan

113,141 sf building, 18.5 acres +/-



**Hanlon-Deerfield Elementary School**
Westwood, MA



REDACTED




# Site Plan

113,141 sf building, 18.5 acres +/-

DORE + WHITTIER

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Westwood, MA



REDACTED










# Daylighting Studies





Southern Classroom wing- integrated solar shading

**Hanlon-Deerfield Elementary School**

Westwood, MA

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Southern Classroom wing- Outdoor Classroom

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View from Bus Loop

**Hanlon-Deerfield Elementary School**
Westwood, MA

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Birdseye overall view of building, looking northwest

**Hanlon-Deerfield Elementary School** Westwood, MA

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View from Gay Street at northern entrance

**Hanlon-Deerfield Elementary School**
Westwood, MA

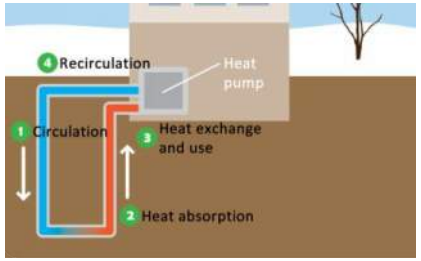
# Sustainable Design Benefits
## Hanlon - Deerfield School Project

The proposed project plans to:

1. Minimize impact on the environment
2. Improve human health and well-being
3. Reduce economic impact over the life of the building



# 1. Minimize Impact on the Environment




- Low Energy and Zero Carbon use:
  - Super insulated and tight thermal envelope
  - Uses the ground for heating/cooling - without burning fossil fuels
  - Use controls for efficient use of HVAC, electricity (lights and outlets)



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




- Waste
  - Separates and recycles construction waste (96% avoid landfill)




- Water
  - Uses low-flow plumbing fixtures



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

# 2. Improve Human Health and Well Being









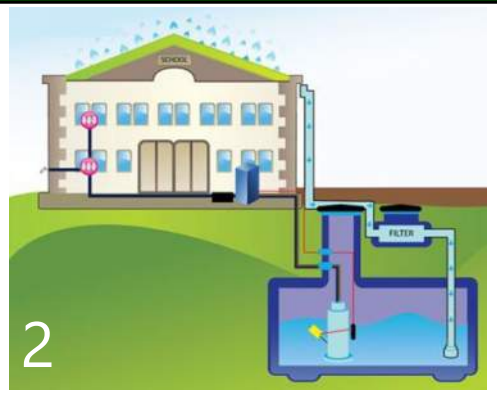




- Indoor Air Quality and monitoring
- Materials made of non-toxic substances
- Daylighting and views
- Using the building and site as teaching tools: help children (and teachers) understand the impact of their decisions

# 3. Reduce Economic Impact - $$













1. Increased thermal envelope = less energy to heat/cool
2. Fossil fuel free, highly efficient HVAC, electrical systems and controls
3. Well-planned daylight use = reduced need for artificial lights/electricity
4. Use Renewable Energy = Photovoltaic (Solar) Panels
5. Careful management by End User so **actual** energy savings achieve **designed** energy savings

# Summary of Sustainable Features

1. **LEED v.4 Silver**

2. **Net Zero Energy Ready**

   - **Super insulated thermal envelope:** Passive House standards for air infiltration
   - **Geothermal wells** for heating and cooling
   - **Fossil fuel free** (all electric)
   - **Tracking predicted EUI of 22.6**
   - **Roof designed to support Photovoltaic Panels**
   - **Mass Save/Eversource Path 1 NZE schools**
   - **Solar shading integrated design**

3. **Highly efficient Electrical, HVAC, and Building Management System**

4. **Thoughtful management of water, sustainable materials and native landscaping**

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