Bond Reimbursement and Grant Review Committee Meeting Agenda

September 1, 2022
1:30 pm – 3:30 pm

Audio Teleconference available through free online Zoom application.
Join Online – Meeting Number: 842 2886 4381
Join by Phone – Toll Call-in number (US/Canada): 1 (253) 215-8782; Meeting: 842 2886 4381

Chair: Heidi Teshner

Thursday, September 1, 2022

Agenda Topics

1:30 – 1:35 PM	Committee Preparation • Call-in, Roll Call, Introductions; Chair's Opening Remarks • Agenda Review/Approval • Past Meeting Minutes Review/Approval
1:35 – 1:45 PM	Public Comment (additional comments related to agenda topics may be solicited throughout the meeting)
1:45 – 2:15 PM	Prototypical Design Committee Position Paper Update Action Item: Approve: Guidelines for Prototypical Designs
2:15 – 3:25 PM	Publications: • Project Delivery Method Handbook (Final) o Action Item: Approve for DEED Use • Preventive Maintenance Handbook (Revised Draft) o Action Item: Approve for Public Comment
3:25 – 3:30 PM	Committee Member Comments
3:30 PM	Adjourn

BOND REIMBURSEMENT & GRANT REVIEW COMMITTEE
Monday, June 27, 2022 – 1:30 p.m. – 3:44 p.m.

Held via Videoconference

Committee Members Present	Staff	Additional Participants
Elwin Blackwell, Chair	Tim Mearig	David Landis, SERRC
Sen. Roger Holland	Lori Weed	Jamie Burgess, Nome City SD
Branzon Anania	Sharol Roys	
Randy Williams	Wayne Norlund	
Dale Smythe		
James Estes		
Kevin Lyon		
David Kingsland		

June 27, 2022
CALL TO ORDER and ROLL CALL
Chair Elwin Blackwell called the meeting to order at 1:30 p.m. Roll was taken, and a quorum was established to conduct business. Representative Ortiz was excused.

CHAIR'S OPENING REMARKS
Chair Blackwell welcomed everyone and thanked the members for attending the meeting.

AGENDA REVIEW / APPROVAL
Dale Smythe **MOVED** to approve the agenda as presented, **SECONDED** by David Kingsland. Hearing no objection, the motion **PASSED**.

PAST MEETING MINUTES REVIEW / APPROVAL – April 19-20, 2022
Branzon Anania **MOVED** to approve the minutes from April 19 and 20, 2022 as presented, **SECONDED** by Dale Smythe. Hearing no objection, the motion **PASSED**.

PUBLIC COMMENT
A public comment period was offered, and no public testimony was received.

DEPARTMENT BRIEFING
Preventive Maintenance Update
Tim Mearig reported on the status of the assessment of school district eligibility for capital project applications as it relates to district preventive maintenance and facility management programs. Ten districts were not certified as of June 1st, but Craig City School District has since achieved provisional status, and several districts are working to correct deficiencies and should receive provisional status by the time this process ends on August 15th.

CIP Workshop
The CIP workshop held on May 12th was a great opportunity to go through the FY2024 CIP application and support materials. The implementation and impact of the *Alaska School Design and Construction Standards*, which was adopted by the committee in April, was discussed.

Cost Model Update
The DEED *Program Demand Cost Model* is an estimating tool that allows anyone to get a reasonable cost estimate prepared for a capital project. The update for the Cost Model reflected an escalation of the model school costs of over 14 percent.

Capital Needs Forecast Database
This statewide capital needs forecasting tool project was awarded to Inzata Analytics and will match up capital needs with proposed or projected funding from various funding streams. The department is working on providing Inzata with data from its databases and renewal and replacement tool data information. An update could be provided as early as December, but the official project timeline remains April 2023.

Legislative Action
Lori Weed reported that the legislature passed a combined operating and capital budget bill, and it has been forwarded to the Governor. If there are no amounts vetoed, the allocations include $100 million for the major maintenance grant fund, $32.8 million for REAA fund capitalization, and $54.9 million for Napakiak, as well as allocations for debt reimbursement and supplemental debt reimbursement.

Randy Williams asked if the cost escalations for the major maintenance items were likely to be more expensive and if there was a plan to cover that. Tim replied that not all the projects on the list will be facing increased costs, because about a third of the projects on the list are substantially complete and just waiting for funds. A few districts did some of their own work, and another portion of the projects on the list will not be ready for construction this year.

PROTOTYPICAL DESIGN COMMITTEE POSITION PAPER UPDATE
Tim Mearig explained that this policy for evaluation and use of prototypical design attempts to realize a cost savings in building the same school design multiple times. This topic has not been utilized for the past ten years due to little or no population growth, and new schools are only being built to replace old ones.

Revisions in the document reflect changes from the 2004 guidelines. Version 1 makes minor changes and clarifies some of the language. Version 2 is a more robust update applying some scoring elements that would support reuse of building designs. Randy Williams said he was in favor of Version 2 and agreed that these advisories belonged in the Design and Construction Standards. In response to a question from Dale Smythe, Randy explained that he liked the reference to designs and building systems, making it clear that they can be two different things. He said he also liked the modularity of the buildings, which allow the addition or subtraction of wings, and in general liked the philosophy of steering away from a cookie cutter design.

Tim stated that Version 2 refers to specific CIP application elements and also includes definitions to help bring clarity. He noted that Version 1 has broader language of what an acceptable prior prototypical design is. Version 2 requires that a reused building system design be framed within a published district standard. Kevin Lyon stated he supported Version 2 because Version 1 is too open.

Branzon Anania asked what would be considered a prototype building system as opposed to just something in a past project. Tim referred to Section 2 of Version 2 where prototype designs are discussed and defined and how different uses of a prior design can be incorporated into a CIP application.

Randy Williams **MOVED** that the committee approve Version 2, the guidelines as presented, to move it to public comment, **SECONDED** by David Kingsland. Hearing no objection, the motion **PASSED** by unanimous consent.

BRIEFING PAPER: INSUFFICIENT / ADDITIONAL PROJECT FUNDING
This paper sets out two options for dealing with projects that are overbudget and cannot be completed with their approved funds. Option 1 allows the submittal of an application for additional funding in certain circumstances. Option 2 would move a project to the top of the priority list or at least give some point consideration to the project.

Jamie Burgess, Superintendent of Nome Public Schools, described the bidding for a roofing project in Nome that is overbid and cannot be awarded. The bidding started during the pandemic, and the two bids received were very high. The district decided not to award and to try again the next year, which they did, and the one bid received was almost double the construction budget. Ms. Burgess wonders if the roofing project could be changed to a partial project, but that was not the scope of the original project. The district is facing some challenges with this project: an Arctic environment, and a rural community with few vendors. She stressed that this situation was not a result of any lack of preparation on the district's part, and that either Option 1 or Option 2 would be helpful in moving forward to get the project completed.

Dale Smythe asked for a review of the methods for dealing with unforeseen circumstances for a project. First the contingency, which is based on elements unknown at the time, such as things below grade or within the walls. Second, the escalation for not knowing when the project might be awarded. Tim Mearig said it seems like the CIP application process is silent on what to do with a project that was never able to go to bid for lack of money or a project that had overruns in construction. There is no CIP guidance on how to support a project to make sure that the state knows that only costs that were unavoidable and unforeseen and not the result of imprudent management are being requested. For the roofing project in Nome, the question is whether the state should be under an obligation to purchase the roof for $182 a square foot because the bid came in at that amount. Tim said that guidance for those kinds of factors could be included in the CIP.

Dale Smythe asked for clarification because it seemed to him there were two scenarios in play: what the state's obligation is to a project once it's been awarded versus what that obligation is

prior to award. Tim did not see it that way and replied that when a project is evaluated and placed on the list, the state is committing that is a viable project and needs to be done. The price that is assigned is the best understanding of what the market-based, reasonable, cost-effective price is at the time. There is no clear answer and no guidance as to what happens if that price increases significantly.

Randy Williams wanted clarification about what needed to be accomplished at this meeting noting that no motion was needed. He thought the two recommendations were both appropriate and that the applicants deserved to know what to expect if their project runs into these situations. Tim said that both options could be implemented or just one or the other.

Dale Smythe is still of the opinion that there are two distinct situations, and guidance should be provided for both scenarios. He would like to see a separate procedure for projects that have already been awarded and are under construction for funding reconsideration.

Randy Williams offered to participate in a group effort to formulate some recommendations for both options. James Estes supported Randy's comments to move forward with both options.

Chair Blackwell asked what the department's availability was to produce guidance applicable to these situations. Tim replied that the department would have time between now and April to add this to the committee's work plan on how to be clear to districts regarding projects that either didn't get funded or projects that had overruns during construction. If the committee wants the projects that were funded in a prior year to have a higher point consideration, that would require a regulation change through the State Board.

Lori Weed mentioned that nothing prevents a district from applying for additional funds for construction alternates or additional funding to complete the initial base bid construction. Tim agreed but mentioned that there is not a lot of guidance on some of the nuances that might be encountered.

Chair Blackwell estimated it would take about a year to accomplish these changes, especially if there are any regulatory changes. Tim suggested that the department could take action if there was consensus among the members of what the committee would like to see. Chair Blackwell agreed, and committee members offered the following comments.

Randy Williams wanted the affirmation clear that applicants can reapply for additional funding under current guidelines in certain situations. He supports recommendation 1 to add application guidance in the CIP application. He also supports recommendation 2 to provide a pathway for identifying whether additional scoring points are warranted for projects that do come back for additional money.

Dale Smythe agreed with the current process for additional funding and thought that should be encouraged. He would like to see a separation of projects that have been funded and under construction started/awarded versus ones that have not been funded. And for projects under

construction, he would encourage a process other than CIP and one that could be described as a separate way to review and consider additional funding.

James Estes supports both recommendations as stated by Randy.

Kevin Lyon supports recommendation 1 whereby the applicant can reapply for the scope that's been dropped from the project. He said they definitely need to look at recommendation 2 and see what that additional scoring looks like and what comes out when it's applicable.

David Kingsland supports recommendation 1. He liked what Randy said about recommendation 2 but is still undecided on that one.

Branzon Anania encouraged moving forward on both recommendations.

Chair Blackwell supports the reapplication in subsequent CIP years for additional funding if need be. He also supports both recommendations.

SPACE GUIDELINES ACCURACY REVIEW / RECOMMENDATIONS

Dale Smythe, chairman of the School Space Subcommittee, summarized the report in the packet and asked for discussion on the following two recommendations.

Recommendation No. 1 is to change measuring space from the exterior to the interior, which would not limit the potential wall assembly R-value. Recommendation No. 2 attempts to resolve some of the percent limitations relative to water storage, water treatment, or sewer treatment. Rural schools, in particular, often need more space than is currently allowed, and this change provides for a variance request process to be individually reviewed by the department.

Branzon Anania supports recommendation 1 to take the exterior wall out of the equation. Randy Williams thought the subcommittee was headed in the right direction. David Kingsland liked recommendation 2, especially section C for space to support dry and frozen food storage. Kevin Lyon supports both recommendations.

Tim Mearig appreciates the work the subcommittee has invested in this project. He had the following comments and concerns:

- The accuracy might be unchanged by changing one word from exterior to interior. It might be just as easy to measure to one or the other of those with equal accuracy.
- Definitions are needed for basements, mezzanines, floor tiers, penthouses, and other words.
- Exterior wall thicknesses have increased, and the department thought about 3 percent, but the subcommittee's study showed a little over 1 percent.
- Exterior wall detail A on page 2 of the report shows an R-30 wall at two different thicknesses and offers two different space calculations, which seems inconsistent.
- Increasing opportunities for variances is good as long as they can be clearly defined and measured.

- Recommendation 2 C for dry and frozen food storage might already be in the current guidelines, and that should be checked for accuracy.

Dale Smythe questioned Tim's comment about wall detail A and explained that it was for information and showed the difference between where a SIP panel was used and a space where electrical was allowed. He agreed they had the same R-value, but the point was that it had the same interior space available to students.

Dale will look into the dry and frozen food storage question, but even if it is in current guidelines, it must not be adequate because it doesn't seem to be giving them what they need.

Dale added that another benefit of moving the measurement to the interior is that the allowable space remains the same, and the site and other elements that are controlled by budget are then dealt with through the design process and limited, but the school is not being penalized for it.

There will be an update and more refinement on the school space project at the December meeting.

COMMITTEE MEMBER COMMENTS
Chair Blackwell appreciated the time the committee members put in both for these meetings and outside of these meetings in subcommittees, and he feels that progress is being made.

ADJOURN
Without objection, the meeting adjourned at 3:44 p.m.

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

Guidelines for Prototype Design

C O V E R M E M O

September 1, 2022

Issue

The department is presenting public comments for the proposed revision to the *Guidelines for Prototype Design for Educational Facilities*, adopted by the committee August 4, 2004.

Background

Last Updated/Current Edition
Guidelines were adopted 2004. Original version is available on the department's website: education.alaska.gov/ facilities/brgr/docs/prototype_design_guidelines_082004.pdf

Summary of Proposed Changes
The proposed revisions to the *Guidelines for Prototype Design for Educational Facilities* were offered in two versions. The first was a minor update to improve clarity regarding appropriate use, and to reference the new *Alaska School Design & Construction Standards* as a possible repository of high-quality implementations. The second version was a comprehensive update to the policy guidance with reference to the new statutory requirements in AS 14.11.013 and 14.11.014. It emphasized alignment with current (and future) CIP application guidance on scoring elements related to this topic. It also referenced and aligned with other department publications. The department prepared these revisions based on discussions and recommendation from the committee at the September 9, 2021, meeting.

No changes were made based on the public comment period.

Version Summary & BRGR Review

This topic was discussed by the committee at the following meetings:

September 9, 2021 – department provided a briefing paper on the history of prototype design/ reuse of plans and options for potential action. BRGR requested proposed revisions for review and potential public comment.

June 27, 2022 – department proposed revisions in two options, one more passive, the other more aggressive. Both reference the CIP application for final scoring provisions. Both reference a range of appropriate use. The committee passed a motion approving version 2 for a period of public comment.

September 1, 2022 – department presented public comment, with no recommended changes to version 2 for a final draft for publication.

Public Comments

The department issued the guidelines for public comment from July 6 – July 28, 2022. Comments were received from three sources. The compiled comments and draft responses prepared by the Facilities section are included with this paper.

BRGR Input and Discussion Items

- Is the committee comfortable with how the guidelines correspond with the statutory role of the BRGR to analyze existing prototype designs for school construction projects (i.e., the department analyzes using application criteria developed by the BRGR.)?
- Does the committee concur that the updated guidelines make a shift to focus to the CIP application scoring and evaluation process?
- Does the committee concur that responsibility for vetting prior design for reuse resides with a district?
- Does the committee concur that, potentially, any prior design can now be considered for CIP application points for planning and design?

Options

Accept DEED draft responses and approve *Guidelines for Prototype Design* (version 2) for publication.

Propose alternate responses to public comments and approve *Guidelines for Prototype Design* (version 2) for publication.

Revise the *Guidelines for Prototype Design* (version 2) based on acceptance of some of the public comments.

Seek additional information.

Suggested Motion

"I move that the Bond Reimbursement and Grant Review Committee approve the proposed responses to the public comments for the *Guidelines for Prototype Design* [*choose:* as presented / as amended] and that the Committee approve the proposed revision of the *Guidelines for Prototype Design* [*option:* with additional revisions from public comments] for publication."

BOND REIMBURSEMENT & GRANT REVIEW COMMITTEE

COMPILED PUBLIC COMMENT AND DRAFT DEED RESPONSES

GUIDELINES FOR PROTOTYPE DESIGNS FOR EDUCATIONAL FACILITIES

JULY 6, 2022 TO JULY 28, 2022

PUBLIC COMMENT RECEIVED	DRAFT DEED RESPONSE
This document looks good. It clearly shows that looking at a prototype approach is legit and encouraged. This document also clearly shows one design does not fit all and any prototype use will take site and user specific modifications. *G. Eckenweiler 7-8-2022*	Thank you for your comment.
Maybe somewhere, CIP application or even on this document districts during concept designing should be required to at least entertain the prototype idea. *G. Eckenweiler 7-8-2022*	Points are available for the CIP application for prototype design or prototype system standards to encourage evaluation and use.
ASD has reviewed and has no comments. *T. Fenoseff 7-21-2022*	Thank you for your review.
As someone who has tried to participate in the process, abet intermittently, I find the information presented by the department seemingly opaque and wonder what could be done to better communicate to practicing Architects, Engineers and School District administrators. *K. Zaccaro 7-25-2022*	Thank you for your comment. The goal of public comment is to make the guidelines as useful as possible. There is a fundamental shift in focus in the guidelines to the AS 14.11 CIP application process. The decision for applicability of reuse of a design is with districts.
Who determines what a good prototypical school is? *K. Zaccaro 7-25-2022*	The policy establishes 'appropriate use' and 'cost effectiveness' as two benchmarks around this question. An entity can use these to evaluate benefits of a prototype design as part of its planning and design processes.
What is the evaluation criteria? *K. Zaccaro 7-25-2022*	In the context of AS 14.11 CIP applications, demonstrated overall cost effectiveness is the criteria. See CIP application instructions for questions 6b and 6c for more detail. For appropriate use, a district could establish their own criteria around the policy's guidance.
Are design professionals included in this evaluation? *K. Zaccaro 7-25-2022*	This is not required but some districts will choose to use design professionals in their appropriate use and cost effectiveness evaluations.

PUBLIC COMMENT RECEIVED	DRAFT DEED RESPONSE
Are there existing examples? (or is simply any reuse of construction documents considered a prototypical school?) *K. Zaccaro 7-25-2022*	School districts may have existing examples. Any reuse of an existing school plan for substantially identical school would meet the definition of a prototype design.
Please see the attached markup with additional thoughts. Let me know if you would like to discuss in more detail. As you can tell I am passionate about education facilities. I also take the responsibility of spending tax money seriously and hope for guidelines that are clear and lead to maximum benefit. *K. Zaccaro 7-25-2022*	Thank you for your comment. The attached markup was reviewed. See responses below.
Who determines success? What factors are considered? WELL Design factors? LEED? Acoustics? Indoor Air Quality? Energy efficiency? Ease of Maintenance? Cost? Educational Outcomes? Teacher retention? User satisfaction? [This comment points to section 1. A. of the guidelines, "Prototype designs may be used as planning tools, and as examples of successful solutions to similar programmatic, space, construction type, and orientation needs."] *K. Zaccaro 7-25-2022*	The policy cites several factors for successful solutions including, education planning objectives, space, modularity, construction type, orientation, and site conditions. Other factors such as you reference may be taken into consideration if desired.
Why is differing education program and user group input left out now? [This comment points to the definition of Prototype Design at the end of the guidelines.] *K. Zaccaro 7-25-2022*	The revised guidelines require a substantially identical facility. Differing programs and user group input were seen as moving away from this standard.

PUBLIC COMMENT RECEIVED	DRAFT DEED RESPONSE
The previous draft referred to post occupancy evaluation of acceptable prototypes. Is this no longer the case? [This comment points to a section of the original guidelines copied and pasted into the current draft, "As part of this reuse development process the district shall do a post-occupancy evaluation of the last prototypical design built and shall have the plans modified to correct items found deficient in this evaluation."] *K. Zaccaro 7-25-2022*	See prior response regarding evaluation factors; a post-occupancy survey could be used. If the survey resulted in substantive changes, the revised design would not be considered a prototype design for the purposes of the AS 14.11 application process. The new guidelines are oriented to design submittals and current CIP applications.
Due process, user group input, educational program needs and technical appropriateness are left out now? [This comment points to section of the original guidelines copied and pasted into the current draft, "Prototype designs shall be used with due process in design review. The review shall include: input by user groups, consideration of the educational program needs and technical appropriateness relative to geographic location, climate, site conditions, orientation and building systems.] *K. Zaccaro 7-25-2022*	See prior responses on evaluation factors. These specific processes may be useful in determining appropriate use of an existing school plan.

From: Gary Eckenweiler
To: Norlund, Wayne A (EED)
Subject: Prototype design comments
Date: Friday, July 8, 2022 10:02:17 AM

Hello Wayne,
This document looks good.
It clearly shows that looking at a prototype approach is legit and encouraged.
This document also clearly shows one design does not fit all and any prototype use will take site and user specific modifications.

Maybe somewhere, CIP application or even on this document districts during concept designing should be required to at least entertain the prototype idea.

Thank you

Gary Eckenweiler
Director Facilities / Maintenance
Bering Strait School District
907 624-4249
geckenweiler@bssd.org

From: fenoseff_thomas
To: Weed, Lori (EED)
Subject: RE: BRGR Seeking Public Comment: Revised Guidelines on Prototype Use
Date: Thursday, July 21, 2022 12:40:55 PM
Attachments: image001.png

Lori,

ASD has reviewed and has no comments.

Respectfully,

Tom Fenoseff, PMP, F.SAME
Senior Director, Capital Planning & Construction
Anchorage School District
Office: (907) 348-5223
Fax: (907) 348-5227
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Anchorage, AK 99515-3517

Educating All Students for Success in Life
www.asdk12.org

From: Weed, Lori (EED) <lori.weed@alaska.gov>
Sent: Thursday, July 21, 2022 9:35 AM
To: Norlund, Wayne A (EED) <wayne.norlund@alaska.gov>
Subject: RE: BRGR Seeking Public Comment: Revised Guidelines on Prototype Use

Correction – closes on July 28, thank you.

Reminder: seeking public comment on the BRGR's proposed revisions to the *Prototype Designs for Educational Facilities.* The comment period closes next week, July 28 at 1pm.

From: Weed, Lori (EED)

Sent: Wednesday, July 6, 2022 11:24 AM
To: Norlund, Wayne A (EED) <wayne.norlund@alaska.gov>
Subject: BRGR Seeking Public Comment: Revised Guidelines on Prototype Use

TO: Interested Parties

The Department of Education and Early Development (DEED) and Bond Reimbursement and Grant Review Committee (BRGR) are seeking public comment on a proposed revision to *Prototype Designs for Educational Facilities*, originally adopted in 2004 under AS 14.11.014(a)(4). The revisions delineate the conditions where prototype designs, including building systems, are to be considered appropriate by DEED and how reuse of school designs and building system standards should be encouraged under AS 14.11.013(a)(4), when that use results in cost savings for the project.

This new draft is a comprehensive revision to the 2004 guidelines. Key modifications include:

- Updated to reflect current statutory requirements.
- Updated to coordinate with current and future Capital Improvement Project (CIP) application guidance on relevant scoring elements.
- Provides definitions of Prototype Design and Prototype Building System for clarity.
- Adds references to, and aligns with, other current DEED publications.

If you are interested in commenting on the attached draft you may comment through the public notice or e-mail your comments to Wayne.Norlund@alaska.gov no later than 1:00 p.m. on July 28, 2022.

Thank you,

Lori Weed
FSS/Facilities, School Finance Specialist II
Department of Education and Early Development
(907) 465-2785 | lori.weed@alaska.gov

PROTOTYPE DESIGNS for EDUCATIONAL FACILITIES

Guidelines Adopted by the BR&GR Committee June27, 2022
This Supersedes Guidelines Adopted August 4, 2004

Purpose: These guidelines are in response to the Committee's statutory responsibility established in AS 14.11.14(b)(4). They are to support analysis of school facility designs for reuse and to support such use when appropriate in accordance with AS 14.11.013(a)(4).

1. To support School Districts in the appropriate use of **Prototype Designs** and **Prototype Building Systems**, appropriate use is established as:

   A. Prototype designs may be used as planning tools, and as examples of successful solutions to similar programmatic, space, construction type, and orientation needs.

   B. Prototype designs with sufficient modularity may be used beyond the planning stage to achieve a project serving a substantially different population by removing or adding classrooms or academic wings but leaving core spaces intact. It is anticipated that only moderate revisions to the prototype design will be required. Such projects will need to conform to provisions in regulation for oversized cores when being considered for eligible space.

   C. Prototype designs may provide full construction documents for solicitation of bids or propos when multiple iterations of a specific school facility will meet district educational planning objectives. This normally occurs during periods of rapid population growth but can also occur in response to catastrophic loss of an existing school. Substantial variations in site conditions may preclude appropriate use of a prototype design.

   D. Prototype building systems may be developed and used for any system identified within levels two through four of the DEED CostFormat. Prototype system solutions can range from complete, turnkey level-two systems (e.g., Substructure, Roof Systems, Mechanical, etc.) to component-based elements at a level-four subsystem (e.g., Fencing & Gates, Heat Recovery System, Food Service & Kitchen Equipment, etc.). Documentation of the system as approved within a published district standard is needed and may range from drawings, to specifications, to narratives as needed to fully describe a system for incorporation into construction documents.

2. **Use of prototype design submittals as scoring criteria for CIP applications:**

   A. Qualifying prototype design documents may be used to establish district progress toward the completion of the planning and design phases and this progress may be used to evaluate the **planning & design scoring element**. Generally, subject to approved CIP application and instructions documents:

      i. Planning tool uses, as identified in 1.A., may qualify a CIP application as meeting Concept Design requirements provided the application establishes the similarities and differences between the prototype design and the proposed design.

      ii. Design uses, as identified in 1.B., may qualify a CIP application as meeting Schematic Design requirements provided the application provides commensurate drawings and narratives documenting anticipated changes.

      iii. Design uses as identified in 1.C., may qualify a CIP application as meeting Design

who determines success?
What factors are considered?
WELL Design factors?
LEED?
Acoustics?
Indoor Air Quality?
Energy efficiency?
Ease of Maintenance?
Cost?
Educational Outcomes?
Teacher retention?
User satisfaction?

Development requirements provided the application provides information supporting that such use meet education planning objectives without substantive changes.

B. Qualifying prototype design and prototype building system documents may be used for the **scoring element evaluating the cost effectiveness** of using a prior school design.

3. The role of the Department of Education & Early Development regarding use of prototype designs and prototype building systems is to act as a resource and facilitator for school districts choosing to use this design approach. To this end, DEED Facilities will work with school districts and design professionals in collecting, publishing, and distributing Best Practices/Lessons Learned, primarily within the *Alaska School Design and Construction Standards*.

Definitions

Prototype Design: consists of design and construction documents for a school facility that are proposed for reuse in providing a substantially identical subsequent school facility. Acceptable deviations from original documents include those for adaptation to differing site conditions and updated building codes.

Prototype Building System: consists of design documents or similarly detailed descriptions documented in a published district standard, of building systems or components proposed for reuse in providing a substantially identical system that is part of a school facility.

The previous draft referred to post occupancy evaluation of acceptable prototypes. Is this no longer the case?

Why is differing education program and user group input left out now?

Prototype designs may also cover full contract documents which could be modified for special conditions. A single district may have Prototype Designs which were designed for specific locations and then developed for reuse in other locations. As part of this reuse development process the district shall do a post-occupancy evaluation of the last prototypical design built and shall have the plans modified to correct items found deficient in this evaluation. The prototypical design shall be customized to adjust to each new site and its conditions. This type of Prototype Design shall be revised as necessary for selected sites, differing educational programming, user group input and code changes.

. Prototype designs shall be used with due process in design review. The review shall include: input by user groups, consideration of the educational program needs and technical appropriateness relative to geographic location, climate, site conditions, orientation and building systems.

Due process, user group input, educational program needs and technical appropriateness are left out now?

PROTOTYPE DESIGNS for EDUCATIONAL FACILITIES

Guidelines Adopted by the BR&GR Committee [DATE]
This Supersedes Guidelines Adopted August 4, 2004

Purpose: These guidelines are in response to the Committee's statutory responsibility established in AS 14.11.14(b)(4). They are to support analysis of school facility designs for reuse and to support such use when appropriate in accordance with AS 14.11.013(a)(4).

1. To support School Districts in the appropriate use of **Prototype Designs** and **Prototype Building Systems**, appropriate use is established as:

   A. Prototype designs may be used as planning tools, and as examples of successful solutions to similar programmatic, space, construction type, and orientation needs.

   B. Prototype designs with sufficient modularity may be used beyond the planning stage to achieve a project serving a substantially different population by removing or adding classrooms or academic wings but leaving core spaces intact. It is anticipated that only moderate revisions to the prototype design will be required. Such projects will need to conform to provisions in regulation for oversized cores when being considered for eligible space.

   C. Prototype designs may provide full construction documents for solicitation of bids or proposals when multiple iterations of a specific school facility will meet district educational planning objectives. This normally occurs during periods of rapid population growth but can also occur in response to catastrophic loss of an existing school. Substantial variations in site conditions may preclude appropriate use of a prototype design.

   D. Prototype building systems may be developed and used for any system identified within levels two through four of the DEED CostFormat. Prototype system solutions can range from complete, turnkey level-two systems (e.g., Substructure, Roof Systems, Mechanical, etc.) to component-based elements at a level-four subsystem (e.g., Fencing & Gates, Heat Recovery System, Food Service & Kitchen Equipment, etc.). Documentation of the system as approved within a published district standard is needed and may range from drawings, to specifications, to narratives as needed to fully describe a system for incorporation into construction documents.

2. **Use of prototype design submittals as scoring criteria for CIP applications:**

   A. Qualifying prototype design documents may be used to establish district progress toward the completion of the planning and design phases and this progress may be used to evaluate the **planning & design scoring element**. Generally, subject to approved CIP application and instructions documents:

      i. Planning tool uses, as identified in 1.A., may qualify a CIP application as meeting Concept Design requirements provided the application establishes the similarities and differences between the prototype design and the proposed design.

      ii. Design uses, as identified in 1.B., may qualify a CIP application as meeting Schematic Design requirements provided the application provides commensurate drawings and narratives documenting anticipated changes.

      iii. Design uses as identified in 1.C., may qualify a CIP application as meeting Design

Development requirements provided the application provides information supporting that such use meet education planning objectives without substantive changes.

B. Qualifying prototype design and prototype building system documents may be used for the **scoring element evaluating the cost effectiveness** of using a prior school design.

3. The role of the Department of Education & Early Development regarding use of prototype designs and prototype building systems is to act as a resource and facilitator for school districts choosing to use this design approach. To this end, DEED Facilities will work with school districts and design professionals in collecting, publishing, and distributing Best Practices/Lessons Learned, primarily within the *Alaska School Design and Construction Standards*.

Definitions

Prototype Design: consists of design and construction documents for a school facility that are proposed for reuse in providing a substantially identical subsequent school facility. Acceptable deviations from original documents include those for adaptation to differing site conditions and updated building codes.

Prototype Building System: consists of design documents or similarly detailed descriptions documented in a published district standard, of building systems or components proposed for reuse in providing a substantially identical system that is part of a school facility.

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

Project Delivery Method Handbook

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

September 1, 2022

Issue

The department seeks committee approval to finalize and publish the revised *Project Delivery Method Handbook*.

Background

Last Updated/Current Edition
Publication last updated in 2017. Current edition available on the department's website: education.alaska.gov/facilities/publications/project_delivery_handbook.pdf.

Summary of Proposed Changes
This proposed publication is a fairly straightforward update of the prior publication. Key revisions/additions to the publication address the following:

- Updated to reflect 2019 regulation changes;
- Updated formatting and organization to better meet WCAG 2.0 accessibility standards;
- Replaced Appendix containing a copy of request template with a list of items to be addressed in a request. The associated template has been updated to a more usable format.

No changes were made based on public comment period.

Version Summary & BRGR Review
Drafts of the publication were presented to the committee at the following meetings:

April 20, 2022 – initial draft presented and approved for a period of public comment.

September 1, 2022 – final draft presented for approval and publication.

Public Comment

The department issued the publication for public comment from May 20 – June 20, 2022. No public comment was received.

BRGR Input and Discussion Items

No discussion items came up during the public comment process.

Options

Approve final publication for issuance and use by the department.
Amend final publication and approve for issuance and use by the department.
Seek additional information.

Suggested Motion

"I move that the Bond Reimbursement and Grant Review Committee approve the department's proposed update of the *Project Delivery Method Handbook* for issuance and use by the department."

Project Delivery Method Handbook

State of Alaska - Department of Education & Early Development **2nd Edition**
Finance & Support Services / Facilities **September 2022**
DRAFT FOR APPROVAL

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State of Alaska
Bond Reimbursement & Grant Review Committee

ACKNOWLEDGEMENTS

A majority of this publication was modeled on the documents prepared and published by the Georgia State Financing and Investment Commission in Volumes 1 and 2 of their Project Delivery Options – Recommended Guidelines. In addition, the department is indebted to efforts by Mike Kenig, Holder Construction, in facilitating a workshop for stakeholders involved in school capital projects in Alaska having state aid. His expertise and consensus direction for the Department of Education & Early Development's administration of project delivery options is reflected throughout the document.

Table of Contents

Introduction

In 1978, the Department of Education & Early Development (DEED) began regulating school capital projects following passage of legislation amending then existing statutes to include a requirement to:

> *. . . review plans for construction of new public elementary and secondary schools and for additions to and major rehabilitation of existing public elementary and secondary schools and . . . determine and approve the extent of eligibility for state aid of a school construction project . . . . [AS 14.07.020(11)]*

By 1981, DEED had taken over full responsibility for administering state aid for school capital projects from the Department of Transportation & Public Facilities. One of the key components in administering capital funding was to establish procedures for the procurement of construction services. By statute, political subdivisions of the state, including school districts in unorganized areas of the state, are exempt from the state's procurement code (ref. AS 14.08.101). Accordingly, and under its powers, DEED established some minimum provisions for the procurement of construction by regulation in 1983 (ref. 4 AAC 31.080).

These provisions reflect key elements of the state's procurement code, including:

- competitive sealed bids;
- minimum advertising and notice periods;
- processes for aggrieved bidders; and
- award to the lowest responsible and responsive bidder.

Although adequately advertised competitive sealed bids awarded to the low offeror form the basis of DEED's process, identified in this handbook as "Design-Bid-Build", regulations include a provision to allow a school district to use a design/build contracting method with DEED approval and district compliance with any DEED directives.

DEED began to see an increasing interest in alternative construction delivery methods beginning with a project funded in July 1998 for an addition/renovation project in Buckland. Following that date and through mid-2003, the department acted on several requests for alternative construction delivery. In each case, under the provisions of regulations, DEED approved a request for a non-traditional delivery method with varying stipulations and under various titles such as CM/Multiple Prime, and Design Assist.

Prior to that time period, there was a series of design-build efforts in the Bering Strait School District. Primarily, these were accomplished on schools damaged or destroyed by fire and did not have direct state aid but were funded with insurance proceeds.

In addition to the Bering Strait experience, the Anchorage School District also had experience using the design-build delivery method on school projects. These projects include an elementary school constructed with state aid (Williwaw Elementary - 1993) and several projects without any state aid (ABC Elementary, Russian Jack Elementary, and Government Hill Elementary).

The procurement results from solicitations of projects approved for alternative delivery methods raised significant questions regarding procedures, competition, and prices. This led the Facilities staff at

DEED to seek a "moratorium" on alternative construction delivery. The moratorium, ultimately not implemented, was intended to provide time for DEED and its constituents to sort out issues, apply lessons learned and develop a more coordinated, defensible, and effective approach to alternative delivery methods and their approval.

Following is a list of concerns brought to light over the course of the prior years of activity:

- DEED had approval authority for design-build but had granted approval ad-hoc for other construction delivery variants, some not recognizable within industry norms.
- Design-build approvals had been granted for projects where design ranged from 50% to 99% complete.
- Design-build criteria packages establishing an *Owner's* performance requirements were noticeably absent; partially complete detailed designs were the substitute document.
- Design-build approvals had been granted for projects in which the *Owner* directed the use of a specific team of design professionals.
- Bid solicitations on comparable projects had resulted in no fewer than four and as many as eight offerors, however, three projects approved for design-build had only two offerors; the same two for each project.
- Bid solicitations on comparable projects in the same time periods had resulted in construction awards up to 35% below (approx. 12% average) the estimated construction cost; however, projects approved for design-build had typically used all available design and construction funds.
- A project was approved for CM/GC where the proposed total construction cost was not a factor in the selection process.
- Factors not germane to the lowest cost to the state, or at best difficult to measure, were heavily influencing alternative project delivery procurement; primarily this related to the incorporation of local hire initiatives.
- Alternative delivery methods approved, which incorporated multiple prime contracts and *Owner*-procured materials, were fraught with expensive "corrections".

A 2003 workshop jointly conducted by DEED and the Alaska chapter of the Association For Learning Environments (A4LE—previously CEFPI) laid the groundwork for this publication. In the public sector, the central issue in moving from a low-bid process to any of the alternative project delivery methods is the shift in influence that the public entity wields in the selection process. In the low-bid process, where the only significant factor differentiating between offerors is price, the *Owner* is essentially "blind" to factors of experience, capacity, personnel, political ties, etc. While this can occasionally result in selection of a less desirable contractor, it always provides an arms-length separation between the *Owner* and contractor selection. It essentially removes the possibility of undue influence. A secondary effect of the exclusive focus on price is that offerors are forced to become price-competitive. This generally serves to drive the initial cost to the *Owner* to the lowest level.

A move to alternative project delivery methods is a move toward *Owner* influence and subjectivity in the procurement of construction. It also provides conditions in which the cost of the work is secondary and therefore potentially higher. However, the benefits to the *Owner* are numerous and are best summarized with the term "best value". All factors considered—cost, quality, experience, schedule,

etc.—*Owners* are more likely to receive a product that meets all of their objectives using a project delivery method that incorporates both qualifications and cost.

For DEED, and other public entities, the need is to establish the proper balance between complete control of *Owners* to choose a "most favored" contractor and the complete lack of control by *Owners* with the choice made for them based on lowest initial cost. This handbook provides the guidance and provisions to meet those standards of care.

Ability to Use Alternative Project Delivery

Introduction

The Alaska Department of Education & Early Development strongly supports full and open competition among general and specialty contractors and their suppliers and service providers. The construction industry's health and integrity depends on every qualified firm having an equal opportunity to compete for work. Public owners must be diligent in honoring the public trust while searching for the most efficient and cost-effective approaches to delivering construction projects. These efficiencies and cost-effective methods increasingly require innovation and flexibility. The public owners who choose alternative project delivery options must ensure the method chosen is properly and fairly used to serve the public interest and provides quality, cost-effective and timely construction. Whatever option is utilized, the selection process for both design services and construction should be consistent, open and competitive.

Of the delivery options discussed in this Handbook, none is prohibited by the laws of Alaska. However, given current state policy and statutory requirements, the "traditional" method of Design-Bid-Build will continue to be the method by which most construction will be performed in Alaska's school districts. This section of the handbook suggests that alternative project delivery options are appropriate for the public sector if the selection process is as open, fair, objective, cost-effective, and free of political influence as the traditional competitive bid method. Specific approval may be required for the use of an alternative delivery method on school projects incorporating state-aid, see statute and regulation below. For instructions on how to get the necessary approvals, contact your agency procurement professionals or the State of Alaska, Department of Education & Early Development.

Alaska Statutes and Administrative Code

Alaska Statutes

Alaska statutes provide for innovative procurements under the state procurement code and include the provisions that such procurements be competitive and that they test best value.

> AS 36.30.308. Innovative procurements.
>
> (a) A contract may be awarded for supplies, services, professional services, or construction using an innovative procurement process, with or without competitive sealed bidding or competitive sealed proposals, in accordance with regulations adopted by the commissioner. A contract may be awarded under this section only when the chief procurement officer, or, for construction contracts or procurements of the state equipment fleet, the commissioner of transportation and public facilities, determines in writing that it is advantageous to the state to use an innovative **competitive procurement** process in the procurement of new or unique requirements of the state, new technologies, or to achieve **best value**.

Statutes acknowledge that all school districts, whether in political subdivisions of the state or in regional education attendance areas, are exempt from the state's procurement code (excepting a few areas such as prevailing wage requirements) and may develop their own procurement policies.

AS 14.08.101. Powers. A regional school board may . . .

(3) determine its own fiscal procedures, including but not limited to policies and procedures for the purchase of supplies and equipment; the regional school boards are exempt from AS 37.05 (Fiscal Procedures Act) and AS 36.30 (State Procurement Code)

Alaska Administrative Code

Notwithstanding that recipient entities of funding administered under AS 14.11 are exempt from the state procurement code, DEED has provided, through regulation, requirements for construction procurement. These requirements are based on those factors of procurement that are critical to a competitive process (e.g., advertising periods, bid protest periods, etc.). The regulations also establish that competitive sealed bids will be the normal procurement method but provide for other alternatives.

4 AAC 31.080. Construction and acquisition of public school facilities.

(a) A school district shall construct a public educational facility with money provided through a grant under AS 14.11.011 - AS 14.11.020 or shall construct a public educational facility that is eligible for reimbursement under AS 14.11.100 under a written contract awarded on the basis of competitive sealed bids. If the estimated construction cost is less than $100,000 or if it is in the best interests of the state, the school district may, with the approval of the commissioner, construct the educational facility itself using its own employees.

(b) The school district shall publish the first notice of its solicitation at least 21 days before the opening of the offers. The department may approve a solicitation period shorter than 21 days when written justification submitted by the school district demonstrates that a shorter solicitation period is advantageous for a particular project and will result in an adequate number of responses. A school district may provide additional notice by mailing its solicitation to contractors on any list it maintains, and any other means reasonably calculated to provide notice to prospective offerors. The district shall provide notice of its solicitation by publication at least three times in a newspaper of general circulation in the state. The department may approve an alternate means of notice through publication on the Internet if the website has the express purpose of advertising similar solicitations, has unrestricted public access, and is equally likely to reach prospective offerors.

(c) The school district shall provide for the administrative review of a complaint filed by an aggrieved offeror that allows the offeror to file a bid protest, within 10 days after notice is provided of intent to award the contract, requesting a hearing for a determination and award of the contract in accordance with the law. The school district shall provide notice to all interested parties of the filing of the bid protest.

(d) The award of a contract for the construction of an educational facility under this section must be made without regard to municipal ordinances or school board resolutions granting a preference to local offerors.

(e) The department may deny or limit its participation in the costs of construction for a project eligible for grant funding under AS 14.11.011 or for reimbursement under AS 14.11.100 if the school district does not comply with the requirements of this section.

(f) Nothing in this section precludes a school district from using an alternative construction delivery method as defined and described in the Project Delivery Method Handbook, 2nd Edition, September 2017, adopted by reference, if the department approves the method in advance of any solicitation, the proposed method is in the state's best interest, and the school district concurs in any directives the department makes concerning the type of selection and award of the contract. The department may deny or

suspend use of an alternative construction delivery method by a school district if the department concludes, based on substantial evidence, that use or repeated use of a delivery method by the school district has resulted or will result in limited competition or higher costs.

(g) A school district may, with prior approval by the department, enter into a lease or purchase agreement for, or accept a donation of, an existing facility for use as an education-related facility if

(1) for the purchase, lease, or accepted donation of an existing facility, a cost saving over new construction is achieved;

(2) the purchase or lease price is arrived at through impartial negotiation and is supported by a real estate appraisal that meets accepted standards; and

(3) the purchase, lease, or donation is in the best interests of the state and the school district.

(h) Notwithstanding (a) of this section, a school district may use any competitive procurement methodology for its solicitation for a public educational facility that is practicable under the circumstances to procure construction services that are estimated not to exceed $100,000, inclusive of labor and materials. A school district may not artificially divide or fragment a procurement so as to constitute a purchase under this subsection or to circumvent the selection procedures otherwise required by this section.

(i) The department may deny or limit its participation in the costs of a school capital project if the real property for the project is acquired by a school district through purchase, lease, or donation without the approval of the department under (g) of this section.

Overview of Project Delivery Options

Introduction

The purpose of this section is to establish a framework for understanding and selecting the appropriate project delivery option. It is critical to have consensus on a list of project delivery options and on the definition of each of the delivery options. Definitions of the options are discussed in this section and reiterated for quick reference in Appendix A. Understanding the differences in project delivery options requires an awareness of two independent factors, the structure of the *Owner's* prime contract(s) for the project and the provisions under which the selection of the project delivery entities (i.e., *Designer* and *Constructor*) are made. Each project delivery option is defined by a unique combination of *contract type* and *selection method*. Embedded in the definitions of each project delivery option, there are two basic terms that are used as selection-method differentiators for the alternative project delivery methods. These terms are *total construction cost* and *construction cost of work*.

Selection Differentiators

Construction Cost of Work is one of the three factors that comprise the Total Construction Cost:

Construction Cost of Work
\+ General Conditions
\+ Contractor's Fee
Total Construction Cost

It represents the "fixed" costs of labor and materials as provided for in the project scope. In addition to the Construction Cost of Work, the Total Construction Cost includes the contractor's General Conditions (i.e., its overhead—the cost of doing business) and the Contractor's Fee (i.e., its profit).

This handbook uses the definition of a "project delivery option" as a method of procurement by which the *Owner's* assignment of "delivery" risk and performance for design and construction has been transferred to another party or parties. These parties typically are a *Design* entity that takes responsibility for the design, and a *Construction* entity that takes responsibility for performance of construction. However, a key principle of alternative project delivery is that benefits are available to *Owners* when these traditionally distinct entities are strategically aligned or even merged. It is when these benefits outweigh the risks that an alternative project delivery method becomes advisable. The relationship between these parties and the *Owner* is the second determinant in establishing a project delivery option. While no further attempt to define the terms *designer* and *contractor* are necessary—the terms being well understood within the industry—the terms used to describe the alignment or merging of these entities is unique to the project delivery discourse. These terms (*Design-Build*, *CM/GC*, etc.) often become points of significant distraction when attempting to "debate" the merits of alternative project delivery. Fortunately, for the purposes of this handbook, the sole understanding of these terms need only occur within the context of how an *Owner* chooses to contract with the *Designer* and *Constructor*.

Contract Differentiators

Owner holds one contract for both Design & Construction = *Design-Build*
Owner holds separate contracts for Design & Construction = *CM/GC* or *Traditional*

Selection Method Factors

Another key aspect related to the use of any project delivery option is the procurement and selection process to be followed, particularly as it relates to the construction services. There are two basic public procurement processes: competitive sealed bid and competitive sealed proposal. Under *competitive sealed bids*, the selection is made solely based on price (which must be clearly defined), with the award going to the responsible and responsive bidder submitting the lowest price. *Competitive sealed proposals* on the other hand require the use of evaluation factors that may or may not include price elements (i.e., cost, fee, etc.) as part of the evaluation criteria.

Under the two basic procurement processes, there are three selection methods that may be followed with proposals and one for bids.

For proposals:

- Qualifications (excluding any cost factors)
- Qualifications and Costs Factors (excluding the *Construction Cost of Work*)
- Qualifications and *Construction Cost of Work*

For bids:

- *Total Construction Cost* (excluding any qualifications)

A Word About "Price"

To appreciate the explanation of the difference between Competitive Sealed Bids and the two types of Competitive Sealed Proposals (cost and qualifications), it is helpful to have an understanding of the Total Project Cost.

Total Construction Cost
\+ Design Fees
Total Design & Construction Cost
\+ Balance of Project Costs
Total Project Cost

It is recommended that caution be used any time the word "price" is used and further clarification be offered to better determine which of the element(s) of the Total Project Cost is being referred to when the word price is mentioned.

Contract Type Factors

The contract type component of the project delivery options is related to the number of primary contracts for design and construction, and the basic services provided. The three primary contract types are defined with their distinguishing characteristics as follows:

- *Designer & General Contractor* (two prime contracts, one with each entity, *Designer* and *Constructor* with the GC contract after design is complete).
- *Designer & Construction Manager/General Contractor* (two prime contracts, *CM/GC* contract may provide for design related management services (e.g., cost estimating, constructability review, etc.) prior to construction).
- *Designer/Constructor* (single contract for design and construction with one entity).

The Matrix: Selection Method and Contract Type

Conceivably, any contract type can be implemented with any selection method. However, some combinations may not be practical, desirable, or prudent in most circumstances. The dual decisions to (a) use a particular contractual arrangement, and (b) use any of the four selection methods should be

made concurrently. As discussed in the following section, **Project Delivery Method Selection Criteria & Processes**, the decision must also consider several *Owner* and project related critical factors such as:

- The desired contractual and working relationship between the parties
- The timing and scope of services to be provided
- The timing and extent of detailed project information available to support the procurement/selection process.

Given the above, the balance of this section of the handbook discusses those combinations of contract type and selection method that yield project delivery methods suitable for the public procurement arena and that are accepted by the Alaska Department of Education & Early Development. Also, for the sake of simplicity, titles for each project delivery option are introduced that most closely align industry terminology with the department's goals for each of the delivery options. For example, the traditional public sector delivery method of having separate design and construction contracts, and where the contractor is selected by evaluating the lowest *total construction cost* offered, is most commonly referred to as **Design-Bid-Build**.

The complete list of project delivery options treated in this handbook, along with the corresponding selection method is:

1. **Design-Bid-Build** – competitive sealed bids (D-B-B)
2. **Construction Management/General Contractor** – competitive best value of cost and qualifications (CM/GC BV)
3. **Construction Management/General Contractor** – competitive qualifications (CM/GC QBS)
4. **Design-Build** – competitive best value of cost and qualifications (D-B BV)
5. **Design-Build** – competitive qualifications (D-B QBS)
6. **Design-Build** – competitive sealed bids or proposals (D-B Bid)

Many who are primarily familiar with Design-Bid-Build think of Design-Build as the only "alternative" delivery option. Several states' attempts at legislating alternative project delivery have been very successful in adding one or two options to the traditional list of one (Design-Bid-Build). Few it seems, however, have included all the options very clearly.

Again, since there are no industry standard definitions, everyone has chosen a slightly different set of characteristics to define various delivery options. The **Project Delivery Option Matrix** (see page 12) takes this to its simplest form and identifies the characteristics that this handbook uses to uniquely define each option. Each individual can take any delivery option, test it against these criteria, insert their own names and they will be able to align the name of their method with the names chosen for use by DEED for review and approval of project delivery options listed in the matrix. If a contract type and selection method cannot be categorized as a version of these six basic options, the reader is encouraged to contact DEED/Facilities for clarification and assistance.

The following discussion provides the definitions chosen for each of the project delivery options. In order to have a definition that works in as many situations as possible, DEED limited the number of characteristics used to define each option to three unique variables. By having a unique combination of these three defining variables, each delivery option is "uniquely" defined.

There are many "other" characteristics that apply to each of these options. Some of these "other" characteristics are typical characteristics of a particular delivery option but are not used in this handbook as a "unique" defining characteristic. The following example explains why:

> *Pre-construction Services*—work provided by a *Constructor* prior to construction start—are typically provided with the CM/GC project delivery option. Are preconstruction services essential to the definition of this delivery option? Could one use CM/GC, hiring a contractor based on criteria other than low price, after the design is already complete and the need for preconstruction services no longer required? Would this still be CM/GC? Based on the definition used in this handbook, the answer is yes.
>
> If pre-construction services were a "unique" characteristic, then you would have to have two types of CM/GC, one with and one without preconstruction services. This would not be right or wrong. The challenge would be where to stop. The more characteristics used to define a delivery option, the more "unique" combinations and thus, the more delivery options you would end up with on your list.

The goal was to keep the definitions used in this handbook as broad and essential as possible so they will work with most industry accepted definitions. Therefore, for purposes of this handbook, characteristics such as preconstruction services are considered to be one of the "other" characteristics (though typical) of CM/GC, but not a "unique" defining characteristic of CM/GC.

Finally, before describing in detail the consensus delivery methods being made available for school capital projects through this handbook, it is appropriate to acknowledge three other project variants. The first, Force Account, is an alternate delivery method sometimes seen in Alaskan projects. The second, Multiple Prime Contracts, is a project strategy which, ultimately, will use one or more of the project delivery options described in this handbook. The third, Construction Management, has two common variations and is a project or program management strategy.

Force Account, sometimes referred to as 'In-House' on projects with small scopes, is a project delivery method in which there is neither a solicitation nor a contract between parties performing design and construction. Under this delivery method, the *Owner* serves as the *Constructor* and uses labor from its own forces—or direct-hired to supplement its forces—to complete the work. Since, under this delivery method, all risk is borne by the *Owner*, it is best used only on low-risk projects. DEED regulations provide for approval of Force Account or In-House project execution if the estimated cost is less than $100,000, or if it is determined to be in the best interest of the state (ref. 4 AAC 31.080(a).

> Multiple Prime Contracts is a project strategy that, in response to issues in the project environment, divides a project into discrete project elements or project phases and uses separate solicitations and contracts for each. Care must be taken to coordinate these contracts well. This project strategy can result in increased risk to the *Owner* when the work of one *Designer* or *Constructor* must be relied on by another to perform their work. DEED has no regulations prohibiting this project strategy, but each work element must be procured in compliance with regulations. (See page **Primary Factor:** *Ability to Participate in Multiple Trade Contractor/Supplier Evaluations* 28 for additional discussion of this strategy.)

Construction Management is a project or program management strategy. Construction Management professionals—often also Architects and Engineers—serve Owners in managing individual projects or entire capital project programs. The two most common contract structures for construction management services are CM-Advisor and CM-At Risk. A CM-Advisor serves as the Owner's principal agent to advise or manage all process over the life of the project regardless of the delivery method used. Alaska statutes (AS 14.11.020) provide for construction management activity on school capital projects with state-aid and implement some restrictions on the cost of this service as a portion of the project's appropriation. Under a CM-At Risk contract, the Owner not only uses a construction manager in the project development phases but also assigns that CM a construction performance role—essentially making that CM the legal equivalent of a general contractor or *Constructor*. There is inadequate statutory and regulatory authorization for awarding a CM-At Risk contract that ensures fair, open, and competitive selection for construction elements of a school project or projects. **As such, CM-At Risk contracts are not permitted for use on projects with funding under AS 14.11.**

There are three Yes/No toggles in the delivery option determination matrix, three questions that when answered in the affirmative or negative, provide the project delivery options from which an Owner may select. The combination of factors combines to create six, and only six, options under which a school capital project may be delivered. The three questions are these—

1. Are the *Designer* and *Constructor* contracts combined (or separate)?
2. Is the *Construction Cost of Work* a selection criteria?
3. Is the *Total Construction Cost* the sole selection criteria?

The resulting delivery options are as shown in the following table.

Project Delivery Options Matrix

SELECTION	DESIGNER & CONSTRUCTOR (SEPARATE CONTRACTS)	DESIGNER & CONSTRUCTOR (SAME CONTRACT)
Competitive Sealed Bid (Low Bid) **Total Construction Cost is sole criteria for selection**	**Design-Bid-Build**	**Design-Build-Bid**
Competitive Cost Proposal (Best Value) **Total Construction Cost weighted with other factors for selection**	**CM/GC Best Value (BV)**	**Design-Build Best Value (BV)**
Competitive Qualifications Proposal (Qualifications Based Selection) **Total Construction Cost not a factor for selection**	**CM/GC (QBS)**	**Design-Build (QBS)**

In the following discussion, the unique combination of characteristics is listed for each project delivery option along with some "other" characteristics that are typical of each option but not defining. An overview of the typical phases of each delivery option is also covered.

Design-Bid-Build (D-B-B)

Design-Bid-Build (D-B-B) is the most common project delivery option. It is often referred to as the "traditional" method. For school projects in Alaska with a state contribution, Design-Bid-Build is the default delivery method. All other project delivery options require a specified approval.

Unique Characteristics

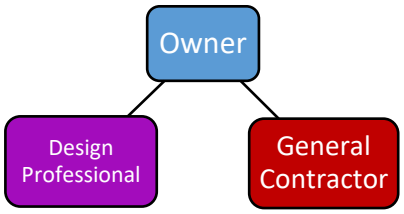
There are three prime players: *Owner*, *Designer*, and *Constructor* (general contractor).

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	NO
Is the *Construction Cost of Work* a selection criteria?	YES
Is the *Total Construction Cost* the sole selection criteria?	YES

Contractor selection: Based on *Total Construction Cost* with the award going to the lowest responsible and responsive bidder.

Design-Bid-Build (Two Separate Contracts for Design & Construction)



Other Characteristics

- Relationship of Phases: Linear sequencing of each of the project phases
- Ability to Bring *Constructor* on Board During Design: **No**
- Risk Allocation: Design risk (quality) allocated to *Designer*; Construction risk (cost and schedule) allocated to general contractor after design is complete and completion of bid and award phase; *Owner* is responsible for adequacy and completeness of design.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A delivery option is selected and corresponding budget and schedule are also established.
- Design – When the Planning has been completed, the *Owner* selects and engages the design team for the design and preparation of construction documents.
- Award – When design documents are complete, they are used for construction bidding. A *Constructor* is selected based on the lowest responsible and responsive price offer and construction cost commitments are made.
- Construction – The *Owner* contracts for construction with the general contractor and the project is built.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and

furnishings) and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Construction Manager/General Contractor Best Value (CM/GC BV)

Unique Characteristics

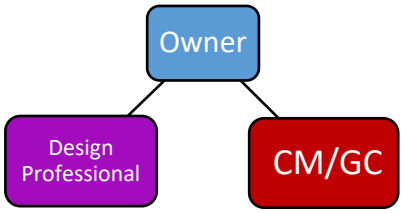
There are three prime players: *Owner*, *Designer* and *Constructor* (manager-general contractor).

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	NO
Is the *Construction Cost of Work* a selection criteria?	YES
Is the *Total Construction Cost* the sole selection criteria?	NO

CM/GC selection: Based on a best value weighting of *Total Construction Cost* with other factors; the award goes to the CM/GC that best meets the predefined qualifications and cost selection criteria.

CM/GC (BV)
(Two Separate Contracts for Design & Construction)



Other Characteristics

- Relationship of Phases: Can accommodate overlapping of each of the project phases
- Ability to Bring Constructor on Board During Design: **Yes**
- Risk Allocation: Design risk (quality) allocated to *Designer*; Construction risk (cost and schedule) allocated to CM/GC at the time of selection based on the design documents at the point in time of the selection. *Owner* is responsible for adequacy and completeness of design.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A delivery option is selected and corresponding budget and schedule are also established.
- Design – When the Planning has been completed, the *Owner* selects and engages the design team for the design and preparation of construction documents.
- Award – Generally prior to the completion of design documents, a CM/GC is selected based on a combination of price and qualifications and a guaranteed maximum price for construction is established at selection.
- Construction – The *Owner* contracts for construction with the CM/GC who then contracts with the various trade contractors using cost as the primary selection criteria. The CM/GC can be available during the final design phase to assist in constructability and budget reviews. Work can begin as soon as phased construction documents are completed.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and furnishings) and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Construction Manager/General Contractor Qualifications Based Selection (CM/GC QBS)

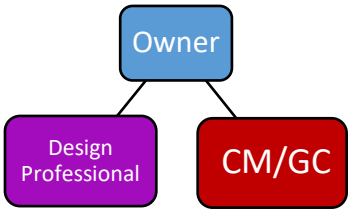
Unique Characteristics

There are three prime players: *Owner*, *Designer* and *Constructor* (manager-general contractor)

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	NO
Is the *Construction Cost of Work* a selection criteria?	NO
Is the *Total Construction Cost* the sole selection criteria?	NO

CM/GC (QBS)
(Two Separate Contracts for Design & Construction)



CM/GC selection: Qualifications based; does not incorporate any weighting for the *Construction Cost of Work*. Rather, selection is based on weighting of predefined criteria with the award going to the offeror that best meets the predefined criteria; selection criteria must include weighting of some cost factors at 50% unless otherwise approved by DEED. Typically these include *General Conditions* or *Fee* costs.

Other Characteristics

- Relationship of Phases: Can accommodate overlapping of each of the project phases
- Ability to Bring *Constructor* on Board During Design: **Yes**
- Risk Allocation: Design risk (quality) allocated to *Designer*; Construction risk (cost and schedule) allocated to CM/GC after design is complete enough to allow all parties to mutually agree. *Owner* is responsible for adequacy and completeness of design.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A delivery option is selected and a corresponding budget and schedule are also established.
- Design - When the Planning has been completed, the *Owner* engages the design team for the design and preparation of construction documents for the project.
- Award – Generally prior to the completion of the design documents, a CM/GC is selected based on the qualifications of the CM/GC. The cost of the CM/GC's *Fee* and *General Conditions* may also be a consideration.
- Construction – The *Owner* contracts for construction with the CM/GC who then contracts with the various trade contractors based on selection criteria agreed upon by the *Owner*. The CM/GC can be available during the final design phase to assist in constructability and budget reviews. Work can begin as soon as phased construction documents are completed. The establishment of the Guaranteed Maximum Price or Lump Sum can be postponed until more complete design and cost information is available.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and furnishings)

and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Design-Build Bid

Unique Characteristics

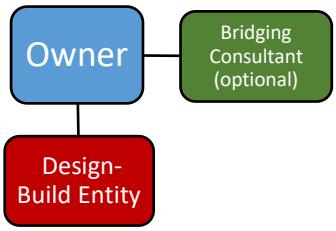
There are two prime players: The *Owner* and the *Design-Builder*. [The *Designer* (architect/engineer) and the *Constructor* (general contractor) are combined into one entity.]

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	YES
Is the *Construction Cost of Work* a selection criteria?	YES
Is the *Total Construction Cost* the sole selection criteria?	YES

Design-Builder selection: Based on *Total Design and Construction Cost* with the award going to the lowest responsible and responsive bidder.

Design-Build Bid (Single Contract for Design & Construction)



Other Characteristics

- Relationship of Phases: Can accommodate overlapping of each of the project phases
- Ability to Bring *Constructor* on Board During Design: **Yes**
- Risk Allocation: Design risk (quality) and Construction risk (cost and schedule) allocated to *Design-Builder* at the time of selection based on design criteria at the point in time of the selection. *Design-Builder* is responsible for adequacy and completeness of design and subsequently the entire project; *Owner* is responsible for adequacy of design criteria.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A delivery option is selected and a corresponding budget and schedule are also established.
- Bridging - Hiring a consultant (optional) to assist in developing the design to some point without completing the final design, and then allowing another firm, usually a design-build entity, to complete the design is referred to as bridging. The initial design firm is often referred to as the "bridging architect" and the firm completing the design is the architect of record and assumes the liability for the design.
- Design – Based on a set of design criteria provided by the *Owner* (which should be extensive if using this option), *Design-Builder* prepares phased construction documents. *Constructor* component of the *Design-Builder* is available during this period for constructability and budget reviews.
- Award – Concurrent award of both the design and construction phases. Lump Sum is established at selection.
- Construction – *Design-Builder* selects trade contractors, usually with cost as the primary selection criteria. Construction can begin as soon as phased construction documents are available.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and furnishings) and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Design-Build Best Value (D-B BV)

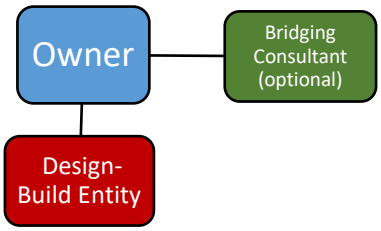
Unique Characteristics

There are two prime players: The *Owner* and the *Design-Builder*. [The *Designer* (architect) and the *Constructor* (general contractor) are combined into one entity.]

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	NO
Is the *Construction Cost of Work* a selection criteria?	YES
Is the *Total Construction Cost* the sole selection criteria?	YES

Design-Build (Best Value) (Single Contract for Design & Construction)



Design-Builder selection is based on some weighting of *Total Construction Cost* including the *Construction Cost of Work* with the award going to the Design/Builder that best meets the predefined qualifications and cost selection criteria.

Other Characteristics

- Relationship of Phases: Can accommodate overlapping of the project phases
- Ability to Bring *Constructor* on Board During Design: **Yes**
- Risk Allocation: Design risk (quality) and Construction risk (cost and schedule) allocated to *Design-Builder* at the time of selection based on design criteria and building requirements at the point in time of the selection. *Design-Builder* is responsible for adequacy and completeness of design and subsequently the entire project; *Owner* is responsible for adequacy of design criteria.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A delivery option is selected and a corresponding budget and schedule are also established.
- Bridging – Hiring a consultant (optional) to assist in developing the design to some point without completing the final design is referred to as bridging. The initial design firm is often referred to as the "bridging architect" and the firm completing the design is the architect of record and assumes the liability for the design.
- Design – Based on a set of design criteria provided by the *Owner*, *Design-Builder* prepares phased construction documents. *Constructor* component of the *Design-Builder* is available during this period for constructability and budget reviews.
- Award – Concurrent award of both the design and construction phases. Guaranteed Maximum Price is usually established at selection.
- Construction – *Design-Builder* selects trade contractors, usually with cost as the primary selection criteria. Construction can begin as soon as phased construction documents are available.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and furnishings) and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Design-Build Qualifications Based Selection (D-B QBS)

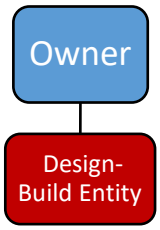
Unique Characteristics

There are two prime players: The *Owner* and the *Design-Builder*. [The *Designer* (architect) and the *Constructor* (general contractor) are combined into one entity.]

The three-question test has the following result:

Test Question	Result
Are the *Designer* and *Constructor* contracts combined?	YES
Is the *Construction Cost of Work* a selection criteria?	NO
Is the *Total Construction Cost* the sole selection criteria?	NO

Design-Build (QBS)
(Single Contract for Design & Construction)



Design-Builder selection is not based on any weighting of the *Construction Cost of Work*. Rather selection is based on weighting of predefined criteria, with the award going to the *Design-Builder* that best meets the predefined selection criteria. Selection criteria may include some weighing of *General Conditions Costs* and/or *Fee*.

Other Characteristics

- Relationship of Phases: Can accommodate overlapping of the project phases.
- Ability to Bring *Constructor* on Board During Design: **Yes**
- Design risk (quality) and Construction risk (cost and schedule) allocated to *Design-Builder* at the time of selection based on design criteria and building requirements at the point in time of the selection. *Design-Builder* is responsible for adequacy and completeness of design and subsequently the entire project; *Owner* is responsible for adequacy of design criteria.

Phases

- Planning – The scope of the project and expectations of quality are established by the *Owner* and any consultants it may need. A corresponding budget and schedule are also established.
- Design – Based on a set of design criteria provided by the *Owner*, *Design-Builder* prepares phased construction documents. *Constructor* component of the *Design-Builder* is available during this period for constructability and budget reviews. *Owner* and review agencies can participate in the process.
- Award – Concurrent award of both the design and construction phases. Establishment of Guaranteed Maximum Price or Lump Sum can be postponed until more accurate scope and cost information are available.
- Construction – *Design-Builder* selects trade contractors, usually with *Owner* input. Construction can begin as soon as phased construction documents are available.
- Occupancy – After the construction of the entire project has been completed, the *Constructor* leaves the site to allow for move-in (installation of *Owner*-furnished equipment and furnishings) and occupancy. If arrangements are made in advance, certain areas of the project (partial occupancy) can be occupied prior to the completion of the entire project.

Delivery Method Selection Criteria & Processes

Introduction

Having established a project delivery method vocabulary, the next step is to determine which of the options is most appropriate for a particular project. While no project delivery option is perfect, one option may be better suited than another based on the unique requirements for a particular project. This handbook does not assume there is only one acceptable option for project delivery. The requirements for each project should be evaluated to determine which of the various options would most likely produce the best outcome for the state and the school district or municipality/borough.

Prior to starting the process to select the most appropriate project delivery method it would be advisable to review again, your entity's ability to choose among those listed in the previous section. Administrative code or policy within a given entity may also determine which project delivery options may be used. A review of pertinent laws, rules, regulations and policies early in the life of a project is also strongly recommended in order to allow time to obtain approval for use of an alternative project delivery method.

For example, regulations promulgated by the Department of Education & Early Development require that all contracts over $100,000 be awarded based on competitive sealed bids unless an alternative construction delivery method is approved, and the department concurs in advance of any solicitation that the proposed delivery method is in the state's best interest.

To be able to recommend the most appropriate option, experience in going through the thought-process of applying the factors outlined in this section is essential. It is even better, and widely considered to be good practice, to use the counsel of a group of trusted advisors who can help to ensure that all the factors and their interrelationships can be as fully evaluated as possible.

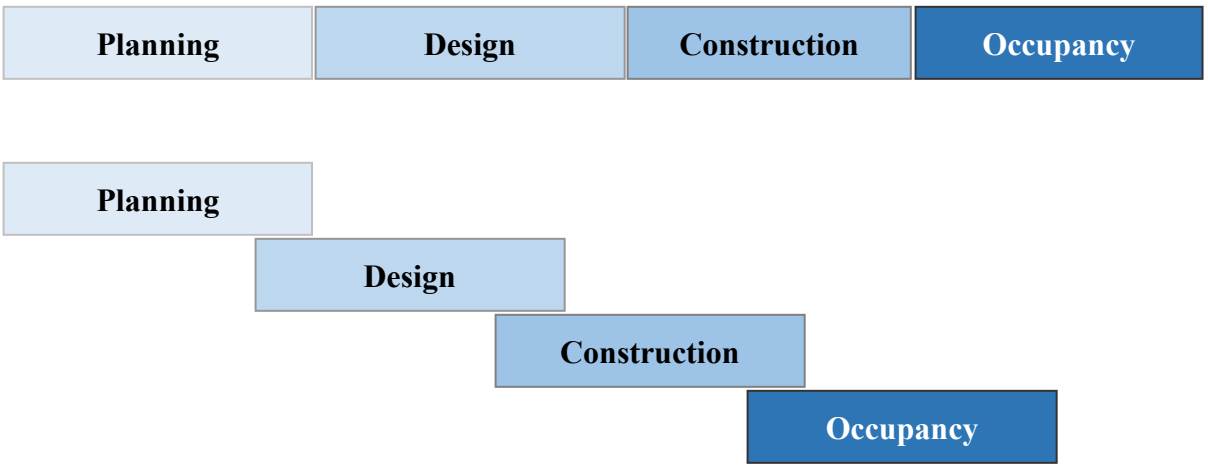
Trusted advisors should be experienced not only in going through the thought-process of applying the major factors, but ideally would be experienced with implementing all of the different delivery options. Everyone is biased based on his or her individual experiences. An advisor should be able to admit his or her prejudices based on their experiences and then set them aside to help evaluate which delivery option is in the best interest of a particular project.

The Project Environment

The recipient entity of state aid for school construction through DEED should consider the environment in which the project is taking place. It should assess the major factors influencing the project in question and then consider the requirements of the project in light of the unique characteristics of each of the identified project delivery options. By properly assessing these influences, the entity requesting approval from the department will not only be able request a specific delivery option, but will also be able to answer the question, "Why am I recommending this particular delivery option?"

Every project occurs in the context of a unique environment, an environment consisting of a variety of both physical and philosophical factors. This environment bears greatly on the successful maturation

of a project. That maturation occurs in four typical phases: planning, design, construction and occupancy. These can occur sequentially or may be overlapped (see illustration).



The main characteristics of a project's environment consist of: its schedule, the need and ability to establish and define its scope, the resources available to the project, the risks associated with the project, and the external constraints placed on the project.

Part of the project environment is the associated risks. The risks associated with the design and construction process are generally not affected by the chosen project delivery method. However, the timing and the allocation of the risk does vary depending on the project delivery method. Therefore, each delivery option provides a different approach to allocating the risks and typically will result in timing differences in transferring the various risks. Any first time user of any project delivery option is cautioned to be sure they understand these differences.

The degree of risk assumed by the *Designer* and/or *Constructor* should be directly proportional to the cost associated with the project. The risk(s) associated with a construction project should be allocated to the party with the best ability to control and manage that risk. The purchase and the requirement for purchase of insurance coverage is just one way in which *Owners*, *Designers*, and *Constructors* try to allocate and control some of the risk.

In selecting the appropriate delivery method, a thorough review of the potential risks and their allocation should be performed. The *Owner* should evaluate its ability and willingness to assume the risk inherent to the option selected. To accomplish this, each of the relevant major factors should be reviewed and considered.

Although identifying and coping with the factors in a project's environment is both complex and an ongoing task until completion is achieved, the focus of this handbook is primarily project initiation not project execution. We will use the luxury of this focus to narrow our determination of primary factors from the overall project environment to those that bear most directly on determining the "best" project delivery method. We are further assisted in this effort by one of the external factors for school construction projects receiving state-aid. This external factor is that the Design-Bid-Build project delivery option is the standard project delivery method for school construction projects. However, we

can recognize there are some primary factors affecting particular projects that might eliminate this delivery method or make it untenable without significantly increasing risk.

Establishing Determining Factors

This handbook groups the *Primary Factors* into five categories as shown in the table below:

Need Factors

Schedule/ Necessity to Overlap Phases
- Tight Project Milestones or Deadlines
- Amount of Overlap of Design & Construction Phases

Ability to Define the Project Scope/Potential for Changes
- Scope Definition
- Potential for Changes During Construction
- Need/Desire for the Contractor's Input During Design
- Flexibility to Make Design Changes After Construction Cost Commitments

Success Factors

Owner's Internal Resources & Philosophy
- Ability or Desire to Define and Verify Program & Design Content/Quality
- Experience with the Particular Delivery Method & Forms of Contracts
- Ability to Participate in Multiple Trade Contractor/Supplier Evaluations
- Desired Contractual Relationship and Ability to Recoup Savings

Desire for a Single Contract or Separate Contracts
- Ability or Desire to Take Responsibility for Managing the Design
- Ability or Desire to Eliminate Responsibility for Disputes Between Designer and Builder

Regulatory/ Legal or Funding Constraints
- Regulatory and Statutory Requirements
- State Budget and Funding Cycles

These are certainly not all that needs to be considered but addressing these *Primary Factors* will guide the selection of the most appropriate delivery option. Furthermore, addressing these early in the project cycle will increase the chances for a successful project.

The first two categories are grouped as *Need Factors*. These factors determine the need to move away from the Design-Bid-Build delivery method established as the standard delivery method for projects administered by DEED. Entities requesting approval for an alternative project delivery method must "prove out" in these categories regardless of their desire or preference for a delivery method other than Design-Bid-Build. The remaining three categories are grouped as *Success Factors*. These are the elements of the project environment that can determine how likely a project is to succeed in using an alternative project delivery method and which of the delivery options is most appropriate. Many of these are tied to the *Owner's* ability to execute the project in a non-traditional method. Following an acceptance by DEED that a need to move away from the department's standard delivery method has been established, the requesting entity must demonstrate it both has chosen and that it has the ability to manage the factors of the project environment aligned with the successful implementation of the alternative delivery option being considered.

Selecting a Delivery Method

Although there are a number of factors in making a decision concerning which project delivery option to recommend, by the time a few *Primary Factors* are applied, it becomes apparent which options are least appropriate. By the process of elimination, the most appropriate option(s) can be determined.

For each factor, there is a *Critical Question* that should be considered. Grouped within the five categories, each *Primary Factor* is listed along with its critical question, appropriate commentary and the ramifications associated with the answer. *Need Factors* are addressed first.

NEED FACTOR: Schedule/Necessity to Overlap Phases

Primary Factor: *Tight Project Milestones or Deadlines*

Critical Question: *Is overlap of design and construction phases necessary to meet schedule requirements?*

Discussion: Schedule is always a consideration on construction projects and will often drive the selection of the project delivery option. During the planning phase, a preliminary schedule should be developed. This master schedule will include an estimated duration for each phase of the project: needs assessment, project identification, planning, design, award, construction, and occupancy.

Simultaneously, the school district entity should evaluate their required date for occupancy. Comparing this date to the date generated from early versions of the preliminary master schedule will indicate whether any acceleration or overlapping of any of the phases may be required. "Traditional" Design-Bid-Build is inherently a linear, sequential process as opposed to Design-Build or CM/GC, each of which is capable of overlapping the phases in the design and construction process.

Ramifications: If the project requires a schedule that can only be maintained by overlapping of the design and construction phases, then one of the alternative delivery options should be considered.

Primary Factor: *Amount of Overlap of Design and Construction Phases*

Critical Question: *Is there time to complete the Design Development stage of the design prior to starting construction?*

Discussion: Assuming it has already been determined that a traditional linear approach to the design and construction phases will not work, and some overlapping of the two phases is necessary, the next question is, "How much overlap of the design and construction is required?" If the construction start date is dictated by the construction completion date, and is required to be very early in the design process (e.g., during the Schematic or early Design Development stages), then the *Owner* should understand the additional responsibility and risk it may be taking by retaining the design responsibility and holding the design contract.

Other factors such as available resources to manage the design, experience with managing the aggressive decision making that will be required, and the possibility of being placed in between the *Designer* and the *Constructor* would all be closely related to the evaluation of this factor.

Ramifications: If the project requires construction to start early in the design process, then who is taking responsibility for managing the design and the timely completion of the design needs to be considered. Transferring the design risk to the party responsible for construction may be a reason to consider using Design-Build in lieu of CM/GC.

NEED FACTOR: Ability to Define the Project Scope/Potential for Changes

Primary Factor: *Scope Definition*

Critical Question: *Is the scope of work difficult to define?*

Discussion: Each District/Municipality is unique and will have special requirements that could have a major impact on determining the proper method of delivery. Similarly, the complexity of the project and the ability to fully define the scope, early in the process, could also have an impact on determining the appropriate project delivery option.

The three points in any project where the need to define the scope become critical are:

1. Prior to selection of a constructor
2. After selection of a constructor but prior to establishing quality, cost, and schedule
3. After establishing quality, cost, and schedule

Each delivery option will require different levels of scope definition at each of these critical points. The inability to fully define scope early in the process will have a direct impact upon the *Owner's* ability to manage scope and cost increases later in the project.

Ramifications: If it would be difficult to produce a set of drawings and specifications that will fully describe the work in question (e.g., a renovation of an existing building), then one of the qualifications-based selection options should be considered.

Primary Factor: *Potential for Changes During Construction*

Critical Question: *Is there a significant potential for changes during the construction phase?*

Discussion: Whenever the scope is difficult to define or other issues tend to indicate that there is a high potential for changes during the construction phase, careful consideration should be given on how this will be handled. If one of the competitive cost delivery options (D-B-B, CM/GC BV, D-B BV) is used, as much of the work as possible should be quantified before a lump sum cost is agreed upon. In an environment of high uncertainty, one of the competitive qualifications options (CM/GC QBS, D-B QBS) should be considered.

Ramifications: If the scope of the project is likely to change during construction, then one of the qualifications-based delivery options may be more appropriate. An example might be a project where the tenants are unknown or likely to change. In this example, the identification of the

tenants may be a cause for required changes throughout all phases of the project including during the construction phase.

Primary Factor: *Need/Desire for the Contractor's Input During Design*

Critical Question: *Is input from a Constructor during design required or desired?*

Discussion: Throughout a project, the *Owner* will make decisions based on their definition of value. What varies from one project delivery option to another is who (which team member) is providing the information and when are they providing it during the project sequence.

This handbook looks at two broad types of information provided: 1) Design Solutions and 2) Constructability (including cost and schedule review of design solutions). What differs with each delivery option is who is providing the information and when are they brought on board. Also, when the information is being provided, and whether the information is intended to be provided at specific points in time or continuously throughout the process will depend on which delivery option is chosen.

There are many times when the demands of the project are unique or difficult to quantify. In these instances, the option of having the *Constructor* on board during the design phase can be of value. The *Constructor* can assist in schedule development and monitoring, in constructability and budget reviews, in factoring in current market conditions, and in locating and procuring long lead equipment items and trade contractors necessary for the work.

If there are significant schedule, budget, or constructability issues, it can be helpful for the decision maker to review these issues during the design phase. Many times, the *Designer* does not have the range of experience in the actual construction of a project to adequately address these issues. However, it should be noted that it is possible to hire a consultant to perform these tasks that will leave the agency open to all of the delivery methods and enable management and development of the scheme prior to commitment to a *Constructor*.

Ramifications: If the assistance of the *Constructor* is desired during the design phase to assist in defining the scope, constructability reviews, schedule determination, or budget confirmation, then one of the alternative delivery options should be considered.

Primary Factor: *Flexibility to Make Design Changes After Construction Cost Commitments*

Critical Question: *Are your design and scope requirements fully defined?*

Discussion: The cost of making changes throughout a construction project increases as the project develops. In the worst case this would include needing to make changes to work already in place. In an ideal situation, the design should be developed to the point where the scope of work is known and the number of changes can be reasonably predicted before commitment to a *Constructor*.

Where the design is used as the basis for selection of the *Constructor* in a competitive cost environment, its completeness will be a key factor in the successful cost management of the project once a commitment has been made to a contractor, regardless of whether construction has started.

Ramifications: It is important when selecting your project delivery method to consider how tightly the scope of work can be defined and review whether design flexibility is required during the construction process. If a significant amount of flexibility is required after commitment to a contractor, then a qualifications-based selection method might be more appropriate than one of the competitive cost methods.

SUCCESS FACTOR: *Owner's* Internal Resources & Philosophy

Primary Factor: *Ability or Desire to Define and Verify Program and Design Content/Quality*

Critical Question: *Will the Owner utilize outside resources to verify quality?*

Discussion: The *Owner's* assurance that there is a responsible person designated to verify quality during construction will relate directly to the *Owner's* in-house resource availability, and to what party the *Owner* assigns the role of project management on each specific project. How much direct influence an *Owner* has on how the quality is defined and verified will be affected by the decision of which option is chosen.

The *Owner's* definition of quality must be identified and communicated for the record early in the process. The quality of a construction project can be characterized by the following:

- *Functional quality* – the ability of the facility space to meet the *Owner's* program requirements (as well as code and safety requirements)
- *Systems quality* – the ability of the various building systems to meet the *Owner's* defined needs
- *Aesthetic (scope) quality* – the level of design and finish as defined in the design documents
- *Workmanship quality* – the physical execution of the design

All of these are closely related. How they are defined and verified should be considered when determining which project delivery option to use.

In the standard Design-Bid-Build delivery option, the definition of quality is heavily dependent upon the architect's ability to understand and translate the *Owner's* needs. In the CM/GC delivery options, this task is still assigned to the architect, though with assistance from the contractor. In Design-Build the *Design-Builder* assumes these duties. Production quality during the construction phase is, in every option, the primary responsibility of the *Constructor*, but the verification of that quality will vary between the options. The architect, as the *Owner's* representative, is responsible in Design-Bid-Build and CM/GC. The *Owner* assumes this role in Design-Build.

Ramifications: If in-house resources are not available, extra caution should be taken when using Design-Build. If Design-Build is desired and in-house resources are not available, outside resources should be engaged to assist in verifying that the quality desired by the *Owner* is achieved.

Primary Factor: *Experience with the Particular Delivery Method and Forms of Contracts*

Critical Question: *Are agency in-house personnel experienced in alternative delivery options or, if not, will in-house personnel be augmented by other agency or contracted personnel?*

Discussion: The responsibility for success on every school construction project ultimately rests with the entity executing the project. Thus, the responsibility for overseeing and managing the entire process resides with the *Owner*. A "project manager" typically handles the process, whether formalized or not. For a typical school project, this responsibility can be fulfilled in one of several ways including:

1. In-house resources
2. Another state agency (i.e., DOT/PF)
3. A third-party consultant

One factor to consider is the level of expertise and experience of the *Owner* embarking on the construction project. In deciding which project delivery option and form of contract to recommend, the availability of *Owner* staff resources and experience is a major consideration. Some entities perform construction routinely and have capable and available staff to manage all phases of the project. Others seldom involve themselves in construction and thus will need to obtain experienced assistance.

Obtaining assistance for the *Owner* from a third-party project or program manager in certain circumstances may be considered. There are unique requirements for the school construction process. This should be taken into consideration when evaluating the use of third-party resources.

Ramifications: Regardless of the delivery option selected, if the *Owner* is inexperienced in management of a capital outlay program, assistance should be obtained by contracting with an experienced professional or by making arrangements for assistance from another state agency that has that experience.

Primary Factor: *Ability to Participate in Multiple Trade Contractor/Supplier Evaluations*

Critical Question: *Does the Owner need the ability to participate in the selection and evaluation of trade contractors or suppliers?*

Discussion: There may be instances where the *Owner* has a direct interest in the selection and evaluation of subcontractors or suppliers for a portion or the majority of the work. For example, the *Owner* may have a complex security system within a building that will require development with a particular subcontractor.

Instances may also occur where many elements of the project scope require development, particularly in a fast-track environment, and a relationship is required that offers a high degree of flexibility in choice and cost transparency from the subcontractor via the contractor.

Ramifications: Where the input required is limited to specific trades or suppliers it is important to ensure the *Owner's* bid documents are structured in such a way to allow control over individual elements, in which case any of the delivery options could suit the *Owner's* requirements. However, if the *Owner* requires a high degree of flexibility across many elements of the project, or the level of control is anticipated but unknown, then a competitive qualifications selection option will afford the *Owner* greater control and cost transparency.

Primary Factor: *Desired Contractual Relationship and Ability to Recoup Savings*

Critical Question: *Does the Owner wish to have a complete and timely access to all of the Contractor's Information?*

Discussion: How the *Owner* selects the construction entity and the resulting contractual relationship created will affect what information is required to be provided and when. For example, whether or not the recipient entity and their consultants are participants in the specialty contractor and vendor selection process and the information shared during this process, will be a direct result of the contractual relationship created. Access to all available information may or may not be necessary or desired. The *Owner* should be aware that the selection of a project delivery option and the resulting contractual relationship would likely affect the manner in which information may be required to be provided.

Legally, a fiduciary relationship arises automatically in several situations, however the specific form of fiduciary relationship contemplated in this document is the one arising when a person or firm has a duty to act for another on matters falling within a contractual relationship. More specifically, a person or entity acting in a fiduciary relationship to the *Owner* owes the *Owner* the duties of good faith, trust, confidence, and candor, and must exercise a high standard of care in managing money and property.

A *Constructor* selection based solely on *Total Construction Cost* will generally result in a contractual relationship that is not a fiduciary one. This will affect the timing of the availability of information and the ability of the *Owner* to make use of that information. If the construction entity is not on board during the design (typical in Design-Bid-Build when cost is the only consideration), collaboration at this stage is not an issue. If, however, some contractor involvement during the design phase is needed, a *Best Value* selection that includes considerations other than *Total Construction Cost*, can be used in selecting the *CM/GC* or the *Design-Builder*. Nonetheless, the contractual relationship developed is generally very similar to Design-Bid-Build concerning access to information.

A *Qualifications Based Selection* (i.e., the *Construction Cost of Work* not a factor at the time of selection) will create a fiduciary relationship. This also allows complete and timely access to the contractor's information. If the project scope is difficult to define, or matching the scope to the project budget is anticipated to be difficult, then having a collaborative process could prove to be advantageous. In such situations, a *Qualifications Based Selection* might be more appropriate.

Ramifications: If the project necessitates an open, collaborative relationship among the parties, then a *Qualifications-Based Selection* should be considered.

SUCCESS FACTOR: Desire for a Single Contract or Separate Contracts

Primary Factor: *Ability or Desire to Take Responsibility for Managing the Design*

Critical Question: *Does the Owner have in-house design resources qualified to oversee design professionals, and does the Owner have the ability to commit sufficient resources to design management?*

Discussion: Some recipient entities may have professional staff capable of providing quality oversight of design professionals for the *Owner*. The *Owner* must make an honest self-assessment, taking into account factors regarding complexity of the project and competing obligations of in-house staff, to determine realistically whether the agency is capable of design management.

Given self-assurance in agency ability, the agency can then consider the practicality of any desire to take on the responsibility for providing design management. If the project is of such unique function that the *Owner* has greater knowledge of its design intent than the agency thinks could be translated reliably into a design without intimate involvement of the district or municipality's own staff, then the *Owner* should consider holding a separate contract with the design professional. However, if the desire exists, the *Owner* must consider its commitment to provide the necessary resources.

Ramifications: The ability and desire to manage the design of a project are both reasons to consider holding separate contracts for design and construction, and argue against Design-Build.

Primary Factor: *Ability or Desire to Eliminate Responsibility for Disputes Between Designer and Builder*

Critical Question: *Does the Owner desire to hold a single entity responsible for coordination, collaboration, and productivity for the entire project?*

Discussion: A completed project is the result of extensive coordination of talent and resources. The skill sets of the *Designer* are not the same as those of the *Constructor*. Viewpoints and interpretations differ, as do personalities, agendas, ethics, and levels of responsibility.

Although holding separate contracts allows the *Owner* to manage the project through the leverage of direct legal relationships with the *Designer* and with the *Constructor*, the *Owner* takes on the responsibility for resolving disputes between the other two parties. If the *Owner* has the greater desire to transfer that responsibility than to use his contractual leverage, its tool is the single contract with an integrated contractual delivery method—Design-Build.

Ramifications: The integrated nature of Design-Build, with its single contract, allows the *Owner* to hold a single entity responsible for the project and keeps disputes between the *Designer* and the *Constructor* in-house with the *Design-Builder*. The trade-off is the loss of *Owner* leverage penetrating separately to the differing skill sets and corresponding work products.

SUCCESS FACTOR: Regulatory/Legal or Funding Constraints

Primary Factor: *Regulatory and Statutory Requirements*

Critical Question: *Do laws, rules, regulations, etc., permit the use of an alternative project delivery method?*

Discussion: The statutory and regulatory basis for use of alternative project delivery methods on school construction projects has already been set out in an earlier portion of this publication.

The local requirements, under which a District/Municipal entity undertaking a project operates, may ultimately be the deciding factor in selecting the project delivery option. While the statutes, regulations and policies of the Departments of Administration (DOA) and Transportation & Public Facilities (DOT/PF) govern the procurement process for most State agencies, political subdivisions of the state may adopt their own laws, rules, regulations, and policies. While it is generally safe to say that the "standard" method of *Design-Bid-Build* is an acceptable method for all District/ Municipal entities, a review of the pertinent laws, rules, regulations, and policies early in the life of the project is strongly recommended in order to allow time to obtain approval for use of an alternative project delivery option. Regulations within a given locality may also determine which project delivery option can be used.

For school capital projects that incorporate state aid through the Department of Education & Early Development, regulations require that all contracts be awarded based on competitive sealed bids unless an alternative delivery option is approved by the commissioner. The commissioner will base a decision on the rationale provided by the requesting agency and the factors discussed in this handbook.

Ramifications: The decision on what delivery option is most appropriate must be made early in the planning phase of the project and properly documented so that sufficient time and justification can be prepared to gain approval for an alternative delivery option if that option is most appropriate.

Primary Factor: *State Budget and Funding Cycles*

Critical Question: *Is funding available for construction at initiation of design?*

Discussion: The State's budget and funding cycle could have an impact on the timing, sequencing, and a subsequent recommendation of a project delivery option. There are three funding combinations for design and construction addressed by this handbook. One is complete project funding that would include design and construction funding all at one time. The second is phased project funding, which is one funding for design, and a second separate funding for construction. The third, is phased construction funding which is one funding for design and then funding of multiple components of construction each funded separately.

Ramifications: While any of the options will work with complete project funding, any phasing of the funding can have a major impact on the decision of which option to select. For example, without complete project funding, Design-Build is not feasible.

Summary

With a list of options and list of major factors to consider, the goal is to determine through a process of elimination, "Which project delivery options are least appropriate to recommend on my project?"

The order in which the *primary factors* are applied by DEED in the review and approval process is illustrated in the ***DEED Alternative Project Delivery Approval Flowchart*** shown in Appendix B. An assessment of the *Need Factors* is applied to the project, any one of which may drive the need to use an alternate project delivery method. Next, the *Success Factors* are applied. These factors reflect judgments that must be made regarding the ability of *Owners* to be successful in implementing a particular delivery method. You should consider the input of several advisers who have experience going through this process. This experience will enable the *Owner* to understand the consequences of managing the project under the various delivery options.

For example, the need to accelerate the schedule may be cited as one of the primary reasons Design-Bid-Build is not the best option. There are circumstances, however, where breaking the project into multiple prime bid packages, each being design-bid-build, is a perfectly reasonable option. Having someone with the experience and understanding of how to manage such a process, and the risks associated with it, could offer valuable guidance as to many of the pros and cons of delivering a specific project using the multiple prime contractor variant of the Design-Bid-Build project delivery method.

As the factors are considered, how they relate to the ***DEED Project Delivery Option Matrix*** (p. 12) demonstrates which options have been eliminated. Since every project is unique, which factors apply and the weight they need to be given is also unique on every project. A group of trusted advisers should be able to use the benefit of their experience to assist the *Owner* in determining which factors should carry the most weight and ultimately which of these six options is most appropriate for each particular project.

Implementing Project Delivery Methods

Introduction

Just selecting the "right" delivery option is not enough. There are numerous details to be addressed in order to ensure the desired results are achieved. Requests For Proposals (RFPs) that clearly spell out expectations and match the right selection criteria with the right project delivery option are examples of the type of issues that must be addressed when implementing any project delivery method. Entities looking for assistance with these issues will benefit from the following information.

Considerations for Solicitation and Award

Using the ***DEED Project Delivery Options Matrix***, *Primary Factors* and ***DEED Alternative Project Delivery Approval Flowchart***, entities requesting an approval of an alternative delivery method under 4 AAC 31.080(f) will need to provide the following evidence and supporting documents.

Concurrence Items (Required prior to approval of alternative project delivery method)

- Provide a resolution from the municipal/borough entity or school board authorizing the requested alternative project delivery method; if municipal/borough code allows the use of the requested delivery method, a copy of that code can substitute for a dedicated resolution.
- Provide a document supporting the requested alternative project delivery method as being in the best interest of the state; address:
    - How the alternative delivery method effort will result in lower project costs/increased value to the state (be specific);
    - How quality standards will be maintained; and
    - How unknown conditions will be accounted for.
- Provide the name and qualifications of the *Owner's* project manager for the alternative delivery method process (list specific experience in the requested delivery method).
- Describe the basic process leading up to the award of the alternative delivery method contract (establish how competitive selection will be achieved).

Upon approval of an alternative delivery method under 4 AAC 31.080(f), directives will be issued by the department applicable to each individual project. These directives will be based on the following factors, some of which are required and will be applied to each project approved for an alternative delivery method and some of which are discretionary and will be applied as needed by the department to either increase the likelihood of a successful project or establish a stronger determination of "best interest" for the state:

Required Alternative Project Delivery Directives

- The alternative project delivery solicitation will occur under competitive, sealed proposals or, in the case of Design-Build-Bid, sealed bids.
- The RFP must contain the following information:
    - The aggrieved offeror protest provision meeting requirements of 4 AAC 31.080(c);
    - Identification of project bonding, insurance, and prevailing wage requirements; and
    - Identifications of the required project warranty period.
- The solicitation RFP and supporting documents including, but not limited to 1) a cost estimate based on the RFP documents and prepared by a qualified cost estimator showing the anticipated

construction cost to be at or below the budgeted amount, 2) the proposed scoring criteria, 3) positions held by evaluation team members, and 4) a copy of the agreement by which the work is to be undertaken, including any general conditions, supplementary conditions, and other project documents that the agreement will incorporate by reference must be approved by the department prior to advertising.

- The RFP evaluation team will include maximum of five members and must include a Facilities staff member from DEED if determined to be appropriate by the DEED Facilities Manager.
- Evaluation team meetings may be in person, by telephone, or online meeting platform.
- A majority of the evaluation team must be experienced facilities professionals; the non-majority may consist of educators, board members or other elected/appointed officials, or other interested parties.
- The contract awarded must either be a *guaranteed maximum price* (GMP) or fixed price contract (allowances for cost savings may be incorporated).
- Sealed cost proposals will be provided separate from the responses to remaining proposal items and will be reviewed only after all other evaluation elements are finalized.
- Provisions for local hire as an evaluation criteria or contract performance requirement are excluded (ref. State of Alaska Attorney General advice dated February 18, 2004).

Additional Alternative Project Delivery Directives

- The RFP will require a guaranteed maximum price (GMP) from each offeror with a breakdown of costs by DEED Cost Format, Level 2.
- For Best-Value selections, consideration of cost as a selection criterion will incorporate an evaluation of both the GMP and an evaluation of the offeror's *General Conditions* and *Fees*. The GMP will constitute at least 50% of the possible scoring with all cost factors constituting at least 60% of the possible scoring.
- For QBS selections, the RFP will require objectively calculated cost factors to include the *Pre-construction* cost, *General Conditions* costs and the constructor's *Fee* to combine for at least 50% of the available points.
- An independent cost estimator will be retained, and a cost estimate will be prepared for the work prior to negotiation of the lump-sum contract.
- A separate scoring factor will be included in the evaluation criteria to evaluate the offeror's plans/abilities to incorporate the resulting facility into a preventive maintenance and facility management program.
- Prior to solicitation, designs will be completed to a sufficient detail (approximately 35% or greater) to provide clarity to the scope of the project and will contain: design standards, necessary drawings, material specifications, performance specifications, project constraints, and other information relevant to the project. (Note: this directive will become required for any request for Design-Build.)
- Identification of project documentation (i.e., software, manufacturer's literature, product warranties, product operating handbooks, inventory of installed equipment, maintenance cycles, etc.) required to establish an effective preventative maintenance and facility management program as defined by AS 14.11.011(b)(4) will be included in the RFP.
- Evaluation criteria and weighting as selected from Appendix C may be mandated by DEED to ensure selection criteria is responsive to the project environment.
- Restrictions on the use of a multi-step selection process. A multi-step selection process is any solicitation which evaluates offerors using sequential criteria. Typical first-step criteria include

qualifications/experience, technical capability, capacity, etc. and usually result in a short-list of qualified offerors continuing to subsequent steps and contract award.

- Legal review of the RFP by the entity's attorney or an independent counsel experienced in construction solicitations and familiar with the entity's local codes and structure.
- For projects including site in the criteria, provide site parameters and site selection criteria.
- In accordance with 4 AAC 31.025, sufficient interest via a deed or lease will be established for the proposed site prior to advertising.
- *Owner* representation must be provided by one of the following methods:
  - The *Owner* must provide a dedicated project manager with suitable experience and credentials to establish criteria, perform inspections and enforce *Owner* requirements;
  - The *Owner* must contract for project management/*Owner* representation by a consultant (subject to the provisions of statutory limitations on fees – AS 14.11.020, and professional services procurement requirements – 4 AAC 31.065); or
  - The design team is to be retained by the district under a separate contract from that of the general contractor and will act on the *Owner's* behalf.
- All construction materials that are to be installed by the contractor are to be purchased by the contractor; the recipient (i.e. municipality/borough/school district) shall not purchase and/or stock pile materials that are to be utilized by the contractor as part of the project construction.
- The price component will be factored such that the difference between the lowest cost proposal and other proposals grows at a rate of twice the proportionate differential between offers (a sample of that formula is depicted below).

$$Total\ GMP\ Points = 300 \times (Lowest\ Received\ GMP \div Proposers\ GMP) - 200$$

[where 100 is the maximum points available for the GMP]

Requesting Department Approval

Template

A Microsoft Word (.docx) template in is available from the department. The template has the analysis structure from this handbook with prompts for project-specific discussion to meet all department information requirements.

Request Letter

If the template is not used, a Recipient requesting department approval of an alternative project delivery method must include the information and analysis identified in the Delivery Method Selection Criteria & Processes section; summarized as the following:

1. Name the requesting district, project title and DEED project number (if available), and date of request.
2. Description of the project environment: scope and conditions.
3. Identify the project manager and any contributing entities (design team, district personnel, etc.).
    a. Provide qualifications and experience with requested project delivery method.
4. Identify the project delivery option being requested based on the options analysis.
5. A project delivery options analysis.
    a. Discuss the Need Factors and Success Factors of the project. Provide project information and ramifications or conclusions regarding each factor.
    b. Discuss how quality standards will be maintained.
    c. Address how unknown conditions will be accounted for.
6. Results of the options analysis.
7. Anticipated project schedule with and without the requested delivery method.
8. The basic process leading up to the award of the contract (establish how competitive selection will be achieved).
    a. Address the solicitation process.
    b. Identify the proposed makeup of the evaluation team.

Tips

- Provide an executive summary preceding the full options analysis. This can be a sentence stating the option being requested or a more complete summary of the process and result.
- Use the flowchart in Appendix B early in the process to help eliminate inappropriate methods.

Conclusion

The environment in which a project is initiated may necessitate an *Owner* to take specific, intentional steps toward setting its course in order to achieve a successful project. Those steps include assessing the project delivery method most likely to result in a project that meets scope, schedule, and budget constraints.

This handbook builds on an analysis of historic use of alternative project delivery methods on school projects in Alaska. It provides both a framework for clear discussion of the options and a process of evaluation whereby an *Owner* may, in conjunction with trusted advisers, determine the suitability of using an alternative delivery method.

Stipulations and directives for various delivery methods are included for use once a best-interest determination has been made in favor of an alternative method. These directives are intended to keep the process of selecting construction entities for public capital projects funded with state aid through the Department of Education & Early Development open and fair.

Sources

1. *Project Delivery Options – Understanding Your Options*; Atlanta, GA; Georgia State Financing and Investment Commission, 2003.

2. *Project Delivery Options – Selecting the Appropriate Project Delivery Option*; Atlanta, GA; Georgia State Financing and Investment Commission, 2003.

Appendix A

Glossary

CM/GC Best Value (BV)

This is the construction manager as general contractor (at-risk) method. This method is defined by use of separate design and construction contracts where the cost of the work is one of the selection criteria and the total construction cost is not the sole selection criterion.

CM/GC QBS

This is the construction manager as general contractor (at-risk) method with a variation of the selection process. This method is defined by use of separate design and construction contracts where the cost of the work is not one of the selection criteria nor is the total construction cost the sole selection criterion.

Competitive Sealed Bid

A standard solicitation provision whereby an offeror's price proposal is transmitted in a sealed envelope for consideration at a bid opening for comparison with other offerors. This solicitation method is the default method under DEED regulation.

Competitive Sealed Proposal

An alternative solicitation process whereby factors other than, or in addition to, price are solicited for consideration. Offerors are usually scored by a selection panel. This solicitation method is allowed under DEED regulation when supported as being in the state's best interest.

Constructor

The entity in a capital project responsible for the construction of a facility or infrastructure project (as differentiated from "contractor", which can be any entity providing a product or service).

Constructor's Fees

The component of a Constructor's Total Construction Cost that are above its direct and indirect costs (i.e., its profit); usually expressed as a percentage of those costs.

Construction Cost of Work

The fixed costs of labor and materials as provided for in the project scope.

Contract Type

The type of contractual arrangement between *Owners*, Designers and Constructors. Contract Type is one of the two determinants, Selection Method being the other, of a project delivery method.

Critical Question

The central question for each Primary Factor in the decision making process related to selection of the most beneficial project delivery method. Answers to critical questions are used to move through the *Alternative Project Delivery Approval Flowchart* to determine delivery options that best match a project's environment.

Designer

The entity in a capital project responsible for the design of a facility or infrastructure project and the documentation of that design for use by the Constructor.

Design-Bid-Build

Often referred to as the "traditional" project delivery method. This method is defined by the use of separate design and construction contracts where the cost of the work is one of the selection criteria and the total construction cost is the sole selection criterion.

Design-Build Best Value

This is normal design-build. This method is defined by the use of a combined design and construction contract where the cost of the work is one of the selection criteria and the total construction cost is not the sole selection criterion.

Design-Builder

A term used to identify the entity contractually responsible to the *Owner* for both the Design and Construction of a capital project.

Design-Build Low Bid

This is a specific variation of the design-build project delivery method. This method is defined by the use of a combined design and construction contract where the cost of the work is one of the selection criteria and the total construction cost is the sole selection criterion.

Design-Build QBS

This is normal design-build with a variation on the selection process. This method is defined by the use of a combined design and construction contract where the cost of the work is not one of the selection criteria nor is the total construction cost the sole selection criterion.

General Conditions

The component of a Constructor's Total Construction Cost that account for its cost of doing business that are not direct costs for materials and labor on a capital project (i.e., its overhead); usually itemized by category such as "home office", insurance, etc. but can be expressed as a percentage of direct costs.

General Contractor

The contractual entity responsible to an *Owner* for the delivery (execution) of a facility or infrastructure project. Subcontractors work under the authority of the General Contractor but do not have a direct contractual relationship with the *Owner*.

Need Factors

The subset of Primary Factors that drive an *Owner's* need to explore and/or use alternative project delivery methods. These factors pertain to challenges related to a projects schedule and scope definition.

Owner

The entity in a facility or infrastructure project that will issue contracts and direct work related to the design and construction and make payments following performance; the *Owner* is normally also the end user of the project.

Pre-construction Services

Services provided by a Constructor to support of the Designer in finalizing a project's design prior to the commencement of construction. Typical services include cost estimating, constructability reviews, schedule analysis, value analysis, phased construction, etc.

Primary Factors

The group of key factors of a project's environment that test both the need to move from Design-Bid-Build delivery and the *Owner's* likelihood of success using an alternative project delivery option.

Project Delivery Options Matrix

The matrix of basic options for the delivery of construction projects which results from the combination of selection methods (3 possible) and contract types (2 possible). This matrix yields six unique combinations understood to encompass all project delivery methods and their variants.

Qualifications Based Selection (QBS)

A method of selecting a Constructor where the Total Construction Cost is not a factor for selection. Under this method, constructors are primarily evaluated based on the qualifications they have that would indicate their ability to succeed on a particular project.

Selection Method

The method by which an *Owner* will select the Constructor for a capital project. Differentiation of Selection Methods hinges on the role of the Total Construction Cost in the selection process. Selection Method is one of the two determinants, Contract Type being the other, of a project delivery method.

Success Factors

The subset of Primary Factors that drive assess an *Owner's* ability use alternative project delivery methods. These factors pertain to challenges related to resources, philosophy, and legal constraints.

Total Construction Cost

A Constructor's price for the execution of a facility or infrastructure project inclusive of the Construction Cost of Work (direct costs), General Conditions (overhead) and Fee (profit). Often solicited by *Owners* as a lump sum or guaranteed maximum price.

Total Design and Construction Cost

The combination of Total Construction Cost and design fees for which an *Owner* is responsible on a capital project.

Traditional Method

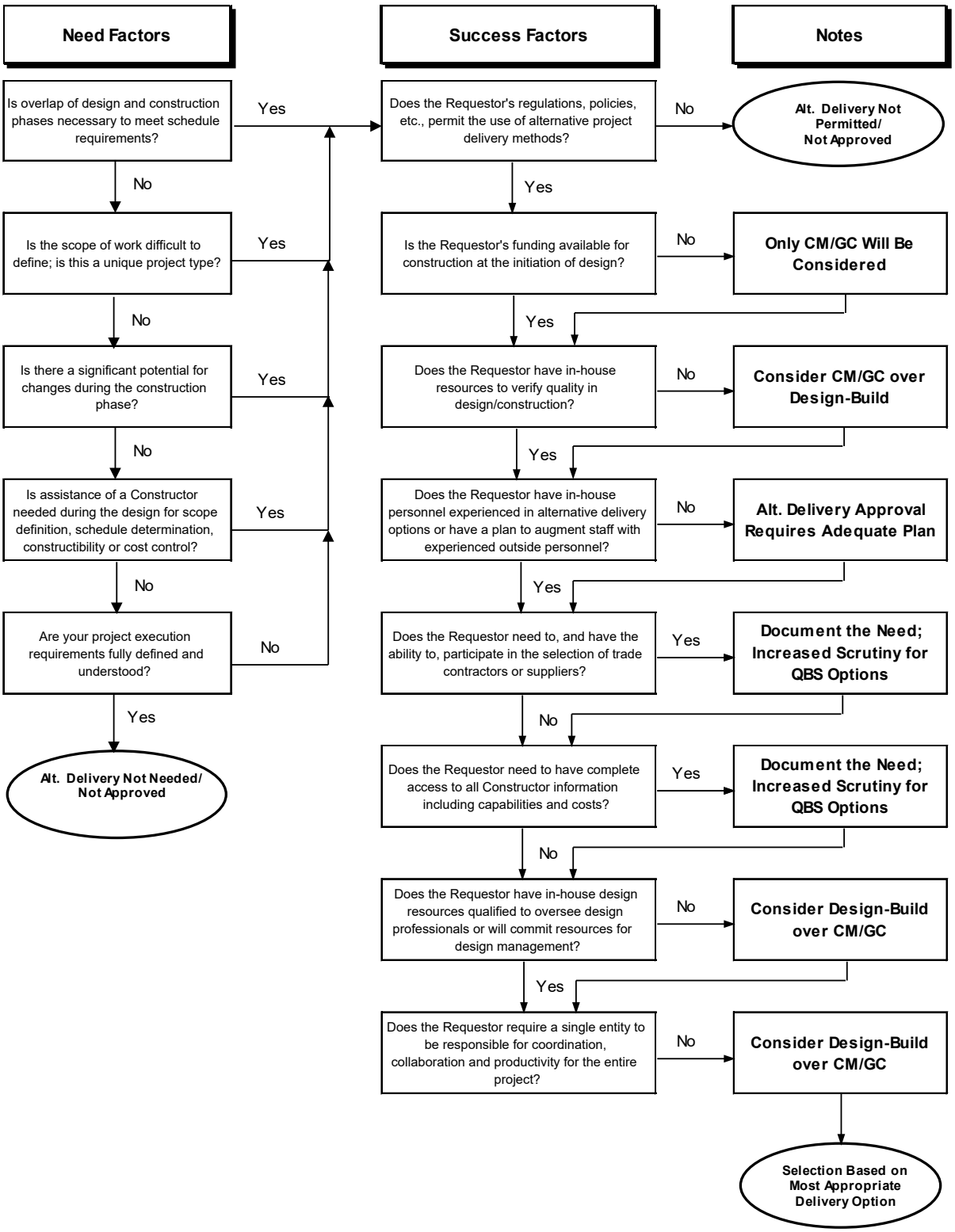
A term synonymous with the Design-Bid-Build project delivery method; also known as low bid.

Unique Characteristics

The features of a project delivery option that set it apart from all other options. Unique Characteristics result from assessing the Contract Type and Selection Method of a project delivery method.

Appendix B

DEED Alternative Project Delivery Approval Flowchart



Appendix C

Sample Evaluation Criteria

Preconstruction Services Experience	Range: 5-10%

Describe your firm's approach to the following preconstruction responsibilities: Design review and commentary, document coordination, constructability review and commentary, cost estimating, value engineering, site logistics, and subcontract preparation and packaging. Provide two or more examples of the range of pre-construction services your firm has provided on previous design-assist projects or projects with a guaranteed maximum price (GMP Projects). Describe the manner in which pricing and constructability services will be provided for areas of work normally subcontracted by the proposer.

Value Engineering/Project Estimating	Range: 5-10%

Describe your value engineering process and how you work with the design team to help reduce construction and life cycle facility costs. Explain your method of estimating the costs of construction during the design process before design documents are complete.

Design Assist/GMP Experience	Range: 10-15%

Provide a summary of projects of this type completed in the last 5 years. Describe your experience, providing details regarding your firms' specific contractual roles and responsibilities. Include the names, addresses, and phone numbers of *Owner* and Architect references for each project. Describe your experience working on a team approach with the *Owner*, Architect and other consultants to achieve the best facility possible within the established time frame and budget.

School Construction Experience	Range: 10-30%

Identify all of the school construction projects performed by the Proposer in the last 5 years where the Proposer has acted as a constructor (either as a General Contractor or a Design/ Builder). Provide names, addresses and phone numbers of *Owner* and Architectural references on projects listed. Highlight *[sub-arctic]* experience.

Project Team	Range: 5-15%

Describe the proposed Contractor's team, including the specific roles and responsibilities of each member. An organization chart would be helpful. Include the staffing requirements and identification of key personnel. Provide separate lists for the preconstruction and construction phases. Provide qualifications for the key individuals including history of employment, education, experience, and any other information the selection committee might find useful in evaluating the project team.

Management Plan	Range: 10-30%

Summarize how the proposer will staff and organize this particular project. Include information on the anticipated level of effort during the construction document design phase, estimating process, and construction quality control procedures. Outline work that will likely be accomplished via subcontract vs. proposer's own forces during the construction phase. Comment on the proposer's review of the attached proposed project schedule and their capacity to meet schedule. Address any significant scheduling issues and potential for partial completion/partial occupancy scenarios.

Quality Control	Range: 5-10%

Provide a summary of your firm's approach to quality control during construction. Include a description of the quality control organization you plan to employ and the authority assigned to the different level of quality control responsibility.

Preconstruction Fee	Range: 5-10%

Stipulated sum for all services to be provided until completion of Construction Document Phase.

GMP	Range: 50-65%

The guaranteed maximum price (GMP) with a breakdown of costs by DEED Cost Format or Construction Specification Institute Division.

Overhead & Profit for Change Order Work	Range: 5-8%

The Overhead & Profit percentage that the contractor will apply to the cost of work directed by change order to arrive at the total cost of the change order work.

References	Range: 5-8%

Include at least two *Owner* and two A/E references from similar projects included and described in the AIA Document 305– Contractor's Qualification Statement.

Contractor's Qualifications/Financial Capabilities	Range: 10-30%

Summarize the proposer's current and anticipated workload from _____ - _____. Include a description of projects, dollar values of construction for which the proposer is responsible, either as a prime or subcontractor, and bonding and insurance capacity available for the referenced period. Provide copy of contractor's State of Alaska Business License. Provide list of legal claims pending or settled over the past five years, either *Owner* or contractor initiated.

Maintenance and Management Plan	Range: 3-8%

Provide information on proposer's experience and implementation of the preventative maintenance and facility management program required by AS 14.11.011(b)(4).

Current and Projected Workload	Range: 5-10%

What has been your annual volume (in dollars) of construction for the past five years? What is your anticipated volume for the current year? What is your plan for the next two years?

Appendix D

Alternate Project Delivery Checklist

District/Recipient
Project:
Project Name
Project Number

Document Submitted:
Reviewer:

Project Data Check

Cost Information				Over Budget
Construction Budget	$0	Estimated Base Bid:	$0	$0
Proposed Alternates	$0	Approved Alternates	$0	
Space Information				**Under Allowable**
Allowable GSF:	0 GSF	Current GSF:	0 GSF	0 GSF

Review Information Review Date MM/DD/20YY

DEED Required

Item	DEED Requirement - *Need Factors*	Reviewed	Comments
1	Tight project milestones or deadlines.	?	
2	Amount of overlap of design and construction phases.	?	
3	Scope definition.	?	
4	Potential for changes during construction.	?	
5	Need/desire for the contractor's input during design.	?	
6	Flexibility to make design changes after construction cost commitments.	?	
7	Other.	?	

Item	DEED Requirement - *Success Factors*	Reviewed	Comments
8	Ability or desire to define and verify program & design content/quality.	?	
9	Experience with the particular delivery method & forms of contracts.	?	
10	Ability to participate in multiple trade contractor/supplier evaluations.	?	
11	Desired contractual relationship and ability to recoup savings.	?	
12	Other.	?	

Item	DEED Requirement - *Concurrence Items*	Reviewed	Comments
13	Provide a resolution supporting the requested project delivery method.	?	

Item	DEED Requirement – *Need Factors*	Reviewed	Comments
14	Request must address how the alternative delivery method will result in lower project costs/increased value to the state.	?	
15	Request must address how quality standards will be maintained.	?	
16	Request must address how unknown conditions will be accounted for.	?	
17	Provide name and qualifications of the Owner's project manager for the alternative delivery method process (list specific experience).	?	
18	Describe the basic process leading up to the award of the contract (establish how competitive selection will be achieved).	?	
19	Other.	?	

Prior Document Coordination – Ed Specs/Schematic Design

Item	Prior Doc Coordination Requirement	Reviewed	Comments
1	X.	?	
2	X	?	
3	X	?	

Best Practice

Item	Best Practice Requirement	Reviewed	Comments
1	For Design-Build, establish accounting protocols to track Design and Construction costs separately.	?	
2	Consider limitation on DEED approval period if project is not commenced (e.g., 6 months, 9 months, etc.).	?	
3	X.	?	
4	X.	?	

Action Items

Item	Reviewer Questions	Recipient Responses	Resolved
1			?
2			?
3			?
4			?

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

Alaska School Facilities Preventive Maintenance & Facility Management Handbook

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

September 1, 2022

Issue

The department seeks committee approval to finalize and publish the 3rd Edition of the *Alaskan Schools Preventive Maintenance &Facility Management Handbook*.

Background

Last Updated/Current Edition
Publication last updated in 1999. Current edition available on the department's website: education.alaska.gov/facilities/publications/PreventiveMaintenance.pdf.

Public Comment
The department issued the publication for public comment from April 27 – May 31, 2022. Two entities provided public comments. The comments and the department's response through the Facilities section are included with this paper.

Summary of Proposed Changes
Proposed draft is a major update of the 1999 version. Whereas the original document only provided information on developing and implementing a preventive maintenance program, the current proposed edition expands upon the subject include all five major required areas: maintenance management, energy management, custodial program, training, and capital planning. The document divides each of these areas into three levels: developing, implementing and sustaining. It also provides additional supplemental information both as content in the body of the document as well as in in several appendices.

This proposed revision has been a larger undertaking that expected and taken much more time and resources than anticipated. As such, while the original vision for this document provided for additional supplementary information and resources, many of those placeholders have been postponed to future versions in an effort to complete this edition and publish it for use by districts. In the May 2022 public comment, the department solicited additional development in these placeholder areas; however, since no comments or responses were received specific to this request, the department is recommending removal of the undeveloped areas.

Version Summary & BRGR Review
Drafts of the publication were presented to the committee at the following meetings:

March 15, 2018	December 2, 2020	December 9, 2021
May 8, 2018	February 25, 2021	April 20, 2022
December 12, 2018	March 17, 2021	September 1, 2022
September 8, 2020	July 20, 2021	

BRGR Input and Discussion Items

1. Are there committee questions or comments on the core structure of the handbook which is to address each of the five statutory areas of maintenance and facility management

using three themes: Establishing a _____ Program, Implementing a _____ Program, and Sustaining a _____ Program?

2. Are there thoughts on any of the content (listed below) that was removed due to lack of development?
    a. Alaska school district examples of commissioning and retro-commissioning.
    b. Example vignette for Alaska school district challenges in custodial staffing.
    c. Alaska school district examples of custodial internal QC and assessment.
    d. An Additional Information section with: Managing Contracted Staff and Privatized Activities, Evaluating Your Maintenance Program, Environmental Safety, Portable Devices in the Maintenance Work Flow, and Electronic Operations & Maintenance Manuals elements.
    e. An appendix with 'facility funding formulas'.
    f. An appendix with a 'bibliography of maintenance publications'.
    g. An appendix with 'standards for a clean classroom'.

Options

Approve draft publication for a final period of public comment (with anticipation of a final document in December 2022).
Amend draft publication and approve a final period of public comment.
Approve final publication for issuance and use by the department.
Amend final publication and approve for issuance and use by the department.
Seek additional information.

Suggested Motion

"I move that the Bond Reimbursement and Grant Review Committee approve the department's final draft of the *Alaska School Facilities Preventive Maintenance & Facility Management Handbook* for a final period of public comment."

DEPARTMENT OF EDUCATION AND EARLY DEVELOPMENT

COMPILED PUBLIC COMMENT AND DEPARTMENT RESPONSES

CAPITAL PROJECT ADMINISTRATION HANDBOOK

APRIL 27, 2022 TO MAY 31, 2022

PUBLIC COMMENT RECEIVED	DEED RESPONSE
I read through the "Preventive Maintenance and Facility Management Handbook" and noted that it does not have much content for hazardous materials identification, removal, disposal, etc. I am not necessarily sure that the plan needs to include specifics related to hazardous materials, since these issues may be more appropriately addressed by other programs required by regulation (such as the AHERA program), but I do believe that some content should be added into this handbook to ensure the costs associated with hazmat are considered, as well as to help prevent inadvertent disturbance of hazmat. [see original for additional content] *C.OTTOSEN 5/16/22*	Thank you for your comment and suggestions. The Additional Considerations section of the publication was to have a section on Environmental Safety. Unfortunately, for simplicity, we ended up dropping the Additional Consideration section entirely.
Page 81 - Custodial component plans per school with counts of all components such as doors, square footage of glass, etc is not realistic or worthwhile for a district our size. *ANCHORAGE SD 5/16/22*	Thank you for your comment. While there are certainly different metrics useful for approximating required custodial effort, a component-based inventory is among the most reliable. This strategy scales to all sizes of districts.
Page 82 - Due to the various work schedules of the maintenance workers, scheduling and coordinating training opportunities can be challenging. Virtual learning systems has simplified the scheduling issues. Our employees can access online training and pre-recorded courses and able to complete the training on their own time. *ANCHORAGE SD 5/16/22*	Thank you for your comment. We completely concur. High quality training delivered over a variety of information systems is a huge benefit to employees and managers alike.

From: Chris Ottosen
To: Mearig, Timothy C (EED)
Subject: Public Comment Period for Revised Publication "Preventive Maintenance and Facility Management Handbook"
Date: Monday, May 16, 2022 12:09:02 PM
Attachments: image001.png

Hi Tim,
I read through the "Preventive Maintenance and Facility Management Handbook" and noted that it does not have much content for hazardous materials identification, removal, disposal, etc. I am not necessarily sure that the plan needs to include specifics related to hazardous materials, since these issues may be more appropriately addressed by other programs required by regulation (such as the AHERA program), but I do believe that some content should be added into this handbook to ensure the costs associated with hazmat are considered, as well as to help prevent inadvertent disturbance of hazmat.

Regulations governing hazardous building materials have a relatively big "footprint" on costs for many reasons. For example, if John D. needed to repair a leaking pipe inside of a wall, there are several possible hazardous building materials that might be present. Can the leak be accessed without demolishing things to access it? If you need to demolish things, let's say part of a gypsum board wall, that wall may have asbestos in the joint compound, texturing compounds, in the GWB itself, and/or it may be painted with lead-containing paints. Once past the wall, does the pipe have asbestos insulation? Is the heat fluid media classified as a hazardous waste? What type of cleanup may be needed due to other damage caused by the leaking pipe? The situations are endless as I am sure you are already aware.

How costs could add up in this scenario would depend on many things (in a very generalized and not all-inclusive way):

1. What information is already known about the affected materials? If nothing, then an accredited inspector must assess the area and collect samples as necessary which then must be analyzed by an accredited laboratory. If this is in a remote location this could add substantial cost if there are no accredited inspectors nearby.
2. Do the materials being affected contain asbestos? If so, how much material will be removed? If the amount being removed is greater than what can fit into a single standard sized glovebag, then you must use accredited project designers, workers, must perform clearances, must document it all, among many other requirements. Quantities less than what can fit into a single standard sized glovebag are not requirement-free, they are just more "relaxed".
3. If lead is present at any concentration, then you must comply with OSHA's lead regulations for worker training, etc., as well as EPA and DOT regulations governing transportation and disposal. If lead concentrations are high enough to be classified as "lead-based", you may have to comply with 40 CFR 745 which is the EPA's regulation intended to protect young populations from lead.

I elected not to provide suggested content at this time as the way in which it could be added varies and depends a lot on what content the department intends for this handbook to contain, and at what detail. I can help provide content if desired.

I hope you find this input useful. Please let me know if you have any questions or comments for me and if you would like any assistance in content development.

Thanks!

Chris Ottosen
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Page Label	Author	Comments
81	ASD Maint.	Custodial component plans per school with counts of all components such as doors, square footage of glass, etc is not realistic or worthwhile for a district our size.
82	ASD Maint.	Due to the various work schedules of the maintenance workers, scheduling and coordinating training opportunities can be challenging. Virtual learning systems has simplified the scheduling issues. Our employees can access online training and pre-recorded courses and able to complete the training on their own time.

Alaska School Facilities Preventive Maintenance & Facility Management Handbook

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ACKNOWLEDGEMENTS

Thanks to the Bond Reimbursement and Grant Review Committee members and to school facility personnel across the state who reviewed this publication in its earlier editions and responded to the Department of Education & Early Development with comments for this 3rd Edition.

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Background

The primary focus of the original (1997) and second edition (1999) of the *Alaska School Facilities Preventive Maintenance Handbook* was to present school districts with a basic outline on how to develop and implement a preventive maintenance program. At that point in history, the Department of Education and Early Development (DEED) realized that many of the school facilities built following the oil boom of the late 1970s were in poor condition and several were already in dire need of major repairs a mere couple decades after original commissioning. In some cases, it was found that the operational systems for many of these schools were having their life-expectancy curtailed mainly because of maintenance staffing levels, training, and management practices. Even though preventive maintenance was present in some of our school districts, other school districts appeared to be unaware of its existence, or simply did not know how to go about managing their schools with adequate maintenance in a manner which would benefit each school while keeping operational and maintenance costs under control.

As a proposal to address these issues, and as a means to better streamline accountability and efforts in all school districts across the state, state officials focused their attention to ensure school districts had at least minimum standards for preventive maintenance and facility management program. In 1998, new legislation was passed and in 2000 regulations were promulgated to implement minimum criteria for maintenance and facility management if school districts wished to remain eligible for state-aid for school capital projects.

The prime objective of these new standards was to empower school districts to develop functioning preventive maintenance and facility care programs; as a reward for their efforts and demonstrated achievements, the department would then enable eligible school districts to apply for future grants.

This narrative summarizes the genesis of the preventive maintenance program at DEED and the main factors which came about to justify its existence. It was imperative then, and continues today, that the department and districts collaborate to move all districts beyond a point—real or perceived—of perpetual "breakdown maintenance" and "fix-it" capital expenditure. We must jointly move to integrated, sustainable, best-practice facility care and management. This type of maintenance and facility management is beneficial to the taxpayer, to maintenance personnel, and to the students and staff in our schools.

Statutory Authority

Alaska Statutes (AS)

- Assign responsibility for preventive maintenance, custodial services and routine maintenance (AS 14.14.090, AS 14.08.111, AS 14.14.060)

> AS 14.14.090. In addition to other duties, a school board shall . . .
> (10) provide for the development and implementation of a preventive maintenance program for school facilities . . .
>
> AS 14.08.111. A regional school board shall . . .
> (8) provide custodial services and routine maintenance of school buildings and facilities;
>
> AS 14.14.060
> (f) The borough school board shall provide custodial services and routine maintenance for school buildings and shall appoint, compensate and otherwise control personnel for these purposes. The borough assembly through the borough administrator, shall provide for all major rehabilitation, all construction and major repair of school buildings. The recommendations of the school board shall be considered in carrying out the provisions of this section.

- Define preventive maintenance (AS 14.14.090); and,

> AS 14.14.090
> (10) . . . in this paragraph, "preventive maintenance" means scheduled maintenance actions that prevent the premature failure or extend the useful life of a facility, or a facility's systems and components, and that are cost-effective on a life-cycle basis.

- Establish the requirements of a preventive maintenance plan (AS 14.11.011, AS 14.11.100).

> AS 14.11.011
> (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 . . .
> (4) evidence acceptable to the department that the district
> (A) has a preventive maintenance plan that
> (i) includes a computerized maintenance management program, cardex system, or other formal systematic means of tracking the timing and costs associated with planned and completed maintenance activities, including scheduled preventive maintenance;
> (ii) addresses energy management for buildings owned or operated by the district;
> (iii) includes a regular custodial care program for buildings owned or operated by the district;
> (iv) includes preventive maintenance training for facility managers and maintenance employees;

Statutory Authority

(v) includes renewal and replacement schedules for electrical, mechanical, structural, and other components of facilities owned or operated by the district; and

(B) is adequately adhering to the preventive maintenance plan.

AS 14.11.100

(j) Except as provided in (l) of this section, the state may not allocate money to a municipality for a school construction project under (a)(5), (6), or (7) of this section unless the municipality complies with the requirements of (1) - (5) of this subsection . . . . In approving a project under this subsection, and to the extent required under (a)(8) - (17) of this section, the commissioner shall require . . .

(5) evidence acceptable to the department that the district

(A) has a preventive maintenance plan that

(i) includes a computerized maintenance management program, cardex system, or other formal systematic means of tracking the timing and costs associated with planned and completed maintenance activities, including scheduled preventive maintenance;

(ii) addresses energy management for buildings owned or operated by the district;

(iii) includes a regular custodial care program for buildings owned or operated by the district;

(iv) includes preventive maintenance training for facility managers and maintenance employees; and

(v) includes renewal and replacement schedules for electrical, mechanical, structural, and other components of facilities owned or operated by the district; and

(B) is adequately following the preventive maintenance plan.

Read in their entirety, these statutes establish that preventive maintenance of Alaska schools is solely the responsibility of school districts, and that funding for such must be included within the district's operating budget. Some school districts share the duties of maintenance with another agency within the city or borough. The statutes in no way prohibit school districts from acting in conjunction with these associated agencies to affect all or a part of their maintenance program. However, doing so does not relieve the school board of its obligations in the areas of preventive maintenance.

Also, based on this statutory authority, the department's capital improvement project (CIP) application does not allow capital funding for the accomplishment of preventive maintenance. A district requesting capital funding for both school construction and major maintenance projects must provide "evidence that the proposed project should be a capital improvement project and not part of a preventive maintenance program, or regular custodial care program." (AS 14.11.011(b)(3))

Regulatory Requirements

Alaska Administrative Code (AAC)

- Provides direction in regulation for development of a school district Preventive Maintenance and Facility Management program and for periodic review by the department that districts are adhering to the plan.

4 AAC 31.013. Preventive maintenance and facility management

(a) For a district to be eligible for state aid under AS 14.11.011 or AS 14.11.100, the district must have a facility management program that addresses the following five elements of facility and maintenance management:

(1) a formal maintenance management program that records maintenance activities on a work order basis, and tracks the timing and cost, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;

(2) an energy management plan that includes

(A) the recording of energy consumption for all utilities on a monthly basis for each building; for facilities constructed before 12/15/2004, a district my record energy consumption for utilities on a monthly basis when multiple buildings are served by one utility plant; and

(B) regular evaluation of the effectiveness of and need for commissioning existing buildings;

(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;

(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person; and

(5) a renewal and replacement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.

(b) Repealed 12/15/2004.

(c) At the request of a chief school administrator, the department will assist a district in implementing a qualifying preventive maintenance program through consultation, on-site reviews, and training.

(d) Repealed 12/15/2004.

(e) The department will make a determination of a district's compliance with each element required in (a) of this section, based on evidence of a program acquired by the department, including information gathered by the department during an on-site visit conducted under (f) of this section. The department may change a determination at any time during the year based on new evidence. For purposes of eligibility for an application submitted under AS 14.11.011, on or before June 1, the department will provide preliminary notice of its determination. Districts that are not in full compliance must provide evidence of compliance to

the department by August 1. On or before August 15, the department will notify districts of its final determination regarding compliance. The department will deny a grant application submitted under AS 14.11.011 by a district that has received a final determination from the department that the district is out of compliance with this section.

(f) The department will conduct an on-site inspection of school district preventive maintenance and facility management program at least once every five years; however, if the department issues a finding of noncompliance under (e) of this section and the district does not provide adequate evidence of compliance, the department may postpone an onsite visit beyond the five-year period. The department may make additional inspections as it deems necessary. The department may change its determination of compliance based on information obtained during an on-site inspection.

(g) In this section

(1) "district" has the meaning given in AS 14.11.135 ;

(2) "maintenance activities" means all work performed by district staff or contractors on building systems, components, utilities, and site improvements.

(h) Notwithstanding (e) and (f) of this section, the department may make a determination of provisional compliance for a district that provides evidence of a plan that meets all required elements identified in (a) of this section but does not provide documentation of adherence to that plan. A determination of provisional compliance will allow a district to be eligible for state aid until a final determination of compliance or non-compliance is provided.

Facility Management Overview

Facility Management as a Strategy

Overview

The preceding Background section summarized the beginnings of department-generated preventive maintenance guidance, and the following legislation-driven expansion of that narrow facilities care element into a more comprehensive maintenance and facility management requirement. Since its inception, nearly 100% of Alaska's school districts have achieved compliance in meeting minimum standards. In fact, only a single district out of 53 has not met the state's minimum standards for maintenance and facility management of school facilities at some point. In August 2002, only six districts met minimum standards. By August 2003, the number was 22. It peaked at 52 school districts in 2008. Disturbingly, since the peak in 2008, and through the date of this edition, multiple school districts lost certification (some have regained it) and nearly 15 school districts have experienced a year or more of provisional compliance where minimum standards are achieved but for which there is not at least 12 months of data demonstrating adherence to the standard. In each of these lapses, it was clear that the measured maintenance, operations, and capital planning areas were not sufficiently integrated into a facility management program so as to remain sustainable through personnel changes or economic shifts in the school district. On a brighter note, some of Alaska's school districts have exceeded the minimum requirements and are operating closer to the forefront of facilities management. Practices and processes such as predictive maintenance to forecast equipment failure, equipment upgrades based on lower life-cycle costs, and managing demand for space are beginning to appear in the department's assessment visits. The Department believes these kinds of results are achievable in every school district, at every level of resource availability, through integration and district-level ownership.

Purpose

The purpose for this document is three-fold:

1. To expand department guidance to reflect the full breadth of maintenance and facility management addressed in statute and regulation,
2. To foster greater consistency and sustainability in meeting department requirements by focusing on the integration of operations, maintenance, and capital planning under a Facility Management paradigm, and
3. To offer best-practice insights and meaningful tools to help create facility management programs that exceed minimum requirements.

The structure of this document supports these purposes by addressing each of the five components of maintenance and facility management in three areas: developing, implementing, and sustaining. In addition, where general facility management topics cross one or more of the five mandatory components, these topics are addressed in this Overview section rather than repeatedly in each category. Finally, specific tools and resources are provided as appendices following the narrative documentation.

With limited availability of capital funding, and community pressure on local funding for public works, it is vitally important for school districts to fully integrate overall facility management

into district operations. Facility management is not just a matter of fixing things when they break; it is a comprehensive program of operating, maintaining, repairing, and replacing components and systems for optimal results. Such a process addresses facility issues before they have a chance to create a crisis or emergency in a school district facility. With a comprehensive facility management program, a school district has tools that will extend the effectiveness of each maintenance and operations dollar so that the maximum amount of funding is made available for the students in the classroom. Processes for implementing a comprehensive facility management program are heavily dependent on actionable data and include:

- tracking tools such as work-orders,
- planning tools such as reports, and
- other tools such as active inventory control for custodial and classroom supplies.

Facility Management Integration

Whole-building preventive maintenance was the threshold step for Alaska's school districts on the path toward life-cycle, cradle-to-cradle, sustainable facility management. That was soon followed with requirements that covered operations (custodial, energy management), maintenance (maintenance management, maintenance training), and construction (capital planning). While each of these functional areas can be built up and managed independently, it is their integration that is most likely to ensure sustainability. In the effort to achieve the most value for the facility dollar contributed from all sources—local, state, and federal—operations, maintenance, and construction programs need to be coordinated through an effective facility management program. They all work hand in hand to extend the life of, and renew, existing facilities. State law identifies the basic building blocks for school districts to get the most out of their facilities. Some school districts have exceeded the minimum requirements and are functioning at the forefront of facilities management, integrating processes, practices, and data between functional areas. They are sustaining momentum by using strategic and tactical measures to extend the service life, lower life-cycle costs, and lower occupancy costs.

Building Systems and Components Inventory

An accurate inventory of the systems and components in a facility is core knowledge for facility management. The school district's maintenance management program, custodial program, and capital planning program all depend on this essential data. Energy management programs and maintenance training programs also draw from this information.

Facility Audits and Annual Inspections

The implementation phase of both maintenance management and capital planning should establish the practice of regular assessments of facility conditions as part of their programs. Integrating condition data between these two elements of facility management will also assist school districts in sustaining these two programs long-term. One practical integration is making the measurement of performance indicators in each area dependent on data gathered and updated under the other program.

Facilities Budgeting and Funding

Budgeting and funding for school facilities includes all elements of facility management—operations, maintenance, and construction. The interface between maintenance management,

custodial programs, energy management, and capital planning (renewal) is especially important when considering the costs associated with school facilities.

Data for Informed Decision Making

> "Timely access to relevant facilities data is essential to both effective management of school facilities by district officials and appropriate oversight of public investments by a community. Providing the needed information to the public and other decision makers involves:
>
> - the development or maintenance of a facilities information system capable of collecting, organizing, storing, analyzing, and reporting relevant, timely, comparable, and accurate facilities data [];
> - the meaningful analysis of available data, including the use of appropriate indicators, indices, measures, and benchmarks [];
> - the collection and frequent updating of a host of clearly defined, comparable data elements that describe school facilities and their funding, operations, maintenance, and use [];
> - the maintenance of data definitions, data standards, quality controls, and operational protocols affecting the collection, analysis, and use of data;[1]
> - the presentation of those data into formats that are reasonably usable by the various stakeholder audiences;[2] and
> - timely access to the data in printed public reports or via public websites.[3]
>
> School districts and states throughout the country continue to increase their use of facilities data to inform decision making: to manage day-to-day operations, maintenance, and repairs, as well as short-term operational planning, long-term capital planning, and master facilities planning. High-quality facilities data are used to create efficiencies, save money, preserve the life of capital resources, and help decision makers become more transparent and accountable to education stakeholders."[4]

Key performance indicators (KPIs) and metrics include:

a. Maintenance labor reports.
b. Maintenance expenditures, 5-year average.
c. Number of unscheduled repairs.
d. Ratio of preventive maintenance to unscheduled repair efforts.
e. Ratio of maintenance costs to asset value.

---

[1] For more information about ensuring data quality and appropriate data use, see the *Forum Guide to Building a Culture of Quality Data: A School and District Resource* (https://nces.ed.gov/forum/pub_2005801.asp) and the *Forum Guide to Taking Action with Education Data* (https://nces.ed.gov/forum/pub_2013801.asp).

[2] For more information about data presentation, see the *Forum Guide to Data Visualization: A Resource for Education Agencies* (https://nces.ed.gov/forum/pub_2017016.asp).

[3] For more information about improving access to education websites, see the *Forum Guide to Ensuring Access to Education Websites* (https://nces.ed.gov/forum/pub_2013801.asp).

[4] *Forum Guide to Facility Information Management: A Resource for State and Local Education Agencies*, 2018, p.15.

f. Ratio of budgeted labor-hours to actual.
g. Instances of callbacks to address the same condition.
h. Customer satisfaction surveys.
i. Backlog of work orders.
j. Custodial cost per square foot is the total custodial expenditures (labor, benefits, supplies, etc.) divided by total district square footage. Includes cost of labor, supplies and other materials, and scope of custodial duties.
k. Custodial workload is the total district square footage divided by available custodial labor-hours. Includes assigned duties for custodians, management effectiveness, effects of labor agreements, and district budget.
l. Energy Use Index (EUI) for previous five years for each main school facility.
m. Energy consumption reports.
n. Training types and schedule.
o. Facility cost index for scheduled repairs.
p. Facility Condition Index (FCI) for all facilities.
q. Renewal/Replacement schedules.

Commissioning: A Special Type of Facility Audit

Introduction

Smart buildings are complex buildings. Many of the leading-edge practices in facility management are dependent on the technology of automated systems. Predictive maintenance is often based on digital sensor technology. Energy management depends on sensors, measurements, and electronically controlled mechanical and electrical equipment. Building complexity takes maintenance training requirements to new levels. In response to building complexity, commissioning has evolved from a subtask of other professions and trades to a position of prominence—many would argue its own discipline.

Initial Commissioning

Initial commissioning (often abbreviated Cx) occurs as part of the construction project close-out and the handover of an education facility to the owner—be that the city/borough or the school district. "Commissioning ensures that the new building operates as the owner intended and that building staff are prepared to operate and maintain its systems and equipment."[5] [3] The scope of work included in commissioning, along with the entities involved, is a matter of contractual agreement and can vary from project to project. A key feature of any commissioning agreement should be the involvement of those who will be operating and maintaining the facility.

The department recognizes the need for commissioning within the following building systems: mechanical, electrical, controls, bulk fuel, and building envelope. Much of the commissioning effort will be to optimize the inter-relation of components within these systems but there will also be cross-system coordination which is needed such as when occupancy sensors might control both lighting and ventilation systems. Because of this cross-discipline need, utilizing a

[5] *A Retrocommissioning Guide for Building Owners*; Portland Energy Conservation, Inc.; U.S. Environmental Protection Agency, 2007, p. 2.

certified commissioning agent is required on certain school capital projects with state-aid. A list of approved commissioning agent certifications is maintained on the department's Publications & Resources webpage under Project Planning and Design.

Retro-Commissioning

Retro-commissioning (RCx), also known as existing building commissioning (EBCx) can generally be expected to yield a positive payback after approximately five years of building operations. It may also be appropriate to conduct retro-commissioning at any time on a building which never received initial commissioning. Most energy service companies (ESCOs) make it a practice to include a retro-commissioning piece in their energy savings performance contracts. The basis for this is the relatively safe assumption that most, if not all, existing buildings are not performing optimally with respect to their energy performance.

During the portions of the building life-cycle that follow project delivery (i.e., operations, capital asset management) buildings, and building uses, change. Equipment is added, school populations grow and shrink, and space utilization is altered. These and other changes can render previous systems and settings ineffective. For good cause, and often for inappropriate reasons, building control systems are bypassed or overridden by maintenance personnel. Reasons for temporary overrides can be forgotten, resulting in systems operating outside of the original parameters. Retro-commissioning, done well, can account for these building changes and can recalibrate building performance.

Example/Vignette

Initial Commissioning: The School District of Greenville County, South Carolina, decided to undertake a massive building program to replace or renovate over sixty schools district wide. Due to the size of the program, limited maintenance resources within the district, and a long history of taking ownership of new buildings that didn't work, the school district and the program manager decided to fully commission the MEP systems on all of the projects.

An experienced commissioning agent (CxA) was selected to provide the commissioning services. The first task was to help the district achieve consistency in design and ensure conformance with the design guidelines through design reviews at the schematic, design development and construction document phases. Monthly commissioning visits were made to each job site during construction to review the work in progress and to monitor compliance with the contract documents.

The commissioning teams prepared pre-commissioning checklists and functional performance tests for all of the installed equipment. Prior to functional testing the systems were balanced and the test and balance reports were validated through random sampling techniques. After conducting all of the functional testing, the commissioning agents organized all of the owner training which was videotaped for future reference by the District. The final reports were scanned to CDs along with drawings, O&M manuals, T&B reports and shop drawings. The files are loaded on the school district servers so the maintenance data can be accessed by computer from anywhere in the district.

The school district is following this effort up with a performance review designed to yield a repository of lessons learned.

Retro-commissioning: DBR Engineering Consultants was hired to perform retro-commissioning for a public school district in Texas. The project was a 396,000 sf high school that was constructed 15 years prior to the project. The scope was limited to the HVAC system and associated controls. The process lasted for five months and included functional testing over a six week period which identified 155 issues in 17 categories. The estimated energy savings that could be realized by implementing the identified energy conservation measures was 41%. All this, even though the school was less than 15 years old and had received good maintenance over that time period.

Maintenance Management

Developing a Maintenance Management Program

Introduction

Department regulations for maintenance management require:

> *(1) a formal maintenance management program that records maintenance activities on a work order basis, and tracks the timing and cost, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;*

This brief paragraph results in a series of eight documents—seven reports plus samples of varying work orders—that are intended to provide solid evidence of a minimally compliant maintenance management program. School district maintenance managers may be able to develop this level of maintenance plan on an ad-hoc basis with rules of thumb and the knowledge of experienced maintenance technicians. This is especially true for small facilities with a minimal range of components and systems. However, as school facility complexity increases, maintenance management plans are best built from a component-based inventory.

The most common deficiency noted during the department's certification process, is that maintenance management programs do not track materials associated with maintenance work. All school districts have systems that track labor, but materials tracking, by work order, is often lacking. This does not meet minimum criteria. While there is no question that a well-developed maintenance management program must track labor efforts, materials can be a significant component of maintenance and tracking them by work order is important for measuring the impact of repeated maintenance, or trends on systems.

Compliance with this regulation is demonstrated by providing:

- copies of work orders in various states of completion;
- report total maintenance labor hours collected on work orders by type of work (e.g., scheduled, corrective, operations support, etc.) vs. labor hours available by month for the previous 12 months;
- report scheduled and completed work orders by month for previous 12 months;
- report number of incomplete work orders sorted by age (e.g., 30 days, 60 days, and 90 days, etc.) and status for the previous 12 months (e.g., deferred, awaiting materials, scheduled, etc.);
- report comparison of scheduled maintenance work order hours to unscheduled maintenance work order hours by month for the previous 12 months;
- report monthly trend data for unscheduled work orders showing both hours and numbers of work orders by month for the previous 12 months;
- report planned maintenance activity for the following quarter;
- report completed maintenance activity for previous three months including labor and material costs; and

- report preventive maintenance components by building system.

School district officials should use these reports to better understand their maintenance management program and to track the results generated by the program.

Maintenance Data Information

In order to have an effective maintenance management program, the first step is to develop a mechanism for collecting information on facility components and systems that will be the subject of the maintenance management program. There is a plethora of computer programs on the market that are specifically designed for such purpose; these are known as Computerized Maintenance Management Systems (CMMS). For all intent and purpose, the basic key to any of these programs is the capability to store, retrieve and analyze the information collected on facilities, their maintenance needs, and the organization's maintenance practices.

Early generations of CMMS consisted of software which was locally installed and hosted on district computers. Data storage was also local. Some of these systems were network compatible, making them useful for organizations where access to the system could not be centralized at one location or functional area. With the advent of 'cloud computing', many CMMS service providers developed business models which involved hosting customer facility and maintenance data on their own servers and providing a web-based user interface. Both of these delivery models remain available to organizations with the hosted-data model being prevalent in most Alaska districts. For a peek into history, see the pop-out for how CMMS worked in the 'good old days'.

Historical Management Systems

Modern CMMS have evolved following the use of 3" X 5" index cards and twelve manila folders (one for each month). One side of the index card contained information about the facility components and systems as well as the services that needed to be performed. The back side of the card was used to record the date on which the service was performed, the name of the maintenance or custodial staff, and the cost of materials. Upon task completion, the card was placed in the manila folder assigned to the future month when the task was due. Although this method now seems crude, it could possibly still meet minimum requirements of the department for a small school district. The analogy is similar to having accountants using pencils, ledgers, and ten-key adding machines. However, the value of a CMMS—especially one specifically designed for school districts—is measurable and all but mandatory.

With the rise and almost universal market penetration of the software-as-service business model, most CMMS include an initial purchase fee (which can include software, hardware, installation, and set-up costs) and an annual service or maintenance fee. While selecting a suitable CMMS to meet the needs of their school district, school officials should be aware there are many options. Most vendors offer modules targeted at specific functions such as space management, fleet management, and inventory management, many of which are not required by statute or

regulation nor are they useful to the school district. Marketing personnel within CMMS vendors excel at selling their products, but some companies have hidden fees that are charged after the program is instituted, where school districts find themselves forced to pay extra in order to achieve adequate results. Other companies, after a successful marketing push, offer poor customer service, which quickly becomes problematic during initial setup. Most of these programs are web-based and consume a good portion of bandwidth during usage. CMMS software should be user-friendly so that it can be implemented with minimal training for all maintenance and custodial personnel as well as school educators. The bottom line is to ask around to other school districts and see what will work best for your organization in order to make an informed decision. The department's PM State of the State, published annually by June 1 and finalized not later than August 15, includes data on each school district's CMMS tool.

Identification of Facilities, Systems, and Components

The second step in developing an effective maintenance management program is to get the information entered into the system.

In order to do so, someone will need to inventory and categorize systems and components maintained by the school district in each of the school facilities that the school district maintains. Vendors and a variety of consultants are willing to perform this task if district personnel are unable to. During the inventory, information such as quantity, type, size, age, condition, manufacturer, model, material specification, location, key parts, part numbers, specialized upkeep requirements (e.g., oil and filter types), and other item-specific data need to be documented. The data collection is time consuming and requires a significant amount of data entry. Part of this data entry will be development of an asset naming convention (see pop-out).

Asset Naming & Equipment IDs

"A little forethought at the start can save a lot of time in the future"

Creating an asset naming convention within your CMMS normally involves both an asset name and an asset ID. Asset names can usually be normal, descriptive text titles (e.g., Generator, Diesel Standby 200KVA Cummins). The problem comes when there are multiple instances of that same asset within the universe of assets managed within the CMMS. An asset ID, on the other hand, is a unique identifier—only one asset has that specific ID. Asset ID's, or equipment tags, are often cryptic combinations of text and numbers that include indicators tying the asset to industry classification systems and types, to particular facilities, to locations within that facility and to the quantity of that particular asset. Asset naming doesn't have to be complex but it must always be consistent and logical. Standardized naming conventions also aid in data reporting and analysis. Come up with a useful naming convention before you go live with your CMMS system because it can be difficult to change later.

The data collection will reveal systems and components that apply to each of the facilities. School district personnel may add items as necessary to create a complete plan. Many facilities

may have multiple system types within a particular category (e.g., roofing, package unit heaters, etc.) as well as multiple components of the same type (e.g., circulating pumps, water closets, toilet partitions, etc.). For each item, and wherever appropriate, a specific preventive maintenance task should be developed. In large school districts, the data collection will reveal similarities amongst systems and components; following these observations, some school districts may elect to standardize as many of their systems and components as possible (e.g., same fire alarm panel, light fixtures, etc.), thereby reducing spare parts inventory and training costs, which in turn creates increased productivity and quality of work. Note that standardization may in some cases only be possible during remodel projects or new construction (e.g., boiler replacement / installation, unit heater replacement / installation, etc.); however, simple part replacements may also enable standardization (e.g., energy efficient bulbs, low-consumption water closet flushometers, etc.) and save on utility costs.

To assist the school district with executing this task, the department has established a baseline by identifying facility systems and components that should be included in the CMMS. A list of these components is included as Appendix A and should clarify the tasks needing to be done in this section. While thorough, the list is not intended to be exhaustive of every possible component. The list is designed to dovetail with other useful assessment devices such as the Association for Learning Environments International (A4LE) *Alaska School Facility Appraisal* and the department's *Guide for School Facility Condition Surveys*, as well as other professional facility audit organizations. The list also gives its users a better understanding on how to update Renewal and Replacement (R&R) schedules, a topic which will be discussed later in this guide. A sample of an R&R schedule is included as Appendix B.

Determining Present Conditions

While developing the inventory of systems and components described previously, the school district will need to complete an inspection of the components in order to establish their current condition. Following the identification of systems and components in each facility, a detailed inventory is needed to quantify the building components and to establish their current condition. This step includes both an objective process of fact-gathering and a subjective assessment of the current condition. Information such as quantity, type, size, manufacturer, model, material specification, location, key parts, part numbers, and other item-specific data will be documented. A qualified technician or professional will need to make the assessment of current condition. The condition assessment is used to determine both the immediate and future levels of preventive maintenance for the system or component and its end-of-service-life replacement date.

Establishing Appropriate Levels of Maintenance

Preventive maintenance efforts range from visual inspections only to performance testing and analysis; from minor adjustment, cleaning and/or lubrication to complete overhauls; from reconditioning to component replacement. [6]

[6] Applied Management Engineering, PC, Kaiser, Harvey H.; *Maintenance Management Audit: A Step By Step Workbook to Better Your Facility's Bottom Line*; Kingston, MA; R.S. Means Company, Inc., 1991. p.83.

School districts that are accredited by the Northwest Association of Schools and Colleges will recall that the accreditation standards include the following:

> Standard III - School Plant and Equipment
> "13. Inspection(s) of the school plant and equipment **shall** be made each school year by a qualified official and any deficiencies addressed." [7]

This type of standard is an example of a preventive maintenance requirement at the visual inspection level.

In establishing levels of maintenance, two determinations are needed. The first is to establish a basic life-span for the system or component (e.g., asphalt shingle roofing - 20yrs, oil-fired boiler, 15yrs, drive belt – 3yrs, etc.). The second determination is, "What maintenance activities are needed to ensure that this particular system/component meets or exceeds its life expectancy?"

Answers to the above queries can oftentimes be found in the Operations and Maintenance (O&M) manuals. These manuals are usually turned in shortly after facilities commissioning or major project completion. Manufacturers' literature, practical experience, test results, and industry averages are some ways to determine both acceptable life cycles and what preventive maintenance work would result in achieving those life expectancies in the most efficient manner; as mentioned previously (i.e., the lowest total life-cycle cost). Alaska presents formidable environmental challenges to our facilities, and the life expectancy of certain systems / components may vary greatly from one region to another, so an informed analysis is necessary.

Preparing the Work Items Plan

Once your levels of maintenance have been established, setting the tasks into a workplan is the next step. According to Basil Castaldi, a recognized expert, and author, in the field of facility planning, four elements make up any preventive maintenance work item.

> "In any prescribed maintenance program, the list of tasks to be performed is described in detail. The frequency and nature of the work are clearly stated. The materials to be used are specified in considerable depth and the manner in which the work is to be accomplished is expressed in simple language." [8]

Consider this further detail of these tasks:

I. The list of tasks to be performed is described in detail.

The detail that accompanies this step is critical and should be as comprehensive as the efforts that were placed in the previous step while identifying facilities, systems, and components. Any maintenance individual who is assigned any of the tasks should be able to determine the location of the equipment, what replacement parts, if any, are needed, what the work entails (e.g. replace air filters), tools and manuals required, estimated time of completion, what Personal Protective

[7] *Standards for Accreditation*; Northwest Association Schools and Colleges, 1995, p. 11

[8] Castaldi, Basil; *Educational Facilities: Planning, Modernization, and Management*; Allyn and Bacon, 1982, rev. 1994, p. 421.

Equipment (PPE) should be worn, if any, etc. This is particularly useful when a new maintenance employee takes over a particular school without having the possibility of shadowing an existing employee.

II. The frequency and nature of the work are clearly stated.

This task is self-explanatory. For instance, a school district may elect to conduct a 30-minute load test for its entire generator fleet at the beginning of each month, with exception to June and July when affected schools are in seasonal shut down. The test will include monitoring and recording all gauges. Another example may be the changing of air handlers filters twice a year, at the beginning of August, and then again at the beginning of February.

III. The materials to be used are specified in considerable depth.

This is another important task, because it avoids the plausibility of maintenance personnel switching various components of a system to a point where functionality and performance are diminished costing the district several operating dollars. For instance, clearly defining a specified nozzle for a fuel burner may enable boilers to maintain peak performance (e.g., hollow, 3.0 gallon per hour, 60-degree angle). Another example could be the adherence to specified air filters, where low-cost air filters may compromise the occupants' environmental safety and well-being (e.g., high-capacity pleated filter, MERV 8, Moisture Resistant Die Cut Chipboard, Nominal Height 24 inches, nominal width 24 inches, nominal depth 2 inches).

IV. The manner in which the work is to be accomplished is expressed in simple language.

The tasks needing attention will be addressed by custodial and maintenance individuals with various educational backgrounds. The best means to ensure understandability across the board is to keep the language simple and direct.

Implementing a Maintenance Management Program

Introduction

Where the first school board responsibility was to *develop* a preventive maintenance program, the second responsibility is to *implement* a preventive maintenance program. This section offers guidance on carrying out the developed preventive maintenance work plan and establishes the importance of having management reports and a system of feedback from the field in order to implement an effective program.

The basic task of preventive maintenance implementation is to match needs with resources. However, both needs and resources are variables in the facilities management effort. As a result, implementation efforts may occur once to initiate a preventive maintenance program but will also require continuous monitoring of needs and resources to accommodate changes in these variables. For example, the work items assessment of a circulating pump may have indicated an anticipated failure in three years. At the three-year point, a stress test of the pump may indicate no appreciable degradation has occurred. This information may necessitate a revision to the preventive maintenance plan initially implemented.

The Need for Sustainability

Revisions to the maintenance plan must occur over the life-cycle of the facility. Other examples driving this change include the impact of new technologies, improvements to building systems or new tools that reduce repair times. These examples of variables in needs and resources all support the conclusion that implementation requires both an initial and an on-going effort. For additional discussion on Sustaining a Maintenance Management Program, see page 23.

Moving from the planning and development phase to implementation and operation almost always involves funding, regardless of the endeavor. Preventive maintenance is no exception. As evidence of the importance of funding in this transition, the portion of the Encyclopedia of Architecture devoted to implementation of a preventive maintenance program is largely a discussion of funding.[9] Because funding is so critical to the transition, some findings from research concerning maintenance funding and resources are included in the following paragraphs.

Determining Necessary Resources

As previously mentioned, most of the resource requirements result in a need for funds. Determining the level of funding needed for preventive maintenance at a detailed level requires estimating literally thousands of labor and material line items. This method is very time consuming. Other approaches to budgeting for preventive maintenance include establishing a

[9] *Encyclopedia of Architecture*, John Wiley and Sons, Inc. p.70.

formula based on a percentage of the operating budget or a percentage of building replacement value(s). In California, research showed that:

> "If a planned maintenance program is followed, about 5 percent of a district's operating budget will be required to provide an adequate maintenance program.
>
> In addition to the 5 percent expenditure for the district's maintenance program, a reserve fund is needed for unanticipated and emergency maintenance expenditures. Another criterion for determining budget requirements is to calculate 2.9 percent of the current net building replacement cost or a projected cost based on the square footage of property to be maintained." [10]

In another budgeting formula, the *Encyclopedia of Architecture* indicated:

> "The cost of preventive maintenance ranges according to the intent of the *plans developed.* To set a budget for this type of work, one may estimate 5% of the present value of the building for preventive maintenance activity. Perhaps 1.5% of the value of the building may be estimated for simpler structures or systems."[11]

The department's capital improvement project (CIP) application scoring criteria assigns increased points to school districts based on the percentage of total maintenance expenditures relative to the building replacement value(s). Maximum points are achieved when the percentage is five percent or greater.

One effective strategy for determining the necessary resources is to identify the smallest detailed increments of the preventive maintenance plan and combine them for the aggregate picture. Take each well-developed preventive maintenance work item and ask, "What skills (trained personnel), tools, materials (parts etc.), and time are needed to complete this work item?" Once these factors are tabulated and the resource needs are clear, the supporting issues of space for shops, material staging and transportation requirements can be addressed.

While starting with the most detailed information and building up yields a comprehensive assessment of necessary resources, broad and systematic thinking is required to arrive at the necessary organizational structure with which to accomplish the preventive maintenance program.

Determining Organizational Structure

The structure and organization of the preventive maintenance program must be in place before effective scheduling of work can occur. Some operations and maintenance organizations establish a cross-disciplined preventive maintenance work center whose main task is to inspect various systems and components (usually dynamic equipment) and write maintenance work orders. Following the inspection, more traditional work centers such as plumbing, sheet metal,

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[10] School Facilities and Transportation Division; *Administration of Maintenance and Operations in California School Districts: A Handbook for School Administrators and Governing Boards*; California State Department of Education, 1986, p. 33.

[11] *Encyclopedia of Architecture*, John Wiley and Sons, Inc. p.70.

etc. are assigned the actual work tasks. Other maintenance organizations are oriented almost completely to preventive maintenance tasks with major crafts taking responsibility for components and systems within their respective areas. In this model, a small multi-disciplined work center handles routine maintenance and emergency repairs and, in some cases, minor improvement work. These organizational structures are variations on how best to accomplish the work that is identified in the component needs-based maintenance assessment. This approach to organizational structure—one that examines the necessary maintenance work and builds an organization structure to match—is often overlooked.

Another driver for determining organizational structure is management. This strategy asks the question, "How can the maintenance resources best be managed?" The expectation is that from good management will follow good maintenance. Most of the management approach structures can be distilled to supporting, or describing, three approaches: centralized, decentralized (or zone maintenance), and hybrid.

Taken together, the combination of organizing personnel to accomplish necessary tasks, and organizing personnel for effective management is most likely to yield a comprehensive maintenance management implementation. There are many resources which can assist a district in implementing an organizational structure. Textbooks have been written and many trade periodicals run at least one if not multiple articles in any calendar year dealing with maintenance organization.

Scheduling and Assigning Work

The heart of any maintenance management program is scheduling and assigning specific maintenance tasks, and tracking the completion of those tasks. In addition, it is best practice to be able to account for all available maintenance hours and to measure time on task and other productivity and utilization metrics. This element of the maintenance management program takes the work items developed for each component and assigns them to the appropriate maintenance craftsperson or team according to the established structure and schedule.

This is accomplished through the CMMS. Once pertinent data is entered into the database system, work orders detailing the scheduled maintenance requirements can be generated and tracked along with all unscheduled work and categories of ancillary work such as training, education support, mail runs, etc. More advanced CMMS programs have an integral query feature which prompts maintenance managers for necessary input and provides industry standards for certain maintenance tasks. It is estimated that there are more than fifty suppliers of maintenance software packages with price variations based on need and capacity. Maintenance magazines and the world-wide-web are good locations to look for these products.

Intentional & Directed

In a roundtable of school maintenance directors, one mentioned an increased awareness of the need to be intentional in the scheduling and management of maintenance efforts. For this district, it appeared that the more workable way to achieve that goal was to bring maintenance scheduling to a more centralized location. For others, site-based management of maintenance is the norm and allows local flexibility in scheduling work. In a site-based organization, the site administrator, or principal, needs to understand the level of importance to be given to scheduled, preventive maintenance.

Most routine maintenance and some preventive and corrective maintenance can be accomplished with very little planning. Often the only planning needed for these is the creation of a work order and assigning/scheduling the work. However, more complex PMs and most corrective maintenance work requires intentional planning—especially when tools or materials are needed that can't be drawn from common stock. There are also labor considerations. Large corrective maintenance efforts, which can involve component or partial system replacements, often require more than one trade or maintenance skill-set. Understanding these needs and taking action to meet them is the activity of maintenance planning. Large maintenance organizations may find it necessary to establish dedicated planning positions. Where that isn't the case, it's common for a maintenance supervisor or manager to assume that role—sometimes to the detriment of the organization when priorities for time clash.

Planning for complex maintenance work is best approached as a shared task. If there is a need for planning, it's because multiple skills and specialized materials are needed. Even the dedicated planner mentioned earlier isn't a solo performer. That person gathers information from others on factors such as labor projections and material needs in order to develop the plan. In the absence of a dedicated planning function, set up a planning meeting and let the key players share in the task of creating the plan. Reach outside of maintenance to include procurement and business office personnel when materials purchases and logistics are involved. Identify a lead entity to track the plan if it looks like multiple meetings will be needed to develop a successful plan.

Reporting Systems and Feedback

In addition to automating the list of items needing scheduled maintenance, most maintenance management software programs also provide the capability for a computerized building data file. This database of facility requirements can be used to generate a wide variety of accurate reports on matters related to building maintenance and operations and the associated costs. To a certain extent, an integrated maintenance system that incorporates both daily maintenance tasks and long-range planning depends on an automated database of facility information. Effective preventive maintenance programs depend on feedback from maintenance personnel and a reporting/tracking system of costs associated with the preventive maintenance effort. This information is used to maintain the proper balance between preventive maintenance and renewal and replacement efforts (i.e., determining when costs have increased to the extent that preventive maintenance on a system is no longer effective on life-cycle basis).

Maintenance Management

Through a combination of informal evaluations and formal audits, a reporting system should be established to analyze a district's maintenance system to achieve the most cost-effective maintenance program. In addition to general feedback and reporting, district maintenance programs should undergo periodic evaluations of their effectiveness. This can occur both at the worker's task level and at the maintenance management level. Evaluations can be done either internally or through the use of an outside evaluation team. Maintenance management audits examine the functional program and generally consider the following four factors:

Productivity - the portion of a worker's time that is directly productive.
Performance - how well the individual is working, e.g., is work being completed as planned?
Work Quality - is the individual producing a satisfactory work product?
Priority - effective allocation of available time to the most important tasks.[12]

Though maintenance management audits may look at symptoms of ineffective maintenance at the worker/task level (e.g. number of callbacks, work completed on schedule, etc.), a management audit's focus, as the name implies, is on improvements through better management.

[12] Applied Management Engineering, PC, Kaiser, Harvey H.; *Maintenance Management Audit: A Step By Step Workbook to Better Your Facility's Bottom Line*; Kingston, MA; R.S. Means Company, Inc., 1991. p.9-10.

Sustaining a Maintenance Management Program

Introduction

Why do maintenance management programs falter, and even fail, over time in Alaska's school districts? The answers to this question may be many and complex, but one over-arching response may be able to encompass the myriad of reasons. Here it is: Maintenance management practices are not sufficiently integrated in, and indispensable to the district's core operations. This section of the handbook describes some key elements in the building lifecycle, which district leadership should use to weave maintenance management into the essential fabric of the district's operations. They include: performance metrics, financial tracking, software upgrades/updates, and evaluations and inspections.

Performance Metrics

While measuring and tracking maintenance management metrics is important for the district's facilities team, being responsible to share, and to explain, those metrics to district leadership at regular intervals is critical to sustaining the program. School boards—you should require performance metric reporting at each regularly scheduled board meeting. Superintendents—make maintenance performance metrics part of your monthly, if not weekly, 'dashboard' of district performance measures. Facilities directors—don't stop until you have the received the tasking to tell the maintenance management story to district leadership on a regular basis. Select from the following list, develop accurate data collection processes, and let your performance be know—whether you're struggling or exceling:

DEED Identified KPIs (see also Appendix D)

- Work Order Maintenance Hours by Type to Total Maintenance Hours Available
- Work Orders Scheduled and Completed
- Incomplete Work Orders by Age and Status
- Scheduled Work Order Hours to Unscheduled Work Order Hours
- Trend Data for Unscheduled Work Orders, Hours and Count
- Planned Maintenance Activity (Labor & Materials)
- Completed Maintenance Activity (Labor & Materials)

Other Industry KIPs

- Deferred Maintenance Backlog
- Preventive Maintenance Compliance
- Average Time to Completion
- Corrective Repair Response Time
- Employee Satisfaction Rate
- Customer Satisfaction Rate

Financial Tracking

The related resources of financial and human capital, of dollars and people, are also critical areas of focus in order to sustain a maintenance management program. In an article published in

Correctional New Magazine, the author identified budget and staffing as two of the three essential elements, along with maintenance tasks, of the maintenance management triangle.

Budgeting goes hand in hand with expenditure tracking. One of the most basic budgeting strategies is to forecast based on past expenditures. Consider this simple question, "How much do you spend on facility maintenance?" Most school district maintenance directors are not aware of the answer to this question. This is not because the information is non-existent. Every district keeps a detailed chart of accounts for expenditures that includes those related to facilities. However, the cost is often allocated in several different line items within the financial structure. For instance, although maintenance and operations costs fall in Function 600, staff costs may accrue under a separate Object code (325) than utility services (430). In addition, separating maintenance staff from other non-certificated staff is optional versus required. Just as the reporting of maintenance performance indicators can substantially increase the likelihood of a sustained maintenance program, so will the regular review of financial data by the Facilities or Maintenance Director. To better sustain a maintenance management program, arrange for and regularly review financial reports related to operations and maintenance. Select one or more from the following list, and work with the district's business office to start producing these for regular review:

- Monthly Cost of Maintenance Personnel (Districtwide 3-5 year trend)
- Monthly Cost of Materials and Supplies (Districtwide 3-5 year trend)
- Routine Maintenance – Cost per Square Foot
- Routine Maintenance – Cost per Work Order [13]

Software Upgrades/Updates

Ignoring software updates, consciously bypassing updates to save money, and being unaware of improvements in the CMMS arena can contribute to stagnation, inflexibility, and missed opportunities when sustaining a maintenance management program. The 'cloud' and 'software as a service' (SAAS) have done much to alleviate this common pitfall but are not a complete panacea. Districts that have installed maintenance management systems on-site must be diligent about receiving and installing software updates. For those using hosted platforms, the challenge is to ensure that the district remains aware of the updates that are being pushed out. Your provider should be sending notices of these changes in a way that can helps to understand what, if any, impact they may have on your use of the platform.

Less common, but no less disruptive to sustaining maintenance management, is the reverse of the previous issue. Instead of you as the customer being out of the loop, it can be your vendor that 'falls asleep'. Businesses, and the people that run them, change. Occasionally, some fail. While the success of your CMMS provider is beyond your immediate control, the decision to stay with them, or to move on is always in your hands. Here are three signs to look out for regarding the performance of your CMMS provider:

[13] These two "Routine Maintenance" items are recommended by the *Council of Great City Schools* KPI Metrics for Maintenance & Operations.

1) Mergers and/or changes of ownership—especially if these become multiple events within a short period.
2) Out-of-scale increases in either the cost of an upgrade or the cost of an annual subscription.
3) Silence (i.e., no upgrades being pushed, no communications about new feature sets).

Staying current with your CMMS also means staying current with training that might be offered by your provider both as they roll out updates and in viewing normal tutorials. Many providers have this training in the form of short 8–12-minute videos on their web site. Others might have a YouTube channel exclusively for this content. Including such offerings in your annual training plan helps to ensure maintenance management is sustained.

Evaluations & Inspections

Even the best maintenance organizations can fall prey to the 'rut' or 'blinders' paradigm. That can occur when you are so focused on your work, so used to following routines and established courses of best practice, that peripheral issues that may arise are invisible. Using some of the techniques already mentioned in this Sustaining a Maintenance Management Program section such as tracking performance metrics, and regular reporting to executive leadership, there is one other tool on which top-performing organizations rely. That tool is the independent audit or inspection.

Case Study:
In 2004, the Lower Kuskokwim School District determined it would retain an outside expert to measure the quality of the district's maintenance program. In January 2005, the district brought in one of the premier national assessment organizations, MGT America, to evaluate the Plant Facilities Department (along with the business office and special education). The executive summary identified 10 commendations for exemplary practices. Of those, four were noted for the district's maintenance and facilities management operation. Specific to maintenance management, the district was found to have implemented "a high-quality preventive maintenance program" and was further commended for "utilizing an effective, cost-efficient computerized maintenance management system." In spite of these accolades, the report identified no fewer than 20 recommendations for improvement within the Plant Facilities and Capital Projects sections such as: 1) "Develop a system to provide on-site and off-site computer data backups," and 2) "Develop a user's manual for the computerized maintenance management system."

The preceding case study identifies a top-level effort for an evaluation of a district's maintenance management program. Estimated costs for this type of independent analysis are $0.02-$0.50/sf of maintained facilities with lower number corresponding to large districts and the high amount corresponding to smaller districts. Between this level and a 'free' internal review, there exists a range of other options.

For maximum impact on sustaining a maintenance management program, plan for at least some level of independent review on a 5-7 year interval.

Energy Management

Developing an Energy Management Program

Introduction

Department regulations for energy management require:

> *(2) an energy management plan that includes*
>
> *(A) the recording of energy consumption for all utilities on a monthly basis for each building; for facilities constructed before December 15, 2004, a district may record energy consumption for utilities on a monthly basis when multiple buildings are served by one utility plant; and*
>
> *(B) regular evaluation of the effectiveness of and need for commissioning existing buildings;*

The baseline requirement in *(2)(A)*—the recording of energy consumption—is deceptively simple. However, because the two categorical requirements—all utilities and all buildings—are comprehensive in nature, the complexity of record keeping multiplies quickly. Not only does the math of buildings x utilities result in many data points, the variety of utilities used varies from building to building as does the variety of delivery methods for those utilities. School district energy program managers will be challenged if they attempt to develop this level of energy plan on an ad-hoc basis without data tracking tools. However, as school facility complexity increases, energy plans, like maintenance programs, must be built from a facility-specific inventory.

Energy Management Plan vs. Policy

An energy management plan is a comprehensive document that " . . . maps out internal maintenance schedules, equipment logs, and keeps equipment manuals and buildings drawings on hand for reference. Unlike an energy policy, the energy management plan is regularly updated, typically on an annual basis. It is used to document recent achievements, changes in performance, and shifting priorities." (AHFC White Paper, p.8).

The most common deficiency noted during the department's certification process is that energy programs are not tracking all types of utilities used or are not doing tracking using a monthly metric. This does not meet minimum criteria. While there is no question that a well-developed energy management program should include districtwide information (e.g., goals, standards, roles and responsibilities, etc.), the energy consumption records are specific, and unique to each building. As defined in the regulation, the energy plan needs to include recording energy consumption on a monthly basis for each building. Energy consumption recording must comprise all school district energy utilities such as heating fuel, steam, natural gas, liquid propane (LP) gas, recovered (waste) heat, electricity, wood, and coal. Non-energy utilities such as potable water, wastewater, refuse, etc. can be equally important to track in school districts but are not required under the regulation.

As noted, the regulation makes exception for buildings built before December 15, 2004. In such case, for instance, if a large fuel tank supplying multiple facilities was built prior to this date (e.g., school, teacher housings, and generator shed all feeding off one main fuel line), it is permissible to record the monthly utility readings for the entire distribution system. The same goes for electrical meters. However, any school built after this date must have individualized means to record each of its utilities (e.g., oil meter, waste heat meter, electric meter, etc.); the daisy-chaining of numerous buildings off one utility meter is no longer permitted.

The utility consumption records only provide the core data for energy management in a school district. This data needs to be monitored and used to guide energy management processes and to achieve energy use goals. In recognition of this need, subsection *(2)(B)* was added to the minimum requirements for a qualifying energy management program in 2020. This subsection begins to address the additional factors that are needed to develop a more complete, effective energy management program. Such factors include purposes, objectives, goals, procedures, strategies, standards, benchmarks, assessments, education, incentives, and staffing These factors can be grouped into the major categories of: policy, data, objectives, strategies, and measurement.

Energy Policy

A policy or purpose statement regarding a school district's energy management program can be an effective anchor for the program, an important point of reference and statement of commitment. In its informative booklet, *Introduction to Energy Efficiency – A Guide to Managing Energy use in Public and Commercial Facilities*, the Alaska Housing Finance Corporation provides a well-developed framework for crafting an Energy Policy,

> **Energy Policy**
>
> An internal energy policy should state why the organization is committed to conserving energy and/or using it efficiently. Usually in the form of a paragraph, this piece outlines the purpose of the document such as conserving energy in the workplace, using energy more efficiently, reducing costs, reducing emissions, or showing environmental stewardship. Typically, this section also articulates areas of concern such as high and increasing energy costs, community sustainability, etc. (AHFC *Introduction to Energy Efficiency*, p.11).

A school district's energy policy should start at the school board level. The Alaska Association of School Boards (AASB) has developed the following recommended board policy, which can be edited to meet district needs:

BP 3511 ENERGY CONSERVATION

The School Board desires to reduce energy use in the district in order to help conserve natural resources and save money to support other district needs.

The Superintendent or designee shall establish energy use reduction goals, monitor energy consumption and encourage employees and students to conserve resources. The Superintendent or designee shall regularly inspect district facilities and operations and make

> recommendations for maintenance and capital expenditures which may help the district reach its energy consumption goals.
>
> The Superintendent or designee shall establish an energy management program sufficient to meet, at a minimum, the standards needed in order to qualify for state-aid for school capital projects under AS14.11.

An energy policy should answer the 'why' question regarding energy conservation but can also address 'what' and 'how' elements in broad direction-setting statements. In the AASB sample, the initial sentence sets out the purpose of an energy management program while the following paragraphs establish a few key provisions on what kinds of steps will need to be taken to achieve that purpose. These provisions are further developed in the Objectives and Strategies sections of the energy management program.

Energy Data & Information

Information and reliable data is the foundation of an energy management program. Good data provides proof that plan goals are being achieved and draws attention to areas that are lacking. Expanding out from the core information of energy consumption, additional elements and layers of data become important in the process of managing energy. Basic data like overall energy use by month for each building is required to evaluate overall performance, but tracking plan goals is made easier by including more detailed energy use. For example, consider tracking fuel use at each boiler or water heater separate from generators and from other facilities; tracking lighting separate from plug loads and separate from HVAC systems. Other examples are tracking unique features like alternate energy systems separately and measuring hot water flow in addition to total water usage. This level of detail allows setting goals such as reducing lighting energy by 10%, or improving boiler firing sequences, where a single building meter would not provide enough feedback.

Information about the building systems is equally important. Keeping good records of original designs, as-built conditions, and modifications to equipment and control systems is crucial to keep costs down in future renovations or troubleshooting high energy use. Future designers will spend less time figuring out what is there and what the systems are doing if they have access to good records of previous work. Similarly, re-commissioning or retro-commissioning is more cost effective if the commissioning agent does not have to reconstruct the original design intent by reverse-engineering the systems.

Building Automation Systems (BAS) make collection of large amounts of useful data fast and easy. Engineers and researchers prefer too much data over too little; tracking as much as practical is generally recommended. However, even handwritten logs of meter readings or redline markups of original drawings can have great value to the energy management program.

Energy Objectives

The objectives of an energy management program should flow out of the school district's energy policy. When developing these objectives, consider the primary influences on energy use such as building use by various occupants, energy production and transmission, building equipment and systems, and maintenance or custodial activities. While energy management objectives should cover the full spectrum of these, and other energy use factors, it's helpful to try and group similar

objectives together so that the resulting list of core objectives is in the six to ten range. To help with this, try not to include specific activities such as "enter monthly bills into the energy tracking spreadsheet." That and similar elements will be developed as strategies and actions needed to support the energy objectives.

Here are examples of energy objectives, grouped by overall category, developed by various school districts in their effort to achieve their stated energy policy:

Building Occupants and Users

- Create a sense of responsibility among students, teachers, staff, administrators, parents, and community members.
- Include all building users as part of the energy conservation process.

Data Gathering and Management

- Monitor all energy consumption.
- Track, monitor and report district progress, and identify trends and opportunities for savings.

Operations and Maintenance

- Operate at optimal efficiency and avoid unnecessary costs associated with reactive maintenance practices and procedures.
- Reduce our district's overall environmental impact and provide a healthier and safer educational environment.
- To reduce energy costs by evaluating and choosing appliances and equipment that are more energy efficient.

Existing Building Assessments

- Understand energy use and opportunities for improvements to energy efficiency at all facilities.

New Construction

- Reduce future energy costs in new facility construction and renovation whenever feasible.

Energy Strategies & Actions

Energy objectives can best be attained by developing clear and actionable strategies and identifying specific supporting actions. It's often at this point in the program development that roles and responsibilities are established, and personnel assignments made. That work will be addressed in the following section **Implementing an Energy Management Program**.

Here are examples of measures taken by various school districts in their effort to mitigate energy consumption:

- Energy monitoring via automated remote reporting;
- Turn off electrical appliances at the end of each day (e.g., lights, smart boards, computers, monitors, speakers, televisions, stereos, copy machines, kitchen hoods, etc.);
- Utilize minimal corridor night lighting during non-occupancy;

- Report all utility malfunctions immediately to maintenance personnel (e.g., oil / gas/ water leaks, lights no longer shutting off automatically, etc.);
- Shut down boilers, refrigerators, and freezers during summer;
- Turn down the heat during non-occupancy periods (also known as night setback), including holiday breaks;
- Install occupant sensor lighting;
- Install low-flow flushometers for water closets / urinals;
- Shut down the school at 5:00 p.m. one night a week;
- Optimize Heating Ventilation and Air Conditioning (HVAC) systems (e.g. replace air filters, tune-up boilers twice a year, ensure fans are not continuously running in manual override mode, ensure air louvers are operational, etc.);
- Replace antiquated lighting systems with more efficient ones (e.g. replace T-12 fixtures with T-8; replace Tungsten filament bulbs with high efficiency Light-Emitting Diode (LED) bulbs);
- Install provisional arctic porticos during cold season;
- Reward schools that decrease energy use (e.g., free movie night at the gym);
- Enlist/appoint an 'energy champion' and ensure someone is comparing and using the information;
- Enter monthly utility records in a software program which is customized to monitor monthly energy usage. (Note: This is a collaborative process which will require close contact between administrative personnel (e.g. personnel processing utility bills), maintenance personnel (e.g. personnel monitoring fuel consumption), and personnel responsible for the energy management program;
- Determine a benchmark year as the starting point for evaluating the school district's energy management efforts;
- Establish projected consumption and cost data. Projected consumption and cost data will be used to determine future energy upgrades and for budgeting purposes;
- Conduct annual rate review and utility bill analysis;
- Analyze monthly consumption data; track, monitor and review monthly utility bills and investigate and write work orders when consumption is outside of set parameters; and
- Obtain and analyze load profiles including the power demand patterns of the highest energy-consuming schools in our district and look for load-shedding and/or load shifting opportunities.

Benchmarks and Measurement

No energy management program is complete without some type of feedback loop regarding effectiveness. Ideally, each energy strategy identified in support of the program's energy objectives would be measurable in some way. This need to measure returns us full-circle to the foundation of a good energy management program—information and data.

Following is an example of a specific energy strategy and its corresponding actions and measurement metrics:

Strategy: Implement water heating set points and guidelines for management.

Actions:

1. Perform PM inspections to identify leaks and check burners, gauges and pumps.
   Standard: 100% of hot water generators/heaters inspected annually; verify with CMMS report.
2. Annually flush water heaters to remove sediment from the system and increase heat transfer efficiency.
   Standard: 100% of water heaters flushed annually; verify with CMMS report.
3. Program water heaters for vacation shut-down to reduce unnecessary heating of water during extended vacation periods.
   Standard: 100% of water heaters programmed; perform annual PM check to ensure no changes occurred.

Measuring effectiveness can build support at all levels for continued implementation and prioritization of energy management programs. The following sample narrative, which was included in a energy program report, would not have been possible without measurement protocols:

> *Two recent school renewal projects at ABC and XYZ Elementary Schools have been very successful at reducing the utility usage. Both schools have seen a 60% reduction in electrical and natural gas usage/sq.ft. after renovations were completed. The cost/sq.ft. for gas and electric at XYZ decreased from $2.17/sq.ft. to $.69/sq.ft. ABC decreased utilities $2.08 to $.64/sq.ft. We are looking forward to seeing successful reduction comparisons for QRS Elementary School and Student Nutrition for the recent building envelope and heating system upgrades.*

Benchmark and measurement elements of the energy management program also become essential elements in sustaining a program over time. This will be discussed in additional detail in the following section **Sustaining an Energy Management Program.**

As described above, there is overlap between the energy management plan and the preventive maintenance management program in regard to maintenance schedules. Although maintenance personnel involvement is critical, a successful energy management plan also necessitates everyone's participation, from school board members to students. The energy plan should incorporate what measures are selected to optimize resource utilization while minimizing costs and expenses. Most importantly, the plan should utilize data gathering to benchmark whether or not efforts are paying dividends; to do so, many school districts set objectives (e.g., reduce fuel consumption by 15% within the next 12 months; reduce electric consumption by 10% within the next 12 months). The plan should be simple and clearly define everyone's tasks in support of the plan. School districts that have effective energy management plans usually assign its execution to a responsible individual with access to top-level administrators. In such manner, school board members can receive updates from their energy plan manager on a regular basis (e.g. monthly, quarterly, or bi-annually) and determine how well the plan is working. Officials may then review issues within the plan's objectives that could be faltering, or that may need attention.

Energy Management

Implementing an Energy Management Program

Introduction

The school board has *developed* an energy management program based on policy, objectives, and strategies; benchmarks have been established—now what? The responsibility that follows is to *implement* the energy management program. In a nutshell, implementation involves two essential steps: 1) committing resources, and 2) taking action. This section offers guidance on carrying out the developed energy management plan and establishes the importance of leadership; the key resources of knowledge, time, and funds; and, finally, executing an action plan.

Leadership

One of the more important components to implementing an energy management plan is simply to commit to the plan. Although—to a degree—energy management plan *development* can be accomplished at the school board-level by defining policy and identifying objectives, energy management implementation must be launched at multiple levels of leadership in the school district's structure. School district officials who engage their entire organization while committing to a cross-discipline team approach often reap optimal benefits. Cross-discipline leadership includes leaders in education delivery (i.e., the classroom), student leaders, leaders in facility operations and maintenance, custodial leaders, and leaders in school administration. More so than in any of the other four key areas of facilities and maintenance management, energy management program implementation only happens well when building users and building operators cooperate together in doing their part.

And finally, it is important for the leadership team to recognize all achievements made so that momentum is kept through the entire organization.

Resourcing the Plan

In multiple years of assessing school district energy management programs, the department has found that the resources needed are generally scaleable to the complexity of the district's operations. Said another way, whether a district serves a small student population and only has a few facilities that consume energy, or whether a district has thousands of students and hundreds of energy-consuming facilities, the resources of personnel, time, and funds are sufficient for a well performing energy management program. Large districts envy the simplicity of a few buildings with basic systems found in small districts, while small district crave the seemingly endless supply of resources and specialists available to large districts.

Knowledge

The cross-discipline leadership team needs to cover the energy program's necessary scope of knowledge. However, not every energy leader needs to know the number of BTU in a gallon of heating fuel or a cord of wood. Facilities and technical leaders may not need the skills to lead and inspire a room full of students, or a building full of instructional staff, on practical methods for energy conservation. A classroom instructor in an urban school may never need to know where their school's fuel tank is located much less how to measure its contents. Conversely for a teacher, who also serves as the school administrator, in a remote location, this knowledge is

indispensable. Within the *knowledge* element of resourcing are actions to provide training and raise awareness through communicating with stakeholders. When implementing the energy management program, identify the necessary elements of knowledge, and match that knowledge up with the personnel on the cross-discipline energy management team. The following bullet points will provide a good starting point for the elements of knowledge that are needed[14]:

- Management skills
  - Organizational and leadership skills
  - Change management skills
  - Contract management
- Financial and accounting skills
  - Risk management
  - Economics of energy management
  - Financing options, alternative financing
- Energy management knowledge
  - Energy fundamentals
  - Energy optimization fundamentals
- Technical knowledge
  - Mechanical and electrical engineering principles
  - Facility and industrial processes
  - Operation and maintenance practices and requirements
  - Awareness and understanding of new and existing technologies
  - Building automation and interoperability
  - Instrumentation and controls
  - Commissioning principles
  - Recommissioning
- Other knowledge and skill areas
  - Communication and interpersonal skills
  - Energy procurement
  - Performance contracting
  - Implementation costs
  - Product and service procurement

Time

There is no doubt that labor hours are needed to implement an energy management program and labor hours equals personnel. When implementing an energy management program, identify and assign needed tasks to appropriate personnel.

One way to wrap the preceding two resources together, knowledge and time, to implement an energy management program is to engage a person to serve as the district's Energy Champion. See the paragraph below for more information.

[14] *Source: Global Superior Energy Performance Partnership Report – 2013*

Funds

The final element that must be brought to the implementation step is funding. Primarily this will be tied to securing the necessary knowledge and personnel required to execute the program, to manage its daily, weekly, monthly, and annual cycles.

Executing the Plan

The development of the energy management program will inform the elements of the action plan. The creation of an action plan is a necessary tool which will act as a blueprint to guide and monitor the systematic approach to improved environmental performance. The action plan needs to focus on the scope and scale of goals, targets, roles, and resources. To promote success, the plan should be accepted by all areas of the facility that it addresses.

At this point in time, the next step is to implement the action plan. This step begins by raising awareness, building capacity, motivating staff, and tracking and monitoring progress. Continual feedback on successes achieved can help motivate stakeholders to continually improve.

There also needs to be a means to assess the plan's performance. Regular evaluations of baseline objectives based on gathered data collection will reveal new opportunities to improve performance.

Goals need to be set to improve performance. The overall objectives should aim to reduce energy usage while maintaining adequate environmental controls. The development of effective goals will help govern possible future improvements.

A periodic progress evaluation of the energy management program will keep everyone informed on improvements made toward goal objectives. This is also a great time to review the action plan itself and to identify any efficiency measures that should be modified or added.

An Energy Champion

The responsibility of an energy champion is to advocate energy efficiency throughout a school district and encourage co-workers to adopt 'efficient' practices in both the workplace and in their everyday lives.

Typical characteristics of an energy champion include:

- The ability to create, drive, and promote internal awareness campaigns.
- Be knowledgeable and up to date on the latest environmental policies and regulations.
- Demonstrating a willingness to challenge others on their behavior.
- Displaying a passion for the environment.
- Leading by example within the workplace.

School districts with dedicated energy champions experience more robust performances in the implementation of their energy management program and in the execution of their energy management plan.

Incentives

Incentives can also play an important role as part of the energy management plan. Incentives can vary from tax credits, rebates, savings programs, etc. In some districts, energy savings are given back to stakeholders to help pay for student activities, etc.

Reporting & Feedback

The reporting of energy consumption is one of the primary tools that can help evaluate the overall performance of the energy management plan. Accurate and consistent data collection is a necessity. There's an expression that "people who don't value energy efficiency keep forgetting the numbers."

Notwithstanding the importance of energy consumption, the need to provide stakeholders with regular feedback on the performance of the district's energy management program can prove just as critical. Our most successful organizations keep all their stakeholders well informed as a key component to the overall success of the energy programs execution. This goes back to the team approach discussed previously.

Energy Management

Sustaining an Energy Management Plan

Introduction

Historically, school district energy management programs have existed at the opposite extremes of sustainment. By far, failure to meet the provisions of a certified energy management program is the leading cause of school district non-certification for Preventive Maintenance and Facility Management. At the same time, the department regularly encounters school districts that have a laser-like focus on managing energy cost and consumption—districts that initiate and sustain these programs without any encouragement from external sources. With the possible exception of custodial programs—whose results are regularly on display for all to see and critique—energy management programs offer the most intrinsic value to districts, and increasingly one of the most immediate returns on investment.

This section examines this somewhat confounding dichotomy by uncovering the most common pitfalls to a sustainable program and offers a focused solution, though one with many layers.

Common Pitfalls

Personnel Changes

Measuring energy consumption at any one site/school doesn't take a team, rarely is more than one person involved. It is most often a one-person job. This makes the core element in an energy management program—measuring consumption—susceptible to failure when that person changes jobs or is otherwise out of commission for a period of time. Also, through fairly simple once procedures are learned, the exact process of measuring monthly consumption, especially for heating fuel, is not immediately intuitive. It's calculation often relies on having access to prior information. Passing on both the know-how and the data during personnel changes can be easily missed.

Program is Not Internalized

There is a strong correlation between districts that struggle sustaining a basic energy management program and those districts who have express the belief, either expressly or anecdotally, that they are collecting and recording energy consumption data for someone else other than the district itself. Most often the erroneous perspective is that they are doing it for DEED. This is evidence that the energy management program is not internalized. When the program becomes internalized, when it is clear that the knowledge and the data are useful to the district's operation and support of its education mission, the program become highly sustainable.

Lack of Clarity on Requirements

Sometimes districts miss achieving compliance in the energy management program by a very small margin. Ninety percent of the required elements are there but a small portion remain unattended—sometimes just one item. This often the result from misunderstanding the requirements set out in DEED regulations. The baseline is each building and all energy sources for that building. While simple in concept, this standard can be challenging in reality when multiple buildings are fed by a single energy source (e.g., a central boiler) or when there are energy utilities being consumed that don't have direct monetary allocation such as recovered

heat. In addition, unlike other certification criteria, an additional requirement was added in 2020 for a qualifying energy management program. Fortunately, the resolution to any lack of clarity is simple. Ask the Facilities staff at DEED.

Lack of Organizational Commitment

A fundamental aspect of an organization's energy management effectiveness is their commitment. While bottom-up support may influence executive management for a time as evidenced by demands for employee parking, break and office appointments, employee-driven calls for improved energy management are not effective. Managers approve employee perks often with an eye toward maintaining or increasing productivity. Energy management has no such recognized link.

To make executive management appreciate the importance of energy, its importance to the organization must be presented. In today's business world, no organization can function without adequate energy input. Improving energy management is crucial to increased profitability, decreased dependence on non-sustainable resources and reduced environmental impact. Too often energy is treated as a crisis problem that can be fixed and forgotten while core business issues require constant attention. This is unfortunate because energy management requires constant attention to be effective. Once energy is removed from a primary focus of attention, the organization will slip back into unsound management practices.

Insufficient Resources

Energy, as any other managed area, requires a commitment of resources to be effective. Resources are required to cover the cost of command and control (oversight) as well as the cost of energy management projects. In most organizations capital resources are reserved for core functions, and energy management is relegated to secondary status. This means that not only are there no funds for energy projects, but the resources to manage energy do not exist.

To effectively manage energy resources, its importance within the organization must be made visible and demonstrated by making energy a core value and delegating manpower, capital resources, and commitment.

Narrow Focus

In most cases the responsibility for energy management is centralized in a single functional area, such as engineering or maintenance. Employing a narrow focus limits the range of opportunities identified and fails to consider how an opportunity identified in one functional area may impact a different department. While the organization's technical expertise may exist primarily in one departmental area, energy opportunities are not limited to technological improvements and can include improved purchasing, operating practices, and maintenance. Widening the focus and participation in energy management will yield measurable improvement in the results.

Shifting Priorities

Effective management requires a sustained commitment to achieve measurable results. Too often, energy management is a passing fancy. When shortages occur or prices spike unexpectedly, energy becomes the crisis de jour and receives the full attention of the

organization. Then when market conditions change, energy management is once again relegated to a minor concern. Because energy is used every day, it must be managed every day.

Employing a crisis approach to energy, or any other organizational concern, produces no sustained improvement and often results in resentment as organizational priorities are constantly changed. Effective management of energy requires a stable, committed staff to provide command and control, collect and analyze energy data, and implement energy management projects. A firm commitment to energy management must be demonstrated by providing adequate resources, and following a carefully planned strategy.

Lack of Energy Data

When the authority for energy is spread across an organization no one is responsible for its management, and no one has accurate data regarding the consumption, cost, and organizational energy efficiency. To achieve proper management, data on usage, demand, utility rates, average price, marginal price, and energy consumption per unit of output must be available and used to influence organizational decisions. Someone in the organization must be assigned responsibility to collect, analyze and report energy cost, consumption and efficiency information.

Results Not Sustained

Sustaining the effort in energy management faces the same concerns as shifting priorities described above. Too often, energy problems are handled with a crisis approach. After the perceived crisis passes or is superseded by other concerns, the effort devoted to managing energy is removed and placed elsewhere. Sustaining energy management efforts and results can only be achieved by instituting a recognized, stable management that defines a structure for managing energy within the organization.

Sustainability Solution(s)

Previously, this document established two principles for sustaining any maintenance or facility management program: 1) by integrating it with other operational practices of the organization, and 2) by making it sufficiently "visible" so that its absence will be missed. These strategies are as powerful in the area of energy management as in any other of the five core practices.

Integration

There are great opportunities in an energy management program for an intersection with district operations both within the educational process and within the education support (i.e., school facilities, business management, etc.) area. The materials developed by the National Energy Education Development (NEED) Project are a great example of how an energy management program can be integrated into classroom instruction. When teachers and students in the classroom are depending on energy consumption data from the Facilities team or Energy Champion, program sustainability follows naturally.

As mentioned earlier in the *Implementing* section, offering incentives related to energy conservation have been used successfully to integrate the energy program into the life of the school—into the processes of daily operations at the school level.

NEED Project

" Since its founding over 40 years ago, NEED has kept its Kids Teaching Kids philosophy as a fundamental principle of NEED programming – encouraging students to explore, experiment, engage, and encouraging teachers to embrace student leadership in the classroom. NEED trains and assists teachers in harnessing the energy of the classroom – the energy of students. "

National Energy Education Development

https://www.need.org/about-need/.

Visibility

The idea behind making the energy program widely visible is that it will enlarge the audience and thereby build both anticipation and expectation of energy information in a larger group. Here are some suggestions for increasing visibility:

- Post consumption and cost data on a school's web page using comparative charts.
- On wall space in a corridor, commons, or gymnasium, post a large chart that can be updated each month by a student group showing consumption data.
- Include energy performance data and metrics in scheduled site-council/advisory-council meetings at the school level.
- Pair schools within the district, or find a school outside of the district, and share energy consumption and costs data comparing the two locations; make it enjoyably competitive if that seems helpful.
- Include energy consumption and performance metrics in Facilities 'dashboard' at the Superintendent level.
- Include such metrics in regular presentations to the school board.

Custodial Program

Developing a Custodial Program

Introduction

Department regulations for custodial programs require:

> *(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;*

This baseline requirement—a schedule of custodial tasks for each building based on the type of work needed (i.e., the activity needed for each surface or equipment item) and the level of effort (i.e., the frequency of care for each type of work)—represents a significant planning effort. School district custodial program managers may be able to develop this level of custodial plan on an ad-hoc basis with rules of thumb and the knowledge of experienced custodians. This is especially true for small facilities with a minimal range of surfaces and appurtenances. However, as school facility complexity increases, custodial plans, like maintenance programs, are best built from a component-based inventory.

The most common deficiency noted during the department's certification process is that custodial programs are not building-specific but rather are a one-size-fits-all program written for the entire school district. This does not meet minimum criteria. While there is no question that a well-developed custodial program should include districtwide information (e.g., goals, standards, master schedules, organizational structure, staffing, etc.), the specific schedule of custodial activities is unique to each building.

The schedule of custodial activities is just the beginning of the planning needed to develop a complete and effective custodial program. Other planning factors include: expectations/goals, staffing, procedures, equipment, safety, and supplies.

Leadership

The custodial program is a tool, unique to each school district, customized to individual school facilities, designed to guide custodial personnel in the execution of their work. ***"The first step toward establishing an effective custodial program is to determine the district's expectations of its custodial services. This requires input from both the school board (who ultimately will fund the program) and the building administration (who will live with the results of the program)."***[15] This is often developed as a vision statement. If this vision is absent, it falls to the Facility Manager to elicit it in order to make proper plans. Often, suitable statements from which to plan can be found in board policy.

[15] NCES/ALASBO. *Planning Guide for Maintaining School Facilities*, 2003, p.82

Sample Vision Statement

"It is our vision to provide the highest level of customer service satisfaction of any school district in Alaska by being innovative, flexible, and competitive with a can-do attitude."

One common, and helpful, step in establishing and communicating a vision is to provide a mission statement. These two elements, vision and mission, can serve as the basis of a custodial plan or program. The mission statement should be supported by goals and objectives. It is imperative that custodial program staff know what is expected of them. For example, will custodians do light maintenance? To whom do custodians report? Are custodians responsible for event set-up such as equipment and furniture?

Sample Mission Statement

"The mission of the XYZ School District Custodial Team is to provide an attractive, healthy, and safe, working and learning environment to facilitate greatness in our staff and students."

Custodial Activities

"Within school districts, custodial operations should reflect the needs of individual facility types, i.e., elementary schools, middle schools, high schools, technical schools, and ancillary buildings. Each type of facility requires a number of basic custodial services in support of the educational process; however, the requirements for middle and secondary/technical schools may be greatly expanded due to their size, complexity, and use patterns."[16]

As mentioned in the introduction, the most complete custodial plan is based on a component inventory, a quantification of building elements and equipment requiring custodial services. In order to streamline this effort, a good place to begin is with a list of custodial tasks. These can be developed from industry guidelines, samples from other school districts, or internal documents such as custodial job descriptions or existing checklists. Consider the following as a sample list which, on the left, covers a variety of custodial tasks pertinent to the common areas in a school:

[16] Florida Department of Education. *Maintenance and Operations Administrative Guidelines for School Districts and Community Colleges*, 2010, pg 49.

Sample Custodial Tasks	*Inventory Building Element*
Sweep/clean exterior walkways to 10ft from entries/exits	*Quantity of exterior walkways*
Vacuum entries/exits and/or wet-mop entries/exits	*Type/quantity of entry flooring*
Clean glazing (doors & sidelites) at all entry/exits, inside and out	*Quantity of glass at entries; height of glass at entries*
Vacuum all carpeted corridors	*Quantity of carpet in corridors*
Dry mop all hard surface corridors	*Quantity of hard surface in corridors*
Wet mop all hard surface corridors	*Quantity of hard surface in corridors*
Extract soiled areas on carpets	*N/A; as needed*
Remove stains and marks from hard surface floors	*N/A; as needed*
Clean all drinking fountains	*Quantity of drinking fountains*
Clean glazing at interior windows, window walls, displays	*Quantity of interior glazing*
Dust all equipment, sills, trims and hard surface furnishings	*Density of dusting surfaces per SF*

On the right side of the table are the associated building elements that would need to be inventoried in order to develop a custodial schedule for the building that was based on the type and frequency of custodial activity. An added benefit of having this component and quantity-based inventory is the ability to use industry standards to develop staffing requirements. For example, if the inventory of glass in the facility totaled 350sf, and that amount needed daily cleaning, an industry standard of 525sf/hour would yield 40 minutes of direct cleaning time for that activity. The combination of all tasks would provide data for determining custodial FTEs (full time equivalent) needed for the facility.

In developing custodial activities, don't forget the plethora of non-cleaning related duties. These might include: recycling, snow removal, events and set-ups, re-lamping, pest control, mail pickup/delivery, supplies inventory/stocking, directing visitors, record keeping, and training.

Standard of Cleanliness

When developing the custodial program based on custodial activities—and especially when developing time-based standards for the activity—the standard of cleanliness must be considered. In other words, how clean is clean? The Association of Physical Plant Administrators (APPA) has developed a widely recognized, and adopted, standard consisting of 5 levels, each with descriptive narratives. Under this standard, the target for most school spaces would be Level II "Ordinary Tidiness". A number of other industry and trade associations also have cleanliness standards that can be adopted and/or modified. Once adopted, these should be integrated into custodial program documents and schedules.

Procedures. Cleaning procedures by function (e.g., empty waste receptacle, clean chalkboard, etc.), to include scheduling (e.g., daily, weekly, etc.) in each area of the building. This description is usually relatively broad and should include location, task at hand, and frequency for all areas of the building:

Methods and procedures. This depiction should give ample details on how to get the job done effectively. For instance, marker boards may require a specific solution to clean their surfaces; mirrors may require a specific cloth. The instructions should also warn personnel as to what not to do, such as using a particular solution on a specific surface. Gymnasium floors and countertops have been ruined while using the wrong cleaning agents. The following subjects should be covered at length in the custodial program:

Safety

Personnel Safety. Custodial personnel are exposed to a variety of health hazards such as chemicals, blood-borne pathogens, toxic substances, electrical shocks, trip and falls, etc. It is important that these employees be informed and trained on how to protect themselves and to conduct their work in the safest possible environment. The custodial program should include:

- when / how to use Personal Protective Equipment (PPE);
- how to deal with Hazardous Materials (HazMat) including Sharps and bio waste; and
- awareness of location and use of Material Safety Data Sheet (MSDS) and the "Right to Know."

Equipment Needs

Care of cleaning equipment and use. The cleaning equipment must be stowed, maintained and operated properly. Custodial personnel should be well-versed and familiar on how to care for all of their equipment, including:

- buffers;
- personnel lifts;
- ladders;
- carts;
- mop buckets and presses;
- dust mops;
- wet mops;
- push brooms and corn brooms;
- vacuum cleaners;
- carpet extractors, etc.

Products

Selection and listing of school district prescribed cleaners. The list should be inclusive of all cleaners, as well as a brief description on use (e.g., spray cleaner; shower foam, etc.) and methodology (e.g., daily, on most hard surface; per manufacturer's instructions, etc.). The following are examples that could be included in the custodial program:

- all-purpose cleaner
- all-purpose degreaser
- glass cleaner;
- disinfectant;
- absorbing deodorant;

- scale and lime remover;
- mar and spray paint remover;
- gum remover aerosol;
- shower descaler;
- stainless steel cleaner;
- septic enzymes, etc.

As in the case for the Preventive Maintenance program, the custodial program will be utilized by custodial individuals with various educational backgrounds. The best means to ensure effective communication is to keep the language simple and direct. If custodial personnel do not read English, the program should be translated in order to achieve proper results.

A good custodial program should also include random inspections. A list of *Standard for Clean Classroom* can be found in Appendix G. By using the standard, strong points and weaknesses can be identified, giving custodians an appraisal of what is getting done properly, and what needs to be improved upon.

Another important tool for the developing the custodial program is the *Master Custodial Schedule* (see Appendix E). There are generally three elements considered when developing master custodial schedules: 1) service or task, 2) frequency, and 3) space use/type or location. In some master schedules, service/task and use/location are blended to help reduce duplication. Frequency of care, the element normally in the most prominent position in the schedule, is the backbone of the schedule. The most commonly used frequencies are: daily, weekly, monthly, annually, and as-needed. However, some plans may add the additional frequencies of: nightly (if a day/night operation is used), semi-weekly, quarterly, semi-annually. Selecting appropriate frequencies is a balance of simplicity and effectiveness and should be indexed to the program's adopted Standard of Cleanliness. The format or organization of any particular custodial master schedule focuses on one of the three elements discussed previously. One focused on frequency will generally list daily tasks, followed by weekly tasks, then monthly, and so on. Types of tasks (e.g., vacuuming, or restocking) and space/locations (e.g., gymnasium, restroom) will be listed adjacent to each other as long as their frequency is the same. These are often presented as a matrix. A schedule focused on use/location will organize the schedule by areas or room types and list all the necessary tasks for that area and state the frequency as a suffix to each task. These types of schedules are most often presented in a 'paragraph' style. A third type focuses on stating the essential tasks one time and then aligning those tasks to the applicable use/location in a matrix. In this last type, frequency is presented with symbols which are defined in a legend. All three structures have their positives and negatives. The sample *Master Custodial Schedule* (Appendix E) uses the space-use/location focus. The complete *Master Custodial Schedule* tool is also available on the department's Facilities web page as a spreadsheet file.

A customized schedule, one edited to include the specific needs of the facility, should be developed from the master custodial schedule. Once developed, it should be displayed in each custodian's workplace. This, and other ideas are more fully developed in the following section, **Implementing a Custodial Program**.

Implementing a Custodial Program

Introduction

At this point, the school board has *developed* a custodial management program based on policy, cleaning standards, and equipment; staffing requirements have been established—now what? The responsibility that follows is to *implement* the custodial management program. Implementation of a custodial program requires gathering and deploying resources you have identified in the planning stage. This section offers guidance on carrying out the developed custodial management plan and establishes the importance of resourcing the plan with knowledge, funds, staffing, and equipment; and, finally, executing an action plan.

Resourcing the Plan

In multiple years of assessing school district custodial management programs, the department has found that the resources needed are often challenging to come by. The human factor is to account primarily as the most difficult of these challenges. Finding qualified individuals to work in the K-12 environment presents a formidable recruiting contest where security background checks routinely eliminate numerous applicants from the get-go—most often rightly so. In some instances, low pay along with marginal or no benefits discourages certain prospects from turning in their applications.

Knowledge

The basic knowledge required to adequately execute custodial work in our institutional settings has taken many by surprise. The custodial work involved while taking care of students attending our schools requires adaptability, good communication skill, attention to detail, ability to do repetitious work, reliability, dependability, trustworthiness, willingness to serve others, be problem solvers, etc. Custodial work in our schools is specialty work that requires both skills and abilities that differ from custodial work in residential or lodging settings, for instance. Most custodians can quickly acquire the basic knowledge to do their work in our schools; but an open mind and a willingness to acquire new skills that will match what is expected of their work is necessary so that custodial program objectives can be met.

Funds

A key element that must be brought to the implementation step is funding. Primarily, this will be tied to securing the necessary knowledge and personnel required to execute the program, and to manage its daily, weekly, monthly, and annual cycles. This also implies the need to determine how long any given task takes so that funds can be budgeted to get the required work done; furthermore, annual appropriations must be included for other expenditures such as for materials and equipment purchases / maintenance.

Staffing

As discussed above, labor hours are needed to implement a custodial program and, indubitably, labor hours equal personnel. When implementing a custodial program, there is a need to identify and assign needed tasks to appropriate personnel. This implies identifying each task and to whom each of those tasks get delegated to. This is a vital element of the custodial plan. Unfortunately, when allowed, in some of our schools, custodians are taken away from their main

custodial duties to routinely perform work outside of their assigned line of work (e.g. running various errands, picking up mail, watching over students, etc.). The long-term effect of this practice is usually negligence of custodial care because there isn't sufficient time to accomplish all of what is being asked of each custodian. This ends up making things confusing for custodians and can affect the custodial team's overall effectiveness.

Custodians must be given the same respect as all school professionals and paraprofessionals and be granted the ability to do their work as prescribed in the custodial program. Unless specific time is set aside in the custodial plan for custodians to perform non custodial-related duties, these employees should be given the opportunity to do their work as planned.

Equipment

Custodial equipment selection begins with cleaning needs. The school environment has specialized areas (e.g. kindergarten classroom, nurse's station, cafeteria, etc.) that require the selection of suitable equipment, whether it be cleaning carpets, tiles, concrete walls, porcelain surfaces, etc. Some of the equipment will require manual operation while other will require mechanical use (e.g. floor scrubbers, washers, etc.). Both types will require ongoing maintenance and eventual replacement. Factors to consider while selecting the equipment includes:

- Suitability for job conditions: the equipment must meet the requirement of the work and working conditions.
- Size of equipment: individual equipment selection should be such that it must be able to be used with other matching units. If the equipment selected is of larger size, that will remain idle for most of the time or shall work on part loads, which means production cost will be more. On other hand, if equipment is of smaller size than desired, the equipment will not be able to work with the matching equipment and hence other equipment will have to remain idle or to be allowed to work on part loads, which shall again be uneconomic.
- Past performance: if the equipment being purchased is of new make and models, it is desirable to enquire about its performance from other users who are using this make and models.
- Operating requirements: the equipment selected should be easy to operate and maintain, acceptable to the operator and should have lesser energy consumption.
- Reliability of equipment: equipment selected must be reliable.
- Economical aspects: while selecting the equipment, it should be considered that cost of unit production should be minimum.
- Service support: should be available in the area where the equipment shall be used. Service after sales are major criteria for selection of equipment.
- Availability of know-how: the equipment selected should be satisfactorily handled by available custodians. Sophisticated equipment may give excellent performance, but it may be difficult to handle and maintain.
- Multipurpose equipment (versatility): there are certain types of equipment which are not utilized fully. Therefore, whenever possible, selected equipment must be capable of performing more than one function.

- Standardization: it is better to have same type and size of equipment. This means lesser spare parts reserve; more interchangeability of parts if required; it makes it easier for the operators to understand how the equipment functions; and local mechanics will be more proficient maintaining and repairing similar type of equipment.
- Availability of spare parts: while selecting a particular type or make of equipment, it should be ensured that the spare parts will be available at reasonable price throughout the working life of the equipment. It should also be ensured that the downtime of the equipment for want for spare parts may not affect long-term performance of the equipment.
- Availability of equipment: the equipment which is easily available in the market should be purchased. It should also be ensured that the equipment is of repute and is likely to be continued to be manufactured in future. This is necessary for future standardization and ensuring spare parts supply.

The equipment list should be inclusive of all that is required to address cleaning needs for each facility. The following are examples that could be included in the custodial program:

- vacuum cleaner, with attachments for hard surfaces and carpet
- bucket or container to carry supplies
- mop and bucket
- auto-scrubber
- scrubber dryers
- duster (both long and short)
- dustpan and broom
- floor sweepers
- paper towels
- microfiber cloths (have separate, color-coded ones for the kitchen and bathroom)
- glass cleaning cloths
- protective rubber gloves
- cleaning brushes
- disinfectant wipes (perfect for bathroom and kitchen surfaces)
- shoe covers (to keep floors clean)
- spray bottle
- pressure washer

Executing the Plan

The development of the custodial program will inform the elements of the action plan. The creation of an action plan is a necessary tool which will act as a blueprint to guide and monitor the systematic approach to improved school health and cleanliness. The action plan needs to focus on the scope and scale of goals, targets, roles, and resources. To promote success, the plan should be accepted by all areas of the facility that it addresses.

At this point in time, the next step is to implement the action plan. This step begins by raising awareness, building capacity, motivating staff, and tracking and monitoring progress. Continual feedback on successes achieved can help motivate stakeholders to continually improve.

Constructive feedback to the custodial workforce may consist of a simple gesture such as publicly acknowledging the organizational support orchestrated by custodians in getting the local gymnasium ready for community events such as during sport tournaments, fund raising events, weddings, funerals, etc. These events add a tremendous workload to custodial efforts such as moving equipment, setting up tables, isolating portions of the school, coordinating work with various parties, going to work early, staying up late, checking on security, being constantly attentive to the organizers' needs, etc. Other examples can be seen in custodians' workspaces where students have given thank you notes or drawings, or where students issued an award certificate through their student council in recognition for the great work and support demonstrated by a noteworthy custodian.

Reporting & Feedback

The implementation of a formal custodial performance feedback loop is one of the primary tools to help evaluate the overall performance of the custodial program. Include a variety of stakeholders to gather this input and strive to make it objective, non-personal, and non-threatening.

Numerous custodial performance evaluation review forms are available online. The main premise is to give program administrators knowledge of their custodial personnel work performance. The evaluative framework usually includes basic elements such as:

- job knowledge
- quality of work
- quantity of work
- adaptability
- working relations
- initiative and innovation
- dependability
- attendance / punctuality
- care of equipment
- communication skills
- human relation skills
- use of proper cleaning techniques
- observation skills
- personal appearance
- health and energy
- ability to climb and work at heights
- performance appraisal profile
- overall appraisal
- employee being properly placed within the organization
- recommendations / suggestions

The employee evaluations should afford a way to benefit both the employee and the organization. Custodians are responsible to keep schools clean and safe, and to keep school grounds attractive while playing a pivotal role in the learning environment.

Sustaining a Custodial Program

Introduction

Previously, this document established two principles for sustaining any maintenance or facility management program: 1) by integrating it with other operational practices of the organization, and 2) by making it sufficiently "visible" so that its absence will be missed. Nowhere do these elements come so naturally to the forefront as in the area of custodial care. The year 2020 will likely be a benchmark for years to come on the integration of custodial programs into the core mission of schools. The heightened awareness of custodial protocols on occupant safety in the midst of the Covid-19 pandemic brought the facility professional responsible for this area to a seat at the leadership team table. So ingrained was a district's custodial program into school operations that schools literally could not open without an effective care and cleaning protocol against the virus that caused Covid-19. With regard to visibility, the custodial program has always enjoyed the benefit of front-and-center awareness of all school users—whether students, staff, or the public. While these users may routinely bypass great custodial care without a thought or reaction, not so where that care is lacking. Unlike other facility programs, the custodial program is always on display; it's absence is nearly impossible to miss. This ensures a measure of sustainability.

Performance Metrics

What are some of the elements that can be used to evaluate custodial effectiveness?

- Employee turnover. This will determine your effectiveness at recruiting and retaining custodians. Custodial employee turnover is unavoidable, but retaining employees can greatly reduce the cost of hiring, while keeping employee morale at satisfactory levels.
- Safety. Are custodians performing their work safely? What is the number of near misses? Number of lost workdays due to work-related incidents? It is helpful to have a record of safety numbers during different school years so you can objectively determine whether problems exist.
- Financial effectiveness. Compare budgetary expenses (labor, equipment cost, consumable costs) to overall cost of cleaning (i.e. cost per cleanable square foot). Knowing these numbers can help you better streamline and standardize cleaning processes, tools, and frequencies.

Evaluations, Inspections, & Education

A periodic progress evaluation of the custodial program will help keep everyone informed on improvements made toward goal objectives. This is also a great time to review the action plan itself and to identify any efficiency measures that should be modified or added.

Maintenance Training

Developing a Maintenance and Custodial Training Program

Introduction

Department regulations for maintenance training require:

> *(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person;*

The intention of statute and regulation is that there should be a program of continuous training for maintenance personnel, custodians, and their managers as part of ensuring maintained state financed facilities. Training in facility systems and operations assist a facility in reaching its expected life and insures the continued effectiveness of an educational facility as designed. This maintenance training is separate from the training mandated and provided by a school district's human resources (HR) department. It is specific to facility maintenance and custodial operations. The previously mentioned HR training is important; however, it is not a substitute for mandated training under these statutes and regulations.

Definition: Custodian

" one that guards and protects or maintains "

There are two common problems found when evaluating districts maintenance training programs. The first is that there are many cases of no planning being done. This is usually due to not establishing a training plan with set dates and schedules to perform training. Without a plan, training is forgotten or put off until another time. The second issue is that increased HR training has begun to encroach on maintenance training. Even when there is a scheduled day, or days, of training, the non-maintenance training utilizes this time due to its convenience.

A good training program, as part of an efficient maintenance program, interacts with all other aspects of the program: maintenance management, energy management, custodial, and capital planning. No part of a preventive maintenance program operates in a vacuum. Good custodial is actually one part of a balanced maintenance program and it will be included under the term "maintenance training" in this section.

Planning

The first thing to contemplate when developing a maintenance training program is, what is being maintained? This is where coordination with maintenance management and capital planning is important. Start with a list of school district facilities and assets, including O&M manuals and scheduled preventive maintenance items. Once the list is compiled of equipment, finishes, and other assets that school district personnel need training on, a school district can begin to plan. Training should include initial new hire training, training on new equipment and finishes, periodic re-training, and training review. Also, an essential part of a training program is recording who was trained and on what subject the training was on. Efficient training records list all types of training over the year and the personnel who attended each one, and separately list each individual and each of the training that person received. One convenient way of recording this is through the maintenance management work order system.

HELPFUL HINT

Standardize to reduce training and inventory costs

Working with capital planning and maintenance to develop school district standards for materials and components will simplify operations, minimize variation of inventory parts, and reduce the makes and models of equipment needing training.

Having "training" as an available work order sub-group makes sorting efficient. Assigning a work order to each individual attending a training session and having those individuals code their time to that work order allows easy sorting by training or by individual. This method also captures hours and costs of training. This is not the only method of recording. There are other personnel management programs available for recording training. Just make sure that it shows facility-mandated training versus HR training. A paper record is not recommended, as this is less useful for long-term tracking of personnel training.

Implementing a Maintenance and Custodial Training Program

Introduction

Once maintenance and O&M requirements have been established, a school district can decide what and how much training is required and set in place its training program. Some things to consider are identifying fundamental training elements for new employees, and what items may require annual training versus every few years. Formulate how training will be conducted, as well as when, where, and by whom. See below for some factors to consider as you develop your program.

New Hires

After basic orientation of the duties expected of the assigned position, additional training should be planned depending on the position or craft.

Custodians

If custodians in the school district are only responsible for cleaning, a more accurate job title would be janitor, and initial training in cleaning products, procedures and cleanliness standards would be all that is needed.. However, custodians are the first level of eyes-on for the maintenance program. They need to be trained on inspections and observations and how to initiate a work order based on any conditions requiring maintenance. If they are expected to perform some light maintenance, closer to the definition of a custodian, then additional training should be provided. For some school districts the additional training is performed by maintenance mechanics. A work order is initiated with a new hire for training in mechanical, electrical, or other trade. The assigned mechanic performs the training (e.g. filter changing, flushometers, etc.) and the time is recorded.

Maintenance Technicians

Facilities maintenance will be very new for many maintenance technicians, even for those that have achieved journeyman status in a building trade. While many of these technicians have a background in construction, performing repairs in a facility environment is not the same. Add in the complexity of being in an educational facility with administration, teachers, and students, and it can be a lot to adjust to. Initial training should include how to operate the work order system (including asset numbering) and procedures for working in a school. A very successful method many school districts use for this training is to have new people initially assigned to the preventive maintenance team. The extent of time varies from one complete cycle of preventive maintenance to a set time like six months. This orients the person to all facilities and locations of components, operations in an active educational facility, and how to perform work orders, close work orders, and create new work orders.

Continuous Training

After maintenance management has assembled the list of maintenance training needs, decide if an item requires annual, semi-annual, or periodic training. Setting a schedule for the training that avoids interfering with normal maintenance duties will help learning. One method is to have an annual in-service for employees just prior to a new school year. Depending on the size of a

school district, a strategy can be to have two days with half of the personnel on each day. This helps to keep the numbers manageable and maintains a maintenance personnel presence in the facilities. This becomes a good time for many training sessions with some hands-on training. Balance quantity of training with quality and avoid over-load. If an in-service is not possible or desired, the school district will need to arrange for the proper training either by going to each facility or having some version of a distributed gathering.

HELPFUL HINT

Train the Trainers

Example:
Custodians are tasked with replacing flushometers on the toilets. Have a maintenance technician train the lead custodian for a facility. When he is competent, have that person train the other custodians in the school under the technician's supervision. This will insure work is able to be performed onsite and the lead custodian has better retention of the skill. This will save time and money by not having a centrally based technician travelling to the facility.

Periodic Training

At times, a training need becomes apparent that is outside of normally scheduled training. This could be from the maintenance supervisor(s) seeing repetition of work orders for the same issue or periodic inspections by preventive maintenance staff or building personnel of conditions that need to be addressed. The training program should have built in allowances for investigating issues and arranging for appropriate training.

Opportunity Training

Shadowing a contracted maintenance technician or craftsman can provide another training opportunity for school district maintenance personnel. These visits may occur during regular inspections or as a result of a failed component.

Sustaining a Maintenance and Custodial Training Program

Introduction

As time passes, finishes and assets are replaced. A good training program must be agile -- ready for changes and to develop or update training as required. One way to stay ahead of the curve is to maintain contact with capital planning. As facilities are being planned for construction or renovation, be prepared to discuss specific items in the plan and what training each may require. Identify whether the items are part of the school district's standards and can be included as part of the normal training plan.

As part of project planning, ensure that adequate factory training is included in the project. This should be true factory-level training and not just an orientation showing where it is and how it works. Training should include all facets of maintenance including a list of recommended parts to keep on hand. For items like building automation and fire alarm systems, training should be full maintenance and programing to the level of a certified technician. This project-specific training is required if the project is funded or reimbursed through AS 14.11 state aid. Training requirements should be incorporated in the project's bid documents. Take this training as a time to refresh your long-term staff and as new training for recently added staff.

HELPFUL HINT

Let technology and the force make training easier and less expensive

Use videos from **YouTube** to assist in training. Many manufacturers and some individuals have posted videos of maintenance procedures. Keep a library, or create a playlist, for training and refresher courses.

Use **mobile video chat** program apps to use smartphones or tablets to communicate when performing maintenance.

Use the school's **distance learning assets** for training across the district when face-to-face is not required.

Part of sustaining a training program is to set a schedule for training that works into the foreseeable future. Review individual training histories and be ready to incorporate training that may be missing. A good time for this is during personnel annual reviews. Review any new items that will require a change in training.

A school district training plan should contain or perform the following:

- A written training plan that has training for new staff, annual training, and how the need for periodic training is addressed;
- Produce at any time the scheduled maintenance training for the next year;
- Produce and review an individual's training history;

- Produce and review the prior year's training activity and attendance; and
- An efficient program can track training on the maintenance work order system in order to track training costs and individual training time.

Capital Planning

Developing a Capital Planning Program

Introduction

Department regulations for capital planning require:

> *(5) a renewal and replacement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.*

Of the five maintenance and facility management criteria outlined in regulation, the capital planning requirement is the longest; it uses the most words. In practice, however, it's been demonstrated that a single, relatively simple spreadsheet—for each facility—can accomplish all of the required elements. Most districts utilize the department-developed Renewal and Replacement Schedule spreadsheet file to document their capital planning efforts. Many districts, especially those being served by the Southeast Regional Resource Center (SERRC), have added functions to the department's basic tool. Two of those include: multiple linked worksheets to account for different ages and renewal cycles, and data updates following the completion of capital projects. That said, capital planning is so much more than simply managing renewal and replacement spreadsheets.

The most common deficiency in capital planning seen by the department during its site assessments is its lack of use. The required data can be produced but there is a starkly apparent lack of its relevance to district processes. While there is evidence that every district is doing some amount of capital renewal, little of it springs from, or is even related to, a cohesive plan. The impact of available capital planning data on district six-year CIP plans is noticeably absent. Moving from data to a program, from develop to implement is a challenge for districts of every size. Exacerbating the issue is the value question, "What good does it do?" When there are economic issues that limit resources for capital renewal and deferred maintenance, it's not uncommon to develop the attitude that capital planning is efforts are wasted. This can prove to be shortsighted if and when funding becomes available and districts find themselves not in position for available funding. Even in times of lean funding, a capital renewal plan with prioritized needs based on data and metrics from a robust capital planning program can be of great value to building owners.

Planning

A school district cannot efficiently maintain their facilities through capital planning alone, nor can a school district manage and maintain their facilities properly without capital planning. Capital planning is, as the name implies, planning for future capital needs. But, in order to plan for those needs, the owner needs to identify the capital components, establish an expected life-span of the components, track repairs and maintenance performed during the life of the components, establish protocols for condition assessment of components, modify the life

expectancy based on condition, and plan for the eventual replacement or rehabilitation of the component.

The first step in establishing a capital planning program is to identify what items the school district intends to include in its plan. Statute indicates electrical, mechanical, structural, and other components of facilities owned or operated by the school district; in other words, the physical buildings and grounds. This is the minimum to satisfy state statute, but a program that properly serves the school district should also include items like vehicles, grounds equipment, and other capitalized equipment. The planning part of the process is the most important part of establishing a capital planning program and needs to be thorough in the items to include. Under "grounds", is playground equipment included by components: play structures, swings, free standing slides, etc.? Should it also include paving and other hard surfaces? In mechanical, boilers and fans are obvious items, but consider pumps, variable air volume (VAV) boxes, day tanks, expansion tanks, etc. As a school district begins planning, it needs to establish the criteria of what is, and what is not a capital component.

The next step in establishing the program is uniquely identifying a component from others in order to track its condition and work already performed. The identifying asset number for a particular object should be assigned in the maintenance management program. Some parts of the identifying number and the record keeping of the item should be able to include and sort by the following items that are important to capital planning:

1. Location (facility, room, etc.);
2. Date placed in service;
3. Make, model;
4. Life expectancy, date of replacement, and date of review;
5. Estimated cost of replacement;
6. All work orders including repairs, PM inspections. Include descriptions and costs; and
7. Date removed from service and identifier of replacement.

There is much more information that a good maintenance program should have available, but these elements are critical for effective capital planning. The first is obvious, recording what school a component is associated with, additionally, identifying a specific room is helpful to physically locate the component; sorting by school also assists in evaluating capital needs by facility. Date in service and a component's make and model helps to establish expected life and when a school district can anticipate future needs. Date of review is when school district personnel begin to review the history of repairs and preventive maintenance inspections to possibly adjust the date of replacement. The date of replacement shows that it is no longer in service and including the new component identifier tracks what replaced the item.

Implementing a Capital Planning Program

Introduction

Capital planning does not happen in a vacuum. The identification and scheduling of maintenance is performed through maintenance management. If it can have an effect on energy efficiency, then tracking performance is important. Many items involve custodial operations -- from being the on-site eyes to possibly changing filters or general cleaning. And finally, the proper training on maintaining the component has a large impact on whether the component meets, or possibly exceeds, the expected life. Below are steps and discussion on how to plan a school district's capital planning program, how to implement it, and how to sustain it into the future.

Once all of the capital components and equipment have been identified, tagged, and put into the maintenance management program, the day-to-day (or year-to-year) part begins. As the components start to reach their expected life, capital planning begins to review the records of repairs and inspections and makes adjustments to the replacement schedule. An example of the flow of information and decision making is as follows:

Boiler 001 at school ABC was installed with the construction of the school in 1990. Part of its O&M information is that it is expected to be replaced at 30 years and reviews to begin at 25 years. In 2015, the maintenance program puts the boiler on the review list and capital planning begins review. As part of the review, capital planning reviews the scheduled inspections performed twice a year and the scheduled cleaning, maintenance, and tuning performed once a year. Also reviewed are all repair work orders for scope of repairs, frequency, and costs. The boiler condition is discussed with the boiler technician(s) and maintenance manager. After discussion, it is decided whether the replacement should be done sooner, at the scheduled date, or if the boiler is in a condition that its useful life can be extended. At the same time the cost of replacement is adjusted to reflect the current cost of replacement. Review is performed again at 27 years.

If an asset is not performing well and does not appear to be able to meet its expected life, the technicians doing repairs and inspections can request an earlier review of the asset. The process of review starts and, if needed, a new replacement date is assigned and planned for.

After all scheduled reviews are performed, a report is produced for each facility that shows replacement needs for the next six years and the expected costs. The person(s) deciding on the final six-year capital improvement plan review the replacement report and put together projects for the plan that may combine related items or stand alone as a single project. In the example above, all three boilers are scheduled for replacement and one project is put forward for boiler replacements; it may include other equipment reaching replacement age, like pumps, expansion tanks, etc.

Sustaining a Capital Planning Program

Introduction

As a school district's capital planning program matures, there will be upgrades, component replacements, new facilities, and maybe facilities being removed from the school district. Planning the process of managing the data for these instances will help to smoothly update the system. One challenge is when an asset is transferred from one facility to another. This is usually capitalized equipment that can be easily moved like vehicles, grounds equipment, or educational equipment such as smartboards. Scheduled PM inspections should catch that the equipment is not where it should be per the asset record. Once the asset is located, it can be reassigned in the record or returned.

Another situation is where an asset has reached its end of useful life and is not of a value to be considered a capital improvement project. An example would be a replacement of a heat circulation pump with a value of a few thousand dollars plus labor. When writing a work order for replacement, either to be performed in-house or by contractor, it is best to assign the new asset number in the work order and order both the pump and asset tag. When the work is complete, the out-of-service date is registered with the old asset and a placed-in-service date is registered to the new asset. The O&M manuals can be electronically made part of the new asset's file and the preventive maintenance schedule can be initiated.

HELPFUL HINT

Involve consultants in the asset replacement strategy

During design, identify assets being replaced and assign the new asset numbers and include them in the equipment schedules. Example:

BOILERS

ID	Old Asset Number	New Asset Number	Manufacturer/Model	In-Service
B-1	03MC02OB01	03MC02OB03	Weil-Mclain Model 886	06/02/1990
B-2	03MC02OB02	03MC02OB04	Weil-Mclain Model 886	08/21/2018

This shows that the asset being retired is identified and the new asset number is assigned. For new construction, only the new asset number is shown.

When a large project replaces many assets, it is best to start early in planning and design stages to coordinate asset replacement strategies. At this point involving the consultants, the maintenance management, and capital planning will make the process smoother. Capital planning and the consultants identify which assets are being replaced and maintenance management assigns the new asset numbers and prepares the old assets for retirement in the system. As the project begins, the contractor submits documents on the proposed replacement/new assets. During submittal review, if the submittal is approved, maintenance management inputs data on make/model, preventive maintenance schedule, maintenance parts, and expected life from the submittal documentation. When O&M manuals are provided electronically, the manuals can be attached to the asset file in the CMMS.

Capital asset management is not a stand-alone operation. It takes coordination with maintenance management, maintenance technicians, maintenance mangers, and the committee that creates and reviews capital improvements.

Appendices

Appendix A

Sample Systems and Components Inventory List

The below listing aligns with the building system and component structure utilized in the department's *Guide for School Facility Condition Surveys*.

Vehicular Surfaces
- Parking lots
- Roads/drives
- Curbs/gutters
- Signage

Pedestrian Surfaces
- Walkways
- Plazas
- Boardwalks

Elevated Decks, Stairs & Ramps
- Elevated Boardwalks
- Elevated Playdecks
- Stairs/railings
- Ramps

Site Walls
- Retaining walls
- Decorative walls

Landscaping & Irrigation
- Turf/Lawn
- Planting/Beds
- Mulch
- Boulders
- Irrigation and controls

Fencing and Gates
- Posts
- Fencing
- Gates
- Vehicle Gates
- Bollards/Staples

Site Furnishings & Equipment
- Benches/tables
- Signs
- Flagpoles
- Planters
- Waste receptacles
- Bike racks

Playgrounds & Playfields
- Playgrounds
- Sports fields
- Hard surface courts
- Ice Rinks
- Playdecks
- Play structures
- Fall protection
- Markings/paintings

Other Site Improvements
- Sledding hills
- Snowmelt systems
- Water features

Freestanding Shelters
- Foundations
- Superstructure
- Enclosure
- Electrical components

Attached Shelters
- Foundations
- Superstructure
- Enclosure
- Electrical components

Support Buildings
- Foundations
- Superstructure
- Enclosure
- Mechanical components
- Electrical components

Appendix A - Sample Systems and Components Inventory List

Water System
- Wells
- Tanks
- Pumps
- Piping/valves
- Treatment system

Sanitary Sewer
- Tanks
- Lift Stations/pumps
- Piping/valves
- Treatment system

Storm Water
- Piping
- Culverts
- Swales
- Catchments
- Fencing
- Treatment system

Fuel Systems
- Foundations
- Tanks
- Piping/valves
- Containment
- Fencing

Heating/Cooling Piping & Utilidors
- Piping
- Valves
- Insulation,
- Utilidors
- Vaults

Electrical Service & Distribution
- Poles
- Transformers
- Switchgear
- Conduit
- Feeders

Data/Comm Service & Distribution
- Conduit
- Cable/wiring
- Satellite dishes
- Foundations
- Equipment

Lighting & Equipment
- Poles
- Fixtures
- Devices
- Panels
- Conduit/feeders

Security Systems
- Poles
- Devices
- Conduit
- Cable

Continuous & Column Footings
- Reinforcement
- Concrete
- Insulation

Foundation Walls & Treatment
- Reinforcement
- Concrete
- Dampproofing
- Insulation

Foundation Drainage
- Pipe
- Geotextile

Structural & Nonstructural Slabs
- Reinforcement
- Concrete
- Joints
- Finish

Appendix A - Sample Systems and Components Inventory List

Trench, Pit, and Pad
- Reinforcement
- Concrete
- Embedments

Underslab Elements
- Vapor barrier
- Insulation
- Pipe
- Geotextile

Piling & Pile Cap
- Pile
- Thermopile
- Pile caps

Caissons
- Piers
- Pile caps

Grade Beams
- Reinforcement
- Concrete
- Insulation

Arctic Foundation Systems
- Thermosyphons
- Refrigeration
- Insulation

Other Special Foundations
- Underpinning
- Vibro-replacement

Lower & Main Floors
- Beams
- Joists
- Decking
- Topping
- Soffit
- Insulation
- Coatings

Upper Floors
- Columns
- Beams
- Joists
- Decking
- Topping
- Coatings

Ramps
- Columns
- Beams
- Joists
- Decking
- Topping
- Coatings

Pitched Roofs
- Columns
- Beams
- Rafters
- Trusses
- Decking
- Bracing

Flat Roofs
- Columns
- Beams
- Rafters
- Trusses
- Decking
- Bracing

Special Roofs
- Pneumatic structures
- Domes

Stair Structure
- Columns
- Landings
- Stringers
- Treads
- Risers
- Toppings

Appendix A - Sample Systems and Components Inventory List

Stair Railings
- Guardrail
- Railing
- Balusters
- Supports
- Coatings

Ladders & Steps
- Ladders
- Steps
- Coatings

Exterior Walls
- Framing
- Sheathing
- Insulation
- Siding
- Vapor/Air barriers
- Vents

Fascias & Soffits
- Framing
- Sheathing
- Insulation
- Siding
- Vapor/Air barriers
- Vents

Curtainwalls & Non-bearing Walls
- Framing
- Mullions/Rails
- Connectors
- Insulation
- Siding
- Barriers
- Interior substrate

Windows
- Frames
- Glazing
- Exterior sills
- Flashings
- Coatings/sealants
- Vandal-proofing

Storefronts
- Framing
- Glazing
- Flashings
- Closures/sealants

Structural Window Walls
- Columns
- Frames,
- Glazing
- Exterior sills
- Flashings
- Closures/sealants

Translucent Panels
- Panel assembly
- Exterior sills
- Flashings

Personnel Doors
- Frames
- Doors
- Lites
- Latch assembly
- Openers
- Thresholds
- Flashings
- Finish

Special Doors
- Frames
- Doors
- Openers
- Lock assembly
- Flashing
- Finish

Louvers, Screens & Shading Devices
- Louvers
- Screens
- Trellis
- Shades/shelfs

Appendix A - Sample Systems and Components Inventory List

Balcony Elements
- Walls
- Grills
- Guardrails
- Handrails

Other Exterior Accessories
- Signage
- Decorations

Pitched Roofing
- Underlayment/barriers
- Roofing
- Flashing
- VTR assembly
- Insulation
- Fascia

Gutters & Downspouts
- Gutters
- Membranes
- Downspouts
- Hangers

Flat Roofing
- Underlayment/barriers
- Roofing
- Flashing
- VTR assembly
- Insulation
- Copings

Roof Drains & Piping
- Drains
- Scuppers
- Leaders
- Insulation

Skylights
- Fixed/operable Skylights
- Curbs
- Flashing
- Hardware

Roof Hatches
- Hatches
- Curbs
- Flashing
- Hardware

Roof Decks, Walls & Railings
- Decking/paving
- Protection
- Supports
- Walls
- Railings

Other Roof Accessories
- Snow guards
- Tie-offs
- Pipe supports

Fixed Partitions
- Framing
- Substrates/sheathing
- Blocking
- Insulation

Soffits & Ceilings
- Framing
- Substrates/sheathing
- Blocking
- Insulation

Operable Partitions
- Partition
- Support structure
- Factory finishes

Demountable Partitions
- Partition
- Support structure
- Factory finishes

Appendix A - Sample Systems and Components Inventory List

Glazed Partitions
- Frames
- Glazing
- Glass block
- Trims

Railings & Screens
- Railing assemblies
- Visual screens

Personnel Doors
- Frames
- Doors
- Integral lites
- Hardware
- Trims
- Finish

Special Doors
- Frames
- Doors
- Hardware
- Finish

Windows & Sidelites
- Frame
- Glazing
- Stops

Access Floors
- Framing/stands
- Floor panels
- Factory finishes

Platforms & Stages
- Framing
- Sheathing/panels
- Accessories

Floor Finishes
- Finish material
- Trims
- Wall base
- Transitions

Wall Finishes
- Finish material
- Trims

Ceiling Finishes
- Framing/supports
- Finish material
- Trim

Other Finishes
- Finish material
- Transitions

Interior Specialties
- Toilet partitions/accessories
- Lockers
- Boards
- Protective Guards
- Signage

Casework/Millwork
- Cabinets
- Cubbies
- Wardrobes
- Counters
- Display case
- Trim

Seating
- Framing
- Finish
- Accessories

Window Coverings
- Drapes
- Blinds
- Blackout shades

Passenger Elevator
- Cab
- Rails
- Machinery
- Appurtenances

Appendix A - Sample Systems and Components Inventory List

Lifts & Other Conveyors
- Cab/enclosure
- Rails
- Machinery
- Appurtenances

Elevators & Lifts
- Cab/enclosure
- Rails
- Machinery
- Appurtenances

Hoists & Cranes
- Structure/rails
- Hoist/crane
- Appurtenances

Other Systems
- Structure/rails
- Enclosure
- Appurtenances

Plumbing Fixtures
- Fixture
- Rough-in
- Valves/stops
- Mounts
- Trims

Plumbing Piping
- Pipe
- Fittings
- Hangers
- Insulation

Plumbing Equipment
- Pumps
- Tanks
- Traps
- Hot water generators
- Treatment

Waste & Vent Piping
- Pipe
- Fittings
- Cleanouts
- Supports
- Insulation

Special Systems
- Equipment
- Piping
- Fittings

Heating Equipment
- Boilers
- Furnaces
- Burners
- Flue
- Expansion tank
- Media

Heating Distribution Systems
- Pipe
- Fittings
- Valves
- Pumps
- Insulation
- Strainers

Ventilation Equipment
- Air handling units
- Supply/Return fans
- Exhaust fans
- Coils
- VAVs
- Terminal units

Ventilation Distribution Systems
- Ducting
- Insulation
- Diffusers
- Damper/Silencers

Appendix A - Sample Systems and Components Inventory List

Cooling Equipment
- Air Conditioning units
- Make-up units
- Coils
- Refrigerant

Cooling Distribution Systems
- Pipe
- Fittings
- Valves
- Gauges
- Insulation

Heat Recovery System
- Heat Recovery units
- Fans

Control Systems
- Head End
- Direct Digital Control points
- Wiring
- Sensors
- Gauges

Riser & Equipment
- Riser
- Backflow device
- Headers
- Valves

Sprinklers & Piping
- Pipe
- Fittings
- Heads
- Hangers/Bracing

Special Suppression Systems
- Tanks
- Valves
- Piping
- Controls

Fuel Supply (Gas & Oil)
- Tanks
- Valves
- Piping
- Controls

Dust Collection Systems
- Tank
- Stand
- Fans
- Ducting
- Controls

Compressed Air & Vacuum Systems
- Tanks
- Mounts
- Fans
- Ducting
- Controls
- Outlets

Other Special Mechanical Systems
- Equipment
- Piping/ducting
- Grills

Main Distribution Panels & Switchgear
- Main Distribution Panel enclosure
- Disconnect
- CT Enclosure
- Bus
- Fuses

Panels & Motor Control Centers
- Switchboards
- Panelboards
- Motor control centers

Transformers
- Transformer

Conduit & Feeders
- Conduit
- Hangers/supports
- Fittings
- Wires

Appendix A - Sample Systems and Components Inventory List

Lighting Fixtures
- Interior Fixtures
- Building Mounted Fixtures
- Exit/emergency
- Trims

Lighting Controls
- Control Panel
- Switches
- Occupancy sensors

Conduit & Wiring
- Conduit
- Fittings
- Wiring

Devices & Connections
- Outlets
- Disconnects
- Sensors/timers
- Motor connections

Conduit & Wiring
- Conduit
- Fittings
- Wiring

Fire Alarms
- Devices
- Panels
- Conduit
- Wiring

Data & Communications
- Equipment
- Devices/connections
- Conduit/tray
- Wiring

Security Systems
- Headend
- Detectors
- Closed circuit television
- Access control
- Conduit/tray
- Wiring

Clock Systems
- Clocks
- Controls
- Conduit/tray
- Wiring

Intercom Systems
- Headend
- Interties
- Speakers
- Wiring

Other Special Systems
- Equipment
- Devices
- Conduit/tray
- Wiring

Power Generation & Distribution
- Generators
- Switchgear
- Panels
- Conduit
- Feeders

Electrical Heating Systems
- Baseboards
- Unit Heaters
- Radiator
- Radiant Heat
- Controls

Grounding Systems
- Grounding
- Lightning Protection

Food Service and Kitchen Equipment
- Cooking Equipment
- Refer/Freezer
- Tables/counters

Appendix A - Sample Systems and Components Inventory List

Athletic Equipment
- Basketball goals
- Inserts
- Ropes
- Bars
- Mat hoists

Career & Technology Equipment
- Woodworking
- Metal/welding
- Small engine
- Robotics

Science Equipment
- Casework
- Equipment

Library Equipment
- Stacks
- Shelves
- Desks
- Chairs

Theater Equipment
- Lighting
- Rigging
- Sound system
- Curtains

Art Equipment
- Kilns
- Sinks

Loading Dock Equipment
- Bumpers
- Levelers

Other Equipment
- OT/PT

Fixed Furnishings
- Classroom
- Administration
- Workrooms
- Assembly

Mats
- Mats
- Grates

Other Furnishings
- Window shades

Packaged Utility Modules
- Foundation
- Superstructure
- Enclosure
- Mechanical
- Electrical

Swimming Pool
- Foundation
- Superstructure
- Enclosure
- Mechanical
- Electrical

Greenhouse
- Foundation
- Framing
- Panels
- Mechanical
- Electrical

Appendix B

Anticipated Life Expectancies (Renewal Schedule)

System	System Life Expectancy (Years)
Site Improvements	25
Site Utilities	40
Foundation/Substructure	50
Superstructure	50
Exterior Wall System	25
Exterior Windows	30
Exterior Doors	20
Roof Systems	20
Interior Partitions	50
Interior Doors	30
Interior Floor Finishes	15
Interior Wall Finishes	25
Interior Ceiling Finishes	25
Specialties	40
Conveying Systems	40
Plumbing Piping	30
Plumbing Fixtures	30
Fire Protection/Suppression	30
HVAC Distribution	40
HVAC Equipment	30
HVAC Controls	20
Electrical Service/Generation	40
Electrical Distribution	50
Electrical Lighting	25
Special Electrical	15
Equip and Furnishings	25

Appendix C

Checklists

District Preventive Maintenance Program Review

District:
Review Year: Site Visit Date:

Item	Requirement	Approved	Comments
	Maintenance Management		
A1	Provide copies of work orders of varying types and status.	☐	
A2	Report: Total maintenance labor hours collected on work orders by type of work (scheduled, corrective, operations support, etc.) vs. labor hours available—by month for previous 12 months.	☐	
A3	Report: Scheduled and completed work orders—by month for previous 12 months.	☐	
A4	Report: Number of incomplete work orders sorted by age (30, 60, 90 days, etc.) and status (deferred, awaiting materials, scheduled, etc.)—by month for the previous 12 months.	☐	
A5	Report: Comparison of scheduled maintenance work order hours to unscheduled maintenance work order hours—by month for previous 12 months.	☐	
A6	Report: Monthly trend data for unscheduled work orders showing both hours and numbers of work orders—by month for the previous 12 months.	☐	
A7	Report: Planned maintenance activity report—by facility for next 3 months.	☐	
A8	Report: Completed maintenance activity (work orders) including labor and material costs—by facility for previous 3 months.	☐	
	Energy Management		
B1	Provide a written energy management plan.	☐	
B2	Reports: Consumption data for each building, each utility [e.g., fuel oil, ~~electricity,~~ natural gas, LPG, electricity, recovered heat, ~~water~~biomass, etc.]—by month for the previous 12 months.	☐	
B3	Provide support of annual evaluation of need and effectiveness of retro-commissioning for required facilities.	☐	
	Custodial Program		
C1	Provide a written custodial plan that is building-specific and describes both the frequency (schedule) and level of custodial care for each facility.	☐	
	Maintenance Training		
D1	Provide a schedule of planned training for both custodial and maintenance personnel—for the current or upcoming school year.	☐	
D2	Provide a record of training describing type and duration of training—by individual for current school year.	☐	
	Renewal and Replacement (R&R) Schedules		
E1	Provide a Renewal/Replacement Schedule (detailed to at least DEED's 26 systems) for each permanent building over 1000sf.	☐	
E2	Provide information that supports that the data in the R&R schedules was developed based on system condition assessments.	☐	
	Fixed Asset Inventory System (FAIS)		
F1	Report: Report of fixed asset, date acquired, location and estimated period of service.	☐	

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Page 1

(a) For a district to be eligible for state aid under AS 14.11.011, the chief school administrator of the district must certify, on a form provided by the department, that the district has, and is in compliance with, a facility management program that addresses the following five elements of facility management, including maintenance management:

(1) a maintenance management program that is a formal system that records maintenance activities on a work order basis and tracks the timing and costs, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;

Mandatory

- ☐ Show that your system for can recording all maintenance activities on a work order basis and how a work order is handled from its creation to completion?
- ☐ Show your maintenance personnel performed no activities this week or this month not recorded on a work order?
- ☐ Show a record of your work orders that track all of your maintenance activities according to typical categories such as preventive, routine, emergency and operations?
- ☐ Generate a report of your planned maintenance activity for the next quarter that shows the timing (i.e., schedule) and anticipated costs, including labor and materials, of that work?
- ☐ Produce a report covering the previous three months of all maintenance activities and their costs, including labor and materials broken out by typical maintenance categories such as preventive, routine, emergency and operations?
- ☐ Show a report of planned versus completed maintenance activity for each facility by work order?

Best Practice

- ☐ Show that assets are identified for tracking purposes to the component level?
- ☐ Demonstrate how the data collected is used in the day-to-day management program?

(2) an energy management plan that includes

(a) the recording energy consumption for all utilities on a monthly basis for each building; for facilities constructed before December 15, 2004, a district may record energy consumption for utilities on a monthly basis when multiple buildings are served by one utility plant; and

(b) regular evaluation of the effectiveness of and need for commissioning existing buildings;

Mandatory

- ☐ Produce a monthly record of energy consumption for each utility by building?
- ☐ Demonstrate that each building over 1000 square feet is separately measured each month?
- ☐ (If this is not practical at every site, tell what you do instead.)
- ☐ Demonstrate tracking and updating of which facilities are required to be evaluated for retro-commissioning?
- ☐ Provide a worksheet or other method of annual evaluation of need for retro-commissioning required facilities?

Best Practice

- ☐ Show comparison of energy consumption in each building over multi-year period.
- ☐ Identify causes of increased or decreased energy consumption?
- ☐ Demonstrate the development of energy efficiency measures (EEMs) based on consumption analysis?
- ☐ Tracking implementation of EEMs and then accomplishing appropriate measurement and verification?

(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;

Mandatory

- ☐ Produce a copy of your written custodial plan at each site showing a schedule of custodial activities?
- ☐ Show that your plan for each building includes the type of work (i.e., the activity needed for each surface or equipment item) and the scope of effort (i.e., the frequency of care for each type of work)?

Best Practice

- ☐ Demonstrate the district's plan has been made available to all custodial staff, principals, and management personnel?
- ☐ Demonstrate how the plan transfers to custodial work being done at the site?
- ☐ Show that the program has included in a scope of effort the quantity (e.g., square feet of carpet, number of toilet fixtures, etc.)?
- ☐ Custodial plan shows areas of each custodian's responsibility?

(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person; and

Mandatory

- ☐ Show a written training plan or training schedule that addresses annual training goals?
- ☐ Produce a schedule of planned training for the coming year?
- ☐ Produce a record of training activities by individual custodian and maintenance staff?
- ☐ Show training records for last year?

Best Practice

- ☐ Track maintenance training through work orders on CMMS?

(5) a renewal and placement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.

Mandatory

- ☐ Provide a Renewal & Replacement (R&R) Schedule for each permanent building over 1000 square feet in size?
- ☐ Demonstrate that major building systems are identified at least at the level of the 26 systems used on the DEED renewal and replacement schedule?
- ☐ Show information that supports the data in the R&R schedule was developed based on on-site assessments?

Best Practice

- ☐ Show how these schedules are being used by the district to formulate capital plans?
- ☐ Show, for buildings with major additions of different ages, that separate R&R schedules have been created?
- ☐ Demonstrate that the R&R schedules are updated each year?
- ☐ Provide a site-by-site or districtwide forecast of renewal cost by fiscal year?

Appendix D

Definitions

Building System(s)
: An assembly of components created to perform specific functions in a facility (ref. DEED *CostFormat* for descriptions of 11 standard building systems).

Capital Renewal or Replacement
: A scheduled and anticipated systematic upgrading or replacement of a building system or component, anticipated based on life-expectancy, to establish its ability to function for a new life cycle—typically at least five years.

Commissioning
: A systematic process of testing buildings systems to ensure that a building performs in accordance with the design intent, contract documents, and the owner's operational needs. Retro-commissioning is commissioning of building systems that occurs on a facility that has never been commissioned, or occurs after an initial commissioning, to recalibrate building performance to ensure optimal systems performance.

Component
: An item within a building system that provides a function distinct from other elements in that system.

Corrective Maintenance
: Unscheduled maintenance or repair in response to system or component failures that are accomplished at an operational level.

Custodial Care
: The day to day and periodic cleaning of building surfaces and fixtures needed to maintain a facility in safe, clean, and orderly condition; includes the replacement of disposable supplies and building items.

Deferred Maintenance
: Component repair or replacement that is postponed for lack of funds, resources, or other reasons.

Energy Audit and Assessment
: An assessment of a building that review current energy consumption and identifies energy efficiency measures that you can conduct to make the building more energy efficient.

Energy Benchmarking
: Measuring building energy performance against its own past performance or against other buildings with a similar function/use.

Energy Consumption Monitoring
: Measuring, recording, and tracking use of energy utilities by a building. Required to be done on a monthly basis.

Energy Efficiency Measures
: Upgrades, retrofits, or repairs of systems or software or a practice that, when implemented, results in reduced energy use while maintaining the same or higher level of service.

Major Maintenance

Facility renewal that requires major repair or rehabilitation to protect the structure, correct building code deficiencies, or achieve an operating cost savings, and shall exceed $50,000 per project, per site. It must be demonstrated, using evidence acceptable to the department that (1) the district has adhered to its regular preventive, routine, and/or custodial maintenance schedule for the identified project request, and (2) preventive maintenance is no longer cost effective.

Preventive Maintenance

The regularly scheduled activities that carry out the diagnostic and corrective actions necessary to prevent premature failure or maximize or extend the useful life of a facility and/or its components. It involves a planned and implemented program of inspection, servicing, testing, and replacement of systems and components that is cost effective on a life-cycle basis. Programs shall contain the elements defined in AS 14.11.011(b)(4) and 4 AAC 31.013 to be eligible for funding.

Routine Maintenance

Light maintenance and inspection tasks performed at regular intervals (daily, weekly, monthly, etc.). Differentiated from preventive maintenance by level of complexity, specialized skill, and duration of effort.

Note: The above definitions are those adopted by the Bond Reimbursement and Grant Review Committee April 20, 2022.

Appendix E

Master Custodial Schedule

The Department of Education and Early Development, Facilities has developed a template master custodial schedule to assist school district in implementing a Custodial Program in compliance with 4 AAC 31.013. This template provides a comprehensive list of Space Types with their respective custodial tasks and frequencies identified. Edit the list to match any specific education related facility. Frequency of tasks to be performed are suggested and can be modified to meet district objectives.

The template's room-based cleaning list can also be adapted to other organizational models such as schedule-based, or a hybrid approach in which repetitive space-cleaning tasks are summarized in a Cleaning Processes section of the district's custodial guidelines. Examples of these would be: Dusting, Vacuuming, Disinfecting, Window Cleaning, etc. The assumption would be that these tasks would occur in all spaces. Spaces needing specialized cleaning, such as Gymnasiums or Bi-cultural/Bilingual, would continue to be broken out for additional attention.

An excel version of the template is available from the department.

Acronyms
AN = As Needed
SA = Semi-annual
Q = Quarterly
BW = Bi-weekly

Category A – Instructional or Resource (Sample Space)

Art Classroom

Task	Frequency
Dust ceiling/wall perimeter	Weekly
Dust all ceiling mounted light fixtures, projectors, etc.	Weekly
Vacuum all vents and diffusers	Weekly
Dust non-wet-area horizontal surfaces (furniture, trim, sills)	Daily
Clean and disinfect table tops	Daily
Spot clean vertical and horizontal hard surfaces	Weekly
Clean/wipe down countertops	Daily
Clean sinks and faucets	Daily
Clean equipment surfaces (pottery wheel, kiln, racks, easles)	Daily
Empty pencil sharpeners	Daily
Clean window glass on doors/sidelights	Daily
Empty trash receptacles and replace liners	Daily
Vacuum, mop/spot clean and disinfect all hard-surface floors	Daily
Strip and wax all hard-surface flooring	Semi-annual

Task	Frequency
Clean and disinfect all waste receptacles	Weekly
Clean shades or blinds	Monthly
Clean marker boards	As Needed
Replace lamps/bulbs	As Needed
[Other]	
Ceramics/Kiln	
Dust ceiling/wall perimeter	Weekly
Dust all ceiling mounted light fixtures	Weekly
Mop floor	Daily
Spot clean walls hard surfaces	Weekly
Clean equipment surfaces (pottery wheels, kiln, etc.)	Weekly
[Other]	

Category B – Support Teaching (Sample Space)

Teacher Breakroom

Task	Frequency
Dust ceiling/wall perimeter	Weekly
Dust all ceiling mounted light fixtures, projectors, etc.	Weekly
Vacuum all vents and diffusers	Weekly
Dust all horizontal surfaces (furniture, counters, trim, sills)	Daily
Clean and disinfect table tops	Daily
Spot clean vertical and horizontal hard surfaces	Weekly; As Needed
Clean sinks and faucets	Daily
Clean appliances surfaces (range, microwave, refrigerator)	Daily; As Needed
Remove and clean behind around appliances	Annually
Clean window glass on doors/sidelights	Daily
Empty trash receptacles and replace liners	Daily
Vacuum all carpeted floors and area rugs	Daily
Spot clean small marks and stains on carpets and area rugs	Weekly
Extraction cleaning carpeted floors and area rugs	Semi-annual
Vacuum, mop/spot clean and disinfect all hard-surface floors	Daily
Strip and wax all hard-surface flooring	Semi-annual
Clean and disinfect all waste receptacles	Weekly
Clean shades or blinds	Monthly
Clean marker boards	As Needed
Replace lamps/bulbs	As Needed
[Other]	
Restroom	
Mop and disinfect floor using enzymatic cleaner	Daily
Clean and disinfect mirrors	Daily
Clean and disinfect lavatory	Daily
Clean and disinfect toilet	Daily

Task	Frequency
Check & replenish hand soap, paper towel, & tissue supplies	Daily
Clean exterior of all dispensers (tissue, soap, etc.)	Daily
Check that all fixtures are functioning properly	Daily
Clean and disinfect wall surfaces	Weekly
Clean and disinfect all waste receptacles	Weekly
Clean and disinfect exposed plumbing piping and valves	Weekly
[Other]	

Category C – General Support (Sample Space)

Nurse/Clinic Space

Task	Frequency
Dust ceiling/wall perimeter	Weekly
Dust all ceiling mounted light fixtures, projectors, etc.	Weekly
Vacuum all vents and diffusers	Weekly
Dust all horizontal surfaces (furniture, counters, trim, sills)	Daily
Clean and disinfect equipment (cots, apparatus)	Daily
Spot clean vertical and horizontal hard surfaces	Weekly; As Needed
Clean sinks and faucets	Daily
Clean appliances surfaces (range, microwave, refrigerator)	Daily; As Needed
Remove and clean behind around appliances	Annually
Clean window glass on doors/sidelights	Daily
Empty trash receptacles and replace liners	Daily
Vacuum, mop/spot clean and disinfect all hard-surface floors	Daily
Strip and wax all hard-surface flooring	Semi-annual
Clean and disinfect all waste receptacles	Weekly
Clean shades or blinds	Monthly
Clean marker boards	As Needed
Replace lamps/bulbs	As Needed
[Other]	
Restroom	
Mop and disinfect floor using enzymatic cleaner	Daily
Clean and disinfect mirrors	Daily
Clean and disinfect lavatory	Daily
Clean and disinfect toilet	Daily
Check & replenish hand soap, paper towel, & tissue supplies	Daily
Clean exterior of all dispensers (tissue, soap, etc.)	Daily
Check that all fixtures are functioning properly	Daily
Clean and disinfect wall surfaces	Weekly
Clean and disinfect all waste receptacles	Weekly
Clean and disinfect exposed plumbing piping and valves	Weekly
[Other]	

Category D – Supplementary (Sample Space)

Mechanical/Electrical (M/E)

Task	Frequency
Dust ceiling/wall perimeter	Weekly
Dust all ceiling mounted light fixtures, etc.	Weekly
Vacuum all vents and diffusers	Weekly
Dust all horizontal surfaces (furniture, counters, trim, sills)	Daily
Clean window glass on doors/sidelights	Daily
Empty trash receptacles and replace liners	Daily
Sweep, mop/spot clean and disinfect all hard-surface floors	Daily
Strip and wax all hard-surface flooring	Semi-annual
Clean and disinfect all waste receptacles	Weekly
[Other]	