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Executive Summary

The Alaska Department of Education and Early Development (DEED) contracted with McDowell Group to explore the feasibility and benefits of developing Alaska school facilities building systems standards as directed in Alaska Statute (AS) 14.11.017(d).

The State of Alaska funds a high proportion of school facility construction and indirectly funds facility maintenance and operations. The State, therefore, is motivated to consider implementing standards that would result in cost-effective school construction while minimizing future maintenance and operating costs.

In states/provinces contacted for this research, educational equality and equity were the primary motivations for developing facilities standards, rather than cost savings. Environmental and efficiency considerations were also initial objectives of implementing standards. Standards developed by other states/provinces also vary in their complexity and detail, with construction and building systems standards often included as a chapter in a more detailed planning document.

McDowell Group used a combination of secondary research and executive interviews to estimate costs to develop and periodically update building system standards. Interviews were conducted with Bond Reimbursement and Grant Review (BR&GR) Committee members, school facilities professionals in other states/provinces, DEED Facilities staff, and other professionals.

Building System Standards Development and Update Costs

Two scenarios were considered for developing and updating standards: the first led by DEED staff and the second led by contractors.

In-house development of standards is expected to cost between $58,000 and $60,000, including DEED staff time and professional services expense for a contracted technical review of draft standards. Contractor-led development is expected to cost between $119,000 and $131,000, including standards drafting by an architecture firm and DEED staff project management and support costs. Implementation costs are expected to total approximately $7,000 in both scenarios. These costs include staff time related to review and approval of standards by the BR&GR Committee and the State Board of Education (SBOE) approval process.

Due to existing DEED staff workloads, in-house development of standards is expected to require two years to complete, while a contractor-led process is expected to take one year. The financial costs estimated in this study do not account for the opportunity cost of delays in other DEED Facilities staff work which would likely be impacted by in-house standards development.

While other states/provinces and districts have a variety of methods and schedules to update standards, interview research found that regular standards updates are critical to ensure continued relevancy and use of the building systems standards. Standards should be updated every year to ensure continued use.

Average annual update costs are expected to range between $5,200 and $8,700 if performed by department staff. This range reflects the recommendation to contract with a professional architecture or engineering firm.
every three years to conduct a more detailed review of standards. The cost of annual updates is expected to average between $11,300 and $12,500 annually if led by a contracted firm. Staff costs associated with BR&GR Committee review of the annual updates is expected to cost $1,500 regardless of in-house or contractor-led update. These annual costs are based on the average time estimated to update standards and will likely be higher or lower in individual years based on the extent and complexity of required changes.

### School Facilities Building Systems Standards
Development and Annual Update Costs, by Development Type

<table>
<thead>
<tr>
<th>Category</th>
<th>In-House Costs</th>
<th>Contractor Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Draft Standards Development</td>
<td>$51,000 - $53,000</td>
<td>$112,000 - $124,000</td>
</tr>
<tr>
<td>Implementation</td>
<td>$7,000</td>
<td>$7,000</td>
</tr>
<tr>
<td><strong>Total Development Costs</strong></td>
<td><strong>$58,000 - $60,000</strong></td>
<td><strong>$119,000 - $131,000</strong></td>
</tr>
<tr>
<td><strong>Update Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards Update Costs</td>
<td>$3,700 - $7,200</td>
<td>$9,800 - $11,000</td>
</tr>
<tr>
<td>Committee Review Costs</td>
<td>$1,500</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Average Annual Update Costs</strong></td>
<td><strong>$5,200 - $8,700</strong></td>
<td><strong>$11,300 - $12,500</strong></td>
</tr>
</tbody>
</table>

Source: McDowell Group

**Benefits of School Facilities Building Systems Standards**

Building systems standards have the potential to result in overall cost savings for the State and local school districts. Because school districts contract for construction and maintenance services, estimating statewide cost savings associated with building systems standards is difficult. Standards may either increase or decrease construction costs for new facilities. However, increasing efficiency and component quality is expected to reduce lifecycle operating and maintenance costs, relative to what those costs would be in the absence of standards. Due to existing deferred maintenance, reducing life cycle costs on new facilities may not reduce overall maintenance spending by the State or local school districts.

Additional non-financial benefits of implementing standards will likely include enhanced efficiency of DEED review of construction applications and improved cost forecasting by the State and local districts.
Introduction and Methodology

Introduction

The goal of this project is to consider the feasibility and benefits of developing Alaska school facility building systems standards. These system standards will identify the quality and/or quantity of systems and components needed to ensure cost-effective school construction in Alaska.

Background

In 1993, the Alaska State Legislature, with AS 14.11.014, created the Bond Reimbursement & Grant Review (BR&GR) Committee, within the Department of Education & Early Development (DEED). AS 14.11.014(b) directed the committee to do the following (among other responsibilities):

- Develop criteria for construction of schools in the state; criteria developed under this paragraph must include requirements intended to achieve cost-effective school construction;
- Recommend to the board necessary changes to the approval process for school construction grants and for projects for which bond reimbursement is requested;
- Set standards for energy efficiency for school construction and major maintenance to provide energy efficiency benefits for all school locations in the state and that address energy efficiency in design and energy systems that minimize long-term energy and operating costs.

In 2001, the BR&GR Committee, along with DEED, initiated a targeted effort to produce cost-effective school construction criteria. This initiative included drafting standards but was discontinued in 2002 due to staffing changes. In April 2017, the BR&GR re-established a subcommittee charged with continuing the development of construction standards. In December 2017, the BR&GR Committee delivered a report to the 30th Alaska Legislature titled Criteria for Cost-Effective School Construction. Criteria #11 of that report recommended the development of “Model Alaskan School standards by building systems to establish the quality and/or quantity of system components needed to ensure cost effective school construction across the state.” The Committee also cited the department’s broad authority to revise a project’s scope and budget, noting that standards would provide transparency to this process and contribute to standardized review of project proposals.

In 2018, passage of House Bill (HB) 212 added the following subsection to AS 14.11.017(d):

- The department shall develop and periodically update regionally based model school construction standards that describe acceptable building systems and anticipated costs and establish school design ratios to achieve efficient and cost-effective school construction. In developing the standards, the department shall consider the standards and criteria developed under AS 14.11.014(b).

As one response to this mandate, DEED completed a template for proposed construction and design standards by building system, vetted this template through the BR&GR, and began drafting construction standards.

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1 Report to the Legislature on Criteria for Cost Effective School Construction, Bond Reimbursement & Grant Review Committee, December 2017.
sections based on that template. This project, the *Alaska School Facility Building Systems Standards Feasibility Study*, was the DEED’s next step in the process of determining how best to complete the development of model school construction standards for Alaska.

**Scope of Work**

This study included two basic components: 1) a feasibility analysis intended to determine how best to develop model school construction standards for Alaska, and 2) development of a cost/benefit modeling tool to compare the costs and benefits Alaska could realize with development and implementation of model school standards.

1. **Feasibility Study** – The feasibility study evaluates the anticipated time and cost to complete, implement, and maintain state-level model school standards. Utilizing the methodology and research tools described below, the feasibility study considered whether the State of Alaska should develop and maintain standards in-house or contract for the development and maintenance of standards. Further, under those options, the study considered whether the State should complete current draft standards or adapt existing standards, either from other states or relevant national standards.

2. **Cost-Benefit Model** – An Excel model was constructed to support comparison of the time and costs to complete, implement, and maintain system standards against possible benefits. Those benefits might include cost savings (capital, maintenance or operating), improvements in the quality of the school facility, or even improvements in educational delivery. The primary research task was designed to identify as accurately as possible the costs associated with developing and maintaining school standards. Research also qualitatively addressed main components of cost savings the department and school districts could realize as a result of standards implementation. Quantifying the potential benefits was outside the scope of this research; however, the Excel model developed includes a framework for benefits analysis.

**Research Methods**

**Secondary research**: Secondary research was conducted to identify other state-level agencies that have pursued or published school design and construction standards, including ‘in-house’ standards establishing cost effective building systems and components or state-specific adaptations of national standards (i.e., LEED, Collaborative for High Performance Schools (CHPS), etc.). This initial secondary research informed the executive interview process, described below.

**Executive interviews**: Interviews were conducted with a total of 29 “key informants” or project stakeholders. These included:

- Members of the BR&GR Committee (seven interviews)
- DEED Facilities staff (five interviews)
- Officials from other states/provinces with experience in developing and maintaining school construction standards (12 interviews)

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• Other knowledgeable professionals, including district-level facilities managers and consultants (three interviews)

A primary purpose of these interviews was to learn about others’ experiences regarding the benefits, costs, and challenges associated with developing model school standards. Interviews were also used to assess costs and benefits of in-house development versus contractor development of school standards. Interviews with DEED Facilities staff were critical to understanding the in-house time required to complete the current draft standards.
School Construction Standards

This chapter summarizes interview research findings related to motivations for developing standards and the structure of standards created outside of Alaska. State education departments and districts often have varied motivations for implementing school facility standards and standards differ in both complexity and content. While interview participants were expressly asked to address the building systems portions of their standards, these factors influenced each state or districts perceived costs and benefits from implementing standards.

Motivations for Developing Standards

Construction cost savings did not primarily motivate the implementation of school construction and building systems standards among states interviewed. Many participants noted that educational equality and equity were the main drivers for the creation of standards. Environmental and energy efficiency were also primary considerations in some participant states/provinces’ decision to implement standards, including energy and water conservation. Many states/provinces were motivated by quality in construction and increasing school facility lifespans.

The following sections briefly outline motivations for implementing school facility standards among states/provinces which participated in this study.

Alberta (Canada)

The province has technical design requirements for all government infrastructure projects. The goal for schools is to deliver buildings that exceed by 30% the government’s baseline construction quality and energy efficiency standards.

Arkansas

Standards were developed in response to a Supreme Court ruling that ordered the state to identify equitable standards for school facilities.

Colorado

An initiative to increase energy efficiency and building sustainability across the state prompted the state architect’s office to implement LEED requirements for all state-funded buildings. As school construction is separate from the architect’s office, the Capital Construction branch of the education department created building guidelines that incorporate a choice of three existing green building certification programs into school construction, including CHPS, LEED for Schools, and Green Globes.

Maine

The governor directed the development of standards to provide equitable facilities across the state. The focus of the building standards is on a minimum quality standard for school facilities and the state funds 100% of the costs incurred to meet required or recommended criteria. Due to high state funding, construction guides serve
as a mechanism to control project size and construction costs. Life cycle costs, high-performance, and green buildings, flexibility, construction and maintenance costs, and durability are essential themes of Maine's construction guide.

New Jersey

The New Jersey School Development Authority fully funds and manages school construction in 30 districts as mandated by the state Supreme Court to provide students with equal access to education through equitable school facilities. The current set of standards are designed to streamline the design-build process to deliver quality schools on time.

New Mexico

A lawsuit brought against the state in 1999-2000 found the state did not treat all districts equally as required by the state constitution. As such, the state changed the funding structure for schools, now funded through oil and gas proceeds, and developed the New Mexico Public School Facilities Authority, which assessed and ranked all existing schools. The result is a set of adequacy standards for existing schools and another set that builds upon those for new school construction projects.

Ohio

In 1997, the standards were created to provide equal opportunity to all students in Ohio through equitable school facilities, as directed by the legislature. The overall goal is equality, but a focus on planning for quality, pricing, and materials is secondary.

Saskatchewan (Canada)

After assessing the province was ten years behind in school capacity, Saskatchewan created a model standard to build a set of nine school sites, with 18 total schools, around a common design (for each site, two schools (one public, one private) with a shared gym, community center and childcare center connecting the schools). The goal is to reuse the developed standard for future projects.

Washington

Schools in Washington are designed and built through local districts and must incorporate green, sustainable, high-performance aspects into building and renovating schools that are state-funded. Schools can use either LEED for Schools or Washington Sustainable Schools Protocol (WSSP) options. The WSSP is a self-certifying process modeled after CHPS but heavily adapted to fit the needs of Washington state. Certification is required for schools receiving any form of state capital funding and heavily encouraged for non-state-funded school.

Standards Structure

Of states/provinces participating in this study, all standards development began by integrating existing state and international building codes. Standard codes referenced include American Society of Heating, Refrigerating
and Air Conditioning Engineers (ASHRAE), National Fire Protection Association requirements, and the International Green Building Code.

Many states/provinces have more extensive standards than those outlined in Alaska’s School Design and Construction Standards Handbook, with construction and building systems standards included as a chapter in a more detailed school planning document. Other content often included are education specifications or square footage assignments.

Facility standards vary in format and use of technical language based on the intended audience. Standards for use by designers or engineers are more technical and often include architectural or engineering diagrams, while standards written for school district or other stakeholder use are often more user-friendly and rely less on technical language. The standards also vary in the precision of their writing due to their inclusion in statutory regulations and requirement for review by legislative committees. In addition to required components, some standards specify either premium features that districts may elect to pay for or materials that are not allowed in school construction.

The following sections briefly describe the content and structure of school facility standards among participating states/provinces.

**Alberta (Canada)**

The Cost Management Standards and Technical Design Requirements outline the expected building quality, what materials not to use in building, what design characteristics are not allowed, and funding ratios for different locations. The province-wide, highly detailed, Technical Design Requirements establish a baseline for all government buildings. Additionally, schools have specific requirements in different areas, including sustainability, structural, mechanical, electrical, acoustical, municipal and environmental engineering, radon mitigation, and guidelines for wildfire protection. As part of sustainability requirements, all new construction and significant renovations are required to achieve at least a LEED Silver certification. ASHRAE standards are a base for mechanical systems standards as is the International Building Code as a whole.

**Arkansas**

Building systems standards are a chapter in the more extensive School Facilities Manual that includes not only building standards but master planning guides, education specifications, and additional guidelines recommended for performance or construction items. There is also an allowance for variances if approved by the state.

**Colorado**

The Public School Construction Guidelines are a brief document outlining the codes to use, which codes apply to specific building aspects, and a section on school safety and security. Building performance guidelines refer readers to the High Performance Certification Program and additional optional standards available. There is an emphasis on sized-right schools and life-cycle of buildings.
Maine

School planning documents are broken into three guides: one for educational specifications, that informs the rest of the design process; space standard allocations for square footage; and the construction and renovation guide that contains specs like site planning, exterior, and interior finishes, HVAC, electrical, and other requirements. To provide flexibility and minimize updates, the construction guide allows some variability for new technologies and products to be considered. A focus on energy efficiency, life-cycle costs, and recyclable materials emphasize the need for high performing schools. International building codes and others like ASHRAE, International Energy Conservation Code, and National Fire Protection Association standards and all state codes are a base starting point, and additional requirements build upon these in relevant categories. These standards are written for both school districts and designers; while technical, they are also relatively user-friendly.

New Jersey

The School Development Authority (SDA) Material and Systems Standards have two main parts: Design Requirements outlining highly detailed requirements for materials and systems and a document with technical drawings and plans for construction details. These documents are primarily for use by designers and SDA staff and are written for a professional audience. Some sections in the standards are under development and are bridged with other resources including performance specifications that list required performance factors for various materials and systems, design bulletins, and other addendums for standards of components like acoustics and commissioning. Collectively, these additional documents allow for updates more frequently and quickly than the standards document, and many are the results of feedback during the design-build process.

New Mexico

The existing school standards called Adequacy Standards are a statutory document that assesses schools based on minimum square footage and performance characteristics to ensure the state graduation requirements can be met through the building; deficient schools receive a calculated update cost to bring them up to adequate quality.

New school construction projects must follow the Adequacy Planning Guide going beyond and builds on the Adequacy Standards. These standards also set out limits for what the state funds and what the district must fund. The New Mexico Public School Facilities Authority is also the project manager for all state-funded school projects, which increases their ability to oversee compliance. Requirements are clearly laid out, as well as best practices for consideration. HVAC and control standards have a separate guide, referenced in the Adequacy Standards.

Ohio

School Construction Standards have two volumes: one for use by districts and written for that audience, and a technical components document. The standards begin with national building codes which are then exceeded in many areas, like fire sprinkler requirements. Components and specifications are based on a 50-year building lifetime standard. Project planning and preparation are state-funded and overseen by a state planner who meets with districts to develop their project. The standards include all requirements necessary to certify as LEED Silver
at a minimum. The district document is user-friendly, while the construction document is more specific and relatively technical with graphs, charts, and diagrams.

**Saskatchewan (Canada)**

The project standards emphasized output and performance with a focus on energy efficiency, abuse-resistant materials, and innovation. To keep these standards relevant for the variety of sites and future projects, lifespans for materials and performance were listed instead of specific materials. Some material types are required in specific educational spaces, like carpeting in libraries.

**Washington**

Districts have local control over the school planning and building process but must conform to High-Performance School Buildings Program requirements either through LEED certification or through the self-certifying WSSP protocol if applying for state funds. Both use a rating program based on points allocated for different categories in sustainability, site preparation, water usage, waste reduction, natural lighting, and material specifications. The WSSP contains a section on incorporating the design and building process as well as future building systems monitoring into the school's curriculum. While the WSSP is a technical document with an elaborate point system, it is written for non-facilities district and school staff.
Study Findings

The following sections describe the financial costs and benefits associated with the development and upkeep of state building systems standards. Estimates are based on interview research with school facilities professionals in Alaska and several other states.

Standards Costs

This section describes costs associated with initial development and periodic update of state building system standards. Two scenarios are considered for standards development and update: the first in which processes are led by DEED staff and the second in which the processes are contractor-led.

Development Costs

Building systems standards development may be led either by department staff (“in-house” development) or a contractor firm or firms (“contractor” development). In-house standards development is expected to cost between $58,000 and $60,000 based on prevailing contractor rates. Contractor-led development is expected to cost between $119,000 and $131,000. While contractor-led development has a higher expected cost, an in-house standards development project is expected to require more time due to existing staff workloads.

The following sections describe in detail the expected costs associated with each development process.

Table 1. Expected Development Costs by Development Type

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>In-House Development</th>
<th>Contractor Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Costs</td>
<td>$51,000 - $53,000</td>
<td>$112,000 - $124,000</td>
</tr>
<tr>
<td>Department staff costs</td>
<td>$37,000</td>
<td>$22,000</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$14,000 - $16,000</td>
<td>$90,000 - $102,000</td>
</tr>
<tr>
<td>Implementation Costs</td>
<td>$7,000</td>
<td>$7,000</td>
</tr>
<tr>
<td>Total</td>
<td>$58,000 - $60,000</td>
<td>$119,000 - $131,000</td>
</tr>
</tbody>
</table>

Source: McDowell Group

IN-HOUSE DEVELOPMENT

This section considers the costs associated with standards development led by DEED staff. In-house standards development is expected to require two full years, with a total expected cost between $51,000 and $53,000. While DEED staff have the expertise to develop draft standards, interview research findings suggest a technical review by a contracted firm or firms would be important for standards development.

Table 2. In-House Development Costs by Cost Category

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department staff costs</td>
<td>$18,000</td>
<td>$19,000</td>
<td>$37,000</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$6,000 - $7,000</td>
<td>$8,000 - $10,000</td>
<td>$14,000 - $16,000</td>
</tr>
<tr>
<td>Total</td>
<td>$24,000 - $25,000</td>
<td>$27,000 - $29,000</td>
<td>$51,000 - $53,000</td>
</tr>
</tbody>
</table>

Source: McDowell Group
**Staff Costs**

Interview participants familiar with the DEED Division of Finance and Facilities agreed the department staff have the expertise and ability to consult with other professionals necessary to lead development of the building systems standards. Two staff members with the following job class titles would have the highest level of and most direct involvement with draft development: Technical Engineer 1/Architect 1 and Architectural Assistant. Based on previous project time requirements and the current draft template status, developing a full building systems standards draft would require an additional 450 hours of staff time, approximately two hours each week for both staff members. Estimated staff hours to develop the standards draft are expected to be divided between the staff positions indicated above. Staff costs to develop the standards draft are estimated at $34,500.

Developing standards in-house would probably require the involvement of additional division staff in support activities. This includes coordination of any special meeting held to address this project by a staff member in a School Finance Specialist position. These activities would likely require 40 hours over the entire project, an estimated $2,500. Additionally, this project would likely require a low number of hours by the Director of Finance and Support Services related to project oversight, a cost of approximately $200 over two years. These estimates exclude staff involvement in the BR&GR Committee review process and the State Board of Education (SBOE) approval process.

**Professional Contract Costs**

Interview participants noted that the BR&GR Committee and other organizations like the Association for Learning Environments (A4LE) could provide a technical review of standards drafted by department staff at no cost. Several states and school districts solicited feedback and review from contractor firms who are often involved in school construction projects in their area through personal communications, rather than a formal contracting review process. This informal review was helpful for states and districts in gaining additional knowledge of the best standards and creating buy-in with contractor firms.

While participants found the informal review of the draft standards helpful, several participants also recommended contracting formally with engineering or architecture firms to provide a technical assessment of standards produced in-house. Interview participants especially noted outside technical review as essential to address regional standards differences and stressed the importance of contracting with Alaska firms familiar with the state’s climate regions.

Engineering or architecture firm technical review can be performed either at intervals throughout the development process or when state staff have created a full standards draft. States like Maine collaborated with firms throughout the standards development process and interview participants suggested that periodic consultation with a contracted firm throughout the development process would be most effective if standards were developed in-house. Benefits of this process include early review and the ability to engage a broad set of expertise.

Costs for both review throughout the development process or a single review of the draft standards are expected to vary between $14,000 and $16,000 based on prevailing contractor rates.
**Project Duration**

While interview participants suggested department staff have adequate expertise to develop draft standards for review by additional professionals, several participants noted in-house standards development would likely require more time to complete due to the ongoing workload of existing staff. Interview research found states and districts that dedicated staff resources to the project full time completed standards drafts in a shorter time period compared to those whose staff were also engaged in ongoing department work. Given the current size and workload of the Facilities staff, in-house standards development is expected to require two full fiscal years.

The costs outlined in this study do not account for the potential delay in other DEED staff work which may be impacted by in-house standards development.

**Contracted Development**

This section considers the costs associated with standards development led by a contractor firm or firms. Development led by a contracted firm is expected to require only one year, with a total expected cost between $109,000 and $125,000.

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department staff costs</td>
<td>$22,000</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$90,000 - $102,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$112,000 - $124,000</strong></td>
</tr>
</tbody>
</table>

Source: McDowell Group

**Professional Contract Costs**

Several states’ standards development processes were led by national contractor firms which specialize in developing school facility design standards which often include building systems standards. National firms often subcontract with engineers or other professional firms where specific expertise is required. Services may consist of stakeholder engagement or SBOE process work.

While national firms have significant expertise in standards development, several interview participants stressed the importance of engaging Alaska contractors due to the specialized nature of construction throughout the state. Participants agreed that firms with construction experience in Alaska’s four climate zones would be best positioned to develop building systems standards which incorporate the significant regional variation in the state.

Based on contracting primarily with an Alaska firm (or firms), which may subcontract specific components of standards development, this project is expected to require professional services costs between $87,000 and $99,000 based on prevailing contractor rates. Additionally, the contracted firm or firms will likely require reimbursement for travel costs to meet with department staff. Estimated travel expenses of $3,000 are based on four people traveling to Juneau to meet with staff, either in a single site visit or multiple individual visits. Combined contracted firm costs between $90,000 and $102,000 are estimated for contractor-led development.

Selection of a national contractor to lead the standards development process is expected to result in higher costs, including significantly higher travel costs from a destination outside Alaska.
**Staff Costs**

In several states, contractor-led development processes also required department staff involvement throughout the standards drafting period. The project is expected to require the Technical Engineer 1/Architect 1 to devote between one and two hours per week to the project, including contractor update meetings and other project management duties. Additionally, a School Finance Specialist is expected to devote an average of half an hour to one hour per week to the project, also including coordination of contractor update meetings.

These activities would likely require 250 hours over the entire project, an estimated $22,000.

**Project Duration**

Several interview participants suggested a contractor-led standards development process could be completed in less time compared to an in-house process due to the contractors’ ability to dedicate professionals to the project. Interview research found states and districts whose standards development process was led by a contracted firm required approximately one year to prepare a draft for the SBOE process.

**Adapted Standards**

Numerous building system-specific standards exist which could be included in a set of Alaska standards. For example, ASHRAE publishes standards often cited in other building system standards. However, neither interview research or secondary research uncovered a national building systems standard which conformed to the standards designed as outlined in the department *School Design and Construction Handbook Draft*.

ASHRAE publishes the *Advanced Energy Design Guide for K-12 School Buildings* manual for free use by states and districts. This guide does include guidance on components of a complete building systems standards, including guidance for envelope and roof construction. This resource could provide guidance for a subset of Alaska-specific standards.

The US Green Building Council publishes the LEED for Schools manual, which provides a building construction and operations/maintenance rating systems adapted to K-12 school facilities. This resource is referenced by select states/provinces that participated in this research; however, their use of LEED varies. Alberta and New Jersey both incorporate LEED standards into their building systems standards. Colorado and Washington cite LEED as one option for high-performance certification but allow districts to choose which building standard they prefer. Various review and submission fees and processes apply to facilities seeking LEED certification. Interview research found that many districts prefer other high performance certifications due to the additional compliance costs charged by architectural and engineering contractors.

Many states use the CHPS criteria as a guide for building standards or require that buildings are CHPS-certified. CHPS publishes a set of national criteria that may be used by states and districts with no licensing fee. States or districts certifying schools using the CHPS criteria pay an annual membership fee. Due to significant differences in Alaska construction and climate zones, it would be difficult for Alaska districts to comply with the national CHPS criteria. To use CHPS as a building standard, Alaska would need to adapt the standards as have other states like Colorado, Washington, and several states in the Northeast. This would require the State to pay both annual CHPS membership fees and an annual licensure fee.
Due to the incompatibility of national standards with the draft building systems standards compiled by DEED, the standards development costs considered in this study do not include any costs to adapt national standards to Alaska. If DEED chose to adapt CHPS for use in Alaska, the State would pay a one-time licensing fee of approximately $10,000 and an annual state-wide membership fee of approximately $5,000.\(^3\) Licensing fees grant access to the CHPS logo and core criteria for adoption; however, no adaptation services are included in this cost.

**Implementation Costs**

Implementation of building systems standards will require review and approval of standards by the BR&GR Committee. This process will require the involvement of the Director of Finance and Support Services, Technical Engineer 1/Architect 1, and a School Finance Specialist and is expected to cost $3,000 in staff time.

The implementation process will require approval and adoption of the standards by reference into regulation by the State Board of Education and Early Development (SBOE). This process will include staff time to prepare for and attend at least two meetings of the board and will cost an estimated $3,000. The BR&GR Committee and SBOE implementation process is expected to require the same level of staff time regardless of how the standards are developed (in-house or contracted development). The implementation process is not expected to require Legislative approval. Legislative hearings and approval would increase staff time and costs required.

Interview participants recommended that information sessions held for facility construction firms or other stakeholders could be helpful to inform stakeholders and prepare firms for new standards. Department staff could offer one to two hour online sessions to inform stakeholders following the approval process. Assuming the department has necessary online tools to host meetings, holding two information sessions would cost approximately $1,100 in staff time, including presentation preparation and time to conduct sessions.

<table>
<thead>
<tr>
<th>Table 4. Implementation Costs by Cost Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Category</td>
</tr>
<tr>
<td>BR&amp;GR Committee Review and Approval</td>
</tr>
<tr>
<td>State Board Meetings and Regulation Process</td>
</tr>
<tr>
<td>Information Sessions</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Source: McDowell Group

**Update Costs**

Interview participants from outside Alaska had a variety of methods to update standards, ranging from informal updates based on stakeholder recommendation to a formal update process led by a contractor. Interview research found necessary standards update frequency is related to the level of detail and specificity in the states/provinces’ overall facility standards, which often include requirements beyond building systems standards. Interview participants noted that standards included in building systems, like ASHRAE standards, changed more frequently compared to non-building system parts of other states/provinces’ facility standards such as educational standards which experience less frequent change. Interview participants noted that

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\(^3\) CHPS licensing and membership fees were approximated through interview research with states that have adapted CHPS. Fees are likely to vary and may be higher than these quoted fees.
technology and safety standards changed most frequently, two categories not currently included in the department’s *School Design and Construction Standards Handbook*.

Interview research found that regular standards updates are critical to ensure continued relevancy and use of the standards. Several interview participants noted that their state or district spent considerable time and money to update outdated standards after failing to review their documents regularly. Findings suggest state building systems standards should be reviewed and updated annually to ensure continued relevancy and use.

Additionally, the department should provide an avenue for stakeholders to submit requests for standards changes for review. Other states ask stakeholders to submit change requests via email, which are compiled for consideration during the update process. Participants noted this has been a successful process to ensure standards are updated appropriately.

The next sections estimate time and costs required to perform annual standards review and update. Review and update costs are based on the average time estimated to update standards annually and may be higher or lower in individual years based on the size and complexity of required changes. Average annual update costs are expected to range between $5,200 and $8,700 if performed by department staff and $11,300 to $12,500 if performed by a contracted firm.

Table 5. Average Annual Update Costs by Update Type

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>In-House Update</th>
<th>Contractor Update</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Update Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department staff costs</td>
<td>$3,700 - $7,200</td>
<td>$9,800 - $11,000</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$0-$3,500</td>
<td>$8,200 - $9,400</td>
</tr>
<tr>
<td><strong>Committee Review Costs</strong></td>
<td>$1,500</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$5,200 - $8,700</td>
<td>$11,300 - $12,500</td>
</tr>
</tbody>
</table>

Source: McDowell Group

**IN-HOUSE UPDATE**

Study findings suggest in-house review of standards should be performed annually. In-house standards review is expected to require the involvement of the Technical Engineer 1/Architect 1 and an Architectural Assistant, with a combined 40 hours necessary for review and update each year. Staff update costs range from an estimated $3,500 in the first year following implementation to $4,000 in the fifth year following implementation due to staff cost inflation.

Additionally, it is recommended that the department engage a contractor firm every three years to perform a more detailed review of the standards every three years, aligning with statewide update of the Building Life Safety Code. Contractor review by an Alaska firm or firms is expected to cost between $3,000 and $3,500 in the third year following standards implementation based on contractor rates and expected inflation.

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4 Alaska adopts an updated version of the International Building Code every three years. The state is currently in the process of adopting the 2015 International Building Codes.
Table 6. In-House Update Costs by Cost Category

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department staff costs</td>
<td>$3,500</td>
<td>$3,600</td>
<td>$3,700</td>
<td>$3,800</td>
<td>$4,000</td>
<td>$3,700</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$0</td>
<td>$0</td>
<td>$3,000 - $3,500</td>
<td>$0</td>
<td>$0</td>
<td>$600 - $700</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$3,500</strong></td>
<td><strong>$3,600</strong></td>
<td><strong>$6,700 - $7,200</strong></td>
<td><strong>$3,800</strong></td>
<td><strong>$4,000</strong></td>
<td><strong>$4,400</strong></td>
</tr>
</tbody>
</table>

Source: McDowell Group

**CONTRACTED UPDATE**

Study findings suggest contractor-led standards updates should be performed annually. While exact professional services costs may vary due to the complexity or amount of necessary changes, professional services are expected to cost between $8,000 and $10,000 annually in each of the first five years following implementation.

A contractor-led update process would require department staff involvement. The process is expected to require the Technical Engineer 1/Architect 1 to devote approximately eight hours annually to the update process, including contractor update meetings and other project management duties. Additionally, a School Finance Specialist is expected to devote approximately four hours to the update process annually, including coordination of contractor update meetings. Staff costs would range from an estimated $1,500 in the first year following implementation to $1,700 in the fifth year following implementation due to staff cost inflation.

Table 7. Contractor Update Costs by Cost Category

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department staff costs</td>
<td>$1,500 - $9,000</td>
<td>$1,550 - $9,000</td>
<td>$1,600 - $9,000</td>
<td>$1,650 - $10,000</td>
<td>$1,700 - $10,000</td>
<td>$1,600 - $9,400</td>
</tr>
<tr>
<td>Professional services contract costs</td>
<td>$8,000 - $8,000</td>
<td>$9,000 - $9,000</td>
<td>$8,000 - $9,000</td>
<td>$8,500 - $10,000</td>
<td>$8,500 - $10,000</td>
<td>$8,200 - $9,400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$9,500 - $10,550</strong></td>
<td><strong>$9,550 - $10,550</strong></td>
<td><strong>$9,600 - $10,600</strong></td>
<td><strong>$10,150 - $11,650</strong></td>
<td><strong>$10,200 - $11,700</strong></td>
<td><strong>$9,800 - $11,000</strong></td>
</tr>
</tbody>
</table>

Source: McDowell Group

**BR&GR COMMITTEE REVIEW COSTS**

Standards updates are expected to be reviewed and approved by the BR&GR Committee annually. This process will require the involvement of the Director of Finance and Support Services, Technical Engineer 1/Architect 1, and a School Finance Specialist. Staff costs are expected to range from $1,500 in the first year following implementation to $1,700 in the fifth year following implementation due to staff cost inflation.

**REGULATION UPDATE COSTS**

Standards are expected to be adopted by reference in regulation by the SBOE. Annual standards updates are assumed to be included in routine updates by the Facilities staff, requiring no additional staff time or costs for presentation preparation.
Standards Benefits

Between FY2006 and FY2015, State aid for school capital projects, including construction and major maintenance, totaled nearly $2.0 billion (an average annual of nearly $200 million). Additionally, school districts spent an average $278 million annually on facilities operations and maintenance. Based on estimates of standards development and maintenance costs as outlined in previous sections, a State aid cost savings of less than one-tenth of a percent is expected to outweigh standards implementation costs at the highest standards cost estimate.

Every participating state and province, as well as members of the BR&GR Committee, were asked about the potential for financial and other benefits of implementing school facility building systems standards. While most participants indicated financial benefits are difficult to quantify, interview research identified three broad categories of cost savings likely to result from implementing standards: construction cost savings, facility maintenance cost savings, and operating cost savings. Operating and maintenance cost savings are expected to outweigh any increase in construction costs that could result from higher quality standards.

Interviews with representatives from Alberta, Maine, and New Mexico indicated standards clearly distinguish what materials and systems the state/province will pay for as part of school construction costs and what items must be paid for with other resources. Interviewees said this both reduced construction costs and prevented overbuilding of schools both size- and aesthetics-wise, which likely reduces maintenance and operating costs compared to previous construction.

Several interviewees suggested cost-savings will result from quality construction and paying close attention to life-cycle costs instead of initial costs in the planning process, though they also noted these initial construction costs would likely be greater. Many standards focus on 40- to 50-year building requirements regarding school building quality. While this may lead to higher initial construction costs, maintenance costs will likely be lower than current maintenance and renovation requirements for previously constructed facilities. BR&GR Committee members indicated reducing costs in small ways will result in overall cost savings. Committee members suggested ensuring quality materials and reducing energy costs will contribute to overall cost reductions and contribute to having high-performance features in school buildings.

High-performance school features like energy efficiency and water conservation were mentioned in most interviews and the importance of sustainable buildings, evidenced by Energy Star reporting in states like Washington and Colorado, show the resulting water and energy savings translate to money saved by the school district. Members interviewed on the BR&GR Committee and DEED staff indicated district-level operating costs would be lower and energy savings should be noticeable.

One interviewee mentioned writing in the use of tried-and-tested materials and not experimental components could reduce costs and improve building quality. This sentiment was echoed by states that have standards which restrict premium products for the sake of aesthetics and preference compared to quality and long-term benefits.

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5 CIP Grant Requests and Funding, FY2006-FY2015 provided by DEED.
6 School district facilities operations and maintenance spending based on school district audit documents as compiled by DEED.
School districts that use standardized systems can benefit from bulk-ordering maintenance supplies and spare parts. Due to significant variation in the size of Alaska school districts and logistic issues in rural Alaska, these benefits may be difficult to realize for some areas of the state.

**Other Benefits**

Interviewees with professionals in states which heavily fund school construction found building standards led to more equitable school facility construction. Other non-financial benefits noted by interview participants include enhanced credibility and reliability in department review of construction applications. Some participants found building systems aided districts and the state in more reliably forecasting construction costs and planning for future capital requirements.

Regarding high-performance features, many interviewees (supported by secondary research) noted the proven benefits of better learning environments from high-performing, greener schools. Beyond saving money, clean indoor air quality, and natural and well-lit schools environments are better for students, and the student-led monitoring of energy and water usage can be a learning opportunity. Washington has a section in their WSSP called Integration, Education, and Operation, which details ways for students to learn not only from the building planning and construction process, but also through monitoring and maintaining the energy, water usage, and other performance topics for their school buildings.
Cost/Benefit Model Description

This section describes the attached Excel file titled *DEED – Building Systems Cost Benefit Model*.

**Summary**

This worksheet provides a summary of annual and total development and update costs and the framework for assessing standards benefits. This worksheet is linked to the following worksheets:

- *Development Costs*,
- *Update Costs*, and
- *Benefits*.

This worksheet also provides a framework to consider the annual expected benefit of standards in an average year based on historic state construction, maintenance, and operations spending. The model multiplies average annual construction spending (as entered in cell B25) by the expected cost savings estimated using specific facilities’ historic data in the *Benefits* worksheet to estimate the expected construction benefit. Similarly, average annual maintenance and operating spending (as entered in cell B30) are multiplied by the estimated maintenance and operations cost savings.

The final component of this worksheet is a framework for estimating the cost/benefit ratio of standards under the two scenarios: in-house or contractor-led development and update. Costs including all development, implementation, update, and review costs for all seven years used in this analysis are divided by the expected annual benefits (as estimated in cell B34).

**Development Costs**

This worksheet provides an estimate of total and annual development costs, based on the assumptions described in the proceeding sections, for the two development processes: in-house and contractor-led. The following are key assumptions:

- DEED staff costs are expected to increase annually based on future salary increase rates and historic benefits cost rates. Additional details can be found in the *Staff Costs* worksheet.
- Professional services costs are based on a contractor rate of $200 per hour, which is the high end of the expected cost range between $175 and $200 per hour.
- Contractor travel costs are based on non-peak season expenses. Additional details can be found in the *Sources* tab.
- Implementation costs are expected to be constant regardless of in-house or contractor-led development.
Update Costs

This worksheet provides the best point estimate of average annual standards update costs in each of the first five years following standards implementation (Year 3 through Year 7). The following are key assumptions:

- DEED staff costs are expected to increase annually based on future salary increase rates and historic benefits cost rates. Additional details can be found in the Staff Costs tab.
- Professional services costs are expected to increase by five percent every three years, with hourly rates of $210 in Years 3 through 5 and $220.50 in Years 6 and 7.

Cost Scenarios

This worksheet was developed to give users the ability to observe the effect of different assumptions on development and update cost estimates. The worksheet provides a range of development and cost estimates based on variable development in hours required, professional services contractor rates, and contractor rate inflation. Users may enter up to four different assumption “scenarios” for development or update costs.

Development hours and contractor rates (in columns B through E and rows 11 through 12) can be changed to describe additional development cost scenarios. Update hours, contractor rates, and contractor rate inflation (in columns H through K and rows 11 through 13) can be changed to describe additional update cost scenarios. Total cost estimates will automatically adjust to reflect new entries in these cells.

This worksheet is not referenced in any of the other worksheets and, therefore, changes will not be reflected in the Summary, Development Costs, or Update Costs worksheets.

Benefits

This worksheet provides a framework for considering the expected costs of construction, maintenance, and operating a school facility constructed under building system standards compared to actual costs associated with recently constructed facilities. This framework is designed to estimate the percent construction, maintenance, and operating cost savings that would result from implementing standards.

Historical facility-specific data from a school facility constructed in the past ten years are intended to be entered in Column B. Users are then expected to estimate the theoretical construction, maintenance, and operating costs which the facility would have incurred if it had been constructed under building systems standards. Entering these estimates results in facility-specific cost savings (benefits) and percent cost savings which can be applied to overall State aid spending.

As an example, general information related to the Kwethluk K-12 school, constructed in 2015, has been entered in Column B rows 4-9 to illustrate that the costs estimated should be facility-specific. This worksheet can be copied multiple times for use in examining a variety of school facility construction projects.
Appendix A: Interviewees

**Alaska**
- Cathy Giessel, Alaska State Senator/BR&GR Committee Member
- Dale Smythe, Senior Architect, Bettisworth North Architects and Planners/BR&GR Committee Member
- David Kingsland, BR&GR Committee Member
- Don Hiley, Facilities Director, Southeast Regional Resource Center/BR&GR Committee Member
- Heidi Teshner, Director, Department of Education and Early Development, Finance & Support Services/BR&GR Committee Member
- Jim Estes, Director, Matanuska-Susitna Borough School District, Facilities/BR&GR Committee Member
- Larry Morris, Architect Assistant, Department of Education and Early Development, School Facilities
- Lori Weed, Lands Management & Project Support, Department of Education and Early Development, School Facilities
- Randy Williams, Associate Mechanic Engineer, PDC Engineers/BR&GR Committee Member
- Sharol Roys, Project Support, Department of Education and Early Development, School Facilities
- Tim Mearig, Facilities Manager, Department of Education and Early Development, School Facilities
- Tony Weese, Capital Planning and Construction Manager, Matanuska-Susitna Borough School District, Facilities
- Wayne Marquis, Preventive Maintenance Program, Department of Education and Early Development, School Facilities
- Yuki Janson, Project Manager, Anchorage School District, Capital Planning and Construction

**Alberta**
- Sean Singer, Director of Project Delivery, South Alberta Infrastructure-Learning Facilities Branch, Alberta, Canada

**Arkansas**
- Brad Montgomery, Director, Arkansas Division of Public School Academic Facilities and Transportation, Facilities Division
- Darrell Tessman, Assistant Director, Arkansas Division of Public School Academic Facilities and Transportation, Facilities Division

**Colorado**
- Andy Stine, Director of Capital Construction, Colorado Department of Education
- Cheryl Honigsberg, Regional Program Manager, Colorado Department of Education, Division of Capital Construction

**Maine**
- Scott Brown, Direct of School Facilities, Maine Department of Education, Facilities and Construction

**New Jersey**
- Gregory Voronov, Managing Director, Program Operations, New Jersey School Development Authority
- Ritchard Sherman, Director of Facilities and Strategic Planning, New Jersey School Development Authority

**New Mexico**
- Jonathan Chamblin, Executive Director, New Mexico Public School Facilities Authority
Ohio
• Eugene Chipiga, Architect and Senior Planner, Ohio Facilities Construction Commission

Saskatchewan
• Phil Pearson, Executive Director, Saskatchewan Ministry of Education, Infrastructure

Vermont
• Cassandra Ryan, Fiscal and Regulatory Compliance Coordinator, Vermont Agency of Education, School Operations

Washington
• John McLaren, Northwest Washington Regional Coordinator, Washington Office of Superintendent of Public Instruction-School Facilities & Organization
• Morgan Powell, Program Manager, Washington Office of Superintendent of Public Instruction, School Facilities & Organization
• Nancy Johns, Coordinator for High-Performance Schools, Washington Office of Superintendent of Public Instruction, Retired
• Randy Newman, Associate Director of School Facilities, Washington Office of Superintendent of Public Instruction

Other
• Chuck Warner, President, Warner Concepts LLC
Appendix B: Additional Interview Comments

Suggestions and Recommendations from Interviews

Interviewees offered feedback that was not necessarily within the scope of work but is valuable for the development process. Specifically, at the end of interviews, participants were asked: *Do you have any other suggestions or recommendations for a state considering creating construction standards?*

- **Technical aspects**: be as prescriptive as possible, especially on the size of facilities, so that local school authorities know exactly what does and does not have room for negotiation.
- **Have a list of estimated costs the state funds by component on their website.** We recommend putting together a standard like this if cost reduction is the goal.
- **Couldn’t imagine running a program without these standards in place. Standards are especially in the interest of taxpayers. Because quality, safety, energy efficiency, etc. is laid out, everyone knows exactly what the state pays for. The better the system you have in place, the more respected process, the better the chances to secure funding (for districts especially). Standards also provide credibility for your department.**
- **Generally, the two-guide model is a good strategy. Some existing schools would be too expensive to bring up to “new school” standards. We have our own standards that deal with space, and it’s a short list that makes sure the school is the right size and has the ability to meet the state’s graduation requirements (like vocational, physical, music education, etc.). These are standards that can apply to all schools, regardless of age/structure type, student population, etc. New projects have an updated standard and must meet additional key requirements to receive state funding.**
- **The Funding Formula is helpful also and is done in conjunction with the legislature. It sets out the funding ratio between state/local funds, based on the size of the district, replacement costs, land valuation, and population density.**
- **Find/consult an Education Planner, a person who can provide the benefit of knowledge. Also, creating Education Specifications (like learning/teaching models for the state, project-based learning, team teaching, etc.) helps with construction standards so you can design your standards to support and achieve those learning goals and facility needs.**
- **The Lean consultant was a great source, because they identified areas of waste that will save money not just initially, but also over time. It’s important to talk to the maintenance and facilities staff at the district level when creating standards because they know how much it costs to maintain these buildings and materials and would understand if more training was required, or special equipment.**
- **There are places where being specific, like the type of flooring (carpet, hard surface) and places where you shouldn’t be too specific, like IT, where systems can be out of date quickly or don’t factor in remote school access.**
- **Rural schools have a hard time with overly sophisticated systems, and many schools have misplaced expectations of what the standards and savings will be, or they don’t have the ability to properly maintain systems to see those high-level savings. Some rural schools don’t have the staff training or numbers to handle the maintenance on new systems and this needs to be factored into the standards. And costs like having a remote-control system monitor in a big city can be difficult, especially if they...**
aren't accounted for from the beginning. The state now urges not just advanced systems, but systems that can be maintained by the districts. Remote and rural schools require thinking beyond the basic standards.

- Starting with an existing program like CHPS or Green Globes and using what you can and building up from there could be a good fit.
- Consider setting a high standard goal that is hard to achieve, but that you can waive for those that can't reach it, especially if the school wouldn't recoup the costs.
- The way standards are written, to save on construction costs. They must account for the fact that writing them too specifically could end up costing far more to build if the cost of certain materials skyrockets. The best bet would be performance-based standard requirements, not necessarily specific brands or material makeup. You see this in districts’ master plans and Ed. Specs, that are far outdated and require the use of old Cat5 cables in classrooms, which are outdated by Cat6 cable, or even not hard wiring in technology in many places. Technology should focus on performance, just like siding, roofing, etc. Giving a required service life and wind ratings for siding would let the market provide the product, and while you might have higher initial costs, maintenance costs are where you want to focus. That is where districts and the state could save money.
- Districts likely wouldn't be upset or find it difficult to adapt to new standards, because they already expect stipulations from the state, because that's where the money comes from. These new standards would likely only affect new buildings, and major renovations that basically remodel an entire existing school, so the standards would be easily accounted for.
- Adopting and modifying national standards is fine for things like fire safety, and basing standards off the international building code, or energy efficiency standards and adapting them to fit Alaska’s needs.
- To really have good standards, consult with the design community, especially because of the climate range and overall uniqueness of the state, would be necessary to make sure the standards are effective and useful. And local input and influence, and experience should be encouraged. There are four major construction zones in Alaska, and firms and individuals with experience constructing similar sized projects, and especially schools, in each zone should be consulted to provide input into what standards are appropriate for the different regions and assist in creating standards for the whole state.
- Depending on what is included in the standards, you might need an Architect, Structural, Mechanical, Electrical, and Civil Engineers. These people should be experienced and/or from within Alaska. They are also important because the standards need to be forward thinking, current, and tested. Nothing experimental, but nothing antiquated or that will be outdated by the time they implement and/or update standards.
- LEED is hard to implement in Alaska particularly due to a requirement to source some local materials, which isn’t feasible state-wide. CHPS might be adaptable, but not necessarily fully adoptable. A cookie-cutter approach is not ideal in Alaska, given the range of climate, geography, and accessibility. Ideally, a checklist to go through with reasonable requirements, like siding, roofing, quality, control systems, etc., that would work across the state would be a good approach.
- If the standards are too detailed, it might hinder the ability to maintain and stay up to date with changing needs. It is better to be a little less detail specific.
- The state needs to promote outreach and make sure people know about the standards and potentially offer education classes, so districts and others know how to comply.
• The regional aspect is really important. In some of discussions we talked about having a single standard so one person/group could do maintenance everywhere. This isn’t realistic given our different regions.

• Utilize research-based methods in the standards, the Cold-Climate Housing Research Center at UAF, and other state resources to provide Alaskan knowledge. Creating standards for the uniqueness of Alaska with substantiated research to back them up is critical for the success of these standards and for building durable, energy efficient schools.

• Space and school model standards are helpful (gross square footage requirements for component space) and leaving room for allowances in some areas, as is recognizing when to build in flexibility to standards.

• Schools and districts can use the Energy Star Portfolio Manager for free to monitor if the building and products are meeting expected performance, and cost savings.

• If you don’t already do it, it is important to have annual post-occupancy evaluations and allow the school stakeholders to give feedback on the performance of the building and materials to see if their expectations are met.

• The Mindful Materials Database is an extensively reviewed list of sustainable building materials with good search and filter options. CHPS recommends it now instead of their own old materials list.

• Looking at performance standards and beginning the process by understanding/knowing how to achieve performance requirements written into the design process could be a good method to develop standards. For instance, require schools to operate below energy use intensity of 32 and let that drive the HVAC and window product selection.

• Recommended consultants included:
  o Civil engineer
  o Energy modeler
  o Education planner
  o Geotechnical engineer
  o Lean consultant
  o Mechanical engineer
  o Resource conservation manager
  o Structural engineer
  o Technical writer
  o Engineering experts with construction experience in each Alaska region
Appendix C: State, Provincial, and U.S. Standards

- Alberta, CA: [Technical Design Requirements](#)
  - School-specific elements are included in relevant subsections

- Arkansas: [Arkansas School Facilities Manual](#)
  - Chapter 7: Building Systems

- Colorado: [Public School Facility Construction Guidelines](#)

- Maine: [Planning Documents](#)
  - Construction-specific document: [Standards & Guidelines for New School Construction & Major Renovation Projects](#)

- New Jersey: [Design Standards](#)
  - [Materials and Systems Standards Manual](#) portion of standards

- New Mexico: [Statewide Adequacy Standards and Adequacy Planning Guide](#) (note that an update is currently in progress)
  - [Design Guidelines for HVAC and Controls](#)

- Ohio: [Ohio State Design Manual](#)
  - [Volume Two](#) contains construction and design requirements

- Saskatchewan, CA: [Project Information from the Ministry of Education](#)
  - [Project Information from SaskBuilds](#)

- Washington: [High-Performance School Buildings Program](#)
  - [Washington Sustainable Schools Protocol](#)

### U.S. Standards


- CHPS: [National and adapted standards](#)

- LEED: [LEED for Schools – New Construction and Major Renovations](#)