

Powell Elementary School - Measures for Design Excellence

1. ***Design for Integration:*** *What is the big idea behind this project and how did sustainability inform the design concept?*

The big idea for this project is sustainability and hands-on stewardship of environmental resources enhances 21st century learning. By updating a historic school building, the AE team discovered the existing solar chimneys. Not only is passive ventilation a key component of the new design, it is also embraced by students and staff as they control the passive systems. The site's existing orientation to wind and solar access informed the location of the additions to maximize daylighting and outdoor spaces for every classroom. The use of recycled materials through plays a key role, along with the solar chimneys, in defining the massing and scale of the additions.

2. ***Design for Equitable Communities:*** *How does this project contribute to creating a walkable, human-scaled community inside and outside the property lines?*

Located within a walkable community, the school updates and additions provide additional amenities for the community – more open greenspace and playgrounds. The additions were designed to provide unique views to the surrounding neighborhood and equal access to the outdoor spaces. The scale and massing of the addition provide space for human connections to both the interior and exterior.

3. ***Design for Ecology:*** *In what ways does the design respond to the ecology of its place?*

The area of the new wings used to be 16th Street Heights School with a vacant parking lot. The additions were sited to maximize daylight and outdoor green spaces. The solar chimneys utilize passive ventilation to embrace the area's shoulder seasons. Storm water, on a tight urban site, is managed from accessible green roofs that double as classrooms. The project also reduced the heat island effect surround the elementary school by demoing the vacant lot and providing green, permeable spaces.

4. ***Design for Water:*** *How does the project relate to the regional watershed?*

The compact footprint, with green roofs, efficiently manages on site storm water helping to reduce the stresses on the urban infrastructure. By allowing the water to seep into the site, it provides a more natural path for water to travel to the regional watersheds rather than being carried off to another location. The outdoor green spaces are filled with native, drought tolerant species.

5. ***Design for Economy:*** *How does the project efficiently meet the program and design challenges and provide "more with less"?*

21st Century learning embraces differentiated learning which maximizes non-traditional teaching and typically less efficient spaces for different scales of learning. Powell Elementary is designed with niches in hallways to provide one on one instruction. The stairs

between the first and second level provide bleacher seating on one end for impromptu class instruction. The additions are also compact and efficient. Roof top spaces double as outdoor classrooms. The design also uses typical school materials reimaged in a new way, such as the louvered screen.

6. ***Design for Energy:*** *Is the project energy-efficient and sustainable while improving building performance, function, comfort, and enjoyment?*

Yes, the project is 53% above the green building baseline. Automated building systems monitor for the right conditions. Solar chimneys connect with automated windows that allow for passive rather than mechanical ventilation. Site orientation, louvered screens and strategic location of trees maximize interior daylight where needed and shield from the heat gains and glare where not desired. Another large factor of improving performance is teaching the occupants about sustainability and their part in it. Both students and staff can control the window systems to activate the solar chimneys. Fluid dynamic modeling was used in the design phases to best size the solar chimney size requirements for maximum ventilation.

7. ***Design for Wellness:*** *How does the design promote the health of the occupants?*

The project was designed to maximize daylight and reduce glare and heat gain with the louvers. The green spaces are oriented so that each classroom has a direct connection to the outdoors and views. Fresh air is provided by the outdoor stairwells designed to maintain children's security but with permeable designs to allow for air flow. The human connection is at many different scales from the classroom, to atrium with bleacher seating, small group learning at hallway niches, and one on one interactions at each classroom's entry door furniture. The outdoor play spaces and green roofs maximize exterior classroom spaces and the student's connection to the cycles of the season.

8. ***Design for Resources:*** *How did the design team optimize the amount and makeup of material used on the project?*

The construction materials were all located within a 500-mile radius and incorporated recycled materials. The project was designed in four phases from the rehab of the existing to the new addition. By maintaining consistency of materials used throughout, additional material from one phase was able to be utilized in the next.

9. ***Design for Change:*** *Is the building resilient, and able to easily accommodate other uses in 50-100 years?*

Yes, the building is resilient because of the passive ventilation systems. The storm water management also mitigates all of the sites storm water outfall. The community also has long term access to the spaces and amenities. The school is designed with flexible spaces that can be easily modified for future teaching styles and evolving student needs. The building itself is also an education tool that teaches occupants about passive building systems.

10. ***Design for Discovery:*** *What lessons for better design have been learned through the process of project design, construction, and occupancy, and how have these been incorporated in subsequent projects?*

During the design and construction, the team learned how to manage design intent as the project managers from both the construction and client sides changed hands and how best to document for ease of understanding. By incorporating signage and ensuring occupant

education as a key part of the building closeout, helps to maximize the integrated systems as the users change. Incorporating automated building technologies helps to reduce the user factor where able. The louvers and building envelope details provide thermal breaks, water proofing and reduce heat glare. With the heavy use of schools, the durability of materials is of utmost importance. The design team also met the LEED requirement but didn't design for LEED. The occupant experience and sustainable strategies were married together to create a greater outcome than complying with a check list.

For subsequent projects, the key take-aways were to continue to educate clients and improve on passive ventilation design systems. To maximize daylighting and views while mitigating heat gain and glare. Continue to research and integrate building automation so that building managers can maximize their building systems efficiencies. Continue to research and utilize the newest materials measured for sustainability and durability.