

# CHPS Technical Session Part 1 Stephany Mason

# CHPS Training:

## *Solutions for Green Schools in Massachusetts & Beyond!*





*Thank You Maynard!*



tappé architects

# NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

*"Accelerating Energy Efficiency"*

## Mission

Accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system

## Vision

Region embraces **next generation energy efficiency** as a core strategy to meet energy needs in a carbon-constrained world

## Approach

Overcome barriers and transform markets via  
***Collaboration, Education and Enterprise***



*One of six regional energy efficiency organizations (REEOs) funded by the US Department of Energy (US DOE) to link regions to US DOE guidance, products and programs*



A photograph of a classroom interior. The room features a row of large, multi-paned windows along the back wall, looking out onto trees. Below the windows is a low shelf with various books and a globe. The foreground is filled with rows of wooden desks and blue plastic chairs. The ceiling has fluorescent lights. The hashtag #schoolsmatter is overlaid in the center.

#schoolsmatter

[@CHPSNews](#)

[@KennethWertz](#)

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# Partners



Healthy Schools Network





# TODAY'S AGENDA

- CHPS Technical session
- Lessons Learned: Things to Keep in Mind Designing Schools
- Debunking the Myth that High Performance Schools Cost More
- Missed Connections: Working with your Local Utility
- School Tour
- Deep Dive into IEQ, Resiliency and Zero Energy Schools
- Attendee Discussion
- School Exemplars





# CHPS Technical session

Stephany Mason, CHPS

Ralph DiNola, NBI



# NE-CHPS Criteria

## Greening Schools from the Inside Out

## Healthy, High Performance Schools for MA's Children



# CONTINUING EDUCATION

CHPS is a Registered Provider with the American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Completion certificates for non-AIA members may be requested.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.





# LEARNING OBJECTIVES

1. Participants will recognize the numerous health, educational and environmental benefits of designing new schools and renovating existing schools to meet CHPS standards.
2. An informative architectural tour of a CHPS Verified School will be led by the lead facility manager and architectural design team. Tour participants will explore and observe critical systems and components of a high performance school and compare them to a typical school facility.
3. Participants will assess lessons learned from completed school construction projects to determine how the school design and construction process can be improved upon to avoid repeating mistakes that have been made in the past.
4. Through the examination of existing CHPS Verified schools in the region, participants will be able to justify upfront school construction costs by analyzing schools that are meeting their performance goals, saving districts money in the long-term and providing superior learning environments for students.



# Making Every School an Ideal Place to Learn



# About CHPS



- **Mission:** Making every school an ideal place to learn
- **Priorities:**
  - 1) **Healthy and productive** learning environment,
  - 2) **Conserve** Natural Resources, and
  - 3) **Protect** the Environment
- National **501(c)(3)** non-profit
- Provides a broad array of **tools and resources** for K-12 schools
- CHPS is a **membership organization**
  - School districts can join for **FREE**



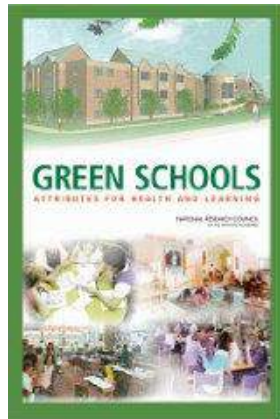
# The Core Values of CHPS

- All schools can be high performance
- Schools are unique environments
- **State-based decision-making** and national collaboration are powerful tools for change

Report from the National Academies Press:  
*Green Schools: Attributes for Health and Learning*

The National Research Council Committee to Review and Assess the Health and Productivity Benefits of Green Schools

[www.nap.edu/catalog/1756.html](http://www.nap.edu/catalog/1756.html)



- High performance schools bring real benefits
- Working collaboratively produces the best results for our schools and students

ENVIRONMENT  
HEALTH  
STUDENT  
PERFORMANCE



# Grasping the Opportunities

## Buildings CAN BE responsible for

- ▶ Heightened student performance
- ▶ Reduced operating costs
- ▶ Improved student & teacher health
- ▶ Increased Average Daily Attendance
- ▶ Improved teacher satisfaction & retention
- ▶ Reduced liability exposure
- ▶ Reduced indoor & outdoor environmental impact
- ▶ Eligibility for financial incentives

Alder Creek Middle School  
Image: Lionakis Press



# History of CHPS in Mass

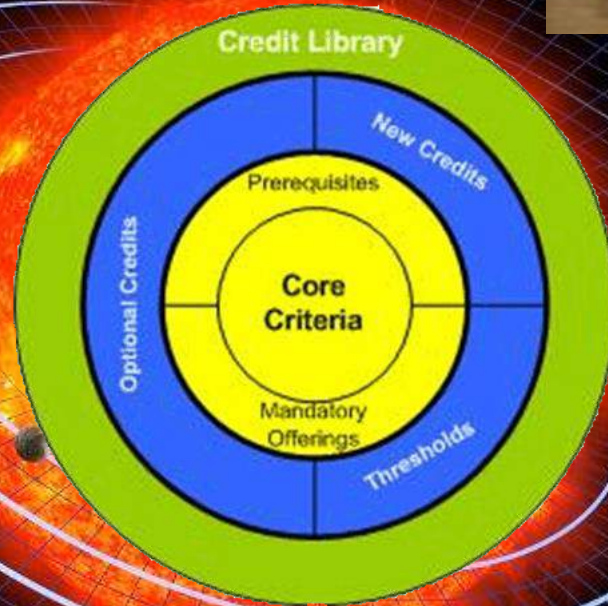
- 2004 – Licensed CHPS Best Practices
- 2006 – MA-CHPS Criteria 1<sup>st</sup> Edition
- 2009 – MA-CHPS Criteria 2<sup>nd</sup> Edition

## **2013 - CORE CRITERIA**

- 2015 – Adopted NE-CHPS V.3









# CORE CRITERIA



## National Voice, Local Choice

- Set High Performance Common Denominator
- Preserve Local Flexibility
- Broaden Definition of Regional “Partner”

# NE-CHPS: High Performance Schools

## Regional Leadership group

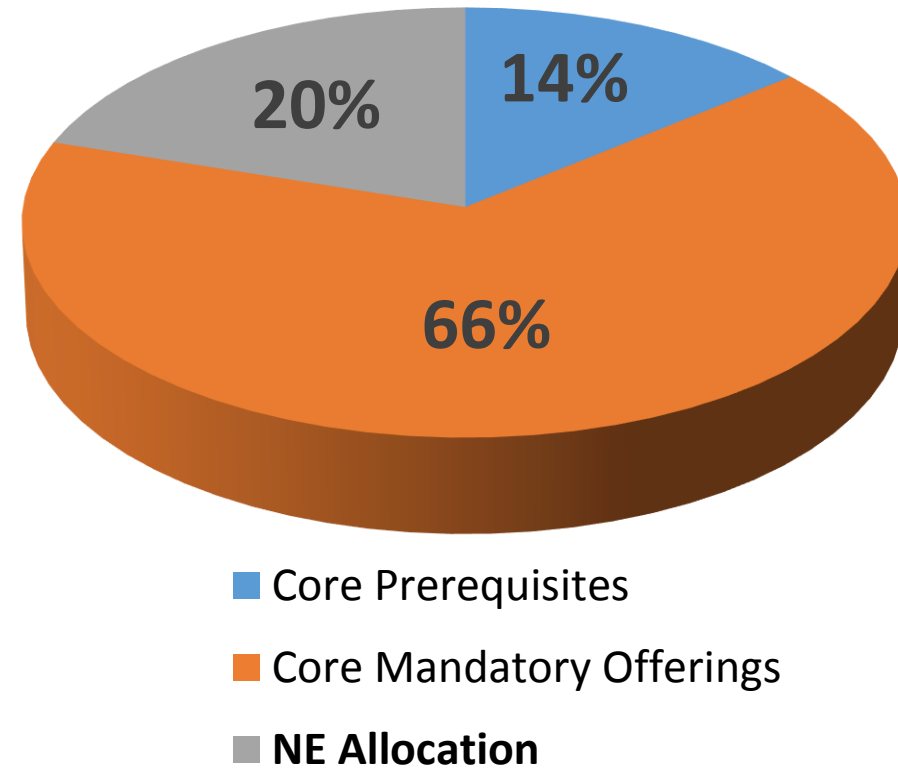
- |                    |   |                        |  |
|--------------------|---|------------------------|--|
| • Carlos Desousa   | <i>Garcia Galuska Desousa Eng</i>       | • Marjorie Schoonmaker | <i>NH Department of Education</i>          |
| • Carolyn Day      | <i>DBA-W Architects</i>                 | • Mark Stafford        | <i>National Grid</i>                       |
| • Carolyn Sarno    | <i>NEEP</i>                             | • Mark Wills           | <i>ASHRAE (formerly)</i>                   |
| • Cathy Hilgendorf | <i>Vermont Depart of Education</i>      | • Martine Dion         | <i>SMMA Architects</i>                     |
| • Chris Armstrong  | <i>Stephen Turner Inc.</i>              | • Michele M. Fiano     | <i>NYSERDA</i>                             |
| • Cynthia Veit     | <i>U.S. EPA Region One</i>              | • Norman Etkind        | <i>VT Superintendents Association</i>      |
| • Ingrid Moulton   | <i>Banwell Architects</i>               | • Patrick Coleman      | <i>MA Depart of Energy Resources</i>       |
| • Jeff Forward     | <i>Forward Thinking Consultants</i>     | • Paul Anastasi        | <i>Newton, MA Public Schools</i>           |
| • Jessica Hing     | <i>U.S. EPA Region One</i>              | • Paul Leveille        | <i>The Jordan Institute</i>                |
| • Joseph Da Silva  | <i>Rhode Island Depart of Education</i> | • Puja Vohra           | <i>National Grid</i>                       |
| • Karen Verrengia  | <i>Cranston, RI Public Schools</i>      | • Richard Donnelly     | <i>VT Energy Investment Corporation</i>    |
| • Kathy Arthur     | <i>EverSource</i>                       | • Robert Cerio         | <i>Ocean State Energy Resources</i>        |
| • Ken Wertz        | <i>Sharon, MA Public Schools</i>        | • Timothy Duffy        | <i>RI Association of School Committees</i> |
| • Linda Darveau    | <i>U.S. EPA Region One</i>              | • Tom Coughlin         | <i>National Grid</i>                       |
| • Lisa Capone      | <i>MA Depart of Energy Resources</i>    |                        |  |
| • Manuel Cordero   | <i>Rhode Island Depart of Education</i> |                        |  |
| • Mario Carreno    | <i>Rhode Island Depart of Education</i> |                        |  |



# Core Criteria Point Summary

- New Point Structure
  - **All criteria**, including prerequisites, now have assigned points
  - Helps indicate difficulty and importance
- 250 points total
  - 200 points assigned in Core Criteria
  - 50 points distributed or created by NE

## Point Distribution



**For CHPS Verified recognition:**

**New construction - at least 110 points**, including all prerequisites.

**Major Renovations - at least 85 points**, prerequisites limited by scope

# Why IS NE-CHPS Different?

Developed with input from **regional stakeholders**

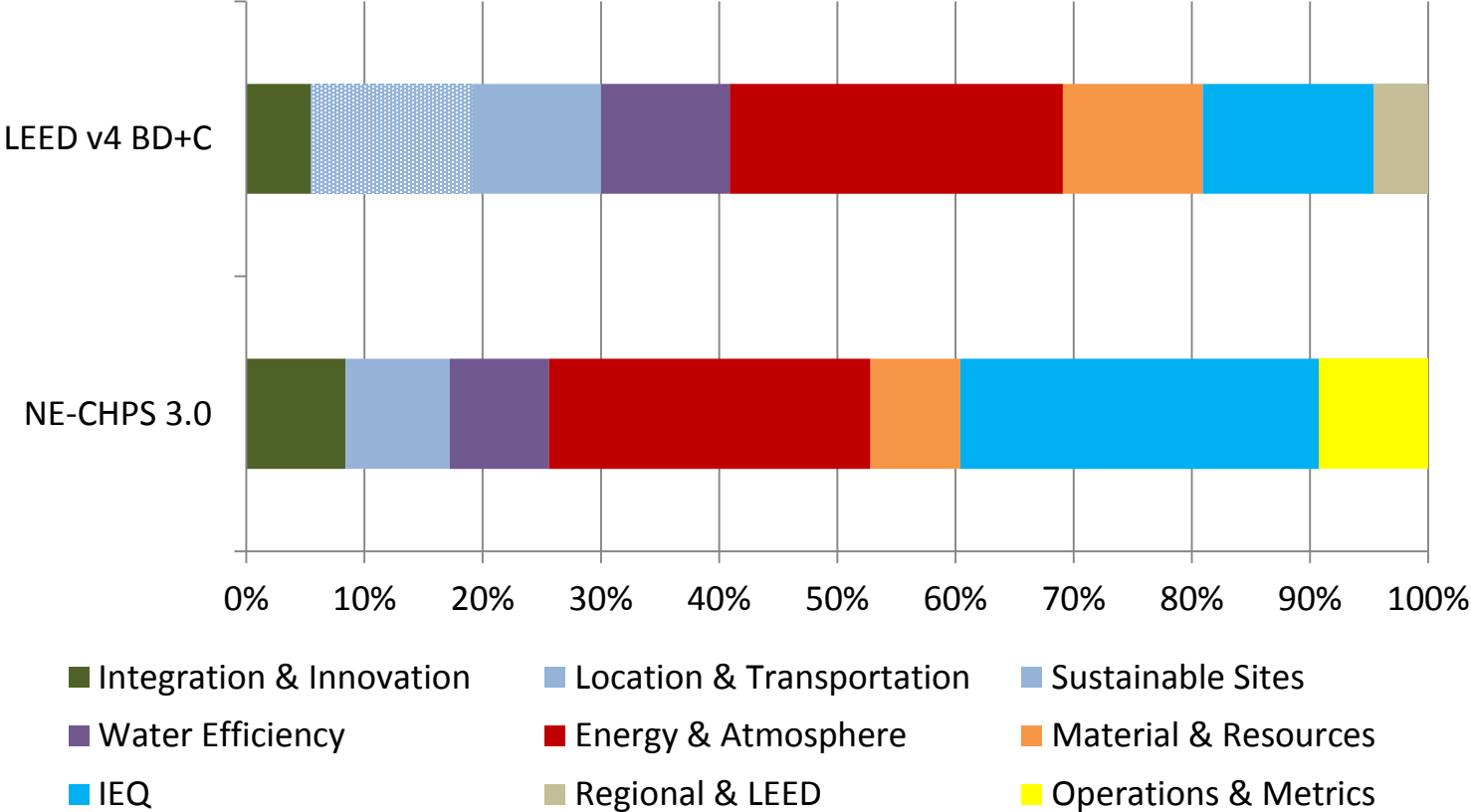
Reflects the climate, building codes, and educational **priorities of the Northeast**

Emphasizes best practices for **ongoing building operation and maintenance**

Stresses **Indoor Environmental Quality** and **Energy Efficient Design**



# Building Rating System Category Comparison



NE-CHPS v3

Energy  
IEQ

LEED v4 S

Energy  
Location/Sites

# Energy Efficiency Comparison

| LEED-S V4    |          |        | NE-CHPS 3rd  |          |        |
|--------------|----------|--------|--------------|----------|--------|
| % over code* |          | Points | % over code* |          | Points |
| New          | Add/Reno |        | New          | Add/Reno |        |
| 0            | 0        | 0      | 0            | 0        | 0      |
| 1            | 0        | 0      | 1            | 0        | 0      |
| 2            | 0        | 0      | 2            | 0        | 0      |
| 3            | 1        | 0      | 3            | 1        | 0      |
| 4            | 2        | 0      | 4            | 2        | 0      |
| 5            | 3        | 0      | 5            | 3        | 0      |
| 6            | 4        | 1      |              |          |        |
| 8            | 6        | 2      |              |          |        |
| 10           | 8        | 3      | 10           |          | 6      |
| 12           | 10       | 4      |              |          |        |
| 14           | 12       | 5      |              |          |        |
| 16           | 14       | 6      | 15           |          | 9**    |
| 18           | 16       | 7      |              |          |        |
| 20           | 18       | 8      | 20           |          | 12     |

Minimum level of efficiency required as a "Prerequisite"

Minimum 10% above code required for no added reimbursement (6 points NECHPS, 3 points LEEDV4)

Minimum 15% above code for 2% added reimbursement (9 points NECHPS, 6 points LEEDV4)



# Why CHPS

- Focus on what matters the most
  - The students: well-being and performance
- Proven Track Record
  - Over 60 completed CHPS projects in MA
- Regional Adaptation
  - 20% of points allotted by NE regional leadership group
- Adapted for Renovations
  - Adjusted prerequisites and minimum recognition score
- Committed to reducing project costs
  - Plan and spec sheet approach for documentation



# Impact of CHPS

*Principal NE-CHPS Verified school on the before and after...*

*Indoor environmental quality*

“The air quality is **unbelievably different**. We also had tremendous difficulty in the old school with climate control; we were freezing in the winter and it felt like it was 100 degrees in the summer. **Now it’s all set perfectly.**”

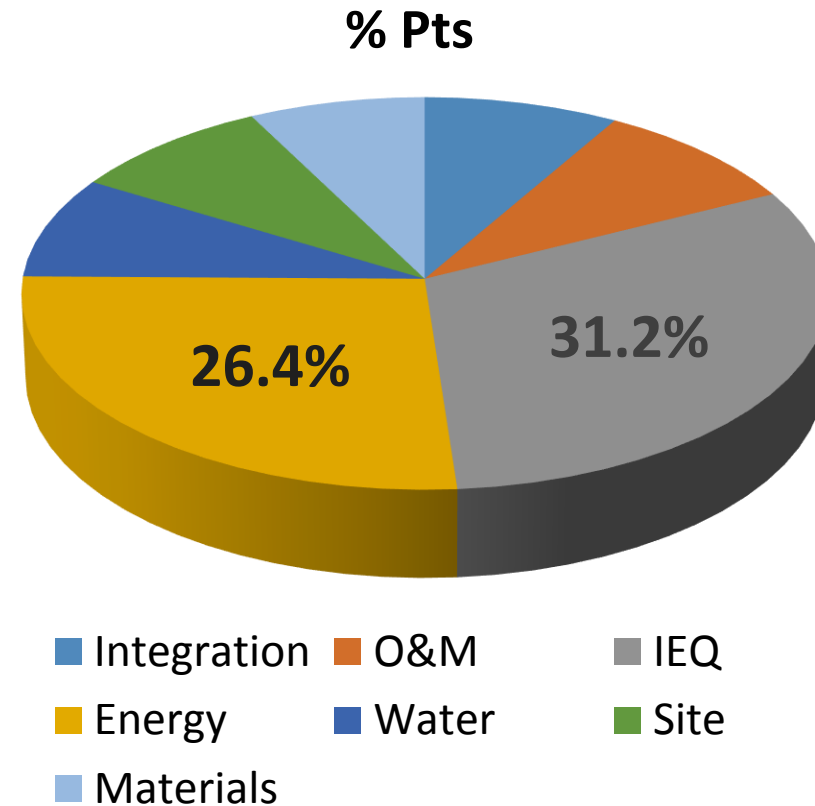


*Student behavior*

“I think the kids are **more positive**, being in a space that is inviting and beautiful instead of one that is old and falling apart. They just seem to be **happier in this space.**”

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**For CHPS Verified recognition:**

**New construction - at least 110 points**, including all prerequisites. **Major**

**Renovations - at least 85 points**, prerequisites limited by scope



# MA-CHPS 2009 vs NE-CHPS v3 Structure

|   | 2009 MA-CHPS | NE-CHPS v3 |
|---|--------------|------------|
| <b>Total No. of Points Available</b>                  | 127          | 250        |
| <b>No. of Prerequisites</b>                           | 23           | 27*        |
| <b>Points from Prerequisites</b>                      | NA           | 69         |
| <b>Points from Credits</b>                            | 127          | 181        |
| <b>Points Needed for CHPS Verified</b>                | 35           | 110        |
| <b>Points from Credits Needed for CHPS Verified</b>   | 35           | 41         |
| <b>%age of Credit Points Needed for CHPS Verified</b> | 28%          | 23%        |

\*includes IPM which is state mandated

# MA-CHPS 2009 vs NE-CHPS v3 Prerequisites

| Category                     | 2009 MA Prereqs | NE v3 Prereqs  | Differences  |
|------------------------------|-----------------|----------------|--|
| Integration and Innovation   | 2               | 3              | Addition of CPTED in NE  |
| Operations and Metrics       | 4*              | 7 <sup>†</sup> | Revised Green Cleaning to Credit, Addition of IPM in NE, Upgrade IEMP, Energy Benchmarking, and ENERGY STAR Equip/Appliances Credits |
| Indoor Environmental Quality | 10**            | 7              | Revised Construction IAQ Management and ASHRAE 55 to Credits   |
| Energy Efficiency            | 2***            | 4              | Addition of EPRs and Local Energy Incentives in NE   |
| Water Efficiency             | 2               | 2              | Move to Full Irrigation System Commissioning   |
| Sites                        | 1               | 2              | Addition of Site/Building Best Practices in NE   |
| Materials and Waste          | 2               | 2              | None   |

\*Includes a Prereq listed in a different category in MA-CHPS.

<sup>†</sup>Includes state mandated IPM

\*\*Two Prereqs in MA-CHPS combined into one in NE-CHPS.

\*\*\*Excludes a Prereq listed in a different category in NE-CHPS.

# What's New: INTEGRATION

## NEW PREREQUISITE

- Crime Prevention Through Environmental Design
  - Sightlines, accessibility, and safety



## NEW CREDITS

- Enhanced Integrated Design
  - Additional meetings and documentation
- High Performance Transition Plan
  - Pathway for phased, renovation projects
- Educational Integration
  - Integrate high-performance design concepts into curriculum
- District Sustainability Plan





# What's New: Operations & Metrics

## NEW PREREQUISITE

- Integrated Pest Management\*

## Upgraded to PREREQUISITE

- Performance Benchmarking
  - Energy Star, ORC, or School Model
- Indoor Env. Management Plan

## NEW CREDITS

- Post-Occupancy Transition
- High Performance Operations
- *Energy Star Appliances*
- *Computerized Maintenance Management System (CMMS)*

\* New to CHPS in MA – State Law



# IEQ



**14 million**  
school days  
missed per  
year in the  
U.S. due to  
asthma

# What's New: IEQ

## NO NEW OR ADDITIONAL PREREQUISITES

### NEW CREDITS and CRITERIA UPDATES

- MERV 11\* and MERV 13 filter requirements
- New alternative to flush-out
  - Similar to LEED v4
- Construction moisture management
- Dedicated outdoor air systems credit
- Low Radon credit
- Individual temperature controls in all classrooms
- Lighting quality performance standards
- Improved acoustics requirements\*
  - Lower BG noise level, Stricter STC ratings, higher testing requirements
- Low-EMF best practices
- *High Intensity Fluorescent Fixtures*





# Benefits On Learning



- levels of **classroom noise linked to academic achievement**; 15% of students have hearing problems
- students in classrooms with the most **daylight** showed a **21% improvement** in learning rates compared to students in classrooms with the least daylight
- **5% to 15% better test scores** for students in buildings with better indoor environmental conditions



# What's New: Energy

## Design toward Zero Net Energy:

- Points awarded based on improved performance over IECC 2012
- Renewable energy production included in overall performance level
- Emphasizes efficient design before energy production
- Cross-reference zEPI scale scores
  - Provides constant scale as energy codes change



# What's New: ENERGY

## NEW PREREQUISITES

- Environmentally Preferable Refrigerants
  - CFC Ban
  - Performance Approach based on Global Warming Potential (GWP) and Ozone Depletion Potential (ODP)
- *Local Energy Efficiency Incentives and Assistance*

## NEW CREDITS

- Enhanced and Building Envelope Commissioning
- Advanced Energy Monitoring
- *Renewable energy performance monitoring*
- Natural ventilation
- *Electric vehicle charging*

# What's New: WATER

- Improved indoor water fixture requirements to match EPA WaterSense®\*
- *New credit for rainwater collection and storage*
- Create irrigation and outdoor water budget for credit



# What's New: SITES

- US EPA Siting Guidelines option added for Site Selection
- New, novel forms of human powered transportation in addition to bikes/skateboards
  - Skis, etc.

## **New PREREQUISITE**

- *Site and Building Best Practices*

## **New CREDITS**

- Locally Native Plants for Landscaping Criterion
- Construction site runoff control



# What's New: MATERIALS & WASTE MGT

- *Increase construction site waste management requirement to 65%*

## **NEW CREDITS**

- Environmental Product Declarations (EPDs)
- Health Product Declarations (HPDs)



# What's Out

- Mercury Reduction
  - Technology advances and common practices have made the criteria redundant
- Certified Wood
  - Only FSC now accepted for most wood, or NWFA's Responsible Procurement Program for flooring
- Alternative Fuel Credits
  - Now available as innovation credits rather than standalone credits

# To Maintain High Performance

“Lessons Learned: Things to Keep in Mind when Designing your School”

- II 1.0 Integrated Design
- OM 1.0 Facility Staff and Occupant Training
- OM 5.0 Systems Maintenance Plan
- OM 6.0 Indoor Environmental Management Plan
- OM 7.1 Green Cleaning
- OM 8.0 Integrated Pest Management
- EQ 1.1 Enhanced Filtration
- EQ 2.1 Pollutant and Chemical Source Control
- EQ 11.0 Daylighting: Glare Protection
- MW 1.0 Storage and Collection of Recyclables



# CHPS Verified™ Summary

A CHPS third-party reviewer checks the following documents **after design** and **after construction**:

- Scorecard / Plansheet
- Construction documents
- Supporting documentation

Two phased process for reviews:

- Phase I: Completeness Screening
- Phase II: Compliance Review



# Basecamp - Your CHPS Project Website

The screenshot shows the Basecamp web interface for a project named "CHPS Verified Project". At the top, there is a navigation bar with links for Projects, Calendar, Everything, Progress, Everyone, and Me. A search bar on the right allows users to jump to a project, person, label, or search. The project header includes the project name, a star icon, and links to "Invite more people" (3 people on this project) and "Catch up" on recent changes. Below the header, there are tabs for "1 Discussion", "8 To-dos", and "Events", along with a button to "Add the first" and a link to "Text document".

The "Latest project updates" section shows a list of recent changes:

- 9:55am: You changed the project name from 'Project Registration Template' to 'CHPS Verified Project'
- May 11: You removed Kathy G. from the project: Project Registration Template
- May 11: Anne D. added a to-do: [Project Team: when the project is ready for Design Review, complete...](#)

A link "See all updates" is provided below the list.

The "Discussions" section features a "Post a new message" button and a link to "Watch a quick video about Discussions". A discussion post by Anne D. titled "Welcome to CHPS Project Website" is shown, dated May 11. The post content reads: "Welcome to your CHPS Project Website! Now that your project is registered, we will send you an invoice/receipt shortly. Once the".

The "To-do lists" section includes an "Add a to-do list" button and a link to "Watch a quick video about To-Do Lists".

The "Registration Phase" section contains a list of steps that must be completed before Design Review:

- ☐ Program Coordinator: set up welcome packet and upload Project Registration Form.
- ☐ Project Team: pay Design fee (fee schedule - [www.chps.net/dev/Drupal/node/560](http://www.chps.net/dev/Drupal/node/560)).
- ☐ Program Coordinator: email Project Team with receipt and further instructions about adding users.
- ☐ Project Team: submit additional members to add as users in BaseCamp to Program Coordinator. (Project Team users will receive email with Basecamp log-in instructions.)
- ☐ Project Team: participate in CHPS-Verified webinar (register via [www.chps.net/dev/Drupal/calendar](http://www.chps.net/dev/Drupal/calendar)).
- ☐ Program Coordinator: once registration/payment process is complete, upload CHPS Verified workbook.
- ☐ CHPS Team: schedule quarterly touch base calls with Project Team.
- ☐ Project Team: when the project is ready for Design Review, complete and upload the Verified workbook with all supporting documents to Basecamp and inform Program Coordinator.

A link "Add a to-do" is located at the bottom of the list.

An "Upcoming Events" sidebar on the right shows an event for July 27: "CHPS touch base follow up", with a link to "All upcoming events..."

# Questions Along the Way?

- Have a process question?
  - Ask it through Basecamp
  - CHPS can answer many process questions quickly and directly
- Have a technical question?
  - Check the CHPS Criteria Interpretation (CCI) library  
[www.chps.net/dev/Drupal/node/725](http://www.chps.net/dev/Drupal/node/725)
  - If unanswered, ask CHPS through Basecamp
  - If highly technical, each registered project has two free CCIs  
[www.chps.net/dev/Drupal/node/789](http://www.chps.net/dev/Drupal/node/789)



# Simplified and Increased Transparency of Documentation

- All Documentation Requirements are in Criteria
  - Plan and Spec Approach
    - Reference Construction Documents
- Additional Tools
  - Scorecard Workbook
  - Documentation Summary





# CHPS Project Workbook/Plan and Spec Sheets

- Two full size plan sheets enable team-wide compliance:
  - Annotated Scorecard
  - Materials Worksheet
- Prereqs and claimed credits reference CDs wherever possible
- Some additional attachments required
  - E.g.: Resolutions, reports

2014 OA-DPS Fleetsheet

Project Information

Project Name

Project Location

School Building Name(s)

Building Number(s)

Anticipated Student Population

Anticipated Staff and Administrative Population

Directions: Complete this form for all projects that are submitted for the 2014 OA-DPS Fleetsheet. Use the following information to complete the form.

For more information, see the 2014 OA-DPS Fleetsheet.

Details

Percentage of Total Construction Cost

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Percentage of Total Construction Cost

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## CHPS PreFAB™ Recognition Program:

*A Streamlined Process for Pre-Approved High-Performance Modular Classrooms*

The Collaborative for High Performance Schools (CHPS) has released the 2016 Edition of the CHPS PreFAB Recognition Program for Prefabricated Modular Classrooms, available for both permanent construction and relocatable classrooms.

CHPS PreFAB classrooms meet stringent criteria:

- Indoor Environmental Quality
- Energy Efficiency
- Materials and Waste Management

CHPS PreFAB classrooms:

- Help Students Learn and Thrive
- Lower Operating Costs

### PROGRAM BENEFITS

#### *For Manufacturers*

- Pre-Approval to CHPS Criteria via 3<sup>rd</sup> Party Review
- Listing in the CHPS Product Database
- Use of the CHPS PreFAB Product Logo

#### *For Schools*

- Assured Healthy, High Performance Classrooms
- Reduced CHPS Verification Time and Cost

### NATIONAL PROGRAM, REGIONAL OPTIONS

CHPS PreFAB is based on the 2014 US-CHPS Criteria applicable in all 50 states. For regional approval, in addition to the US-CHPS requirements, all regional CHPS Criteria prerequisites and credit requirements must be met. Regional approvals will be indicated on the Chain of Custody that accompanies the CHPS PreFAB classroom.

### TWO LEVELS OF QUALIFICATION

For both, all relevant US-CHPS prerequisites must be met and has a 158 point basis.

- CHPS PreFAB™ - *Base Qualification* - At least 70 points have been earned.
- CHPS PreFAB LEADER™ - *Higher Tier* - At least 100 points have been earned.

### GET STARTED!

**PreFAB Manufacturers:** Register your classroom

Go to [www.chps.net/CHPS-PreFAB](http://www.chps.net/CHPS-PreFAB) to sign up!

#### *Find Pre-Approved Classrooms*

Information about CHPS PreFAB classrooms can be found on the CHPS High Performance Products Database ([www.chps.net/products/](http://www.chps.net/products/))

### MORE INFO

Learn more online at: [www.chps.net/CHPS-PreFAB](http://www.chps.net/CHPS-PreFAB)

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#### *Champion Sponsor*



But wait...  
there's  
more!  
CHPS  
PreFAB  
Update!!



### FOR MORE INFORMATION ON CHPS

- Contact us at [verified@chps.net](mailto:verified@chps.net) or call 415-957-9888
- Attend another free CHPS webinar: [www.chps.net/events](http://www.chps.net/events)
- Register your project [www.chps.net/verified](http://www.chps.net/verified)
- Find us on social media

FOR MORE INFORMATION ON NEEP

(e.g. School Exemplars) – [www.neep.org](http://www.neep.org)

FOR MORE INFORMATION ON MSBA –  
[www.massschoolbuildings.org](http://www.massschoolbuildings.org)



# See the Results!



## Southeastern Regional VoTech HS



### Virtual Tour

[www.youtube.com/watch?v=kYluICcZ5Ms&feature=em-share\\_video\\_user](http://www.youtube.com/watch?v=kYluICcZ5Ms&feature=em-share_video_user)

### One Earth Music Video

[www.youtube.com/watch?v=gg3rMTeDQV8](http://www.youtube.com/watch?v=gg3rMTeDQV8)