2023 A4LE Planning & Design Awards

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Timnath & Wellington Middle-High Schools A Prototype Design for Poudre School District, Colorado

### **Executive Summary**

In 2018, Poudre School District (PSD) undertook an ambitious project to design and construct two new high schools simultaneously, on new sites, for two rapidly growing communities. Both schools-one in Wellington, CO and one along the western edge of Timnath, CO-are designed as a prototype for 1,500 students each with a planned addition that will expand each school's capacity for 1,800 students in the future. Each facility serves both middle school (grades 6-8) and high school (grades 9-12) programs until the District's enrollment numbers justify new middle schools, at which point the schools will transition to comprehensive high schools. The schools are identical in plan with varied finishes to give them a unique identity. In addition, the Timnath site also includes a Districtwide stadium for use by all five high schools in the District as well as an enhanced Performing Arts space.

The schools deliver a wide variety of learning spaces allowing students to work in varied groupings with flexibility for spaces to change over time—an important component which will allow the schools to transition from MS/HS uses to HS only, as well as to accommodate future educational delivery methods. Transparency, connections to the surrounding natural world, and a philosophy that allows students ownership of their educational spaces all manifest throughout the design.

# Scope of Work & Budget



Exterior Rendering



### School & Community Research/Engagement

#### **About the District**

PSD, the eighth largest school district in Colorado, covers 1,800 square miles and serves students from nine different communities. The district supports school choice and offers a wide spectrum of educational programs to fit any child's needs; however, more than 70% of PSD families choose to send their children to their neighborhood school. In the 2022-23 school year, PSD enrolled over 30,000 students districtwide.

#### Visioning Process

When the project began, a thorough process was undertaken to articulate PSD's vision for these two new schools including goals, strategies and projected future needs. In short, the goal was for instruction to drive construction. During this process, the District's design and planning team analyzed the teaching and learning philosophy and practices of PSD and then translated that information into physical parameters to guide the design and development of these schools. The process gathered insights from a multitude of perspectives throughout the community. Planning and design guidelines during this phase were synthesized with PSD standards, educational specifications, technical and sustainability guidelines.

### **Guiding Principles**

Twelve Guiding Principles (below) were developed to set the stage for design by finishing the statement: "At the new PSD schools...



# School & Community Research/Engagement

### **Parameters & Spatial Organization**

The new schools would serve both current and future needs as a comprehensive high school with dedicated applied learning opportunities. Both sites are planned to accommodate up to 1,500 students (with a future expansion to 1,800) in grades 6 through 12 in the short term, and grades 9 through 12 as enrollment changes. Community use of the building and grounds continues to be supported. Average class sizes were planned to be 25-30 students, although some programs would have larger and/or smaller class sizes. The targeted utilization rate for educational spaces ("teaching stations") is approximately 80-85% to accommodate and facilitate student choice and scheduling flexibility. Facilities are designed to support current programs and practices, but to also be flexible enough to support changes to these over time.

Organizationally, the new schools are arranged to support the guiding principles and to promote safe, effective and efficient operation of the facility. Core academics were designed to blend with applied learning programs and spaces to promote hands-on and applied learning. Performance venues and athletics facilities are available for controlled after-hours use. A student/community commons becomes a hub of activity, supporting collaboration and social interaction as well as academic and student support services. The main entry is secure yet welcoming and easy to find.



# School & Community Research/Engagement

### **Design Process and Engagement**

This project design and construction effort involved the monumental challenge of organizing people, gathering diverse input, filtering feedback, and integrating the appropriate information into the design from a dozen professional disciplines. The following types of meetings were held in addition to school tours early in design.

#### Meetings & Workshops

| 2018   | 2019  | 2  | 020  | 2021  | 2022   |
|--|---|--|--|---|--|
| Design of Both Schools<br>84 Consultant Team Meetings<br>7 Design Advisory Group Meetings<br>5 Focus Group Meetings<br>4 Building Systems Selection Committee Meetings<br>1 Integrated Design Workshop<br>Many BIM Coordination Meetings |   | Wellington MS-HS Construction         Timnath MS-HS & Stadium Construction         Wellington MSHS Completion         Timnath MSHS Completion         100+ Owner/Architect/Contractor Meetings (for each school) |  |   |  |
| Who was inv<br>District Lead<br>• Superint<br>• Board of<br>Educatio<br>• Operatio<br>• Mainten<br>• Facilities  | ership         tendent         for         on         ons         ance         s         S         Students         Department         Heads* | Focus Groups<br>Administration<br>Performing Arts<br>Children's'<br>Nutrition<br>Security<br>Career Tech   | <ul> <li>Community</li> <li>Parents</li> <li>Community<br/>Members</li> <li>Code/Authorities</li> <li>AHJs</li> <li>Utility Providers</li> </ul> | Professionals• Architect• Lar• Educational• Irrig• Planner• Foc• Contractor• Acc• Mechanical• Day• Electrical• Enere• Plumbing• Auc• Fire Alarm• Low• Civil (2)• Pere• StructuralSystem | dscape<br>lation<br>Id Service<br>Justics<br>lighting<br>rgy Modeling<br>lio/Visual<br>V Voltage<br>formance<br>tems |

\*Educational Department Heads were included for all disciplines, including but not limited to: art, foreign language, math, science, integrated services/SPED, english, library, athletics, security, grounds maintenance, applied learning, etc.

#### 'Integrate Middle with High School Students'

Through extensive conversation, it was determined by the DAG that an 'integrated' curriculum configuration would be employed at the MS/HS Prototypes wherein middle school students and spaces will be mixed in with high school students and spaces. Benefits to this approach include mentorship opportunities, the ability for advanced students to enroll in higher level educational courses, and an emphasis on cooperation between diverse groups of students.

### 'Connected to Nature'

The buildings were designed to be Connected to Nature. By locating the 36,000 SF Outdoor 'Learning Park' about a central focal point of the building, and through the use of narrow building floor plates, no occupants throughout the building, are ever far from views or access to a secure, pristine, outdoor natural area designed to encourage a connection between the occupants and nature. The Learning Park is fully secured.

### 'Two-Hands'

An equally important and concurrent theme that the design team integrated is the "Two-Hands" Concept, wherein the metaphoric 'hands,' (academic cores,) flanking the Outdoor Learning Park represent the middle school and high school programs and symbolize how these two programs relate to each other around the "Connected to Nature" Design Concept. A variety of student and teacher collaboration spaces, with an emphasis on transparency, encourage collaboration and accommodate supervision.

### 'Flexible for the Future'

The building was designed to be flexible, such that the Owner may implement a variety of educational configurations within the building if programming changes in the future. For example, Science Classrooms are dispersed throughout the building as opposed to being grouped together so that if the Owner desires to keep the middle school students contained in one wing of the building, the infrastructure is in place to support their curriculum without mixing with the high school population. There are exceptions to this integrated approach, such as Locker Room Facilities and Health Clinics, where the building design features the flexibility to keep the student populations separated.

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#### Early Concept Sketches, Models, Renderings

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#### **Concept Exploration: Learning Suite Configurations**

The intent behind these studies is to explore different configurations that offer more flexibility and variety than traditional classroom environments to facilitate different pedagogical approaches. These spaces support colearning, co-creation and open discussion to fully capitalize on the benefits of active learning. Features explored within the concepts include:

- Centralized teacher collaboration area;
- Combination of open and closed classroom environments;
- Multiple direct instruction locations (no designated front of classroom);
- Individualized rooms with a centralized teacher collaboration area;
- Multiple areas within the room for instruction to take place;
- Varied sized of adjacent student breakout rooms to foster collaboration between different sized groups of students;
- Transparency along the circulation spine.



### **Applied Learning Opportunities**

The facility provides abundant opportunities in Applied Learning. Each school features a 7,200-square-foot Career and Technical Education Program supporting three hands-on labs: (1) Woodworking and (2) Metalworking at both schools, as well as (3) Agriculture at Wellington and (3) Robotics at Timnath. Each Workshop is equipped with comprehensive teaching stations for lecture-based instruction, as well as multiple tool workstations for handson instruction.

All Applied Learning spaces open directly to a secure Exterior CTE Yard via overhead sectional doors, facilitating the delivery and storage of materials as well as the on-site assembly of large-scale projects. From inside the building, CTE spaces are highly visible to the general student population, visually engaging peers and highlighting the activity taking place within the Workshops.



### Furnishings

With flexibility and project based learning driving design direction, the furnishings play a vital role in fulfilling the operation of the finished spaces and, thus, were highly integrated into the design process. The design team held a series of meetings focused on furniture specifically to generate necessities and key aspects important for each department and learning function to ensure the FF&E met PSD's needs. Easily movable and reconfigurable furnishings were prioritized along with variation in heights and non-static options for seating to allow students agency and choice as well as flexibility for rooms to change purpose in the future.

Another vital furniture element was the provision of functional storage solutions.

Minimal casework is built into the classrooms to intentionally allow space for optimal furniture solutions that would (1) meet the needs for project-based learning materials, (2) provide mobile storage options that could transition from room to room, and (3) allow for more efficient space. Proper furnishings for the teacher collaboration spaces prioritized a homebase for the teachers, since classrooms may not be owned. These rooms also provide furniture for team-teach meetings as well as retreat space for staff to take a break on their off-period. Many specific needs were also addressed through equipment and furnishings selection in CTE programs.



# Physical Environment Design

#### **Site Organization**

Both project sites were annexed from one municipality to another and had significant drainage issues needing mitigated. Both sites also provide building components for middle school and high school educational and athletics curriculum, as well as site amenities such as: ample site circulation, athletic fields and facilities, student, visitor and staff access drives and parking, bus/parent drop-of areas, infrastructure for an irrigation pond at the Wellington Site, and run-of detention on previously undeveloped sites.

### **Districtwide Stadium**

The Timnath site is larger to accommodate a districtwide stadium with seating and amenities for 3,500 spectators. The stadium includes buildings to support home and visitor ticketing, concessions, toilets, home and visitor team rooms and storage, and a press box for coaching staff and administration. The Stadium is intended to support large intra-District and inter-District athletic events, including football games, soccer matches, lacrosse matches, and track + field meets.





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Overall Axonometric Rendering

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#### Flex Studio Classrooms Physical Environment Design Classrooms 201-10-1 **Building Form** Mechanical One enters the building from the south, moving through H the main entry and into the Commons. Admin and CTE are ----located to the west. Performing Arts and Athletics are located Shark to the east, and classroom wings are located to the north. Tank Main Gym Media Center Learning Park **CTE/Business** Aux Gym Flex Studio Classrooms Classrooms MA Flex Studio T) 10----Music/ 0000 Performing Arts ħΓ Forum Wing ..... Foreign Language Classrooms 5 -0 $\odot$ LEVEL TWO Kitchen Main LITT north 1 Learning Park ]]Ę ·# CTE Wing Comn Music/ Performing Arts Wing Main Entry Art Wing Admin Wing

Aux Gym

#### LEVEL ONE

# Physical Environment Design

### **Building Environment**

A pedestrian promenade at the south façade of the building guides visitors to the **Main Entry**. The Administration Area, equipped with a secure entry vestibule, promotes a welcoming entrance while requiring visitor check-in prior to entering the facility.

The **Commons** is the first major area the visitor experiences upon entering the building and it functions as a multi-purpose gathering space, cafeteria, and prefunction area for the adjacent Performing Arts and Gymnasium. A tiered 'Learning Stair' provides a practical and flexible space for students to gather.

The (outdoor) **Learning Park** is immediately adjacent to the Commons with multiple access points. The Learning Park provides 'active' and 'passive' zones (for formal instruction as well as student lounge areas) while large enough to contain the entire student population. Mobile furniture is situated at the perimeter of the Learning Park and encourages multi-use configuration and rearrangement.

Also flanking the Commons is the **Performing Arts Wing**, situated to provide acoustic separation from the rest of the building. This multi-purpose space features telescoping chair platform seating which when opened can accommodate seating for 392 spectators (454 at Timnath) immediately adjacent to the Stage. When the telescoping chair platforms are closed, this is a 3,400 SF multipurpose room (4,400 SF at Timnath).

The **Athletics Wing** Features a Competition Gymnasium with retractable seating to accommodate the entire student population while featuring three competition courts. An Auxiliary Gym is also provided, with retractable seating and two competition courts. Three 42'x42' Flex Studios accommodate a variety of programmatic needs including space for Wrestling, Cheerleading, Dance, Yoga and Health Classrooms. Toilet facilities are designed to serve spectators at the exterior athletic fields for afterhours competitive events as well as the Gymnasium occupants.

The **Career Tech and 2D/3D Art Programs** are adjacent to one another promoting collaboration, and 2D Art is adjacent to the Learning Park for prominent daylighting and ease of access to the outdoors for sketching.

The **Forum**, located on the second floor above the Main Entry, is a unique lecture space for up to 150 occupants.

The **Media Center**, also on the second floor, opens to the Commons space below and is equipped with a variety of learning environments for maximum flexibility. Technology enhancements support a modern, innovative learning environment and multiple sizes of learning spaces encourage a range of activity.

Photo of the Main Entry

![](_page_13_Picture_13.jpeg)

Photo of the Secure Entry Vestibule from Admin

![](_page_13_Picture_15.jpeg)

![](_page_14_Picture_0.jpeg)

![](_page_15_Picture_0.jpeg)

View of the Stage in the Performing Arts space being used for student instruction (main image). View from stage of telescoping seating for performances (inset).

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![](_page_16_Picture_1.jpeg)

The Athletics studio serves multiple purposes, with transparent views and garage doors that open into the gymnasium. 2

![](_page_18_Picture_0.jpeg)

![](_page_18_Picture_1.jpeg)

Clockwise from Top Left: Hallway breakout space looking into applied learning studio, Textiles studio, science classroom, the Forum.

![](_page_18_Picture_3.jpeg)

![](_page_18_Picture_4.jpeg)

![](_page_19_Picture_0.jpeg)

![](_page_20_Picture_0.jpeg)

# Sustainability & Wellness

#### Integrated Design Workshop

To best create a comprehensive design that would support the high-performance goals of the client, the design team held an Integrated Design Workshop during Schematic Design to encourage integrated, holistic thinking over isolated, layered thinking. This approach acknowledged that all members together are smarter than any one team member individually. In this workshop, every member of the design team was represented to evaluate how each discipline would positively influence indoor environmental quality, energy efficiency, and maintainability. This Design Workshop included 10-minute presentations from each discipline to present lessons learned, coordination needs and associated timing, as well as project opportunities. Small group breakout sessions helped to establish project goals and develop lists of high-performance building features that could generate 10% or more energy cost savings beyond code requirements. The meeting attendees regrouped to establish consensus before progressing forward.

### **High-Performance Metrics**

Although a high performance, energy-efficient facility was always a project requirement, a grassroots effort from the community called for an integrated approach to evaluating the building for holistic sustainability. As a team, the energy modeler, design team, and owner reviewed the design under LEEDv4 BD+C for Schools and found the design was inherently certifiable. Not only energy efficiency, but indoor air quality, profuse daylight and quality views, acoustic performance, and sustainable materials make this project green on many fronts.

![](_page_21_Picture_5.jpeg)

## Sustainability & Wellness

#### **Biophilic Design**

In addition to visual connections with nature and abundant daylighting, biophilic design also guided materials selection and reinforces the schools' connections with nature. Natural materials (polished concrete, textured pre-cast, glulam beams, textural tiles and natural colors) serve as visual backdrops, allowing views of the Learning Park to take center stage. Flowing serpentine walls surround soften the angular corners of the building and create opportunities for breakout space from the main corridors.

### **Sustainable Features**

The **Geo-Exchange HVAC System** has an annual Energy Usage Intensity (EUI) of just 26.5 kBTU/SF. A de-centralized HVAC system necessitated heat pumps be located throughout the facility in strategically located mechanical closets. The Design Team provided large, writable maker board doors at these mechanical closets throughout corridors for ease of maintenance access, which the students could use in break-out learning. These schools operate well below normal ranges for an "efficient" high school of similar size.

**Mechanical sustainability** features include geothermal Energy, RTUs with Energy Recovery Wheels, an efficient condenser water pumping system, and recirculation systems applied at the CTE to recycle over 10,000 CFM. Energy Efficient LED Lighting combines with occupancy sensors and daylighting controls.

**Xeriscape and native landscaping** were used throughout the sites to conserve irrigation water.

#### Low VOC Building and Finish Materials include:

- Concrete and wood were used throughout. Carpeting patterns mimic those found in nature.
- Rubber flooring with subtle-stone look and durability, heavy-duty wall protection embossed with wood graining in a natural wood color, porcelain tiles along full height walls offer sensory experiences plus durability

- Views to learning park from virtually any common area of the school allows for the seasonal changes to add a bulk of the "color" as part of the interior palette
- Natural, renewable materials were used, such as Wood Glulam Structural Roof Beams
- Daylighting maximizes sunlight indoors while limiting glare and solar heat gain, and engineered glazing with Low-E coatings was used throughout.

The **highly efficient envelope** utilizes structural precast concrete panels to add mass and increase energy efficiency while Sprayed-In-Place insulation maintains thermal, air, vapor barrier integrity.

**High efficiency plumbing fixtures** help perform over 30% better than LEED V4 baseline requirements for water.

**Off-site pre-fabrication** of components further contributes to sustainability. Thru BIM coordination efforts, wherever possible, site and building components were fabricated in sections in a controlled shop environment, then shipped to the site and installed in the largest sections possible. This method significantly reduced construction site materials waste throughout the course of the Projects.

![](_page_23_Figure_0.jpeg)

## Results of the Process and Project

PSD's middle/high school design exemplifies connections with nature through a flexible, transparent, biophilic-inspired design that provides abundant learning opportunities for students and staff while delivering a healthy and delightful learning environment.

The buildings' organization around 'Learning Suites' helps to facilitate **student agency** by providing a variety of learning spaces. These elements help to promote **autonomy** and agency as students move from middle through high school.

**Teacher collaboration** is encouraged within the Teacher Collaboration Studios.

The building is **flexible** enough to be reconfigured (as needed) when the facility transitions from a middle-high school model to high school-only model in the future.

Applied Learning spaces are also abundant, affording many opportunities for **hands-on learning**, helping to engage students with peers in project-based academics. Glass delivers both **transparency** into applied learning spaces and creates 'implied supervision', delivering even more student agency while teachers maintain supervision.

All of these elements help provide students opportunity for growth and enhance their independence as they move through middle and high school.

![](_page_23_Picture_8.jpeg)

![](_page_23_Picture_9.jpeg)

Applied Learning workshops