Bond Reimbursement and Grant Review Committee Meeting Agenda

July 21, 2021
1:00 pm – 3:30 pm

Audio Teleconference available through free online Zoom application.
Join Online – Meeting Number: 863 0386 9876
Join by Phone – Toll Call-in number (US/Canada): 1 (253) 215-8782; Meeting: 863 0386 9876

Chair: Heidi Teshner

Wednesday, July 21, 2021

Agenda Topics

1:00 – 1:05 PM	Committee Preparation • Call-in, Roll Call, Introductions • Chair's Opening Remarks • Agenda Review/Approval • Past Meeting Minutes Review/Approval
1:05 – 1:15 PM	Public Comment (additional comments related to agenda topics may be solicited throughout the meeting)
1:15 – 1:30 PM	Subcommittee Reports • Design Ratios • School Space • Model School
1:30 – 3:20 PM	Publications • *Construction Standards* (progress draft) • *Site Selection Handbook* (draft to public comment) • *School Equipment Purchases* (initial draft) • *Alaska School Facilities Preventive Maintenance Handbook* (progress draft)
3:20 – 3:30 PM	Committee Member Comments
3:30 PM	Adjourn

BOND REIMBURSEMENT & GRANT REVIEW COMMITTEE

Wednesday, April 14, 2021 – 1:00 p.m. – 4:18 p.m.
Thursday, April 15, 2021 – 1:00 – 3:19 p.m.

DRAFT MEETING MINUTES FOR APPROVAL

Committee Members Present	Staff	Additional Participants
Elwin Blackwell, Chair	Tim Mearig	Larry Morris, Anchorage SD
Heidi Teshner - present day 2	Lori Weed	Dana Menendez, Anchorage SD
Rep. Dan Ortiz - present day 2	Sharol Roys	Rachel Molina-Lodoen, Anchorage SD
Sen. Roger Holland - not present		Don Hiley, SERRC
Randy Williams		Damien Hill, Lake & Peninsula Boro SD
Dale Smythe		Kent Gamble, HMS Inc.
James Estes		Rob Brown, HMS Inc.
Kevin Lyon		Aimee Smith, HMS Inc.
David Kingsland		Gary Eckenweiler, Bering Strait SD
Branzon Anania		Caroline Hamp, Staff to Rep. Ortiz
		Drake Goodsen, Staff to Rep. Ortiz

April 14, 2021

CALL TO ORDER and ROLL CALL

Chair Elwin Blackwell called the meeting to order at 1:00 p.m. Roll call was taken, and a quorum was established to conduct business. Senator Holland and Representative Ortiz were excused.

CHAIR'S OPENING REMARKS

Chair Blackwell explained that Heidi Teshner had legislative issues to deal with today, so he is standing in for her as chair for today and possibly tomorrow. He extended his thanks and appreciation for all the members who have volunteered to be on the committee and also welcomed the new members. He mentioned that the discussion today would include the CIP (AS 14.11 Capital Improvement Project) application, which is a big step for school districts to receive funding for school construction and maintenance.

NEW BUSINESS, ADDITIONS TO THE AGENDA

Chair Blackwell added an agenda action item to approve the CIP application for FY'22 following the CIP briefing and discussion.

AGENDA REVIEW/APPROVAL

Dale Smythe **MOVED** to approve today's agenda with two modifications: remove the action item for final design ratios for April 15 and add the CIP action item for today.

Kevin Lyon **MOVED** to approve the agenda as amended, **SECONDED** by Dale Smythe. Hearing no objection, the motion **PASSED.**

PAST MEETING MINUTES REVIEW/APPROVAL – February 25 and March 17, 2021

Randy Williams **MOVED** to approve the minutes from the February 25 and March 17, 2021 meetings as amended, **SECONDED** by Branzon Anania. Hearing no objection, the motion **PASSED**, and Lori Weed will make the administrative amendments.

WELCOME AND INTRODUCTION

Chair Blackwell welcomed the new members and recognized Dana Menendez and Larry Morris from Anchorage School District and Damien Hill from Lake and Peninsula School District.

PUBLIC COMMENT

A public comment period was offered, and no public testimony was provided.

DEPARTMENT BRIEFING

FY2022 CIP Reconsideration & Final Lists

Tim Mearig announced that there is a final FY'22 CIP list that the State Board of Education approved at its March 17th meeting. There are two lists: one that shows the project name and dollar amount, and one that shows total points. Also included in the packet is a ten-year history of projects and the total value of the state's share if all the projects were to receive funding. That page also shows a ten-year history of school funding.

PM State-of-the-State Update (incl. Retro-Commissioning Update)

Tim Mearig explained that in order for districts to be eligible for state aid for school capital, they must meet certain requirements for minimum maintenance and facilities management. The department makes final determinations every August.

Presently there are five districts ineligible for the FY'22 funding cycle. Two of those districts are working to pursue eligibility for CIP funding. Hydaburg is on track to be upgraded from non-compliant to provisional, and Lake & Peninsula has been offered a site-specific provisional compliance status. There has been no real activity from Aleutian Region, Skagway, or Yukon Flats to pursue a provisional or compliant status.

Provisional status is granted when a district has a compliant plan but must demonstrate adhering to that plan for 12 months. The following FY'22 provisional districts are on track to demonstrate 12 months of adherence: Chatham, Galena, Lower Kuskokwim, Nenana, Pelican, and Kake. Kodiak and Unalaska were not able to provide evidence of compliance. Both received a one-year waiver so remain eligible for FY'22, but unless they provide evidence of compliance, they will not be eligible for FY'23.

Wayne Marquis has been conducting online site visits with districts that are able to gather their data. Some districts have not been able to get their information together due to personnel changes, but the process is going well considering the difficulties of making assessments off site.

Tim reported that last November the department implemented regulatory provisions to require districts to achieve an additional element of maintenance compliance within the energy management program related to commissioning of existing buildings. Every district was

supposed to demonstrate compliance with the new requirements for the period November to June 1.

All 53 districts could have been non-compliant this year because no districts were carried over from the previous cycle. So far, 20 districts are in compliance, and that number is expected to rise since districts are diligently working to gather the documentation to demonstrate they have the ability to regularly evaluate their facilities for a need for commissioning. Fifteen districts do not have facilities to track because the buildings have aged beyond the system criteria.

This process is a result of a lot of collaboration between the department and the districts and is enabling the districts to evaluate energy use to determine whether a building needs attention.

Damien Hill asked if Tim could summarize the provisionally compliant strategy that Lake and Peninsula is in. Tim replied that the district needs to have the ability to track recovered heat at its sites. Normally, if one building is out of compliance, then the whole district is out. But for FY'23 the department had offered that individual school sites would be evaluated without impacting the entire district's compliance.

Dale Smythe asked if there were consistent themes or challenges that districts have faced in providing the required information. Tim replied that it can be challenging to monitor energy consumption from different utilities for each building month by month.

Don Hiley commented that some districts must make significant monitoring investments in order to comply. For example, some districts do not have electrical meters other than where the power came onto the site, so meters had to be retrofitted on each building.

Damien Hill said that a few of his district's schools receive heat from community generators at no cost, so they have not been monitoring waste heat. Tim commented that the requirement for building utility consumption measurement has been in place for 20 years but recognized that there are challenges associated with that.

Report: School Capital Project Funding Under SB 237

Tim Mearig stated the department is required to provide a funding analysis regarding grants and debt funding. The Institute for Social Economic Research (ISER) at UAA used this information to determine the status of adequate investment in school capital in Alaska. The report is available on the ISER website.

Among the legislative actions the department is tracking is the general obligation bond package (HB 93/SB 74) and an energy bill (SB 17). Summaries of legislative action are in the packet.

The Cost Model update draft has been completed and is being reviewed by the department. Tim is looking forward to meeting with representatives of HMS, Inc. to discuss some of the items in the Cost Model update.

The department hopes to be able to utilize funding in the Governor's supplemental to develop a database for forecasting school capital.

DEPARTMENT CIP BRIEFING

FY 2023 CIP Application & Support Materials

Tim Mearig reviewed the CIP briefing and application and support materials for the FY'23 CIP application. The hope is to formalize the package as the FY'23 application by the end of the meeting.

Tim said the department is considering using e-mail instead of the U.S. Mail return receipt method to determine the date of receipt of a reconsideration decision, which triggers the beginning of the appeal period. Branzon Anania was concerned that the e-mail addresses were current as there is a lot of turnover at the district sites. Lori Weed said that the e-mails go to the superintendent, and those addresses are kept current by the department's Assessments team. Dale Smythe had the same concern and suggested that the e-mail contacts be defined on the CIP application and should include the person who helped assemble the application.

Don Hiley mentioned that for all the CIP applications he has written, he has never been cc'd, and sometimes the notice stays in the superintendent's office until the reconsideration period has run.

Tim discussed a possible application changes relating to unhoused students so that a district could count anticipated future lost square footage, the preventative maintenance and facility management scoring, and a bullet list of miscellaneous application changes noted in the packet.

FY 2023 APPLICATION REVIEW

FY 2023 Application Instructions

Lori Weed referred to the summary of changes to the FY'23 CIP application and instructions and discussed each one as follows:

- Split mailing address versus physical delivery address.

This minor change makes it clear that the department does not receive mail at the physical address any longer, but still can receive deliveries from courier services.

- Add language providing regulatory guidance on timeline for submitting for reimbursement of project costs.

This minor change to question 3f of the instructions clarifies what costs a project can include when looking back to pick up expenses that were incurred prior to application submittal.

- Add notation on reduced percentage of projected unhoused points for projects utilizing imminent loss of facility.

This moderate change to question 5e was referenced in the packet, and Randy Williams asked if "environmental factors" was defined. Lori replied it was not, and she welcomed any input. Kevin Lyon commented that it should be made clear that mold is not an allowable environmental factor. Dale Smythe commented that the loss from environmental factors would be out of the control of anyone to stop it or change it. Lori pointed out that question 5g refers to "certain environmental factors like erosion."

Lori Weed also said that some things would be covered in the protection of structure/life-safety category, such as a foundation failure. This question applies to situations where there is nothing wrong with the school other than it is about to be lost to a river or ocean, for example. Tim was in favor of using restrictive language that could be broadened in the future if necessary.

Lori Weed summarized the change in question 5e to read, "Scoring for projected unhoused due to facility loss by external environmental factors (reference question 5g) is scored at half points." The committee indicated agreement with that change.

Don Hiley questioned the rationale for half points and brought up the case of Napakiak whereby next summer the water is probably going to be under the door of the building. To him, two years is almost a current problem; even though the building is okay at the present time, it's going to be lost. Lori replied that two years matched the timeline of a charter school that does not intend to renew its lease or find other lease space; it is open for committee input. Dale Smythe's understanding of the intent of the half points was to place facilities further up the list to save the state money.

Tim Mearig said the reason this point category does not need full points is that when a facility is in this condition, it is also eligible for emergency points. Chair Blackwell agreed with the half points, and he said that in the past, the school would not get any unhoused students because the building still fit their needs. He also remarked that sometimes the dire predictions about erosion do not occur because rivers are unpredictable.

Randy Williams thought that the unhoused students category was specifically for population changes. Lori replied that was true, but the population percentage of capacity depends on square footage, and if the building is gone, then you have unhoused students.

Dale Smythe said that these are not instantaneous like a roof collapse or a school fire but something that has high potential for the future, like Napakiak where in the next few years the school will not be occupiable because the erosion is so close. These points allow preparation before the disaster happens. Branzon Anania understood that one of the ideas behind the half points was to give some advantage but not too much.

Randy Williams asked if this should be a separate category next year or if they should try to do that now. Dale replied that considering the timeline, he would vote to approve all of it as is but recognizes that there needs to be a more robust emergency category.

- Add guidance on existing space is used for calculating existing gross square footage and instruction for new inputs. Add language specifying that the existing GSF can be reduced based on environmental factors causing an imminent loss of buildings and providing certain conditions.

These are changes appearing in the packet in question 5g. The first and second paragraphs explain how the gross square footage (GSF) and average daily membership (ADM) are calculated and set out three new GSF inputs. Tim Mearig noted that this change is a minor cleanup and a way to tabulate the information.

Paragraph 3 contains instructions on how to document future unhoused projections based on imminent loss of a facility due to certain environmental factors like erosion. Randy Williams requested that the word "external" be added between the words "certain" and "environmental" to be consistent with the language in question 5e. The committee agreed with that change.

Randy was curious how much of an effect this scoring would have on a place like Napakiak and if it was going to be vaulted to the number 1 spot. Lori replied that even if the project was assigned 30 points, it would not outdo the amount of unhoused in Nunapitchuk, number 2.

There was discussion about points for Napakiak and Nunapitchuk and the placement on the list if it received 15 versus 30 points. Randy asked if there was a method to give more points the more imminent the danger is. Tim replied that they would get more emergency points in that situation. Dale added that more dedicated effort can be put into the emergency point scoring to consider the threat time frame and the school replacement time frame.

Lori Weed asked Dale if he wanted to add permafrost degradation as an example in addition to erosion as an external environmental factor. Dale replied that he would like that change because in his opinion, erosion and permafrost degradation are the main causes of facility loss.

- Update ASHRAE 90.1 reference to 2016 edition. Add clarification that prior building system standards must be adopted, not just a previously bid specification.

The proposed change reads, "Standard must be adopted by the entity; prior use of a system specification in a bid solicitation is not sufficient to meet the criteria." After discussion, the decision was made to delete the first clause so the amendment reads, "Prior use of a system specification in a bid solicitation is not sufficient to meet the criteria."

- Add note on cost estimate format.

This change is intended to inform people that if awarded a grant allocation, the cost estimates must be in the proper format.

- Add language identifying supplemental documents for each narrative; conforms to *Guidelines for Raters* draft PM matrices. Provide additional guidance on narrative development.

Lori mentioned that the committee reviewed the rater matrices at the February meeting and had a good debate about them but did not incorporate changes into the instructions. The matrices for the five-point category were itemized and added to the instructions. Only the top tier instructions were included with the caveat of "Scores will be reduced incrementally where information or supporting documents are not provided." The incremental point reduction portion is in the Rater's Guide.

FY 2023 Application

Referring to the packet, the proposed application changes are as follows:

- Correct Roof/Envelope 12-point condition "Windows, age >20" to ">30" (conforms to FY22 & FY23 Rater's Guide).

Lori explained this was a typo in section 4a that should have been corrected last year .

- Add language regarding Sec. 9 supplemental preventive maintenance documents.

This change is intended as a reminder that there are supplemental documents that are requested and should be attached to the application.

Randy Williams **MOVED** to accept the editorial changes to questions 5e and 5g that were made during discussion, **SECONDED** by Kevin Lyon. A roll call vote was started before any discussion. After discussion, Randy Williams **AMENDED** the motion for approval of the entire application as presented and edited during discussion, **SECONDED** by Kevin Lyon. A roll call vote was taken, and the motion **PASSED** unanimously.

DEPARTMENT CIP BRIEFING – LIFE-SAFETY MATRIX

Tim Mearig explained that the department was looking for a way to normalize and temper some of the gains from FY'20, '21, and '22 where the scores have been trending significantly upward because of weighting factors between code-related work and non-code-related work. Rather than comparing points to dollars, a more statistically certain and cohesive review of evaluating points to points and cost to cost was developed. There are three options in the briefing paper as follows:

1. Condition points modified by condition cost to total cost;
2. Condition points modified by condition points to total points; and
3. Condition points modified by condition cost to total cost with additional modifier of condition points to total points.

The department recommends option 2 as giving the best results as a weighting factor for the purpose of bringing scores down to a more normalized range. A need for an adjustment was apparent when high point, low dollar value situations were coming up to address code conditions. Option 2 basically keeps the lower scores the same, moderates the medium scores, and tempers the high scores down.

Chair Blackwell asked what is meant by a "minimum one point floor." Tim replied that one point is the lowest score possible because there isn't any advantage in scoring a fraction of one point, even though the calculations might have taken the score down to below one point. Randy Williams asked if there was still a 50-point cap, and Tim confirmed.

Lori Weed noted that this scoring method does not work well with renovations, which score an accumulation of issues and receive more points. That will be an issue to deal with in the future.

Randy Williams was curious what the plans are for checking how this performs in the next cycle. Tim replied that the scoring will be added to the ten-year running average of the top 20 scores, and then they will be able to see what happened. The expectation is that the scores will look similar to FY'19.

Don Hiley asked how this is going to relate to Napakiak versus new Nunapitchuk, which has about twice as many code life-safety points as Napakiak based on the current facility. Tim replied that the scoring is based on the current condition, not the forecasted condition, which could come in through other factors such as emergency. Don talked about the poor buildings in

Lower Kuskokwim and emergency points and unhoused student points and code-life-safety points and wondered how all that is factored in and how one school is balanced against another that is poor. Chair Blackwell commented that the balance between current need and emerging need is always going to be a problem, but priorities are made based on current information.

Randy Williams asked about the mechanics of how this formula gets deployed. Lori replied that each rater rates individually, but one rater completes a score sheet that provides a raw score and the costing. Then a formula is applied to get a weighted percentage, which is then input into the database and applied to all three rater scores. Tim referred to the evaluative rating guidelines in the packet where it states, per regulation, "Scoring of mixed-scope projects will be weighted."

Randy commented that the committee is ostensibly going to approve this change but was unclear what was being changed. Tim agreed and stated that he wanted every applicant to be able to score their own application, and they should know exactly how to do it. Chair Blackwell tabled this matter until after the Cost Model update tomorrow.

RECESS
The meeting recessed at 4:18 p.m.

April 15, 2021
CALL TO ORDER/ROLL CALL
Chair Blackwell called the meeting to order at 1:00 p.m. Roll call was taken, and a quorum was established to conduct business. Drake Goodsen and Caroline Hamp were present on behalf of Representative Ortiz's office.

CHAIR'S OPENING REMARKS
Chair Blackwell said he would be chairing the whole meeting today. Heidi Teshner would probably stop in for part of the meeting to listen in.

PUBLIC COMMENT
No public members wished to provide comment at this time.

COST MODEL UPDATE
Chair Blackwell asked Tim Mearig if he would like to comment on the new edition of the Program Demand Cost Model. Tim said the department is in receipt of the draft documents and will be reviewing against the scope of the work for the update and will share the results later.

Rob Brown from HMS stated that most of the changes in the Cost Model are from increased material costs due to COVID and similar factors. A few labor costs were updated due to changes in the database with RSMeans, but the main focus for this year's changes was material cost, and overall the cost increased about 4 percent.

There were no changes to the Model School this year. A possible change to the exterior closure system with wood stud versus metal stud was discussed, but it was not justified because of the high price of lumber and the miniscule savings. There were a few changes to line items to correct some labor numbers and some materials that are not available any longer.

Tim Mearig shared a document outlining DEED requested modifications to the Demand Cost Model and stated that the primary role of the committee is to review and participate in changes to code, technology, general material, supply, and standard practice, so he was looking for input from the committee on the proposed modifications. Particularly, he wanted comments on standardization of an exterior wall assembly with some combination of dimensional and engineered lumber and whether the proposed standard is appropriate.

Dale Smythe asked if the intent of identifying a standard exterior wall assembly is so assumptions can be made based on building size. Tim said it was to standardize the Model School within the Cost Model so everyone knows what the baseline is and also to compare the costs between projects by using the same set of parameters and components.

Dale asked if the idea was to use components instead of a purchased system such as SIPs. Tim said that SIPs would be treated in an evaluation as an equivalent system that provides equivalent performance at a reasonably equivalent price. Dale shared specific concerns regarding the wall assembly.

Dale questioned the percentages of metal to something else, and Tim replied that the Cost Model is going to set out the quantity of exterior siding for the Model School and whether 80 percent would be at one price and 20 percent at another. This was also aimed at longer members and a higher wall, not just standing up an eight-foot wall.

Kent Gamble clarified that this assembly is meant to be a common type of wall assembly that will be adjusted based on the designer's judgment at the time and other factors such as location. A building on the North Slope is going to be different from one in Southeast. Tim agreed, stating that the Model School is in Anchorage. He said these assemblies are baseline and determine what are acceptable and unacceptable alternatives.

Gary Eckenweiler asked if the baseline could specify a wall that is equivalent to an R-value which would encompass SIPs or framing. Tim replied that the Model School is an actual building with actual cost components.

Rob Brown compared the Cost Model wall with the assembly on the list and concluded that they are roughly the same, the difference being a dimensional LSL versus the metal studs of the HMS model. He noted that from a construction standpoint, the quality of construction will be better using metal studs rather than wood, and the difference in cost is nominal.

Randy Williams shared his concern that the insulation in the stud space is not specifically listed. He noticed that ASHRAE 90.1 states that the minimum is R-13 batt plus minimum R-7.5 exterior or R-19 batt plus R-5 exterior. Rob Brown stated that R-19 is the current standard in the Cost Model.

There was a question about the price of lumber and metal, and Rob Brown said that lumber has increased a lot, but as of February, the price of metal studs had only gone up 5 to 7 percent. These prices were captured in the Cost Model for this year.

Dale asked why the type X 5/8 sheetrock and vapor retarder was excluded on the assembly, and Kent Gamble replied that it is typically part of the UniFormat from the exterior wall assembly from exposed face to finished face.

Dale wondered if it was important to have a gauge on the metal siding. Kent replied that metal siding can vary widely depending on the specification. It is priced now at $7.50 a square foot for the panels, and that should provide a robust metal panel.

Tim said he appreciated the opportunity to have this discussion and thanked HMS for taking part.

Randy Williams noted that the ASHRAE 90.1 requirements for insulation are a little different for metal versus wood frame, and it is recommended that more of the insulation for the metal framing go on the outside of the studs. Branzon Anania shared his opinion that steel studs are better to start with than the wood because there are not many 8-foot walls in a school, and hanging steel is faster and more accurate than wood.

Dale asked if the challenges dealing with COVID are accounted for in this revision. Kent Gamble said that they are adding an additional 3-1/2 percent special market contingency to the projects to provide for unknowns associated with COVID. Hopefully, prices will start to level out, vaccines will start to catch up, and things will return to some kind of normal state.

Lori asked for a summary cost comparison, particularly those costs that might have the highest delta change. Rob Brown reviewed the list and noted that most changes are in the 2 to 5 percent category. The highest changes revolve around the increased lumber prices, notably in substructure and superstructure. The exterior closure appears to have decreased 22 percent, but that is misleading because the cost comparison is accomplished by comparing the draft with the draft rather than the final. Labor prices in last year's draft were corrected, and so if this year's draft was compared to last year's final, it would be in that 2 to 5 percent range. Electrical prices have gone up considerably and appear higher because of the proportion of materials involved. There was only a 3 percent increase, though, in electrical section 9.

ACTION ITEM: MODEL SCHOOL ESCALATION ELEMENTS

The Model School Subcommittee has looked at this area in the past. Each year there have been changes, but this year there were no changes to the Model School elements. Unless the committee has any changes, there are no recommended changes that are on the table to approve, and the department will do its regular due diligence in this area.

LIFE-SAFETY SCORING MATRIX
WORDING ON SCORE SHEET REGARDING FUTURE UNHOUSED

This item was tabled yesterday and is now taken up for consideration. Tim explained the new language related to the weighting factor calculation in the Rater's Guide. The proposed change is as follows:

> Points for mixed-conditions can total more than the possible points. Combined points are weighted using a ratio of construction cost for correcting scored conditions to the total requested construction cost of the project except for any

code condition where the percentage of its cost to the total project cost is less than half of the percentage of its points to the total condition points. In that case, the weighting is shifted to the percentage of condition points to total condition points; in no case will less than 1 point be assigned to a condition.

One other change occurred in the score sheet for item 10 adding the language, "Unhoused due to loss of eligible square footage based on external environmental factors is scored at half of the points identified."

Branzon Anania **MOVED** that both edits as presented today be accepted as presented, **SECONDED** by Dale Smythe. A roll call vote was taken, and the motion **PASSED** unanimously. Drake Goodsen noted for the record that Representative Ortiz was absent for this vote.

PUBLICATIONS UPDATE

Construction Standards for Alaska Schools

Chair Blackwell referred the committee to publication updates in the packet. Tim Mearig said there were not a lot of substantive changes to the document. Some things were taken out of the interior section that were duplicated in the equipment area, and there were some other cleanups. He invited comments and discussion from the committee, and he noted that the Model School Subcommittee needs a chairman.

Dale Smythe commented that the document could be more precise and more beneficial if the repeating of spaces that would be covered in an educational specification could be separated. The decision of what to include should be driven somewhat on cost experience to the state. Assuming that the basis is to control costs, those elements that have historically cost money in their repair should be a priority that is defined in a standard. He stated he would volunteer to be a part of the subcommittee but could not offer to be the chair.

Randy Williams is interested in the topic but doesn't think he has the expertise required to lead it. If there is an open seat, he would like to be a member of the subcommittee.

Tim said that Kevin and Jim had agreed to serve on the Model School Subcommittee, and industry partners from ASD and BDS are also currently being recognized as committee participants. Branzon said he has an interest in the subcommittee and would be more of an asset once he understands a little bit more of the process.

Lori said that the committee chair does not have to know much about the topic involved but should be a good manager of time and agendas and able to run the committee well. Kevin Lyon said he would consider being the chair if needed.

Tim said that the role of the chair includes coordination and guidance and informing the committee about the subcommittee's progress. He added that the department is committed to helping and doing a lot of work for the subcommittee, and that the chair will have several resources at his disposal. The department handles the administrative work of the subcommittee such as scheduling, using their meeting platforms, and taking care of minutes. He thanked Kevin

for agreeing to be the chair and confirmed that Randy Williams would like to be invited to the subcommittee meetings.

Tim commented that both Kevin and Jim are associated with districts that have a fairly robust district standard, and that would be an asset to the subcommittee. He added that one of the goals is to avoid writing the same standard in multiple places and to try and hold it under a hundred pages. That will take an understanding of where it overlaps with code or local conditions. Some of that is going on now with system standards and how they work with design principles. Tim hopes to have something in September that is a recommendation to release for public comment.

Site Selection Handbook

This handbook discussion paper outlines the results of a survey of 17 participants. Tim Mearig summarized the results of the survey, which showed that the publication remains viable, and the tools are helpful. The department will be working on revising the handbook to increase the applicability for use in remote communities with limited site alternatives, parking area allocations, and updating the sample documents to comply with some regulation changes. The department has a goal of turning the publications over on five-year intervals, and the last time this handbook was revised was 2011.

Tim stated that if the committee is willing to schedule a July meeting, this document will be ready for the committee to review for public comment.

SUBCOMMITTEE REPORTS

Design Ratios

Dale Smythe reported that he had intended to have final comments on the last ratio for consideration at this meeting, but that did not happen. He would like to have it finished by the end of May to have time to have a subcommittee meeting for review, but in any case, he wants it to be reviewed at the July committee meeting. Once the ratio is finalized, he would like to work on the space guideline discussion, to make some goals and a plan to get that done next.

BR&GR CALENDAR AND WORK PLAN REVIEW & UPDATE

Tim Mearig referred the committee to the July meeting on the last page and summarized the four publication updates anticipated to be on the agenda.

Scheduled for the September meeting, in addition to publication updates, is a briefing paper on reuse of plans and systems policy and whether it belongs in regulation as opposed to just the application.

SET DATES FOR NEXT MEETING

Meeting dates for July were discussed, and the July meeting was set for Wednesday the 21st from 1:00 to 3:00 or 3:30 p.m. After discussion, the September meeting was set for Wednesday the 8th from 1:00 to 4:00 p.m.

Tim Mearig put forward a subject the department would like to bring up at a future meeting: A briefing paper on what happens when a grant is awarded that ends up not having sufficient funds to complete.

DEED WRAP-UP

Lori Weed asked if the Work Plan Master List item 3.3, Commissioning could be deleted as completed or does it need future review. Tim thought it could be taken off the list. Lori suggested in its place add "review commissioning system requirements and agent qualifications." Randy proposed deleting the three sub-items and substitute "periodic effectiveness evaluation."

Tim is hoping that the department receives funding for the capital forecasting database in the Governor's supplemental. Randy asked, if there were any windfall money, how that would be allocated? Heidi Teshner said that it depends on how the money is allocated by the legislature. If the list is funded, then the projects are taken in order. If certain projects are chosen directly, then those projects are funded.

As for the federal funds under ARP and ESSER, those have to be allocated a certain way. The legislature has no flexibility to direct those funds. Each district's application contains an assurance to the department that the funds will be used toward ventilation and other eligible projects to help mitigate the spread of COVID. The department is working on a short document that provides additional guidance of how districts could spend the federal money on facilities.

COMMITTEE MEMBER COMMENTS

Dale Smythe thanked the committee members and everyone at the department for the work. He was also appreciative of the legislative members who attended and the public participation, and he encouraged others to call in.

Chair Blackwell thanked the committee members for taking the time to be here to work on these items and continue to work on different subcommittees.

Lori Weed asked if the Zoom platform was preferred by the members over WebEx. Committee members were very much in favor of using the new Zoom platform.

MEETING ADJOURNED

Heidi Teshner **MOVED** to adjourn, **SECONDED** by Branzon Anania. Hearing no objection, the motion **PASSED**, and the meeting adjourned at 3:19 p.m.

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Design Ratios

S U B C O M M I T T E E R E P O R T

July 12, 2021

Mission Statement

Under AS 14.11.014(b)(3), evaluate and propose construction design ratio guidelines for use by the department, school districts, and the design community to design new and renovated school facilities to reduce first cost (construction) and long-term cost (operation).

Current Members

Dale Smythe, Chair	Michael Spencer, AHFC	Larry Morris, ASD
Randy Williams	Gary Eckenweiler, BSSD	Lori Weed, DEED
	Karen Zaccaro, ECI	Ezra Gutschow (post report)

Status Update

Recommendations from 2017 Report to the Legislature:

1) *Adopt the Alaska Climate Zones established by the Alaska Building Energy Efficiency Standard (BEES) and used by the Alaska Housing Finance Corporation.*

   Status: Confirmed with AHFC that the BEES Alaska climate zones can be used by the department as needed for development of ratios and potential regulations.

2) *Implement a school design ratio of Openings Area to Exterior Wall Area (O:EW).*

   Status: DEED provided an O:EW ratio recommendation with specific targets and ranges for each climate zone on August 25, 2020. Subcommittee support of recommendation. DEED follow-up recommendation to seek additional support for target and range numbers. No BRGR action, not brought back for adoption.

   Implement a school design ratio of Building Footprint Area to Gross Square Footage (FPA:GSF). This ratio would be applied to facilities in excess of 30,000 GSF.

   Status: Subcommittee recommended to not move forward an FPA:GSF ratio at this time. General consensus of agreement from BRGR at December 2, 2020 meeting.

3) *Implement a school design ratio of Building Volume to Net Floor Area (V:NSF).*

   Status: BRGR adopted a Building Volume to Gross Floor Area (V:GSF) ratio for all four climate zones based on subcommittee recommendation on December 2, 2020.

4) *Implement a school design ratio of Building Volume to Exterior Surface Area (V:ES).*

   Status: Subcommittee recommended to not move forward a V:ES ratio at this time. DEED seeking procurement of additional modeling data.

Discussion

It was agreed at the subcommittee level that the ratios concerning a volume component (*V:NSF* and *V:ES*) and the FPA:GSF ratio were related to a buildings compactness and would be presented as one ratio recommendation and separate ratios. It was decided to consider the ratio V:NSF, modified to V:GSF, and a recommendation was brought to the committee December 2020. At the meeting the committee adopted an amended V:GSF recommendation and concurred that no ratio would be pursued for FPA:GSF; however, during committee discussion, the department requested additional review of V:ES with an emphasis on its potential effect on first cost savings.

Both the departments modeling effort and the study by the Royal Society open Science (D'Amico and Pomponi) reinforced how difficult it is to study a finite set of ratios to produce any meaningful guidance. The subcommittee could not correlate a V:ES ratio with significant savings within our own modeling study and we found that same conclusion in related studies – the Royal Society's quote concerning V:ES is "A practical implication of this observation is that there exists a wide range of geometrically different shapes to choose from, which are only slightly less efficient than the theoretically optimal semi cube shape." It was further discussed that not only was it unlikely to identify a ratio that could represent a realistic school program (or that would produce any savings) that it would be irrelevant against the cost related to code required ventilation for any given volume.

DEED is moving forward with a small procurement to obtain additional building energy modeling data on the O:EW and V:ES ratios.

Future efforts

Considering elements that effect the first and operational cost of a school: monitoring and reporting of exterior wall and ceiling height as separate from a building square footage or exterior envelope component may produce the original intent of a Design Ratios. Considerations on use could then be factored in when considering Classroom vs Gymnasium space for example.

Schedule

No meetings scheduled at this time.

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Model School

S U B C O M M I T T E E R E P O R T

July 9, 2021

Mission Statement

To provide minimum criteria and expectations to test the performance of a school's mechanical, electrical, plumbing, fuel, controls and envelope systems; to promote energy efficiency of the school and save operational costs over the life of the building.

Current Members

Kevin Lyon, Chair
Jim Estes
Dana Menendez, ASD
Scott Worthington, BDS
Tim Mearig, DEED
Sharol Roys, DEED

Status Update

Recommendations from 2017 Report to the Legislature:

1) *Enhance the Cost Model for possible use as a cost limit standard to include: a) defining/updating geographic cost factors, b) adding detail to the 4.XX Site Work elements, and c) adding detail to the 11.XX Renovation elements.*

   Task 1: Prepare scope, issue an RFQ, award and manage the update.

   Status: Cost Model enhancement has been completed by HMS. The 18th Edition is much more complete than previous versions, and now provides more flexibility in the variety of projects that can be estimated. Some usability and functionality issues were found after delivery, but have now been resolved. The updated version is available to public online.

   Task 2: Develop regulations, as needed, to establish the Cost Model as a cost limit for projects.

   Status: Subcommittee to prepare analysis of need and make recommendation to BR&GR. This has not yet been scheduled. Issues found in the latest version illustrate the difficulty in broadening the Cost Model's scope, and will likely take at least one or two more iterations to work out issues needed to complete this task.

   The subcommittee recommended transfer of the committee work plan elements listed below from the subcommittee to the department:

1.1.1.1.	Analyze, Recommend Cost Model As Cost Control	Dept	Jul 2019
1.1.1.2.	Draft Regulation Language For Cost Control Use	Dept	Jan 2020
1.1.1.3.	Review Draft Reg Language, Recommend To State Board	Committee	Mar 2020
1.1.1.4.	Manage Regulation Development and Implementation	Dept	Dec 2020

The Subcommittee has discussed the idea of the Cost Model as a tool for regulating project costs for some time. While a maximum cost per square foot (and the Cost Model as a potential alternative), had been part of the discussion in the original senate bill (SB87) that started much of this process, this idea was not included in HB212, the legislation finally enacted. The Subcommittee has continued to have concerns about how something like this could be implemented, especially in light of some of the known limitations of the Cost Model in its current state, and the unique challenges that Alaska presents. Department staff has also since communicated with facilities officials in other areas of the country that have similar requirements, and found that such a process has been problematic in those locations, even with fewer geographic and other variables that Alaska would face. Given these issues, the Subcommittee and Department staff are recommending that the idea of the Cost Model as a project cost control be abandoned at this time, and that this task be closed. A briefing paper to this effect, prepared by Department staff, has been included in the December 2020 BRGR packet.

Geographic Factors - Subcommittee received and reviewed new geographic factors for the Cost Model. To be shared with the full Committee at September meeting. Department to compare changes made since this was first presented at the December meeting. Does this need further public review?

2) *Establish a process of reviewing model school elements within the Cost Model so that those updates become researched, vetted, and intentional.*

Task 1 & 2: Develop a best-practice strategy for updating model school elements in conjunction with HMS, Inc.. Analyze effectiveness of BR&GR vs. consultant vetting.

Status: Subcommittee and department staff provided a great deal of input and feedback into development of the 18th Edition. More user feedback is anticipated as this version is put into practice during the FY21 CIP cycle. The department will keep the committee apprised of feedback received. Committee should maintain current roll of reviewing model school element changes proposed in each new edition.

Procedures for Updating the Model School File – Need direction: would the Committee support contracting out review of the model file if funding was available annually? Would the Committee support review of the file by a volunteer organization (e.g. A4LE)? These may not be mutually exclusive.

There appears to be some funding available for initial development and for subsequent update and maintenance of the standards. The subcommittee discussed how a paid consultant might fit into this process. The initial idea would be for

DEED staff and the subcommittee/committee to put together the outline of the manual. The consultant would then help to fill in details for specific items as needed based on current practice. The finished product would then be available for public/peer review prior to implementation. Annual or periodic updates would be made as needed based on user feedback and other information. Updates to the Cost Model tool would be made to follow development of the model and standards.

These tasks have essentially now been completed. The Subcommittee and Department staff recommendation is that the current update process continues wherein the Cost Model and Model School Building Escalation file is updated by the cost consultant using their experience with Department guidance on the scoping of their contract, and Committee review of the recommendations made under that contract.

3) *Develop Model Alaskan School standards by building system (ref. DEED Cost Format) needed to ensure cost effective school construction.*

Task 1: Complete outline-level standards for remaining seven systems.

Status: Department has not produced additional draft sections for subcommittee review.

Task 2: Conduct an independent feasibility and cost/benefit analysis on developing outline standards into comprehensive state-level model school standards.

Status: A contract was awarded to the McDowell Group to conduct the feasibility study, which was completed and delivered on July 5, 2019. Along with Department staff and BRGR Committee members, a number of people in state and provincial governments in the US and Canada were interviewed as part of the study. These interviews looked not only the implementation, but also the motivation in adopting standards by these different entities. School equity and efficiency/sustainability appear to be at least as much, if not greater factors in developing standards as cost savings for many.

The study provided good information about potential costs for developing and implementing a standard, either by Department staff or by contracting much of the work out to a consultant. The assumption has been made that implementation of a standard would likely result in cost savings due to relatively low cost to develop and update the standard versus the amount spent on school construction and renovation. A tool was developed, along with the report, to aid in putting together a cost benefit analysis.

Subcommittee discussed the need for more review and input by members of the design community in relation to standards that was somewhat lacking in feasibility study. One of the major questions to be addressed is what level of detail is appropriate in the standards? Subcommittee plans to review examples of standards currently in use by other entities to see how detailed they get in various areas, and seek input to try determine what the level of detail should be for Alaska.

In response to the need identified at the previous meeting to determine the appropriate level of detail in any proposed standards, DEED staff provided the subcommittee with several examples of facility design and construction standards from agencies in other locations. In all, the committee looked at six sets of standards including Alberta, Arkansas, Florida, Maine, New Jersey, and New Mexico. Each of these had somewhat different approaches and levels of detail. This ranged from fairly general to quite specific, for example, including specifying minimum pipe sizes. Some provided standard detail drawings for use by the design teams.

After reviewing these, the subcommittee reached the following recommendations:

1. Standards should be at more of a policy level, with greater detail provided as needed in some areas. Examples of added detail might be specifying minimum and/or maximum thicknesses for metal roofing and siding. The goal would be to try to keep the manual to a more manageable size of perhaps 50-100 pages, which would help to make periodic updates of the manual more realistic, and allow the information to be more easily digested by the design teams as they worked on projects. This was more in the vein of the Arkansas and Maine examples.
2. The standards manual should somewhat mirror the layout and organization of a standard project manual, which should make it easier to use and follow during project design. More discussion is needed as to whether the standards manual should be more narrative/bullet point format, or more specification number format.
3. The standards manual might identify "premium inclusions" that would be permitted, but at the district's expense. This might be similar to that found in the Maine example.

Other issues discussed by the subcommittee, but not resolved, include:

- The cost/benefit analysis is not complete. Information required to make use of the tool provided will take more time and effort to gather.
- Not much input from outside A/E professionals to this point.
- Not much discussion of the downsides of their standards, if any, by other entities. What were pitfalls/lessons learned?
- What is the appropriate level of detail for the standards? Some areas possibly more specific or general than others. Are performance based standards more appropriate for some things?
- Can the standard be maintained over time and not become outdated?
- How do standards integrate with other codes adopted by the state and/or municipalities?
- How do the building systems standards integrate with other aspects of the cost effective construction mandate?

Task 3: Review analysis and publish a handbook or regulations as recommended.

Status: The $50k in funding previously discussed for acquiring professional assistance in creating the Model School Standards Manual was recently made available to the Department. The Subcommittee met on March 18th to discuss and review an RFP for professional services for "*development of a DEED School Design & Construction Standards building system template, and for the completion of drafts of four building system standards using the approved template."* The initial four building systems include exterior closure, interiors, mechanical, and electrical. The standards template is to be based around "*a more narrative format with a focus on simplicity and brevity*" as previously discussed by the subcommittee. An RFP for professional services was issued with proposals due April 7th, and award of the contract targeted for April 10th. The consultant will be able to consult with the Department staff as well as Committee members through the process. The contract work is due to be completed by the end of June. At that point, the template and completed parts of the manual would be available for review by Department staff, BRGR Committee, and the public.

BDS Architects submitted the only proposal to deliver the Model School Standards template and draft standards, and was awarded the contract in April 2020. A draft standard, along with the template, was submitted to the subcommittee for review by BDS on May 18th. Comments regarding the draft were collected, and the subcommittee then met on May 22nd to discuss the draft and review comments received, both from subcommittee members and Department staff.

The draft standards consisted of three parts: Part 1 - Purpose and Use, Part 2 - Design Principles, and Part 3 – System Standards. The initial draft was based largely upon the standards developed by the state of Maine, and still contained a great deal of "placeholder" information at that point, which needed to be fleshed out and rewritten more specifically for Alaska. The System Standards piece, although included in the template, had not been provided.

Discussion of the content included in the draft standard included concerns that it not try to duplicate building codes, other government regulations, other DEED publications, and/or the Educational Specifications. Also of importance was that the standard itself be structured such that the Design Principles would not potentially contradict the System Standards over time. The subcommittee thought that it is probably better to error on the side of more general information in the standard initially, and that the template would allow additional more specific information to be added over time if needed. The experience and perspective of the design team/community would help to determine the appropriate level of detail. There was also some concern that the draft standard had seemed to deal primarily with school construction, and had so far not addressed smaller component type renovation projects.

BDS has recently provided a second draft of the standard to DEED. However, this has not yet been reviewed by the subcommittee. The final draft of the template and standard is still scheduled to be completed by the end of June.

BDS delivered a draft of the Alaska School Design and Construction Standards by the end of June 2020 as called for in their contract. That draft was still very much a work in progress. BDS agreed to continue working on the document into July. The Subcommittee met with BDS on July 8th to go over review comments made by members, and to provide direction for continuation of their work.

A second review meeting took place on July 28th to review progress in implementing the previous comments. Additional review comments were offered by Subcommittee members, and were discussed with BDS for inclusion of a final draft.

On August 17th, BDS delivered their final draft of the standards included in the September BRGR packet for Committee review. There was general agreement that while the template was fairly defined, the information was still far from complete. For example, the BDS contract only stipulated providing the information for four building systems. Other building systems outlined remain to be fleshed out. This was estimated at approximately 40% complete. Likewise the design principles section still also has much work to be done, and that section was estimated at approximately 20% complete.

The Subcommittee met once again on August 24th to approve a recommendation to the full Committee on how to proceed in further completing the standards. That recommendation to make use of Department staff to fill out the missing information required to allow implementation of the standards with Subcommittee review, was also included in the September 2020 BRGR packet.

The Subcommittee, as well as the Department staff believe that this work can be completed over the fall and winter, and ready for full Committee approval and issuance for public comment at the April 2020 BRGR meeting.

The Subcommittee met briefly on October 20th, and again on November 10th to discuss the completion of the remaining sections of the School Construction Standards Manual. Department staff provided drafts of six sections in various stages of completion, using information transferred from previous Department work and other sources. These sections were:

- Section 1 - Site and Infrastructure
- Section 2 - Substructure
- Section 3 - Superstructure
- Section 7 - Conveying Systems
- Section 10 - Equipment and Furnishings
- Section 11 - Special Conditions

After reviewing the progress to date, and work still to be done, it was felt that it would be beneficial and create a stronger product to get other voices and professional experience involved to assist in drafting and refining the various manual sections, particularly with the time constraints and other current

circumstances. It was suggested again that we attempt to get members of the Association for Learning Environments (A4LE) involved. Other BRGR committee members and other design professionals were also suggested as possible contributors. Department staff has recently sent out an invitation to some of these people to contribute, and an overture will be made to A4LE to see if some work sessions can be implemented with that group**.**

On January 28th, Tim Mearig distributed drafts of three additional sections of the School Construction Standards Manual that had been developed by Department staff. These included:

- Section 2 – Substructure
- Section 3 – Superstructure
- Section 7 - Conveying Systems

The Subcommittee met again on February 8th to review and discuss these new sections, work still to be done, and some potential changes that had been suggested that might be incorporated into the overall document.

The subcommittee continues to grapple with the appropriate level of detail contained in the various sections of the manual, and how prescriptive they should be, at least initially. Essentially, this is whether it should be more general to start and add detail as it evolves over time and receives more public vetting, or to begin with more detail and potentially reduce some specificity if issues occur in use. This issue remains ongoing.

One of the new sections submitted, Section 3 – Superstructure, incorporated some new language included a system summary describing the systems covered in that section, and some language regarding design philosophy for that section. Both of these pieces were felt to be beneficial, and will likely be included in each of the sections moving forward. A third piece referencing the Model Alaskan School File was felt to be less useful, and likely not included in the final product. There was also discussion of DEED staff putting together a checklist for projects to assist districts in the use of this manual, similar to what has already been done in regards to the ASHRAE 90.1 requirements. This was also felt to be a very useful tool to help implement the new standards, and eliminate uncertainties as the manual is put into use, and the idea was very much encouraged.

An invitation to has been extended to the A4LE group to hold an online meeting to discuss and review the manual as it exists currently, and to provide comments (and hopefully contributions) from the members in completing the initial version before it goes out for general public comment. As has been discussed several times previously, the A4LE membership encompasses a variety of professional knowledge and backgrounds that would be beneficial in vetting and improving the content and usability of the construction standards manual. Given that a number of members will also likely be impacted by implementation of the new standards

manual, it is assumed that motivation for their participation would be high. However, the subcommittee has not heard back from A4LE at this time.

The Subcommittee met briefly on May 25th to work on the completion matrix, and again on June 24th to discuss the completion of the remaining sections of the School Construction Standards Manual. The subcommittee considered reduction of 36 space types to 11. Department staff provided drafts of three sections in various stages of completion, using information transferred from previous Department work and other sources. These sections were:

- **Section 4 – Exterior Closure both with and without expanded sub sections.**
- **Section 5 – Roof Systems both with and without expanded sub sections.**
- **Section 8 – Mechanical both with and without expanded sub sections.**

The census by the subcommittee was to move forward with the expanded subsections for sections 4 – Exterior Closure and 8 Mechanical and to move forward without the expanded subsections for Section 5 – Roof Systems.

4) *As part of describing a Model School, identify school elements that do not further the core educational mission of the school.*

Task 1: Review current Topic Paper and include in Report to Legislature.

Status: Completed January 2018.

Task 2: DEED to develop regulations that define non-core amenities based on legislative direction.

Status: No current action. DEED could use the Legislative Proposal process to advance. Subcommittee would need to make recommendations to Committee. BR&GR recommendations to department.

Schedule

The next Subcommittee meeting is under consideration for August 5 and August 19. Department staff will continue with work on remaining sections including Site Work and Special Conditions. RSA will be helping provide final content in 09 Electrical. It is anticipated that the initial School Construction Standards Manual will be available for public comment in September 2021.

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Alaska School Design and Construction Standards

P U B L I C A T I O N C O V E R

July 21, 2021

Issue

The department seeks committee feedback on the draft additions and revisions to Part 2 Design Principles and Part 3 System Standards of the *Alaska School Design and Construction Standards* handbook.

Background

Last Updated/Current Edition
This is a new publication; no current edition is available.

Summary of Proposed Changes
The department, through the Model School Subcommittee, has prepared revisions/additions to Part 2 Design Principles and Part 3 System Standards of the publication. All work continues to supplement the work completed by BDS Architects.

Part 2 elements continue to be organized under the major headings of *Regionally Based Design*, *Site and Infrastructure*, *School Buildings*, and *High Performance Facilities*. Within the *School Buildings* section, the document uses the categories and types of space listed in the CIP application instructions, Appendix D. However, that list has been pared down and consolidated in this update to provide an appropriate level of detail. Also, the option of a tabular listing of space requirements was removed in favor of staying with a narrative listing. This provides a consistent format throughout the document. This update also continued to relocate items from the BDS edition related to Interiors and assigned them to their appropriate section in Part 2. Completion efforts for the *School Buildings* section is being sought from A4LE and is projected for August 16th.

Part 3 System Standards elements received substantial analysis for the appropriate level of detail in each of the 11 systems. Most sections were indexed to the subsections used in the DEED CostFormat, 2020 version. However, sections with minimal breakout at Level 4 were kept at a Level 3 alignment. In April 2021, there were approximately 25 subsections that had no development (out of 129). As of this update, that count is down to 16. An industry partner has agreed to take five of those in 09 Electrical. DEED will develop content in five subsection in 01 Site & Infrastructure and six are awaiting assignment in 11 Special Conditions. Further in Part 3, the 4 section outline format consisting of *Building System Summary, Design Philosophy, Model Alaskan School*, and *Design Criteria & Ratios*, was developed for all 11 building systems.

Public Comment
No public comment period has occurred.
The handbook is scheduled to be presented for public comment once the work on both Part 2 and Part 3 is completed. A public comment period is anticipated to start in September 2021.

Version Summary & BRGR Review

Drafts of the publication were presented to the committee at the following meetings:

September 8, 2020 – original BDS draft presented that provided an overall structure to the publication and completed Part 1 describing its purpose and use. Part 2 Design Standards, and Part 3 System Standards were left incomplete due to limited funding for the consultant assistance; committee directed DEED to develop incomplete sections.

February 25, 2021 – DEED presented four draft sections for Part 3: 01 Site and Infrastructure; 02 Substructure; 03 Superstructure; and 07 Conveying Systems. Updated Part 3 structure and numbering to index to *DEED CostFormat*.

March 17, 2021 – DEED presented two additional Part 3 sections: 10 Equipment and Furnishings, and 11 Special Conditions. Part 2 had several sections with further development and included some alternative formats for comparison and consideration.

July 21, 2021 – DEED presented subcommittee work primarily aimed at finalizing the structure and level of detail of the document. New content was also developed for ~10 subsystems.

BRGR Input and Discussion Items

- Continued alignment of CIP Instructions Appendix D and this publication, primarily in the area of space types/nomenclature.
- Is the *Model Alaskan School* section a meaningful and helpful feature?
- How will this publication interface with adopted Design Ratios?
- Staff review items:
    - Does the structure require a differentiation between elementary, middle, and high school features/elements?

Suggested Motion

No motion suggested at this time. Department will continue development and refinement of draft publication based on committee comments and discussion.

ALASKA SCHOOL DESIGN & CONSTRUCTION STANDARDS

Table of Contents

Part 1. PURPOSE & APPLICATION 1

1. Background 1
2. Document Organization 2
3. Prerequisites 3
4. Flexibility and Innovation 3

Part 2. DESIGN PRINCIPLES 5

1. REGIONALLY BASED DESIGN 5
2. SITE & INFRASTRUCTURE 6
3. SCHOOL BUILDINGS 9
4. HIGH PERFORMANCE FACILITIES 24

Part 3. SYSTEM STANDARDS 27

01. SITE AND INFRASTRUCTURE 27
02. SUBSTRUCTURE 38
03. SUPERSTRUCTURE 44
04. EXTERIOR CLOSURE 50
05. ROOF SYSTEMS 60
06. INTERIORS 65
07. CONVEYING SYSTEMS 77
08. MECHANICAL 80
09. ELECTRICAL 92
010. EQUIPMENT & FURNISHINGS 102
011. SPECIAL CONDITIONS 108

Part I. PURPOSE & APPLICATION

1. Background

These Standards achieve two primary objectives. They fulfill a statutory mandate, and they establish consistency for state aid. In 1993, the Alaska legislature created the Bond Reimbursement and Grant Review Committee under AS14.11.014 and identified the committee's purpose. Among their many tasks, the committee was charged, through the Department of Education & Early Development (DEED), with the development of criteria intended to achieve cost effective school construction in the State of Alaska. These Standards are those criteria and are the result of decades of work by the committee. They also set the stage for continued work toward ensuring cost effective school construction into the future.

Regarding consistency, powers granted to DEED provide broad authority for the state to revise a project's scope and budget if the costs are excessive, and to reject projects not in the state's best interests. These Standards have been developed to make these determinations more transparent; to provide consistent, clear information for school districts and design professionals, and to establish a uniform level of quality and performance for all of Alaska's public-school buildings.

The Standards also provide a framework for research, "best practices," accepted procedures, "lessons learned," statutory and regulatory requirements, and for inclusion of the experience of students and educators across the State of Alaska. The best of what is currently known and available in these areas is included; future knowledge and understanding will be incorporated through a vetted public process.

It should be acknowledged that the Standards are also very DEED-centric in fulfilling the two objectives stated above. They are not a building code. Alaska's adopted statewide building code requirements for schools, are already well developed and are enforced by the appropriate authority having jurisdiction (AHJ). Neither are the Standards district-level facilities manuals. They do not, for example, establish a preference for a side-coiling grill versus an upward acting grill for security or access separation. These standards fit between national code standards and local preferences. Their focus will always be cost effectiveness from a state perspective. The Standards apply to all new school construction and new additions to existing buildings. Renovation to existing facilities will adhere to the Standards, whenever possible, as approved by DEED.

School construction in Alaska encompasses a wide range of climates, differences in school sizes, and the logistics of building in remote areas with limited access to labor and materials. Building system and component types, quantities, and quality vary widely across school projects with state aid. Where applicable the Standards are tailored to address this wide range of conditions.

The Standards recognize the need to consider the long-term operations and maintenance of a school facility rather than focus solely on initial construction cost. Therefore, these Standards will not only consider the initial cost of construction but also operations and maintenance expenses, by looking at design and construction decisions on a life cycle basis.

It is evident that there is an extensive need for new and renovated school facilities. Many of the older schools in Alaska do not meet the program needs of today's complex learning environments. Older

schools tend to be costly to maintain, energy inefficient, and non-code compliant in some cases. There are also many safety issues within and outside of older school buildings. With a deep financial involvement by the State of Alaska, the Department of Education and Early Development has a responsibility to assure that projects meet established criteria for cost effectiveness including durability, economy, and quality.

One of the major objectives of the State is to address as many projects as possible within the limited financial resources at both the State and local levels. To this end the State wants to avoid unnecessarily expensive designs, unapproved assemblies, and products that carry premium costs. The Standards are intended as a baseline for architects, engineers, and other design professionals, along with school districts, to develop cost effective solutions to meet the needs of individual school communities. The information is provided to allow the planning, design, and construction process to proceed most efficiently—without undo restriction on the design of facilities—focusing efforts on the creation of the best possible educational environments for each project.

2. Document Organization

These standards are intended to be used in conjunction with other school planning guidelines developed by DEED including those for alternative project delivery, school condition surveys, and site selection. When available, the Standard may also incorporate Design Ratios whose purpose will be to measure the efficiency of a school design as it relates to cost effectiveness. The Standards do not include all possible building components and materials used in school construction. They reflect the department's belief that good design is occurring every day based on the compendium of knowledge present in Alaska's design firms and school districts. Instead, they are to provide both general guidance to the design professional in key areas of concern, and specific guidance on selected design elements and materials that DEED has identified, based on experience from prior projects.

Part 1 – Purpose and Applications is an introduction to the Standards, their background, intended purpose and implementation.

Part 2 – Design Principles deals with overall design, construction, and project management principles. Each design principle includes a list of standards and guidelines. These standards are displayed in three sections as *Required, Recommended,* and *Premium*.

Part 3 – System Standards is organized by a DEED-specific elemental cost structure with specific material or system selections, design criteria, and guidance.

Levels of Implementation
In Part 3 the System Standards are grouped into categories with the following definitions:

Required: These are required elements that are accepted practice by DEED. Not all Required elements are intended to be incorporated into any one project and will vary based on design intent, budget, region, climate and school size.

Recommended: These elements are recommended as alternatives and possible improvements or upgrades to the Required elements. These are also accepted practice by DEED.

Premium: These elements are considered substantial upgrades to the Required and Recommended designations. They can be included in projects but in most cases will not qualify for DEED funding. Inclusion of Premium elements requires DEED review.

Cost Factor and Life Cycle Cost Analysis Index
Selected materials described in Part 3 System Standard, have been designated with indicators of CF (Cost Factor) and LCCA (Life Cycle Cost Analysis). The indicators are followed by a numerical scale of 1 through 5.

For CF, a factor of 1 is the least costly option, 5 is the most expensive. For LCCA, 1 has the least life cycle to cost benefit, 5 has the most benefit.

3. Prerequisites

[This placeholder section title is for possible DEED-specific content developed around "prerequisites" on how the state might implement this document.]

4. Flexibility and Innovation

The State recognizes that there will be constant modifications to this document as new technologies and products enter the construction market. Design professionals are encouraged to discuss new approaches, technologies, and materials with DEED officials. Many design decisions should be based on a "life-cycle analysis" that considers energy use, first cost, operational cost, equipment life, and replacement cost. In addition, consideration should be given to materials that can be recycled and are not hazardous to the environment.

The State recognizes that school facilities will differ with each school district's educational program and internal organization. The design of the building will also be influenced by the school site, region, climate, and other external factors. A one-design-fits-all approach is not advocated; however, these Standards do attempt to address cost-effectiveness, quality considerations, and design efficiency. To allow for appropriate flexibility and innovation, as discussed above, the Standards set out elements as Required, Recommended, or Premium. Recipients of state-aid that wish to incorporate elements that exceed these standards (indicated as Premium) shall do so with non-state funds unless a variance is obtained from DEED.

The State has a commitment to the development of quality educational spaces that will meet the educational needs of students in Alaska schools. Spaces and buildings should be flexible in order that present and future programs can be housed appropriately to meet the needs of an ever-changing public-school curriculum. These standards and guidelines will be used by DEED when reviewing school capital projects approved for state-aid.

DEED encourages an integrated planning and design process that combines the Recipient's project requirements with these Standards to provide the design team with greater clarity as to the needs of both. The process of qualifying for state-aid for school capital projects as established in AS 14.11 provides all the necessary steps for close collaboration between the recipient district or city/borough

regarding the scope of a project. From the initial application and evaluation process through the design iterations, the importance of maintaining collaboration and DEED oversight throughout is critical. A cooperative approach will ensure a smooth process.

Part 2. DESIGN PRINCIPLES

1. REGIONALLY BASED DESIGN

School construction in Alaska encompasses a wide range of climates and must respond to the challenging logistics of building in remote areas with limited construction seasons. Design principles must be adapted based on climate and geographic region. The climates zones illustrated below will be used as a baseline to identify and evaluate appropriate design strategies in the application of these Standards. It remains the responsibility of design and facility professionals to understand any micro-climate or site-specific conditions which may impact the application of the Standards on a project-by-project basis.

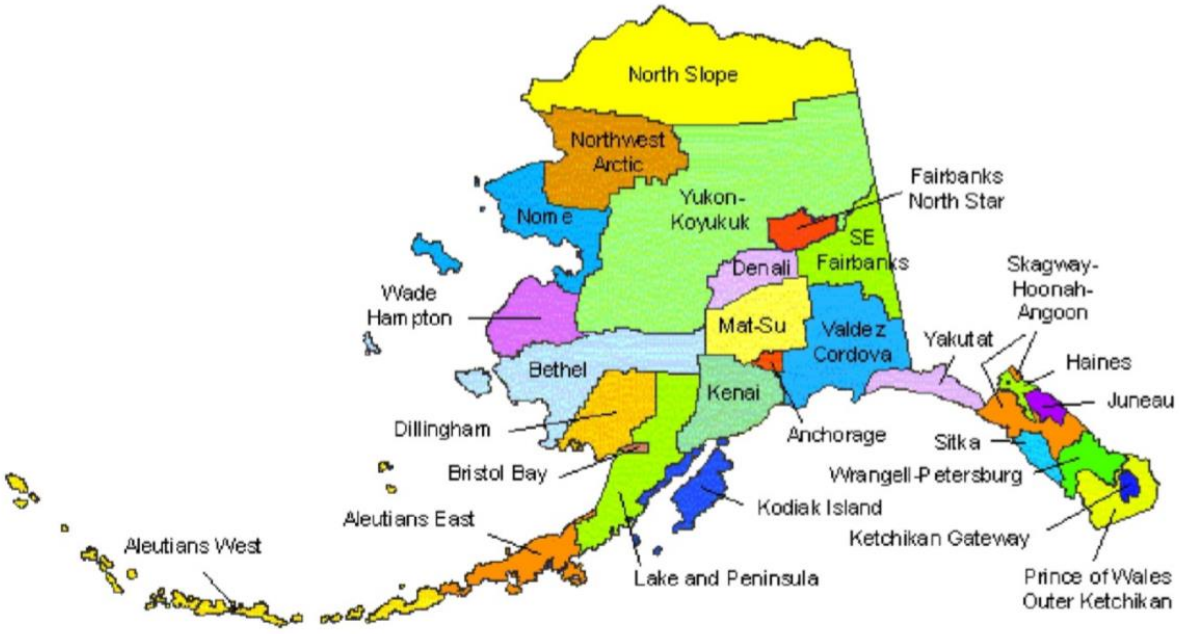


Table A301 Alaska Census Areas

Zone 6	Zone 7	Zone 8	Zone 9
Juneau	Aleutians East	Bethel	North Slope
Ketchikan Gateway	Aleutians West	Denali	
Prince of Wales	Anchorage	Fairbanks North Star	
Sitka	Bristol Bay	Nome	
Skagway-Hoonah-Angoon	Dillingham	Northwest Arctic	
Wrangell-Petersburg	Kenai Peninsula	Southeast Fairbanks	
Yakutat	Kodiak Island	Kusilvak (Wade Hampton)	
Haines	Lake & Peninsula	Yukon-Koyukuk	
	Matanuska-Susitna		
	Valdez-Cordova		

Consideration of geographic regions in the application of the Standards relate primarily to initial construction costs. The department has established an analytical model for the evaluation of

geographic cost variations across Alaska, as it relates to school facilities, and publishes the results of that analysis as part of the Demand Cost Model for Alaskan Schools. The geographic cost factors identified in that DEED publication will be used as a baseline to identify and evaluate appropriate design strategies in the application of these Standards. As with climate zones, it remains the responsibility of design and facility professionals to understand any local variations and site-specific conditions which may impact the application of the Standards on each project.

2. SITE & INFRASTRUCTURE

The State must be involved in reviewing site selection, design, and programming. Selected sites should be affordable, easily developed, and close to commercial-grade utilities wherever possible. Sites requiring extensive earthwork, long driveways, or environmental challenges should be avoided. In urban areas, schools should not be located directly on major roadways with high speeds or heavy traffic.

Recent tragedies at schools around the country have reinforced the need for designs to keep students and staff safe in our public schools. School safety experts and educational facility planners have been working together to develop recommendations that cover the outside and inside of school buildings. DEED encourages school districts to consider student safety as one of the most important criteria when designing or renovating schools.

A. Safety + Security Site Design

Required:

1. Develop site plans that allow two separate points of access to the site.
2. Make the main entrance easily identifiable from the street, primary parking area or main access route.
3. In settings where the school building is at or near grade, develop main entrances with discrete physical barriers such as concrete-filled steel bollards, boulders, planters or other physical barriers, as applicable, to prevent cars or trucks from being driven into the school.
4. Maintain clear and unobstructed sight lines for security and safety.
5. Obtain preliminary approvals from the Department of Transportation, the Army Corp of Engineers, and other appropriate agencies before site approval.
6. In school settings where emergency services are available, provide emergency vehicle access to all areas of the site, including playgrounds and fields.
7. In school settings where bus service is available, separate bus loop and parent drop-off areas and install fencing or guardrails to limit pedestrian circulation to designated crosswalks and sidewalks.
8. At urban schools, provide safe access for pedestrian and bicycle circulation from site entrances to the main building entrance and consider keeping pedestrian paths away from automobiles.
9. Provide safe, clearly marked pedestrian pathways, sidewalks, and boardwalks through the site.
10. Locate play areas away from vehicle circulation and parking areas. Provide accessible pedestrian pathways to playgrounds and athletic fields that avoid vehicular traffic.

11. Provide chain link fencing at the perimeter of playgrounds as required.
12. Avoid sidewalks that link to high speed roads and highways.
13. Provide clear vehicular circulation patterns and signage. Provide stop signs and speed tables.
14. Provide LED lighting at all travel ways, parking areas, and building perimeter.
15. Oil, propane, and gasoline tanks are preferred to be located below ground. When above ground protect the tank with fencing, berms or bollards. Small propane tanks serving kitchen or science room equipment may be located above ground.
16. Separate service vehicles from bus and parent drop-off areas.
17. Keep perennial bushes and trees a minimum of 20'-0 away from each side of major entrance doors.
18. Keep electric and telephone services secure from vandalism. Use the preferred method of protection, underground service from a street telephone pole to the entering point of a building.
19. Provide adequate lighting for the main entrance sidewalk and parking lot to discourage loitering and vandalism.
20. Provide appropriate site security gates at fire lanes to prevent non-authorized vehicles from driving around the sides or back of the school.
21. Provide exterior public address systems that can be heard in the parking lot, bus loop, and playgrounds.

Recommended:

22. Consider developing emergency off-site staging areas.
23. Consider providing a secondary access to the site for emergency vehicles.
24. Consider how an emergency evacuation will be conducted. Consider bus loading areas and/or staging areas.

Premium:

25. Locally required (i.e., municipality, borough, etc.) off-site improvements.
26. Masonry or stone pavers in locations with a geographic area cost factor above 105.
27. Concrete sidewalks further than 50'-0" from the main entrance.

B. Building Location and Orientation

Required:

1. Select the building site to minimize environmental impact and encourage a simple, straightforward construction process.
2. Orient the main entrance to face primarily south. Avoid entrances facing north.
3. Consider prevailing wind and wind speeds with regard to doors. Provide measures such as wing walls or rails to prevent wind from catching doors and causing damage.
4. Orient the building design to maximize natural daylighting in classrooms and other occupied spaces.
5. Keep building ventilation intakes away from vehicle exhaust and other sources of air pollution. Consider the site's prevailing winds when locating intake and exhaust equipment.

Recommended:

6. Consider orienting the longer axis of the building East-West for maximum solar impact.

Premium:

7. Building pads/sites with slopes in excess of 10 percent.

C. High-Performance Site Principles

Required:

1. Site buildings to maximize daylighting (a north-south orientation for classrooms).
2. Orient buildings with a major entrance on the south side whenever possible.
3. Choose native and adaptive plants that do not need permanent irrigation systems.
4. Conduct a Phase I Environmental Assessment (and Phase II if necessary, based on Phase I) to identify hazardous materials. Conduct required mediation on site.
5. Control erosion and sedimentation during construction.

Recommended:

6. Consider opportunities to reduce light trespass onto adjacent sites and improve nighttime visibility by reducing up-lighting, reducing maximum lumens of fixtures above horizontal, and locating luminaires well inside the project site boundary.
7. Consider opportunities to reduce impervious surfaces on site, reduce quantity and improve quality of stormwater runoff. Practice low-impact rainwater management strategies.

Premium:

8. Stormwater management: bioswales, pervious pavers.
9. Green roofs.
10. School vegetable gardens.

D. Building Entrances

Required:

1. Provide a single point of entry for all visitors that is easily identifiable from the main approach to the school. When called for by school district policy, visitors shall enter through a secure vestibule at the main building entrance. This arrangement may not be practical in a renovation or necessary in a very small school.
2. Design all exits and entrances so the building can be securely locked down after the start of school if desired
3. Safety and Security **at** Main Office
    a. Locate the main office door adjacent to the security vestibule lobby so office personnel can maintain visual supervision while visitors come in to sign the visitor log.
    b. Provide a hidden electronic security panic button in the office that can send a signal to police or emergency responders when a crisis is developing at the school.
    c. Provide a minimum of two locations for interior intercom and exterior public address system. The second location should be designated as a “safe room.”
    d. Design main offices with a second means of exit, either directly outdoors or into a more remote hallway.
    e. Provide security cameras at the main entrance and other remote locations around the school. Video systems should be capable of being reviewed for live on-demand broadcasting as well as a minimum thirty-day archival library system.

   f. Design the main office so it has easy supervision of the security vestibule, the main entrance lobby, and one or more main corridors leading into the "heart" of the school.
4. In a secure vestibule arrangement, the interior bank of doors of the vestibule should be equipped with an electronic strike that allows the door to be unlocked electronically by main office personnel after visitors have been approved for entrance.
5. Provide proximity card readers for staff at the main, kitchen, and at least one other staff entrance.
6. Provide video cameras in the ceiling of the security vestibule and directly inside of the vestibule doors so that visitors can be photographed on video loops for later review.
7. Design all major entrances and exits with vestibules if they are likely to be used during school hours.
8. Design entrance doors to be controllable from a remote location, preferably at the administrative office, with a direct view and oversight of the main entrance security vestibule.
9. Install exterior rain canopies at the main entrance and exterior doors that are expected to have high usage.
10. In buildings that are at our near grade, protect all front entrances and other major doors used on a regular basis throughout the school day with concrete-filled steel bollards or other appropriate, rugged obstructions.

Premium:

11. Pivot hinges, sliders, or revolving doors.
12. Electric door openers other than at the ADA main entrance.
13. Overly complex ceiling finishes and features.

3. SCHOOL ~~FACILITIES~~BUILDINGS

Every school plan should be a reflection of the Space Allocation Guidelines found in Alaska Administrative Code (4 AAC 31.020), as well as the school district's educational specifications and pedagogy. The opportunity to design new or redesign existing school buildings is often a once-in-a-lifetime experience for teachers, school boards, and the local community. Serious consideration should be given to a comprehensive educational visioning process at local expense that reviews current state-of-the-art thinking and considers which educational strategies are most appropriate for the school's age group and local community values. Learning spaces should support traditional as well as expeditionary, and "virtual" learning experiences. The following general planning principles apply to all school facility design:

A. General Planning Principles

Required:

1. Design interior wall layouts to be simple and straightforward.
2. Zone the building for public and after-hours use.
3. Consider zoning the building for lockdowns that allow different sections of the building to be securely isolated.
4. Design the floor plan to carefully separate quiet, academic areas from noisy, high activity functions.

5. Design classrooms to conform to best practices for acoustic isolation and separation as defined by ANSI-S12.60-2010 (Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools Part I).
6. Organize functional layouts to support small-group and large-group activities.
7. Designs should emphasize multi-functioning rooms to maximize daily use and minimize underutilized spaces.
8. Design the floor plan to optimize multi-functioning spaces such as cafeterias, commons, gymnasiums, and exploratory labs.
9. At the Concept Design or Schematic Design phase, school designs must demonstrate the ability to be expanded to accommodate a 15% increase in student population.
10. Provide acoustical and smoke separation by designing classroom walls to extend to the underside of the structural deck whenever possible and when required by codes.

Recommended:

11. Consider single or double intercommunicating doors between classrooms.
12. Consider achievements for rewarding good behavior to include, but not be limited to:
    a. Comfortable lounge-type furniture.
    b. Gaming equipment with monitors, video access and controls.
13. Schools should be designed to be as flexible as possible to accommodate future learning styles and technology.
14. Group rooms to have marker boards, tackable surfaces, a conference table and 8-10 chairs.
15. Operable partitions or large sliding doors.

Premium:

16. Complex floor patterns involving curves, cuts, and intricate details.
17. Wood floors, except where allowed for gymnasiums, or natural stone floors.
18. Elaborate, expensive, curved or complex walls, ceilings, windows, and arches.
19. Building plans with more than one elevator.
20. Stairways not required by code for egress.
21. Elaborate, monumental stairs, regardless of location or code compliance.
22. Interior channel glass wall systems or glass block walls.
23. Complex ceilings with multiple levels and decorative soffits.
24. Wood or metal slat ceilings.
25. Plaster or fiberglass shaped ceiling planes.
26. Ceiling tiles larger than 24" x 48".

B. General Building Safety + Security Planning Principles

Required:

1. Design the building so it can be locked down into separate security zones, preferably at internal firewalls requiring rated steel fire doors.
2. Provide a minimum of two means of exit out of any gymnasium, cafeteria, or library.
3. Provide a secure steel service door at the service entrance with a proximity reader and a means of identifying visitors without opening the door.

4. Provide locked, secure chemical storage areas that are not accessible to students or visitors.
5. Provide laminated security glass at remote exterior doors or sidelights.
6. Reduce the number of exterior doors that need to be supervised or checked for security and safety purposes.
7. Provide exterior doors convenient to playgrounds and playfields that can be quickly unlocked by proximity card readers in cases requiring "reverse evacuation."

Recommended:

8. Consider providing steel frame doors with no glass vision panels at remote, unsupervised doors.
9. Consider putting fire doors on electric hold opens and having them tied into the emergency security notification system that allows the main office to release fire doors for lockdown.

Premium:

10. TBD

C. Safety + Security at Classrooms

Required:

1. Provide commercial-grade hardware and locksets on all doors.
2. Provide heavy duty, commercial-grade hardware at classroom doors where the door can be quickly locked by the teacher from the inside.
3. Provide small vision panels with laminated security glass in classroom doors.
4. Provide a phone and two-way intercom system in every classroom.
5. Provide a minimum of one National Fire Protection Assoc. (NFPA)-approved escape window in every classroom, where necessary.

Recommended:

6. TBD

Premium:

7. TBD

Category A – Instructional or Resource

General Use Classrooms

Required:

1. Design classroom walls to the underside of the deck for smoke and acoustical performance.
2. Design all classroom doors to be easily lockable from the inside by the teacher but to allow egress from the classroom at any time.
3. Specify sinks and countertops with postformed backsplash and front edge.
4. Provide bookcases and teacher storage closets as required.
5. Provide waterproof finishes for winter boot storage.
6. Provide separate row switching to allow artificial light levels to be reduced when natural daylight can be maximized.

7. Design the classrooms for excellent acoustics.
8. Provide a simple, straightforward lighting plan that provides appropriate light levels on white boards and does not interfere with projectors or TV video screens.
9. Provide a technology plan that shows how technology can be incorporated in the classroom and supports the educational pedagogy.
10. Integrate special education spaces within the larger school population.
11. Provide appropriate storage for special education equipment.
12. Provide appropriate structural support for special swings or hanging equipment.
13. Provide quiet spaces or timeout rooms that are hygienic, vandal proof, and code compliant.

Recommended:

14. Consider ~~D~~demountable wall systems.
15. ~~Operable wall systems or large sliding doors~~Consider double leaf door openings between classrooms.
16. Consider radiant floor heating for grade levels where children are likely to sit on the floors.
17. Consider classroom cubbies for coats, hats, and boots in grades Pre-K-2.
18. Consider toilets in the classrooms for grades Pre-K-1. For classroom toilets, provide seamless or ceramic tile flooring.
19. Consider ceramic tile to a wainscoting height of 48" on the wet wall.
20. Consider sinks in the classroom for grades Pre-K-5.
21. Specify paperless and water-resistant materials, such as sheetrock, for wet walls.
~~20.~~22. Consider OT and PT space adjacent to or inside of other multi-functioning spaces to maximize efficiency.

Premium:

~~21.~~23. Operable wall systems or large sliding doors.
~~22.~~24. Decorative or specialty lighting other than standard classroom lights.
~~23.~~25. Decorative wall sconces.
~~24.~~26. Custom designed sliding doors or operable wall systems.
~~25.~~27. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling.
~~26.~~28. Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings.

Dedicated Classrooms

Art ~~Rooms~~

Required:

1. Provide separate storage area and separate kiln room with exhaust (see also, Premium).
2. Art Rooms - Specify cleanable and stain resistant room finishes, including countertops, floors, and wall backsplashes.
3. Design for abundant natural lighting with preferred north orientation.
4. Provide appropriate acoustical absorption in rooms with open ceiling structure.

5. Provide adequate storage for student projects.
6. Provide adequate wall display systems for hanging two-dimensional artwork.
7. Provide lockable bins for clay storage and mobile carts for moving greenware into the kiln room.
8. Provide markerboard and tackable surfaces.
9. Provide tall storage cabinets.

Recommended:

10. Consider concrete or seamless floors that can resist paint, markers, and other art materials.
11. Consider floor drains with appropriate traps and trap primers.
12. Consider multiple station student cleanup sinks.

Premium:

13. Ceramics/pottery equipment in schools serving students below grade 9.
14. Stone or epoxy countertops.
15. Wood cabinetry or architectural millwork.
16. Decorative or special light track lighting.
17. Expensive tile floors such as stone, ceramic tile, or quarry tile.

Science ~~Labs~~

Required:

1. Design and equip science labs to support the educational specifications and to conform to the [enter appropriate space standard source(s)]. Equip science rooms and labs to serve only the science program for which the room is designed.
2. Design science rooms or labs using best practices for safety.
3. Design science labs to allow for adult supervision throughout the room.
4. Provide deluge showers, eye wash stations, and emergency shut-off equipment where required for safety.
5. In science rooms and labs where chemicals will be used, specify appropriate chemical-resistant furniture and countertops, fume hoods, acid neutralization tanks, and plumbing that will prevent wastewater contamination.
6. In science rooms and labs where chemicals will be used, design appropriate safety equipment into the room and design appropriate prep rooms with lockable storage and fireproof, chemical-resistant cabinets.
7. In middle and high school science labs, provide appropriately designed tables and countertops for computer use with experiments.
8. Design to maximize shared amenities such as fume hoods, prep rooms, and storage.

Recommended:

9. X.

Premium:

10. Compressed air systems.
11. Gas at rooms other than chemistry.
12. Fume hoods at rooms other than chemistry.

Music/Drama ~~Rooms~~

Required:

1. Music office & storage with open wall shelving, work counter with stool for instrument repair, upper and lower cabinetry for storage of materials and resources, lockable wardrobe storage, teacher desk with ergonomic chair, copy/printer/scanner, tackboard.
2. Design band, chorus, keyboard, and practice rooms to prevent noise from leaking into adjacent spaces and floors. Design walls and floors to prevent noise through ceilings or structural elements.
3. Provide acoustic vestibules at doorways to prevent music from disturbing the rest of the building.
4. Tune band and chorus rooms with sound absorbing materials and acoustic mass to prevent sound transmission.
5. Tune chorus spaces to help amplify the human voice without the use of amplification systems.
6. Specify washable hard surface floors in band rooms.
7. Provide security glass in the doors of keyboarding and practice rooms.
8. Prefer flat floors with portable risers over permanent concrete step floors.
9. Design door configurations to allow for the easy movement of pianos, drums, and other large instruments.
10. Provide lockable storage for music instruments.
11. Design for convenient access to stages and other performance areas.
12. Provide lockable wall cabinets for instrument storage.

Recommended:

13. X.

Premium:

14. Natural hardwood paneling or woodwork used as acoustical baffles and reverberation panels.
15. Specialty flooring.
16. Television or acoustical recording studios or services.
17. Prefabricated practice rooms.

~~Consumer Ed &~~ Bi-Cultural/Bilingual & Consumer Education

Required:

1. Provide space and amenities for project-based learning associated with cultural and traditional language heritage when supported with intentional curriculum in all or some of the following areas: food processing and preparation, construction and use of traditional art/artifacts and apparel, oral and visual presentation both live and electronic.
2. ~~X~~Provide standard height ceilings, +/- 9ft.
3. Provide resilient flooring in vinyl or rubber with standard wall base.
4. Provide base cabinets w/laminate counter, wall cabinets, teacher wardrobe, 12ft whiteboard (2), paper towel dispenser, soap dispenser, window coverings (full, room darkening).
5. Provide double bowl stainless steel link with lever mixing valve.
6. Provide range hood at cooking surfaces.

~~2.~~7. Provide range, refrigerator, microwave/hood, dishwasher (all residential.)

Recommended:

8. Consider an exterior door for biologic products and/or for the purpose of after hours/ community use.

~~3.~~9. Consider dedicated room exhaust for odor control.

10. Consider locking hardware on one or more cabinets if valuables will be stored.

~~4.~~11. Consider elements for display of 2D and 3D projects.

Premium:

~~5.~~12. Commercial appliances.

~~6.~~13. Oversize or non-standard doors.

Wood/General/Small Machine Shop ~~***Career & Technology Education***~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Assembly Spaces

Library ~~***&***~~ ***/Media*** ~~***Spaces***~~***Center***

Required:

1. Provide space which supports the following uses: collections (i.e., stacks), computer workstations, individual and group seating, staff workspace, meeting/collaboration space, and presentation space.
2. Provide space in amounts needed to meet defined program needs based on guidelines contained in 4 AAC 31.020(a)
3. Provide robust infrastructure including power receptacles above code-minimum, USB charging ports, wireless connectivity, and interactive white board(s).
4. ~~Refer to the [enter appropriate space standard source(s)] for acceptable room sizes based on student population.~~
5. ~~Design the library in consultation with school district librarians and design guidelines developed by the [Alaska?] Library Association.~~

~~6.~~4. Design the library for easy adult supervision; avoid creating dead zones.

~~7.~~5. Provide appropriate structural design to accommodate heavy book loading.

~~8.~~6. Provide moveable furniture and equipment for maximum flexibility; use fixed built-in features sparingly.

~~9.~~7. Library office / workroom within the library space to have a minimum of 20 lineal feet of perimeter cabinetry with sink and intermittent openings for knee space, lockable storage

cabinets, ergonomic task chairs, lockable file cabinets, librarian desk/workstation, guest chair, paper towel & soap dispensers at sink, tackboards and markerboards and storage space for book cart storage.

~~10.~~8. Library storage room to have upper & lower cabinetry, heavy duty shelving, lockable file cabinets, video monitors and other A/V equipment on rolling carts and laptop carts.

Recommended:

~~11.~~9. ~~X~~Consider distributed versus centralized media for small student populations and adjust classroom sizes accordingly.

~~12.~~10. Consider planning and design guidance from the American Association of School Librarians (AASL).

~~13.~~11. Consider providing an exterior swing door for connection to supporting exterior spaces.

Premium:

~~14.~~12. Space required for non-district, municipal/borough-owned library functions.

~~15.~~13. Excessively high ceilings or volumes.

~~16.~~14. Expensive architectural woodworking, paneling, and custom millwork.

15. Custom ceilings, soffits, skylights, or other monumental architectural features.

~~17.~~16. More than one exterior door.

Gym~~nasiums~~

Required:

1. PE office equipment and furniture including casework for instructional materials & resources.
2. Provide synthetic sports floors in Pre-K-5 schools.
3. Specify MFMA-RL second or better grade, plain sawn hard maple floor systems for middle and high schools only.
4. Provide minimum underslab 15 mil vapor retarder that meets Class “B” WYB.
5. Refer to the [enter appropriate space standard source(s)]to determine the size of the gymnasium, locker rooms, bleachers and support areas.
6. Provide public toilet areas near the gymnasium.
7. Provide for wireless network computer access in the gymnasium and offices.
8. Locate gymnasiums adjacent to or with easy access to exterior playfields and parking lots for public events.
9. Locate bleachers and gymnasium doors to protect floors from street shoe traffic.
10. Provide energy-efficient lighting that can resist damage from thrown basketballs, softballs and dodge balls.
11. Provide safety and security cages around light switches, thermostats, sensors, etc.
12. Locate door swings, equipment, and other enclosures so they do not become dangerous obstructions to running students playing within the space.
13. Present affordable strategies for maintaining appropriate humidity levels for wood flooring.
14. Design gymnasiums with supporting toilet and shower facilities.
15. Consider sports net dividers to maximize class use of gyms.
16. Limit wall padding to competition court basketball backstops only.

17. Floor painting and striping for intended sports and physical education purposes.
18. Adjustable, retractable basketball backboards/hoops
19. Recessed floor plates for volleyball posts
20. Wall-hung hand sanitizer stations

Recommended:

21. Consider gymnasiums as possible multi-functioning and multipurpose spaces. Provide enough sound absorbing material to allow for good voice recognition, and appropriate sound amplification for group presentations
22. School names, mascots, or logos on floor and walls.

Premium:

23. Separate, specialized dehumidification systems for wood floors
24. Glass backboards or automatic electric winch backboards other than two for the main court
25. Climbing walls
26. Movable bleacher systems designed to be relocated throughout the room
27. Large, tall, electric operable divider systems
28. Specialty equipment other than basketball and volleyball supports or tie-downs
29. Batting cages
30. Television platforms for broadcasting games and events
31. College or professional grade floor systems

Category B – Support Teaching

Shared Spaces

Teacher Workroom/Breakroom/Offices/Parent Resource

Required:

1. Staff work area and support space furniture includes but is not limited to:
   a. Copy/print/scan machines in teacher work areas.
   b. Built-in cabinetry and open shelving for materials & resources.
2. Kitchenette with base & upper cabinets, microwave shelf at ADA height, and refrigerator.
3. X.

Recommended:

4. X.

Premium:

5. X.

Dedicated Spaces

Counseling/Testing

Required:

1. TBD.

2. X.

Recommended:

3. X.

Premium:

4. X.

Educational Resource Storage

Required:

1. Storage rooms to have counters with lockable cabinets for storage of instructional supplies and materials, heavy-duty shelving and lockable file cabinets and mobile technology carts.
2. X.

Recommended:

3. X.

Premium:

4. X.

Time-out Room~~s~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Category C – General Support

Administrati**on**~~ve Areas~~

Required:

1. Administration area should maximize the use of modular, moveable furniture. Furniture includes but is not limited to: Built-in reception counter with ADA height section and lockable storage pedestals, waiting area with chair rail.
2. Staff work area and support space furniture includes but is not limited to:
    a. Copy/print/scan machines in administrative office areas.
    b. File cabinets, etc.
3. Conference rooms TBD.

Recommended:

4. X

Premium:

5. X

Shared Spaces

Student Commons~~/Lobby~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Auditorium (& Stage)

Required:

1. Consult the [enter appropriate space standard source(s)] for state-supported stage sizes based upon program and grade configuration.
2. Specify a state-supported basic stage curtain, sound system, and theatrical lighting systems
3. Design dressing rooms, storage rooms, and scenery shops only if academic theater programs exist as part of the school curriculum.
4. Design a reasonably sized control booth, 10’-0" x 15'-0".
5. Specify sealed or painted concrete floors with carpeted aisles.
6. Locate the control booth for visual supervision of the stage and for video and audio recording of performances.
7. Design the auditorium stage and all support areas to be ADA accessible.
8. Stage curtains and backdrops in auditorium and performance spaces
9. Fixed seating in auditoriums to have tilting upholstered seat and back and integral arms. Seat number/row letters to be Americans with Disabilities Act (ADA) compliant. Provide wheelchair access as required by code.

Recommended:

10. X

Premium:

11. Square footage that exceeds that required for seating one-third of the student body or for the appropriate stage as recommended by the [enter appropriate space standard source(s)]
12. Additional seating
13. Additional theater curtains
14. Proscenium arches wider than 60'-0"
15. Fly galleries
16. Stage gridirons, pin rails, or catwalks over stages
17. Proscenium openings higher than 25'-0" or stage ceilings higher than 30'-0"

18. Under-stage storage
19. Orchestra pits
20. Professional theater lighting systems
21. Balconies or spectator boxes
22. Elevators dedicated to serving just the auditorium
23. Special curved plaster wall or ceiling assemblies designed for acoustic balancing
24. Decorative wood paneling, wallpaper, and murals
25. Spaces and systems for “black-box” theaters

Multipurpose Room

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Dedicated Spaces

~~*Cafeteria*~~*Lunch Room*

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Pool

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Weight Room

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Locker Room~~s~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

~~Health Clinic +~~ Nurse ~~Space~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Kitchen/Food Service

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Student Store

Required:

1. TBD.

2. X.

Recommended:

3. X.

Premium:

4. X.

Category D – Supplementary

Circulation

Corridors/Vestibules/Entryways & Stairs/Elevators

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Utilities/Maintenance

Mechanical/Electrical

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Supply Storage ~~Maintenance~~ & Receiving Areas

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Custodial ~~and Recycle Rooms~~

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

Other Building Support (Telecom ~~Room~~)

Required:

1. Provide dedicated space for telecom rooms. Avoid co-locating racks in electrical or mechanical rooms.
2. Use 2-post racks unless equipment needs call for a 4-post.
3. Provide cable runway over racks for routing cabling.
4. Limit number of telecom rooms to minimum required per standards for size of the building.
5. Locate telecom room in central area of building where possible to average cable lengths.
6. Electrical panel serving the telecom room should have surge protection.

Recommended:

7. Provide rack-mounted UPS for essential systems.
8. Coordinate with Mechanical for cooling needs.
9. Locate utility service entrance in Main Telecom Room where possible.
10. Size room large enough to allow for fire alarm, access control, intrusion detection, DDC, and other similar systems to be located in the room.
11. Provide one circuit per rack, with a larger circuit provided to the main rack with UPS.
12. Use multi-connection KVM units instead of fixed monitors/workstations.
13. Install a paging speaker and telephone in the room.

Premium:

14. Central UPS systems.
15. Air conditioning if temperatures are not excessive in rack cooling systems.

Restrooms/Toilets

Required:

1. TBD.
2. X.

Recommended:

3. X.

Premium:

4. X.

4. HIGH PERFORMANCE FACILITIES

The Alaska DEED encourages high-performance schools for Alaska communities. A high-performance school is designed to conserve natural resources, save money, and improve the overall health and well-being of students, staff, and community. Emphasis is placed on low-impact site design, reduced impact on local infrastructure, energy efficiency, water use reduction, non-toxic materials, waste management, indoor air quality, efficient operations, and community engagement.

High performance school design principles can be broken into three general areas of emphasis:

- Integrative design process
- Human health and comfort
- Demand reduction

These principles are woven throughout this document as both required strategies and suggestions for premium strategies. Resources on high-performance school design are included at the end of this section to provide further guidance to project teams.

A. Integrative Design Process

One of the key ingredients to creating a high-performance school is to conduct an integrative design process. The integrative design process is a collaborative approach that includes the full team in decision-making from project inception through design, construction, and commissioning. The process focuses on a whole-systems design approach: recognition that all the components of the building work interdependently and affect the performance of one another.

A few key steps to implementing an integrative design process include:

- Set sustainability goals with the owner at project inception.
- Conduct a full team meeting at the beginning of each project phase.
- Include high-performance design principles as an agenda item at all project meetings.
- Incorporate life cycle costs and operating costs into the project decision-making process.

Buildings are often budgeted on first costs alone. Life cycle costing takes a more integrated approach, factoring in energy savings over time, durability and reduced maintenance of systems and materials, and enhanced occupant health and productivity. High performance design principles place emphasis on looking at the building as a whole over time to minimize energy use, maximize cost savings, and create comfortable and healthy spaces for the occupants.

B. Human Health and Comfort

Learning environments have a huge impact on student performance, health, and overall well-being. High performance schools can provide high quality indoor air and thermal, visual, and acoustical comfort. Emphasis is placed on daylight in classrooms and views to the outdoors, HVAC and lighting controls, non-toxic materials, enhanced filtration, carbon dioxide sensors, cross-contamination prevention, natural ventilation, and increased outdoor airflow rates in mechanically ventilated spaces.

Benefits of high-performance schools can include improved student performance, increased student health, reduced student absentee rates, and greater staff satisfaction.

Required:

1. Low water consumption plumbing fixtures.
2. Provide third-party commissioning starting at project concept design.
3. Design heating and cooling systems to meet the requirements of ASHRAE 55 Thermal Comfort in Buildings (latest edition).
4. "Right sizing" of HVAC equipment based on development of building massing and envelope. May require multiple iterations as building layout changes during design.
5. Avoid operating independent heating and cooling systems simultaneously. Utilize HVAC systems that will redistribute heat while also providing cooling, such as variable refrigerant flow (VRF) systems.
6. Design variable output HVAC systems to adapt to varying building heating and cooling demands.
7. Utilize low temperature heating and cooling systems, such as in-floor radiant.
8. Use high-efficiency HVAC equipment.
9. Provide building occupants with individual access to building temperature controls.
10. Minimum MERV-13 filtration on all ventilation systems.
11. Demand control ventilation, with carbon dioxide (CO2) sensors installed in spaces with high occupant density.

Recommended:

12. Best practices include providing green spaces, open spaces, and shared community spaces in the building; reusing and recycling materials during construction and occupancy; and creating an environment that is a community teaching tool for high performance building and sustainable living.
13. Consider using energy modeling and iterative design to reduce building energy consumption by 5% over ASHRAE-90.1 (current version).
14. Consider providing more than ASHRAE 62.1 minimum outdoor air rates. This may not be appropriate for all locations in Alaska.
15. Consider using the building control system to monitor indoor air quality and adjust ventilation rates to mitigate contaminants such as CO2 and VOCs.
16. Consider providing a building flushout post construction.

Premium:

17. Provide on-going commissioning of the facility every 5 years.
18. Consider utilizing grey water reclamation systems for use with flushing plumbing fixtures.
19. Consider on-site harvesting of renewable energy such as wind and solar.
20. Provide static and/or dynamic educational displays describing the sustainable features of the facility.
21. Provide a display showing instantaneous and aggregate building water and energy consumption.

C. Demand Reduction

High-performance schools are designed to reduce demand on energy and natural resources, to optimize the performance of building systems, and to reduce the overall operating costs of the school. Emphasis is placed on energy efficient mechanical systems, high-performance envelope design, low-flow water fixtures, renewable energy systems, lighting and daylight controls, and energy efficient equipment and appliances.

As part of an integrative design process, energy modeling and commissioning will confirm that all systems and components are integrated to achieve optimum results and are installed and operated as designed. One strategy may offset another. For instance, daylight sensors may cost more up front as an individual strategy, but once energy savings and associated reduced mechanical loads are considered, the team may realize that they can save money by selecting a smaller mechanical system.

Practices to optimize systems integration and increase efficiency include energy modeling and building commissioning. Design-phase energy modeling is a tool to use early and throughout the design process to test a variety of energy efficiency measures to determine the best way to align systems and components. Commissioning also offers an opportunity to make adjustments in the field and to train occupants on how to use the systems, improving efficiency even further.

Employing high-performance principles such as demand reduction, energy efficiency, and system optimization results in climate appropriate solutions, buildings that have low-to-no impact on local infrastructure, and an overall reduction in the project's carbon footprint.

D. High-Performance Certifications

High-performance building certification systems such as the United States Green Building Council (USGBC) LEED for Schools Rating System can provide detailed guidance on implementing high performance school design strategies.

Although DEED recognizes the value of building certifications by a third-party organization, the State will not participate in costs associated with these certifications that may result in materials and systems that cannot be supported by the State.

Premium:

1. Green Building Certification: Register the project with the USGBC LEED Rating System and obtain LEED for Schools certification.
2. Educational Display: Provide a permanent display, building signage, digital dashboard, or building tour that describe the high-performance features of the school.
3. Carbon Footprint Reporting: Calculate the school's carbon footprint. Include a greenhouse gas inventory and opportunities to reduce greenhouse gas emissions.
4. Climate Action Plan: Develop and implement a climate action plan to raise awareness of the school community's carbon footprint and engage students, staff, and the community in reducing that carbon footprint.
5. Performance Benchmarking: Track the school's energy use over time, using a tool such as the US EPA's Energy Star Portfolio Manager.

Part 3. SYSTEM STANDARDS

01. SITE AND INFRASTRUCTURE

A. Building System Summary

The **Site and Infrastructure** of school buildings consist of construction elements, systems and features external to the school facility. A common rule-of-thumb for the demarcation of building infrastructure from site infrastructure is "five feet outside the building line". This is, of course, an imperfect approximation but it can serve as a useful reference when differentiating between similar systems. The department recognizes five sub-categories in this building system: **Site Improvements**, **Site Structures**, **Civil/Mechanical Utilities**, **Site Electrical**, and **Offsite Work**. While all these systems support the use and purpose of the school facility, many have no physical connection to the facility. The utility sub-systems are the exception; they both serve and are connected. Site issues not related to improvements and infrastructure are identified and categorized under **11 Special Conditions**. Examples would be site and utility demolition, site drainage, and remediation of hazards.

B. Design Philosophy

Historically, development of Site and Infrastructure systems for education facilities has been widely variable in projects with state-aid across Alaska. School planning and design goals should achieve statewide equity for capital investments in the various subsystems of this category while responding to the variety of geographic and climatic needs. Overbuilding must be avoided and sustainable solutions which respond to local conditions must govern.

Many determinants influence the ultimate cost of site and infrastructure development for a project. Some determinants are programmatic, for instance, site development costs for a high school will be higher than those of an elementary school due to factors such as the increased accommodation of vehicles, and the inclusion of competition sports fields typically provided with the construction of a high school. The location of the site and proximity to utilities also can greatly affect the site development costs. Rural sites can have much greater utility costs than urban sites due to the need to provide utility infrastructure, such as water storage and treatment, sewage treatment and disposal, and heating oil storage, that urban sites are not required to provide. Though sometimes necessary, constructing, and operating dedicated utility systems to serve the needs of school facilities places a heavy burden on a school district. This should be avoided wherever possible, instead making that the responsibility of the local community.

The physical characteristics of the site, such as soil conditions and topography, also have a great impact on the site development costs. Sites that require a good deal of excavation, grading, or imported fill to provide an adequate building pad will understandably have higher earthwork costs when compared to building sites not requiring such extensive alterations. The cost of earthwork is not limited to the building footprint; the construction cost of playfields, parking areas, roads, and even utility infrastructure will be impacted by the physical characteristics of the site.

The selection of a quality building site is the first step in ensuring cost-effective Site and Infrastructure costs. The department's publication ***Site Selection and Evaluation Criteria Handbook***

is intended to be a resource and tool for districts to use when evaluating potential school sites. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes site improvements typical for the less remote locations including paved parking and drives, appropriate catch basins and culverts for drainage, concrete walks, vegetative landscaping, playgrounds with equipment, and fencing. A variety of minor elements such as bike racks and flag poles round out the developed school site. Utility distribution piping from municipal connection points is provided for heating fuel, water, wastewater, electrical power, and data/communications. Exterior pole-mounted lighting is also included. No **Site Structures** or **Off-site Work** is anticipated with the model school. Acceptable additional items and alternatives are detailed in the construction standards that follow.

011 Reserved

011X TBD

012 Reserved

012X TBD

013 Site Improvements

0131 Vehicular Surfaces

Required:

1. Parking areas, access drives, and vehicular circulation will have appropriate structural subbase, 4 inch basecourse, and 2 inch asphalt paving; increase cross-section at truck delivery and bus loops.
2. Provide parking spaces at a ratio of 1/20 K-6 students and 1/15 9-12 students for the projected student population.
3. Provide dedicated bus lanes/bus loops and dedicated parent pick-up/drop-off areas. Design vehicle circulation and parking areas to maximize site safety.
4. Minimize islands and other obstructions in parking areas, except where needed for circulation control, to accommodate snow removal and storage.
5. Provide parking lot lighting to IES standards. (Ref. Section *0163 Lighting & Equipment* for additional provisions.)
6. Provide accessible parking spaces in accordance with applicable codes.

Recommended:

7. Consider a top course of uniform gravel, crushed rock, or recycled asphalt in any community without access to a batch or drum-mix plant within an approximate 45min delivery radius.
8. In roadless communities, consider vehicular surfaces of the best available local fill.
9. Consider designing mitigations in vehicular pavement to prevent stormwater and snowmelt from flowing across pedestrian surfaces.

10. Consider speed control measures a long straightaways and high-pedestrian areas.
11. Consider designating parking spaces near the main entrance for carpool and low-emitting vehicles.
12. Consider providing headbolt heaters at staff parking areas in climate zones 8 and 9. (Ref. Section *0161 Electrical Services & Distribution* for additional provisions.)

Premium:

13. Paving plants as a project cost.
14. Additional parking and locally mandated parking over the above the standards.
15. Concrete pavement other than at loading dock aprons and dumpster approaches.
16. Asphalt concrete pavement more than 2in thick except at loading docks, bus loops, and dumpster approaches which may be 4in.
17. "Porous" drainage pavement.
18. Access controlled (e.g., magnetic cards, etc.) parking lots.
19. Colored pavement.
20. Radiant parking snow melt systems.
21. Headbolt heaters in climate zones 6 and 7, or those in zones 8 and 9 beyond 50% of the anticipated number of school staff.

0132 Pedestrian Surfaces

Required:

1. Provide pedestrian surfaces from building entries to all vehicular parking areas, bus and parent drop-offs.
2. Provide pedestrian surfaces from primary public access points to the school facility.
3. Pedestrian surfaces will have appropriate structural subbase, basecourse, and allowable surfacing.
4. Provide accessible pedestrian routes in accordance with applicable codes (i.e., ADA, etc.).

Recommended:

5. Consider a top course of uniform gravel, crushed rock, or recycled asphalt in any community without access to a concrete or asphalt batch plant within an approximate 45min delivery radius.
6. In roadless communities, consider pedestrian surfaces of the best available local fill.
7. Where cost-effective, consider constructing pedestrian surfaces using pressure treated wood boardwalks.

Premium:

1. Pedestrian surfaces over 6ft in width except at main entrances.
2. Concrete or asphalt pavers.
3. Concrete walks beyond 50ft from building entries unless demonstrated to be more cost-effective than asphalt paving.
4. Asphalt concrete pavement more than 1-1/2in thick
5. Radiant snow melt systems

0133 Elevated Decks & Ramps

Required:

1. None required.

Recommended:

2. Consider elevated decks at buildings constructed above grade on piling or caissons; use substructure similar to the adjacent facility, adjusted for load conditions.
3. Consider decking/surfacing of pressure treated wood, galvanized metal (grip-strut) or fiberglass. CF-2 LCCA-1
4. Provide handrails and guardrails for elevated decks when required by code.

Premium:

5. Elevated decks beyond 50ft from building entries unless demonstrated to be more cost-effective than at-grade decks.
6. Elevated decks or ramps sized to support vehicles greater than 1000lb.
7. Decorative or custom handrails and/or guardrails.

0134 Site Walls

Required:

1. None required.

Recommended:

2. Consider retaining walls where required by transitions in grade.
3. Consider alternatives to concrete in any community without access to a batch plant within an approximate 45min delivery radius. Alternatives might include gabion baskets, driven posts/piles, or unit masonry. CF-2 LCCA-1
4. Retaining walls designs must have an engineer's seal where required by code.

Premium:

5. Site walls over 10ft in height.
6. Decorative or custom detailed site walls.

0135 Landscaping & Irrigation

Required:

1. Prioritize the location of plantings at the main entrance and as buffering for paved areas and walks, and along public building facades.
2. Avoid plantings that create a security or visibility issue near entrances.
3. Provide native, water conserving plants.
4. Plant trees of a reasonable size and caliper.
5. Locate trees away from the building to provide a minimum of 12'-0" clearance from the drip line of a fully grown tree.

Recommended:

6. X

Premium:

7. Annual plantings.
8. Buffering plantings required by local authorities.
9. Non-native plantings or trees.
10. Site irrigation systems for athletic fields.

0136 Fencing and Gates

Required:

1. Provide 6ft chain-link fencing around all playgrounds and athletic fields.
2. Provide 8ft chain-link fencing at elevated playdecks.
3. Provide personnel swing gates where needed for reasonable access and control.
4. Provide one 10ft vehicle access gate, swing hinged or slide roller.
5. For fencing associated with site utility requirements (e.g., bulk fuel storage, generators, off-site utilities, etc.).

Recommended:

6. Where curbs are not provided, recommend safety bollards or 'staples' to segregate vehicular and pedestrian traffic at drop-off zones.
7. Recommend staggered-fence access points in lieu of swing gates wherever possible.
8. Consider ground contact treated wood for fence posts where determined cost-effective.

Premium:

9. Custom fabricated or decorative fencing.
10. Wood fencing.
11. Chain link fence coatings and screen slats.
12. Site fencing at property boundaries.

0137 Site Furnishings & Equipment

Required:

1. Provide a building sign meeting local signage ordinances, if any.
2. Provide low maintenance, exterior trash receptacles near playgrounds and building entrances.
3. Provide one 30ft aluminum flagpole with hinged base (may also be building mounted).

Recommended:

4. Consider bike racks at the main entrance to the school.
5. Recommend aluminum benches with backs at locations where outdoor seating is needed.

Premium:

6. Building signs with a surface area greater than 35sf per side.
7. Decorative concrete or stone benches.

0138 Playgrounds & Playfields

Required:

1. Design field orientation to conform with National Associations–Court and Field Diagrams.

2. Design play areas to conform to ASTM (American Society of Testing Materials) standards and the publication by the National Principals Association.
3. Specify play area equipment and surfaces to meet Consumer Product Safety Commission standards.
4. Provide drainage for play areas to prevent ponding.
5. Specify surfaces and play equipment for soft play areas that meet ADA and OSHA standards.
6. Provide subsurface drainage systems under soft play areas.
7. Use linear shapes and simple forms at play areas to accommodate snow removal and maintenance.
8. Specify playground equipment constructed of durable, weather-resistant, low maintenance materials.

Recommended:

9. Consider installing empty conduit for future power to the athletic fields.

Premium:

10. Athletic and play areas that exceed the DEED's minimum standards.
11. Bike trails or exercise trails.
12. Bleachers, lighting, concession stands, irrigation systems, press boxes, scoreboards, and exterior drinking fountains.

0139 Other Site Improvements

Required:

1. None required.

Recommended:

2. None recommended.

Premium:

3. Sledding hills.
4. Ice rinks.
5. Water features.

014 Site Structures

0141 Freestanding Shelters

Required:

1. None required.

Recommended:

2. Recommend covered play areas with sidewall eave heights up to 16ft in climates with high precipitation.
3. Recommend outdoor classroom structures/pavilions to support a specific educational program.
4. Recommend energy efficient lighting inside shelters.

5. See *0138 Playgrounds & Playfields* for Required, Recommended equipment and surfaces.

Premium:

6. Perimeter wall enclosures greater than 75% of enclosed perimeter.
7. Heating of any type.
8. Footprint areas in excess of allowable covered area (4 AAC 31.0120)

0142 Attached Shelters

Required:

1. None required.

Recommended:

2. See *0141 Freestanding Shelters* for applicable recommendations.

Premium:

3. See *0141 Freestanding Shelters* for applicable premiums.

0143 Support Buildings

Required:

1. None required.

Recommended:

2. See *111 Special Construction* for specific support building types.
3. Consider walk-in freezers for food storage in remote locations.
4. Consider storage for approved school equipment needed to protect such from premature deterioration.
5. Consider storage for instructional and/or education support items.

Premium:

6. Support buildings classified as temporary (4 AAC 31.900).

015 Civil/Mechanical Utilities

0151 Water Systems

Required:

1. Select sites with public water available to the site.
2. Locate water utility connections away from main building entrance.
3. Coordinate water connections with wastewater, and fuel utility connections to enter building at mechanical utility spaces.
4. Where water piping is installed above ground outside of buildings, locate piping away from the main building entrance.
5. Locate water piping to allow access for pipe maintenance and building maintenance; locate piping away from pedestrian walkways and vehicle traffic to the greatest extent practicable.

Recommended:

6. Consider recirculating and/or heat trace on water supply mains as required by site climate conditions.

Premium:

7. Avoid depressed loading docks.

0152 Sanitary Sewer

Required:

1. Select sites with public wastewater available to the site.
2. Locate wastewater utility connections away from main building entrance.
3. Coordinate wastewater connections with water, and fuel utility connections to enter building at mechanical utility spaces.
4. Where wastewater piping is installed above ground outside of buildings, locate piping away from the main building entrance.
5. Locate wastewater piping to allow access for pipe maintenance and building maintenance; locate piping away from pedestrian walkways and vehicle traffic to the greatest extent practicable.
6. Locate kitchen delivery areas, school maintenance, delivery, and dumpsters away from the main building entrance or student activity areas.
7. Locate the dumpster to encourage and maximize recycling of waste materials. Show storage areas for recycled materials in and outside the building on site and building plans.
8. Enclose the dumpster with an 8'-0"-high chain link fence and set it on a bituminous concrete slab with steel bollard bumpers. Provide a 12'-0"-long reinforced concrete pad on the loading side of the dumpster.

Recommended:

9. Consider wastewater pretreatment systems at sites with septic systems.
10. Consider coordinating with the vacuum waste utility to have vacuum collection sumps installed within the school building, for sites served by utility level vacuum waste systems.

Premium:

11. X.

0153 Storm Water

Required:

1. Design an on-site drainage system to keep stormwater run-off away from the building and to keep grounds, paved areas, and playfields free of standing water.
2. Design “open pond” stormwater storage systems. Avoid buried storage systems.
3. Enclose stormwater ponds and holding areas with 4'-0"-high galvanized chain link fencing. Provide gates for maintenance.
4. Provide drip edges at sloped roof areas with positive means of collecting roof runoff and a pipe to convey the flow to the drainage system. Do not use perimeter foundation drains to intercept roof runoff.

Recommended:

5. X

Premium:

6. Chain link fence coatings and screen slats.

0154 Fuel Systems

Required:

1. Locate fuel oil storage away from the building front entrance.
2. Enclose bulk fuel oil storage areas with 8'-0"-high galvanized chain link fencing. Provide gates for maintenance.
3. Install UL-142 above grade double wall intermediate fuel oil storage tank as close as practicable to fuel-fired mechanical equipment. Enclose with 6'-0"-high galvanized chain link fencing. Provide gates for maintenance.
4. Provide containment for fuel oil piping installed below ground including double-wall fuel-rated piping, corrugated carrier pipe, pipe transition and containment sumps.

Recommended:

5. Consider installing a fuel leak detection system with alarms to monitor integrity of fuel storage tank and distribution piping.

Premium:

6. Do not bury ferrous fuel oil piping.
7. Fuel level monitoring system with digital outputs for remote viewing and connection to building energy management system/control system.

0155 Heating/Cooling Piping & Utilidors

Required:

1. X

Recommended:

2. X

Premium:

3. X.

016 Site Electrical

0161 Electrical Service & Distribution

Required:

1. Utilize 3-phase power if available.
2. Coordinate with the local utility for connection point, distribution voltage, and power plant capacity early in the design.

Recommended:

3. If designing the line extension, try to locate transformers as close as practical to service entrance.

Premium:

4. X

0162 Data/Comm Service & Distribution

Required:

1. Utilize public fiber optic services if available.

Recommended:

2. Where practical, use the same routing as power to reach site/building.

Premium:

3. X

0163 Lighting & Equipment

Required:

1. This lighting is for general use. Specific applications such as athletic fields, hockey rinks, and similar would be included in design of those site elements.
2. Building-mounted lighting may be used for site lighting if practical, or as a supplement to pole-mounted lighting.
3. Pole-mounted lighting should be designed for roadway, driveway, and parking areas per IES standards. Additional lighting should be considered for hardscape, playground equipment, sledding hills, and similar areas where use may require artificial lighting.
4. Poles should be located on the perimeter of parking areas to stay out of the way of snow removal paths as much as possible.
5. Lighting parameters including minimum lighting levels, glare, uniformity, and similar should meet IES standards where no local code is in effect.

Recommended:

6. Consider providing conduit to new poles for signal wiring to cameras, wireless access points, etc., as design budget and need allows.

Premium:

7. X

0164 Security Systems

Required:

Recommended:

Premium:

017 Offsite Work

0171 Offsite Improvements

Required:

Recommended:

Premium:

0172 Offsite Utilities

Required:

Recommended:

Premium:

0173 Other Offsite Work

Required:

Recommended:

Premium:

D. Design Criteria & Ratios

Criteria

- Site earthwork should attempt to achieve no import or export of soil – this will clearly be difficult on sites with poor soils.
- Site utilities should be provided offsite by the public utility whenever possible – this includes water, sewer, electrical, and fuel storage utilities at rural sites and efforts should be made to work with the community to a developed shared utility infrastructure.
- Development of vehicular circulation and storage areas shall be minimized.

- Parking areas will be sized to provide the required parking spaces per the governing code and the parking spaces will be sized to accommodate the standard vehicle in the region.
- Construction of fire service roads around school buildings is not required in communities that do not have an organized fire fighting capacity and equipment.
- Roads and parking areas shall be consolidated to minimize their footprint on the site.

Ratios

1. XX/AC
2. XX/GSF

02.SUBSTRUCTURE

A. Building System Summary

The **Substructure** of school buildings consist of all types of building foundations and supporting elements such as insulation, waterproofing and drainage systems. At-grade concrete floor slabs, both structural and non-structural are also included in this system including special features in those slabs such as trenches and pits. The department recognizes three sub-categories in this building system: **Standard Foundations & Basements**, **Slab on Grade**, and **Special Foundations**. Basements, which are not common in Alaskan schools, are included within the standard foundation element. They often only differ from standard foundations in the height of the foundation stem wall. Five types of special foundations are identified. A common special foundation would be a pile foundation. As a sub-system, Slab on Grade overlaps with the function of the Floor Structure sub-system within **Superstructure**. Similarly, Substructure performance is often very dependent on proper control of site drainage and grading, areas which overlap with the Special Site Conditions sub-system within **Special Conditions**.

B. Design Philosophy

Substructure systems, foundations in particular, are typically far more expensive in Alaska than in other parts of the country. Usually, foundation system options are heavily influenced by the soil conditions of a particular site. Similar to its effect on the cost of site development, the soil conditions of the selected site also play a large part in the cost of the foundation system and determining the number of foundation system options that are acceptable on a given site. Thus, the quality of soils should be given significant weighting when evaluating site options.

Due to the relative high cost of foundation systems, consideration should be given to the construction of two-story structures for school facilities exceeding 40,000 GSF. The cost savings of a two-story structure is not only limited to the foundation system. When evaluating the potential cost savings of a two-story design versus a single story, other building systems, such as roofing, vertical circulation, and exterior wall, should be considered. The shipping weight of the potential foundation system as well as the installation cost should be taken into consideration when evaluating foundation system options. Building sites whose soil conditions allow the use of standard concrete foundations are preferable to sites that require piling foundations.

The selection of a quality building site is the first step in ensuring cost-effective Site and Infrastructure costs. The department's publication ***Site Selection and Evaluation Criteria Handbook*** is intended to be a resource and tool for districts to use when evaluating potential school sites. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes Substructure elements typical of sites with high-quality soils which are suitable for building construction. These elements include a standard concrete foundation, and a concrete slab on grade—both with typical steel reinforcing. Insulation, vapor retarder, and dampproofing are the only minor elements needed to support these sub-systems. No **Special Foundations** elements are anticipated with the model school. Acceptable additional items and alternatives are detailed in the construction standards that follow.

021 Standard Foundations & Basements

0211 Continuous & Column Footings

Required:

1. 4000psi concrete is the basis of design. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
2. Carbon steel reinforcing bar is the basis of design with ratios in the 30-80lbs range per cubic yard of concrete.
3. Design footings sized in accordance with building codes, soils and superimposed loads.
4. Soil bearing pressures below 2000psi require site selection justification and DEED approval.

Recommended:

5. All weather wood (AWW) footings consisting of timbers and strongbacks are acceptable where soils are appropriate (i.e., low moisture, non-permafrost). AWW foundations must be supported by appropriate life-cycle cost analysis.

Premium:

6. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
7. Reinforcing bar above 80lbs per cubic yard of concrete.

0212 Foundation Walls & Treatments

Required:

1. Extend foundation walls to frost depths per local conditions/codes.
2. 4000psi concrete is the basis of design. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
3. Carbon steel reinforcing bar is the basis of design with ratios in the 50-100lbs per cubic yard of concrete.
4. Design foundation walls sized in accordance with building codes, soils and superimposed loads.
5. Insulate foundations as required by DEED-adopted energy codes to eliminate or minimize heat loss.

6. Provide dampproofing treatment as required by local conditions/codes.
7. Provide durable (e.g. 10mil poly) vapor barrier on all exposed earth contained within foundation walls.

Recommended:

8. Concrete masonry units (CMU foundation walls, with reinforcing, are acceptable.
9. All weather wood (AWW) foundation walls consisting of framing and sheathing are acceptable where soils are appropriate (i.e., low moisture, non-permafrost). AWW foundations must be supported by appropriate life-cycle cost analysis.
10. Frost protected shallow foundations (FPSF) including perimeter insulation are acceptable when supported by appropriate life-cycle cost analysis.
11. Avoid below grade functional space enclosed by foundation walls whenever possible.
12. Exterior sheet waterproofing on foundation walls that enclose space below the finish grade level; includes below-grade mechanical and service spaces.

Premium:

13. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
14. Reinforcing bar above 100lbs per cubic yard of concrete.
15. Foundation walls enclosing below grade space classified under adopted codes as occupied space.

0213 Foundation Drainage

Required:

1. Install perimeter foundation drainage only where required by codes adopted by the state or a local jurisdiction with delegated authority.

Recommended:

2. When required by local conditions/code, perforated pipe footing drains bedded in drain rock with filter fabric are acceptable.
3. Run foundation drain systems to daylight where possible and appropriate (see *0153 Storm Water* for standards on site drainage collection).
4. Drainage mats and other water/moisture control measures are acceptable when required by site conditions and supported by appropriate life-cycle cost analysis.

Premium:

5. Sites requiring underslab drainage.

022 Slab on Grade

0221 Structural & Non-structural Slab

Required:

1. 4000psi concrete is the basis of design for interior slabs. 5000psi concrete is the basis of design for exterior, exposed slabs. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.

2. Carbon steel reinforcing bar is the basis of design with ratios in the 20-50lbs range per cubic yard of concrete.
3. Structural slabs are not anticipated except at isolated point loads for installed equipment.
4. Non-structural slabs shall be 4" nominal thickness.
5. Provide standard compacted sub-base, welded wire fabric reinforcement, moisture control, and trowel finish.
6. Insulate slabs as required by DEED-adopted energy codes to eliminate or minimize heat loss.
7. See *0311 Lower and Main Floors* for wood and steel superstructures.

Recommended:

8. Consider reinforcing bar in non-structural slabs where required for slab openings, incidental loads, and perimeter durability.
9. Consider shrinkage and crack control using glass fiber reinforcing in-lieu of or in addition to welded wire fabric.
10. Integrate footings and slabs where part of an approved design assembly such as at FPSF.
11. Consider polished concrete finish where appropriate to be used in-lieu of applied floor coverings.
12. Consider providing full frost-depth wall foundations under entry slabs where necessary to prevent frost heaving.
13. including perimeter insulation are acceptable when supported by appropriate life-cycle cost analysis required by site conditions and supported by appropriate life-cycle cost analysis.

Premium:

14. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
15. Reinforcing bar above 50lbs per cubic yard of concrete.
16. Colored or decorative concrete slabs exceeding 40 percent of exposed concrete.

0222 Trench, Pit and Pad

Required:

1. 4000psi concrete is the basis of design for pits and pads. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
2. Carbon steel reinforcing bar is the basis of design with ratios in the 50-100lbs range per cubic yard of concrete.
3. Elevator pits shall be provided in the dimensions and depths required.
4. Pads to provide adequate securing of equipment will be provided where required for anchoring or other safety measures were required by codes adopted by the state or a local jurisdiction with delegated authority.

Recommended:

5. Consider non-seismic housekeeping pads for major HVAC and electrical equipment at nominal heights not to exceed 4in above the surrounding floor level.

Premium:

6. Trenches formed of concrete; slab block-outs and reinforcing for nominal trench drains in support of CTE are acceptable.

0223 Underslab Elements

Required:

1. None.

Recommended:

2. Consider underslab rigid insulation in support of FPSF and where otherwise supported by an energy life-cycle cost analysis of the proposed heating system.

Premium:

3. Sites requiring underslab drainage.

024 Special Foundations

0241 Piling & Pile Cap

Required:

1. Provide a steel H-pile foundation including steel or lumber pile caps and required lateral bracing where soil bearing pressures cannot support a standard foundation or where it is not cost effective to remove poor soils and replace with suitable fill.
2. Install thermistor tubes integral with pile.

Recommended:

3. Consider a treated wood piling foundation including timber or engineered lumber pile caps, and required lateral bracing for smaller education related facilities up to 5000gsf.
4. Consider steel pipe piles where supported over H-piles based on a life-cycle cost analysis.

Premium:

5. Sites where pile stick-up exceeds a total average of 6ft for all piles, or any pile stick-up exceeds 12ft.
6. Pile foundations exceeding 40#/FPA (does not include lateral bracing or pile caps).

0242 Caissons

Required:

1. None; caisson foundations not anticipated.

Recommended:

2. Consider caisson foundations where bedrock (+/- 15,000psi) occurs at shallow depths of up to 8ft below grade. If this foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Caisson foundations where total estimated 02 Substructure cost exceeds other alternatives.

0243 Grade Beams

Required:

1. None; grade beam foundations not anticipated.

Recommended:

2. Consider grade beam foundations where adequate support for continuous footings is not available, subgrade point loads are available or can be created (i.e., piliing, etc.), and concrete is readily available and cost effective. If this foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Grade beam foundations where total estimated 02 Substructure cost exceeds other alternatives.

0244 Arctic Foundation Systems

Required:

1. Provide an arctic foundation system consisting of thermopile (with or without helical ribs, pile extensions, steel or lumber pile caps and required lateral bracing where soils consist of continuous or discontinuous permafrost.
2. Install thermistor tubes adjacent to each pile.
3. Thermopile and thermosyphons will be included in a project's commissioning plan unless approved otherwise by DEED.

Recommended:

4. Consider passive thermosyphons in-lieu-of thermopile where suitable fill is available to support installation of standard foundations.
5. Consider underslab rigid insulation in support of FPSF and where otherwise supported by an energy life-cycle cost analysis of the proposed heating system.

Premium:

6. Arctic foundations with active refrigeration.
7. Gravel pads in conjunction with thermopile arctic foundations.

0245 Other Special Foundations

Required:

1. None; other special foundations such as sheet pile, raft, multi-point frame, etc. are not anticipated.

Recommended:

2. Consider other special foundations when building loads and soil conditions may exclude other substructure solutions. If a special foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Other special foundations where total estimated 02 Substructure cost exceeds other alternatives.

D. Design Criteria & Ratios

Criteria

- Multi-story construction shall be considered and presented as a schematic design option for all school structures over 40,000 GSF.
- Where appropriate for soil conditions, standard concrete foundations are almost always the preferred substructure system.
- If any other substructure system is to be considered, a cost analysis will be performed. Cost analysis shall include cost of energy and maintenance.
- Where soils are of low moisture content, all weather wood foundations should be considered for facilities smaller than 20,000 GSF.
- Where appropriate for soil conditions, substructure systems utilizing a heated crawlspace with perimeter closure are preferable to substructure systems that utilize an elevated building with an air space between the underside of the building and grade.

Ratios

1. Total building deadload/GSF
2. Cubic feet of concrete/GSF
3. Pounds of rebar/CY concrete
4. Total building deadload/GSF
5. Pile weight (LB)/Footprint area (FPA).

03.SUPERSTRUCTURE

A. Building System Summary

The **Superstructure** of a building consists of all gravity and lateral force resisting members above the substructure to and including the roof deck. The department recognizes three sub-categories in this building system: **Floor Structure**, **Roof Structure**, and **Stairs**. Floor, roof, and stair structures normally include vertical members (columns, walls), horizontal members (beams, joists/rafters, trusses), decking (wood sheathing, concrete, etc.), and a variety of bracing elements. In some superstructure systems with bearing walls (e.g., masonry units, light-gauge steel, nominal wood framing, etc.) the superstructure blends with the Exterior Closure and Interiors systems. In **Floor Structure** using slab-on-grade, the system overlaps with **Substructure**.

B. Design Philosophy

Alaskan schools must be provided with an adequate superstructure which responds efficiently, and effectively to building loads as prescribed in adopted building codes and to the conditions of the local environment and building's use. Structural efficiency measures include minimizing the deadload of the building, selecting high strength-to-weight and strength-to-cost materials, building simplicity, and structural member uniformity. A uniformly loaded floor system is typically the most cost-effective elevated floor system; concentrated point loads must be accommodated but should be minimized. It should be noted that concrete slab on grade floor systems is the least expensive floor system in areas

where concrete is readily available For additional design parameters see the **Design Ratio** section of this system.

The same can be said for roof assemblies that are typically comprised of roof sheathing, roof rafters or trusses, beams, and columns carrying concentrated vertical loads to the foundation or a lower floor assembly. Structural roof assemblies that utilize load-bearing partitions are typically more cost-effective than assemblies that use post and beam systems to bear vertical loads. With the inclusion of the structural insulated panels in the roof assembly and its use to replace both the roof sheathing and roof rafters or trusses due to its large span and loading limits, roof assemblies have become more reliant on a post and beam assembly. While the use of structural insulated roof panels may reduce the time required to fully construct the structural roof assembly, its inherent inclusion of heavily loaded beams and columns adds to the overall cost of the superstructure.

The previous paragraphs deal with how the structural systems are designed to accommodate gravity loads. Consideration must also be given to how the structural system performs under lateral, seismic, and wind loading conditions. The best way to design a cost-effective structural system to handle wind loads is to limit them. The building's form and massing play a significant role in limiting the structure's exposure to wind loads and should be considered by the architect at the outset of design. Buildings that expose large areas of high bay space to lateral wind loads will not be conducive to cost-effective structural design.

C. Model Alaskan School

The Model Alaskan School includes a main floor structure of reinforced concrete slab on grade and includes a small portion of elevated floor with steel columns, beams, joists, metal decking and concrete. The roof structure uses a combination of wood frame bearing wall, steel columns, beams, joists, and metal decking. Steel angle bracing and light gauge steel shear walls provide lateral support. Acceptable alternatives are detailed in the construction standards that follow.

031 Floor Structure

0311 Lower & Main Floors

Required:

1. Structural frame floor assemblies of wood or metal consisting of posts, beams/frame walls, joists, and decking are required when slab on grade is not cost effective. Support frame floor assemblies with appropriate cost analysis (e.g., in geographic regions where the cost of concrete is high, or soils will not permit this standard).
2. Design frame floor assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. HHS shapes for columns/posts, W-shapes for beams/girders, open web trusses for joists and fluted sheet metal for decking form the basis of design.
4. Wood members functioning in the capacity of metal deck and concrete must be minimum 1-1/8" wood structural panel or wood decking.
5. Insulate frame floors as required by DEED-adopted energy codes to eliminate or minimize heat loss.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider, where pile foundations (0241, 0244) are accepted, a structural insulated panel (SIP), with or without embedded floor joists, as required to meet code-specified loading. If panels will not span between pile caps, consider intermediary engineered wood beams or steel wide flange beams. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0311 floor structure.

Premium:

9. Framed floor assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.

0312 Upper Floors

Required:

1. Provide structural frame floor assemblies of wood or metal consisting of columns, beams/frame walls, joists, and decking.
2. Design upper floor assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. HHS shapes for columns/posts, W-shapes for beams/girders, open web trusses for joists and fluted sheet metal for decking form the basis of design.
4. Wood members functioning in the capacity of metal deck and concrete must be minimum 1-1/8” wood structural panel or wood decking.
5. Insulate upper floor perimeters as required by DEED-adopted energy codes to eliminate or minimize heat loss.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in 0312 and 0411 Exterior Walls or 0312 and 0611 Fixed Partitions.
9. Consider, where pile foundations (0241, 0244) are accepted, a structural insulated panel (SIP), with or without embedded lumber, as required to meet code-specified loading. If panels will not span between pile caps, consider intermediary engineered wood beams or steel wide flange beams. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0311 floor structure analysis.

Premium:

10. Framed floor assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.
11. Exterior balconies and construction.

0313 Ramps

Required:

1. Ramps accepted with framing equal *to 0311 Lower and Main Floors* and alternative systems as required by building function and with approved cost analysis.

Recommended:

2. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., ramp dimensions and configurations).
3. See Section *0711 Passenger Elevators* for use of ramps in-lieu-of elevators.

Premium:

4. Framed ramp assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.
5. Ramps wider than 10% of the minimum permitted under applicable codes.

032 Roof Structure

0321 Pitched Roofs

Required:

1. Provide structural frame roof assemblies of wood or metal consisting of columns, beams/frame walls, rafters, and decking.
2. Provide trusses where clear spans are required or possible (gymnasiums, multipurpose, library, etc.).
3. Design roof assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. HHS shapes for columns/posts, W or HSS steel for beams/girders, open web trusses or engineered wood for rafters, and fluted sheet metal for decking form the basis of design.
5. Wood members functioning in the capacity of metal deck may wood structural panel or wood decking with appropriate span ratings as required by applicable building codes.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood (including GLB) or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in 0321 and 0411 Exterior Walls or 0321 and 0611 Fixed Partitions.
9. Consider a structural insulated panel (SIP), with or without embedded lumber, as required to meet code-specified loading. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0321 roof structure analysis.

Premium:

10. Framed roof assemblies where total estimated 02 Substructure + 0321 Pitched Roofs cost exceeds other alternatives.

0322 Flat Roofs

Required:

1. Provide structural frame roof assemblies of wood or metal consisting of columns, beams/frame walls, rafters, and decking.
2. Provide trusses where clear spans are required or possible (gymnasiums, multipurpose, library, etc.).
3. Design roof assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. HHS shapes for columns/posts, W or HSS steel for beams/girders, open web trusses or engineered wood for rafters, and fluted sheet metal for decking form the basis of design.
5. Wood members functioning in the capacity of metal deck may wood structural panel or wood decking with appropriate span ratings as required by applicable building codes.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood (including GLB) or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in *0322* and *0411 Exterior Walls* or *0322* and *0611 Fixed Partitions*.

Premium:

9. Exposed structural members where cost analysis demonstrates a cost increase above 2% for the *0321* and *0322* systems.
10. Framed roof assemblies where total estimated *02 Substructure* + *0322 Flat Roofs* cost exceeds other alternatives.

0323 Special Roofs

Required:

1. None; other special roof such as (occupied) roof decks, canopies, etc. are not anticipated.

Recommended:

2. Consider other special roofs when building loads, logistics, materials and construction may exclude other roof solutions. If a special roof is proposed, it must be supported with an appropriate cost analysis of the full superstructure.

Premium:

3. Other special roofs where total estimated 03 Superstructure cost exceeds other alternatives.

033 Stairs

0331 Stair Structure

Required:

1. Provide stair structure assemblies for stairs and landings, of wood or metal consisting of stringers, treads, risers, connectors, beams/joists. Treads and landings may include concrete decking.
2. Design stair assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads (example: plate steel stringers with stiffening provided by treads and risers).
3. Provide stairs in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
4. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

5. Consider up to one stair associated with a primary common area or public space that has 'architectural features' such as: no stair enclosure, concealed structure, concealed connections, open risers, cantilevered treads, integrated enhanced finishes, etc.
6. Consider alternative stair types where permitted by code for limited access such as alternating tread stairs.

Premium:

7. Stairs with any dimension greater than 10% of the minimum permitted under applicable codes.
8. More than one stair with 'architectural features'.

0332 Stair Railings

Required:

1. Provide stair railing assemblies for stairs and landings, of wood or metal consisting of posts, rails, spindles/panels, shoes, and connectors.
2. Design railing assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. Provide railings in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
4. Provide protective coating on railing members as required by local conditions/codes.

Recommended:

5. Consider up to one stair railing associated with a primary common area or public space that has 'architectural features' such as: decorative posts, tempered glass panels, , concealed structure, concealed connections, open risers, cantilevered treads, integrated enhanced finishes, etc.
6. For stairs railings in high-visibility areas, consider stainless steel for all high-wear elements such as handrails and shoes to reduce long-term maintenance costs.
7. Where functionally and visually appropriate, consider stair railings with top rails at guardrail heights and separate handrails.

Premium:

8. Railings with any dimension greater than 10% of the minimum permitted under applicable codes except as noted.
9. More than one stair railing with 'architectural features'.

0333 Ladders & Steps

Required:

1. Provide ladder assemblies of wood or metal consisting of rails, rungs, cages, and connectors.
2. Provide structural step assemblies in conformance with applicable provisions of *0331 Stair Structure*.
3. Design ladder assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. Provide ladders in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
5. Provide protective coating on ladder members as required by local conditions/codes.

Recommended:

6. Consider alternating tread stairs and other alternatives to ladders to improve access.

Premium:

7. Ladder and step materials not commonly accepted as 'utilitarian'.

D. Design Criteria & Ratios

Criteria

- All single-story structures and smaller (60,000 GSF or less) two story structures should utilize uniform loading structural systems (i.e. load bearing walls) wherever feasible.
- Building massing should limit exterior wall area and exterior exposure of large high bay spaces to wind loads.

Ratios

04. EXTERIOR CLOSURE

A. Building System Summary

The **Exterior Closure** of a building consists of an assembly of components which isolate the interior spaces of a building from the exterior environment or modulate the interaction between those elements. In addition to its technical function, the sub-systems in this category are often the most visible elements of a building and work together to provide an aesthetic function. The department recognizes four sub-categories in this building system: **Exterior Walls & Soffits**, **Exterior Glazing**, **Exterior Doors**, and **Exterior Accessories**. Wall and soffit systems normally include framing, exterior and interior substrates and finishes, insulation, and various types of membrane barriers. Windows

and doors integrate with the wall/soffit assembly. Where wall framing provides structural capacity, some exterior closure elements overlap with **Superstructure**. In addition, while roof systems provide a technical function that is nearly identical to Exterior Closure, the department recognizes **Roof Systems** as a separate major building system due to its unique complexities.

B. Design Philosophy

Exterior closure systems bear the brunt of Alaska's harsh climate. They must be able to endure large variations in seasonal temperatures. While fraught with differing elements and junctions of such elements, the assembly must remain weather tight, even in Alaska's extreme wind and rain. To achieve optimal performance, the exterior assembly should be constructed of quality materials and craftsmanship. Exterior closures should be designed holistically to control transfer of heat, air, moisture, vapor drive, daylight and noise. The construction of a high-performance exterior assembly is expensive, so the design of a school facility should strive to reduce the amount of exterior wall area that is to be constructed. This is not only cost-effective in terms of initial cost, but is also cost-effective in terms of operations, maintenance, and replacement costs. By reducing the area of the exterior closure system, the area for heat loss is reduced, the area to be painted or regularly maintained is reduced, and when the exterior finish has reached the end of its useful life, the area to be replaced is reduced. All of these factors contribute to reduce the life cycle cost of the school facility.

Oftentimes, a facility's exterior closure system will also serve as part of the facility's structural system by transferring roof and floor loads to the foundation system. The use of an assembly that serves dual purposes is a helpful step toward the cost effective design of a facility. Wall assemblies constructed from dimensional lumber, structural insulated panels, metal studs, and concrete masonry units are all capable of serving this dual-purpose role as exterior closure and structural system. Each material assembly has its own strengths and weaknesses that require the designer to determine the systems appropriateness for a given project. However, as noted earlier, load bearing exterior wall systems deserve serious consideration on most projects.

C. Model Alaskan School

The Model Alaskan School includes exterior load-bearing walls with light-gauge steel members and structural wood panel sheathing. Insulation is a combination of fiberglass in the wall cavity and 2in of continuous board at the exterior. Air and vapor barriers complete the assembly. Siding is a primarily metal panel with some phenolic panel in a rain-screen assembly as an accent. Vents, flashings, and sealants complete the exterior. Gypsum wall board is used on the interior side of the assembly. Soffits are framed with nominal lumber, treated plywood and siding finishes were visible. Windows are metal-clad dual-pane insulating units with operable sections. Doors are hollow metal with insulated frames and high quality hardware including motor operated doors where required. Acceptable alternatives are detailed in the construction standards that follow.

041 Exterior Walls and Soffits

0411 Exterior Walls

Required:

10. Wall and soffit assemblies should be designed to consider life-cycle analysis, energy efficiency, durability, low or no required maintenance and overall costs of assemblies.
11. Materials used for exterior enclosures shall be of commercial grade, durable with an intended 20-year or longer usable life.
12. Consider use of a load-bearing exterior wall assembly where feasible. Wall assemblies constructed from dimensional lumber, structural insulated panels, metal studs, and concrete masonry units are all capable of serving this dual-purpose role as exterior closure and structural system.
    a. Wood studs – CF-3, LCCA-3, Labor intensive.
    b. Structural insulated panels CF-3 to 4 (better in remote locations), LCCA-3.
    c. Metal Studs – CF-4, Thermal Bridging leads to more complex total wall assembly. LCCA=3.
    d. Concrete masonry units CF-3 (rural location 1). LCCA-1. CMU become very expensive in rural location due to freight. CMU has addition LCCA cost for future renovation as it is difficult to remove/modify.
13. Exterior Cladding and Siding: Exterior material choices are numerous and diverse. When choosing cladding, careful consideration should be given to design guidelines listed above and coordinated with District design preferences. Products that require sealants and repeated paint and stain maintenance are discouraged. Products include:
    a. Structural Insulated Panels (SIP): Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. CF-3, LCCA-3
    b. Metal Wall Panels: 24-gauge minimum thickness zinc-coated (galvanized) or aluminum-zinc alloy-coated sheet steel. fluoropolymer exterior finish with minimum 20-year finish warranty. CF-2, LCCA-2, (in rural locations overall wall system maybe more expensive as more layers of material are used in total system.
    c. Insulated Metal Wall Panels (IMP): 24-gauge minimum thickness zinc-coated (galvanized) or aluminum-zinc alloy-coated sheet steel. fluoropolymer exterior finish with minimum 20-year finish warranty. R-value as appropriate to the climate and region. CF-2, LCCA-2
    d. Phenolic Resin Panels: install per manufacturer's instructions on recommended mounting and fastening systems. Specify colors and patterns proven to not fade over time due to ultraviolet radiation exposure. CF-4, LCCA-2
    e. Fiber Cement Panels: install per manufacturer's instructions on recommended mounting and fastening systems. CF-4, LCCA-2
    f. Exterior Insulation Finish System (EIFS). Specify impact resistant mesh that will resist damage from projectiles. Provide flashing to prevent water intrusion into the system. Provide drainage layer behind insulation layer to allow moisture to escape if needed. CF-4, LCCA-2 to 4, (expensive to repair in rural locations).

g. Exterior Masonry: Can also serve as the structural system. Consider also as an exterior 4’ to 8’ high protective “wainscot” with different materials above. Avoid use in remote areas due to transportation costs. Schedule installation to avoid the need for temporary heat. Masonry or concrete walls should contain weep holes at the base of walls 8"-12" above finish grade, unobstructed, with insect screen. CF-3, LCCA-1 to 2

14. Wall Insulation: Types and R-values; the following values or those values tested from manufacturers may be used in determining R-values of wall assemblies.
    a. Expanded Polystyrene (EPS) Board R-Value = 4.17 per inch CF-2, LCCA-2
    b. Extruded Polystyrene (XPS) Board R-Value = 4.17 per inch CF-3, LCCA-3
    c. Polyisocyanurate (Polyiso) Board R-Value = 5.6 per inch CF-2, LCCA-2
    d. Glass-Fiber Batt Insulation R-Value = 3.16 per inch CF-1, LCCA-2
    e. Glass-Fiber Batt Insulation (High Density) R-Value = 4.28 per inch CF-1, LCCA-2
    f. Glass-Fiber Blown-In Insulation R Value = 3.7 - 4.28 per inch CF-1, LCCA-2
    g. Mineral Wool Batt Insulation R-Value = 4.0 per inch CF-4, LCCA-2
    h. Open Cell Spray Foam Insulation R-Value = 3.6 per inch CF-3, LCCA-3
    i. Closed Cell Spray Foam Insulation R-Value = 6.0 - 6.5 per inch CF-3, LCCA-3
15. Continuous Exterior Insulation (CI): provide a continuous layer of insulation at the exterior side of the wall assembly. Protect CI with air/weather barrier and siding material in a rain screen assembly. Minimum R-Value of continuous insulation layer of R-7. Use CI to mitigate thermal conductance through wall structure. CF-1, LCCA-1 low first cost and significant LCCA advantage due to energy savings.
16. Vapor Retarders at Exterior Walls: Provide vapor retarder at the warm side of wall insulation with permeance rating not to exceed 0.13 perms, polyethylene, 6-10 mils thick. Where vapor retarder is not in direct contact with a cover material such as gypsum wallboard, vapor retarder shall have a flame-spread rating not to exceed 25 and a smoke density not to exceed 450. Ensure vapor retarder is continuous at wall to roof transitions. Minimize penetrations of vapor retarder.
17. Vapor Retarders at Concrete Floor Slabs: Floor slabs on grade with non-permeable floor finishes should have a vapor retarder of 0.05 perms or less, polyethylene, 10-15 mils thick. Non-permeable floor finishes include (but are not limited to) epoxy, polyurethane, vinyl, linoleum, and rubber. Under slab vapor retarders must be durable enough to withstand construction activity. Penetrations should be detailed according to the manufacturer’s instructions. Specifications should require measurement of slab relative humidity in accordance to meet the requirements of the floor finish manufacturer.
18. Thermal Resistance: Insulation and minimum R-values of wall assemblies shall accommodate regional climate. Minimum wall assembly value in all Climate Regions is R-19.
19. Exterior Air/Weather Barrier Systems: Self-adhering sheets, fluid applied membrane, or mechanically attached building wrap. Detail wall/roof intersection to provide continuous air/weather barrier system. CF-2 to 4, LCCA-2 to 3 (product vary in cost and performance)
20. Impact Resistance at Exteriors: Provide impact resistant material up to a minimum of four feet above ground height. CF-3, LCCA-3
21. Corrosion Resistance: Consider local risks of corrosion from environmental or industrial sources.

22. Graffiti Resistance: Enable the removal of graffiti without damage to the appearance, finish, and durability of the substrate.
23. Acoustics: Consider local conditions for requirements.
24. Building massing should limit exterior exposure of large high bay spaces to wind loads.
25. Design flashing details as per Sheet Metal and Air Conditioning Contractors' National Assoc. (SMACNA) flashing recommendations to prevent water infiltration into the wall.
26. Design simple, cost effective steel, concrete, or masonry lintels. Specify galvanized at exterior steel lintels.
27. Do not use paper or organic products that support mold growth when wet in any exterior wall assembly.

Recommended:

28. Avoid materials that require paint or sealers to prevent water intrusion.
29. Impact Resistance: Provide impact resistant material up to a minimum of eight feet above ground height. CF-1, LCCA-1
30. Avoid masonry veneer. CF-3, LCCA-2
31. Consider power and data raceways at exterior walls to reduce the number of penetrations in the vapor retarder.
32. Insulated Metal Wall Panels (IMP) with addition of air/weather barrier directly behind the IMP for additional protection. Air/Weather Barrier CF-1, LCCA-1

Premium:

33. Glazed bricks, cast stone, "architectural" finish cast-in-place concrete. Cost prohibitive in most rural applications CF-4, LCCA-3
34. Precast concrete Cost prohibitive in rural application due to freight and need of large equipment to handle. CF-3 to 4 LCCA-2.
35. Granite, slate, or other stone that is more expensive than common masonry. CF-5, LCCA-2
36. Lead-coated copper, stainless steel, zinc, or other metal shingles and siding products. CF-4, LCCA-1, may have application in saltwater environments.
37. Ceramic, porcelain, or other tile products that are more expensive than common brick. CF-3 to 4, LCCA-2
38. Enamel panels or other manufactured curtain wall products. CF-4, LCCA-3
39. Exterior porcelain tile, glass tile, or glass cladding systems. CF-4, LCCA-3
40. Composite stone veneer cladding CF-4, LCCA-3 weight of material is problematic in rural locations.
41. Channel glass facades. CF-5, LCCA-4

0412 Facias & Soffits

Required:

1. Soffits such as at overhangs: Provide the following:
   a. Siding material as described in Siding and Cladding, item 4 above.
   b. Exterior Air/Weather Barrier System as described in item 12 below.
2. Soffit areas that separate exterior space from heated space: This construction should be avoided or minimized. Where used in fire sprinklered buildings, and the size of the soffit

requires sprinkler coverage, sprinkler piping must be in a heated space or a dry sprinkler system provided.

3. Buildings located in some regions are recommended to be elevated based on local geotechnical and climatic condition. In such a structure, where the space underneath the building is exposed to the elements, consider enclosure with sheathing or another weather-resistant covering.
4. Consider structural insulated panels (SIPs), which are all capable of serving a dual-purpose role as exterior closure and structural system. CF-3, LCCA-3
5. Exposed underside of SIPs:
6. Plywood bottom surface
7. Provide coverage of any exposed foam insulation with intumescent paint.
8. Moisture Resistance: Provide vapor retarder to inside of insulation.
9. Thermal Resistance: Insulation and minimum R-values to accommodate regional climate.
10. Provide barrier system (skirting) to prevent public access to underside of building for fire-safety prevention. CF-1, LCCA-1
11. Chain link fence

Recommended:

12. X.

Premium:

13. Building skirting:
    a. Perforated metal panel or CF-4 LCCA-2
    b. Welded wire fabric. CF-4 LCCA-2
14. Metal panel siding on underside of SIPs. CF-2 LCCA-1

0413 Curtainwalls & Non-bearing Walls

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. X.

042 Exterior Glazing

0421 Exterior Windows

Required:

1. Provide glass thickness and safety glass materials appropriate to safety risk, energy performance requirements and local conditions, including wind loads and internal air pressures, deflections, safety and code compliance.

2. Conduct life cycle analysis and collect detailed warranty information on vinyl, vinyl-clad, and fiberglass windows for DEED review and approval prior to incorporation into the design. CF-3
3. Exterior windows must have insulated glazing system (outer glazing low E coating with an air space and interior glazing that meets latest adopted edition of IBC for wind pressures). Consider building energy efficiency, interior glare, daylighting, acoustic performance, and security when selecting exterior window and glazing systems. Consider high performance glazing units with high visible light transmittance for better daylighting and a low solar heat gain coefficient (SHGC) in accordance the National Fenestration Rating Council.
4. Exterior glazing: area recommended not to exceed 10% of the entire exterior closure area. Consider a balance of natural lighting, view, solar gain and heat loss.
5. Glazing in windows in high-traffic areas and vandal-prone areas should provide an appropriate level of impact resistance.
6. To simplify replacement of broken units, avoid individual glass pieces larger than 4 feet in width or 6' in height.
7. Exterior windows constructed with thermally broken frames to reduce heat loss and prevent thermal conduction.
8. Provide commercial-grade windows. Provide prefinished exterior surfaces as opposed to field finished or painted options.
9. Provide casement and awning windows with screens at operable vents. Casement and awning windows must not be oversized and must be easily opened by crank mechanisms. Do not locate operable windows at locations where persons can accidently strike the frame of an open window. Provide adequate number of locking points to provide positive closure
10. Specify windows with sub-frame construction for efficiency and to resist water penetration.

Recommended:

11. Consider single or double hung windows with window screens in appropriate climates (primarily zones 6 and 7) as a character defining feature of an existing building or as an historic treatment. CF-3, LCCA-3
12. Consider specifying high-performance glazing as determined by orientation and energy modeling. CF-4, LCCA-TBD Depending on glazing price of windows can double, LCCA analysis of the systems vary.
13. Consider polycarbonate covers at windows susceptible to vandalism and in remote areas where window replacement is not readily available.

Premium:

14. Stainless steel, mahogany, teak, or exotic hardwood windows, skylights, or doors.
15. Triple-glazed windows in climate zones 6 and 7 without an LCCA.
16. Bullet-~~proof~~ resistant glass. Consider providing UL 752 Ballistic Rating of Levels 3 through 7. Degree of ballistic protection level should be determined by school district or community policy and design parameters for each school.
17. Any manufacturer's non-standard window sizes.
18. Any windows of special sizes requiring manufacturer's premium costs.
19. Silicone glazing systems, butt glazing systems, or double wall glazing systems.
20. Non-standard colors or finishes on windows that require manufacturer's premium costs.

21. Glazed channel glass wall systems.
22. Arched or complex windows and frames.

0422 Storefronts

Required:

1. Provide thermally broken aluminum windows, aluminum clad wood windows or storefront systems for larger window installations. CF-4, LCCA-3
2.

Recommended:

3.

Premium:

4.

0423 Structural Window Walls

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. X.

0424 Translucent Panels

Required:

13. X.
14. X.

Recommended:

15. X.

Premium:

16. X.

043 Exterior Doors

0431 Personnel Doors

Required:

42. Exterior doors shall be water-tight, weather-tight, and protected from climatic influences, including rain and strong winds.
43. Exterior doors subject to continual heavy use must be constructed both for strength and resilience against wear, and against accidental and deliberate damage. Sufficiently robust to provide appropriate building security and to withstand high traffic conditions without stress or

damage to the door, glazing or hinges. Specify exterior doors with fully welded metal frames. Avoid "knock-down" frames at exterior doors.

44. Door materials include:
    a. Insulated, fully galvanized steel, primed and painted. CF-2, LCCA-1
    b. Fiberglass, especially suitable for coastal, salt environments, climate zones 6 and 7.
    c. Aluminum, factory finish CF-2, LCCA-1
45. Avoid the use of fully glazed door systems
46. Specify Grade 5 exterior door hardware with stainless steel components and no plastic components in hinges, locks, panic hardware, or lever handles. CF-4, LCCA-1
47. Specify exterior doors with fully welded metal frames. Avoid "knock-down" frames at exterior doors. CF-3, LCCA-1
48. Provide electronic locks and controls at exterior doors where required for security.

Recommended:

49. Specify 42" wide doors only at limited locations when functionally necessary such as at service doors. CF-2, LCCA-1
50. When selecting exterior materials for remote communities consider the site-specific local complexities of construction logistics.

Premium:

51. Non-standard colors or finishes on doors that require manufacturer's premium costs. CF-4, LCCA-2
52. Stainless steel doors or frames. CF-4, LCCA-1

0432 Special Doors

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. Non-standard doors that are higher than 84" or wider than 36" – other than service doors. CF-4, LCCA-1
5. Any doors of special sizes requiring manufacturer's premium costs. CF-4, LCCA-1
6. Overhead doors except at service/delivery. CF-3, LCCA-3
7. Bullet-~~proof~~ resistant doors. Consider providing UL 752 Ballistic Rating of Levels 3 through 7. Degree of ballistic protection level should be determined by school district or community policy and design parameters for each school.

044 Exterior Accessories

0441 Louvers, Screens & Shading Devices

Required:

1. Louvers: specify internally draining style. In all climate zones, in high wind environments provide protective exterior wall mounted hoods to prevent accumulation of rain, snow and ice within louvers.
2. Hoods shall be galvanized and painted metal or stainless steel with sloped tops.

Recommended:

3. Screening enclosures at services areas and dumpsters: cedar fencing, front of the enclosure may have a gate, however, may also be left open for ease of access.
4. Light Shelves: at large window areas to reduce interior glare and solar heat gain, primarily at south and west facing facades. Light shelves may be pre-manufactured as part of the window system or “stick built”.

Premium:

5. Light shelf on the interior side of windows can deflect solar gain and also reflect light upward to augment or reduce artificial light needs.

0442 Balcony Elements

Required:

1. Guardrails and handrails: Provide at locations and construction as required by IBC. Materials include galvanized, galvanized and painted or high performance coated steel; aluminum (bare or coated); treated wood or combinations of the above.
2. X.

Recommended:

3. X.

Premium:

4. X.

0443 Other Exterior Accessories

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. X.

D. Design Criteria & Ratios

Criteria

- All single story structures and smaller (60,000 GSF or less) two story structures should utilize a load bearing exterior wall assembly wherever feasible.
- Building massing should limit exterior exposure of large high bay spaces to wind loads.
- The footprint, configuration, and structural grid should be simple and straightforward, without complex geometries.
- Exterior walls should be straight, with few, if any, curves. Avoid complex configurations with unnecessary corners and changes of materials.
- DEED-adopted energy codes will have a significant influence on envelope design and must be complied with in the most cost-effective way possible.

Ratios

1. School facilities less than 20,000 GSF shall have a maximum exterior closure area (excluding roof soffits) to GSF ratio of .8 and a maximum number of one exterior door leaf per 2000 GSF
2. School facilities between 20,000 and 40,000 GSF shall have a maximum exterior closure area (excluding roof soffits) to GSF ratio of .7 and a maximum number of one exterior door leaf per 2500 GSF
3. School facilities greater than 40,000 GSF shall have a maximum exterior closure area (excluding roof soffits) to GSF ratio of .6 and a maximum number of one exterior door leaf per 3000 GSF
4. Exterior glazing area shall not exceed 10% of the exterior closure area

05.ROOF SYSTEMS

A. Building System Summary

The **Roof Systems** of a building consists of an assembly of components which protect the building's structure and interior spaces from precipitation of all types and work together to control and remove that precipitation. It also isolates the interior spaces of a building from other exterior environmental factors such as temperature. The department recognizes three sub-categories in this building system: **Pitched Roof**, **Flat Roof**, and **Roof Accessories**. The sub-systems under these categories include the components associated with each roofing system including the roofing material, and collection and drainage features. Roof accessory components such as hatches and skylights, and curbs for mechanical equipment are also in this section. Roofs which also serve as walkable/usable decks and components associated with vegetative roofs would be assessed in this section. Roof systems interface with **Exterior Closure** and **Roof Structure** but have little to no component overlap. Unlike **Exterior Walls & Soffits** where an interior wall substrate is part of the wall assembly, all interior ceilings are assigned to **Ceiling Finishes**.

B. Design Philosophy

One of the most challenging building systems on Alaskan school facilities is the roof system. Achieving high-performing roofs with long lifespans can be difficult. Failed roofs, especially those which are allow water to penetrate interior spaces are a distraction to students and educators. In addition, they degrade building structural systems and finishes, oftentimes creating damages whose repair costs dwarf the repair cost of the leak itself. Many school districts' maintenance staffs spend an inordinate amount of time chasing roof leaks and repairing the damage they have created. But roof issues aren't just limited to leaks. The insulating property of a facility's roofing system is also an important design consideration. As the primary point of heat loss, the design and construction of the roof system must be designed in response to Alaska's climate zones.

The easiest way to reduce the potential roofing problems and initial construction cost of a high-performance roofing system is to reduce the area of roof to be constructed. By decreasing the roof area of a facility, the annual roof maintenance effort is reduced, thus reducing the system's maintenance cost. Often these types of reductions can only occur when considering multi-story versus single-story buildings. Following size, reducing roof complexity is the next most important factor when designing for cost effectiveness. The footprint, configuration, and structural grid should be simple and straightforward, without complex geometries. Water-shedding pitched roofs offer the best performance in areas of high rainfall but can reach performance limitations on schools with large roof areas. Successful, cost-effective use of low-slope roof systems has been proven in most Alaska climate zones, however, these roofs are the most dependent on high quality materials and excellent installation.

C. Model Alaskan School

The Model Alaskan School includes a pitched roof system consisting of concealed fastener metal roofing over fire-treated plywood sheathing and 8in of rigid insulation. Vapor barriers, ice and water shield, and flashing complete the assembly. Acceptable alternatives are detailed in the construction standards that follow.

051 Pitched Roofs

Required:

1. Recommended pitch for major portion of roofs is 3 in 12 to 6 in 12. Where the size of the structure in a pitched roof design causes an excessive volume of unused attic space consider changing to a low slope roof design.
2. Snow shedding: On roof materials prone to snow shedding carefully consider the discharge areas to provide occupant safety and to avoid damaging nearby surfaces. Snow shedding shall not occur at any door, including service and maintenance doors.
3. Gutters and downspouts: Where needed to control run off provide commercial grade gutter and downspouts. Ensure downspout discharge is in a controlled drainage system. Do not discharge run-off over sidewalks or other pedestrian circulation.
4. Roof penetrations: minimize the number of roof penetrations. Where possible, sidewall penetrations such as mechanical intake and exhaust are preferred. On metal roof surfaces locate necessary penetrations near to the ridge to minimize risk of sliding snow damage.

Provide heavy gage snow diverters above penetrations where shedding may damage penetrations.

5. Installation detailing shall consider and accommodate thermal expansion and contraction.
6. Roof Materials: When choosing roofing systems, careful consideration should be given to design guidelines listed above and coordinated with District design preferences
    a. Standing Seam Metal Roofs: Sheet material, 24 gauge minimum in portable roll formed or factory formed profiles. Base metal aluminum-zinc alloy coated hot-dipped process and prepainted. Preferred 2-coat fluoropolymer finish system, 20-year warranty on the finish. Avoid large roofs where metal lengths exceed practical lengths due to shipping, handling and machine roll forming considerations. Avoid field splices. CF-3, LCCA-3
    b. Insulated Metal Roof Panels (IMP). Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. CF-3, LCCA-3
    c. Asphalt Shingles: asphalt coated glass felt, mineral granule surfaced, Class A fire resistance. Installation must be rated for site wind conditions. 35 year warranty. Do not specify residential grade shingles. CF-1, LCCA-3
    d. Structural Insulated Panels (SIP) covered with an approved roofing option: Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. Provide ventilation space above SIP. C-2, LCCA-2
    e. Underlayment: self-adhering polymer-modified asphalt sheet, 40 mil total thickness, polyethylene sheet top surface, specify slip resistant top surface when needed for safe installation. CF-2, LCCA-1
7. Roof Insulation: Types and R-values; the following values, or tested values from manufacturers may be used in determining R-values of roof assemblies.
    a. Expanded Polystyrene (EPS) Board R-Value = 4.17 per inch CF-2, LCCA-1
    b. Extruded Polystyrene (XPS) Board R-Value = 4.17 per inch CF-3, LCCA-1
    c. Polyisocyanurate (Polyiso) Board R-Value = 5.6 per inch CF-2 to 3, LCCA-1
    d. Glass-Fiber Batt Insulation R-Value = 3.16 per inch CF-1, LCCA-1
    e. Glass-Fiber Batt Insulation (High Density) R-Value = 4.28 per inch CF-1, LCCA-1
    f. Glass-Fiber Blown-In Insulation R Value = 3.7 - 4.28 per inch CF-1, LCCA-1
    g. Mineral Wool Batt Insulation R-Value = 4.0 per inch CF-3, LCCA-1
    h. Open Cell Spray Foam Insulation R-Value = 3.6 per inch CF-3, LCCA-1
    i. Closed Cell Spray Foam Insulation R-Value = 6.0 - 6.5 per inch CF-4, LCCA-1
8. Ventilation: provide ventilation openings equal to or exceeding building code requirements for the roof area to be ventilated. Ensure the structure and associated blocking does not impede air movement. In high wind areas provide design to mitigate infiltration of wind driven rain, snow or ice crystals through use of filters and/or baffle design at ventilation openings. Provide weep holes, or similar, to allow escapement of moisture accumulation such as at ridge vents.

Recommended:

9. Attachment: Fasten sheet metal roofing to supports with concealed clips at each standing-seam joint, avoid exposed fastener systems.

10. Provide (2) layers of underlayment at slopes of 2 in 12 or less. CF-1, LCCA-1
11. At asphalt shingle installations, minimum of one daub of roofing cement at each shingle, one inch in diameter, to prevent wind uplift
12. Asphalt Shingles: asphalt coated glass felt, mineral granule surfaced, Class A fire resistance. Installation must be rated for site wind conditions. 50 year warranty.

Premium:

13. Polyurethane Foam (PUF) roof assemblies.
14. Metal shingles and tiles – required DEED review and approval
15. Clay or ceramic roof tiles - require DEED review and approval
16. On large roof areas served by gutters: Gutter system large enough to walk in and with safety rail along the side of gutter and tie offs for cleaning.

052 Flat Roofs (Low Slope)

Required:

1. Low slope roofs to be exposed membrane over coverboard, insulation, vapor retarder and thermal barrier board over structural deck. Specify roofs with extended warranties with 20-year minimum life. CF-3, LCCA-3
2. Assemblies should be fully adhered systems. Mechanically attached systems may be used when conditions do not allow for fully adhered. In a mechanically attached system provide self-healing vapor retarder to reduce impact of attachment penetrations through the system.
3. Slope of the surface membrane to drain is 3/8 inch per foot preferred, 1/4 inch per foot minimum. Calculate slope of valleys at tapered crickets to maintain positive drainage.
4. Membranes:

   Note, membranes requiring heated asphaltic products may not be practical in remote locations due to transportation costs and logistics.

   a. Ethylene propylene diene monomer (EPDM) single ply membrane, 60 mil, internally reinforced. CF-2, LCCA-2
   b. Ethylene propylene diene monomer (EPDM) single ply membrane, 90 mil, non-reinforced. CF-2, LCCA-2
   c. Asphaltic built-up, 5-ply (BUR) consisting of base sheet, 3 ply sheets plus cap sheet. CF-4, LCCA-3
   d. Asphaltic mineral cap built-up, 5-ply (MCBUR) consisting of base sheet, 3 ply sheets plus mineral cap top sheet. CF-4, LCCA-3
   e. Weldable Thermoplastic Polyolefin (TPO) single ply membrane CF-3, LCCA-2
   f. Weldable Thermoplastic Polyvinyl Chloride (PVC) single ply membrane CF-3, LCCA-2
   g. Modified Bitumen, multi-ply membranes CF-4, LCCA-2
5. Insulation: See 5.A.7 above for insulation types and R-values.
6. Roof drains: Provide code required secondary overflow drains. Connect to internal rain leaders leading to storm drain system where available. Provide insulation sump at roof drains. Rain leaders may lead to dry wells or to daylight where storm drains are not available. Avoid the use of scuppers except for secondary overflow drains. Provide rock/debris screening at any discharge pipes where accessible from ground level. Provide measures to prevent

freezing around roof drains such as reduced R-value around drains, minimum R-value around drains is R-12. Use heat trace as a last option.

7. Use cast iron dome strainers on roof drains. Do not use plastic.
8. Specify insulated roof drain sumps to prevent condensation from forming inside the building.
9. Do not discharge water, snow, and ice along the face of the walls. Design systems to prevent water from sheeting down across the face of exterior walls or splashing against exterior walls at grade.
10. Parapets: Top of parapet to be minimum 12" above the roof surface. Roof membrane to lap up and over the parapet and be protected by a cap flashing. Cap flashing to be held by a continuous wind cleat, fastened at an on-center distance capable of resisting site-specific wind conditions.
11. Minimize roof penetrations through the roof membrane. All roof penetrations to be made by certified installers with approved roofing manufacturer's details. Avoid "shelves" on the exterior faces of parapet that might hold ice to prevent potential of falling and personal injury and to avoid melting and staining down the face of the wall.
12. Mechanical equipment curbs should have diversion crickets to maintain rainwater flow and avoid damming. Elevate mechanical equipment a minimum of 18" above the roof surface. Locate mechanical air intakes a minimum of 24" above the roof surface.

Recommended:

13. EPDM, 90 mil, single ply membrane. CF=3, LCCA-3
14. At BURs – Built-up bituminous roofing: asphalt saturated glass fiber felts, four ply plus base sheet. CF-4, LCCA-4
15. Consider installing electric heat trace and insulation on roof plumbing vents.
16. Where possible, achieve roof slope by sloping the building structure to reduce the quantity of tapered insulation.
17. Minimize complex and multiple roof levels in the building design.

Premium:

18. Roof warranties exceeding 30 years
19. Liquid Applied Membranes (LAM) CF-3
20. Any colored roofing system other than manufacturer's standard colors CF-4, LCCA-1
21. Green/vegetative roofs. CF-5, LCCA-5

053 Roof Accessories

Required:

1. Provide OSHA compliant rooftop safety railings where rooftop equipment requires access within 10 feet of a roof edge.
2. Design roof hatches for maintenance large enough to accommodate individuals equipped with full emergency gear or service personnel with supplies and toolboxes.
3. Design roof access with regular stairways or alternating tread stairs, not by ship's ladders or exterior roof ladders whenever possible.
4. Provide snow guards to prevent large accumulations of snow and ice from shedding. CF-1, LCCA-1

Recommended:

5. Skylights are discouraged with preference given to vertical glazed clerestories. Locate base of glazing minimum 24" about roof surface
6. Permanently mounted safety harness tie offs CF-1, LCCA-4

Premium:

7. Roof deck plazas with pavers and protective railings, walls and supports.

D. Design Criteria & Ratios

Criteria

- Multi-story construction shall be considered and presented as a schematic design option for all school structures over 40,000 GSF
- Hot roof design is preferable to a vented cold roof especially in facilities possessing a wood structural system
- Roof penetrations will be minimized by consolidation of plumbing vents and other systems where possible
- Roof penetrations will be located near the ridge or top of the roof slope to reduce potential snow damage and roof leaks
- Roof design shall be simple and not broken into planes or cut-up by unnecessary dormers
- Water shedding roof systems shall be constructed at a minimum of a 3:12 slope
- Metal roof with exposed fasteners are not to be utilized on new construction or replacement roof projects.

Ratios

1. XX

06.INTERIORS

A. Building System Summary

The **Interiors** of a building consists of elements that divide buildings into different rooms and spaces and the fittings and finishes in those rooms and spaces which contribute to their special function. It does not include mechanical and electrical systems. The department recognizes six sub-categories in this building system: **Partitions/Soffits**, **Special Partitions**, **Interior Openings**, **Special Floors**, **Interior Finishes**, and **Specialties**. The sub-systems under these categories include the components needed to construct walls, provide openings in those walls such as doors and windows, and provide appropriated finishes to all the surfaces including ceilings, walls, and floors. Interiors systems interface primarily with **Mechanical** and **Electrical** systems which are often embedded in or attached to **Interiors** elements.

B. Design Philosophy

Interior partitions, soffits, openings, finishes, and specialties typically account for ~10-12 % of a project's total construction cost. In a traditional school design, the cost of partitions and doors are fairly consistent. However, the use and quantity of special partitions such as glazing and movable partitions varies between school designs and can significantly impact the cost of the interiors. The use and quantity of casework also varies between school designs, thus affecting the project cost. The material choice and specification of interior floor, wall, and ceiling also plays a large part in determining the cost of a project's interiors.

C. Model Alaskan School

The Model Alaskan School includes light-gauge steel framing members enclosed with gypsum wall board, or other substrates suitable to the finish applied. Solid core wood doors in hollow metal frames are standard, complete with hardware. Vertical coiling grills are used in select locations. Glazing consists of relites in hollow metal frames, and specialties include partitions in toilet rooms, lockers, white boards, tack boards and signage. Fire extinguishers and cabinets are provided when required. Finishes include carpet, tile and rubber flooring, paint, tile, and FRP walls, and suspended and glue-on acoustic ceilings. Acceptable alternatives are detailed in the construction standards that follow.

061 Partitions/Soffits

0611 Fixed Partitions

Required:

1. Specify interior construction materials of high durability, low maintenance, and an expected life span of 30 years.
2. All walls to be durable and provide the appropriate STC ratings for school spaces (per ANSI/ASA S12.60 on Classroom Acoustics).
3. Standard partition construction will be 20-gauge metal framing sized for needed wall cavity widths, 5/8" gypsum wall board each side, taped, mudded and finished to Level 4. Add the following: CF-3 LCCA-3
    a. plywood sheathing where required for shear CF-2 LCCA-1
    b. wood blocking as permitted by code where required for wall-mounted accessories CF-2 LCCA-1
    c. 18-20 ga metal backing if wood is not permitted CF-3 LCCA-1
    d. cementitious backer board where installing wall tile CF-3 LCCA-1
    e. acoustical insulation, resilient channel, and sealant where required for STC ratings CF-3 LCCA-1
    f. impact resistant GWB or surface applied impact resistance at high-traffic areas
4. Partitions to be easy to maintain and easily cleanable
5. High traffic areas to be impact resistant CF-4 LCCA-1
6. Provide expansion/control joints as required
7. Gymnasium wall finishes to have hard surfaces below 8' to allow for rebound of balls. Cost and LCCA vary on types of surfaces

8. Non-porous, easily cleanable surfaces for food services areas. Ceramic or porcelain tile wainscot to 4'-0" A.F.F. at a minimum for wet areas. Provide full height ceramic tile at grease-prone areas. CF-3 LCCA-3

Recommended:

9. Concrete masonry walls where cost effective and deemed essential by design team (may need LCCA) CF-3 to 5 in rural locations LCCA-1
10. Wood framed walls where more cost effective. CF-3 LCCA-3
11. At glazed porcelain and/or ceramic tile, consider use of manufactured metal trim pieces at base, corners, and terminations. CF-1 LCCA-1
12. Acoustical panels: fabric wrapped panels or paint-grade wood fiber strand board CF-1 LCCA-2

Premium:

13. Radiused and curved walls.
14. Walls that exceed the minimum STC rating for school spaces
15. Walls that use both impact resistant GWB and an impact resistant applied wall finish

0612 Soffits & Ceilings

Required:

1. Standard soffit construction will be 20-gauge metal framing, cold rolled channel, or fabricated metal suspended-ceiling systems sized for anticipated loads and spans, 5/8" gypsum wall board, taped, mudded and finished to Level 4. Add the following:
    a. additional gypsum wall board where required for fire resistance CF-3 LCCA-3
    b. wood blocking as permitted by code where required for wall-mounted accessories CF-2 LCCA-1
    c. 18-20 ga metal backing if wood is not permitted CF-3 LCCA-1
    d. acoustical insulation, resilient channel, and sealant where required for STC ratings
2. Soffits to be easy to maintain and easily cleanable.
3. High traffic areas to be impact resistant CF-4 LCCA-1
4. Provide expansion/control joints as required

Recommended:

5. X.

Premium:

6. X.

062 Special Partitions

0621 Operable Partitions

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. Operable partitions or large sliding doors.

0622 Demountable Partitions

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. X.

0623 Glazed Partitions

Required:

1. X.
2. X.

Recommended:

3. Consider 2-way mirrors in observation areas; safety glazing.

Premium:

4. X.

0624 Railings & Screens

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. X.

063 Interior Openings

0631 Personnel Doors

Required:

1. Interior doors systems shall be readily available and have a wide variety of offerings including acoustical, fire rated, hollow metal and flush wood veneer. CF-varies LCCA-varies
2. All doors within public use areas to be ADA compliant.
3. All swing doors throughout to have ADA compliant, lever-style, commercial grade hardware.

4. Overhead doors at food service pass-throughs, shop areas, or for separating zones ; lockable
5. Specify interior doors with welded metal frames in all new construction. “Knock-down” frames are discouraged. CF-3 LCCA-3
6. Standard door assemblies to be solid core, factory-finished wood doors and painted hollow metal frames, with fire resistive ratings as required by code. 1 ¾” 16 gauge insulated hollow metal doors may be used in lieu of wood; metal doors should be used in PE, shops, gym, labs and locker rooms.
    a. Provide glass vision lite kits and/or louvre openings as indicated by ed specification and/or program.
    b. In un-rated assemblies, provide ¼” clear tempered glass door inserts and relites.
    c. Vision Lite kits within doors to have 18 gauge cold rolled steel frames with mitered and welded corners and should utilize standard sizes: 6”x27”, 12”x12”, 24” x 24”, 24” x 36”, 24” x 60”.
7. Door hardware in a variety of configurations including, but not limited to:
    a. Office sets: full-perimeter gaskets and door bottom with neoprene element, office lockset, wall or floor stop
    b. Storage sets: full-perimeter gaskets and door bottom with neoprene element, storage lockset, wall or floor stop, closer, kickplate.
    c. Classrooms: full-perimeter gaskets and door bottom with neoprene element, closer, wall or floor stop, lockdown locking mechanism
    d. Gymnasium doors or sets of double doors used to close down portions of the school: panic hardware, closers, kickplates, locking doors (manual or card reader), floor or wall stops where possible, overhead stops where floor/wall stops are not possible and full-perimeter gaskets and door bottom with neoprene element. Double doors should not have astragals. CF-3 LCCA-3
    e. ADA/Unisex single-toilet room doors: full-perimeter gaskets and door bottom with neoprene element, lockset with occupied indicator, and a wall or floor stop.
    f. Teacher work and support spaces: silencers, proximity card readers, closer, and a wall or floor stop

Recommended:

8. All classroom doors to have closers, with closing mechanism to be mounted on the classroom side to allow for locking devices to be applied in the event of lockdown situations.
9. Door glazing insert kits in a variety of sizes, safety glazing. CF-3 LCCA-3
10. Consider single or double intercommunicating doors between classrooms. CF-3 LCCA-2

Premium:

11. Non-standard doors that are higher than 84" or wider than 36". CF-4 LCCA-2
12. Any doors or windows of special sizes requiring manufacturer’s premium costs. CF-4 LCCA-2
13. Non-standard colors or finishes on doors that require manufacturer’s premium costs. CF-4 LCCA-1

0632 Special Doors

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. Motorized overhead doors with glazing used as space dividers walls between classrooms. CF-4 LCCA-4.
5. Bullet resistant~~proof~~ doors & glazing; UL Listed Level 1- Level 3 is acceptable. CF-5 LCCA varies.
    a. UL 752 - Level 1 - protects against 9mm full metal copper jacked with lead core. No spall, no penetration.
    b. UL 752 – Level 2 – protects against .357 Magnum jacketed lead soft point. No spall, no penetration.
    c. UL 752 – Level 3 – protects against .44 Magnum lead semi-wadcutter gas checked. No spall, no penetration.

0633 Windows & Sidelites

Required:

1. Limit the size of windowpanes and relites to standard sizes: 18, 24, 36, 48, 60 inches wide by 18, 24, 36, 48 or 60 inches high. Limit overall size of windowpanes; use multiple smaller windows in lieu of one large window. Glazing/relites adjacent to doors can go up to 84 inches high.
2. Relite and frames to be painted hollow metal, with fire resistive ratings as required by code.
3. Window & relite frames and sills to be paint grade. CF-3 LCCA-3

Recommended:

4. X.

Premium:

5. Silicone glazing systems, butt glazing systems or double wall glazing systems.
6. Arched or complex windows and frames.
7. Non-standard relites and vision lite kits.
8. Ballistic and blast mitigation coatings or films.

064 Special Floors

0641 Access Floors

Required:

1. X.
2. X.

Recommended:

3. X.

Premium:

4. Raised floor raceway systems. CF-3 LCCA-3.

0642 Platforms & Stages

Required:

1. X.
2. X.

Recommended:

3. Provide floors in stage/platform areas appropriate for a variety of performances: dance performances, vocal/music performances, etc. Floors, where required by the program, shall be a cost-effective, self-install sprung floor, resilient finish panel system designed for permanent installation. CF-4 to 5 LCCA-3

Premium:

4. Auditorium spring floor panel system with hardwood surfaces.

065 Interior Finishes

0651 Floor Finishes

Required:

1. Selected finishes to be sustainable and contribute to a healthy, productive learning environment. Evaluate products for recycled content, recyclability, waste reduction, energy efficient maintenance, low VOC content and post-installation product emissions.
2. Specify applied finishes shall be easy to clean and resistant to moisture and mold/bacterial growth.
3. Resilient flooring such as linoleum, sheet vinyl, rubber flooring or VCT is preferred for hallways/corridors, art classrooms, storage rooms and other locations where carpet is not ideal.
    a. Resilient floor materials to be low-voc, use low-voc adhesives and be compatible with low-voc, water based solvents/cleaning agents.
    b. All resilient materials shall be commercially rated for heavy-duty wear.
    c. Resilient sports flooring to have striping for common indoor sports played within the district.
    d. Science labs to have chemical resistant flooring.
    e. Provide static dissipative flooring where required by the program.
4. Carpet tiles are preferred for office and classroom spaces throughout (exception: labs and art rooms)
    a. Carpet tile should have a high wear / TARR rating, stain resistance and cleanability; carpet to have moisture impervious backing
    b. Carpet tiles should have a minimum of 25% recycled content and a minimum of 17 ounce face weight.

   c. Carpets to be low-voc, use low-voc adhesives and be compatible with low-voc, water based solvents/cleaning agents.
5. Adhesives and sealants used in the building interior (inside the exterior moisture barrier) must be low VOC.
6. Provide a walk-off mat system at every main entrance.
7. Standard resilient wall base should be use throughout office, classroom, and hallway areas with slight modifications based on the rooms.
   a. Tile base where walls are receiving tile applications.
   b. Resilient sheet cove base with top trim in toilet rooms or food service areas.
8. Wood sports flooring, where required by the program, to be second and better grade maple strip flooring with striping for common indoor sports played within the district. CF-4 to 5 LCCA-3

Recommended:

9. Consider Porcelain tile and mosaic tile floor and wall finishes in toilet/shower rooms where required by the program. All tile and grouts should be installed based on the installation conditions and as recommended by the Tile Council of America. CF-3 LCCA-1
   a. Use epoxy-modified grout mixture for high moisture areas.
   b. Wall padding in gymnasiums to be limited to competition court basketball backstops.

Premium:

10. Flooring materials other than rubber, vinyl composition tile, linoleum, or floor carpet.
11. Wood sports flooring for elementary schools.
12. Cork, bamboo, recycled rubber, or other expensive flooring material.
13. Wood, Plywood wrapped or stainless-steel wall base.
14. Wax-free resilient floor systems.
15. Recessed walk-off grate entry system. CF-4 LCCA-1
16. Cove base in areas other than toilet rooms.

0652 Wall Finishes

Required:

1. Paint / sealers used throughout should be durable and scrubbable, with low to no-VOC content.
   a. Use acrylic, water based for non-metal surface.
   b. Use alkyd enamel paints on metal surfaces
   c. Use water-based epoxy paints in interior spaces with high humidity or areas subject to surface moisture
   d. Use concrete sealer and/or concrete paint where required by the program
   e. Wall paint to have a minimum of three (3) applied coats
   f. Door/relite frames to have a minimum of two (2) applied coats.
2. Gymnasium wall finishes to have hard surfaces below 8’ to allow for rebound of balls. Surfaces above 8’ to have acoustical wall panels.

3. Non-porous, easily cleanable surfaces for food services areas. Ceramic or porcelain tile wainscot to 4’-0” A.F.F. at a minimum for wet areas. Provide full height ceramic tile at grease-prone areas.

Recommended:

4. Consider FRP panels as needed for service and as required CF-2 LCCA-1.

Premium:

5. LEED and/or WELL Certified building CF-3 LCCA-1.
6. Wall paneling or wallpaper CF-4 LCCA-2.
7. Full height wall tile except at grease-prone areas in Kitchens CF-4 LCCA-1.
8. Architectural resin panels.

0653 Ceiling Finishes

Required:

1. Acoustical ceilings and panels to contain recycled content where possible.
    a. Sound absorptive with a minimum NRC of .55 and a CAC rating of 35.
    b. Ceilings to be installed with a standard 15/16” grid system and seismically braced. Ceiling suspension system to be hot dipped galvanized steel to inhibit rust.
    c. Ceilings within food service and lab areas to be washable & scrubbable.
    d. Acoustic ceilings shall meet ASTM C 1264 for Class A materials.
2. X.

Recommended:

3. Consider ceiling grids to support hanging displays in all classrooms and hallways.

Premium:

4. Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings. CF-5 LCCA-2.
5. ACT ceiling trims other than 15/16" grid profiles.

0654 Other Finishes

Required:

1. Acoustical wall treatments to be rigid fiberglass board and fine-grain cork core faced with fabric approved for wall panel use.
2. Acoustical wall panels above 8’-0” in gymnasiums, pool areas or other echo-producing locations. Design team to include an acoustical engineer to determine the number/type of acoustical panels needed for each specific environment.

Recommended:

3. X.

Premium:

4. Acoustical felt wall panels.

066 Specialties

0661 Interior Specialties

Required:

1. Interior signage to be provided at all areas required by code to receive signage.
    a. All signs to have grade 2 Braille, tactile characters and pictograms as required by code.
    b. ~~All signs to coordinate with interior and exterior finish palettes~~.
2. Student lockers shall be provided as required by the programming documents and should be steel construction with sloped top and closed base; locks requirements to be selected by the school. Lockers within locker rooms and changing areas to be ventilated steel construction.
3. Built-in toilet room items to include, but not limited to commercial-grade, readily available:
    a. Soap dispensers.
    b. Mirrors.
    c. Toilet paper dispenser.
    d. Seat cover dispensers.
    e. Sanitary napkin receptacles.
    f. Grab bars.
    g. Paper towel dispensers.
    h. Baby changing stations and/or adult-sized changing stations for special needs classrooms as indicated by the program documents.
    i. Waste receptacles.
    j. Toilet partitions; to be durable and graffiti resistant. Partition hardware or door type to be selected to provide maximum privacy and minimum gaps between stall components.
    k. ADA shower with shower seat.
4. Corner guards to be minimum of 2mm thick, have a 1 ½" wing on either side and be a minimum of 4'-0" A.F.F. Material to be textured rigid material and available in 90 degree and 135-degree corner styles. CF-2 to 4 LCCA-1
5. Fire extinguishers to be provided per code. All fire extinguisher cabinets to be recessed. Provide signage and stickers on cabinet for fire extinguisher visibility.
6. Install sliding double whiteboards with an integrated map/poster rail at top and tackboards, typical within all classrooms where markerboards are called out. Music rooms to have whiteboards with and without staff lines.
7. Cork bulletin boards with aluminum frame in manufacturer standard sizes.
8. Install retractable, recessed projection screens.

Recommended:

9. X.

Premium:

10. Signage: signage with changeable inserts, ADA signage on acrylic with standoffs or vinyl graphic signage.

11. Toilet room premiums: motion-sensored soap dispensers, automatic hand dryers. CF-4 LCCA-3.
12. Antimicrobial lockers to help protect against bacteria, mold, yeast and mildew or hardwood or hardwood veneer lockers. CF-4 LCCA-3.
13. Wood or metal framed mirrors of custom size, backlit.
14. Stainless steel corner guards.
15. ~~Climbing walls~~.
16. Magnetic glass whiteboards, electronic smartboards or other technology-based display boards.
17. Dry-erase wallcovering surfaces that double as projection screen.
18. Motor operated projection screen in any location other than auditoriums or presentation lecture areas.
19. Suspended acoustical felt baffles & wall panels.

0662 Casework & Millwork

Required:

1. Specify durable and easily cleaned casework. Base requirement is high pressure laminates over stable substrate with 4mil PVC edge banding. Counters are high pressure laminate with postformed backsplash and front edge profile. Standard casework to be provided throughout with the following special conditions: CF-3 LCCA-1.
    a. Resin counters in science labs space. CF-4 LCCA-1
    b. High school science labs to have lockable, ventilated acid storage cabinets, lockable and labeled alkali metals & halogens storage cabinet, lockable casework for with minimum 15” inside useable depth, and trays to fit cabinets/shelves under bottles to prevent liquid spills.
    c. Polycarbonate or wired glazing to be used for casework within science lab space. CF-3 LCCA-1
    d. Coat cubby areas with coat hooks, storage above and benches for changing shoes/outdoor gear. Provide dividers and spacing between hooks to prevent the spread of head lice.
    e. Boot racks with space below to allow for cleaning.
    f. Perimeter counter with sab sinks/stations, and art drying racks in art classrooms.
    g. Library Circulation desk with 6’ minimum counter space including ADA height counter, book drop, supply drawers, files, and technology including computer, printer & storage.
2. Hallway areas to have lockable display cases for 2-d and 3-D displays, benches near toilet rooms and tackboards. CF-3 LCCA-1

Recommended:

3. X.

Premium:

4. Hardware pulls greater than 6” in length.
5. Solid surface countertops and backsplash.

6. Solid surface counters and backsplashes, solid vinyl, recycled glass, or polycarbonate counters.
7. Stainless steel lab storage & cabinetry.
8. Solid wood cabinets or wood veneer cabinets.
9. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling.

0663 Seating

Required:

1. Building entry vestibules to have perimeter benches in the parent pick-up / drop-off zones and lost & found bin CF-3 LCCA-1.
2. X.

Recommended:

3. X.

Premium:

4. Built-in bleachers or built-in, retractable bleachers.

0664 Window Coverings

Required:

1. Window treatments to be roller shades or miniblinds. Provide fascia on coverings to hide mounting brackets and mechanisms.
2. *Window coverings on all windows within occupied spaces; roller-shade style.*
3. X.

Recommended:

4. X.

Premium:

5. Motorized roller shades.

D. Design Criteria & Ratios

Criteria

- Interior glazing and operable partitions should be used prudently.
- Alternative storage solutions, such as closets with shelving in lieu of casework, should be considered.
- Entries and circulation corridors should utilize a durable, non-staining, non-slip floor material.
- In areas without paved walk and road surfaces, gym floors should utilize a sheet athletic flooring or a poured urethane floor in lieu of a wood floor to minimize damage to floor from tracked in soils.
- Interior spaces and floor finishes should be laid out in a manner that reduces seams and material waste.

Ratios

1. Interior doors should be limited to one per every 400 GSF
2. XX

07.CONVEYING SYSTEMS

A. Building System Summary

The **Conveying Systems** of a building are dedicated systems designed to move persons or materials up, down, around, and through a facility. The department recognizes two sub-categories in this building system: **Passenger Conveyors**, and **Material Handling Systems**. The sub-systems under these categories include elevators and personnel lifts as well as material lifts, hoists/cranes and other kinetic systems such as dense files storage. The functions and loads induced by Conveying Systems often require broad integration with other building systems such as **Substructure**, **Superstructure**, **Mechanical** and **Electrical** systems. **Interiors** elements including Partitions & Soffits and Interior Finishes are often represented in Conveying System components.

B. Design Philosophy

Conveying systems were developed to increase efficiency and capacity. Where they are able to achieve this in Alaskan schools, they should be implemented—with discretion. The efficiencies gained with two story school construction are often offset by the need for passenger conveyors. In addition, most of these systems rely on tight tolerances that are impacted by building movement. Such movement can occur in all Substructure and Superstructure types and is primarily influenced by the stability of subsurface conditions. Some sites and building configurations can appropriately trade the space efficiency of elevators and vertical lifts with the equally accessible solution of ramps. Cost-effective use of Conveying Systems in schools should be supported by solid life-cycle cost analysis.

C. Model Alaskan School

The Model Alaskan School, a single story structure, does not include any Conveying Systems elements. Acceptable alternatives are detailed in the construction standards that follow.

071 Passenger Conveyors

0711 Passenger Elevators

Required:

1. Install elevators only where required by codes adopted by the state or a local jurisdiction with delegated authority. (For multi-story schools meeting accessibility requirements with ramps in-lieu-of elevators, see 4 AAC 31.020 for a space variance.)
2. Install electric traction elevators when permitted for maximum energy efficiency.
3. Installations not within 100 road miles of an establish elevator service center at the time of construction are limited to hydraulic elevators excluding roped-hydraulic mechanisms.
4. In-ground hydraulic elevators must be supported by a geotechnical report showing suitable subsurface conditions.

5. Single piston hydraulic systems may not be eccentrically loaded.
6. Elevators will be supplied with backup power for lowering (only?).
7. Elevators will be included in a project's commissioning plan unless approved otherwise by DEED.

Recommended:

8. Elevators with machine rooms are preferred for maintenance simplicity. (For space variances associated with machine rooms, see 4 AAC 31.020).
9. Where a sump is required for an elevator pit, locate the sump pump outside the elevator shaft.
10. Education related facilities with three or more stories should consider in-ground hydraulic pistons where subsurface geotechnical consideration allow.
11. Cab flooring should match adjacent lobby/corridor flooring; doors and frames should be stainless steel.
12. Robust, durable controls, one per car (including both card access if a building standard and keyed controls), sensors, and connection to building automation.

Premium:

13. Educations related facilities with more than one passenger elevator. [CF-X, LCCA-X??]
14. Elevators with rated speeds above 200fpm and load capacities above 2500lbs.
15. Cab construction, features (lighting, etc.), and finishes above the manufacturer's standard base or that require manufacturer's premium costs except as noted above.

0712 Lifts & Other Conveyors

Required:

1. Passenger lifts or wheelchair lifts may be used where permitted by codes adopted by the state or a local jurisdiction with delegated authority. Primarily this will be at floor level changes that are less than a story height.
2. Inclined stair lifts are not permitted.

Recommended:

3. A lift's audio-visual alarm shall be operational at all times and shall activate when the lift is in operation except that a lift installed at a stage shall be free of a warning light or alarm.
4. Lifts shall have shielding devices to protect users from the machinery or other hazards and obstructions.
5. Cab flooring should match adjacent lobby/corridor flooring.

Premium:

6. Escalators or any type of moving walkway.

072 Material Handling Systems

0721 Elevators & Lifts

Required:

1. Dedicated freight elevators (or lifts where permitted by code) in education related facilities may be installed where the upper level(s) served by the conveyance total in excess of 100,000gsf.
2. If layouts permit, and as allowed by code, a required passenger elevator may be increased in size and capacity to function as a freight conveyance.
3. Vehicle lifts in the following quantities may be installed at any education related facility serving grades 9-12 whose approved educational specification includes an automotive Career Technology Education pathway:

<500 students grades 9-12	1
501 – 2000 students grades 9-12	2
>2000 students grades 9-12	3

Recommended:

4. Lifts shall have shielding devices to protect users from the machinery or other hazards and obstructions.
5. The maximum lifting height for vehicle lifts shall be 68 inches.
6. Two post lifts are limited to slab-on-grade construction; use four post lifts for elevated floors.
7. Where portable automotive lifts can meet curriculum requirements, such lifts shall be purchased and provided under School Equipment.

Premium:

8. Eligible educations related facilities with more than one freight elevator or lift.
9. Freight elevator dimensions exceeding 5ft x 8ft and load capacities above 5500lbs.
10. Vehicle lifts in excess of allowable quantities.
11. Vehicle lifts with load capacities above 3000lbs or with ancillary accessories or features such as alignment calibration.

0722 Hoists & Cranes

Required:

1. None.

Recommended:

2. None.

Premium:

3. Site constructed, permanent, overhead hoist or crane assemblies.

0723 Other Systems

Required:

1. None.

Recommended:

2. Dumbwaiters of any size permitted by code may be used when transfer of materials between floors is needed and freight elevators are not permitted. (Note: dimensions and capacity of dumbwaiters are restricted by code and are very modest.)

Premium:

3. Belt conveyors, pneumatic tube systems, linen/trash/mail chutes, or operable scaffolding.

D. Design Criteria & Ratios

Criteria

- Select the type of elevator mechanism based on subsurface soil conditions and building stability.
- Two-story school solutions should incorporate a design layout that requires only one elevator.
- Vehicle lifts and hoist systems will be limited to a defined educational program need.

Ratios

1. XX

08. MECHANICAL

A. Building System Summary

The **Mechanical** systems of a building create the internal environment necessary for comfort, hygiene, and safety within the school facility. The systems are highly integrated and are often highly automated. The department recognizes five sub-categories in this building system: **Plumbing**, **HVAC**, **Integrated Automation**, **Fire Protection**, and **Special Mechanical Systems**. The sub-systems under these categories include a large variety of fixtures, equipment combined with several types of distribution components including piping, valves, ducting, and controls. The Mechanical functions within a facility require broad integration with other building systems such as **Exterior Closure, Interiors**, and **Electrical** systems.

B. Design Philosophy

Mechanical systems shall be designed to conserve energy and water to reduce operating costs and demand on community resources. The systems shall be integrated with the design of the building plan and envelope to optimize performance and provide occupant comfort. The systems shall be durable, expandable, and easily maintained. Mechanical systems shall comply with DEED-adopted energy codes.

Mechanical joins Interiors as one of the higher cost building systems and typically account for ~10-12% of a project's total construction cost. Like Interiors, Mechanical systems are subject to initial cost savings by specification of materials or equipment, but oftentimes the reduction in initial cost is offset by increased maintenance and operation costs over the life of the system. It is important that the cost effectiveness of all material and equipment specifications is evaluated on a life cycle basis.

Plumbing systems can be greatly influenced by standards for cost-effective design because their use is not required in every functional area, whereas HVAC and sprinkler systems are. Consolidation of plumbing systems to core areas to limit piping runs and reduction of the overall plumbing fixture count are design decisions that limit a project's plumbing cost. Fine-tuning the design of the HVAC systems can also generate cost savings. Ventilation requirements for indoor air quality are a primary driver of energy use. By right sizing the ventilation system to a proper occupancy count, establishing a higher acceptable maximum temperature, and incorporating operable windows into the design calculations, ventilation rates can be reduced, thus reducing air handler capacity and the space required for equipment and distribution. Wet sprinkler systems are less expensive than dry systems, so reducing or eliminating the need for dry sprinkler systems will reduce the cost of the facility.

C. Model Alaskan School

The Model Alaskan School includes cast-iron waste piping, hot and cold domestic water distributed in insulated copper piping, bathroom fixtures, stall showers, classroom sinks, exterior hose bibs, commercial food prep and clean up sinks and hot water generating equipment. Heating systems are oil/gas fired boilers and hydronic heat distribution to terminal devices. Cooling is a 10T DX air conditioner supplying fan coils. Ventilation is a single AHU with distributed ducting and VAV boxes; both central and localized exhausting is provided via fans and ducting. Controls include a DDC system and thermostats. Fire protection is wet pipe system with appropriate risers and valves. Heating fuel is stored in an exterior tank and interior day tank and is distributed via steel piping. Acceptable alternatives are detailed in the construction standards that follow.

A. General

Required:

1. Design in accordance with the version of ASHRAE 90.1 currently required by DEED, including amendments by DEED.
2. Incorporate redundancy into critical mechanical systems at remote sites.
3. Provide sufficient floor space to provide minimum equipment clearances, and to allow maintenance activities and maintenance equipment.
4. Design potable water systems to conserve water to the greatest extent practicable, without compromising system performance.
5. Group spaces with high fixture counts together – i.e. public restrooms, commercial kitchens, custodial.
6. Design piping systems to provide ease of maintenance - valves and equipment that are readily accessible, clearly indicated access locations, and clearly labeled piping, valves and equipment.
7. Utilize rainwater and/or snowmelt capture systems for facilities with limited access to potable water.
8. Do not abandon equipment or systems in building for remodel/addition projects. Demolish piping, ducts and wiring back to active portions of the systems.
9. Install low volatile organic compound (VOC) containing materials in accordance with 40 CFR 59, the **National Volatile Organic Compound Emission Standards For Consumer And Commercial Products.**

10. Design building systems to allow for future expansion.

Recommended:

11. Consider accommodating future removal and replacement of all mechanical equipment, with appropriate coordination between disciplines to provide for this occurrence.
12. Provide flow meter on the domestic water service for monitoring by the building control system. CF-2 LCCA-2
13. Design gray water and rainwater capture, treatment and distribution systems for urinal and water closet flushing. CF-varies LCCA-varies.
14. Consider using energy modeling during the design phase for system selection and building configuration.
15. Consider compiling comprehensive life cycle analyses throughout the design phase that addresses the initial cost of the systems, annual operating cost, maintenance costs, and replacement costs.
16. Consider designing building systems to allow for 15% capacity for future expansion when population rates indicate future growth.
17.

Premium:

18. Considering renewable energy sources such as geothermal, biomass, and thermal electric storage from turbines.
19.

081 Plumbing

0811 Plumbing Fixtures

Required:

1. Provide water conserving fixtures that meet the Energy Policy Act (EPAct) 1992, with Amendments.
2. Provide commercial fixtures that are durable and easily maintained.
3. Specify floor mounted wall carriers for urinals, lavatories and drinking fountains.
4. Provide plumbing walls large enough for wall-mounted water closet carriers – 11-inches minimum for single-wall carriers, and 16-inches for back-to-back carriers.
5. Provide toilets in Pre-k–1st grade classrooms.
6. Provide sinks in classrooms for elementary grades including grade 5.
7. Specify floor drains with trap primers.
8. Pitch all slabs to floor drains.
9. Avoid locating floor and roof drains over electrical and data system equipment.
10. Install floor drains next to air handlers.
11. Install floor drains next to all equipment that produces condensate.
12. Install floor drains next to fire sprinkler pumps if practicable.
13. Provide emergency eyewash, shower units, floor drains, and sloped slabs as required by Occupational Safety and Health Administration (OSHA) in science rooms, art rooms, shop and maintenance spaces, and any classroom where chemicals are used.

14. Provide tamper-proof hose bibs adequately spaced around the perimeter of the building, except in locations where water supply is limited.

Recommended:

15. Recommend installing plumbing fixtures on interior walls only.
20. Consider reducing potable water use by choosing low-flow water fixtures that meet these maximum flow rates:

▪ Lavatories	0.5 gpm metered
▪ Sinks	0.5 gpm
▪ Water closet	1.28 gpf
▪ Urinal	0.125 gpf
▪ Showerhead	1.5 gpm
▪ Kitchen sink (commercial kitchen sink excluded)	1.5 gpm

21. Avoid using ultra-low flow or waterless water closets and urinals.
22. Consider providing automatic controls at lavatories, water closets and urinals.
23. Consider specifying intuitional/penal grade shower heads.
24. Consider providing bottle fill stations.
25. Consider providing multi-station wash fountains with automatic operation for elementary ganged restrooms. Install hose bibbs with backflow protection in mechanical equipment rooms for equipment cleaning.
26. Consider installing bubblers on elementary classroom sinks.
27. Consider providing large sinks – minimum 30” wide x 18” front-to-back – with solids interceptors in Alaska Native cultural studies classrooms.

Premium:

16. Garbage disposals are not an accepted fixture.

0812 Plumbing Piping

Required:

1. Meet the requirements of NSF-61 for materials in contact with drinking water.
2. Provide furred out walls for plumbing fixtures installed on exterior walls. Do not install plumbing piping in the building thermal envelope.
3. Install isolation valves on piping serving rooms with ganged fixtures – such as restrooms, science rooms, kitchens.
4. Provide solids interceptors (plaster traps) at art rooms.
5. Provide recirculation loop for domestic hot water systems out to the furthest hot water fixture. Only operate during occupied hours.

Recommended:

17. None.

Premium:

18. None.

0813 Plumbing Equipment

Required:

1. Provide grease interceptors in commercial kitchens.
2. Store domestic hot water at minimum 140°F to prevent Legionella growth.
3. Provide hot water in accordance with Alaska Food Code_18 AAC 31 for facilities with commercial kitchens.

Recommended:

6. Consider providing above-floor grease traps with automatic grease skimming technology in commercial kitchens.
7. Consider install ceiling anchor points above lift stations, for mounting equipment to aid in removing pumps.
8. Consider choosing equipment and appliances with an Energy Star label.

Premium:

19. None.

0814 Waste & Vent Piping

Required:

4. For sites that use sewage lift stations, design waste and vent piping systems to use as few lift stations as practicable.
5. Locate plumbing vents away from roof edges, and snow drift locations; place near the ridge of sloping roofs.
6. Install roof plumbing vents in visually discrete locations to the greatest extent practicable.
7. Install cleanouts in locations readily accessible to maintenance personnel.

Recommended:

20. None.

Premium:

21. None.

0815 Special Systems

Required:

1. None.

Recommended:

2. None.

Premium:

3. None.

082 HVAC

0821 Heating Equipment

Required:

1. Locate ~~mechanical rooms~~heating equipment away from educational spaces to avoid the transfer of noise and vibrations.
2. Avoid placement of heating equipment and building openings on leeward side of building where subject to snow drifting.
3. Use high efficiency 3-pass cast iron boilers for locations heating with fuel oil.
4. Consider providing glycol fill and storage tanks with integral pump, check valve, isolation valves, pressure switch, and alarm panel.
5. Consider using utility waste heat where available. Size plate-and-frame heat exchangers for future expansion.
6.

Recommended:

4. Consider requiring extended warranties on ~~boilers, air handlers and other~~ major heating equipment items (e.g., boilers, hot water generators, etc.).
5. Consider locating heating equipment in mechanical rooms or penthouses, not on roofs, in most regions of Alaska.
6. Consider installing floor mounted equipment on 4” concrete housekeeping pads.
7. Consider using condensing boilers and low temperature (140 °F and lower heating supply) hydronic heating systems when using natural gas or propane as heating fuel.
8. Consider installing BTU metering of hydronic heating.
9. Consider using utility load-shed electric heat where available. Provide sufficient storage/buffer capacity for electrothermal systems.
10. Consider installing bypass filtration on new hydronic heating systems connected to existing piping and equipment.
11.

Premium:

12. Electrostatic precipitators for wood chip systems.
13.

0822 Heating Distribution Systems

Required:

1. None.

Recommended:

2. Consider installing radiant ceiling panels or radiant floors in restrooms and locker rooms, rather than fin tube.

Premium:

3. None.

0823 Ventilation Equipment

Required:

1. Coordinate with local electric utility for equipment motor sizes requiring variable frequency drives (VFD).
2. Control indoor air quality during construction, meeting SMACNA IAQ Guideline for Occupied Buildings under Construction 2007, Chapter 3.
3. Provide radon testing for buildings with slab-on-grade construction, below grade crawlspaces, and basements, particularly in locations known to have radon. Design radon mitigation systems as needed.
4. Locate equipment like make-up air units (MAU) for kitchens on the roof, where practicable due to climate.
5. Implement demand control ventilation.
6. Utilize economizer cooling and natural ventilation to the greatest extent practicable.
7. Locate building air intakes away from sources of air pollution such as buses, exhaust vents, kitchens, and shop spaces.
8. Exceed minimum distances as needed between outside air intakes and pollution sources if subject to entrainment and carryover from wind.
9. Locate louvers at least 8'-0" above grade and keep plantings away from louvers.
10. Avoid using louvers on outside air intakes in locations with frequent wind driven snow and rain, and subject to heavy frosting. Use arctic-tee hoods instead.
11. Maintain outside air intake velocities at or below 500 feet per minute to avoid entraining rain and snow.
12. Provide deck-to-deck partitions, dedicated exhaust to the outdoors, and negative air pressure for spaces with hazardous materials (janitors' closets, chemical mixing areas, darkrooms, and high-volume copy rooms, etc.).
13. Operate exhaust fans with lighting controls in small restrooms.
14. Operate exhaust fans with dedicated wall switches in janitor closets to allow continuous operation.
15. Provide exhaust fans sized for 5 air changes per hour in spaces that allow access to below-floor sewage lift stations. Exhaust fans to have dedicated switches to allow continuous operation.
16. Consider using factory-fabricated, listed grease duct for Type 1 kitchen hoods.

Recommended:

17. Consider providing variable frequency drives (VFD) or electrically commutated motors (ECM) on all equipment for balancing.
18. Consider providing VFDs with integral disconnects.
19. Consider providing passive radon venting that can be converted to active ventilation when site soil test confirm radon mitigation is needed.
20.

Premium:

21. Dehumidification systems ~~for summer use~~.

0824 Ventilation Distribution Systems

Required:

1. Locate balancing valves and dampers to allow easy access for testing and balancing.
2. Cover and seal ventilation equipment and ductwork during construction to prevent dust and debris in ductwork and equipment.
3. Install preheat coils on outside air ducts in locations with winter design temperatures lower than 40°F to avoid condensation when mixing with return air. Provide preheat coils with summer filters.
4. Use sound attenuation for air handlers and ductwork serving classrooms, media centers, theaters, and administrative spaces.
5. Use 3/4" birdscreen on outside air intakes to avoid frost build up.
6. Install duct access doors at inlet and outlet side of all duct-mounted equipment.
7. Consider providing Minimum Efficiency Reporting Value (MERV) 13 filters, MERV 11 minimum if higher-rated filters are not provided by the unit manufacturer.
8.

Recommended:

9. Consider using factory-fabricated, listed grease duct for Type 1 kitchen hoods.
10.

Premium:

11. Building flush-out following LEED requirements. CF-varies LCCA-low
12. .

0825 Cooling Equipment

Required:

1. Provide appropriate air conditioning in computer rooms, computer labs, and data hub rooms. Utilize economizer cooling for server and data rooms and reject heat to return path of building ventilation system, to the greatest extent practicable.
2. Limit air conditioning to spaces used year-round: administrative offices, auditoriums, data and equipment rooms with equipment that generates heat, and spaces needed for summer school programs.
3.

Recommended:

4. None.

Premium:

5. Install variable refrigerant flow (VRF) or variable refrigerant volume (VRV) for interior spaces that need cooling, and reject heat in other portions of the building.
6.

0826 Cooling Distribution Systems

Required:

1. None.

Recommended:

2. None.

Premium:

3. None.

0827 Heat Recovery Systems

Required:

1. Use energy recovery on ventilation systems according to size, based on DEED requirements.
2.

Recommended:

3. Consider using energy recovery on all ventilation systems.

Premium:

4. None.

083 Integrated Automation

0831 Digital Controls ~~Systems~~

Required:

~~1. Install control systems capable of operation by school district personnel.~~

~~2. Maintain monthly and annual records of resource consumption (water, fuel, electric).~~

1. Provide all electronic control devices by the same manufacturer to the greatest extent practicable.

~~3.~~2. Provide individual room temperature controls.

3. Provide programmable temperature controls in occupied spaces.

4. Provide On-Off heating temperature controls for unoccupied and utility spaces (i.e. storage rooms, mechanical rooms, electrical rooms, generator rooms, vestibules, cargo receiving areas, refuse storage, heated attics, crawlspaces, utilidors, etc.)

5. Provide On-Off cooling temperature controls for unoccupied spaces with cooling applications (i.e. mechanical rooms, electrical rooms, generator rooms, refrigerator/freezer condensing unit spaces, telecommunications rooms, server rooms, etc.)

~~4.~~6. ~~Use~~ Provide locking enclosures on temperature ~~sensors~~ controls ~~and thermostats~~ in common areas and public spaces (i.e., gymnasiums, restrooms, locker rooms, corridors, vestibules, auditoriums, multipurpose rooms, etc.).

7. Temperature controls shall not contain mercury.

8. PLC based digital controllers operating equipment should be capable of providing 7-day, 24-hour scheduling, digital and analog inputs and outputs (including alarms), user interface on the controller for manual control and programming.

9. Boiler control panels are preferred over aquastats for operating boiler plants and heating circulation pumps.

10. Provide standard controls components not custom designed specifically for the project.

11. Provide local-readout gages at each control system sensor location (at minimum).
12. Wired networks are preferred over wireless.
13. Locate controls components in dry, stable environments to reduce need for specialty enclosures.
~~5.~~14. Provide engraved identification tags on controls components.

Recommended:

~~6.~~15. Consider hiring a 3rd party agent to perform commissioning in accordance with DEED requirements based on facility size construction scope. Systems to consider for commissioning include: heating ventilation and cooling (HVAC), controls, lighting and power loads, and air barrier systems.
~~7.~~16. Consider direct digital control (DDC) system with remote (web) access, alarms, graphics of all monitored and controlled equipment and systems, and programming tools for maintenance personnel.
17. Provide for future expandability in the DDC system.
18. Connect DDC system directly to equipment having integral controls with a communication interface for remote monitoring and control.
~~8.~~19. Consider requiring control contractor to inspect control system performance, confirm occupant comfort, and provide training 1 month prior to 1-year warranty date.

Premium:

20. Integrating maintenance management software with building automation software.
~~9.~~21. Providing ongoing building commissioning.
~~10.~~22. Connecting a permanent metering system to the building management system to track water and energy consumption, manage use, and identify opportunities for additional savings.
~~11.~~23. Establishing service contracts with control contractor with clearly stipulated and measurable performance requirements.
~~12.~~24. Re-commissioning systems two years after the school opens to ensure the energy conservation features are operating as intended and to adjust to increase efficiency.

0832 Other Automation

Required:

1. On Support buildings less than 5000sf, provide temperature controls (thermostats, etc.) using stand-alone, low voltage systems.
2. X.

Recommended:

3. Consider wireless versions where non-local control is needed.

Premium:

4. X

084 Fire Protection

0841 Riser & Equipment

Required:

1. Provide complete National Fire Protection Assoc (NFPA) 13 systems.
2. Do not recirculate fire sprinkler pump discharge to a potable water supply.
3. Provide a dedicated fire pump room with fire-rated construction, and door directly accessible to the outdoors or through a fire-resistant-rated corridor, per NFPA 20, for facilities with fire pumps.
4. Provide direct access from the fire sprinkler pump room.
5. Check with the AJH for special requirements related to fire panel types/locations and fire department connections (FDC).
6. Design sprinkler systems in conformance with local sprinkler ordinances.
7. Use cross contamination protection (i.e. backflow prevention) when connecting fire sprinkler system to potable water supply, including fire pumps.
8. Do not combine potable water and fire sprinkler water storage if practicable.

Recommended:

9. Consider using electric fire pumps if electric utility has sufficient capacity.
10. Consider installing diesel fire sprinkler pumps near other fuel-fired equipment for efficient fuel storage and distribution.
11. Consider fabricating all exterior building overhangs, walkways, balconies, porches, etc., of dimensions and/or materials to avoid fire sprinkler protection.
12. Consider nitrogen-generator for dry sprinkler systems, rather than air compressor only.

Premium:

13. X

0842 Sprinklers & Piping

Required:

1. Use Schedule 40 black steel pipe for threaded fittings.
2. Use galvanized Schedule 40 black steel pipe for dry pipe systems.
3. Avoid dry sprinkler systems as much as practicable.
4. Use dry heads at entry/exit vestibules on wet fire sprinkler systems.
5. Conceal fire sprinkler piping to the greatest extent practicable in occupied spaces.
6. Do not install exposed sprinkler piping below 10 feet above finished floor to the greatest extent practicable.
7. Standardize on sprinkler heads throughout building.

Recommended:

8. X.

Premium:

9. X

0843 Special Suppression Systems

Required:

1. Provide water mist fire sprinkler protection system designed to NFPA 750, where water mist is used in lieu of an NFPA 13 sprinkler system.
2. X.

Recommended:

3. X.

Premium:

4. X

085 Special Mechanical Systems

0851 Fuel Supply (Gas & Oil)

Required:

1. Utilize public fiber optic services if available.

Recommended:

2. X.

Premium:

3. X

0852 Dust Collection Systems

Required:

1. Provide dust collection systems designed to NFPA 68, 69 and 654, as applicable, in facilities with equipment producing combustible dust – vocational education, maintenance shop, etc.

Recommended:

2. X.

Premium:

3. X

0853 Compressed Air & Vacuum Systems

Required:

1. Compressed air and vacuum systems to have dedicated equipment rooms with limited access, constructed per the building code based on the type of gases stored.

Recommended:

2. X

Premium:

3. X

0854 Other Special Mechanical Systems

Required:

1. Provide lab exhaust hoods for labs and science rooms, with lighting, fan switch, retractable sash. Install other accessories as required by school district.
2. Install HVAC systems for swimming pools to maintain space temperature and humidity levels between 82°F to 86°F, and 50% to 60% relative humidity.

Recommended:

3. Use outside air only for pool room dehumidification, if possible, based on site climate conditions.

Premium:

4. X

E. Design Criteria & Ratios

Criteria

- Boilers should be designed to burn natural gas where available or #2 diesel fuel where not.
- Sinks or other plumbing shall not be provided in standard classrooms that serve grades 4 and greater.
- Ventilation systems shall be sized per the estimated room occupancy rather than the fire egress code occupancy.
- Maximum interior design temperature for ventilation system design shall be 75 degrees Fahrenheit or greater.
- Where operable windows are furnished, design of the ventilation system shall incorporate the cooling and ventilation capacity of the windows.
- Install building automation systems capable of being operated by school district personnel.
- Integrate monthly utility consumption records into integrated automation systems where possible.

Ratios

1. XX

09. ELECTRICAL

A. Building System Summary

Electrical systems are required to support nearly every function and purpose of the school facility and support and provide key safety functions with the school. The systems are highly integrated and are often highly automated. The department recognizes five sub-categories in this building system: **Service & Distribution**, **Lighting**, **Power**, **Special Systems**, and **Other Electrical Systems**. The sub-systems under these categories include a large variety of fixtures, devices, and equipment combined with several types of distribution components including low-voltage and normal-voltage wiring, conduit, raceway, and control components. The Electrical functions within a facility require broad

integration with other building systems such as **Site Electrical**, **Exterior Closure, Interiors**, and **Mechanical** systems.

B. Design Philosophy

Electrical systems shall be cost effective and will reduce initial construction costs as well as long-term energy consumption and operating costs. The systems shall be integrated with the design of the building plan and envelope to optimize performance and provide occupant comfort. The systems shall be durable, expandable, and easily maintained. Electrical systems shall comply with DEED-adopted energy codes.

Of all the building systems, a school facility's Electrical Systems have probably experienced the greatest increase in scope and cost over the last 20 years. With the integration of computers in education, first into the school and now into the classroom, the scope of network data systems has increased dramatically. A biproduct of the increased number of computers is a corresponding increase in the power systems required to operate the computers. An increase in the scope and complexity of other special electrical systems, in particular fire alarm and detection systems, has also increased the overall cost of electrical systems.

Since many of the electrical systems are required by code (power, lighting, and fire alarms), a baseline cost for Electrical is part of all school facility projects. However, cost savings opportunities still exist in the scope of these systems beyond the minimums established by codes and in the materials specified. It is important for the cost effectiveness of electrical systems to be evaluated on a life cycle basis where the operating and maintenance cost of the system is considered. Often, a more expensive lighting fixture will more than pay for itself over time by a reduction in power consumption.

Other optional electrical systems (security systems, phone/data systems, intercom systems) should be evaluated in the same manner as code-required systems. In addition to a life cycle analysis of the systems and their components, the optional systems should also pass a commonsense test. For instance, is it necessary for a four-classroom school to have an intercom system? Does it make sense for a school designed to house 50 students to have 75 data outlets?

C. Model Alaskan School

The Model Alaskan School includes a service disconnect, a main distribution panel, and subpanels all fed via various size conductor and both rigid, IMC, and flexible conduit. Lighting systems include pendent and surface mounted area lighting, task lighting, and emergency lighting. Lighting is controlled via occupancy sensors, manual, and automated controls. Power is distributed through sub-panels to feed receptacles of varying amperages, motors, and equipment. Special Systems include addressable fire alarm, data/telecom, public address intercom and at gym/stage, security to include intrusion detection and video surveillance, and hearing impaired classroom audio assist. Emergency backup power is provided via diesel generator complete with fuel storage and system interties. Acceptable alternatives are detailed in the construction standards that follow.

D. General

Required:

Electrical systems shall comply with the version of ASHRAE Standard 90.1 currently required by DEED, including amendments by DEED.

1. The building electrical systems encompass lighting, power, telecommunications, and electronic safety and security systems. These systems are for the purposes of life safety, user convenience, building and user security, occupant comfort, and educational delivery.
2. Electrical systems shall be designed in accordance with applicable codes and standards and shall conserve energy while also meeting the needs of the building and users.
3. The systems shall be integrated with the building programming, floor plan, and local District requirements to enhance and support the building's usefulness and longevity.
4. The systems shall be robust, expandable where feasible, and easily maintained.
5. Design shall meet present needs, with consideration given to future. Spare capacity or the ability to expand in the future should be evaluated within budgetary constraints.
6. Electrical systems should be considered for replacement based on age, condition, availability of parts, availability of support, and obsolescence.
7. For Special Systems, in the absence of code requirements, design should follow BICSI or similar standards to the extent possible.

091 Service and Distribution

0911 Main Distribution Panels & Switchgear

Required:

1. Size equipment for all building and site systems.
2. Locate equipment as close to the service entrance as practical to minimize the length of large feeders.
3. Use secondary distribution panels to consolidate panels and reduce the number of feeders running throughout the building.

Recommended:

4. Limit spare capacity to around 25% of physical breaker capacity or overall electrical capacity.
5. Provide surge protection at the main distribution panel, particularly on grids with lower reliability.
6. Provide metering with a network connection at the main distribution panel and any large distribution panels for accurate energy monitoring.
7. Allow listed series-rated systems to lower rating and cost of downstream panels and breakers.
8. Allow aluminum conductors on large feeders to lower project costs, if local District maintenance personnel are in agreement.

0912 Panels & Motor Control Centers

Required:

1. Locate panels away from student-occupied areas unless unavoidable. Try to consolidate in electrical rooms, storage rooms, or similar spaces. Coordinate locations during design and monitor during construction to maintain working clearance. Provide an equipment grounding conductor in all conduits containing line voltage conductors.
2. Provide a dedicated neutral conductor for all circuits requiring a neutral.

Recommended:

3. Feed lighting circuits from a single panel that can be monitored.
4. Limit spare capacity to around 25% of physical breaker capacity or overall electrical capacity.
5. Provide surge protection for panels primarily serving classroom and office receptacles, or telecom equipment.
6. Locate a panel in areas with high numbers of circuits required, such as the kitchen and mechanical rooms, to minimize the length of branch circuits and number of disconnects.

Premium:

7. Building-wide monitoring of all panels.

0913 Transformers

Required:

1. Size transformers for required load.
2. Avoid excessive transformer capacity and losses.
3. Coordinate with the electrical utility early in the project to identify delineation of work, particularly with respect to utility/medium-voltage transformers and circuit.
4. Vibration isolators are required where transformers may affect nearby spaces.

Recommended:

5. Consider using 120/208V where practical to avoid step-down transformers.
6. Utilize wall-mount or suspended configurations to maximize floor space.

Premium:

7. X

0914 Conduit & Feeders

Required:

1. X.
2. X.
3. X.

Recommended:

4. X.
5. X.

Premium:

6. X.

092 Lighting

Required:

1. Fixture types should be commodity level, commonly available, and cost effective to the extent possible. The use of custom/architectural fixtures, whether for general or decorative/accent lighting, should be limited to small areas of architectural interest and fit within budgetary constraints of the project.
2. Fixture source should be LED for efficiency and life expectancy unless design criteria justifies use of alternate sources.
3. Maintenance should be considered in fixture placement and selection. Fixtures should have field replaceable components, readily available replacement parts, and be installed in a manner that allows for access by local maintenance staff to clean, test, or repair.
4. Minimize the types of lamps to reduce inventory and replacement costs.
5. Provide fixtures that are easily relamped and cleaned.
6. Lighting levels shall be in accordance with Illuminating Engineering Society standards and Alaska Administrative Code (AAC). Lighting levels shall meet or exceed minimum recommended levels of the latest published version of the IES Handbook (25-65 age group) unless AAC requires higher light levels.
7. Emergency lighting/exit signs shall be provided in all code-required areas. Additional emergency lighting should be provided in areas with either increased risk of injury during an outage, or likelihood of persons unfamiliar with the space. These would include support spaces (electrical/mechanical/telecom rooms), large restrooms, conference/meeting rooms, kitchen, and similar.
8. Coordinate ceiling plan and lights with projectors and IT equipment.
9. Provide light emitting diode (LED) site lighting with zero cut-off fixtures where light trespass is unwelcome.
10. Provide lighting controls for dimming or multi-level light switching in educational spaces.
11. Install task lighting at instructional area wall surfaces where necessary.
12. Install LED fixtures or extended life lamps in areas with high ceilings where relamping is difficult.
13. Lighting control shall meet current codes at a minimum. Additional energy savings may be achievable with a more complex system but should be balanced with local maintenance capabilities and project budget constraints.
14. Minimum lighting control elements should include exterior photocell control, interior occupancy sensor control of applicable spaces, dimming of fixtures either through manual interface, daylight sensor input, or occupancy sensors, and multi-zone layouts for more functional use of spaces. Examples would be a separate teaching wall zone in classrooms, or multiple zones in a gym or multi-purpose room to allow for most lighting to be off while maintaining some visibility.

Recommended:

15. Consider control for site and corridor lighting systems with the direct digital control system or a lighting control system.
16. Consider direct/indirect fixtures in classrooms with 10'-0" ceilings or greater.

17. Track energy use through a building automation system (BAS) or local metering of the lighting panel.
18. Use dimmable site lighting with integral photocell/occupancy sensors to reduce energy use.
19. Use fixtures with integral controls where practical to reduce device count and cabling.

Premium:

20. Building-wide lighting controls with extensive individual control of fixtures or connection with other systems. CF-3 LCCA-2
21. Architectural fixtures outside of limited use noted above. CF-4 to 5 LCCA-3

093 Power

Required:

1. Provide adequate electrical capacity for future building expansion.
2. Specify variable speed/frequency drives on electrical motors. Coordinate requirements with Mechanical.
3. Specify a minimum of two (2) double duplex outlets (2 outlets per circuit) per classroom wall unless covered with cubbies/casework that makes them inaccessible.
4. Provide receptacle load control in private offices, computer labs, and open office areas per energy code requirements. Switch receptacles with lighting occupancy sensor.
5. Provide tamper-resistant and GFCI receptacles where required by code.
6. Provide dedicated circuits for 120V equipment and appliances equal to or greater than 10 amps of draw.
7. Provide power and data for electronic whiteboards or digital TVs in classrooms.

Recommended:

8. Consider using GFCI circuit breakers where maintaining ready access to GFCI receptacles may be difficult.
9. Limit general purpose circuits to 6 duplex outlets.
10. Limit high-draw areas (kitchen, break room/lounge, workroom, etc.) to 2 duplex outlets per circuit in areas with high concentrations of equipment.
11. Use floor boxes and power poles in areas where they serve a specific purpose, instead of general power distribution.
12. Avoid headbolt heater outlets over 50% of staff positions. Consider time or occupancy based control of these circuits.
13. Provide locations with dedicated circuits for laptop charging stations if programmed.

Premium:

14. Excessive receptacle counts, including surface raceway with high quantities outside of labs or workbenches where required.

094 Special Systems

0941 Fire Alarms

Required:

1. Code-minimum coverage for initiating and notification devices.
2. Code-required monitoring of mechanical equipment, generator, suppression systems, fire pump.
3. 24-hour monitoring service in areas served with a fire department.
4. Automatic dialer with local contacts in areas without a fire department.

Recommended:

5. Additional detection in areas with elevated risk of fire, such as storage rooms, kitchen, mechanical/electrical spaces, public restrooms.
6. Exterior notification on at least two sides of the building.
7. Low-frequency sounder/horn and high-candela strobe in areas that may be used for sleeping, even if occupancy is not called out for itinerant housing.

Premium:

8. Pre-action systems.
9. Full coverage detection.

0942 Data and Communications

Required:

1. Provide classroom ceilings with an outlet with voice/data capability and power for technology (if required, verify if PoE first)
2. Provide for wireless connectivity. Coordinate with IT for number and location of needed devices.
3. Provide minimum CAT 6 cabling–all horizontal cabling to be less than 295' in length.
4. Provide one (1) voice/data jack at each classroom wall unless inaccessible due to cubbies/casework.
5. During design development, provide layouts and cut sheets for all equipment requiring active electrical equipment to be built-in or purchased as part of movable equipment budget.
6. Provide cable pathways between all points.
7. Use plenum-rated cabling where distributed in open-air environments.

Recommended:

8. Provide fiber optic backbone between telecom rooms.
9. Provide Category 6A cabling to wireless access points.
10. Use J-hooks for smaller cable counts, consolidate into cable tray for larger counts.
11. Coordinate with Architect to minimize number of inaccessible conduit sleeves in cable pathway to telecom rooms.

Premium:

12. Raised floor raceway systems

13. Oversize cable tray systems.
14. PON or similar fiber distribution systems.

0943 Security Systems

Required:

1. Access Control: If a system is used, limit number of doors to main entry points, including front, playground, staff entry, and loading dock/kitchen. Office area may be controlled.
2. Intrusion Detection: Verify need/want with School District.
3. Video Surveillance System: Verify need/want with School District.
4. Secure Entry/Lockdown: Verify need/want with School District.

Recommended:

5. Use card readers or combination card reader/key pad.
6. Minimize use of key pad only, and if so assign unique codes to individuals. Do not assign a common code to a given door.
7. Use of a reader or button to initiate lockdown in the office should be provided. Lockdown should re-lock all doors, and release any magnetic door holders to seal off corridors/MPR/Gym, etc.
8. System should function independently if network connection is lost.
9. System should use standard readers, locks, and hardware to the extent possible to allow for migration to a different software.
10. Utilize a combination of door contacts, glassbreak sensors, motion sensors for intrusion detection.
11. Locate a keypad at main entry and staff or kitchen entry.
12. Provide either a 24-hour monitoring service or automatic dialer with local contacts (particularly if no local law enforcement agency exists).
13. Connect to lighting controls if used to switch on corridor/site lighting upon alarm.
14. System can monitor industrial alarms, but avoid redundancy with building control system.
15. Provide surveillance cameras at least at all major entry points and corridor intersections, with traffic in and out of the office covered.
16. Provide a workstation in the Principal's office for review/download of video, and a monitor in the main office.
17. In schools with a security officer, Assistant Principal, or other similar party, additional workstations should be provided for effective monitoring.
18. IK08 impact resistance is the minimum allowed for cameras that can be touched, or objects thrown at them from less than 10' away.
19. Playgrounds should be monitored.
20. Use multi-sensor or wide-angle cameras wherever possible to replace multiple cameras with a single camera.
21. IK10 impact resistance is recommended.
22. Video system can integrate with access control/intrusion detection to assist those systems.
23. Provide a lockdown button at the main office and security office. Lockdown should re-lock all doors, and release any magnetic door holders to seal off corridors/MPR/Gym, etc.

24. If lockdown is only used for duress (as opposed to abundance of caution such as non-custodial parent), button should call local law enforcement and/or alert District.
25. If lockdown and duress functions differ, provide two buttons.
26. Broadcast a coded message to classroom paging zone upon activation of button to alert teachers to lock doors.
27. Provide a controlled point at main entry to screen visitors, including intercom/camera.

Premium:

28. Card readers on interior doors except for the office area, particularly when used widely to eliminate keys.
29. Cabinet locks and similar where keys would normally be used.
30. Proprietary hardware (such as wireless locksets, hubs, etc.) that cannot migrate in case of software replacement.
31. Badging printers at every school in a District instead of centralized credentials.
32. Surveillance cameras at locations other than exterior doors, office, playgrounds, or corridors.
33. Interior cameras that exceed the ratio of 1 camera per 5,000 sf
34. Security camera systems that exceed 20 cameras for schools under 50,000 sf. For schools over 50,000 sf, add 2 cameras (one inside, one outside) per 5,000 sf.
35. Pan-tilt-zoom cameras, particularly without an active security officer.
36. Video walls, analytics packages if not justified, thermal or other specialty cameras.

0944 Clock Systems

Required:

1. Provide general paging throughout the building, with ability to page via phone system.

Recommended:

2. Provide multiple paging zones, including classrooms, corridors, exterior, support spaces. Consider a network-based solution with individual zones for each classroom.
3. Provide synchronized central clock system.

Premium:

4. Augmented/Virtual Reality Systems

0945 Intercom Systems

Required:

1. Provide general paging throughout the building, with ability to page via phone system.

Recommended:

2. Provide multiple paging zones, including classrooms, corridors, exterior, support spaces. Consider a network-based solution with individual zones for each classroom.
3. Provide synchronized central clock system.

Premium:

4. Augmented/Virtual Reality Systems

0946 Other Special Systems

Required:

1. Provide power and data for electronic whiteboards or digital TVs in classrooms.
2. Provide HDMI connection at teacher's desk for electronic media.
3. Provide sound system in Gym/MPR/Commons with speakers, microphones, media input (CD optional/Aux input), amplifier and digital signal processor/mixer.
4. Provide small sound system in Band/Orchestra/Choir for support of program.
5. Coordinate location of motorized screen controls with sound input, basketball hoops, stage controls, lighting, etc.

Recommended:

6. X

Premium:

7. Augmented/Virtual Reality Systems
8. Multiple fixed projectors in large spaces.
9. TV Walls instead of projector screens.
10. Digital Signage, Graphic Walls for decorative/accent purposes.

095 Other Electrical Systems

0951 Power Generation & Distribution

Required:

1. None

Recommended:

2. Use battery backup instead of an emergency generator. If a generator is included, design it for standby functions.
3. Consider a standby generator to support safety, security, and core building systems.
4. Locate the generator inside of the building, or in an equipment enclosure instead of a walk-in module to preserve square footage.

Premium:

5. Photovoltaic arrays or systems
6. Electrical wind generators
7. Standby generator beyond critical systems.
8. Walk-in generator modules or buildings.
9. Excessive capacity, either electrically or physical.
10. Redundant generators or bypass isolation automatic transfer switches.

0952 Electrical Heating Systems

Required:

1. X.

Recommended:

2. X.
3. X.
4. X.

Premium:

5. X.
6. X.

0953 Grounding Systems

Required:

1. X.

Recommended:

2. X.
3. X.
4. X.

Premium:

5. X.
6. X.

D. Design Criteria & Ratios

Criteria

- Fluorescent light fixtures should be utilized whenever possible in lieu of incandescent or other lamp types
- Lighting control options should be evaluated on a life cycle basis
- Computer data ports and related outlets shall be laid out as they are to be used, not as they might be used in the future
- Power wiring and service shall be size per the present electrical demand of the facility rather than to meet perceived future demands.

Ratios

2. XX

010. EQUIPMENT & FURNISHINGS

A. Building System Summary

The **Equipment & Furnishings** of school buildings consist of the educational program and support equipment physically connected to the facility or its support systems. It also includes furnishings that are fixed or integral to the building. The department recognizes two sub-categories in this building system: **Equipment** and **Furnishings**. Equipment in this category is normally incorporated into load

calculations by engineering disciplines and installed by a contractor using one or more trades. Furnishings in this category are of traditional types (chairs, bookcases, tables, etc.) but that are built-in or affixed to the facility. The **Furnishings** category fits in a niche between **Specialties** in **06. Interiors** and moveable fixtures, furnishings and equipment (FF&E). Lockers, casework, display cases, bleachers and window coverings are all examples or items covered in **Specialties**. For additional information and standards on FF&E, see the department's publication ***Guidelines for School Equipment Purchases***.

B. Design Philosophy

Cost effective school construction requires detailed design coordination between the school's building systems and the **Equipment** and **Furnishings** needed to deliver and support education. Items in this section include those that have proven to need a moderate to high level of integration to meet their intended function, and to avoid changes during construction. The building technology and educational technology elements deserve a special note as components related to these areas are changing rapidly from year to year with new technology resulting in faster, lightweight, affordable, and portable "plug-in" equipment. The State expects schools to take advantage of the latest technology that can simplify building systems and lower installed technology costs. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes a selection of athletic equipment (main and secondary basketball goals, volleyball floor inserts, chinning bar, pegboard), food preparation (refrigerator, freezer, convection oven, range and hood, under-counter fridge), laundry equipment (stacked washer and dryer), classroom equipment (projection screens, window blinds), and entry mats. Associated with special electrical systems, the model also provides for classroom and gym/stage audio visual systems. Associated with plumbing systems, the model provides for three-compartment sink, handwash sink, and grease interceptor. Acceptable additional items and alternatives are detailed in the construction standards that follow.

101 Equipment

1011 Food Service & Kitchen Equipment

Required:

1. Provide equipment for basic food preparation and cleanup for student lunch preparation of up to 40 meals/day in all school facilities to include appropriately sized items from the following categories:
   - Reach-in refrigerator
   - Reach-in freezer
   - Combi steam/convection oven
   - Commercial range
   - Wall-mounted shelving
   - Dishmachine
   - Mop sink cabinet
   - Type 1 vent hood

   (Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)

2. Provide equipment for full-service food preparation and cleanup for student lunch preparation of over 40 meals/day. Size and select equipment based on DEED-reviewed kitchen design from the basic equipment list and the following categories:
   - Walk-in refrigerator
   - Walk-in freezer
   - Steam kettle
   - Braising pan
   - Production steamer
   - Fryer
   - Ice maker
   - Type 2 vent hood(s)

   (Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)
3. Provide other support equipment that is mobile/moveable and plugs into standard receptacles as FF&E. Items below are considered FF&E; see Building System Summary preceding:
   - Prep appliances (mixer, slicer, etc.)
   - Cooking appliances (microwave, toaster)
   - Mobile hot/cold serving tables
   - Mobile heating cabinets
   - Multi-tier shelving units
   - Mobile prep/work tables
   - Mobile transport carts
   - Pots/pans/utensils

Recommended:

4. Consider providing equipment for a warming/cooking kitchen only when the district provides a central kitchen to include:
   - Reach-in refrigerator
   - Reach-in freezer
   - Convection oven
   - Wall-mounted shelving
   - Mop sink cabinet
   - Type 1 vent hood

   (Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)

Premium:

5. Equipment for full-service food preparation in districts which operate a central kitchen.

1012 Athletic Equipment

Required:

1. Provide ceiling or wall-mounted basketball backboard/hoops at competition court; motor-operated raise/lower.
2. Provide floor inserts for volleyball standards/nets.
3. Provide a multi-sport wall-mounted score board opposite each set of bleachers.

Recommended:

4. Consider secondary, wall-mounted basketball backboards/hoops at recreational courts; motor operated raise/lower.
5. Consider mat hoists where wrestling programs are established.
6. Consider ceiling mounted gym curtains to support multiple concurrent programs; motor-operated raise/lower.
7. Consider ceiling-mounted climbing ropes.
8. Consider chinning bar(s), peg climbing board, and other wall-mounted fitness equipment requiring structural support.

9. Consider a motor-operated projection screen.
10. Consider a high-capacity washer and dryer.

Premium:

11. Whirlpools or ice-bath equipment.
12. Saunas

1013 Career & Technology Equipment

Required:

1. Provide the following woodworking equipment in floor-standing models: 10in table saw with 'saw stop' technology, 12in band saw, 1hp drill press. (Other benchtop and plug-in equipment will be provided as FF&E)
2. Provide the following metal working equipment: welding station/booth, 1hp milling machine/lathe.

Recommended:

3. Consider additional woodworking equipment to include: lathes, router/joiner, and belt/disc sanders.
4. Consider additional metal working equipment to include: sheet metal brake, and grinders.
5. Consider moving all equipment to portable, tabletop, 110v for small programs and additional flexibility. All such equipment would be provided as FF&E.
6. Consider medium format 4ftx8ft CNC machine.
7. See Section *0721 Elevators and Lifts* for provisions associated with vehicle lifts.

Premium:

8. See Section *0733 Hoists and Cranes* for premium limitations.

1014 Science Equipment

Required:

1. [See Section *0652 Casework/Millwork* for fixed lab tables.]
2. Provide one 36in fume hood.

Recommended:

3. Consider a 48in fume hood for larger programs; demonstration type or double sided.
4. Consider a commercial undercounter dishwasher at Science Storage/Prep.

Premium:

5. Fume hoods larger than 48in.

1015 Library Equipment

Required:

1. Provide a book drop with catch bin; free standing or built-in to casework.
2. Provide book stacks in a combination of wall perimeter (5-6 shelf) and freestanding (2-3 shelf) for approximately 50 volumes/student capacity. Laminate finish. [Note: Other book display shelving to be FF&E; all seating, tables and other loose furnishings to be FF&E.]
3. Provide a motor-operated projection screen.

Recommended:

4. Consider wood veneer on book stacks in libraries serving any secondary grades.

Premium:

5. TBD

1016 Theater Equipment

Required:

1. Provide motor-operated projection screen.
2. Provide motor-operated stage curtain.

Recommended:

3. Consider fixed overhead rigging for stage curtains, sets, and lighting.
4. Consider stage lighting system including fixtures and control board.
5. Consider auditorium audio/visual system including building-mounted elements such as speakers, projectors, etc. (Note: all rack-mounted components and hand-helds will be FF&E.)

Premium:

6. Orchestra pit equipment

1017 Art Equipment

Required:

1. [None required.]

Recommended:

2. Consider up to two gas-fired kilns.
3. Consider heavy-duty clay mixer.
4. Consider electric pottery wheels; quantity for anticipated class size.

Premium:

5. Darkrooms for chemical film/print processing.

1018 Loading Dock Equipment

Required:

1. [None required.]

Recommended:

2. Consider bin-size recyclable baler and multi-waste compactor.
3. Consider providing fixed commercial compactor chute (to align with vendor provided compactor and waste service).
4. Consider dock bumpers where elevated truck loading/unloading occurs.

Premium:

5. Dock leveler systems.

1019 Other Equipment

Required:

1. [None required.]

Recommended:

2. Consider kitchenette at Special Needs Life Skills areas with residential type refrigerator, range, over range microwave, and dishwasher.
3. Consider high-capacity washer and dryer at Intensive Needs program area.
4. Consider ceiling mounted plates/eye bolts at OT/PT program area.

Premium:

5. Plumbed and hardwired commercial equipment at 'student store' unless specifically supported by curriculum in an approved educational specification.

102 Furnishings

1021 Fixed Furnishings

Required:

1. Provide benches at building entry vestibules/lobby in the parent pick-up/drop-off zones; secure to floor.

Recommended:

2. Consider built-in benches/seating at Library and Elementary Classroom.

Premium:

3. TBD

1022 Mats

Required:

1. Provide walk-off grates/mats at entry vestibules.

Recommended:

2. TBD

Premium:

3. TBD

1023 Other Furnishings

Required: Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

011. SPECIAL CONDITIONS

[The following Site and Infrastructure language was added by department Facilities staff in the 3/8/21 draft version.]

A. Building System Summary

The **Special Conditions** related to school buildings consist of both special purpose facilities and project conditions that bridge across, rather than fitting within, several of the core building systems. The 'system' deals with the installation, removal, or relocation of integrated or self-contained support buildings, and with site conditions that, while altering the site, do not install utility or improvement features. Generally, all elements related to hazardous materials and conditions are included within this system. The department recognizes three sub-categories in this building system: **Special Construction**, **Special Demolition**, and **Special Site Conditions**. Special Construction includes three specific use-types. Special Demolition includes all demolition work from entire buildings to selective building elements and utilities. It also captures hazmat associated with that demolition. Special Site Conditions deals with management of site conditions for both effective construction execution and long-term building operations. Remediation work for sites is also captured. **Special Construction** will overlap nearly all building system sections **02** through **09** depending on complexity, as will **Special Demolition**. The **Special Site Conditions** category abuts **01. Site & Infrastructure** categories but should not have much, if any, overlap.

B. Design Philosophy

Cost effective school construction can sometimes be enhanced by isolating special facility uses such as greenhouses or various types and combinations of utility modules and providing them as separate facilities. These solutions, while more common in remote school locations, are not automatic for any project and should be based on solid value analysis. Similarly, selective, and whole building demolition work occurs across a range of scope and possibility. Final project solutions should be driven by options analysis supported by accurate life-cycle costing. Site conditions can have a significant impact on cost effective school construction. Factors such as topography, erosion, proximity to natural hazards, wetlands, site drainage, and flooding must be properly evaluated in the project planning phase. The department's publication ***Site Selection Criteria and Evaluation Handbook***, provides guidance and tools in these areas. The State expects school districts to thoroughly evaluate **Special Conditions** that can simplify building systems and lower construction costs. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes site preparation work that aligns with Special Site Conditions of this section to include clearing and grubbing, survey and layout, SWPPP, excavation, geotextiles, fill, and compaction work. While the full ***Program Demand Cost Model for Alaskan Schools*** does include estimating elements for demolition and hazardous materials conditions, its Model School Escalation file does not. Primarily this is due to these elements being dependent on specific project environments and conditions. Acceptable additional items and alternatives are detailed in the construction standards that follow.

111 Special Construction

1111 Packaged Utility Modules

Required:

1. Provide packaged utility module supporting any of the following functions in locations where site-constructed solutions are less cost effective: fire suppression, heating plants (i.e., oil and wood-fired boilers, etc.), power generation, walk-in refrigerator/freezers (CF-3 LCCA-1).

Recommended:

2. Consider including electrical services in conjunction with utility modules providing heating plants (CF-3 LCCA-1).

Premium:

3. Packaged utility modules with utility runs to the supported facility that exceed 40ft.

1112 Swimming Pool

Required:

1. Swimming pools are supported as school space under AS 14.11 under certain conditions. Refer to the most current department publication *Swimming Pool Guidelines for Educational Programs*.

Recommended:

2. Consider construction of swimming pools in support of the educational program where the capacity exists to meet the above average operations and maintenance costs of such facilities over time.
3. Consider partnering with related municipal and borough entities in sharing the cost of initial capital, O&M, and capital renewal costs though a joint use agreement (ref. 4 AAC 31.020(g)).

Premium:

4. Swimming pool tank sizes, amenities, and resulting facilities not supported under statute and regulation.

1113 Greenhouse

Required:

1. None required. [Note: Greenhouses are considered school space under 4 AAC 31.020.]

Recommended:

2. Consider building-attached greenhouse spaces when such spaces can meet the educational program being provided (ref. ***0142 Attached Shelters***).
3. Consider freestanding greenhouses in support of the educational program where the capacity exists to meet the above average operations and maintenance costs of such facilities.

Premium:

4. Greenhouse space which is beyond the allowable gross square footage in the attendance area (ref. 4 AAC 31.016 and 4 AAC 31.020).

112 Special Demolition

1121 Structure Demolition

Required:

1. Provide demolition of existing schools which are no longer cost effective to repair and or transfer to another entity when approved for replacement as part of an application for state-aid under AS 14.11 (CF-3 LCCA-1).
2. Provide demolition of state-owned abandoned school sites as part of the development of new schools, replacement schools, or additions/renovations to existing schools.
3. Secure permits for local disposal (i.e., one-time monofill on state-owned or district-owned property), on property owned by others by agreement, or in approved local landfills.

Recommended:

4. Consider the demolition of education support facilities that have exceeded their useful life and cannot be renovated for additional use(s).
5. Consider removal of demolition waste to a landfill in Alaska or outside of Alaska when local disposal options have been exhausted (CF-3 LCCA-1).

Premium:

6. Demolition of any structure not accepted as an *education related facility* and approved by the department.

1122 Building Selective Demolition

Required:

1. Provide selective demolition in support of approved new work or renovation.
2. Secure permits for local disposal in approved local landfills.

Recommended:

3. Consider removal of demolition waste to a landfill in Alaska or outside of Alaska when local disposal options have been exhausted (CF-3 LCCA-1).

Premium:

4. Any selective demolition not accepted as part of an *education related facility* and approved by the department.

1123 Site & Utility Demolition

Required:

1. X

Recommended:

2. X

Premium:

3. X

1124 Hazardous Material Removal

Required:

1. X

Recommended:

2. X

Premium:

3. X

1125 Building Relocation

Required:

1. X

Recommended:

2. X

Premium:

3. X

113 Special Site Conditions

1131 Site Shoring & Dewatering

Required:

1. X

Recommended:

2. X

Premium:

3. X

1132 Site Earthwork

Required:

1. X

Recommended:

2. X

Premium:

3. X

1133 Site Remediation

Required:

1. X

Recommended:

2. X

Premium:

3. X

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Site Selection Criteria and Evaluation Handbook

P U B L I C A T I O N C O V E R

July 21, 2021

Issue

The department is alerting the committee that it has initiated an update of the *Site Selection Criteria and Evaluation Handbook*.

Background

Last Updated/Current Edition
Publication last updated in 2011. Current edition available on the department's website (education.alaska.gov/facilities/publications/SiteSelection.pdf). The publication includes a companion scoring matrix tool using the Microsoft Excel platform.

Summary of Proposed Changes
The department started the update of this publication with a validation assessment. On March 19, 2021, the department produced a nine-question survey and solicited feedback using the Facilities listserv and direct e-mail. 17 entities responded to the survey.

Based on the survey results (see Validation Survey following), the publication remains valid for DEED school capital processes and is expected to continue to be useful for an additional five years. Comments were general in nature and supported a straightforward update of the prior publication (see Input and Discussion below for additional detail).

Version Summary & BRGR Review
The initial draft update is provided for committee review and support is requested for a period of public comment. A final publication is anticipated in September.

BRGR Input and Discussion Items

Below are questions and comments developed by DEED during the revisions of this draft. Statements on how the update responds to each follow for consideration by the BRGR Committee:

- Increase applicability where possible for use on remote communities with limited site alternatives;

  Response: no specific revisions were made in response to this comment. Flexibility in use of the tool was adequately referenced (see pg. 1 *Overview*, pg. 2 *Site Selection Elements*, and pg. 5 *Ranking Criteria Elements*).

- Provide additional details regarding parking allocations/needs based on school facility size;

  Response: This may have been a result of a misunderstanding regarding the table under *Size of Site*. Elements listed in that table are not indexed to the school facility gross square

footage (GSF). Clarifying language was added. When the Design & Construction Standards are published, some metrics may be included that index allowable site improvements to student populations or school GSF.

- Update to conform to current regulations regarding site approval and acquisition;

  Response: A review of recent revisions to 4 AAC 31.025 Site Selection and Approval did not yield any required updates or changes. (Recent changes in that section dealt primarily with the sequence of approval and the start of construction or site purchases.)

- Update sample documents and illustrations;

  Response: Sample documents were reviewed and a call issued for updated graphics. DOT/PF provided a more clear copy of the existing Suburban School Site graphic at Appendix C. Other graphics remained as is.

- Review of Traffic and Access criteria provided by DOT/PF;

  Response: The Statewide Traffic Engineer and Central Region's Traffic Engineer did a hard scrub of the related elements and offer several clarifications.

- Ensure the document and supporting tools meet accessibility standards.

  Response: This requirement was accomplished.

Suggested Motion

I move that the Bond Reimbursement and Grant Review Committee approve the updated *Site Selection Criteria & Evaluation Handbook* [as presented] [as edited] for a period of public comment.".

Site Selection Criteria and Evaluation Handbook

CONTRIBUTORS

~~Sam Kito III~~Tim Mearig, ~~P.E.~~Architect
Facilities ~~Engineer~~Manager
Alaska Department of Education and Early Development
Juneau, Alaska

Scott Thomas, P.E.
Alaska Department of Transportation and Public Facilities
Anchorage, Alaska

ACKNOWLEDGEMENTS

Thanks to the Bond Reimbursement and Grant Review Committee members who reviewed the publication in its draft form and to those at the Department of Transportation and Public Facilities, Division of Facility Procurement Policy Division who were responsible for the predecessor to this document. Special thanks to Sam Kito III, PE~~Tim Mearig, AIA~~, Edwin Crittenden, FAIA and Michael Morgan, PMP who shepherded earlier versions of this document through to completion.

This publication was originally adapted from a November 1978 document published by the State of Alaska Department of Transportation and Public Facilities, Division of Facility Procurement Policy, entitled *Site Selection Criteria and Evaluation Guideline for Educational Facilities in Rural Alaska*.

Table of Contents

Introduction 2
Overview 2
Authority 2
Basic Procedures 3
Site Selection Elements 3
Weighting Factors (WF) 3
Applying Ranking Criteria 4
Tabulating and Analyzing Results 4
Ranking Criteria Elements 5
The Evaluation Report 25
Introduction and Executive Summary 25
Maps and Graphics 25
Evaluation Matrix and Narratives 25
Appendix A Site Evaluation Matrix 26
Social and Land Use Factors 26
Construction Cost Factors 27
Maintenance and Operating Cost Factors 28
Site Evaluation Summary Table 28
Appendix B Sample Site Graphic Analysis 29
Appendix C Suburban School Layout 30

Introduction

Overview

The perfect school site can be envisioned as generally level with some topographic interest, having complete utilities, stable, well drained soils, excellent road and pedestrian access, protection from excessive weather patterns, with ample space for school facilities, playground and sports fields. The site would be accessible to present and future populations and be free of any natural or environmental hazards. It would be removed from undesirable business, industry and traffic hazards but be convenient to important public facilities and recreational/outdoor learning areas. In most communities, however, the perfect site is elusive and difficult to find.

School siting is also a serious public policy decision. Land availability, land use, public sentiment and other community issues can have dramatic influence on site selection. In any site selection process, local involvement and judgments regarding the relative significance of selection criteria are important.

This Site Selection Criteria Handbook was developed with flexibility in mind~~,~~ and can be used by school districts to perform a site selection analysis for any school facility by carefully selecting the appropriate criteria and weighting factors. Districts can use this guide for analysis of site opportunities for elementary schools, secondary schools, charter schools, alternative schools and special purpose facilities.

Finally, site selection for school facilities has a direct and lasting impact on the resources of the State of Alaska. Both the economic resources and the natural resources of the state are affected by the construction and operation of public schools. Primarily in response to these factors, the state recognizes the need for careful and thorough evaluation of school sites.

Authority

The guidelines incorporated in this handbook have been developed to give assistance and direction to Alaska school districts and communities in determining the suitability of various building sites for educational facilities planning. They are based upon AS 14.11.013 and 14.11.100, which provides for department review of projects to ensure they are in the best interest of the state. This provision is further developed by regulation 4 AAC 31.025 which requires approval of educational facility sites under paragraph (a) and investigations by the appropriate local governing body for suitability in paragraph (d). This handbook establishes the basic considerations for an adequate site selection process. Other products of similar detail may be used to fill the requirements laid out in statute and regulation.

Basic Procedures

Site Selection Elements

This handbook establishes a set of basic site selection elements and offers suggested evaluation criteria for rating the elements. Although the document does incorporate an internal weighting factor (it lists a few key ranking criteria elements which have high--cost impacts in more than one sub-category) it does not prescribe the importance of most selection elements but rather, incorporates a weighting system whereby a district or community can assign a range of importance to each element. It is recognized that information for all the elements cannot always be determined nor are all elements applicable to every site. However, detail and rigor in addressing the elements is important for an effective evaluation.

The selection elements are grouped into three major categories as follows:

1. Social and Land Use Factors

2. Construction Cost Factors
    a) Soils/Foundations
    b) Utilities
    c) Other

3. Operations and Maintenance Cost Factors

The site selection elements form the basis for an evaluation matrix which is shown in **Appendix A** and is available as a spreadsheet on the department's website. The first step in the process is to review the matrix elements for applicability to the project and sites being considered.

Weighting Factors (WF)

After identifying the site selection elements, the next step is to assign weighting factors to each element. Assignment of the weighting factors is the district/community's opportunity to apply its values to the evaluation process so that the final scores for each site reflect issues involved at the local level. This is often accomplished through community surveys, public meetings and other forums for developing consensus among the parties affected by the school project. A suggested model for the district/community weighting factors is shown below:

Weighting Factors
1 = not very important
2 = somewhat important
3 = important
4 = very important
5 = essential

Applying Ranking Criteria

Following the assignment of the weighting factors, each selection element is evaluated according to established criteria and ranked on the simple five-point scale from 0 to 4. The detailed ranking criteria to be used, which differentiates as needed between rural and urban sites, is described following this section on **Basic Procedures**. The table below gives a suggested definition of each ranking score:

Criteria Ranking Scores
0 = unacceptable (least desirable/least cost effective)
1 = poor
2 = fair
3 = good
4 = excellent (most desirable/most cost effective)

Tabulating and Analyzing Results

Using the Site Evaluation Matrix (Appendix A) enter the criteria ranking scores for each element. Compute the total score for each site by multiplying each criteria score by the weighting factor and sum them. An example of a portion of the Site Evaluation Matrix is shown below:

Maintenance and Operating Cost Factors

Criteria	WF	**Site 1**	S1 x WF	**Site 2**	S2 x WF	**Site 3**	S3 x WF	**Site 4**	S4 x WF
Site Drainage	3	4	12	3	9	3	9	n/a	n/a
Flooding	4	4	16	4	16	2	8	n/a	n/a
Site Erosion	4	3	12	3	12	3	12	n/a	n/a
Sun Orientation	2	2	4	1	2	1	2	n/a	n/a
Protection from Elements	2	3	6	3	6	2	4	n/a	n/a
Proximity to Natural Hazards	4	0	0	3	12	4	16	n/a	n/a
Alternative Energy Sources	3	1	3	1	3	2	6	n/a	n/a
Air Inversions/Katabatic Winds	2	4	8	4	8	4	8	n/a	n/a
TOTALS			61		68		65		n/a

The total scores for each site represent a detailed analysis; the highest score should indicate the most desirable site. If the district or community, based on factors not captured by the evaluation, desires to choose a site other than the site receiving the highest score, a narrative justification of this position will need to be developed for inclusion in the site selection report.

Ranking Criteria Elements

The following ranking criteria elements provide specific guidance to school districts in establishing a score of each associated ranking element. If a particular district has a particular criteria that is not included in the ranking criteria listed below, but is important to the district in determining the acceptability of a school site, then the district can utilize the spreadsheet available on the department's website to add that criteria to the scoring matrix. Because the department reviews and approves site selection decisions made by a school district, the department will need to be consulted if additional criteria are proposed for a site selection analysis.

Size of Site

Criteria:
The specific criteria listed below have been adapted from the *Council of Educational Facility Planners International Creating Connections Guideline*.

Selection of a school site involves many variables, all of which cannot be captured in a basic metric such as the one shown below; however, the tool below can be helpful for identifying the approximate site size necessary to accommodate a district's proposed school facility. For assistance with estimating a size, or a quantity (vehicles/buses) for a particular use contact the department, or consult with a design professional.

Use	Typical Size	Actual Estimated Size
Building Footprint	Varies	
Service Area (3 dumpsters/recycling bins, loading and turning area for two trucks)	8,000 SF	
Bus Drop-off/Pick-up (including space for angled parking and driveways with appropriate turning radius)	5,500 SF/bus	
Bus Drop-off/Pick-up (parallel loading at sidewalk)	650 SF/bus	
Car Drop-off/Pick-up	250 SF/car	
Vehicle Parking	285 SF/space	
Paved Outdoor Play Area	4,500 SF (varies)	
K-2 Playground Equipment Area	3,200 SF (varies)	
3-5 Playground Equipment Area	3,200 SF (varies)	
Outdoor Learning Area	Varies	
Grassy/Natural Play Area	Varies	
Football Field	88,000 SF	
Football Field with track and field event space	225,000 SF	
Soccer	106,000 SF/field	
Total Net Square Footage		
Net to Gross Factor (10% for larger sites varying to 30% for small sites to accommodate walkways and buffers between activity areas)	10%-30% of net square footage	
Total Useable Area Required		
Number of Useable Acres Required (divide total useable area required by 43,560 SF/acre)		

See next page for evaluation criteria

Evaluation (for Site Size Criteria):	Scores:
Site size is within 30% of the calculated programmatic space requirements for the proposed facility	0
Site size is within 20% of the calculated programmatic space requirements for the proposed facility	1
Site size is within 10% of the calculated programmatic space requirements for the proposed facility	2
Site size is adequate to meet the calculated programmatic space requirements for the proposed facility	3
Site size exceeds the calculated programmatic space requirements for proposed facility and provides room for building expansion and/or activity use expansion	4

Proximity to Population to be Served

Criteria:
Ideally, all students served by the school would be in convenient, safe walking distance to the site. In communities with roads, convenient vehicle/bus travel is also important. Evaluate this criterion using the anticipated population distribution when the school is at capacity (i.e. 5 year post-occupancy). Use the following standard, evaluating for both elements and using the lowest score:

- 50% of students served are within reasonable walking distance (i.e. ¼ mile or less) and,
- 90% of students served are within a 15 minute vehicle/bus ride

Evaluation:	Scores:
Proximity of student population is 40% or more below standard	0
Proximity of student population is within 20% of standard	1
Proximity of student population is within 10% of standard	2
Proximity of student population is equal to standard	3
Proximity of student population is 10% or more above standard	4

Proximity to Future Expansion of Community

Criteria:
Occasionally, schools are constructed on sites that within 20 years are no longer adjacent to population centers and/or residential areas. This criterion assesses long-range planning and land use factors related to school sites. Use a subjective evaluation of how well the site corresponds to future expansion and land use in the community to score this criterion. Answer the question, "Is this a good long-term site for a school?"

Evaluation:	Scores:
Incompatible with future expansion	0
Significant variances with future expansion	1
Some variances with future expansion	2
Corresponds well with future expansion	3
Corresponds ideally with future expansion	4

Proximity to Important Existing Facilities

Criteria:
In some instances, a district/community can identify an existing facility (e.g. swimming pool, food service, etc.) which is shared between multiple schools and to which close proximity is essential or desired. If more than one facility is important, this criterion may have to be scored multiple times. In most cases the adjacency is important because it involves student transit. Use the following standard:

- students served are within a short walking distance to important existing facilities (i.e. 1/8 mile [660ft.] or less)

Evaluation:	Scores:
Proximity of school is 40% or more below standard	0
Proximity of school is within 20% of standard	1
Proximity of school is within 10% of standard	2
Proximity of school is equal to standard	3
Proximity of school is 10% or more above standard	4

Year-round Accessibility

Criteria:
Ideally, the site should be easily accessible during all times of the year regardless of weather and temperature effects on paths, walks or roads. In some communities, access may improve during winter due to frozen water/wetlands. In other communities, winter may cause the most difficult accessibility problems. Evaluate this criteria assuming standard amenities for site accessibility are provided (i.e. walks, roads, bridges, etc.). Costs for providing these amenities should be covered in other criteria.

Evaluation:	Scores:
Site is inaccessible during certain times of the year	0
Access is routinely interrupted by weather/temperature conditions	1
Access is periodically over swampy, unstable soils	2
Typically year-round well drained ground/road access	3
Fully accessible; only severe storms may temporarily hinder access	4

Site Topography

Criteria:
Ideally, the site should be fairly level with some topographic relief that can provide opportunities for learning area development. In some communities, choice of level property may not be available, so consideration should be given to the side that best meets the programmatic needs of the facility. Evaluate this criterion by considering the types of amenities required for the facility (i.e. playground/play area, soccer field, track, basketball court, etc.). Costs for providing these amenities should be covered in other criteria.

Evaluation:	Scores:
Site contains significant topographic relief, and cannot accommodate anticipated uses	0
Site is not level, and can only accommodate a limited number of anticipated uses	1
Site is not level, but can still accommodate all anticipated uses	2
Site is mostly level and can accommodate all anticipated uses	3
Site is level and can accommodate all anticipated uses	4

~~<<<<BEGIN TRAFFIC AND ACCESS RELATED CRITERIA>>>>~~

Traffic Impact, Access Needs

The following five criteria relate to traffic and access issues that may affect a potential school site. A thoughtfully situated site will allow walking, busing and driving access while minimizing crash risk between those modes of travel as well as mainline traffic. The criteria address capital and maintenance needs for road function, sight distance, access and circulation, walking routes, school zones, turn lanes, and traffic signals. The following five criteria are especially important to consider in urban and suburban site selection processes where inadequately addressed traffic issues can result in safety concerns for students.

Road Access

Criteria:
Evaluate site access options. Access to the school site from minor arterials and collectors is more compatible than access from high speed or high volume road corridors or a low volume neighborhood residential street. Consider traffic speed and volume at the point of driveway access. Request DOT/PF or local agency assistance for roadway classification and traffic volume information, even for remote areas if registered vehicles are present.

Evaluation:	Scores:
Driveway access from National Highway System, Principal Arterial, or Interstate	0
Driveway access from a low volume internal residential-only street	1
Driveway access from a Major Arterial roadway	2
Driveway access from a Minor Arterial roadway	3
Driveway access from Local Road or Collector (not generally a low volume residential-only street)	4

Visibility, ~~s~~Safety of ~~d~~Driveways

Criteria:
Driveways have the potential to create conflicts when vehicles enter the roadway, particularly where slopes, curves or obstacles prevent good sight distance. The potential for conflicts can be reduced through provision of proper sight distance and traffic control devices. Evaluate sight distance at existing intersections and identify changes that may be required to provide adequate sight distance. Request DOT/PF or local agency assistance for help reviewing minimum intersection sight distance.

Evaluation:	Scores:
Adequate intersection sight distance cannot be provided or is very difficult to provide.	0
n/a	1
Adequate intersection sight distance can be provided but requires clearing and/or earthwork.	2
n/a	3
Adequate intersection sight distance can be provided without any major work.	4

Driveway Conflicts and Internal Circulation

Criteria:
Driveway access options are limited by roadway frontage. The greater the frontage along a road, or along adjoining roads, the greater the likelihood that multiple driveways will provide options for internal site circulation of vehicular traffic (buses, visitors, students and faculty), pedestrians and bicycle traffic. Evaluate driveway access and internal circulation options. For information on how driveway separation requirements improve circulation, contact DOT/PF.

Evaluation:	Scores:
Road frontage ~~limits access to one driveway; site~~ *restricts* driveways and requires multiple travel modes to share the same access with undesired conflicts. Site~~or~~ *limits* internal ~~site~~ traffic circulation options and requires mixing of travel modes.~~, or driveways and access frontage is insufficient for multiple modes of access~~. On-site storage is insufficient and will lead to undesirable queuing on the adjacent roadway.	0
~~n/a~~Some, but not all of the above factors apply.	1
Road frontage limits driveway access options and requires some mixing of travel modes with acceptable conflicts.~~;~~ ~~site~~ Site *allows* internal ~~site~~ traffic circulation options~~. Frontage limits multiple modes of access~~ but not complete separation of each mode. On-site storage is *a concern* and could lead to less desirable queuing on the adjacent roadway.	2
~~n/a~~Some but not all of the above factors apply.	3
Road frontage ~~wide enough~~is *sufficient* for multiple driveways ~~and other~~to separate conflicts between non-compatible modes of travel~~;~~. ~~site~~ Site *allows* internal ~~site~~ traffic circulation options with segregation or buffers for each mode. On-site storage is *adequate*; no queuing is expected on the adjacent roadway~~.~~	4

Safe Routes to School for Pedestrians and Bicycles

Criteria:
Safe walking routes enable students within a short distance of the school the option to walk or ride bicycles. Minor collectors and local roads with easy access to the school are best for student pedestrians and bicycles. Roads with a significant amount of traffic act as barriers to students, will require traffic control devices (signs, signals, crossing guards) and can result in conflicts ~~when~~ if students make poor crossing decisions. Evaluate the local walking conditions and changes necessary to improve safety for students.

Evaluation:	Scores:
No walking routes are available, nor can reasonable routes be constructed.	0
Walking routes can be constructed, but significant pathway work is required. Traffic control devices could be extensive, requiring tunnels, bridges, or signalization.	1
Walking routes can be constructed at-grade without major right-of-way or road work.	2
Existing walking routes are suitable for 1/4 to 1/2 mile travel. ~~A s~~School zone signs, a crosswalk, or a beacon system may be required.	3

Ranking Criteria Elements

Evaluation:	Scores:
Existing walking routes are suitable for 1/4 to 1/2 mile travel. No new traffic control devices are required.	4

Roadway Capacity, Safety Needs

Criteria:
Schools generate a significant amount of traffic. Increased vehicle trips to a school site may create congestion and delay for school and non-school related traffic. Turning movements create conflicts between vehicles and pedestrians. Major intersection safety improvements could include adding through lanes, right-turn lanes, a significant length of road widening to accommodate left turn lanes, or a traffic signal or a roundabout. Evaluate ~~how~~ whether increased traffic volume and turning movements can be safely accommodated. Request DOT/PF or local government guidance and technical assistance regarding traffic impacts, safety improvements and permitting.

Evaluation:	Scores:
The roadway requires major intersection and road segment improvements for long distances. Requires a Traffic Impact Analysis (TIA) per 17 AAC 10.060 (required typically for site generated traffic volume greater than 100 vehicles per hour).	0
The roadway requires major intersection improvements. Requires a Traffic Impact Analysis (TIA) per 17 AAC 10.060 (required typically for site generated traffic volume greater than 100 vehicles per hour).	1
The roadway requires widening to provide turning lanes to accommodate turning traffic demand. Requires a limited Traffic Impact Analysis (TIA) to review turning demands. Site-generated traffic volume is typically between 50-99 vehicles per hour.	2
No roadway improvements are required; signing changes are needed.	3
No roadway improvements are required; existing road capacity and traffic control devices are adequate.	4

~~<<<<END OF TRAFFIC AND ACCESS RELATED CRITERIA>>>>~~

Aesthetic Value

Criteria:
Sites can be assessed for the quality of their surroundings such as vegetation, topography, views and surroundings. Because aesthetic value is subjective, it is important that the local residents establish the aesthetic criteria considering each of the categories mentioned above. Use a subjective evaluation of the aesthetic merits of the site and answer the question, “What would it take to make this site aesthetically pleasing?”

Evaluation:	Scores:
Will never be aesthetic	0
Has few natural aesthetic features and little potential	1
Has some aesthetic features; potential for more with considerable effort	2
Could have many aesthetic features with minimal efforts	3
Has many aesthetic features naturally	4

Sun Orientation

Criteria:
The site should allow designs to take full advantage of available sun angles. Locating outside play areas to receive sunlight normally makes them a more desirable place for activity. A facility can benefit from the solar gain of winter sunlight. Large stands of trees, north-facing slopes and adjacent structures can be detrimental. Evaluate this criteria based on the year-round use of the facility.

Evaluation:	Scores:
Site is in constant shadow during fall, winter and spring months	0
Site is mostly in shadow during winter months with some fall/spring sun	1
Site is mostly exposed winter sun	2
Site is exposed to year-round sun with some obstructions	3
Site is exposed to full year-round sunlight; no obstructions	4

Protection from Elements

Criteria:
The site should provide protection from prevailing winds which intensify cold temperatures, dust, driving rain and drifting snow. Topography, orientation and site vegetation relative to cold winter winds can be important both for indoor and outdoor educational activities. Sites with some type of wind protections are desirable over those exposed to harsh winds (this is especially critical in coastal areas). Evaluate this criteria based on natural features. Costs of compensating for inadequate protection should be covered in other criteria.

Evaluation:	Scores:
Site is fully exposed to prevailing winds; no obstructions	0
Site is mostly exposed to prevailing winds	1
Site is partially protected from prevailing winds; some natural barriers	2
Site is mostly protected from prevailing winds	3
Site offers full protection from prevailing winds	4

Site Drainage

Criteria:
Sites with good drainage are easier to develop and maintain. Good drainage reduces the chance of water or ice collecting around a facility which could cause undermining, decay and/or frost heave leading to structural damage. It could also make general use and occupancy of the site difficult. Evaluate this criteria based on natural features. Costs of compensating for inadequate drainage should be covered in other criteria.

Evaluation:	Scores:
Site is generally low; surrounding areas drain into it	0
Drainage collects in some areas within the site	1
Drainage collects in areas adjacent to the site	2
Site has positive drainage; water contribution from surrounding areas is easily accommodated	3
Site has positive drainage; no water contribution from surrounding areas	4

Proximity to Natural Hazards

Criteria:
Ideally, the site would have no susceptibility to damage (facilities, utilities, etc.) from natural disasters. These would include the results of "Force Majure" such as earthquakes, avalanches/landslides, volcanic activity as well as health and safety hazards such as bluffs/steep cliffs, bodies of water and sewage/garbage disposal areas. Evaluate this criteria based on natural features and the historical occurrence of those hazards listed above. Costs of compensating for hazards should be covered in other criteria.

Evaluation:	Scores:
Site in proximity to five or more hazards	0
Site is in proximity to four or fewer hazards	1
Site is in proximity to three or fewer hazards	2
Site is in proximity to one hazard	3
Site free of any potential damage/injury from natural hazards	4

Zoning/Land Use

Criteria:
Current and projected zoning and land use should be compatible with the use of the site for a school. If local regulations do not currently permit educational facilities, it could be a lengthy process to obtain a change in zoning or a conditional use permit. Evaluate this criterion according to the difficulty and associated risk.

Evaluation:	Scores:
Present/future zoning does not permit use of the site for a school	0
Not zoned for schools but change or exemption can be requested	1
Current zoning will allow schools as conditional use	2
Currently zoned for schools; not likely to change	3
Present/future zoning permits schools or no zoning restrictions exist	4

Site Soils/Foundation Conditions

Criteria:
Ideal sites contain well graded, stable soils with high soil bearing pressure. Soil conditions should allow conventional, economical foundation systems which can meet or exceed a 50 year life expectancy with little maintenance. Soil conditions which can adversely affect construction include, discontinuous permafrost, silts and clays, substantial surface or sub-surface organic and high water contents (all susceptible to frost heave). Sites should be assessed for the quality of their soil based on known conditions or on-site investigations.

Evaluation:	Scores:
Unstable soils throughout; highly specialized foundation required	0
Mostly unstable soils; specialized foundation required	1
Isolated area of the site have unstable soils, some specialized foundation likely	2
Most areas of the site have stable soils; conventional foundation possible	3
Stable soils; conventional foundation system possible	4

Availability of Water Utilities

Criteria:
Connection into an existing, reliable water supply system with adequate capacity is preferred. Sites closest to the existing system would be rated highest. When considering adequacy, don't forget fire suppression system requirements. If a new water system is required for the site, then sites should be rated as to their potential to support/provide the system. For new systems, proximity to wells, lakes or rivers may be a factor. Evaluate this criteria based on known improvements and/or natural features as described above. Costs of providing water utility should be covered in other criteria.

Evaluation:	**Scores:**
No existing system; no known/potential water supply near site	0
No existing water system; potential water supply near site	1
No existing water system available; known water supply at site	2
Adequate, reliable water system is available adjacent to or near the site	3
Adequate, reliable water system is available within the site	4

Availability of Sewage Utilities

Criteria:
Connection into an existing, reliable waste/sewer system with adequate capacity is preferred. Sites closest to the existing system would be rated highest. If a new sewage system is required for the site, then sites should be rated as to their potential to support/provide the system. For new systems, perking soils, space for lagoons and availability of effluent outfalls may be a factor. Evaluate this criteria based on known improvements and/or natural features as described above.

Evaluation:	Scores:
No existing system; no known/potential waste handling area near site	0
No existing sewer system; potential locations for sewer system near site	1
No existing sewer system available; known location/method avail. on site	2
Adequate, reliable sewer system is available adjacent to or near the site	3
Adequate, reliable sewer system is available within the site	4

Availability of Electrical Power

Criteria:
Connection into an existing, reliable electrical system with adequate capacity is preferred. Sites closest to the existing system would be rated highest. If a new electrical system is required for the site, then sites should be rated as to their potential to support/provide the system. For new systems, space for generators, space for fuel storage and availability of fuel may be a factor. Evaluate this criteria based on known improvements and projected requirements.

Evaluation:	Scores:
No existing system; known difficulties for generation on site	0
No existing power system; good potential for power generation near site	1
No existing power system available; known power generation at site	2
Adequate, reliable power system is available adjacent to or near the site	3
Adequate, reliable power system is available within the site	4

Availability of Fuel Storage/Distribution

Criteria:
Connection into an existing, reliable fuel storage/distribution system with adequate capacity is preferred. Sites closest to the existing system would be rated highest. If a new fuel system is required for the site, then sites should be rated as to their potential to support/provide the system. For new systems, proximity to delivery points, available land for tankage, etc. may be a factor. Evaluate this criteria based on known improvements and/or natural features as described above. Costs of providing fuel utility should be covered in other criteria.

Evaluation:	Scores:
No existing system; known difficulties for fuel storage on site	0
No existing fuel system; good potential for fuel system near site	1
No existing fuel system available; known fuel system location on site	2
Adequate, reliable fuel system is available adjacent to or near the site	3
Fuel system is not required or is available on site	4

Proximity to Fire Response Equipment

Criteria:
This may or may not influence site selection in rural areas since many villages have no organized fire protection. In areas with fire hydrants and a continuous/reliable water supply and/or a fire station, sites may be rated by response time or whether a site is within the service area. In facility design, sprinkler systems may be specified which become part of the fire protection equipment which is independent of site location except as it relates to water supply. Use the following standard:

- site is within a service area and is in close proximity to a fire station (i.e. 4 miles or less)

Evaluation:	Scores:
Proximity of site is 40% or more below standard	0
Proximity of site is within 20% of standard	1
Proximity of site is within 10% of standard	2
Proximity of site is equal to standard	3
Proximity of site is 10% or more above standard	4

Ease of Transporting Construction Materials

Criteria:
Proximity to transportation routes which can support heavy equipment and loads can affect the usability of a site for construction. This criterion is not to measure the cost of getting construction materials to a community or geographic area but evaluates the local impact of transporting materials to the site. Sites closest to the transportation route will be most easily serviced. Evaluate based on the following:

Evaluation:	Scores:
Site is inaccessible	0
Transporting materials/equipment will be very difficult	1
Transporting materials will be difficult	2
Transporting will be fairly easy, routes will need upgrading	3
Transporting of equipment/materials will be simple; on established routes	4

Site Availability

Criteria:
Land status availability is one of the most fundamental criteria for locating capital improvements. The title to the site should be free of legal encumbrances, platted and surveyed with an accurate legal description and have a single owner. Evaluate as follows:

Evaluation:	Scores:
Clear or unclear title, owner/seller not interested	0
Uncertain title/boundaries; multiple owners	1
Some encumbrances/easements, etc., multiple owners	2
Clear title, recent survey, possibly available	3
Clear title, recent survey, definitely available	4

Site Cost

Criteria:
Land parcels should be available at an affordable cost. The most favorable situation is one in which the parcel is public land available at no cost to the district or available by donation from a private entity. Obviously, the cost of some parcels may be totally beyond the available funds. Evaluate as follows:

Evaluation:	Scores:
Site is cost prohibitive	0
Site is above fair market value but within reach	1
Site is available at fair market value	2
Site is available below fair market value	3
Site is available at no cost or has a nominal administrative fee	4

Alternative Energy Sources

Criteria:
In some cases it may become feasible/cost effective to use the waste heat from an electrical generation plant, or some other low-cost alternative energy source for heating the new facility. All other criteria being equal, this may become an important factor. Evaluate as follows:

Evaluation:	Scores:
Site has no possibilities for alternative energy systems	0
n/a	1
Site is adjacent to alternative energy systems; significant effort to develop	2
n/a	3
Site is adjacent to alternative energy systems; easily developed	4

Permafrost Stability

Criteria:
The best method in dealing with permafrost is to avoid it if possible. If the whole area is underlain with permafrost, then a site with well drained, non-frost-susceptible soils is preferred since there is less chance of encountering an ice wedge/lens, which, when melted will cause unstable soil conditions. Evaluate as follows:

Evaluation:	Scores:
No soils testing; obvious signs of discontinuous permafrost	0
Soils test silt and clay, known permafrost conditions	1
Undetermined soil conditions; no obvious signs of permafrost	2
Limited soils information; most of site free of permafrost	3
Site soils tested, no permafrost present	4

Flooding

Criteria:
Flooding potential from adjacent bodies of water should be considered. Ideally, the site would not be located within a flood plain of flood-prone area.

Evaluation:	Scores:
Site floods routinely	0
Site is within flood plain boundaries	1
Site is in close proximity to flood prone areas	2
Site is in proximity to bodies of water but well above flood plain	3
Site is not in flood plain; no nearby bodies of water	4

Site Erosion

Criteria:
Sites which border on eroding river banks and eroding sea spits should be evaluated on how much and how often erosion takes place to determine if a facility would be endangered. Slopes which have been cleared of vegetation can also erode due to heavy rain. Evaluate this criteria based on natural features and the historical occurrence of those hazards listed above. Costs of compensating for hazards should be covered in other criteria.

Evaluation:	Scores:
Known erosion potential	0
n/a	1
Moderate erosion potential; mostly during construction	2
n/a	3
No erosion potential; not near water or at toes of slopes	4

Air Inversions/Katabatic Winds

Criteria:
During winter under clear sky/no wind conditions, cold air flows down hillsides settling in low-lying areas. This causes temperatures to be colder at low-lying sites (especially in the Interior where there may be little wind). In regions where this occurs often during the winter, sites which are on a hillside are preferred over sites in low-lying areas. Evaluate as follows:

Evaluation:	Scores:
Site has continuous winter Katabatic accumulations	0
Site is routinely affected by Katabatic accumulation; annually	1
Site is in areas of occasional Katabatic wind; not every season	2
Site is adjacent to areas of known Katabatic accumulation	3
Site is on a hillside above cold air accumulation areas	4

Existing Site Development

Criteria:
Vacant, undeveloped land is preferable; if developed or currently used, alternative sites must be available for existing uses. Evaluate based on the magnitude of existing uses requiring relocation and/or demolition and the simplicity of the action.

Evaluation:	Scores:
Site has many existing uses; will all be problematic to relocate/demolish	0
n/a	1
Has 2000 square feet or less in existing uses; all relocatable/demo	2
n/a	3
Site has no existing uses	4

Access to Outdoor Recreation/Learning

Criteria:
Students benefit when complimentary park and recreation resources are located near public schools. Recreation and nature areas available by walking provide opportunities to use the outdoors as an extension of the classroom. Evaluate according to the following standard:

- site is contains or is adjacent to outdoor recreation/nature area (i.e. 1/8 mile or less)

Evaluation:	Scores:
Proximity of site is 40% or more below standard	0
Proximity of site is within 20% of standard	1
Proximity of site is within 10% of standard	2
Proximity of site is equal to standard	3
Proximity of site is 10% or more above standard	4

Noise

Criteria:
Incompatible noise such as from air traffic, vehicle traffic, industrial uses, etc. is detrimental to educational delivery. Evaluate this criteria based on actual or anticipated noise factors according to the following standard:

- sound decibel level is below 65db sustained and 75db peak

Costs for mitigating these factors will be covered in other criteria.

Evaluation:	Scores:
Sound level of site is 40% or worse than standard	0
Sound level of site is within 20% of standard	1
Sound level of site is within 10% of standard	2
Sound level of site is equal to standard	3
Sound level of site is 10% or more better than standard	4

Wetlands

Criteria:
Wetlands should be avoided due to the adverse impact on cost and schedule. Evaluate as follows:

Evaluation:	Scores:
100% of site is classified as wetlands; significant impact to building	0
Most of the site is wetlands; considerable impact to building likely	1
Some of the site is classified as wetlands; some impact to building likely	2
Some of the site is classified as wetlands; little or no impact to building	3
Site has no wetlands	4

Potential for Hazardous Materials

Criteria:
The site should be free of evidence of past use by industrial functions, unregulated storage of items containing hazardous materials or know disposals of hazards. A site assessment may be required. Evaluate as follows:

Evaluation:	Scores:
100% of site has known hazmat; significant impact to building	0
Most of the site has known/probable hazmat; considerable impact likely	1
Some of the site has known/probable hazmat; some impact likely	2
Some of the site has known/probable hazmat; little or no impact likely	3
Site has no known/potential hazmat issues	4

The Evaluation Report

There are many formats for reporting the results of a site investigation. Reports can range from basic tabulations and narratives with a few maps showing the sites being evaluated to high-powered multi-media presentations incorporating aerial photography, video footage, color graphics and detailed site plans. Appendices can range from a few simple support documents to detailed reports covering everything from archeology to zoning maps. Regardless of the visual and graphic development, a good site investigation report should include the following:

Introduction and Executive Summary

The introduction should describe the purpose and scope of the investigation listing the type and size of planned facilities which the site would need to support and a brief description of the sites. Toward the front of the report, a summary which indicates which site was selected and the basic rationale for the selection should be provided.

Maps and Graphics

Because of the type of information normally processed in a site investigation, graphic representations are essential. For instance, a metes and bounds narrative of the property may very well be an accurate description of the site's boundaries but a site plan with a graphic representation of those bearings and distances communicates more effectively, the shape and size of the site. Similarly, the sentence, "a stream crosses the property from the north to the south," offers a general description of a key site feature where the same stream drawn on a site plan offers an instant evaluation of its impact on placing a building on the site.

It is helpful not only to have graphic representation of each site and its immediate surroundings showing roadways, vegetation, adjacent structures, etc., but also a smaller scale map showing each of the potential sites and their relationship to one another as well as to key area landmarks. Appendix B shows an example of a site graphic for a rural village. On one simple sheet the following items are indicated: each site, bodies of water, compass directions, roads/paths, vegetation, topography, existing structures and site improvements, utility systems, prevailing winds, winter sun angles and natural and man-made hazards.

Aerial photographs, site cross-sections, and photographic panoramas are all useful and fairly standard graphic tools which assisting not only in describing the results of the site investigation but are often instrumental in making the evaluation itself.

Evaluation Matrix and Narratives

In addition to graphics, tabulated data is often one of the best ways to condense information and allow comparison across a specific category. The tabulations shown in Appendix A and/or the spreadsheet available on the department's website offer suggested formats for this type of information.

Appendix A
Site Evaluation Matrix

Social and Land Use Factors

Criteria	WF	**Site 1**	S1 xWF	**Site 2**	S2 xWF	**Site 3**	S3 xWF	**Site 4**	S4 xWF
Size of Site									
Proximity to Population to be Served									
Proximity to Future Expansion of Community									
Proximity to Important Existing Facilities									
•									
•									
Year-round Accessibility									
Site Topography									
Road Access									
Visibility, Safety of Driveways									
Driveway Conflicts and Internal Circulation									
Safe Routes to School for Pedestrians and Bicycles									
Roadway Capacity, Safety Needs									
Aesthetic Value									
Sun Orientation									
Protection from Elements									
Site Drainage									
Proximity to Natural Hazards									
Zoning/Land Use									
Proximity to Fire Response Equipment									
Flooding									
Existing Site Development									
Access to Outdoor Recreation/Learning									
Noise									
Wetlands									
Potential for Hazardous Materials									

TOTALS

Note: Italicized Items are also evaluated in either **Construction Cost Factors** or **Maintenance and Operating Cost Factors**

Construction Cost Factors

Criteria	WF	Site 1	S1 xWF	Site 2	S2 xWF	Site 3	S3 xWF	Site 4	S4 xWF
Soils/Foundation Conditions									
Permafrost Stability									
Availability of Water Utilities									
Availability of Sewer Utilities									
Availability of Electric Power									
Availability of Fuel Storage/Distribution									
Year-round Accessibility									
Driveway Conflicts and Internal Circulation									
Safe Routes to School for Pedestrians and Bicycles									
Roadway Capacity, Safety Needs									
Ease of Transporting Construction Materials									
Site Availability									
Site Cost									
Site Drainage									
Proximity to Natural Hazards									
Site Erosion									
Existing Site Development									
Wetlands									
Potential for Hazardous Materials									

TOTALS

Note: Italicized Items are also evaluated in **Maintenance and Operating Cost Factors**

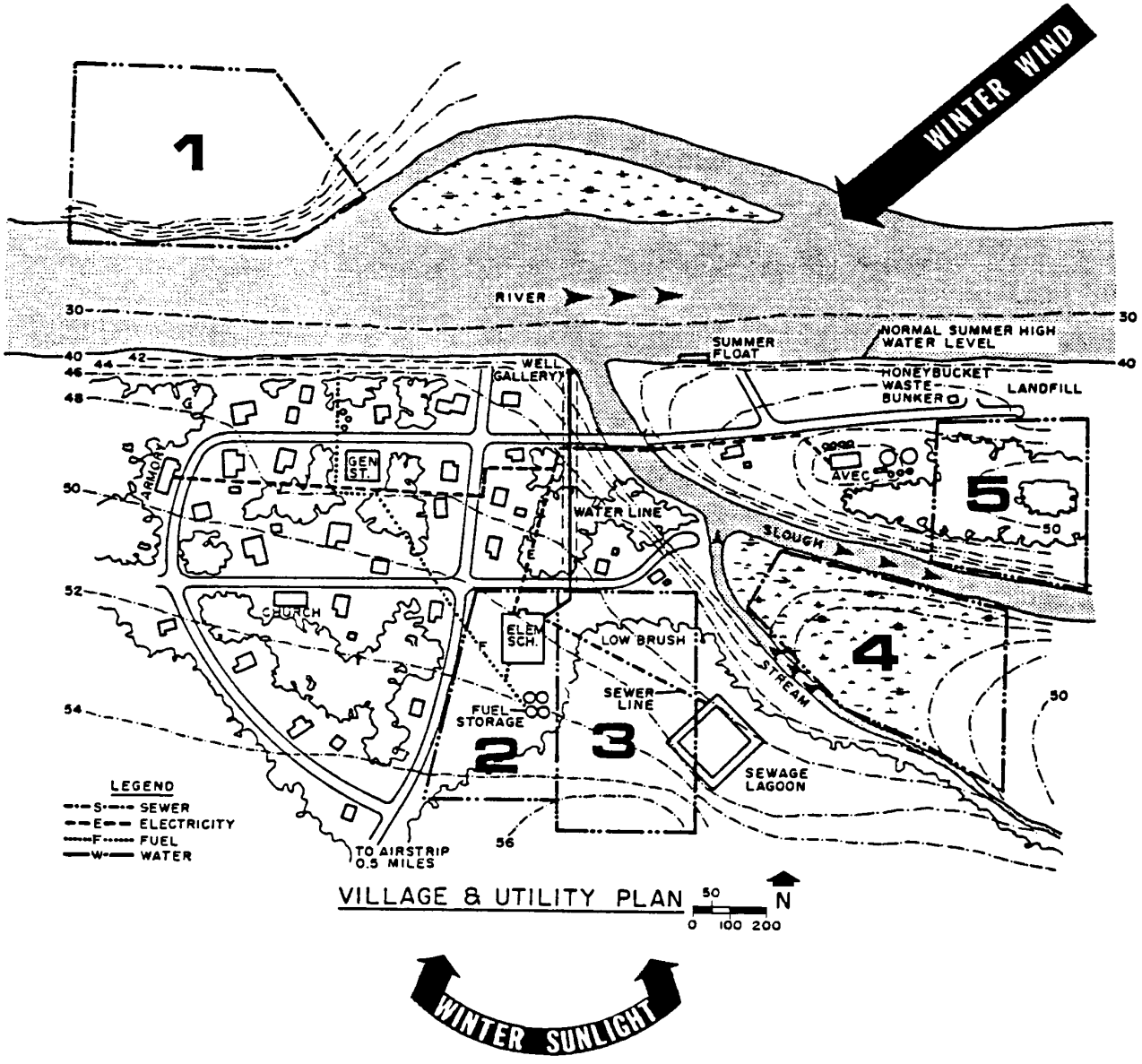
Maintenance and Operating Cost Factors

Criteria	WF	Site 1	S1 xWF	Site 2	S2 xWF	Site 3	S3 xWF	Site 4	S4 xWF
Safe Routes to School for Pedestrians and Bicycles									
Site Drainage									
Flooding									
Site Erosion									
Sun Orientation									
Protection from Elements									
Proximity to Natural Hazards									
Alternative Energy Sources									
Air Inversions/Katabatic Winds									
TOTALS									

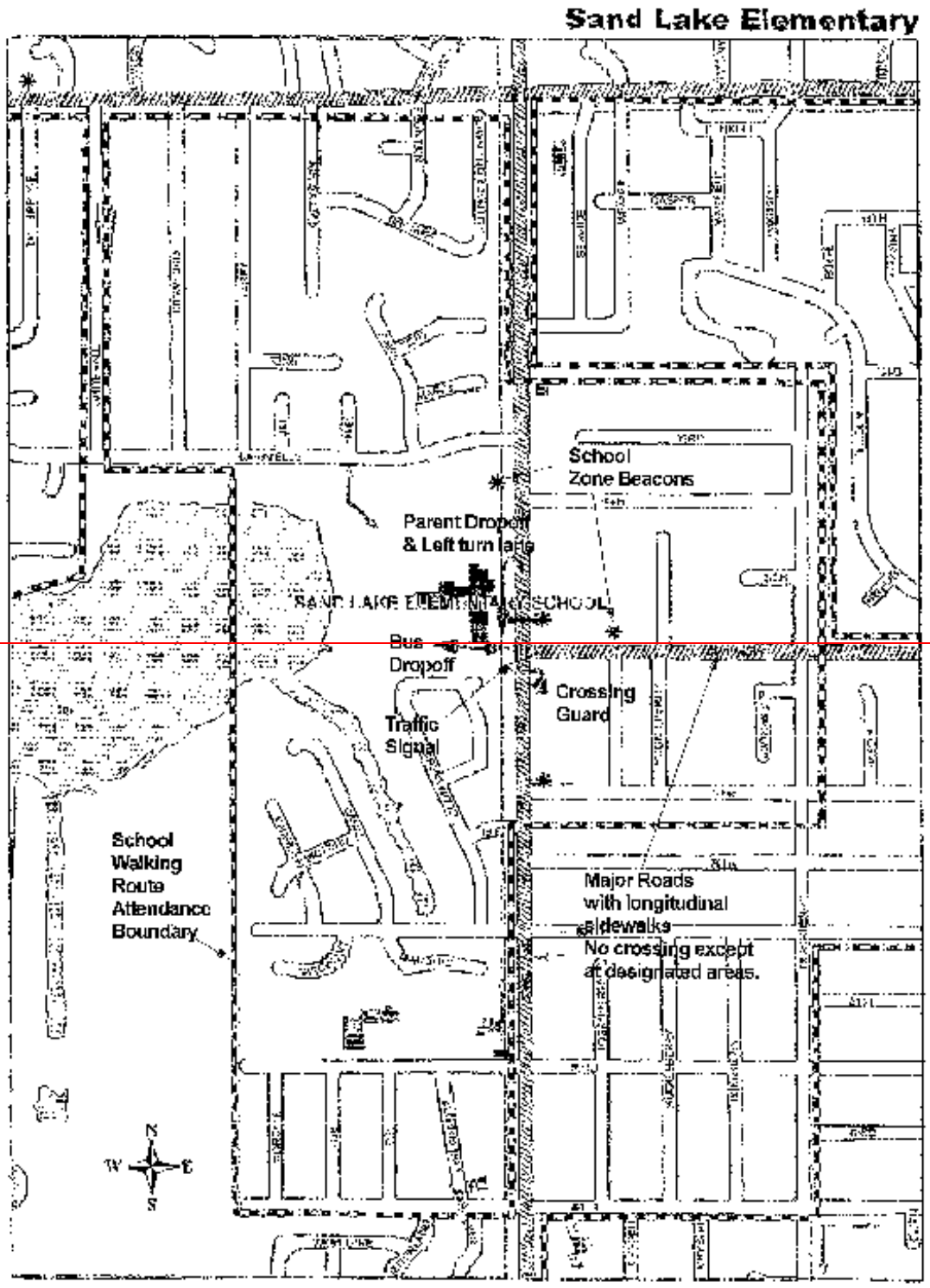
Site Evaluation Summary Table

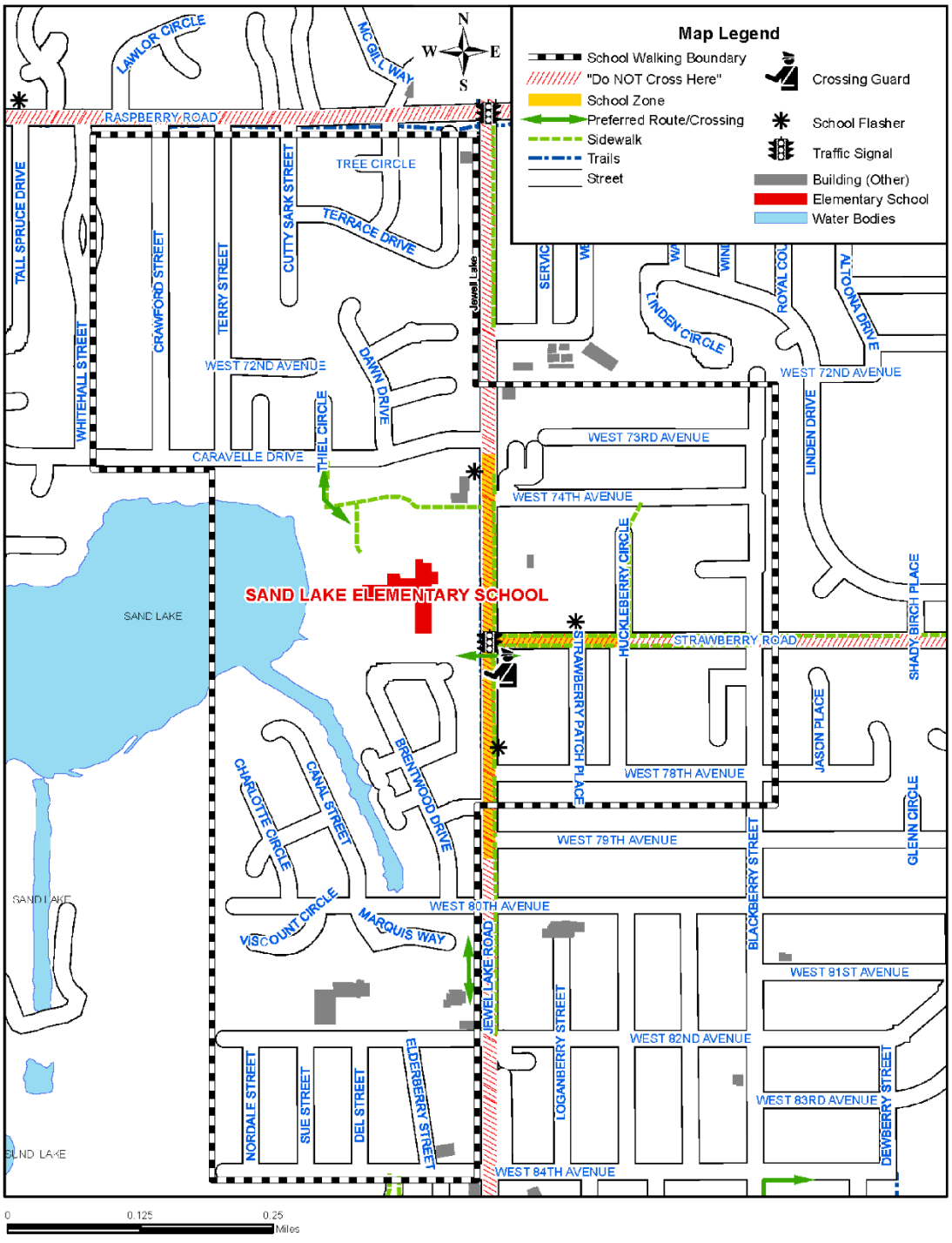
Criteria	Site 1	Site 2	Site 3	Site 4
Social and Land Use Factors				
Construction Cost Factors				
Maintenance and Operating Cost Factors				
GRAND TOTALS				

Appendix B
Sample Site Graphic Analysis



Appendix C
Suburban School Layout


Sand Lake Elementary
School
Zone Beacons
Parent Dropoff
& Left turn lane
SAND LAKE ELEMENTARY SCHOOL
Bus
Dropoff
Crossing
Guard
Traffic
Signal
School
Walking
Route
Attendance
Boundary
Major Roads
with longitudinal
sidewalks
No crossing except
at designated areas.
N
W
E
S


Map Legend
School Walking Boundary
"Do NOT Cross Here"
School Zone
Preferred Route/Crossing
Sidewalk
Trails
Street
Crossing Guard
School Flasher
Traffic Signal
Building (Other)
Elementary School
Water Bodies
N
W
E
S
SAND LAKE ELEMENTARY SCHOOL
SAND LAKE
RASPBERRY ROAD
LAWLOR CIRCLE
MC GILL WAY
TREE CIRCLE
TERRACE DRIVE
TALL SPRUCE DRIVE
WHITEHALL STREET
CRAWFORD STREET
TERRY STREET
CUTTY SARK STREET
Jewell Lake
WEST 72ND AVENUE
DAWN DRIVE
THIEL CIRCLE
CARAVELLE DRIVE
LINDEN CIRCLE
ROYAL COU
ALTOONA DRIVE
WEST 73RD AVENUE
WEST 74TH AVENUE
LINDEN DRIVE
HUCKLEBERRY CIRCLE
STRAWBERRY ROAD
SHADY BIRCH PLACE
STRAWBERRY PATCH PLACE
JASON PLACE
WEST 78TH AVENUE
GLENN CIRCLE
WEST 79TH AVENUE
BLACKBERRY STREET
BRENTWOOD DRIVE
CANAL STREET
CHARLOTTE CIRCLE
WEST 80TH AVENUE
VISCOUNT CIRCLE
MARQUIS WAY
JEWEL LAKE ROAD
WEST 81ST AVENUE
WEST 82ND AVENUE
LOGANBERRY STREET
ELDERBERRY STREET
NORDALE STREET
SUE STREET
DEL STREET
WEST 83RD AVENUE
DEWBERRY STREET
WEST 84TH AVENUE
0
0.125
0.25
Miles

State of Alaska

Department of Education & Early Development
Bond Reimbursement & Grant Review Committee

Guidelines for School Equipment Purchases

P U B L I C A T I O N C O V E R

July 12, 2021

Issue

The department is alerting the committee that it has initiated an update of the *Guidelines for School Equipment Purchases*.

Background

Last Updated/Current Edition
Publication last updated in 2016. Current edition available on the department's website (education.alaska.gov/facilities/publications/SchoolEquipment.pdf).

Summary of Proposed Changes
This is the first of the DEED non-annual publications set to achieve the 5-year update cycle goal. The department has prepared this initial update to the publication based on its experience in grant administration and recent updates dealing with school equipment in the department's handbook on educational specifications. Key revisions/additions to the publication address the following:

- Altered a 'focus area' from maintenance to shared staff program areas.
- Initiating a single item purchase limit for maintenance equipment.
- Clarifying the expectations that existing equipment should be factored in for reuse. Noting that, generally, renewal of school equipment is an operating expense.
- Increased per-student allocations at the 500+ level by approximately 10% (higher for the lower populations).
- Introduced a metric to better measure (maybe biennially) the cost change of school equipment.

Version Summary & BRGR Review
This initial draft update is being presented for committee review in July 2021. The document will be updated/revised based on committee input. A draft final version will be brought back for committee review in September with a recommendation to open a period of public comment. A final publication is anticipated in December.

BRGR Input and Discussion Items

Below are questions and comments developed by DEED during the revisions of this draft. Outlined below for consideration by the BRGR Committee:

- Should per-student allocations be increased in this version without a clear basis?
- Is there support for a CPI-style cost of FF&E index? If so, what belongs in the index?

Options

Proceed with a final draft to release for public comment.
Request additional vetting with districts in initial draft.
Seek additional information.

Suggested Motion

None at this time, no committee action requested other than feedback.

Guidelines for School Equipment Purchases

PRIMARY AUTHOR

Tim Mearig, Architect
Alaska Department of Education & Early Development
Juneau, Alaska

CONTRIBUTORS

Facilities Staff
Alaska Department of Education & Early Development
Juneau, Alaska

ACKNOWLEDGEMENTS

Thanks to the Bond Reimbursement and Grant Review Committee members who reviewed the publication in its draft form and to those in the Department of Education & Early Development who were responsible for the predecessors to this document.

Originally published in 1988 by the State of Alaska, Department of Education as *Guidelines for School Equipment Purchases* and updated in 1997, 2005, and ~~2005~~ 2016 under the same name.

Table of Contents

SECTION ..... **Page**

Introduction 2
Overview 2
Authority 2

Identifying Needed Equipment 4
Educational Specifications 4
Technology Items 4
Furnishing & Equipment Items 4
Distinguishing Between Supply & Equipment Items 5

School Equipment Budgets 7
Quantities 7
Overall Budgets 7
Summary 8

Accounting for Equipment Purchases 9
Installed Equipment 9
Fixed Asset Inventory 9
Equipment Control 9

Appendix A - Definitions 10

Introduction

Overview

Regulations governing the use of state aid from debt reimbursement and grant funding provide for the use of capital project funds for the purpose of equipping new or rehabilitated school facilities. In addition, statutes prohibit the granting of capital project funds to districts unless districts account for all school equipment through an auditable fixed asset inventory system. The purpose of this Department of Education & Early Development guideline is to assist school districts and municipal entities in purchasing equipment in compliance with school construction statutes and the regulations which implement them. The guideline provides direction in three major areas: identifying the needed equipment, equipment budgets and accounting for the equipment.

Authority

AS 14.17.190(b)

> (b) Each district shall maintain complete financial records of receipt and disbursement of public school foundation money, money acquired from local effort, and other money received by the district. The records must be in the form required by the department and are subject to audit by the department at any time.

AS 14.11.011(b)

> (b) For a municipality that is a school district or a regional educational attendance area to be eligible for a grant under this chapter, the district shall submit
>
> (1) a six-year capital improvement plan that includes a description of the district's fixed asset inventory system and preventive maintenance program no later than September 1 of the fiscal year before the fiscal year for which the request is made; the six-year plan must contain for each proposed project a detailed scope of work, a project budget, and documentation of conditions justifying the project; . . . .

AS 14.11.017(a)(3)

> (a) The department shall require in the grant agreement that a municipality that is a school district or a regional educational attendance area . . .
>
> (3) agree to limit equipment purchases to that required for the approved project plan submitted under (5) of this subsection and account for all equipment purchased for the project under a fixed asset inventory system approved by the department, ...

AS 14.14.060(h)

> (h) School boards within the borough may determine their own policy separate from the borough for the purchase of supplies and equipment.

AS 14.11.135(3)

> (3) "costs of school construction" means the cost of acquiring, constructing, enlarging, repairing, remodeling, equipping, or furnishing of public elementary and secondary schools that are owned or operated by the state, a municipality, or a district and includes the sum total of all costs of financing and carrying out the project; these

include the costs of all necessary studies, surveys, plans and specifications, architectural, engineering, or other special services, acquisition of real property, site preparation and development, purchase, construction, reconstruction, and improvement of real property and the acquisition of machinery and equipment that may be necessary in connection with the project. . . .

4 AAC 31.900 defines school equipment as follows:

(2) "capital equipment" means built-in and movable equipment used to furnish a newly constructed or rehabilitated space; it includes the first-time purchase of library books, reference material, and media to furnish a new or renovated library; it does not include supply items such as textbooks and expendable commodities; the term is further defined in the ~~Department of Education & Early Development's~~ *Guidelines for School Equipment Purchases*, ~~1997~~ 2016 edition, adopted by reference in 4 AAC 31.020; . . . .

Identifying Needed Equipment

Educational Specifications

The general scope of necessary equipment purchases, as defined in 4 AAC 31.900(2) and this guide, should be a part of the educational specification developed for the project. Paragraph (7) of 4 AAC 31.010 Educational Specifications, indicates that the educational specifications should include, "the educational spaces needed, their approximate sizes in square feet, *their recommended equipment requirements*, and their space relationships to other facility elements." Educational specifications for projects incorporating state funding are reviewed and approved by the Department of Education & Early Development prior to contract award. ~~Good~~ Acceptable educational specifications include, in tabular form, a listing of necessary equipment for the project. The listing should be based on the Activity Setting Descriptions identified in the department's guide "A Handbook to Writing Educational Specifications", current edition. If the project architect's professional services include responsibilities for preparing furnishing, fixtures, and equipment (often referred to as FF&E) documents, these listings become an invaluable tool in communicating district needs to ensure their inclusion in the project. The project's design documents should identify types and quantities of equipment which conform to the district's established standards. The actual selection and purchase of this equipment is normally the responsibility of the school district in which the school facility is located unless otherwise agreed when a municipality is the project manager.

Technology Items

A key component of any equipment budget is the provision of technology items such as computers, computer peripherals and software, audio-visual and vocational-technical equipment. Technology incorporates a wide spectrum of equipment items and has become an integral part of education. Technology can both be taught as a subject area and used as a delivery system in the teaching/learning process across all subject areas. In other words, most schools include both technology education and educational technology. They do this to differing degrees depending on the objectives and culture of the school district or individual school. The definitions included in Appendix A indicate that technology is best thought of in the broad sense of those equipment items used to process or create electronic data which are integrated into a system. Under this definition, typical technology equipment at the publication of this guide would be, computers, printers (2D/3D), monitors, video projectors, interactive whiteboards, scanners (2D/3D), video cameras, digital cameras, large format displays, video recorders/players, image processors, robotics, calculators, electronic test equipment, voice over IP, digital telephone, etc. Most of these items are dependent on both the software and wiring/cabling connections to make them functional for specific purposes. An initial copy of software can be purchased as technology equipment. Typically, the wiring and cabling will be included as part of the construction budget.

Furnishing & Equipment Items

The remaining components of an equipment budget include furnishings and the equipment necessary to provide for the administration, operations and instructional programs of the school. The identification of furnishings for administrative and instructional use is a relatively straightforward process. The items are typically large and are used daily. This serves to keep

them in the forefront of people's minds when being asked to develop school equipment lists. The identification of instructional equipment presents additional challenges and requires intentional planning and even research on the part of the school district's project design team. Often, the most difficult to properly equip are those programs that may be shared among several staff such as physical education or music instruction for the elementary grades. ~~Probably the most overlooked items are those that pertain to the~~ Equipment for the maintenance and operation of the new or renovated school can also be overlooked and can require strategic engagement with the proper stakeholders. Items in this category include custodial care equipment, personnel lifts, mowers, snow blowers, and similar items that are appropriately sized and are dedicated to the use and operation of that specific facility. The individual item purchase limit for such equipment without prior department approval is $15,000 at the factory. Maintenance items such as testing equipment, any type of construction equipment, or vehicle that can be used at multiple school locations are not appropriate purchases under the capital equipment associated with the school facility being constructed or rehabilitated.

Distinguishing Between Supply & Equipment Items

An item can be classified as **supply** if it meets one or more of the following criteria:

1. It is consumed, worn out, or deteriorated as it is used, to the point of being not useful or not available for its principal purpose, and under normal conditions of use, it reaches this state of being not useful or not available for its principal purpose typically within one (1) but nor more than two (2) years.
2. Its original shape, appearance, and/or character changes with use.
3. It loses its identity through fabrication or incorporation into a different or more complex unit or substance.
4. It is expendable, that is, if the item is damaged or some of its parts are lost or worn out, it is usually more feasible to replace the item with an entirely new unit rather than repair it. Examples are paper, pencils, cleaning supplies, etc.

An item can be classified as **equipment** if it is an instrument, machine, apparatus, or set of articles which meets *all* of the following criteria:

1. It retains its original shape, appearance, and/or character with use.
2. It does not lose its identity through fabrication, or incorporation into a different or more complex unit or substance.
3. It is non-expendable; that is, if the item is damaged or some of its parts are lost or worn out, it is usually more feasible to repair the item rather than to replace it with an entirely new unit.
4. Under normal conditions of use, including reasonable care and maintenance, it can be expected to serve its principal purpose for more than one (1) year.

Equipment items are normally of significant value, usually over $5000, or the value that the local school district has established in its capitalization policy. However, smaller value items, often

needed in quantity or available as sets, which meet the above conditions also qualify as equipment. Examples include, a) office equipment such as punches and staplers, classroom flags, and waste cans, b) maintenance and career technology equipment such as hand tools and diagnostic equipment, and c) food service equipment such as utensils, pot/pans, shelving, and portable work surfaces.

Items which are obviously “supply” in nature may be purchased only if they are an integral part of an equipment package purchase such as with a computer (operating system software) or teaching machine or other device meeting the criteria of an equipment item.

For supply/equipment decision flow chart, see the department’s Uniform Chart of Accounts, current edition.

School Equipment Budgets

Quantities

Equipment items should be purchased only as needed to support the individual school project or program which is authorized. Numbers of desks, computers, calculators, video players, video display panels, etc., should be--when added to those already available to be moved from any older facility which formerly housed the program--a total of no more than those appropriate to adequately provide for the educational program served by the school construction project named in the funding application or project agreement. School districts should regularly be budgeting for the addition, or replacement, of school equipment to meet the educational program and current student population. With the life-cycle for facility rehabilitation being much longer, up to 30 years, than the life-cycle for school equipment, it will be rare to have a capital project align perfectly with a need to replace existing school equipment. Proper justification may need to be provided to support this occurrence.

The Department of Education & Early Development will approve the general types and quantities of equipment purchases as it approves the educational specifications submitted by the school district. It is the responsibility of the school district to actually purchase the equipment and to make specific cost-benefit value decisions and product selections.

Overall Budgets

The portion of each school construction or major maintenance project budget used for the purchase of school equipment should respond to the district's instructional program, the type of equipment needed to deliver the program, the grade levels being served, the availability of satisfactory existing equipment and the cost and quantities of new equipment. Traditionally, school equipment budgets have been thought of as a percentage of the facility construction cost. Current experience is showing percentages ranging as high as eight percent. This figure is for new construction; a lesser amount often is sufficient in renovations due to the availability of existing equipment items. For projects funded by appropriations made to the Department of Education & Early Development, total equipment budgets (i.e. conventional equipment plus technology items) have been limited to 7% unless a detailed justification is provided ~~which~~ that shows the correlation between a school board-approved instructional program and the need for additional equipment.

While budgeting for equipment as a percentage of construction cost has some merit, state-wide equity is difficult to achieve due to the widely varying cost per square foot of Alaska schools. Whereas the cost of acquiring a constructed facility involves labor costs, material costs, and substantial premiums to access and serve remote sites, the cost of acquiring school equipment is more likely to be similar among districts regardless of location. Some small increases can be expected for shipping, lack of quantity discounts, as well as the services required to install more elaborate systems.

The department has established two parameters with which to evaluate school equipment budgets. The first will be the percentage-of-construction method with the standard limitation

remaining at 7%. The second budget parameter is established on a per-student basis as shown in the following tables ~~on the following page~~:

Elementary Students Served	Technology Equipment	All Other Equipment
10 - 100 students	$~~1,400~~1,500	$~~1,700~~1,900
101 - 250 students	$~~1,300~~1,350	$~~1,700~~1,900
251 - 500 students	$~~1,000~~1,100	$~~1,500~~1,700
over 500 students	$~~900~~950	$~~1,400~~1,550

Secondary Students Served	Technology Equipment	All Other Equipment
10 - 100 students	$~~1,700~~1,800	$~~2,100~~2,300
101 - 250 students	$~~1,500~~1,600	$~~2,000~~2,200
251 - 500 students	$~~1,300~~1,400	$~~1,900~~2,100
over 500 students	$~~1,200~~1,300	$~~1,700~~1,900

Note: for schools with a mix of elementary (K-6) and secondary students (7-12), the aggregate number of students will determine which per-student allotment is used. Example: A K-12 school with 86 students in grades K-6 and 59 students in grades 7-12 would use figures from the 101-250 category ($~~1,300~~1,350 and $~~1,700~~1,900 for elementary and $~~1,500~~1,600 and $~~2,000~~2,200 for secondary). These would be applied to the specific numbers of students in each grade grouping.

Schools in regions with a geographic area cost factor greater ~~then~~ than 110.00, as established in the department's current Program Demand Cost Model for Alaskan Schools, will be allowed an additional amount to account for estimated shipping and installation costs. For these schools, equipment budgets calculated using the per-student table may be increased an amount equal to one-fifth of their geographic area cost factor. Example: A school with a geographic factor ~~is~~ of 140.91~~,~~ may increase their per-student-based equipment budget by 8.18 percent. (40.91 / 5 = 8.18)

The standard limitations published in this guideline may be adjusted by the department using the pricing index show in Appendix B. Any such adjustment will be published as part of the capital improvement project (CIP) application, annually approved through the Bong Reimbursement & Grant Review Committee (BRGR).

Summary

For projects funded under AS 14.11, total school equipment budgets will be limited to the lesser of the amounts generated by the percentage of construction cost formula at 7%, and the per-student formula shown above. The opportunity to provide detailed justification which shows the need for additional funding of equipment remains in effect.

For projects providing new facilities or projects constructing space for new media programs which do not replace another facility, the initial purchase of library media is appropriate for inclusion in the equipment budget.

Accounting for Equipment Purchases

Installed Equipment

Built-in equipment or furnishings or those pieces of equipment which are an integral part of a building system are normally included in the construction documents and are not considered capital equipment for the purposes of a fixed asset inventory. Installed equipment is instead accounted for as part of the building cost.

Fixed Asset Inventory

Procedures and requirements for establishing and maintaining a property accounting system can be found in various industry, state, and federal publications. Equipment purchased as part of a school construction project will be recorded in a district's approved fixed asset inventory system, as required. It is impractical for every individual item purchased as school equipment to be recorded. Therefore, a minimum cost should be established above which an asset will be entered into the fixed asset records. The Alaska Department of Education & Early Development Uniform Chart of Accounts, current edition, establishes that minimum at $5000 or the school district's/municipality's capitalization threshold for equipment, whichever is lower. The cost established as the threshold should be stated in the fixed asset portion of the annual audit submitted for department review under 4 AAC 09.130. In establishing the appropriate management of school equipment within a fixed asset system, cost thresholds and financial accounting are one consideration. Another consideration of similar importance is level of control or physical control. Often, these two considerations—fiscal control and physical control—work in conjunction within a fixed asset inventory.

Equipment Control

The tracking and control of physical resources by school districts is a matter of responsible stewardship. In devising methods for carrying out this responsibility, selecting an appropriate level of control is important. Three broad categories of control have been suggested as applicable to school equipment purchases: little or no control, group control, and individual control. Two of these, group control and individual control intersect with the district's fixed asset system. The individual control category, in which discrete equipment items are tracked based on their relatively high value, has been adequately covered in the preceding paragraph. Group control, as a category, offers a mechanism for school districts to include equipment items with lower individual dollar values in their fixed asset inventory. Items in this category, when taken as a group, are valuable enough to justify the cost of providing some type of control over their safety, use, location, and condition. Examples of such items include classroom equipment group, or administration equipment group. These groups would consist of furnishings, computers/peripherals and appliances assigned to a room, suite, or wing of the school facility. Best practices for school equipment accounting would include such groups as fixed assets.

Appendix A - Definitions

Construction Equipment: Any type of ~~bulldozer~~excavator, front end loader, ~~fork lift~~telehandler, or other type of equipment that is typically used in construction activities that may or may not be legal for use on a public way, that can move under its own power, and is controlled by an operator that is located on or in the equipment.

Installed Equipment: Built-in equipment or furnishings or those pieces of equipment which are an integral part of a building system.

Fixed Assets: An account grouping used to track the balance of expenditures and revenues associated with owned property.

Property: Physical assets including land, buildings, and equipment.

Supplies: Items which are consumed during normal use or are more feasible to replace with an entirely new unit rather than repair it. Supplies are not part of the fixed asset account group.

Technology: An integrated system of electronic and mechanical equipment, associated software and peripherals which creates and/or process information to support a school's educational program.

Vehicle: Any tracked, two, or four wheeled motorized means of conveyance that carries an operator, that may or may not carry a passenger, and that may or may not be legal for use on a public way.

Appendix B – School Equipment Price Index

Quote line	Description	#	$/ea
1	Desk classroom select contemporary	86	$ 125.00
2	Chairs classroom select 18"	60	$ 120.00
3	Classroom tables 48" round	5	$ 310.00
4	Kidney table	6	$ 910.00
5	Waste container, w/dome top and dolly, 32gal	3	$ 225.00
6	Walk off matt 4'x6'	2	$ 850.00
7	Carpet extractor	1	$ 8,100.00
8	floor scrubber	1	$ 18,500.00
9	Flammable storage cabinet	2	$ 1,800.00
10	4-station CTE work bench	3	$ 4,000.00
11	Lateral 4 drawer fire-proof cabinet	1	$ 4,100.00
12	Library 4 shelf starter double sided	4	$ 1,200.00
13	Library 42" round tables	2	$ 680.00
14	Teachers desks	8	$ 1,350.00
15	Swivel chairs	20	$ 235.00
16	Lateral 4 drawer cabinet, standard	1	$ 1,600.00
17	4 drawer file cabinet	8	$ 1,150.00
18	Computer table	12	$ 1,010.00
19	Nesting stack chairs w/stacking cart	50	$ 260.00
20	Cafeteria tables, folding, 12-seat	7	$ 3,050.00
21	Guest chair	8	$ 275.00
22	Office task chair	5	$ 430.00
23	Wrestling Mat	1	$ 28,300.00
24	Lot of shop equipment	LT	$ 30,000.00
	[need list]		
25	Lot of PE equipment	LT	$ 40,000.00
	[need list]		
26	Choral risers	3	$ 14,400.00
27	Smartboards	12	$ 8,000.00
28	iPad	30	$ 300.00
29	Printer	10	$ 300.00
30	LCD Projector, 10K lumen	1	$ 14,000.00
31			
32			
33			
34			
35			
		296	$ 148,580.00

Alaska School Facilities Preventive Maintenance & Facility Management Handbook

The *Alaska School Facilities Preventive Maintenance & Facility Management Handbook* cover memo and draft publication will be issued as supplemental material prior to the meeting.