



**NEW JERSEY
SCHOOLS CONSTRUCTION
CORPORATION**

**One West State Street
Trenton, New Jersey 08625**

**21st Century Schools
Design Manual**

May 15, 2007

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SUMMARY OF MAJOR CHANGES

The *21st Century Schools Design Manual* is intended for use in the design of all New Jersey pre-K through 12 public School Facilities Projects within the NJ Schools Construction Corporation (NJSCC) Program. The Design Manual shall compliment the 'A-Z' Design Consultant Agreement, all other NJSCC documentation, and any and all presiding Laws, Codes, Ordinances, and requirements of Regulatory Agencies having jurisdiction over this project. The *Manual* brings together, in one comprehensive document, all the guidance developed by the NJSCC, as of its time of issuance, for designing its 21st century schools, including:

- An amended set of Design Criteria to guide the design process toward the NJSCC's performance objectives while allowing Project Teams the creative flexibility to reach these objectives in their own ways.
- A new set of Requirements and Recommendations associated with the Design Criteria, establishing minimum expectations for all NJSCC School Facilities Projects. The Standards **replace and supersedes**, prior such guidance including the NJSCC's *Design and Construction Guidelines, November 5, 2003 and the Design Manual (September 30, 2004) and all associated bulletins addressed by this document.*
- An updated checklist for Deliverables that **replaces and supersedes** the Submission Checklists currently contained in the *Procedures Manual for Design Consultants, Version 2001A, January 1, 2001 or later and the Design Manual (September 30, 2004)* and all associated bulletins addressed by this document.
- A newly revised description of the Procedures that **replaces and supersedes** the *NJEDA Procedures Manual for Design Consultants*, and all associated technical bulletins, that has been coordinated with the associated Deliverables and Definitions contained herein.
- A newly revised Progress Report Guide process, centered on oral and written Project Progress Report presentations at the conclusion of each major project phase, to ensure that Project Teams are addressing all the 25 Design Criteria in a timely fashion
- An updated NJSCC LEED™ Checklist(s) for reporting anticipated LEED™ for Schools credits.

All such provisions shall constitute minimum expectations of the Design Consultants in fulfillment of their obligations under the Design Consultants Agreement unless otherwise authorized by the NJSCC in writing and other authorities, specifically the newly adopted New Jersey State Uniform Construction Code and associated sub-codes, which represents some of the most progressive standards in the nation.

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TABLE OF CONTENTS

SECTION ONE OVERVIEW.....	1
INTRODUCTION.....	3
CONTENTS AND ORGANIZATION	4
BACKGROUND AND RATIONALE	7
USING THE MANUAL	9
SECTION TWO DESIGN CRITERIA	11
INTRODUCTION.....	13
ORGANIZATION AND CONTENT	14
1. ACOUSTIC COMFORT	15
2. THERMAL COMFORT.....	19
3. VISUAL COMFORT	21
4. DAYLIGHTING.....	25
5. INDOOR AIR QUALITY	29
6. SAFETY AND SECURITY	35
7. ENERGY PERFORMANCE.....	39
8. LIFE CYCLE COST	43
9. COMMISSIONING	47
10. LEARNING CENTERED DESIGN	51
11. STIMULATING ARCHITECTURE.....	57
12. ACCESSIBILITY.....	61
13. FLEXIBILITY AND ADAPTABILITY	67
14. INFORMATION TECHNOLOGY	71
15. HIGH PERFORMANCE BUILDING ENVELOPE	75
16. RENEWABLE ENERGY	81
17. HIGH PERFORMANCE HVAC	85
18. HIGH PERFORMANCE ELECTRIC LIGHTING.....	89
19. ENVIRONMENTALLY RESPONSIVE SITE PLANNING	93
20. ENVIRONMENTALLY PREFERABLE	97
21. WATER EFFICIENT	103
22. COMMUNITY INVOLVEMENT	107
23. COMMUNITY USE.....	111
24. CATALYST FOR ECONOMIC DEVELOPMENT	115
25. SERVICE LIFE PLANNING	119
SECTION THREE PROCEDURES AND DELIVERABLES.....	123
SUMMARY OF MAJOR CHANGES TO THE	125
SUMMARY OF SUBMISSIONS AT EACH MAJOR PHASE OF THE SCOPE OF	
WORK.....	126
GENERAL REQUIREMENTS	127
<i>NJSCC Project Team.....</i>	<i>127</i>
<i>Schedule</i>	<i>127</i>
<i>Cost Control</i>	<i>127</i>
<i>Construction Cost Estimates (CCE).....</i>	<i>128</i>
<i>Correspondence</i>	<i>128</i>
<i>Meetings</i>	<i>128</i>
<i>Proprietary Specifications</i>	<i>129</i>

<i>E-Rate Program</i>	130
<i>Project Progress Reports</i>	130
<i>NJSCC LEED™ Checklists</i>	130
<i>Full Building Commissioning Requirements</i>	131
<i>Controlled Testing</i>	131
<i>Material Storage</i>	132
<i>Long Lead Equipment/Pre-Purchase</i>	132
<i>Utility Rebate ‘Smart Start’ Program</i>	132
<i>Recycling During Construction</i>	132
<i>Project Review Meetings</i>	132
<i>Submission Requirements</i>	133
<i>Integrated Design</i>	133
PROGRAM /CONCEPT PHASE	135
<i>Required Deliverables Checklist:</i>	135
<i>Description</i>	137
<i>Community Involvement</i>	137
<i>Project Kick-Off Meeting</i>	137
<i>Information Gathering</i>	138
<i>Programming</i>	139
<i>Site Analysis</i>	139
<i>Borings and Surveys</i>	140
<i>LEED™ Charrette</i>	140
<i>Applicable Legal/Regulatory Approvals and Code Summary</i>	140
<i>Owner Project Requirements (OPR) Workshop</i>	141
<i>Development of Alternative Concept Designs / Initial Integrated Design Sessions</i>	141
<i>Construction Cost Estimates (CCE)</i>	142
<i>Project Schedule</i>	143
<i>Design Review and Project Progress Meeting(s)</i>	143
<i>Value Management / Engineering Review</i>	143
<i>Final Concept Design</i>	144
<i>Program/Concept Phase Project Progress Report</i>	144
<i>Program /Concept Phase Submission Requirements</i>	145
<i>Design Consultant Approval to Proceed</i>	145
<i>Program /Concept Phase Submission Requirements</i>	146
SCHEMATIC DESIGN PHASE	147
<i>Required Deliverables Checklist:</i>	147
<i>Description</i>	149
<i>Update LEED™ Checklist Form</i>	152
<i>Schematic Educational Adequacy Review and Specifications</i>	152
<i>Submissions to Other Authorities</i>	152
<i>Final Schematic Design Documents</i>	153
<i>Specifications</i>	153
<i>Construction Cost Estimate</i>	153
<i>Schematic Phase Project Progress Report</i>	154
<i>Project Review Meeting</i>	154
<i>Design Consultant Approval to Proceed</i>	154
<i>Schematic Design Phase Submission Requirements</i>	155
DESIGN DEVELOPMENT PHASE	157
<i>Required Deliverables Checklist</i>	157
<i>Description</i>	159
<i>Updated LEED™ Checklist Forms and Letter Templates</i>	162

<i>NJDOE Final Educational Adequacy Review</i>	162
<i>Submissions to Other Jurisdictions</i>	163
<i>Utility Availability/Approval</i>	163
<i>Final Design Development Documents</i>	164
<i>Design Rendering/Sketches</i>	164
<i>Interior Finish Color/Material Selection Board(s)</i>	164
<i>Construction Cost Estimate</i>	164
<i>Value Management / Engineering Review</i>	164
<i>Design Development Phase Project Progress Report</i>	165
<i>Project Review Meeting</i>	165
<i>Design Development Phase Submission Requirements</i>	166
<i>100% Design Development Deliverable Details</i>	167
<i>Design Consultant Approval to Proceed</i>	172
CONSTRUCTION DOCUMENT PHASE	173
<i>Required Deliverables Checklist</i>	173
<i>Description</i>	175
<i>Updated LEED™ Checklists and Letter Template Forms</i>	178
<i>Submissions to Other Authorities</i>	178
<i>High Performance Building Envelope; Envelope Testing Building Envelope Peer Review [Design Criteria # 15c] (AKA Cx Focused Review of Design Documents)</i>	178
<i>Final Construction Documents (Construction Permit Set)</i>	178
<i>Construction Control Cost Estimate</i>	179
<i>Construction Document Phase Project Progress Report</i>	179
<i>Construction Document Survey Form</i>	179
<i>Project Review Meeting</i>	180
<i>Construction Document Phase Submission Requirements</i>	181
<i>Design Consultant Approval to Proceed</i>	182
BIDDING AND CONTRACT AWARD PHASE	183
<i>Required Deliverables Checklist</i>	183
<i>Description</i>	185
<i>Bidding and Contract Award Construction Documents</i>	186
<i>Bid and Contract Award Phase Project Progress Report</i>	186
<i>Project Review Meeting</i>	187
<i>Design Consultant Approval to Proceed</i>	187
<i>Bidding and Contract Award Submission Requirements</i>	188
CONSTRUCTION ADMINISTRATION PHASE	189
<i>Required Deliverables Checklist</i>	189
<i>Description</i>	191
<i>Conformed Drawings</i>	191
<i>Construction Project Meetings and Observation</i>	191
<i>Submittals and Requests for Information</i>	193
<i>Final Interior Finish Color/Material Selection Board(s)</i>	193
<i>LEED™ Checklist and Letter Template Form</i>	195
<i>Other Construction Administration Processes</i>	195
<i>Construction Document Phase Project Progress Report</i>	195
<i>Project Review Meeting</i>	195
<i>Design Consultant Approval to Proceed</i>	196
<i>Construction Administration Phase Submission Requirements</i>	197
PROJECT CLOSE-OUT PHASE	199
<i>Required Deliverables Checklist</i>	199
<i>Description</i>	201

<i>Responsibilities</i>	201
<i>Commencement</i>	201
<i>Development of Punch-Lists and Inspection Reports</i>	201
<i>Correction/Completion of Punch-List Items</i>	202
<i>Determination of Substantial Completion</i>	202
<i>Issuance of a 'Temporary Certificate of Occupancy'</i>	203
<i>NJSCC LEED™ Checklist Forms and Supporting Documentation</i>	204
<i>Initiation of Final Contract Acceptance Process</i>	204
<i>Submission of Close-Out Documentation</i>	204
<i>Submission Checklist</i>	205
<i>Design Consultant Approval to Proceed</i>	205
<i>Contractors Final Payment</i>	206
<i>Design Consultant's Final Payment</i>	206
<i>Final Performance Evaluations of the Contractor</i>	206
<i>Project Close-out Phase Submission Requirements</i>	207
POST OCCUPANCY REVIEW PHASE	209
<i>Required Deliverables Checklist</i>	209
<i>Description</i>	211
<i>Warranty Period</i>	211
<i>Warranty Inspection</i>	211
<i>Product Inspection</i>	211
<i>Commissioning Plan</i>	212
<i>Post Occupancy Review Phase Submission Requirements</i>	212
APPENDIX A PROJECT PROGRESS REPORT GUIDES	213
SCOPE AND INTENT	215
ORGANIZATION AND CONTENT	215
USING THE APPENDIX	216
PROGRAMMING	217
SCHEMATIC DESIGN	223
DESIGN DEVELOPMENT	229
CONSTRUCTION DOCUMENTS	235
BID AND CONTRACT AWARD	241
CONSTRUCTION ADMINISTRATION	245
APPENDIX B LEED POLICY, INSTRUCTIONS, AND CHECKLIST	251
NJSCC LEED™ POLICY AND INSTRUCTIONS	253
NJSCC LEED CHECKLIST	255
APPENDIX C DCA BEST PRACTICE STANDARDS	261
BEST PRACTICES STANDARDS	263
APPENDIX D DEFINITIONS AND ABBREVIATIONS	269
DEFINITIONS	271
ABBREVIATIONS	293
APPENDIX E NJSCC CONSTRUCTION DOCUMENTS SURVEY	295
CONSTRUCTION DOCUMENT SURVEY	297
APPENDIX F DESIGN MANUAL VARIANCE REQUEST FORM	303
DESIGN MANUAL VARIANCE REQUEST FORM	305

NJSCC Design Manual

Section One

Overview

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INTRODUCTION

The *NJSCC 21st Century Schools Design Manual* has been prepared for and shall apply to public School Facilities Projects in the State of New Jersey that are managed by the New Jersey Schools Construction Corporation (NJSCC) as defined by the “Educational Facilities Construction and Financing Act”.

Under Section C.18A: 7g-2d the Act states: ‘*While providing that the educational infrastructure meets the requirements of a thorough and efficient education, the State must also protect the interests of taxpayers who will bear the burden of this obligation. Design of school facilities should incorporate maximum operating efficiencies and new technologies to advance the energy efficiency of school facilities and the efficiency of other school building systems, construction should be in as efficient a manner as possible, and a mechanism to assure proper maintenance of new facilities should be established and implemented, in order to reduce the overall cost of the program and to preserve this infrastructure investment.*’

With the *Design Manual*, it is NJSCC’s full intent to establish a uniform approach to School Facilities Project design such that we accomplish the following key goals:

- Establish a means for NJSCC managed School Facilities Projects to be built in an educationally appropriate, community focused, cost effective, sustainable, energy efficient, safe, secure, clean, and environmentally friendly manner.
- Establish a sustainable design approach as a cost effective and common sense means of constructing 21st Century Schools for New Jersey.

This *Design Manual* raises the bar and sets forth an approach for NJSCC’s School Facilities Project design to attain such goals. This approach will serve to establish a new design norm for pre-K through 12 school facilities, while simultaneously establishing NJSCC as the nation’s foremost resource for knowledge relative to efficient planning and implementation of projects by means of excellence reviews and lessons learned in constructing School Facilities Projects for both urban and suburban areas.

This *Design Manual* is a living document that will be updated as NJSCC Project Teams learn more efficient and effective ways to design and construct School Facilities Projects for New Jersey, given the specific challenges faced by the NJSCC Program. The *Manual* is centered around NJSCC’s commitment to build on the Best Practices from others throughout the nation who have implemented design of pre-K through 12 schools, from both similar national and regional manuals as well as the practical knowledge contributed to the development of this manual by representative members of associated state agencies, local school districts, and design and construction professionals.

NJSCC has developed a series of performance criteria tempered by practical considerations in the *Design Manual* to encourage design creativity while simultaneously addressing shortcomings of the conventional Delivery Methods. By implementing the elements included within the *Design Manual*, the Project Team will be taking a significant step forward in the design, construction and ultimate performance of physical conditions in which the learning process can thrive. This, in essence, is what defines a 21st Century School for New Jersey.

CONTENTS AND ORGANIZATION

The *NJSCC Design Manual* was developed to help facilitate the creation of 21st Century schools throughout the State of New Jersey. The *Manual* is organized into three main sections and four Appendices.

Section 1 Introduction

This section orients the user to the “what, why and how” of the Design Manual: what the Manual contains; why it has been developed; and how the Design Manual should be used over the course of a design/construction project.

Section 2 Design Criteria

This section identifies the five performance objectives for all NJSCC managed School Facilities Projects in New Jersey. Such schools will be: healthy and productive; educationally effective, cost effective; sustainable; and community centered.

To help Project Teams reach these objectives, the NJSCC has developed a set of 25 Design Criteria to guide and inform the design and construction process:

Acoustic Comfort	Flexibility and Adaptability
Thermal Comfort	Information Technology
Visual Comfort	High Performance Building Envelope
Daylighting	Renewable Energy
Indoor Air Quality	High Performance HVAC
Safety and Security	High Performance Electric Lighting
Energy Performance	Environmentally Responsive Site Planning
Life Cycle Cost	Environmentally Preferable Material and Products
Commissioning	Water Efficient
Learning Centered Design	Community Involvement
Stimulating Architecture	Community Use
Accessibility	Catalyst for Economic Development
Service Life Planning	

Each of the 25 Design Criteria, include information and specific requirements that must be satisfied with recommended design strategies that should be considered. Addressing the requirements and recommendations for these criteria is mandatory for all Project Teams working for the NJSCC. The manner in which the criteria, specifically the design recommendations, are addressed is left to the discretion of the Project Teams, so as to allow them the flexibility to be responsive to their own local conditions and circumstances. However, all the criteria must be considered and addressed at every phase of a project, by means of a Project Progress Report delivered at each Project Review Meeting by which the NJSCC will ensure compliance with this requirement as described by Section 3.

Section 3 Procedures and Deliverables

This section of the *Design Manual* details the procedures and deliverables required at each major phase of Work.

The procedures and deliverables described in the *Design Manual* **replace and supersede** the *Procedures Manual for Design Consultants, Volume 2001A* and the *Design Manual* dated September 30, 2004. Consultants are expected to comply with all the procedures described, as modified by the Project Scope of Work, and provide all the Deliverables listed in the *Design Manual*.

Appendix A Project Progress Report Guides

This appendix provides guidance for each of the twenty five Design Criteria that are to be addressed in the six Project Progress Reports due at the each major phase of Work.

The appendix contains six individual Guides, one for each Project Progress Report that Design Consultants must prepare. Each Guide is designed to help the Design Consultants understand some of the key issues to be addressed in their designs and explained in the reports. These Guides will also be used by NJSCC and its agents to structure and facilitate Project Review Meetings, as well as inform the Commissioning Process.

Appendix B LEED™ Checklist

Design Consultants are required to submit Checklists at each major phase of Work indicating the LEED™ credits anticipated for the project as of that particular phase.

A sample Checklist is included in this Appendix, together with instructions on how to complete it. The actual Checklist should be submitted electronically and is available on the NJSCC FTP website.

Appendix C Homeland Security Requirements

This appendix provides a copy of the New Jersey Department of Community Affairs' Homeland Security requirements for schools. These requirements are in addition to requirements contained elsewhere in this Manual and must be met for all schools constructed under the program.

Appendix D Definitions and Abbreviations

This appendix provides common definitions of terms used within this document and the Design Consultant Agreement and shall having the meaning prescribed to them here unless otherwise agreed to in writing.

Appendix E Construction Document Survey Form

This appendix provides a hardcopy of the survey form to be completed by the Design Consultant in accordance with the process described by this document that will serve as a record of project attributes for the benefit of the NJSCC and its districts. An electronic copy shall be used and is available from the NJSCC Project Manger.

Appendix F Design Manual Variance Request Form

This appendix provides a hardcopy of the request form to be completed by the Design Consultant in accordance with the process described by this document that will serve as the basis of a change to the Scope of Work. The written acceptance to the terms of the request will be at the discretion of the NJSCC Project Manager for its own interest and/or convenience and will be the only basis upon variation from the provisions of this document shall be allowed, see section titled Using This Manual. An electronic copy shall be used and is available from the NJSCC Project Manger.

BACKGROUND AND RATIONALE

The New Jersey Schools Construction Corporation (NJSCC) is committed to creating a legacy of world-class educational facilities. To help guide School Facilities Project design and construction in the State toward this goal the NJSCC has:

- established **Performance Objectives** for all Project Teams;
- developed **Design Guidance** to help Teams meet these objectives; and
- implemented a **Management Process** – based on updated Deliverables requirements - to ensure that the Guidance is followed and the Objectives are met.

The *NJSCC Design Manual* contains the Design Guidance and the updated list of Deliverables and Procedures developed – together with relevant supporting materials - to meet the NJSCC's Performance Objectives.

The following briefly describes each of these key program components and their impacts on the School Facilities Project design process in New Jersey.

Performance Objectives

To help clarify its goals, the NJSCC has established a set of five key performance objectives for all NJSCC-constructed School Facilities Projects in New Jersey. Such School Facilities Projects will be:

- *Healthy and Productive* - enabling students and teachers to achieve maximum potential by providing healthy, safe, and comfortable environments.
- *Cost Effective* - providing facilities that save money over time by being efficient to build, maintain, and operate.
- *Educationally Effective* - providing a superior teaching and learning environment that accommodates present and future needs.
- *Sustainable* - minimizing environmental impacts and maximizing the use of non-polluting, renewable resources.
- *Community Centered* - creating School Facilities Projects that are integral parts of their communities.

Achieving these performance objectives in every NJSCC School Facilities Project is a core performance objective for all NJSCC Project Teams.

Design Guidance

To help Project Teams better understand these objectives and how to achieve them, the NJSCC has:

- committed to ensuring that all NJSCC projects achieve a minimum number of LEED™ points (plus all prerequisites) required of certification, wherever possible;
- identified 25 Design Criteria that every Project Team must address in their designs;
- developed specific requirements and design recommendations for each of these Design Criteria;
- provided additional sources of information and training to help design teams address the criteria and meet the performance objectives of the program.

Procedures and Deliverables

To help ensure that Project Teams meet its Performance Objectives the NJSCC has:

- updated and streamlined its existing Deliverable requirements
- implemented a integrative design process whereby Project Teams are given the freedom to satisfy the Design Criteria requirements in their own fashion;
- developed an integrated design process and associated procedures to assure that progress toward such goals is regularly reported and evaluated to assure progress in meeting the Performance Objectives.

Detailed discussions of the Design Criteria (Section 2), the Deliverables (Section 3), the Progress Reports (Appendix A), the NJSCC LEED™ Checklist (Appendix B) and the Homeland Security Requirements (Appendix C) form the basis of the *NJSCC Design Manual*.

USING THE MANUAL

The *NJSCC Design Manual* is intended to accomplish two key goals:

1. To help NJSCC Project Teams understand and then design 21st Century Schools throughout New Jersey; and
2. To provide a structured framework that the Project Team can use to report on – and NJSCC personnel can use to evaluate – their progress in meeting the NJSCC's 21st Century School Facilities Project objectives.

This *Manual* should therefore be used in distinct ways during design and the report/evaluation period.

During Design

At the beginning of a School Facilities Project design project NJSCC Design Consultants should undertake the following steps:

- Read and familiarize themselves with the entire *NJSCC Design Manual*.
- Review each of the 25 Design Criteria in detail in Section 2: Design Criteria.
- As appropriate, access additional resources listed.
- Attempt to address and incorporate the Design Criteria at the earliest phases of the design process.
- Continue to incorporate the criteria, on an ongoing basis, as the design process proceeds.
- Ensure that all Requirements are met.
- Review the LEED™ for Schools Reference Guide and NJSCC LEED™ Checklist (Appendix B).
- Attempt to incorporate as many LEED™ points as possible at the earliest phases of the design process. Ensure that at least the minimum number of credits (29 Credits), plus all prerequisites, required of certification are incorporated in design and construction of project and ultimately the finished building.

During Project Report and Evaluation

In preparation for the Project Review Meeting required at each project phase, NJSCC Design Consultants should consult Section 3 of the Design Manual to review the Procedures and Deliverables for that phase. Consultants should then undertake the following steps:

- Prepare all required deliverables in accordance with Section 3, in accordance with the procedures delineated. Prepare a Project Progress Report using the appropriate Progress Report Guide in Appendix A as a reference.
- Complete the LEED™ Checklist for that phase of the project.
- Attend the Project Review Meeting for that phase of the project – review design/construction activities over the course of the phase; submit all required deliverables; and deliver and discuss the Project Progress Report and the LEED™ Checklist for that phase of the project.

In addition to the Project Progress Report, all required deliverables as delineated by the Deliverable Checklist shall be submitted simultaneously in the format described by Section 3 of this document.

Request for Variance

Requests for variance from the requirements and/or procedures of this document due to unique circumstances associated with any particular project may be requested by the Design Consultant on behalf of the School District to the NJSCC by means of the form included in Appendix F. The NJSCC will review the request and all supporting documentation deemed appropriate, in consideration of the concerns expressed, and grant a decision that shall be final. Such variances, in no circumstance, shall be granted solely for budgetary purposes or scheduling convenience alone but rather shall represent unique considerations of the particular project that would give cause to undue hardship.

NJSCC Design Manual

Section Two

Design Criteria

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INTRODUCTION

SCOPE AND INTENT

The NJSCC has identified five performance objectives for all NJSCC-constructed schools in New Jersey. Such schools will be:

- Healthy and Productive;
- Cost Effective;
- Educationally Effective;
- Sustainable; and
- Community Centered.

To help Project Teams reach these objectives, the NJSCC has developed a set of **25 Design Criteria** to guide and inform the design process:

Acoustic Comfort	Flexibility and Adaptability
Thermal Comfort	Information Technology
Visual Comfort	High Performance Building Envelope
Daylighting	Renewable Energy
Indoor Air Quality	High Performance HVAC
Safety and Security	High Performance Electric Lighting
Energy Performance	Environmentally Responsive Site Planning
Life Cycle Cost	Environmentally Preferable Material and Products
Commissioning	Water Efficient
Learning Centered Design	Community Involvement
Stimulating Architecture	Community Use
Accessibility	Catalyst for Economic Development
	Service Life Planning

Addressing the requirements and recommendations for these criteria is mandatory for all Project Teams working for the NJSCC. The manner in which the criteria, specifically the design recommendations, are addressed is left to the discretion of the Project Team, allowing them the flexibility to be responsive to their own local conditions and circumstances. However, all the requirements associated with the criteria must be met and all recommendations considered and addressed at every phase of a project.

A Project Progress Report delivered and discussed at each Project Review Meeting is the mechanism by which the NJSCC will ensure compliance with this requirement.

ORGANIZATION AND CONTENT

This section of the *Design Manual* contains Individual ‘fact sheets’ on each of the 25 Criteria. Each fact sheet is organized into the following six short sections:

What and Why...

A brief explanation of the intent and significance of the Design Criteria.

Integrated Design Considerations

A discussion of how the criteria may interact with other 21st Century criteria and systems.

Requirements

Performance requirements related to the Criteria. All requirements must be met in the design of a school.

Recommendations

A brief list of best practice recommendations that shall be considered for incorporation in the design of the School Facility Project.

Associated LEED™ Credits

A summary of LEED™ credits and/or prerequisites associated with a particular Design Criteria.

Reference Standards and Guidelines

A list of reference standards and/or guidelines applicable to the Design Criteria.

Industry and Governmental Resources

Targeted references and resources that expand on the information in the fact sheet

The discussions are purposely short, and are only intended to provide an introduction to key issues and concepts, as well as highlight best practice recommendations for addressing a particular criterion in the design of schools. Further information can be found by accessing the referenced documents and resources identified at the conclusion of each Design Criteria.

Using This Section of the Design Manual

Project Teams should familiarize themselves with the information contained in this Section at the earliest stages of a School Facilities Project. Because the Design Criteria contained herein are intended to help guide and inform the design process, this Section – especially the requirements and recommendations - should be consulted regularly over the course of a project.

In addition, the Section should be specifically referenced as Project Teams review the Project Progress Reports due at the end of each major phase of design and construction. Since these Reports must discuss how the Team is addressing each of the 25 Design Criteria, a good understanding of the Criteria will be important for preparing effective Reports. Appendix A provides a series of Guides – organized to follow the Design Criteria – to assist in preparing Progress Reports.

1. ACOUSTIC COMFORT

WHAT AND WHY...

Parents, students, teachers, and administrators across the country are increasingly concerned that classroom acoustics are inadequate for proper learning. Noise from outside the school (vehicular traffic, aircraft flyover, etc.), hallways (foot traffic and conversation), other classrooms (amplified sound systems and inadequate sound attenuation), mechanical equipment (compressors, boilers and ventilation systems), and even sound from within the classroom itself (reverberation) can all hamper students' concentration.

A 21st Century school should address these potential problems and ensure a superior acoustical environment by:

- Reducing sound reverberation time inside the classroom;
- Limiting transmission of noise from outside the classroom;
- Minimizing background noise from the building's heating, ventilating, and air conditioning system.

Trying to hear in a poor acoustical environment is like trying to read in a room with the lights off: stress increases, concentration decreases, and learning is impaired. This is especially true for younger students (the ability to sort meaningful signals from noise is not fully developed until children reach their teens), those for whom English is a second language, and those with hearing impairments. Although little consideration has historically been given to acoustic design in classrooms – as opposed to lighting and ventilation – this situation is beginning to change. The information and tools needed to design classrooms for high acoustical performance now exist. They can be used to ensure that any newly constructed classroom provides an acoustic environment that positively enhances the learning experience for students and teachers.

INTEGRATED DESIGN CONSIDERATIONS

When classroom ceilings are designed to optimize daylighting, suspended acoustical ceilings are often eliminated. Similarly, as flooring products such as carpeting are eliminated for either hygiene or maintenance reasons and hard surface products are employed in their place. The sound absorption value lost by the absence of these materials must be replaced in other ways to prevent the classroom from becoming highly reverberant. However, ceiling and wall surfaces if appropriately designed can serve to dampen reverberation and may compensate for such decisions.

REQUIREMENTS

All 'new', 'alteration', 'reconstruction', and/or 'change of use' of Instructional Spaces, as defined by the NJDOE facilities efficiency standards, shall meet the maximum noise levels, minimum Reverberation Time (RT), and Sound Transmission Coefficients (STC) requirements as described in ANSI / ASA Standard S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools modified as follows. The maximum permissible background noise level, as cited in Table 1 of the standard, shall read 45 dBA with a maximum reverberation of 0.6 second (unoccupied) mid-frequency (average of 500, 1,000 and 2,000 Hz) in spaces with volumes of up to 10,000 ft³ and the minimum permissible STC value for windows shall be 35.

RECOMMENDATIONS

- ✓ Configure classrooms to damp rather than magnify sound reverberation.
- ✓ Specify sound absorbing materials (especially on exposed surfaces) to damp reverberation.
- ✓ Limit transmission of noise from outside the classroom:
- ✓ Design high Sound Transmission Class (STC) walls between:
 - Classrooms adjacent to laboratories
 - Classrooms adjacent to music practice or mechanical equipment rooms
 - Design exterior walls, windows, and roofs such that noise transmission (except for intermittent noise such as airplane flyovers) is reduced to the same levels as background noise inside the classroom
- ✓ Minimize background noise from the building's heating, ventilating, and air conditioning system
- ✓ Avoid locating mechanical equipment rooms next to classrooms unless specifically designed to mitigate for sound transmission.
- ✓ Recognize that sound control is more difficult in unducted rooftop or through-the-wall units than in central air handling systems.
- ✓ If using ducted rooftop units, ensure that they are mounted on spring isolators.
- ✓ Consider using larger ducts with lower air flow speeds (1000 feet per minute maximum).
- ✓ Select diffusers with low noise ratings.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Prerequisite 3: Minimum Acoustical Performance

EQ Credit 9: Enhanced Acoustical Performance

REFERENCE STANDARDS AND GUIDELINES

- ANSI / ASA Standard S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Apfel, Robert E. Deaf Architects & Blind Acousticians? A Guide to the Principles of Sound Design. New Haven: Apple Enterprises Press, 1998.
- Acoustical Society of America. ANSI/ASA S12.60-2002: American National Standard Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. Melville, NY: ASA, 2002. (<http://asa.aip.org/classrooms/acoustics-booklet.htm>)
- American Society of Heating, Refrigerating and Air Conditioning Engineers. 1999 Applications Handbook, Atlanta, GA: ASHRAE 2003. (www.ashrae.org)
- Sleeper, Ramsey. The American Institute of Architects. Architectural Graphic Standards, Tenth Edition. Washington, DC: John Wiley & Sons. Pages 63-70.

Online Resources

- American Speech-Hearing-Language Association. www.asha.org/index.htm (May 2007)
Online course available.
- The Classroom Acoustics Coalition. Guidelines for Classroom Acoustics in New Construction. www.nonoise.org/quietnet/qc/workshop/dec97shp/guide.htm (May 2007).
- Institute of Noise Control Engineering. www.inceusa.org (May 2007)
- National Council of Acoustical Consultants. www.ncac.com (May 2007)
- National Clearinghouse for Educational Facilities. www.edfacilities.org/rl/acoustics.cfm (May 2007)
- Noise Pollution Clearinghouse. www.nonoise.org/quietnet/qc (May 2007)
- Quiet Classrooms. Classroom Design for Good Hearing. <http://quietclassrooms.org> (May 2007)
- Quiet Classrooms. Listening for Learning. <http://quietclassrooms.org> (May 2007)
- U. S. Access Board. Acoustics Fact Sheet.

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2. THERMAL COMFORT

WHAT AND WHY...

Thermal comfort is a function of the temperature and relative humidity in a room. While the State of New Jersey has adopted the 2006 International Mechanical Code minimum indoor air temperatures, it does not specify how these levels are to be achieved, leaving open the possibility that individual areas within a room may be too hot or too cold. Further, code levels are only minimums – the optimal levels for specific applications may be quite different. A 21st Century school should ensure that rooms and HVAC systems are designed to allow temperature and humidity levels to remain within the ‘comfort zone’ at all points in an occupied space.

Thermal comfort is an important variable in student and teacher performance. Hot, stuffy rooms – and cold, drafty ones – reduce attention spans and limit productivity. They also waste energy, adding unnecessary cost to a school’s bottom line.

INTEGRATED DESIGN CONSIDERATIONS

Thermal comfort is strongly influenced by how a specific room is designed (How much heat do its walls and roof gain or lose? How much sunlight do its windows let in? Can the windows be opened? etc.) and by how effectively the HVAC system meets the specific needs of that room. Balancing these two components – room design and HVAC system design – is a back-and-forth process that continues throughout all stages of new facility development.

In a 21st Century school, the process results in an optimal blend of both components: rooms configured for high student and teacher productivity served by an energy efficient HVAC system. The system is designed, sized, and controlled to maintain thermal comfort under all conditions.

REQUIREMENTS

All occupied spaces shall be designed to meet, and ultimately perform as per the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy. Control of humidity may be desirable but is not a required of this document. All instructional spaces shall be provided with independent controls to regulate temperature so as to accommodate anticipated activities, various occupancy levels, and personal preferences.

RECOMMENDATIONS

- ✓ Analyze room configurations and HVAC distribution layouts to ensure that all parts of a room are receiving adequate ventilation.
- ✓ Analyze placement of windows and skylights and provide adequate, controllable shading to avoid 'hot spots' caused by direct sunlight.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Credit 6.2 Thermal Comfort Controllability
EQ Credit 7.1 Thermal Comfort, Design
EQ Credit 7.2 Thermal Comfort, Verification

REFERENCE STANDARDS AND GUIDELINES

ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). 2003 Applications Handbook. Atlanta, GA: ASHRAE 2003. (www.ashrae.org)
- American Society of Heating, Refrigerating and Air Conditioning Engineers, 2000 HVAC System and Equipment Handbook. Atlanta, GA: ASHRAE, 2003. (www.ashrae.org)

Online Resources

- Energy Efficiency and Renewable Energy Network.
www.eere.energy.gov/EE/buildings_specific.html (May 2007)
 - Efficient Window Collaborative. www.efficientwindows.org (May 2007)
- Energy Design Resources. Design for Your Climate.
<http://www.energydesignresources.com/resource/27/> (May 2007)

3. VISUAL COMFORT

WHAT AND WHY...

For both students and teachers, performing visual tasks is a central component of the learning process. A 21st Century school should provide a rich visual environment – one that enhances, rather than hinders, learning and teaching. These environments are achieved by carefully integrating natural and artificial lighting strategies, by balancing the quantity and quality of light in each room, and by controlling or eliminating glare.

Students spend much of their day engaged in visual tasks – writing, reading printed material, reading from visual display terminals, or reading from blackboards, whiteboards, and overheads. Further, they must constantly adjust their vision from ‘heads up’ to ‘heads down’ positions and back again. Inadequate lighting and/or glare in these situations can seriously impact a student’s ability to learn. On the other hand, a comfortable, productive visual environment – one that takes into account more than simply the amount of light hitting the desk top – will enhance the learning experience for both students and teachers.

The introduction of information technology in the classroom, specifically computers and audio-visual equipment, has created new challenges for the designer as such equipment often has its own set of visual comfort parameters that are at odds with those of conventional reading and writing activities. Such equipment, being a source of illumination itself is often highly reflective and in combination with other such as window, wall, and projection surfaces, may contribute to glare. For this reason the designer should strive to create adaptable light sources suitable for a wide range of activities and equipment while minimizing contrast and potential sources of glare so as to assure comfort.

INTEGRATED DESIGN CONSIDERATIONS

Visual comfort results from a well-designed, well-integrated combination of natural and artificial lighting systems. Any strategy for enhancing the visual environment will therefore strongly impact the size and configuration of both of these systems (e.g., number, type, and placement of windows; number, type, and placement of light fixtures; etc.). The final configurations will, in turn, impact a school’s heating and cooling systems.

An optimized overall design will provide a high quality luminous environment and will use daylight effectively to reduce the need for artificial lighting. Less artificial lighting means lower electricity bills and less waste heat which, in turn, reduces the demand for cooling and lowers overall HVAC operating expenses.

REQUIREMENTS

All lighting in either instructional or administrative spaces, as designated by the Facility Efficiency Standards, shall be provided with independent controls to regulate luminance levels so as to accommodate anticipated activities, various occupancy levels, and personal preferences. At minimum, all instructional spaces and core learning spaces shall operate in two modes; general illumination and audio / visual presentation with an independently controlled and dimmable means of illuminating a white board, chalkboard or similar surface. In addition, all instructional or administrative spaces shall be provided with manually operated opaque window treatments.

In general illumination mode, achieve an average illumination at the desk level as specified in the NJDOE Educational Facility Planning Standards (N.J.A.C. 6A:26-6.3 and 6.4) In A/V mode, achieve an average illumination at the desk level of between 10 to 20 footcandles with no greater than 7 footcandles of vertical illumination at any point of the projection surface; and a separately switched 'white board' area with vertical illumination of at least 30 footcandles average with maximum uniformity ratio of 8:1.

RECOMMENDATIONS

Balance the Quantity and Quality of Light in Each Room:

- ✓ Avoid excessively high horizontal light levels.
- ✓ Design for 'uniformity with flexibility':
 - Illuminate spaces as uniformly as possible, avoiding shadows or sharp distinctions between dark and light
 - As appropriate, provide task or accent lighting to meet specific needs (e.g., display areas, white boards, team areas, etc.)
 - Develop individual lighting strategies for individual rooms or room types (e.g., classrooms, hallways, cafeteria, library, etc.). Avoid 'one size fits all' approaches

Control or Eliminate Glare:

- ✓ Consider how light sources in a room will impact work surfaces. Design to avoid:
 - Direct glare from sources in front or to the side of a work area
 - Overhead glare from sources above the work area
 - Reflected glare from highly reflective surfaces, including glossy paper and computer terminals
- ✓ As methods of control, consider increasing the brightness of surrounding surfaces, decreasing the brightness of light sources, or both.
- ✓ Consider interior (shades, louvers, blinds) or exterior (overhangs, trees) strategies for filtering daylight and controlling glare from sunlight.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Credit 6.1 Lighting System Design and Controllability

REFERENCE STANDARDS AND GUIDELINES

NJDOE Educational Facility Planning Standards (N.J.A.C. 6A:26-6.3 and 6.4)

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Illumination Society of North America (IESNA). IESNA Lighting Handbook 9th Edition. New York: IESNA, 2000. (www.iesna.org).
- Illuminating Engineering Society of North America, IESNA RP-3-00: Lighting for Educational Facilities. New York: IESNA, 2000.
<https://www.iesna.org/shop/item-detail.cfm?ID=RP-3-00&storeid=1>
- New Buildings Institute. Advanced Lighting Guidelines 2003 Edition. White Salmon, WA: NBI, 2003. www.newbuildings.org/lighting.htm#guide

Online Resources

- Design lights Consortium. www.designlights.org (May 2007)
- Electric Power Research Institute. Controls: Patterns for Design. www.epri.com (May 2007)
- Energy Star Program. www.energystar.gov (May 2007)
- Lighting Research Center, Rensselaer Polytechnic Inst. Case Studies. www.lrc.rpi.edu (May 2007)

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4. DAYLIGHTING

WHAT AND WHY...

Daylighting is the controlled admission of natural light into a space through windows, skylights, or roof monitors. A 21st Century school should use as much natural daylight as possible (especially in classrooms) while avoiding excessive heat loss, heat gain, and glare.

Access to natural light may be one of the most important attributes of a 21st Century school. Daylight is the highest quality light source for visual tasks, as it enhances the color and appearance of objects. Studies clearly indicate that daylighting can enhance student performance (see resources). Views from windows also provide a connection with the natural world and promote healthy vision by allowing frequent changes in focal distance.

Daylighting can also save a school money. Properly designed systems can substantially reduce the need for electric lighting, which can account for 35 to 50 percent of a school's electrical energy consumption. An added benefit: waste heat from the lighting system is also reduced, which in turn reduces demand on the school's cooling equipment. These savings can be as much as 10 to 20 percent of a school's cooling energy usage. It's also worth noting that daylight provides these savings during the day, when demand for electric power is at its peak and rates are at their highest.

INTEGRATED DESIGN CONSIDERATIONS

Daylighting strategies should interact strongly with a school's lighting and HVAC systems. Properly designed daylighting systems will reduce the need for electric light, thus lowering overall electricity usage. Less electric light also means less waste heat from the lighting system, reducing the need for cooling. Both of these strategies improve the school's bottom line by substantially reducing overall energy costs. Operable windows and skylights can also be opened to provide natural ventilation when outdoor conditions permit.

REQUIREMENTS

All instructional spaces, with the exception of assembly spaces, Secondary School science instruction spaces, and similar dedicated purpose instruction spaces, shall make provisions for natural diffuse (indirect) illumination to the greatest extent possible, supplemented as necessary by electric lighting to satisfy the minimum requirements of the NJDOE Educational Facility Planning Standards. No direct sunlight shall extend beyond four feet as measured from the interior face of the exterior wall within instructional spaces during periods of scheduled occupancy, as measured on the summer solstice and the equinox. Admission of all daylight, irrespective of source and specifically including skylights, shall comply with the requirements of the Thermal and Visual Comfort criteria contained in this document (Criteria 2 and 3). At minimum, a daylighting analysis (either computational simulation or physical model) shall be utilized to evaluate and optimize the amount of natural illumination that can be practically achieved in the design. This analysis should be conducted at the earliest stages of Schematic Design and completed no later than the submission of Schematic Design deliverables.

RECOMMENDATIONS

- ✓ Design windows to allow diffuse, uniform daylight to penetrate as far as possible into a room. Consider using light shelves (solid horizontal elements placed above eye level, but below the top of the window) to reflect daylight deep into a room.
- ✓ Treat the electric lighting system as a supplement to natural light; i.e., design for daylighting first and use the electric system to add light as needed during the day while providing sufficient illumination at night.
- ✓ Integrate Natural and Artificial Lighting Strategies:
 - Take the amount of daylight entering a room into account when designing and sizing the artificial lighting system for that room.
 - Provide controls that turn off lights when sufficient daylight exists.
 - Consider dimming controls that continuously adjust lighting levels to respond to daylight conditions.
- ✓ Use a daylighting analysis tool to help guide the design process.
- ✓ Consider roof monitors, skylights (horizontal glazing), light from two sides, and/or clerestory windows.
- ✓ Avoid direct-beam sunlight.
- ✓ Avoid glare.
- ✓ Consider interior (shades, louvers, or blinds) and exterior (overhangs, trees) strategies to control glare and filter daylight.
- ✓ Design room layouts that take advantage of daylight. Consider sloped ceilings and/or light colored ceiling surfaces to help reflect daylight within the room.
- ✓ Integrate daylighting with the electric lighting system. Provide controls that turn off lights when sufficient daylight exists. Consider dimming controls that continuously adjust lighting levels in response to daylight conditions.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Credit 8.1 Daylight & Views, Daylight Classroom Spaces
EQ Credit 8.2 Daylight & Views, Views for 90% of Spaces
EQ Credit 8.3 Daylight & Views, Daylight 75% of Other Spaces

REFERENCE STANDARDS AND GUIDELINES

NJDOE Educational Facility Planning Standards (N.J.A.C. 6A:26-6.3 and 6.4)

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- New Buildings Institute. The Advanced Lighting Guidelines 2001. White Salmon, WA: 2001. (<http://www.newbuildings.org/lighting.htm#guide>)
- Heschong Mahone Group, Pacific Gas and Electric Company on behalf of the California Board for Energy Efficiency Third Party Program. Daylighting in Schools. August 1999. (<http://www.pge.com>)
- Ernest Orlando Lawrence Berkeley National Laboratory. Tips for Daylighting with Windows: The Integrated Approach. University of California, Berkeley, 1997.

Online Resources

- New Jersey Institute of Technology. Daylighting in Schools Online Training. <http://www.daylightingtraining.org> (May 2007)
- Daylighting Collaborative. Cool Daylighting Design Approach Workbook Volume 2: Schools , 1999. <http://www.daylighting.org/pubs/v2schools.pdf> (May 2007)
- Energy Design Resources California Public Utilities Commission. Skylighting & Daylighting Guidelines. www.energydesignresources.com/resource/140/ (May 2007)
- New Buildings Institute. Daylighting in Schools: Additional Analysis. February 2001. www.pge.com (May 2007)
- Nicklas, M. and G. Bailey. Analysis of the Performance of Students in Daylit Schools, Proceedings of the 1997 Annual Conference. American Solar Energy Society. www.ases.org (May 2007)
- Plympton, P., Conway, S. and Epstein, K. Daylighting in Schools: Improving Student Performance and Health at a Price Schools Can Afford. Presented at the American Solar Energy Society Conference, Madison, Wisconsin, 2000. www.deptplanetearth.com/nrel_student_performance.htm (May 2007)
- Rensselaer Polytechnic Institute Lighting Research Center. www.lrc.rpi.edu (May 2007)

5. INDOOR AIR QUALITY

WHAT AND WHY...

The quality of the air inside a school is critical to the health and performance of children, teachers, and staff. A 21st Century school should provide superior indoor air quality by: controlling the sources of contamination, providing adequate ventilation, preventing unwanted moisture accumulation, and implementing effective operations and maintenance procedures.

According to the U.S. Environmental Protection Agency, the concentration of pollutants inside a building may be two to five times higher than outside levels. Children are particularly vulnerable to such pollutants because their breathing and metabolic rates are high relative to their size – much higher than for adults. Maintaining a high level of indoor air quality is therefore a critical issue for schools to address. According to the EPA, failure to do so may:

- Negatively impact student and teacher performance;
- Increase the potential for long- and short-term health problems for students and staff;
- Increase absenteeism;
- Accelerate deterioration and reduce efficiency of the school's physical plant;
- Create negative publicity that could damage a school's image;
- Create potential liability problems.

'Designing in' superior indoor air quality from the beginning is the most cost-effective way to avoid these negative outcomes and ensure a healthy and productive indoor environment.

INTEGRATED DESIGN CONSIDERATIONS

Simply, increasing ventilation to improve indoor air quality will likely increase the size and operation expense of the HVAC system. The entire system should be "right sized" that seeks to reduce pollution sources while making use of appropriate technology to provide the optimum level of ventilation air in the most energy and cost effective manner possible.

REQUIREMENTS

Minimum Ventilation Levels

All 'new', 'alteration', 'reconstruction', and/or 'change of use' of Instructional Spaces, as defined by the NJDOE facilities efficiency standards, shall meet the minimum requirements as prescribed by ASHRAE 62.1-2004, Ventilation for Acceptable Indoor Air Quality, Sections 4 thru 7 or the 2006 International Mechanical Code, whichever is more stringent. Ventilation systems shall employ a Carbon Dioxide - Demand Control Ventilation (CO²-DCV) strategy and associated equipment, at spaces with significant variance in occupancy, to regulate air volume in accordance with the referenced standard and applicable building codes.

IAQ Mgmt. Plan, Construction

The Design Consultant shall develop an Indoor Air Quality (IAQ) Management Plan that at minimum requires full compliance with the provisions of the *Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3*. Upon installation of all air handling HVAC equipment and return air grilles, filters with Minimum Efficiency Reporting Value (MERV) of 8 shall be installed for the duration of construction and removed immediately prior to occupancy.

Contractors shall protect all materials and equipment to be incorporated into the construction, specifically materials that may accommodate the growth of mold, from adverse environmental conditions as recommended by the manufacturer or applicable industry guidelines.

Low Emitting Adhesives & Sealants

All adhesives and sealant materials located within the interior of the air barrier shall comply with the maximum emission requirements as specified by the following reference standards; South Coast Air Quality Management District (SCAQMD) Rule #1168 or California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda.

Low Emitting Paints & Coatings

All paint and coating materials located within the interior of the air barrier shall comply with the maximum emission requirements as specified by the following reference standards; Green Seal Standard GC-03, Second Edition, January 7, 1997, South Coast Air Quality Management District (SCAQMD) Rule 1113, Amended July 9, 2004 or California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda.

Low Emitting Carpet and Hard Surface Flooring

All carpet, associated carpet backing (cushion) materials, and adhesives located within the interior of the air barrier shall comply with the maximum emission requirements as specified by the following reference standards: Carpet and Rug Institute's Green Label Plus program or California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda.

All hard surface flooring shall comply with the maximum emission requirements as specified by the following reference standards; FloorScore certification program or California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda.

Low Emitting Composite Wood

All composite and/or engineered wood products (specifically including 'plywood', 'oriented strand board', 'particleboard', medium density fiberboard (MDF), 'fiberboard', 'wheatboard', 'strawboard') and associated adhesives used during their fabrication, located within the interior of the air barrier, shall contain no added urea-formaldehyde or comply with the maximum emission requirements as specified by the following reference standards; California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda.

Indoor Chemical & Pollutant Source Control

Pollutant source control shall be addressed by the following minimum provisions:

1. Provide a permanent, six-foot long minimum, (as measured in the direction of travel) 'walk-off mat/grill/grate' system so as to reduce pollutants and/or contaminants from foot traffic at all vestibules mandated by the International Energy Conservation Code 2006, Section 502.4.6 Vestibules.
2. All spaces which house equipment that potentially produce hazardous gases and/or chemicals (specifically including instructional spaces for art and sciences, copy/printing rooms, and similar such spaces) shall be exhausted by dedicated means so as to create a negatively pressurized space when doors to the space have been closed. The pressure differential shall be a minimum of 5 Pa (0.02 inches of water gauge) on average and a minimum of 1 Pa (0.004 inches of water) at minimum when the doors to the rooms are closed.
3. All regularly occupied conditioned spaces shall be provided with ventilation, both return and outside air, employing filtration media with a Minimum Efficiency Reporting Value (MERV) rating of 13.
4. Permanent provisions shall be provided for the appropriate disposal of all hazardous liquid waste utilized for instructional purposes (specifically including chemistry and photography laboratories and associated prep areas).

RECOMMENDATIONS

Control Sources of Contamination:

- ✓ Test the site for sources of contamination: radon, hazardous waste, fumes from nearby industrial or agricultural uses.
- ✓ Locate sources of exhaust fumes (e.g. from buses, cars, or trucks) away from air intake vents.

Prevent Unwanted Moisture Accumulation:

- ✓ Design to minimize water vapor condensation, especially on walls and the underside of roof decks, and around pipes or ducts.
- ✓ Design to keep precipitation out of the building: off the roof and away from the walls.

Operate and Maintain the Building Effectively:

- ✓ Regularly inspect and maintain the ventilation system so that it continues to operate as designed.
- ✓ Design cleaning, pest management, and maintenance programs to minimize the use of toxic materials.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Prerequisite 1 Minimum IAQ Performance
EQ Prerequisite 2 Environmental Tobacco Smoke Control
EQ Credit 3.1 Construction IAQ Management Plan, During Construction
EQ Credit 3.2 Construction IAQ Management Plan, Before Occupancy
EQ Credit 4.1 Low-Emitting Materials, Adhesives & Sealants
EQ Credit 4.2 Low-Emitting Materials, Paints & Coatings
EQ Credit 4.3 Low-Emitting Materials, Flooring Systems
EQ Credit 4.4 Low-Emitting Materials, Composite Wood & Agrifiber Products
EQ Credit 4.5 Low-Emitting Materials, Furniture and Furnishings
EQ Credit 4.6 Low-Emitting Materials, Miscellaneous Materials
EQ Credit 5 Indoor Chemical & Pollutant Source Control
EQ Credit 10 Mold Prevention

REFERENCE STANDARDS AND GUIDELINES

ASHRAE 62.1-2004, Ventilation for Acceptable Indoor Air Quality, Sections 4 thru 7
ICC International Mechanical Code 2006

Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3

International Energy Conservation Code 2006, Section 502.4.6 Vestibules.

California Department of Health Services *Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers*, including 2004 Addenda

South Coast Air Quality Management District (SCAQMD) Rule #1168

Carpet and Rug Institutes Green Label Plus program

Green Seal Standard for Commercial Adhesives GS-36.

Green Seal Standard GS-11, Paints, First Edition, May 20, 1993

Green Seal Standard GC-03, Second Edition, January 7, 1997

South Coast Air Quality Management District (SCAQMD) Rule 1113, Amended July 9, 2004.

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- American Society for Testing and Materials. ASTM D 6245-1998: Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation. Washington, DC: ASTM, 1998. www.astm.org
- U.S. Environmental Protection Agency. Indoor Air Quality Tools for Schools and Indoor Air Quality Tools for New Schools. Washington, DC: EPA, 2002. www.epa.gov/iaq
- Model School District Policies for Protection of Staff and Students, 2005. www.edlawcenter.org/ELCPublic/AbbottSchoolFacilities/FacilitiesPages/Resources/Model_School_District_Policies.pdf
- Preventing Losses from Moisture and Mold During Construction. www.awci.org/thefoundation.shtml

Online Resources

- IAQ Design Tools for Schools, U.S. Environmental Protection Agency <http://www.epa.gov/iaq/schooldesign/> (May 2007)
- National Clearinghouse for Educational Facilities. Indoor Air Quality in Schools. www.edfacilities.org/rl/iaq.cfm (August 2004) Washington State Dept of Health. School Indoor Air Quality Best Management Practices. www.doh.wa.gov/ehp/ts/IAQ/schooliaqbmp.pdf (May 2007)
- Healthy School Facility Environments. www.state.nj.us/health/healthyschools (May 2007)
- The IPM (Integrated Pest Management) Institute of North America <http://www.ipminstitute.org/> (May 2007)

6. SAFETY AND SECURITY

WHAT AND WHY...

Safety and security have become critical concerns for students, teachers, and parents across the country. A 21st Century school should create a safe and secure environment by design. Opportunities for natural surveillance should be optimized, a sense of territoriality should be reinforced, access should be controlled, and technology should be used to complement and enhance, rather than substitute for, a facility's security-focused design features.

Crime and vandalism – and the fear they foster – are problems facing school populations throughout the United States. While better buildings cannot solve these problems alone, they can be powerful factors in helping reduce crime and other antisocial behavior. Thoughtful design that builds on Crime Prevention through Environmental Design (CPTED) principles is crucial to this process.

PROPOSED REQUIREMENTS

Provide a complete automatic fire suppression system in accordance with NFPA 13: Standard for the Installation of Sprinkler Systems, most recent edition adopted by the State of New Jersey.

See Appendix 'C' for provisions of the NJDCA as it pertains to Homeland Security Standards

RECOMMENDATIONS

Control Access to the Building and the Ground:

- ✓ Provide securable fencing to control access to school grounds as far as practical from the perimeter of the building.
- ✓ Limit the number of entries to the building.
- ✓ Allow visual surveillance of all entries from inside the school.
- ✓ Provide the ability to 'lock down' parts of the school when the facility is in a state of alert or used for after-hours activities.

Integrate Security Technology:

- ✓ Ensure that all high-risk areas (office, cafeteria, shops, labs, etc.) are protected by high security locks.
- ✓ Consider metal detectors and other security technologies, as appropriate.

Increase Opportunities for Natural Surveillance:

- ✓ Design landscaping to minimize places that are hidden from view.
- ✓ Ensure that key areas – parking, bicycle storage, drop-off points, play equipment, entries – are easily observable from inside the building.
- ✓ Design exterior lighting to facilitate nighttime surveillance.
- ✓ Design to minimize areas within the building that are hidden from view.

Reinforce a Sense of Territoriality:

- ✓ Foster a sense of 'ownership and community' and serve to encourage a sense of ownership among students and teachers.
- ✓ Clearly define borders – what is part of the school and what is not.
- ✓ Consider designing common areas – particularly corridors – that are less institutional and more 'room like.'
- ✓ Consider materials and finishes that are graffiti resistant.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

None

REFERENCE STANDARDS AND GUIDELINES

Crime Prevention through Environmental Design (CPTED)
Homeland Security for SCC School Facilities

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- The Aegis Protection Group, Inc. The Complete School Safety and Security Manual. Goshen, KN: ACPI, 2001. <http://www.aegisprotect.com/asd/publications.php>
- Crowe, Timothy D. Crime Prevention through Environmental Design. Boston: Butterworth-Heinemann, January 2000. <http://books.elsevier.com>
- National Crime Prevention Council. Designing Safer Communities: A Crime Prevention through Environmental Design Handbook. Washington, DC: NCPC, 1997 <http://www.ncpc.org/ncpc/ncpc/?pg=5882-2006-2486>
- Newman, Oscar. Defensible Space. New York: Macmillan, 1972. <http://www.defensiblespace.com/book.htm>

Online Resources

- American Society of Industrial Security. www.asisonline.org (May 2007)
- FEMA 428. Primer to Design Safe School Projects in Case of Terrorist Attacks. <http://www.fema.gov/pdf/plan/prevent/rms/428/fema428.pdf> (May 2007)
- Keep Schools Safe. www.keepschoolssafe.org (May 2007)
- National Resource Center for Safe Schools. www.safetyzone.org (May 2007)

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7. ENERGY PERFORMANCE

WHAT AND WHY...

High performance schools are designed to reduce short- and long-term energy costs as much as possible, while maintaining a high-quality learning environment. The key to this process is utilizing an integrated, “whole-building” approach in which all a building’s major systems – and the interactions between them – are systematically analyzed and optimized over the course of the design process. The design team for a 21st Century school should begin this analysis and optimization process at the outset of the design process (ideally during pre-design, when sustainable building strategies can be integrated at lowest possible cost) and continue through the bidding/negotiation phase.

INTEGRATED DESIGN CONSIDERATIONS

Analyzing and optimizing the “whole building” energy performance of a facility will impact virtually all of a school’s key systems (building shell, windows, lighting, space conditioning). Because optimization addresses all these systems interactively, the process can save a school money on initial construction costs as well as on long-term operating expenses.

For example, a school that combines daylighting strategies and highly efficient electric lighting in its classrooms will require less electricity to illuminate those classrooms – a long-term operating savings. In addition, because the rooms take advantage of daylight and use high efficiency lamps, fewer overall light fixtures may be needed in order to achieve a high quality visual environment. This results in an immediate savings on initial costs. Finally, highly efficient lighting – and, potentially, fewer light fixtures – will result in less waste heat in each classroom. This, in turn, allows the cooling system for the classrooms to be smaller, yielding additional up-front savings.

REQUIREMENTS

The Design Consultant shall perform Energy Analysis in accordance with the ASHRAE 90.1-2004: Appendix G Performance Rating Method to determine that the proposed design shall at minimum exceed energy performance of a simulated baseline facility by 14% for new buildings and additions or 7% for substantially renovated buildings.

RECOMMENDATIONS

A wide number of energy analysis tools are currently available, some appropriate for the early stages of a project, others developed with the later phases in mind. The following, contains a sampling of tools for both time periods. Sources of additional tools can be found in the “Industry and Government Resources” section below.

Architectural Design Tools – to be used primarily during early development:

- ✓ ENERGY-10, Sustainable Buildings Industry Council (www.sbicouncil.org)
- ✓ Building Design Advisor, Lawrence Berkeley National Laboratory (<http://gundog.lbl.gov>)
- ✓ Energy Scheming, Iris Communications (www.oikos.com/esb/37/scheming.html)

Load Calculation and HVAC Sizing – to be used primarily during later development:

- ✓ HAP, Carrier Corporation (www.carrier.com)
- ✓ TRACE, Trane Corporation (www.trane.com)
- ✓ DOE-2, Lawrence Berkeley National Laboratory (<http://gundog.lbl.gov>)
- ✓ BLAST, University of Illinois (support@blast.bso.uiuc.edu)
- ✓ VisualDOE, Architectural Energy Corporation (www.archenergy.com)
- ✓ EnergyPlus, Lawrence Berkeley National Laboratory (<http://gundog.lbl.gov>)

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EA Prerequisite 2 Minimum Energy Performance

EA Credit 1 Optimize Energy Performance, 14% New, 7% Renovation

EA Credit 1 Optimize Energy Performance, 17.5% New, 10.5% Renovation

EA Credit 1 Optimize Energy Performance, 21% New, 14% Renovation

EA Credit 1 Optimize Energy Performance, 24.5% New, 17.5% Renovation

EA Credit 1 Optimize Energy Performance, 28% New, 21% Renovation

EA Credit 1 Optimize Energy Performance, 31.5% New, 24.5% Renovation

EA Credit 1 Optimize Energy Performance, 35% New, 28% Renovation

EA Credit 1 Optimize Energy Performance, 38.5% New, 31.5% Renovation

EA Credit 1 Optimize Energy Performance, 42% New, 35% Renovation

REFERENCE STANDARDS AND GUIDELINES

ANSI/ASHRAE / IESNA 90.1-2004; Energy Standards for Buildings Except Low-Rise Residential Buildings, IP Edition: Appendix G Performance Rating Method

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- American Society of Heating, Refrigerating and Air Conditioning Engineers. ASHRAE Standard 90.1-1999, Energy Standard for Buildings Except Low-Rise Residential Buildings. Atlanta, GA: ASHRAE 2003. www.ashrae.org

Online Resources

- Sustainable Buildings Industry Council. ENERGY-10. www.sbicouncil.org/store/index.php#Software (May 2007)
- Lawrence Berkeley National Laboratory. Building Design Advisor. <http://gundog.lbl.gov> (May 2007)
- Iris Communications. Energy Scheming. www.oikos.com/esb/37/scheming.html (May 2007)
- U.S. Department of Energy. Energy Analysis Tools Directory. Office of Building Technology, State & Community Programs. http://www.eere.energy.gov/buildings/tools_directory/ (May 2007)
- U.S. Environmental Protection Agency. Energy Star Benchmarking Tool. www.energystar.gov/benchmark (May 2007)

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8. LIFE CYCLE COST

WHAT AND WHY...

The true cost of a school is much more than the price to design and build it. The long-term costs of operating and maintaining the facility must also be included. Only by evaluating all three of these parameters can a community understand how much a new school really "costs."

And only by looking at all three parameters simultaneously can the impacts of alternative design approaches be evaluated. 21st Century classroom glazing, for example, may cost more upfront, but may result in load reductions that allow a less expensive HVAC system to be used, thus offsetting the higher cost of the glazing. In addition, the energy savings provided by the glazing upgrade will continue to save money for years to come. Life cycle cost analysis is the key to making these kinds of comparisons and to creating new schools with the lowest long-term costs of ownership.

Special Note: One of the key impediments to optimizing school facilities from a life cycle perspective is the standard separation, common in school districts across the U.S., of capital and operating budgets. In such situations, there is little incentive to make capital spending decisions based on their potential for operational or maintenance savings. This approach often yields new schools that meet their budgetary constraints, but may be suboptimal from a total facility cost perspective. The only way to ensure that operation and maintenance costs become part of the capital cost decision-making process is to make life cycle cost analysis an integral part of the design process. The result will be schools that represent better long-term investments of a community's short-term capital funds.

INTEGRATED DESIGN CONSIDERATIONS

Life cycle cost analysis impacts virtually every system in a school. When used properly, such analyses can optimize the integrated performance of all these systems and reduce a school's total cost to the community.

REQUIREMENTS

Evaluate the following building systems utilizing the National Institute of Standards and Technology (NIST) Building Life Cycle Cost (BLCC) Software: HVAC, lighting and renewable energy systems.

RECOMMENDATIONS

None

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

None

REFERENCE STANDARDS AND GUIDELINES

National Institute of Standards (NIST) Building Life Cycle Cost (BLCC) Software v 5.3-06

NIST Life Cycle Costing Manual for the Federal Energy Management Program, NIST Handbook 135, (February 1996)

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- R.S. Means. Building & Renovating Schools.
<http://www.rsmeans.com/bookstore/detail.asp?sku=67342>
- Whitestone Research. Building Maintenance and Repair Cost Reference 2003, (Eighth Ed.). <http://www.whitstoneresearch.com/cost.html>

Online Resources

- Fuller, Sieglinde. Whole Building Design Guide. National Institute of Standards and Technology (NIST) www.wbdg.org/design/resource.php?cn=0&cx=0&rp=6 (May 2007)
- Energy Smart Schools. www.rebuild.org/sectors/ess/index.asp (May 2007). Online video available.
- National Institute of Standards and Technology. BEES (Building for Environmental and Economic Sustainability). www.bfrl.nist.gov (May 2007)
- U.S. Department of Energy. Life Cycle Cost Analysis Tools www.eere.energy.gov/buildings/tools_directory (May 2007)
- U.S. Cost. www.uscost.com (May 2007)

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9. COMMISSIONING

WHAT AND WHY...

Building commissioning is the systematic process of ensuring and documenting that all building systems perform in accordance with design intent, and that they meet the owner's operational needs. The key components of a comprehensive building commissioning plan include: documenting the design intent and operation protocols for all building systems; verifying in-place system performance through well-documented testing and measurement; preparing comprehensive operation and maintenance manuals, coupled with appropriate training of building operations staff; and monitoring system performance on an ongoing basis. Properly implemented, such a plan will ensure that a new school starts its life cycle at the highest performance level possible.

A 21st Century school's key systems should be designed to function interactively in ways that create a healthy, productive, environmentally efficient, and cost-effective environment for teaching and learning. A robust commissioning process will ensure that these systems actually function as designed and that they meet the goals of the school's students, teachers, and administrators.

In many ways, commissioning is similar to a 'test run' or 'systems check'. It tests, verifies, and fine tunes the performance of key building systems, so that the highest levels of performance are achieved. Correctly implemented, commissioning should improve the building delivery process, increase systems reliability, improve energy performance, ensure good indoor environmental quality, and improve facility operations and maintenance.

INTEGRATED DESIGN CONSIDERATIONS

Commissioning strongly influences the final design and size of a school's HVAC, electrical, and control systems. Properly implemented, commissioning helps ensure that these systems are 'right sized' and that they function at the optimal levels of efficiency and cost effectiveness.

REQUIREMENTS

An independent Commissioning Authority (CxA) shall lead, review and oversee the completion of a commissioning process, which at a minimum shall satisfy LEED™ for Schools Prerequisite EA1 Fundamental Commissioning of the Building Energy Systems and EA Credit 3 Enhanced Commissioning.

RECOMMENDATIONS

None

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EA Prerequisite 1 Fundamental Commissioning of the Building Energy Systems
EA Credit 3 Enhanced Commissioning
EA Credit 5 Measurement & Verification

REFERENCE STANDARDS AND GUIDELINES

USGBC LEED™ Reference Guide for Schools (www.usgbc.org) EA Prerequisite 1 and EA Credit 3

ASHRAE / NIBS Guideline 0 – 2005; The Commissioning Process

ASHRAE Guideline 1 – 1996R; The HVAC&R Technical Requirements for The Commissioning Process

NIBS Guideline 3-2006; Exterior Enclosure Technical Requirements for the Commissioning Process

ASHRAE Guideline 4-1993; Preparation of Operating and Maintenance Documentation for Building Systems

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- ASHRAE Guideline 4-1993: Preparation of Operations & Maintenance Documentation for Building Systems www.ashrae.org
- ASHRAE Guideline 1-1996: The HVAC Commissioning Process <http://resourcecenter.ashrae.org/store/ashrae/newstore.cgi>
- Heinz, J.A & R.B. Casault. Building Commissioning Handbook, 2nd Edition. Association of Higher Education Facilities Officers. Alexandria, VA: APPA, 2004. www.appa.org/applications/publications/index.cfm

Online Resources

- Building Commissioning Association. www.bcx.org/ (May 2007)
- Federal Energy Management (FEMA) Program. Building Commissioning Guide. www.eere.energy.gov/femp/pdfs/ccg03_ch1.pdf (May 2007)
- Model Commissioning Guide. National Institute of Health. http://des.od.nih.gov/eWeb/research/farhad2/Commissioning/nih_cx_guide/Guide/hh_start.htm (May 2007)

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10. LEARNING CENTERED DESIGN

WHAT AND WHY...

As society transitions from the industrial to the information age (and beyond), our understanding of the learning process continues to evolve. Educational strategies and the facilities within which these strategies are implemented are also evolving. A key aspect of this evolution is that the facility is no longer viewed as merely a passive envelope for the delivery of education. Rather, the facility is increasingly seen as an active variable in the educational process – one that can, if properly designed, assist and inspire learning.

While there does not appear to be one key trend – or family of trends – dominating this educational evolution, several developments are emerging which should be taken into account when designing K-12 schools:

Learning-Centered Environments

Student needs are a primary focus for the educational process and should be reflected in the design of the learning environment. Education is evolving from a “teacher as leader” to a “teacher as coach” model.

Multiple Teaching and Learning Styles

Multiple forms of intelligence – and multiple ways and speeds of learning – exist within any student body. A School Facilities Project should strive to accommodate the needs of all learners. This includes the need for individualized instruction, self-directed learning, collaborative learning, and activity-based/project-based learning.

Variety

Learning can and does occur in a wide variety of settings. A School Facilities Project should incorporate a range of different spaces and “places,” including formal and informal gathering and instructional areas. To the extent feasible, spaces should be able to be reconfigured to accommodate multiple types of learning activities.

Personalization

Personalization of space is an important factor in any individual’s development. A School Facilities Project should help foster such personalization by students and teachers. To the extent possible, a design should also foster a personal sense of ownership/stewardship of the facility and its many “places” among students and teachers.

Link to Outdoors

A strong connection to the outdoors can have beneficial impacts on both students and teachers. A School Facilities Project should facilitate such connections. In addition, outdoor elements, including roofs, should be designed to optimize their potential use as learning environments. A school should incorporate as many such “outdoor learning environments” as possible.

INTEGRATED DESIGN CONSIDERATIONS

Planning an educational facility to accommodate multiple forms of learning requires coordination with many systems in the building. Classrooms designed to accommodate students working in small groups or individuals working at their own pace will need lighting and HVAC systems that are equally flexible. If areas such as the roof, present the opportunity to be used for curricular purposes, then the location of mechanical equipment, exhaust vents, skylights, and the like should be carefully coordinated to optimize the available space.

REQUIREMENTS

None

RECOMMENDATIONS

Attempting to design facilities within a constantly evolving educational environment can be tricky at best. The following should therefore be treated as preliminary considerations that should inform, but not drive, the design process. Special attention should be paid to the role that stakeholders can play in defining their particular educational objectives and needs - perhaps the most straightforward way to design user-responsive, learning-centered facilities.

- ✓ Include teachers, administrators, and students early and continuously in the planning and design process. Attempt to learn the approach (es) to teaching and learning currently being practiced, and any new directions the school intends to pursue in the future. To the extent feasible, develop a program that is responsive to – and a design that accommodates - this input.
- ✓ Wherever feasible and in accordance with life safety codes, use circulation areas for more than circulation. Consider integrating informal gathering areas into circulation spaces and consider the extent to which circulation areas can function as active learning spaces.
- ✓ Consider the ceiling as an armature for securely hanging more than lighting and HVAC components. To what extent can the ceiling – and appendages suspended from it - be used to define and, perhaps, reconfigure the space in a room?
- ✓ Consider furniture/furnishings and their role in defining and reconfiguring the space in a room: movable desks with portable drawers; media carts; adjustable chairs; adjustable tables; computer workstation clusters; ample storage.
- ✓ Consider clustering classrooms around common shared areas. Consider providing one or more “student commons” as gathering points for socializing and/or instructional use.
- ✓ Provide every learner with a personalizable area – a “home base” that is uniquely theirs. Provide ample areas for the display of student work.
- ✓ Provide every teacher with the same type of personalizable area. Also provide teachers with spaces where they can collaborate. Explore distributing such areas strategically throughout the school, so that each area serves a limited number of teachers.
- ✓ Consider providing areas for instructional resources that can be shared among several teachers.
- ✓ Provide adequate teacher workspace, including: classroom-based workspace; office-based workspace; and teacher collaboration areas (see above).
- ✓ Consider the extent to which the facility itself can be used as a teaching tool or “3-D textbook.”
- ✓ Consider the school grounds – pathways, play structure areas, gardens, sandy spaces, aquatic areas, seating areas, ball fields, dramatic play areas, wooded areas, covered pavilions or porches and, as appropriate, the roof - as potential “outdoor learning environments” and design them as such.
- ✓ A School Facilities Project should facilitate a strong connection to the outdoors. Spaces adjacent to major landscape features should, to the extent feasible, be oriented toward them. Consider using the transitional spaces between indoors and outdoors as additional learning, gathering and/or socializing environments.
- ✓ Consider the extent to which single-purpose spaces are needed/desirable versus spaces that can accommodate a variety of different functions.

- ✓ Consider how community facilities outside the school grounds. Y's, museums, health centers, etc. can be used to extend the "learning environment."
- ✓ Consider how the facility can be designed to accommodate adult learners and/or community users.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

ID Credit 3: The School as Teaching Tool

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Iltus, Selim & Renee Steinhagen. *Where Do Children Play? The Importance and Design of Schoolyards*. Newark, NJ: New Jersey Appleseed Public Interest Law Center, 2003. www.njappleseed.org/
- Chan, Dr. Tak-Cheung & Petrie, Dr. Garth. *A Well Designed School Environment Facilitates Brain Learning*. Scottsdale, AZ: Council for Educational Facility Planners, 2000. www.cefpi.org/ V35-3.

Online Resources

- National Clearinghouse for Educational Facilities: <http://www.edfacilities.org/>
 - *Do School Facilities Affect Academic Outcomes?*
 - *Ten Educational Trends Shaping School Planning and Design*
 - *Teacher Workspaces*
 - *Student Commons*
 - *Planning School Grounds for Outdoor Learning Classrooms*

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11. STIMULATING ARCHITECTURE

WHAT AND WHY...

A key component of any 21st Century School – one that transcends notions of efficiency and functionalism - is the overall design of the building itself. After the needs and aspirations for the building are defined, it is up to the architect, drawing on a long history of exemplary school architecture from around the world, to provide a cohesive vision for the design and construction of the facility. Students, faculty, and the community will benefit from- and be inspired by – this vision and by well-designed, stimulating spaces that convey a sense of place. By making good design a key goal, school stakeholders can harness the architects' highly developed problem-solving skills to create schools that are civic landmarks - schools that achieve 21st Century goals while, at the same time, giving architectural expression to a community's hopes and ideals.

INTEGRATED DESIGN CONSIDERATIONS

Architectural design impacts every design criteria in a 21st Century school. The key is finding ways to accommodate the architect's vision for the facility, and at the same time constructing a building that is economical, efficient and functional. An interactive, iterative process that incorporates high performance components, systems and strategies into a cohesive design vision is critical to creating high quality "schools for the 21st century."

REQUIREMENTS

None

RECOMMENDATIONS

Respect the architect's vision for the school, and understand that it is the architect's role to question and think "outside of the box". At the same time, ensure that this vision is applied in the service of 21st Century goals, specifically those articulated in the other design criteria contained in this Design Manual.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

ID Credit 1: Innovation in Design

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Perkins, Bradford. Elementary and Secondary Schools. New York: John Wiley and Sons, 2001. Comprehensive Source for National Case Study Schools.
- Dudek, Mark. Architecture of Schools: the New Learning Environments. Boston: Architectural Press, 2000. Comprehensive Source for International Case Study Schools.

Online Resources

- AIA Committee on Architecture for Education (CAE)
www.aia.org/pia/gateway/PIA_Home_pages/cae.asp#about (May 2007)
- Duke, D. & Sara Trauветter. Reducing the Negative Effects of Large Schools. National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007)
- The Council of Educational Facility Planners (CEFPI)
<http://www.cefpi.org/> (May 2007)
- Design Share, www.designshare.com (May 2007)

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12. ACCESSIBILITY

WHAT AND WHY...

Several decades of regulations have firmly established the concept of “free and appropriate education for all students with disabilities in the least restrictive environment” in the public consciousness. Laws such as the Individuals with Disabilities Education Act (IDEA) have further reinforced inclusive education for children with disabilities as both a philosophical imperative and a legal right.

The principle of inclusive education maintains that children with disabilities should, to every extent possible, be educated in the same schools as, and along side of, their peers who are not disabled. Successful inclusive education depends upon several mutually reinforcing structures: a strong philosophical commitment, creative and appropriate teaching strategies, dedicated and effectively trained personnel, and a school facility that provides the proper environmental supports for students and their curricula.

As inclusive education and “mainstreaming” programs are enacted across the U.S., increasing numbers of children with disabilities, who were historically educated in special schools, are now being integrated into regular school systems. Since this trend will continue, schools that are currently being constructed will educate a continually expanding population of students with special needs. Because disability among school age children is both prevalent and highly diverse, providing an inclusive school environment for these students offers unique opportunities and challenges to planners, architects, administrators, and teachers.

A particular challenge is creating environments that support students with cognitive – as opposed to physical – disabilities. While the ADA, through its guidelines and standards, has provided guidance on designing to accommodate those with physical, especially orthopedic, disabilities, relatively little is known about designing to accommodate students with cognitive disabilities such as attention deficit disorder or autism. Unfortunately, the majority of special needs students in or entering the public school system appears to suffer from cognitive rather than physical disabilities. A report by the National Research Council indicates that of the five million K-12 students nationwide with disabilities that require special education, “more than 90 percent fall into one of just four categories of disability: speech or language impairment, serious emotional disturbance, mental retardation, and specific learning disability” and that “specific learning disabilities account for more than half of all eligible students” (McDonnell, McLaughlin, and Morison, 1997).

While students with physical disabilities must still be accommodated, it is becoming clear that School Facilities Projects must also address students with other forms of disability: learning deficits, sensory impairments, intellectual limitations, emotional problems, and/or some combination of all of the above. Designing a school environment that meets these highly diverse needs, as well as the needs of the teachers and “typical” students, presents significant challenges.

INTEGRATED DESIGN CONSIDERATIONS

Accessible and inclusive design reinforces the objectives of a number of other 21st Century School Facilities Project criteria:

- Controlling glare impacts the lighting, daylighting strategies, and visual comfort that may impact energy performance.
- Controlling noise interacts directly with designing for acoustic comfort.
- Designing to prevent uncontrolled egress from the school impacts security design.
- Planning classrooms to accommodate students with disabilities impacts learning centered design, flexibility and adaptability, and information technology configurations

REQUIREMENTS

None

RECOMMENDATIONS

- ✓ Involve special education specialists and school health care personnel at all stages of the design process.
- ✓ Provide variety in the classroom environment.
 - Consider strategies – alcoves, small adjacent rooms - to provide visual and acoustical separation between activities to reduce distractions.
 - Consider the need to accommodate, at various times, teachers plus other adults (special teachers, personal aides, et al.) in the space.
 - Consider varied ceiling heights as a way to create variation and define more intimate, “time out” areas.
 - Consider designing areas in the hallway that can be used for “time out” areas and individual consultations.
- ✓ Integrate accessible areas into the facility.
 - Avoid separate “accessible” labs, project rooms, etc. Instead, integrate accessible workstations into these rooms.
 - Avoid isolating accessible seating in auditoriums, cafeterias, libraries, etc. Instead, spread/integrate such seating throughout these rooms.
- ✓ Provide for expanded services in the health suite.
 - Consider providing larger spaces.
 - Consider the need for a lift.
 - Consider the need for a private examination room or area.
 - Consider providing a one-way mirror in examination or therapy rooms.
 - Consider providing a separate physical therapy and/or occupational therapy suite.
- ✓ Minimize travel distances.
 - Locate key services – food services, bathrooms, and, especially, elevators – centrally
- ✓ Integrate special needs and general education.
 - Avoid clustering special education spaces in one location. Spread them throughout the facility.
 - Within the classroom, avoid clustering services – electric outlets, data ports – in special areas or solely along the perimeter of the room. Attempt to provide as many access points as possible across the room.
- ✓ Consider how parents of special needs students will use the facility.
 - Consider one or more rooms or areas parents can use.
 - Consider special parking areas for visiting parents.
- ✓ Outdoors
 - Consider how the outdoor play areas (pathways, playground surfaces, etc.) can be designed to accommodate students with a variety of disabilities.
 - Consider how outdoor learning environments can be designed so that students with disabilities can access and participate in these environments.
- ✓ Furnishings
 - Consider furniture with rounded edges.
 - Ensure that desks and tables are accessible to students in wheelchairs (no aprons or legs that block access).
 - Provide height-adjustable desks and chairs.

- Provide accessible lockers at the end of locker rows.
- ✓ Bathrooms/Toilets
 - Consider placing toilets near classrooms.
 - Ensure some or all toilets have accessible stalls. (If only some, then make sure they are centrally located.)
 - Consider accessible stalls with sinks in them, so that students with special toileting needs can use the equipment in private.
- ✓ Pay special attention to glare. Design lighting and surfaces to reduce glare as much as possible.
- ✓ Revisit building security considerations from the perspective of keeping students with certain disabilities safely within the facility.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

ID Credit1: Innovation in Design

REFERENCE STANDARDS AND GUIDELINES

Individuals with Disabilities Education Act
www.ed.gov/offices/OSERS/Policy/IDEA/index.html

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Bar, Laurel & Galluzzo Dreyfuss. *The Accessible School Universal Design for Educational Environments: Universal Design for Educational Settings*. Berkeley: MIG Communications, 1999.
- North Carolina State Department of Public Instruction, Raleigh Division of School Support. *Exceptional Children Facilities Planner; Sample Plans, Accessibility Guidelines*. Raleigh, NC: Schoolclearinghouse, Jun 1998.
www.schoolclearinghouse.org/pubs/exchild.pdf

Online Resources

- Americans with Disabilities Act (ADA) Home Page. www.ada.gov (May 2007)
- National Clearinghouse for Educational Facilities.
 - *Creating Accessible Schools*
 - *Planning and Designing for Students with Disabilities*.
www.edfacilities.org/pubs/disabilities.pdf (May 2007)
- Council of Educational Facility Planners International (CEFPI). www.cefpi.org/ (May 2007)
- O'Neill Lucinda M. *Moving Toward the Vision of the Universally Designed Classroom*. Center for Applied Special Technology (CAST)
<http://udl.cast.org/udl/MovingTowardtheVision623.cfm> (May 2007)
- Stoecklin, Vicki L. *Designing for All Children*. 1999 White Hutchinson Leisure & Learning Group. www.whitehutchinson.com/children/articles/designforall.shtml (May 2007)
- Universal Design Education Online. www.udeducation.org (May 2007)

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13. FLEXIBILITY AND ADAPTABILITY

WHAT AND WHY...

School facilities have always needed to adapt to change. Enrollments rise and fall; teaching and learning methods shift, and new programs emerge; the connection between the community and the school continues to evolve; and technology advances in ways that cannot be anticipated. This process shows no sign of abating. On the contrary, the pace of change in education, particularly technology-driven change, appears to be accelerating.

Creating a facility that is expected to last for more than one generation and to respond effectively to accelerating change is one of the critical challenges facing all those involved in the design, construction and renovation of schools. Responding to this challenge requires the creation of facilities that are flexible in the near term and adaptable over the long term.

A flexible facility is one that facilitates short-term rearrangements of the learning environment to suit different activities and programs. Flexibility can most easily be achieved through furnishings that are easy to move and reconfigure. The concept also extends to creating spaces that can support multiple functions, including activities by user-groups outside the school. Movable components, especially movable partitions and walls, can also be employed to enhance flexibility.

An adaptable facility is one that can accommodate more substantial and systemic change over time. Such changes may include reconfiguring spaces within a facility (not just the furnishings within those spaces); adapting/modifying spaces for substantially different uses; enlarging a facility to accommodate increased enrollment; converting one large facility into two or more “small schools;” adapting a facility to year-round and/or 24-7 operation; and relocating or substantially reconfiguring a building’s systems, especially its information technology systems.

INTEGRATED DESIGN CONSIDERATIONS

The design team needs to consider a multitude of factors to accommodate these criteria for the design of the facility. Building in flexibility for classroom spaces is particularly important. Impacts on other systems need to be understood early so that all consultants can work together toward a common goal and avoid future conflicts. HVAC, lighting and furniture systems all need to be adaptable and designed with change in mind. The building’s infrastructure should also be designed so as to not preclude future facility expansion.

REQUIREMENTS

None

RECOMMENDATIONS

While flexibility and adaptability are relatively straightforward as concepts, designing a facility to accommodate them can be complicated. To the extent possible, flexibility should be accomplished with elements like furniture, fixtures, and equipment (FF&E), and specifically to items with relatively short life expectancies. History has shown that “bricks and mortar” solutions to providing flexibility quickly become obsolete no matter how well they embody a current – but soon outdated – theory of flexible space planning.

Designing for adaptability is different and requires close attention to the size, capacity and configuration of the building’s basic systems. What is the anticipated useful lifespan of the respective systems? Can the structure accommodate expansion, upward or outward? Can the MEP and IT systems be easily reconfigured to serve spaces whose size and use have changed? Can partitions be torn down or moved with minimal impacts on lighting, flooring, and/or ceiling systems?

While such considerations should not drive the design process, they should be taken into account in some way. School facilities are renovated, updated and “adapted” all the time in a process that is complex, time consuming and often expensive. Designing for adaptability can help reduce this complexity and, hopefully, save the school time and money in the process.

Additional considerations concerning flexibility and adaptability include the following:

- ✓ To the extent possible, avoid fixed (non-movable) stations for equipment such as computers and other forms of information technology.
- ✓ Design spaces that can accommodate numerous furniture layouts.
- ✓ Design spaces that can accommodate multiple functions.
- ✓ Consider the appropriateness of raised floors in terms of both flexibility and adaptability with ever-changing technology.
- ✓ Consider the potential for subdividing the facility into two or more “small schools.”

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

ID Credit1: Innovation in Design

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Dudek, Mark. Architecture of schools: the New Learning Environments. Boston: Architectural Press, 2000.
- Perkins, Bradford. Elementary and Secondary Schools. New York: John Wiley and Sons, 2001.

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- Duke, D. & Sara Trauvelter. Reducing the Negative Effects of Large Schools. National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007)
- National Clearinghouse for Educational Facilities. Reducing the Negative Effects of Large Schools. www.edfacilities.org (May 2007)
- Hall, M. & R. Fanning. Programming Circulation Factors in K-12 Facilities. Fanning/Howey Associates, Inc. www.fhai.com (May 2007)
- Designshare. Planning for Flexibility, Not Obsolescence. www.designshare.com/research/EEK/Ehrenkrantz1.htm (May 2007)
- Designshare. How Large Should a School Be? www.designshare.com (May 2007)

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14. INFORMATION TECHNOLOGY

WHAT AND WHY...

There is no question that technology is transforming education at all levels in the United States. A simple statistic indicates the recent, explosive growth in information technology in schools: in 1998 the ratio of public school students to instructional computers with internet access was 12.1 to 1; in 2002 the same ratio was 4.8 to 1. (from the National Center for Education Statistics report, "Internet Access in U.S. Public Schools and Classrooms: 1994-2002.") The technology revolution that has transformed business and industry in the U.S. is clearly impacting education as well.

What this means for the educational process is still emerging. It is clear that technology is beginning, and will continue, to impact K-12 curricula and instructional methods in significant and unpredictable ways. It is also clear that, whatever technologies emerge over time and however they may impact the curriculum or instructional methods, they will become outdated and replaced far more quickly than the facility that houses them.

INTEGRATED DESIGN CONSIDERATIONS

Technology design interacts with and impacts other systems in a facility in two distinct ways. Technology infrastructure, especially low voltage cabling, interacts with other basic infrastructure systems (wiring, plumbing, HVAC, and building structure). Technology applications (projection areas, computer screens, white boards) interact strongly with lighting and daylighting systems. Technology configurations and layouts should acknowledge the lighting/daylighting design in a space. The lighting/daylighting design strategy should consider the types of technology to be used in the space. The plug loads, heating loads of technology, and equipment should be considered in the thermal and energy analyses conducted for a space and for the facility as a whole. Special attention should be paid to potential changes (and increases) in plug and heating loads over time as more and different forms of technology (especially more computers) are added.

With the nearly universal adoption of digital technology by a variety of previously discrete systems, intended to utilize common wiring (AKA Backbone) and be able to communicate with not only each other but remotely with other locations the effort required to integrate these systems have become exponentially more complex. This trend sometimes described as 'convergence', the combination of phone, data, security, public address, closed circuit television, and life safety systems not only requires close collaboration amongst different consultants and manufacturers as well as the ultimate users but a master plan that serves to assure the promised inter-operability within the facility but beyond. The District Technology Plan, developed by each of the Abbott districts, is intended to serve as just such a master plan by which a common vision and protocols are established to facilitate integrated design

REQUIREMENTS

None

RECOMMENDATIONS

Designing educational facilities to accommodate rapidly evolving technologies is complicated and challenging, requiring close cooperation between designers, technology consultants and district personnel. The following general issues should be considered as the detailed technology plan for a facility is developed.

- ✓ Consider whether/how a District's Technology Plan facilitates interaction/integration with other schools in the district and with the district's overall technology plan.
- ✓ Consider the impacts of multiple forms of technology (white boards, projectors and projection surfaces, "wired" furnishings, etc.) not only computers and telecom.
- ✓ Consider the potential for 1-to-1 computing (one computer for every learner, if only on an intermittent basis) to become a reality in the near future.
- ✓ Provide "technology-enabled" infrastructure to support both wired and wireless applications. Configure the infrastructure to meet current demands, but "design in" the capacity to easily reconfigure the infrastructure to meet future needs.
- ✓ Design to integrate technology throughout a school, rather than in isolated pockets.
- ✓ Design learning environments that facilitate cooperation between technology and instruction. Avoid letting technology considerations dominate a learning environment design strategy.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

ID Credit1: Innovation in Design

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- eSchool News. K-12 School Technology Best Practices. Bethesda, MD: eSchool News www.eschoolnews.com , 2003.

Online Resources

- Designshare. Planning for Flexibility, Not Obsolescence. www.designshare.com/research/EEK/Ehrenkrantz1.htm (May 2007)
- National Clearinghouse for Educational Facilities:
 - *Wireless Wide Area Networks for School Districts*
 - *The Role of Wireless Computing Technology in the Design of Schools* www.edfacilities.org. (August 2004)

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15. HIGH PERFORMANCE BUILDING ENVELOPE

WHAT AND WHY...

The building envelope (walls, roofs, floors, and windows) of a 21st Century school should enhance energy efficiency without compromising durability, maintainability, or acoustic, thermal or visual comfort. An energy efficient building envelope is one that integrates and optimizes insulation levels, glazing, shading, thermal mass, air leakage control.

An energy-efficient building envelope will reduce a school's overall operating expenses while easing the strain on the environment. Many of the techniques employed – high performance glazing, shading devices, light-colored surfaces – are easily accessible to students and can be used as instructional aids.

INTEGRATED DESIGN CONSIDERATIONS

The building envelope strongly impacts the performance of a school's HVAC and lighting systems. The amount of heat the building envelope lets in or out determines how much heating or cooling the HVAC system must provide. The more efficient the building envelope, the less the HVAC system will have to work and the smaller (and less expensive) it can be.

Likewise, if the window system is designed to maximize natural daylight, less electric light will be needed. This will reduce the school's electricity costs. In addition, the school's need for cooling will decrease. This is because electric lights generate heat. In schools where less electric light is used, less waste heat will be created, resulting in a reduced demand for cooling and even more HVAC system savings.

REQUIREMENTS

Energy Efficiency

The building envelope shall at minimum comply with both the ‘prescriptive’ and ‘mandatory’ requirements of the International Energy Conservation Code (IECC 2006) and by reference ASHRAE 90.1-2004, Section 5.

Air Barrier

Provide a continuous air barrier in compliance with the provisions of the Massachusetts Energy Code 1304.3 Air Leakage.

Quality Assurance

Ensure that the building envelope is designed and constructed so as to efficiently and effectively meet the design intent by means of the following verification methods to be addressed by the Construction Documents and Commissioning process.

Peer Review Process

Construction Documents relevant to the ultimate performance of the building envelope shall be reviewed by an independent third party professional designated by the NJSCC, prior to the development of ‘conformed documents’, to determine the likely effectiveness of the building envelope.

On-Site (In-Situ) Control Samples

The design consultant shall designate areas of the Building Envelope deemed representative of critical field and interface conditions that are to be constructed in the ordinary course of construction at which time the Design Consultant may review the proposed methods and workmanship for compliance with design intent. No such similar work shall proceed until the Design Consultant has approved such work.

Envelope Testing

The Design Consultants shall designate testing methods to be included in the General Construction scope of Work deemed to be appropriate to verify performance of the Building Envelope with the Design Intent. Testing shall be specified only when other Quality Assurance methods, including but not limited to Peer Review of Construction Documents, On-Site Representative Control Samples, and Construction Documentation are deemed insufficient to assure ultimate performance. Envelope systems shall be tested for performance by qualified entities with substantial prior experience. Tests shall specifically address all field and interface conditions deemed necessary to establish compliance with the design intent. Suggested test methods for consideration include; ASTM e1105-00; Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference, AAMA 501.2-03 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems, ASTM E514-05c Standard Test Method for Water Penetration and Leakage Through Masonry (Walls, Masonry), ASTM E 799-87 Test Method for Determining Air Leakage by Fan Pressurization (Air Barrier), ASTM C 1060-90 IR.

Construction Observation

Regular field observations shall be conducted during the erection of the building

envelope to ensure construction conforms to construction documentation and design intent and to identify and resolve potential problems. Observation shall take place on-site during the construction of the pre-determined control samples, including but not limited to roof installation, wall erection, and foundation waterproofing and drainage systems, are being installed and during all on-site testing procedures so as to verify compliance with the Design Intent.

RECOMMENDATIONS

The key to optimizing the building envelope is an integrated approach to design. It considers how all the components of the envelope interact with one another and with the building's lighting and heating/ventilating/air conditioning (HVAC) systems. Tools to analyze these interactions are readily available and can be used to create the optimal building envelope based on total system performance.

As part of an integrated approach, the following actions, specific to the building envelope, should be considered:

- ✓ Specify glazing that represents the best combination of insulating value, daylight transmittance, and solar heat gain coefficient for its specific application and local climatic conditions in consideration of Homeland Security provisions.
- ✓ Consider the use of exterior shading devices as required of the Visual Comfort criteria to reduce solar heat gain and minimize glare.
- ✓ Use the building's thermal mass to store heat and temper heat transfer.
- ✓ Consider adding thermal mass to increase the storage capacity and energy efficiency of the school.
- ✓ Consider using light-colored materials for roofs in order to reflect, rather than absorb, solar energy.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EA Prerequisite 2: Minimum Energy Performance

EA Credit 1: Optimize Energy Performance

SS Credit: 7.2 Heat Island Effect: Roof

REFERENCE STANDARDS AND GUIDELINES

International Energy Conservation Code (IECC 2006)

ASHRAE 90.1-2004, Section 5

Massachusetts Energy Code for Commercial Buildings, 780 CMR 13, 1304.3 Air Leakage, 2001

ASTM e1105-00; Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference

AAMA 501.2-03 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems

ASTM E514-05c Standard Test Method for Water Penetration and Leakage Through Masonry (Walls, Masonry)

ASTM E 799-87 Test Method for Determining Air Leakage by Fan Pressurization (Air Barrier)

ASTM C 1060-90 IR Standard Practice for the Location of Wet Insulation in Roofing Systems Using Infrared Thermography

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Bachman, L. Integrated Buildings: The Systems Basis of Architecture. Washington, DC: John Wiley & Sons, 2002.

Online Resources

- EPA Energy Star Program. www.energystar.gov (May 2007)
- Federal Energy Management Program. www.eere.energy.gov/femp (May 2007)
- U.S. Department of Energy. Energy Design Guidelines for High Performance Schools. www.eere.energy.gov (May 2007)
- Sustainable Buildings Industry Council. www.sbicouncil.org (May 2007). Online Video Training Available.
- Whole Building Design Guide. www.wbdg.org (May 2007). Product Information by CSI Format Available.

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16. RENEWABLE ENERGY

WHAT AND WHY...

Renewable energy (particularly solar and wind energy) is a free resource, which, if effectively captured and used, can significantly reduce a school's operating costs. A 21st Century school should maximize the cost-effective use of renewable systems to meet its energy needs. The school district should also consider purchasing 'green power.'

Renewable energy systems reduce a school's overall operating expenses and play a significant role in preserving the environment. Many of the techniques employed (for example, daylighting and natural ventilation) also contribute to a high quality learning environment. Other strategies, particularly solar thermal, wind, and photovoltaic applications, are exciting technologies that can be used to teach students about science, ecology, and the environment.

INTEGRATED DESIGN CONSIDERATIONS

Renewable energy systems closely interact with the heating/ventilating/air conditioning (HVAC), hot water and electric power systems in a building. Passive solar and solar thermal systems provide heat, which reduces demand on the HVAC system. Daylighting reduces the need for electric lighting, while natural ventilation reduces the need for mechanical venting. Solar hot water replaces mechanically heated water, and geothermal heat pumps replace conventional heating/air conditioning equipment. Wind and photovoltaic provide electricity, thus reducing the need for utility-provided power.

PROPOSED REQUIREMENT

The feasibility of installing On-Site Renewable Energy Systems that can be cost-effectively implemented within a 10-year payback period, as determined using the LCC methods established by this document in Criteria 8, shall be evaluated.

RECOMMENDATIONS

During the design process, the developers of a 21st Century school should systematically evaluate and consider integrating one or more of the following renewable energy systems into the building:

- ✓ Daylighting – maximize the amount of natural light throughout the school.
- ✓ Passive Solar Heating – to meet some of the school’s heating needs, capture the sun’s energy through south-facing windows.
- ✓ Solar Hot Water – capture the sun’s energy in ground- or roof-mounted systems that provide some or all of a school’s hot water needs.
- ✓ Solar Thermal – capture the sun’s energy in ground- or roof- mounted systems to help heat the school or, using an absorption system, to help cool it.
- ✓ Wind – use wind energy to generate on-site electricity.
- ✓ Photovoltaic – use ground-mounted, roof-mounted, or building-integrated systems to transform sunlight into electricity.
- ✓ Green Power – purchase power from producers who generate electricity from renewable sources.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EA Credit 2 On-Site Renewable Energy, 2.5% of Annual Energy Cost
EA Credit 2 On-Site Renewable Energy, 7.5% of Annual Energy Cost
EA Credit 2 On-Site Renewable Energy, 12.5% of Annual Energy Cost
EA Credit 6 Green Power

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Patel, Mukund R. Wind and solar power systems. Boca Ratón, FL: CRC Press, 1999.

Online Resources

- American Solar Energy Society. www.ases.org (May 2007)
- American Wind Energy Association www.awea.org (May 2007). Online Bookstore Available.
- Energy Efficiency and Renewable Energy Network. www.eere.energy.gov/ (May 2007)
- Geothermal Heat Pump Consortium. www.geoexchange.org/ (May 2007)
- Geoexchange. www.geoexchange.org/publications/software004.htm (May 2007). Online Video Available.
- Green-E Renewable Electricity Program. www.green-e.org (May 2007)
- Interstate Renewable Energy Council. www.irecusa.org/ (May 2007). Database of State Incentives for Renewable Energy Available.
- Renewable Energy: An Overview. www.nrel.gov/docs/fy01osti/27955.pdf (May 2007) Glossary Available Online.
- The Renewable Resource Data Center. <http://rredc.nrel.gov/> (May 2007)
- Solar Energy Industries Association. www.seia.org/ (May 2007)
- Sustainable Buildings Industry Council. www.sbicouncil.org/ (May 2007). Online Training Videos Available.
- U.S. Department of Energy. Energy Design Guidelines for High Performance Schools. www.eere.energy.gov (May 2007). Good Online Resource.

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17. HIGH PERFORMANCE HVAC

WHAT AND WHY...

A school's HVAC system provides the heating, ventilating, and air conditioning necessary for the comfort and well being of students, teachers, administrators, and visitors. To ensure peak operating efficiency, the HVAC system in a 21st Century school should:

- Use high efficiency equipment
- Be 'right-sized' for the estimated demands of the facility
- Include controls that boost system performance

The HVAC system is one of the largest energy consumers in a school. Even modest improvements in system efficiency can yield relatively large savings in a school's operating budget. With the highly efficient systems available today (and the sophisticated analysis tools that can be used to select and size them), every school HVAC system can be designed to the highest levels of performance.

Various parts of the HVAC system (especially controls placed inside the classroom) can be used as instructional aids.

INTEGRATED DESIGN CONSIDERATIONS

In a 21st Century school, the HVAC system offers a range of cost saving opportunities. If accurate energy use estimates have been calculated the HVAC system can be 'right sized' to meet these estimates. This approach invariably saves money over rule-of-thumb approaches that tend to oversize equipment. These savings can, in turn, be used to draw down the costs of other energy efficiency measures. Daylighting, for example, will not only reduce the need for electric lights, it will also reduce the heat these lights create. This reduction may be sufficient to allow for a smaller, less expensive air conditioning unit to be specified.

Similarly, right-sized and appropriately selected equipment is necessary to create an environment conducive to learning, specifically as it pertains to acoustics.

PROPOSED REQUIREMENTS

Energy Efficient Equipment

The mechanical and electrical equipment shall at minimum comply with both the 'prescriptive' and 'mandatory' requirements of International Energy Conservation Code (IECC 2006) and by reference ASHRAE 90.1-2004, Section 6.

AC Refrigerant

No CFC-based refrigerants shall be used in HVAC and refrigeration equipment for any 'new', 'alteration', 'reconstruction', and/or 'change of use' facility projects.

RECOMMENDATIONS

The key to optimizing HVAC system performance is an integrated approach to design that considers the building as a interactive whole, rather than as an assembly of individual systems. For example, the benefits of an energy efficient building envelope may be wasted if the HVAC equipment is not sized to take advantage of it. Based on rule-of-thumb sizing calculations, an oversized system will not only cost more, it will be too large to run at peak efficiency and will, in effect, waste energy every time it turns on. An integrated approach, one based on an accurate estimate of the impact of the high efficiency building envelope, will allow the HVAC system to be sized for optimum performance. The resulting system will cost less to purchase, will use less energy, and will run more efficiently over time. As part of an integrated approach, the following actions (specific to HVAC systems) should be considered.

Use High Efficiency Equipment:

- ✓ Consider Geothermal (Water Source) Heat Pump systems.
- ✓ Consider Energy Recovery Systems.
- ✓ Consider 'economizer cycles' for small, packaged systems.
- ✓ Investigate the potential for on-site cogeneration.

'Right-Size' the System:

- ✓ Consider standard HVAC sizing safety factors as upper limits.
- ✓ Apply any safety factors to a reasonable base condition for the building premised on operational schedule (i.e., not the hottest or coldest day of the year with maximum attendance; not the most temperate day of the year with the school half full).
- ✓ Select systems that operate well under part-load conditions.

Incorporate Controls that will Boost System Performance:

- ✓ Consider integrated Building Management Systems that control HVAC, lighting, outside air ventilation, water heating, and building security.

Design for Operational Effectiveness:

- ✓ Provide simple differential air pressure indicators at filter locations
- ✓ Locate ductwork and equipment within conditioned envelope whenever practical

- ✓ Locate supply and transfer grilles in locations not subject to obstructions such as storage cabinets, bookcases, shelving, etc.
- ✓ Provide all required training and service documentation
- ✓ Specify position description of operator(s)/mechanic(s) needed to operate and maintain system at Design Development phase for the benefit of district.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EA Pre-Requisite 3: Fundamental Refrigerant Management

EA Credit 4: Enhanced Refrigerant Management

EQ Credit 1: Outdoor Air Delivery Monitoring

EQ Credit 2: Increased Ventilation

REFERENCE STANDARDS AND GUIDELINES

U.S. Department of Energy's *Energy Conservation Voluntary Performance Standards for New Building*. http://www1.eere.energy.gov/femp/sustainable/sustainable_fedrequire.html

Energy Star Approved Products. www.energystar.gov/index.cfm?fuseaction=find_a_product

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- American Society of Heating, Refrigerating and Air Conditioning Engineers. Cooling and Heating Load Calculation Manual. Atlanta, GA: ASHRAE 2003. www.ashrae.org

Online Resources

- Federal Energy Management Program Online Energy Cost Calculator. www.eere.energy.gov/femp (May 2007)
- U.S. Environmental Protection Agency. Energy Star Program. www.energystar.gov (May 2007). Online Training Available.
- U.S. Department of Energy. www.eere.energy.gov (May 2007)

18. HIGH PERFORMANCE ELECTRIC LIGHTING

WHAT AND WHY...

The quality of a school's electric lighting system has an enormous impact on the productivity of students, teachers, and staff, and on the facility's operating budget. A 21st Century school should provide superior electric lighting by optimizing 'watts per square foot' while retaining visual quality. This can be accomplished by: specifying high efficiency lamps and ballasts, optimizing the number and type of luminaries (light fixtures) for each application, incorporating controls to ensure peak system performance, and integrating complementary electric lighting and daylighting design strategies.

Electric lighting can account for 30 to 50 percent of a school's electric power consumption. Even modest efficiency improvements can mean substantial bottom line savings. This is especially true in locations subject to extra 'demand charges' during times of peak energy use. Since these charges usually occur during daytime hours when schools are in full operation, any efforts to reduce the demand for power during these times will reap additional savings. An added benefit: more efficient lighting produces less waste heat, thus reducing the need for cooling and further reducing operating costs. These savings are achievable now in any school by using readily available equipment and controls.

INTEGRATED DESIGN CONSIDERATIONS

Electric lighting systems interact strongly with a school's daylighting and HVAC systems. Daylighting strategies that are well-integrated with lighting equipment and controls will reduce the demand for electric light. If addressed by a combination of high efficiency electric lighting equipment and controls, this reduced demand can substantially lower a school's electricity usage. In addition, less electric lighting means less waste heat and, therefore, less demand for cooling.

REQUIREMENTS

All lighting shall at minimum comply with both the ‘prescriptive’ and ‘mandatory’ requirements of IECC 2006 and ASHRAE / IESNA 90.1-2004, Section 9 Prescriptive Requirements.

RECOMMENDATIONS

Design for High Efficiency and Visual Comfort:

- ✓ Develop individual lighting designs for individual rooms or room types (e.g., classrooms, hallways, cafeteria, library, etc.).
- ✓ Consider a mix of direct and indirect light sources for each design.
- ✓ Optimize each design so that overall lighting levels (watts per square foot) are as low as possible while still providing optimal illumination for the tasks at hand.
- ✓ Avoid overlighting any space.
- ✓ Analyze the impact of the lighting system on the HVAC system, and resize as appropriate.
- ✓ Design systems to facilitate cleaning and lamp replacement.

Specify High Efficiency Lamps and Ballasts:

- ✓ Consider use of T-5 or T-8 fluorescent lamps with electronic ballasts for most general lighting applications (classrooms, offices, multipurpose rooms, cafeterias).

Optimize the Number and Type of Luminaries (lighting fixtures):

- ✓ Use suspended indirect or direct/indirect luminaries in classrooms to provide soft uniform illumination throughout the room.
- ✓ Consider incorporating additional accent and directional task lighting for specific uses (team areas, etc.)
- ✓ Consider the potential for using a smaller number of higher efficiency luminaries to light spaces, resulting in fewer fixtures to purchase, install, maintain, and clean.

Incorporate Controls to Ensure Peak System Performance:

- ✓ Use occupancy sensors with manual overrides to control lighting (on-off) in intermittently occupied spaces. Consider scheduled time clocks in other rooms.
- ✓ Consider incorporating lighting controls into the facility’s overall energy management system, as appropriate.

Integrate Electric Lighting and Daylighting Strategies:

- ✓ Treat the electric lighting system as a supplement to natural light; i.e., design for daylighting first and use the electric system to add light as needed during the day while providing sufficient illumination at night.
- ✓ Install controls that dim or turn lights off at times when daylight is sufficient.
- ✓ Consider controls that provide continuous, rather than stepped, dimming.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

EQ Credit 6.1: Lighting System Design and Controllability

SS Credit 8: Light Pollution Reduction

REFERENCE STANDARDS AND GUIDELINES

International Energy Conservation Code 2006

ASHRAE / IESNA 90.1-2004, Section 9 Prescriptive Requirements.

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- New Buildings Institute. Advanced Lighting Guidelines. White Salmon, WA: NBI Inc, 2003. www.newbuildings.org
- Watt Stopper, Inc. Lighting Control Best Practice Guide: Schools. Santa Clara, CA: Watt Stopper, Inc., 2002 www.wattstopper.com/pdf/SchoolK12guide.pdf

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- Illuminating Engineering Society of North America. www.iesna.org/ (May 2007)
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- Lighting Research Center, Rensselaer Polytechnic Institute. www.lrc.rpi.edu (May 2007). Product Database Available.
- National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007)
- NY City Department of Design & Construction. High Performance Building Guidelines. www.nyc.gov/html/ddc/html/ddcgreen/highperf.html (May 2007)
- Power Research Institute. Lighting for Schools Controls: Patterns for Design, Electric. www.epri.com (May 2007)

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19. ENVIRONMENTALLY RESPONSIVE SITE PLANNING

WHAT AND WHY...

A 21st Century school should be located on a 21st Century site; one that helps the school function at peak efficiency, minimizes adverse impacts on the local environment, and serves as an amenity for the surrounding community. A 21st Century site should be planned to conserve existing natural areas and restore damaged ones, minimize stormwater runoff (at non-urban locations) and control erosion, enhance the school's 21st Century features, reduce 'heat islands', and minimize light pollution.

A 21st Century site is good for the local and regional environment. It can also help reduce a school's operating costs by enhancing, rather than inhibiting, the 21st Century features of a facility (e.g., energy conservation, water conservation, renewable energy, safety and security, etc.).

A well-planned, 21st Century site can also be an exciting natural laboratory for students.

INTEGRATED DESIGN CONSIDERATIONS

Site conditions impact virtually every system in a building. A well-integrated design and site planning process will ensure that the site reinforces the building (and vice versa) and that both components operate at peak levels of performance.

REQUIREMENTS

None

RECOMMENDATIONS

Conserve Existing Natural Areas and Restore Damaged Ones:

- ✓ Preserve local vegetation in place, especially mature trees.
- ✓ Reduce parking and building 'footprints.'
- ✓ Landscape with non-invasive, indigenous plants.

Minimize Stormwater Runoff and Control Erosion:

- ✓ Design so that at a minimum, there is no net increase in stormwater runoff from the site after the school is built.
- ✓ Reduce impervious surfaces (such as parking lots, paved paths, etc.) that contribute to runoff.
- ✓ Maximize on-site stormwater infiltration.
- ✓ Consider providing for on-site stormwater retention (at non-urban locations).
- ✓ Use vegetation to keep soil in place.
- ✓ Consider anti-erosion grading and stabilization techniques.
- ✓ Minimize stormwater runoff during construction.

Use the Site to Enhance the School's 21st Century Features:

- ✓ Orient the building on the site to take advantage of the sun: (usually along an east-west access to maximize southern exposure), the prevailing breezes, shade trees and any landforms that might reduce the building's energy use; increase its access to natural daylight; enhance its acoustical environment; and/or improve its security.

Reduce Heat Islands:

- ✓ Reduce developed areas, such as parking lots, that are much hotter than surrounding, undeveloped areas
- ✓ Use landscape elements (preferably existing trees and vegetation) to shade roads, walkways, and parking lots.
- ✓ Consider using light colored materials for the school's roof to reflect, rather than absorb, sunlight.

Reduce Light Pollution:

- ✓ Design site lighting so as to minimize contribution to nighttime 'skyglow'.
- ✓ Consider outdoor lights with covered tops so that the light shines down, rather than up into the nighttime sky.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

SS Prerequisite 1: Construction Activity Pollution Prevention
SS Prerequisite 2: Environmental Contamination-Free Site
SS Credit 1: Site Selection
SS Credit 2: Development Density & Community Connectivity
SS Credit 3: Brownfield Redevelopment
SS Credit 4.1: Alternative Transportation, Public Transportation Access
SS Credit 4.2: Alternative Transportation, Bicycle Use
SS Credit 4.3: Alternative Trans., Low-Emitting & Fuel-Efficient Vehicles
SS Credit 4.4: Alternative Transportation, Parking Capacity
SS Credit 5.1: Site Development, Protect or Restore Habitat
SS Credit 5.2: Site Development, Maximize Open Space
SS Credit 6.1: Stormwater Design, Quantity Control
SS Credit 6.2: Stormwater Design, Quality Control
SS Credit 7.1: Heat Island Effect, Non-Roof
SS Credit 8: Light Pollution Reduction

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Barnett, Dianna L. & William D. Browning. *A Primer on Sustainable Building, 2nd edition*. Snowmass, CO: Rocky Mountain Institute, 1999. <http://www.rmi.org/store/pid960.php>
- School Site Selection and Approval Guide. California Department of Education. www.cde.ca.gov/ls/fa/sf/schoolsiteguide.asp
- US Environmental Protection Agency (EPA) IAQ Design Tools for Schools, Pre-Design. www.epa.gov/iaq/schooldesign

Online Resources

- Abbott District School Construction Program. www.state.nj.us/dep/opppc/school.htm (May 2007)
- Center of Excellence for Sustainable Development, U.S. Department of Energy. www.sustainable.doe.gov (May 2007)
- Energy Star Roof Products, U.S. Environmental Protection Agency. www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products (May 2007)
- Lawrence Berkeley National Laboratory. Cool Roofing Materials Database. Material Database Available. <http://eetd.lbl.gov/coolroofs/> (May 2007)
- Sustainable Site Design, National Park Service. www.nps.gov/dsc/d_publications/d_1_gpsd_5_ch5.htm (May 2007)

20. ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

WHAT AND WHY...

Building materials can have a significant impact on the environment and on human health. To the maximum extent possible, a 21st Century school should be constructed of durable, non-toxic materials that are high in recycled content and are themselves easily recycled. Preference should be given to locally manufactured materials and those derived from sustainable-yield processes. The school itself should be designed to facilitate recycling to the extent possible. In addition, waste should be minimized during construction.

Some building materials contain toxic substances that can harm workers during construction, and may also be harmful to students and teachers after occupancy. In addition, the mining, harvesting, and production of certain building materials can pollute our air and water. They also destroy habitats and deplete natural resources. Transporting building products long distances also contributes to pollution and energy waste.

Careful selection of materials can reduce or eliminate these problems, resulting in a school that not only helps the environment, but also contributes to the health and well-being of its occupants. Many of the materials selected – particularly those with recycled content – can serve as the basis for lessons on ecology and the environment, as can areas within the building designed for on-site recycling.

INTEGRATED DESIGN CONSIDERATIONS

Building products and materials will impact the indoor air, acoustic, and visual quality of a school. They can also affect operation and maintenance procedures. When new materials are used, new procedures may be required for their maintenance and upkeep. These new procedures should not be more complicated, costly, or time consuming than those associated with standard products, but they will be new, and so maintenance staff will require some training to implement them effectively.

PROPOSED REQUIREMENT

Provide permanent facilities to accommodate the collection and storage of recyclables

RECOMMENDATIONS

Reduce the amount of construction waste that goes to landfill:

- ✓ During construction, develop and implement a management plan for sorting and recycling construction waste.
- ✓ Consider a goal of recycling or salvaging 50% (by weight)

Specify materials and products that are environmentally efficient:

- ✓ Specify materials, especially timber, harvested on a sustainable-yield basis.
- ✓ Consider a goal of having 50% of the school's wood-based materials certified in accordance with the Forest Stewardship Guidelines for wood building components.
- ✓ Give preference to locally manufactured materials and products, which stimulate the local economy and reduce transport distances.
- ✓ Consider specifying salvaged or refurbished materials, as appropriate.

Maximize recycled content of all new materials:

- ✓ Use EPA-designated recycled content products to the maximum practicable extent.
- ✓ Within an acceptable category of product, use materials and assemblies with the highest available percentage of post-consumer or post-industrial recycled content.
- ✓ Consider a goal of having 25% of the school's building materials contain a weighted average of 20% post-consumer or 40% post-industrial recycled content.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

MR Pre-Requisite 1: Storage & Collection of Recyclables

MR Credit 1.1: Building Reuse: Maintain 75% of Existing Walls, Floors, & Roof

MR Credit 1.2: Building Reuse: Maintain 95% of Existing Walls, Floors, & Roof

MR Credit 1.3: Building Reuse: Maintain 50% of Interior Non-Structural Elements

MR Credit 2.1: Construction Waste Management, Divert 50%

MR Credit 2.2: Construction Waste Management, Divert 75%

MR Credit 3.1: Resource Reuse, Specify 5%

MR Credit 3.2: Resource Reuse, Specify 10%

MR Credit 4.1: Recycled Content, Specify 10% PC + PI

MR Credit 4.2: Recycled Content, Specify 20% PC + PI

MR Credit 5.1: Regional Materials, Extracted, Processed and Manufactured Locally, 10%

MR Credit 5.2: Regional Materials, Extracted, Processed and Manufactured Locally, 20%

MR Credit 6: Rapidly Renewable Materials

MR Credit 7: Certified Wood

REFERENCE STANDARDS AND GUIDELINES

Forest Stewardship Council. Structure and content of Forest Stewardship Standards www.fsc.org

Environmental Protection Agency. Comprehensive Procurement Guidelines.

www.epa.gov/cpg/products.htm

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- American Institute of Architects (AIA). The Environmental Resource Guide. Washington, DC: John Wiley & Sons, 1992. www.wiley.com
- The Architectural Machine. The Green Building Resource Guide. www.greenguide.com
- California EPA. Designing with Vision: A Technical Manual for Material Choices in Sustainable Construction. Sacramento, CA: Integrated Waste management Board, 2000. www.ciwmb.ca.gov/ConDemo/Pubs.htm
- Wilson, Alex, Malin N., Wiechers, T. and L. Strain. The GreenSpec® Directory: Product Directory with Guideline Specification, 3rd Edition. Building Green, Inc, 2003.
- Mendler, Sandra and Odell William. HOK Guidebook to sustainable design. Hoboken, NJ: John Wiley & Sons, 2000. www.wiley.com

Online Resources

- California Environmental Protection Agency. Designing with Vision: A Technical Manual for Material Choices in Sustainable Construction. Sacramento, CA: Integrated Waste Management Board, 2000. www.ciwmb.ca.gov/ConDemo/Pubs.htm (May 2007)
- California Integrated Waste Management Board. Construction and Demolition Waste Recycling Information. www.ciwmb.ca.gov (May 2007)
- California Integrated Waste Management Board. Recycled Content Product Database. www.ciwmb.ca.gov/rcp (May 2007)
- Center for Resourceful Building Technology. www.crbt.org (May 2007)
- Certified Forest Products Council. www.certifiedwood.org (May 2007)
- Environmental Building News. www.buildinggreen.com (May 2007)
- Forest Stewardship Council. www.fsc.org (May 2007)
- Green Seal. www.greenseal.org (May 2007)
- GSA Environmental Strategies and Safety Division. Construction Waste Management Database. www.wbdg.org/ccbref/cwm.php (May 2007). Online Database of Recyclers Available.
- International Dark Sky Association. www.darksky.org (May 2007)
- Rainforest Alliance. www.rainforest-alliance.org (May 2007)

- Scientific Certification Systems. www.scscertified.com (May 2007)
- Sustainable Building Sourcebook. www.greenbuilder.com/sourcebook (May 2007)
- US EPA. EPA Comprehensive Guide for Procurement of Products Containing Recovered Materials. www.epa.gov/epaoswer/non-hw/procure/index.htm (May 2007)
- US EPA. Comprehensive Procurement Guidelines. www.epa.gov/cpg/ (May 2007)

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21. WATER EFFICIENT

WHAT AND WHY...

In many parts of the country, fresh water is an increasingly scarce resource. A 21st Century school should reduce and control water runoff from its site, consume fresh water as efficiently as possible, and recover and reuse gray-water to the extent feasible.

Basic efficiency measures can reduce a school's water usage by 30% or more. These reductions help the environment, locally and regionally. They also lower a school's operating expenses. While the cost savings may be modest now, since water is relatively inexpensive in most areas of the country, there is a strong potential that the value of these savings will rise over time, especially in areas of the country where water is scarce and becoming more expensive.

The technologies and techniques used to conserve water – especially landscaping, water treatment and recycling strategies – can be used to help instruct students about ecology and the environment.

INTEGRATED DESIGN CONSIDERATIONS

Using less hot water will reduce energy costs. This reduction should be factored in to all life cycle cost analyses performed for the facility.

REQUIREMENTS

Water Efficient Landscaping

Reduce potable water consumption for irrigation by 50% from a mid-summer baseline case calculated in accordance with LEED™ for Schools WE Credit 1.1 and associated references.

Water Use Reduction

All water consuming plumbing fixtures in aggregate (excluding irrigation) shall be designed to use at minimum 20% below a baseline estimate established by the specified Energy Policy Act of 1992 plumbing fixture performance requirements

RECOMMENDATIONS

Water Efficient Landscaping:

- ✓ Specify hardy ('drought tolerant'), native vegetation.
- ✓ Consider using an irrigation system for athletic fields only, not for plantings near buildings or in parking lots.
- ✓ Use high efficiency irrigation technology (e.g., drip irrigation in lieu of sprinklers).
- ✓ Use captured rain or recycled site (gray) water for irrigation. "Design in" cisterns for capturing rain water.

Water Use Reduction:

- ✓ Specify high efficiency equipment (dishwashers, laundry, cooling towers).
- ✓ Consider single temperature fittings for student toilets/locker rooms.
- ✓ Consider automatic lavatory faucet shut-off controls.
- ✓ Consider low-flow showerheads with pause control.
- ✓ Consider using recycled or rain water for HVAC/process make-up water.

Innovative Wastewater Treatment:

- ✓ Decrease use of potable water for sewage conveyance by using gray and or black water systems. Opportunities include toilet flushing, landscape irrigation, etc.
- ✓ Consider on-site wastewater treatment, including full or partial "solar aquatics" systems.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

WE Credit 1.1: Water Efficient Landscaping, Reduce by 50%

WE Credit 1.2: Water Efficient Landscaping, No Potable Water Use or No Irrigation

WE Credit 2: Innovative Wastewater Technologies

WE Credit 3.1: Water Use Reduction, 20% Reduction

WE Credit 3.2: Water Use Reduction, 30% Reduction

WE Credit 3.2: Water Use Reduction, 40% Reduction

WE Credit 4: Process Water Use Reduction, 20% Reduction

REFERENCE STANDARDS AND GUIDELINES

LEED™ for Schools WE Credit 1.1

Energy Policy Act of 1992 plumbing fixture performance requirements

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Vickers, Amy. Handbook of water use and conservation. Amherst, MA: Waterplow Press, 2002. www.waterplowpress.com/index.html

Online Resources

- American Rainwater Catchment Association. www.arcsa-usa.org (May 2007)
- Innovative Design. Raincatcher Design Tool. www.innovativedesign.net/raincatcher_a.htm (May 2007). Specialized Software Available.
- National Park Service. Guiding Principles of Sustainable Design: Chapter 8. www.nps.gov/dsc/dsgncnstr/gpsd (May 2007)
- National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007). Specialized Software Available.
- NY City Department of Design and Construction. High Performance Building Guidelines. www.nyc.gov/html/ddc/html/ddcgreen/highperf.html (May 2007)
- Water Alliance for Voluntary Efficiency (WAVE) Searchable database available. <http://www.epa.gov/envirosense/> (May 2007)

22. COMMUNITY INVOLVEMENT

WHAT AND WHY...

A School Facilities Project process that involves the community shapes each school facility as a positive, inclusive, and vital presence for the neighborhood. Community stakeholders that should be included in the design process include parents, students, educators, and community organizations. Businesses and government agencies who wish to partner with the school board and district administration to create more effective schools and healthier neighborhoods should also be included.

Authentic community engagement “leads to school facilities that are central to the life and learning of the entire community and that embody community values. It establishes the connection between schools and communities, creating more effective schools and healthier neighborhoods.”

The US Department of Education’s planning guide Schools as Centers of Community notes that “involving educators, parents and other stakeholders in the process of designing schools can help ensure that schools support student learning and address community needs in the best ways possible. Such involvement also can strengthen community support for education. Ownership comes from shared problem-solving and decision-making that leads to the creation of a common vision and purpose that binds divergent parts of the community together.”

INTEGRATED DESIGN CONSIDERATIONS

In order to design a school that is central to the life and learning of a community, the design team must incorporate into its process the widespread, fully informed, critical participation of stakeholder groups. A commitment to community engagement in designing learning environments demands that adequate time and resources is allocated to this phase of the design process.

“Facilities needs can be wide-ranging. They can encompass issues as simple as air conditioning in every classroom and as ambitious as elementary schools with no more than 400 students. The critical factor in this phase of the planning process is to ensure that identified needs are clearly aligned with beliefs. If, for instance, the committee believes that students need opportunities to engage in project-based learning and work in teams, then spaces other than 900-square-foot lecture-type classrooms will be required. If the committee believes that the most effective schools embody a strong culture of personalization, then smaller, more intimate configurations will have to be designed. If the committee believes that parent involvement on school campuses is important, then spaces in schools for parents to park their cars, hang their coats, and do their work will be necessary. If the committee believes that schools should be centers of learning for the whole community, then other needs, and solutions, will come into view.”

REQUIREMENTS

None

RECOMMENDATIONS

Model community engagement involves “large groups of participants representing a broad cross-section of community constituents [who] assemble at regular intervals to review data, investigate options, and make firm recommendations” to the design team. While this collaborative format may be perceived as time-consuming, an open dialogue leads to more a thorough evaluation and broader acceptance of decisions that might otherwise generate conflict or protracted debate. Another benefit from broad-based community engagement is that “recommendations can often be more systemic, incorporating a broad range of the community’s physical, cultural, social, economic, organizational, and educational issues into more elegant, cohesive, and efficient solutions.”

The U.S. Department of Education’s publication “Putting the Pieces Together” offers tips for communicating with the larger community over the course of the planning and design process:

- ✓ Develop good written communication, such as a low-cost newsletter widely distributed throughout the community.
- ✓ Reach out to your critics by inviting them to see a new program, listening to their concerns, and providing opportunities for them to contribute.
- ✓ Keep participants and local leaders well informed by hosting an open house or site visits.
- ✓ Share the bottom line to show that collaborative programs are cost effective and get results.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

None

REFERENCE STANDARDS AND GUIDELINES

U.S. Department of Education’s publication. Putting the Pieces Together.
www.ncrel.org/sdrs/areas/issues/envrnmnt/css/ppt/putting.htm

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- None

Online Resources

- Spector, Stephen. Creating Schools and Strengthening Communities through Adaptive Reuse. National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007)
- North Central Regional Education Library. Putting the Pieces Together.1999. www.ncrel.org (May 2007)
- DeKanter, A., Ginsburg, A.L., Pederson, J., Peterson, T.K., and Rich, D. A compact for learning: An action handbook for family-school-community partnerships.1997 www.ed.gov/pubs/Compact/ (May 2007)

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23. COMMUNITY USE

WHAT AND WHY...

A community school can be defined as a public school that combines the rigorous academics of a quality education with a wide range of in-house, non-educational services that support and promote learning for all segments of the community.

Shared uses in schools allow a community to identify with its educational facilities, to develop skills that directly improve the community, and to improve the quality of educational services offered to students of all ages. Additionally, community schools involve families in their children's education, and also help families address issues that are barriers to learning.

Ideally, community schools are planned by and for the community, and offer programs that enrich children and adults of all ages. It is not unusual for community-based agencies, parents, business leaders, and other community and school partners to be invited by the district to plan the design and the programming aspects of the school. These partnerships help leverage private resources and make public programs accountable to community members.

Most importantly, community schools have been shown to improve student learning, promote family engagement with students and school, help schools function more effectively, and enhance community building and vitality.

INTEGRATED DESIGN CONSIDERATIONS

There are a number of planning and design considerations for community or joint-use schools that must be considered early in the design process. Opening school space to the public involves important safety issues. Spaces should be designed to restrict the public from wandering school hallways and compromising school safety regulations. The designer might consider creating separate entrances and planning for restricted public access during school hours. From a planning standpoint, it is important to determine who will be responsible for ensuring the security of the building during non-school hours.

Other crucial planning issues include funding and maintenance. Developing a funding plan for components of the facility that may be ineligible for state funding may require a phasing plan for design and construction. It is also necessary to address maintenance and operational issues associated with community design features and facilities operated outside of school hours: Who is responsible? What are the costs? Who will pay? For these reasons, it is important to reach a written agreement amongst all parties/users as early as possible in the development of a project and if deemed appropriate design the facility so that it may be sequenced or severable so as not to delay the project.

Above all, designers should approach the programming of community facilities and services with an open mind. For example, in some cases it may be more advantageous to locate school programs at existing or planned community facilities, rather than locating community facilities at the school.

REQUIREMENTS

None

RECOMMENDATIONS

A needs assessment process should consider the needs of all community members in the development of a community school. Stakeholder representatives such as community and business leaders, school board members, and district representatives should work closely with the design teams to assess community needs, and also determine what services and facilities might be incorporated into the school.

Health clinics, recreational facilities, technology centers, auditoriums, etc. are all tangible community assets and should be planned and implemented with assistance from the community. Likewise, a careful inventory of community facilities and assets may reveal opportunities to locate school and community functions in ways that support educational and community objectives.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

SS Credit 10: Joint Use of Facilities

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- MacKenzie, D. & Rogers, V. *The Full Service School: A Management and Organizational Structure for 21st Century Schools*. Community Education Journal, Vol. XXV, No. 3 & 4, Spring/Summer 1997, pp 9 –11.
- Steven Binger, Linda Quinn, and Kevin Sullivan, *Schools as Center of Community: A Citizens Guide for Planning and Design*, 2003

Online Resources

- Coalition for Community Schools. www.communityschools.org (May 2007)
- Comprehensive Procurement Guidelines. www.epa.gov/epaoswer/non-hw/procure/index.htm (May 2007)
- KnowledgeWorks Foundation. www.kwfdn.org (May 2007)
- New Schools Better Neighborhoods. www.nsbno.org (May 2007)
- Sullivan, Kevin J. *Catching the Age Wave: Building Schools with Senior Citizens in Mind*. National Clearinghouse for Educational Facilities. www.edfacilities.org (May 2007)

24. CATALYST FOR ECONOMIC DEVELOPMENT

WHAT AND WHY...

The planning, design, construction, and operation of new and substantially renovated school facilities provide an unusual opportunity to encourage reinvestment in neighborhoods surrounding schools. Such reinvestment can bring about compatible infill development, promote civic engagement in issues and sites important to the neighborhood residents, and help enhance and preserve the State's multi-million dollar investment in school facilities. Coordinated planning and investment can also provide financial savings through coordinated design, demolition and construction of both facilities and infrastructure.

School facility construction is the first significant investment – public or private – in many neighborhoods in years, and as such must provide a catalyst for the community to develop and advance plans to tackle related issues such as housing, services, jobs, public safety, recreation and open space as well as environmental cleanup. Revitalization of surrounding areas assists a school in providing a safer and a more effective educational environment. Appropriate economic development provides a stronger sense of community, encourages parents to keep their children within the local school, creates pride within the community and enhances property values and the creation of new ratable.

INTEGRATED DESIGN CONSIDERATIONS

Substantial opportunities exist to use school facilities as direct stimuli for development. For example, designing school eating facilities to serve the community after hours can result in a locally operated, and even student prepared food products. Similar arrangements can be made with physical education facilities that can become neighborhood health clubs. Storefronts for neighborhood and student operation can be designed within or adjacent to the school facility. Housing, office, and commercial uses should be considered as part of the site, or even the building, wherever feasible. All these considerations will significantly impact the planning and design of the school facility itself.

REQUIREMENTS

None

RECOMMENDATIONS

- ✓ Ensure that the community planning and engagement process includes: representatives from the municipality's planning and redevelopment offices; relevant county and state planning and redevelopment officials; housing, economic, and community development offices; and non profit organizations. Public and private developers should also be consulted.
- ✓ Ensure that the needs assessment discussed in Design Criteria 23 examines: housing, employment, community service, and facility needs.
- ✓ Recognize that enhanced economic development may not (and need not) occur simultaneously with school construction. Planning for desired and needed uses is important, even if market or financing conditions are not currently conducive to development.
- ✓ Systematically review all available local, state, federal, and private funding sources, including grants, loans, equity investments and tax credits.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

SS Credit 9: Site Master Plan

REFERENCE STANDARDS AND GUIDELINES

None

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

- Chung, C. *Using Public Schools as Community-Development Tools: Strategies for Community-Based Developers*. Cambridge, MA: JCHS Harvard University, 2002.
- Jonathan D. Weissman, *Public Schools and Economic Development: What Research Shows*, Knowledgeworks Foundation, 2004

Online Resources

- Coalition for Community Schools. www.communityschools.org/ (May 2007)

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25. SERVICE LIFE PLANNING

WHAT AND WHY...

High performance schools are, by definition, cost-effective to own and operate. They are optimized for energy performance, with a focus on substantially reducing the “cost to run” the facility. They should also be optimized with respect to the “cost to own” key building systems – like the walls, roof and fenestration. This can be accomplished by calculating the construction costs of these systems and the costs to maintain, repair and replace these systems over their service lives. The combined “cost to own” individual systems can then be compared to various alternatives to ensure that the optimal system – in terms of its overall service life cost – is selected.

Such an approach ensures that systems with the highest long-term value are selected; an outcome that is not always certain when the “cost to buy” a system is the sole consideration.

INTEGRATED DESIGN CONSIDERATIONS

Analyzing and optimizing key building systems in terms of their cost of ownership can and should have an impact on any operation and maintenance plans that are developed over the course of the design process. In addition, ensuring the performance of the selected systems may become part of the commissioning process.

REQUIREMENTS

The “cost to own” each of the following five critical building systems shall be calculated using the method described below.

Roof
Exterior Walls (Building Envelope)
Fenestration (Windows and Doors)
Interior Walls at High Traffic Areas
Flooring at High Traffic Areas

Calculation Method

The estimated first (capital) cost of each proposed system, including all associated accessories/interface conditions, shall be calculated and then combined with the total estimated cost to maintain and repair the system over its projected service life. (Costs shall be calculated on a “constant dollar” basis.)

Results shall be provided for both the “total” cost to own the system over its service life and the annualized “cost per square foot per year” to own the system (derived by dividing the total cost by the system square footage and its service life).

To ensure uniformity of procedure and results, estimated maintenance and repair costs shall be derived in one of two ways. For systems that are included in the *Whitestone Building Maintenance and Repair Cost Reference*, Whitestone Research (August 2005), the information provided by this reference – current for the year in which the calculation is made and adjusted for the region where the facility will be located - shall be used. (The *Whitestone Reference* represents a systematic, nationally recognized method for organizing maintenance and repair cost information and should be utilized to the greatest extent possible in these calculations. However, the *Whitestone* data can be modified, to the extent necessary, so as to better conform to specific service life and/or warranty provisions not otherwise addressed by the Reference.)

For systems not addressed by the *Whitestone Reference*, sources of inputs for the types, schedules and estimated hard costs of maintenance and repairs shall be clearly delineated. In particular, all maintenance and repair activities necessary to ensure the anticipated service life and/or to satisfy all warranty provisions shall be explicitly addressed. Labor cost inputs shall be derived from the State Prevailing Wage Rates, wherever possible. In cases where this is not possible, the source of projected labor costs should be clearly identified and explained.

In all cases, the *Whitestone Reference* utilized shall be the edition current for the year in which the calculations are made.

RECOMMENDATIONS

The Service Life Planning methods may be applied to all systems and assemblies. As evaluations are made this basis of experience may serve to inform future decisions on similar projects.

ASSOCIATED LEED™ PREREQUISITES AND CREDITS

Required Prerequisites:

None

Elective Credits

ID Credit 1: Innovation in Design

REFERENCE STANDARDS AND GUIDELINES

Whitestone Building Maintenance and Repair Cost Reference, Whitestone Research (August 2005)

INDUSTRY AND GOVERNMENTAL RESOURCES

Publications

Building Services Component Life Manual (Building Life Plans), Building Performance Group

Whole Life Appraisal: For Construction, Roger Flanagan and Carol Jewell

Service Life Considerations in Relation to Green Building Rating Systems, Athena Institute, April 2006

Life-Cycle Assessment in Building and Construction: A State-Of-The-Art Report of Setac Europe

Built to Last – Service Life Planning, Prof. Christer Sjöström, ISO Focus

Online

International Organization for Standards – Building Construction Design Life Committee,
<http://www.iso.org/iso/en/CatalogueListPage.CatalogueList?COMMID=1968&scopelist=ALL>

Building Research Establishment, BRE Service Life Assessment Method,
<http://www.bre.co.uk/service.jsp?id=371>

NJSCC Design Manual

Section Three

Procedures and Deliverables

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SUMMARY OF MAJOR CHANGES TO THE PROCEDURES AND DELIVERABLES SECTION

This section of the *Design Manual* details the deliverables and procedures required at each major phase of Work.

The Deliverables Checklists in the Design Manual **replaces and supersedes** the “Submission Checklists” contained in the previous *Design Manual* (September 30, 2004) and the *Procedures Manual for Design Consultants, Volume 2001A* or later. Consultants are expected to provide all the Deliverables identified by the Design Manual and to conform with all procedures and associated requirements.

Key changes embedded in the new Deliverables Checklist include the following:

- The deliverables for the Design Development phase are more detailed in required content so that they can be used for more accurate cost estimating and for Department of Education review.
- As with the Design Manual (September 30, 2004), the 60% CD submission required in the Procedures Manual has been eliminated.
- As with the Design Manual (September 30, 2004), the 95% CD submission required in the Procedures Manual has been eliminated.
- As with the Design Manual (September 30, 2004), a new, 100% CD “Bid Documents” submission, containing, as required, revisions based on review comments, is required.
- As with the Design Manual (September 30, 2004), there is a requirement that the NJSCC and/or its agents convene – and Design Consultants attend – at least one, formal Project Review Meeting during each major phase of design/construction. The purpose of these meetings will be to review all design/construction activities over the course of the phase, to ensure that all required activities have been accomplished and all deliverables submitted, and to evaluate Project Teams on their progress.
- During the Review Meetings, Project Teams are required to present both orally and in written form; formal Project Progress Reports, explaining how they are addressing the 25 Design Criteria described in Section 2 of this Manual as well as present all other required deliverables. Appendix A provides structured Project Progress Guides to help Project Teams prepare these reports.

SUMMARY OF SUBMISSIONS AT EACH MAJOR PHASE OF THE SCOPE OF WORK

Design Phase:

- Programming/Concept Design (PG)
- Schematic Design (SD)
- Design Development (50% & 100% DD)
- Construction Documents (CD)
- 100% CD submission to NJ Department of Community Affairs (DCA) Permit Application
- 100% CD Bid documents (Revised based on DCA review comments, as required)

Construction Phase:

- Bidding and Contract Award (BC)
- Construction Administration (CA)
- 100% Conformed documents (Within thirty (30) days after Contract Award for Construction)
- Project Close Out (PC)
- 100% As Built documents
- Post Occupancy Review (PO)

Each Phase of the Project is shown in this Section of the Design Manual each with its own Deliverables Checklist. Consultants are expected to provide all the Deliverables listed in this Design Manual and the 'A-Z' Design Consultant Agreement.

Deliverables listed in the Design Manual shall be submitted accompanied by a Transmittal for each required submission. Submission of actual 'Deliverable Checklist' (available electronically) is required.

GENERAL REQUIREMENTS

Following are descriptions of crosscutting deliverables that are required at more than one phase of Work over the course of a project. Within the NJSCC, a Project Manager will be assigned to the School Facilities Project to work with and be part of the Project Team. The NJSCC Project Manager will be responsible for giving approvals and making decisions on behalf of the NJSCC.

NJSCC Project Team

At the core of every project and clearly responsible for any project's success is the Project Team (Team). A cooperative, working Team is essential to accomplish all the goals and objectives described in this Design Manual. The Project Team shall consist of the NJSCC with the Project Manager as lead, Design Consultant Team, NJSCC and/or its agents (Project Management Firm or Construction Management Firm), the School District, Representatives from the New Jersey Department of Education (NJDOE), and the Community where the school facility is being planned. Other groups may be added when appropriate.

Schedule

A milestone schedule for design and construction will be provided in the Agreement. Prior to the commencement the Design Consultant's Work, the Design Consultant shall, for each School Facilities Project, prepare and submit for review and approval/revision, by the NJSCC and/or its agents, a schedule showing the order and time frames in which it proposes to carry out their Work. The design schedule must include all details related to design work, design submittals, cost estimates, review periods, and other major activities for each phase. Major milestone dates such as reviews, presentations, and bids shall be consistent with the milestone schedule provided to the Design Consultant by the SCC in the Agreement. The schedule shall be in a form, compatible with the Primavera Expedition software and the comprehensive Milestone Schedules prepared by the NJSCC and its Agents. This schedule shall be used to show both the proposed schedule and actual progress for each School Facilities Project. At the beginning and end of each design submittal phase, the Design Consultant shall review the approved design schedule of the School Facilities Project and update the schedule if necessary and obtain approval from the NJSCC and/or its agents. Should, in the opinion of the Design Consultant, the schedule need revision, the request must be made in writing and approved by the NJSCC and/or its agents. The Design Consultant shall immediately advise the NJSCC and/or its agents of any difficulties encountered during the Project, which may impact the schedule. The NJSCC and/or its agents will attempt to alleviate those problems and notify the Design Consultant accordingly.

Cost Control

The School Facilities Project gross square feet shall be multiplied by the regional cost per gross square foot to obtain a total Initial Construction Cost Estimate as derived from the Project Charter for that School Facilities Project. The typical School Facilities Project includes traditional site work, and building foundations along with the typical school facility building. Extraordinary, unexpected, or unusual costs are excluded. Calculations shall also be made for addition and renovation projects, based on scope of work.

The Design Consultant shall be given an Initial Construction Cost Estimate by the NJSCC and shall use this Initial Construction Cost Estimate as the Project Budget. From Project inception, the Design Consultant shall be required to complete the School Facilities Project within this Lump Sum Cost.

Fixing the Project Cost as an Initial Construction Cost Estimate allows flexibility for the net to gross factor, as long as the project Lump Sum Cost is maintained.

The Design Consultant must still meet the net area (NSF) requirements of the NJDOE approved Project Model.

Construction Cost Estimates (CCE)

The NJSCC and /or its agents and the Design Consultant must prepare a CCE in the NJSCC Standard Format utilizing the appropriate CSI/Master Format, at the conclusion of each Phase. The CCE's are to be prepared for all progress and final submittals: Programming / Concept Design, Schematic Design, Design Development and Complete Construction Documents. The NJSCC, at its own expense and where deemed appropriate, may produce an independent cost estimate for budget verification. The Project Team, including the Design Consultant, NJSCC and /or its agents, and SCC Project Manager, must reconcile the two or three Construction Cost Estimates. A document summarizing and approving the mutually agreed upon reconciled CCE shall be prepared by the NJSCC and /or its agents or Design Consultant and signed by the NJSCC Project Manager. The Design Consultant will be required to verify, with a reconciled CCE at each Design Submittal, that the current design complies with the currently approved NJSCC Construction Cost Estimate. This shall occur prior to authorization of approval to proceed to the next Phase of project development. An electronic copy of all CCE's including reconciled estimates must be forwarded to: SCC Architecture and Engineering, 1 West State Street, 6th Floor, Trenton, NJ 08625-0991.

Correspondence

All project correspondence, submittals and documents shall be directed to the NJSCC and/or its agents. All general correspondence shall reference a package title and number along with location and project number, if applicable. Correspondence shall be submitted in original with distribution as required by the NJSCC and/or its agents. Distribution of copies is to be noted at the bottom of all correspondence.

Meetings

The Design Consultant shall attend all meetings scheduled by the NJSCC and its Agents unless otherwise instructed. The NJSCC and/or its agents will ensure that all parties concerned with the School Facilities Project will be present at the meetings. Design Phase progress meetings with the NJSCC and/or its agents will be required at an interval appropriate to the schedule of the project. Meetings will also be required with the Client School District at each school facility included in the project to adequately determine the needs of the School Facilities Project. Agreed upon meeting dates shall be reflected in the Design Consultants Schedule.

Construction Administration Phase progress meetings with the NJSCC and/or its agents will be

required at an interval appropriate to the activity of the Project. Progress meetings will be held as directed by the NJSCC and/or its agents, at least weekly. The NJSCC and/or its agents are responsible for recording the minutes of all meetings unless stated otherwise in the Design Consultant Agreement. Copies of minutes must be distributed to all present and as designated by the SCC Project Manager. The minutes of project design meetings shall be numbered consecutively beginning with the Pre-Design Meeting through all design Phases, ending at the start of construction. The minutes of construction meetings shall be numbered consecutively beginning with the Pre-Construction Meeting, continuing through construction and ending at the closeout of construction. Minutes shall be distributed within seven (7) calendar days of the meeting date. Copies of minutes shall be distributed to all present and also as designated by the NJSCC Project Manager.

Proprietary Specifications

The use of proprietary specifications is prohibited; therefore, whenever a "brand name" item is specified, the Design Consultant must list by name at least three (3) comparable manufacturers followed by the words "or approved equal." If these comparable "equal" manufacturers are not available, NJSCC must have previously approved the specifications prior to issuance for bids. To ensure that the word "equal" cannot be misinterpreted in the course of bidding, the Design Consultant must thoroughly describe in the technical specifications all essential performance and/or physical features which must be incorporated into the specified item or system to meet its minimum functional needs and space limitations. Minor features of the preferred products that do not have an impact upon the product performance for this use shall not be specified as required criteria for bidding. Accessories and/or minor component associated with systems and/or assemblies, as defined by the MasterFormat 2004 designated specifications sections, may be identified as a single manufacturer followed by the words "or approved equal". The listed manufacturer of a minor product must not void any warranty offered by a company for a comprehensive system, not decrease performance or quality, and shall be compatible with the system or assembly which it may be part of.

Variances from this requirement may be granted, including restricting bids to certain select manufacturers, subject to the following stipulations:

No known readily available products, other than the specified, are capable of providing the salient physical, functional, and/or other characteristics, including cost, essential to the minimal needs of the Client School District.

Where existing systems are being extended (fire alarm, etc.) and single-system integrity can only be preserved or compatibility assured by resorting to the designated products. This applies to new construction, additions to existing buildings and when major renovations to an existing building are planned, if the School District has a 'District-Wide' system where the single system integrity would be lost by adding an incompatible generic system. Focus for an exception to the requirement of a non-proprietary system should be prioritized by importance. Importance factors (from highest): Fire/Life Safety systems, Occupant Safety and Security, followed by long-term ease of building Operations and Maintenance.

The Design Consultant must request in writing to the NJSCC and/or its agents, a request for variance from the proprietary specification requirements at least thirty (30) days before inclusion in the Contract Documents. This request shall include a draft version of the proposed specification sections, and the relevant justification for this action.

Within ten (10) days of receipt, the request will be reviewed, and if approved, the NJSCC Project Manager (PO) will grant authorization in writing to proceed. Upon receipt of authorization, the Design Consultant shall include in the Construction Documents the name of the desired manufacturer to be used by the contractor in its base bid.

E-Rate Program

The Design Consultant shall ensure that the School Facilities Project is designed and constructed to maximize its telecommunications connectivity through, but not limited to, the E-Rate Program instituted in accordance with the provisions of the Federal Telecommunications Act of 1996, Pub. L. 104-104, set forth at 47 U.S.C.A. § 253, and administered by the Schools and Libraries Division (SLD) of the Universal Service Administrative Company at the direction of the Federal Communications Commission. The Design Consultant Team shall coordinate the Contract Documents to assure there is no duplication of scope between the E-Rate Program and the Technology Contract Documents and systems for the School Facilities Project. The Design Consultant shall assist the NJSCC designated district representative in the application for any rebates and shall ensure that any resulting installation discounts or reimbursements are forwarded to the NJSCC, as directed by the NJSCC Project Manager.

Project Progress Reports

Formal written Project Progress Reports are required during each of the first six phases of Work. (Reports are not required for the Project Close-Out or Post-Occupancy Review phases)

The Reports shall be delivered before or during the formal Project Review Meetings that are required at the end of each major design/construction phase (see below). The purpose of these reports is to provide Project Teams an opportunity to explain how they are addressing the requirements, recommendations, and associated required deliverables of the 25 Design Criteria described in Section 2 of this Manual. It is recommended that the Design Consultant Review each of 25 Design Criteria's requirements and recommendations in the Design Manual, the respective Project Progress Report Guide (Appendix A) and the definitions at the beginning of each phase. As a reference the Section 3 Deliverables descriptions that follow in each phase include Section 2 references for the requirements of each phase.

Appendix A provides structured Project Progress Report Guides – organized by project phase - to help Project Teams prepare these reports. NJSCC and/or its agents and NJSCC personnel will also use these Guides to structure and review a Team's Report presentation and to evaluate a Team's progress in addressing the 25 Criteria contained in Section 2. All required deliverables identified in the respective Phase Required Deliverables Checklist should be included in this report. This information shall be delivered in a project book or binder. Required Contract Documents; Construction Drawings and Specifications, beginning at the Design Development Phase, need not be included in the Project Progress Report. These deliverables shall be delivered in the separate sets consistent with the requirements set within.

NJSCC LEED™ Checklists

The NJSCC requires Design Consultants to apply sustainable design concepts in the planning,

design, construction, environmental management, and operation of Projects in the New Jersey Schools program. The criteria of US Green Building Council (USGBC) LEED™ for Schools, shall be used as a guide to achieve a minimum of 29 points.

LEED™ Checklists are required to be submitted during each of the first seven phases of Work. (Checklists are not required for Post-Occupancy Review).

Design Consultants shall submit the Checklists following the guidance provided in Appendix B of this Design Manual. The guidance provided in Appendix B – including the checklist form and the submission procedures – are required of all Design Consultants. In addition; beginning with the Program / Concept Design Phase, the Design Consultant shall submit the NJSCC LEED™ Checklist administered by the NJSCC and /or its agents as required. The Design Consultant shall provide both digital and hard copies of these documents as part of the Project Progress Report at the end of each phase.

Commissioning Requirements

Commissioning shall be a planned, continuous integrated design and construction effort for the entire building, including all its systems. It is not limited to the HVAC system nor the construction administration phase alone. Commissioning is a systematic quality-assurance process requiring that all building systems perform interactively according to the design intent as described by the Contract Documents, and in accordance with the school's operational needs. This begins in the Program phase with the definition of needs, continues through Design, Construction, and the Post Occupancy phase with verification, and concludes with review, of testing and systems documentation to assure the goals have been met. The commissioning process requires peer review in all design phases, and coordination during equipment startup, control system calibration, testing, adjusting and balancing, equipment documentation, facility staff training, and the Post Occupancy phase. This process requires that the school's facilities staff be properly trained, with accurate as-built documents, along with operation and maintenance manuals delivered at project substantial completion.

Commissioning shall be organized and led by a Commissioning Consultant (Cx) in a formal and continuing process of testing, review and reporting. For additional information refer to the contents of the Design Manual, the NJSCC Commissioning Protocol, and the 'A-Z' Design Consultant Agreement.

Controlled Testing

The testing requirements shall be defined in the contract documents and other scope documents on a project specific basis by the Design Consultant and managed by the NJSCC and/or its agents. The certified testing results shall be submitted to the Design Consultant for review and approval.

Ease of Operation & Maintenance

The Design Consultant shall develop the School Facilities Project design for ease of Operation and Maintenance. The DC shall work with the school facilities staff concerning Operation and Maintenance.

Material Storage

Storage of all material is critical. This includes storage at the manufacturer or supplier's facility, the method of product delivery to the site, storage on site, handling/protection during installation, and protection of installed components through the substantial completion phase of a School Facilities Project. Through all these phases, the construction material or product must be protected from adverse environmental conditions such as temperature, sunlight, changes, moisture and water. This includes keeping elements such as but not limited to; brick, CMU, insulation, finish materials, ductwork and mechanical components, etc. covered and dry from the time of their manufacture through their installation and final acceptance of the building. The Design Consultant shall be responsible for specifying adequate measures in their development of the Construction Documents to reasonably assure compliance with such concerns.

Long Lead Equipment/Pre-Purchase

The Design Consultant in consultation with the NJSCC and/or its agents shall identify and prepare a list of long lead items at the completion of the Design Development sub-phase. The NJSCC agents shall make a recommendation to the NJSCC PO for possible action.

Utility Rebate 'Smart Start' Program

The Design Consultant shall become familiar with any and all applicable utility rebate programs and or their successors, specifically including the NJ Smart Start Buildings Program. The DC in consultation with the NJSCC and/or its agents shall apply for all applicable incentives associated with the project. All incentives, rebates, grants, etc. shall be awarded directly to NJSCC for appropriate distribution. Such program(s) often offer technical assistance and funding for design in addition to incremental equipment costs.

Recycling During Construction

The Design Consultant, in the specifications, shall designate the Contractor and all Sub-Contractors to follow material recycling criteria during demolition and construction in accordance with requirements set forth by the responsible local authority. At a minimum 50% of all construction waste including demolition waste and land clearing waste should be recycled / reused. This can include reuse of the recycled asphalt, recycled concrete and waste brick as clean fill onsite in accordance with the beneficial reuse regulations at NJAC 7:26-1.7 in appropriate areas not as structural fill or within a segregated recycling system for offsite use.

Project Review Meetings

NJSCC and/or its agents shall convene, and Design Consultants shall attend, a minimum of one formal Final Project Review Meeting at the completion of each phase of Work (from Programming through Post Occupancy Review). The purpose of these meetings shall be to review all design/construction activities over the course of the phase, to ensure that all required activities have been accomplished and all deliverables submitted, and to evaluate Project Teams on their progress.

During the first six phases of Work (from Programming through Construction Administration), Design Consultants will be expected to deliver formal Project Progress Reports (described above) at each Project Review Meeting. These Reports will provide Design Consultants the opportunity to describe their activities over the course of the phase, include all required deliverables and, specifically, to indicate how they are addressing the 25 Design Criteria for high performance schools established by the NJSCC and included in Section 2 of the Design Manual.

Design Consultants will be evaluated based on the quality of work accomplished over the course of the phase, the timeliness and quality of the deliverables they are required to submit, and on how well they are addressing the NJSCC's 25 Design Criteria.

Submission Requirements

The requirements identified in the Deliverables and Procedures Section of this document refer to number of copies for the various submittals. All other requirements listed in Section 2 & 3 of the Design Manual and the Design Consultant's Agreement shall also be met and submitted during the respective phase. All copies of submittals must be accompanied by appropriate transmittals to ensure proper documentation.

Each set shall include all required deliverables in each Phase or agency submittal and/or as listed in the 21st Century Schools Design Manual and the Agreement, including, but not limited to: all drawings, renderings, and sketches, specifications, studies, reports, standard forms, construction cost estimates (CCE), photos, and checklists, etc. Any party receiving drawings may request a substitution of a half size set of drawings in place of a full size set. A copy of all electronic and paper document submissions, as defined herein, shall be transmitted to the SCC Project Manager, NJSCC Project Agents, and SCC Technical Services c/o Deirdre Burnett, 1 West State Street PO Box 991, 6th Floor Mezzanine, Trenton, N.J. 08625-0991, Tel.: (609) 777-1882, e-mail: Dburnett@NJSCC.com

Integrated Design

The Integrated Design process shall begin at the Program/Concept Design Phase and is initiated by the Project Team led by the Design Consultant during the conceptual design generation of three alternative concepts. Integrated Design, while seeking to communicate the needs and knowledge of all participants, is respectful of the Design Consultants unique role and experience in facilitating such dialogue and synthesizing these goals as a final design solution. Integrated design is the consideration and design of all building systems and components as one single unit, optimizing sustainability. It brings together the Project Team involved in designing a school throughout the entire process. The distinction from a conventional process, being that the participant's knowledge and requirements are shared at strategically scheduled meetings so as to inform this process as early in the process as possible so that it may be 'integrated' into the solution. This approach optimizes the combination of educational adequacy, building performance, ease of operation and maintenance and cost.

This process customarily includes two primary groups, the designers/constructors and the users/stakeholders. Both these groups work both independently and together in the process of developing and evaluating each others work as informed by the analysis conducted by the respective groups and delineated in the activities of the Program / Concept Phase. This effort culminates in a Final Concept Design that is representative of the Integrated Design process so as

to accomplish greatest value.

The Concept Design Process / Initial Integrated Design Session(s) are initiated by first establishing the Project Team and its methods of communication. Then the Design Consultant seeks to assemble all pertinent information about the School Facilities Project and its location. This is called “Information Gathering” and includes but is not limited to; Programming, Site Analysis, Existing Conditions Analysis and a review of the requirements of all presiding codes, ordinances, and other regulatory approvals, etc for the project. That stage is then followed by a workshop, defining the Owner’s Project Requirements (OPR), at which the needs of the user/stakeholders are defined. Once this process is complete; the Design Consultants with their Specialist Consultants, (HVAC, Structural, Civil Engineering, Landscape Architecture, etc.) and any other participants the Design Consultant feels are necessary to achieve the defined goals of this process are assembled to collectively participate in the “Concept Design Process / Initial Integrated Design Sessions” to produce a minimum of three (3) alternate designs for the project. Once that stage is complete the results (Three Concepts) are presented to the entire Project Team for review.

Integrated Design involving the Project Team does not stop at the end of this phase, but shall continue throughout the entire process as described by this section of the Design Manual.

PROGRAM /CONCEPT PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

The deliverables of the Program Phase shall document all key decisions made in this phase of work.

- Document Project Communication and Organizational Directory
- Prepare a current confirmed Project Schedule at beginning and end of phase
- Prepare Program Document / Educational Specifications
- Existing Conditions Survey Drawings for Site Analysis
- Site Analysis drawings with all existing conditions considered (i.e. DEP, traffic, orientation, utilities, acoustics, etc.).
- Test Borings and Surveys
- Written Site Analysis document w/ utilities availability
- Written Summary of Applicable Legal/Regulatory Approvals (AKA Code Summary)
- Conceptual Design Generation: Initial Integrated Design Sessions
- Space Adjacency Diagrams
- Blocking and Stacking Diagrams
- Lighting / Daylighting Studies [Design Criteria # 4]
- Homeland Security Compliance Documentation [Design Criteria # 6]
- Preliminary Energy Analysis Model Calculations [Design Criteria # 7]
- Preliminary NIST Building Life Cycle Cost Studies [Design Criteria # 8]
- LEED™ Checklists
- Program / Concept Design Drawings (Site Plan, Floor Plans, and Elevations)
- Computer generated or hand drawn color, three dimensional Exterior and/or Interior Views Sketches
- Description of Building Exterior Enclosure Systems
- Description of MEP Systems
- Description of Structural Systems
- Construction Cost Estimate reconciled with the NJSCC estimate for each concept
- Written report of Value Management / Engineering Review
- Estimated Utility Loads (based on sq ft unit rates)
- Prepare and submit Program/Concept Phase Project Progress Report (AKA Basis of Design)
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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PROGRAM /CONCEPT PHASE

Description

Following execution of the Design Consultant Agreement, a Notice-to-Proceed for the Design Phase will be issued to the Design Consultant. The Notice-to-Proceed for the Design Phase is the authorization for the Design Consultant to begin the Work under the Agreement. The design phase will begin with the following scope if the Program / Concept Phase are designated as the first phase of the S.O.W. of the Design Consultant.

All School Facilities Projects will include a Program Model to be performed by the Design Consultant unless indicated otherwise in the RFP and the Agreement. The Client School District working with the Department of Education completes the development of eligible and required educational space or the approved Facilities Efficiency Standards (F.E.S.) Model. The NJDOE approved F.E.S. Model, consisting of net square footage approved for the Project is provided to the Design Consultant. The Design Consultant uses this document (in Net Square Feet), and multiplies it by a Net to Gross maximum allowable ratio of 1.4. The result determines a preliminary estimate of the Gross Square Footage of the Project. When multiplied by the regionally adjusted allowable gross dollars/sq. ft., this determines the Lump Sum Project Budget. This initial Lump Sum Project Budget must be maintained throughout the project. The net to gross factor may vary, however the Design Consultant is held to meeting the Lump Sum Budget for the Project as approved by the NJSCC with appropriate justification by the Design Consultant.

The Design Consultant shall review the Scope of Work (SOW) and based upon the Agreement shall at a minimum include the creation and analysis of the three concept alternatives. These alternatives shall be based on program definition, narrative description, space analysis, site evaluation, community input, the OPR Workshop, diagrammatic sketches and concepts, systems analysis and energy modeling, first cost (CCE), operating and maintenance costs, 20 year life cycle cost, USGBC LEED™ Credits, Homeland Security Compliance, budget, schedules and Contract deliverables.

Community Involvement

The school is the true center of a Community. Because of this, the NJSCC requires all Design Consultants to solicit and incorporate input from the members of the community to be served by the school. It is the responsibility of the Design Consultant with the rest of the NJSCC Project Team to define an approach to community involvement (Community features and funding). Community involvement in the site selection and school design process, incorporating community design features where possible, and maximizing public access to the school are critical elements in the effort for the school to meet the needs of the community it serves. This will be developed in the Workshop and review sessions co-coordinated by the NJSCC and /or its agents.

Project Kick-Off Meeting

The purpose of this effort is to review the responsibilities and lines of communication between all parties of the Project Team as well as confirm the Scope of Work, and Project Schedule.

1. The Design Consultant will meet with the New Jersey School Construction Corporation (NJSCC) and the Project Team to confirm the project SOW, Schedule, and preliminary Lump Sum Budget and Initial Construction Cost Estimate for the Project.
2. The Design Consultant will introduce their consultants and review their project responsibilities.
3. The lines of communication and associated processes will be defined between NJSCC Project Team representatives, the Design Consultant Team, the school facilities project Users (The District), and the NJSCC and/or its agents. The Design Consultant will assist the NJSCC and/or its agents in creating a Project Communication and Organizational Directory including all Project Team staff members and all other project related contacts.
4. The Design Consultant will meet with the NJSCC Project Team to review the Scope of Work and Project Schedule. Key milestones, NJSCC Procedures, and associated deliverables will be reviewed for conformance with this and other contract documents. Agreed upon meeting dates shall be reflected in the Design Consultants Schedule. The Design Consultant shall submit a revised Project Schedule at the beginning and end of each phase for review and approval by the NJSCC and/or its agents.

Information Gathering

The purpose of this effort is to collect information on existing conditions, both on-site and surrounding, that will impact the planning and design of the Project and to document such relationships.

1. Design Consultant will tour and photograph the site and other elements that impact the site.
2. Design Consultant will acquire all planning, zoning and construction ordinances applicable to the development of the site for the specified use for reference.
3. As described by the SOW, the Design Consultant or NJSCC shall provide the following:
 - a. Base survey plans identifying existing conditions; including at minimum topographic contours (one foot intervals), property lines, rights-of-way and easements, internal and adjacent roadways, parking, walkways, security fences, site utilities, buildings and other structures, etc. This information shall be consistent with the standards established in the definitions.
 - b. Any previous reports on development of this site including parking studies, master plans, environmental hazards or constraints, etc.
 - c. Location, size, capacity, etc. of existing utilities.
 - d. Any deed, developer agreements, restrictions, easements, covenants, etc. that may impact the location or design of the Project.
 - e. Soils and Environmental reports including test borings as required to identify soil conditions, water table, bearing capacity, possible wetlands, etc.

Programming

The Design Consultant shall conduct a series of meetings (interviews) with the users and their appointed representatives to review the Program Model and curriculum, as approved by the NJDOE, and identify the user's expectations and operational practices, desired space adjacencies, and particular school facilities project requirements as defined by the users themselves. Upon completion of these efforts, the Design Consultant will develop Educational Specifications that will include an executive summary, general narrative description of the project goals and objectives, summary tabulations and square foot areas, adjacency diagrams and a brief verbal description of each area. In addition Space allocation and Furniture listings including size of each piece of furniture shall be included in conformance with all NJDOE requirements. The Design Consultant will meet with the Project Team to present and review the draft of the Educational Specifications to obtain input and comments. Thereafter, the Design Consultant will update the Educational Specifications incorporating this input.

Upon approval of the Educational Specifications by the Project Team they shall be submitted to the NJSCC for approval. The Design Consultant will review and incorporate all relevant comments into a Final Program Document. The final Program Document / Educational Specifications are to be submitted as part of the Schematic Educational Adequacy review by the NJDOE.

Site Analysis

This effort focuses on uncovering and analyzing existing site conditions, which will impact the site selection and project design. This deliverable should be created prior to OPR Workshop. The analysis should be utilized to establish environmental issues that will influence the conceptual design of the Project particular to the site.

1. The Design Consultant will develop composite site analysis drawings that combine all the site information, including materials provided by the NJSCC. The drawings will illustrate the following:
 - a. City planning and zoning/land use requirements (as a reference)
 - b. State planning requirements
 - c. Existing infrastructure locations and capacities
 - d. Existing construction and its current condition
 - e. Existing pedestrian and vehicular circulation
 - f. Character of immediately adjacent urban area
 - g. Soil conditions (through the NJSCC consultant)
 - h. Traffic evaluation (through the NJSCC consultant)
 - i. Environmental conditions (through the NJSCC consultant)
2. Meet with City planning and building officials to discuss local ordinances, the municipal master plan, and opportunities for community development.
3. Design Consultant will meet with the Project Team to review and the preliminary conclusions of this effort and obtain additional input.
4. Design Consultant will prepare a written Code Summary of all presiding codes, regulations and opportunities affecting this site with the possible implications to the Project identified.

Borings and Surveys

When the Agreement provides an allowance for borings and surveys, the Design Consultant must obtain competitive proposals from three (3) firms. The proposed locations of borings shall be established in drawing form by the Design Consultant Team. The borings shall comply with the requirements of all presiding codes. The survey shall be prepared in accordance with NJSCC standards and as referenced herein.

LEED™ Charrette

A LEED™ Charrette is required either as preparation for or shall be conducted during the OPR Workshop and shall include the Project Team and all other stakeholders. The LEED™ for Schools Checklist should be reviewed during the development of alternative concepts and building siting of each of the three conceptual designs. Integral to the conceptual design process should be an evaluation of selected LEED™ for Schools Credits anticipated to be achieved. The Design Consultant shall complete a LEED™ for Schools Checklist for each concept design. Utilize the checklist information as one of the tools for evaluating the three alternative concepts. At the conclusion of this Phase; the Design Consultant shall revisit the NJSCC LEED™ Checklist for the selected concept design and complete the expanded LEED™ for Schools Checklist as a required deliverable. Refer also to the related Commissioning Process defined in the Design Manual Section 2.

Applicable Legal/Regulatory Approvals and Code Summary

The Design Consultant shall include a Code Summary which means providing documentation on respective Contract Documents indicating the presiding codes adopted through the Uniform Construction Code (N.J.A.C. 5:23) by the Division of Community Affairs; Division of Codes and Standards and any other presiding codes and ordinances. The Design Consultant shall also identify any required application to regulatory agencies and commissions having jurisdiction over the project and respective contact information as well as a summary of requirements. The Design Consultant Team shall also identify and obtain written verification from all applicable authorities that off-site facilities exist and can service the project and provide a summary of requirements. This summary shall also include specific applicable section references, content and calculations applicable to the specific School Facilities Project.

Confirm availability of adequate service including pressures available, specific consumption or loads and approximate date of service.

Establish a firm commitment by the utility, or in the case of on-site utilities, the Client School District to provide the service.

Contain statements regarding any special regulations and/or requirements which, should they not be included in the Contractual Documents, would result in significant redesign and/or extra cost of construction by having to be included at a later date.

Generally state the extent of work to be done by the provider of the utility and whether there will be any fees to be paid by the Client School District or Contractor.

This summary shall also include specific applicable section references, content and calculations applicable to the specific School Facilities Project.

Owner Project Requirements (OPR) Workshop

The Workshop, facilitated by the Commissioning Agent, is intended as the first opportunity for the team to collectively discuss and document all the requirements and goals applicable to the project. This document, titled the Owner Project Requirements (OPR), shall be revisited, and revised throughout the design process and serve as a 'touchstone' by which team members may evaluate if goals are met and how decisions evolve over the course of the process. The significance of the OPR can not be overstated, as the definition of such requirements and expectations will inform most all design decisions. The Commissioning Agent is merely a facilitator at this event and as such may raise questions for the purpose of clarification, such as those suggested by the Project Progress Report Guides, but it the responsibility of all participating parties to communicate at this time both information pertinent to the project that may have yet to be assembled and concerns pertaining not only relevant to the design and construction of the project but ultimately the operations and maintenance of such a facility. The work product associated with this activity will establish the basis of collaboration among the numerous Project Team members and therefore early and active involvement of all stakeholders is of paramount performance so as not to require re-design later or otherwise delay the project development.

Development of Alternative Concept Designs / Initial Integrated Design Sessions

During this effort the Design Consultant Team shall develop three alternative Conceptual Designs for school facilities project located on the proposed site that are based on the approved final Educational Specifications and the Owner Performance Requirements, inclusive of the requirements, recommendations of this Manual, and the selected LEED™ for Schools credits. The Concept Design documents shall specifically include; a site plan, floor plans and a front elevation that shows site development, major mechanical, electrical and utility areas described and diagrammed, pedestrian and vehicular circulation, a response to Homeland Security Standards, as well as all major program spaces. A Description of the Building Enclosure, MEP and Renewable Energy Systems under consideration are to be included. A narrative description of the HVAC systems Mechanical/Electrical and controls in sufficient detail to allow a proper understanding of its operation, required modeling and costs shall be provided for each concept.

Supporting analysis for each of the three designs shall be developed at this time, using common factors, so a comparison of their respective merits may be evaluated by the Project Team at the Project Review Meeting. Such analysis shall specifically include all the documentation, as delineated in the Deliverables Checklist, associated with this phase of work and further described by either the Deliverable Definitions as defined by this Manual and/or further described below:

1. **Lighting / Daylighting / Studies [Design Criteria # 4]**

A three dimensional study model **or a summary and response of the conceptual designs to the controlling Daylighting criteria** are required of each of the alternate designs under consideration by which both the practical availability and quality of lighting may be assessed when selecting a final design for further development. This information shall be evaluated in relation to building orientation, siting, and approach to the openings in the façade. Upon selection of a final conceptual design a more complete analysis shall be prepared during the Schematic Phase to reflect any changes further identified to be incorporated.

2. **Safety and Security: Homeland Security [Design Criteria # 6]**

The Project Team participating in the Integrated Design Sessions is to achieve

compliance with the most current applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards. These requirements are to be reviewed and incorporated into each of the three conceptual designs. The ability of each of the three concepts to comply with these requirements and the associated costs should be analyzed, documented, and used as a tool to evaluate the three solutions.

3. **Energy Analysis Model Calculations [Design Criteria # 7]**

Architectural Design Tools, as identified and described by Design Criteria 7, may be employed at the earliest stages of conceptual design to assess the anticipated performance of the alternate designs and associated systems selected. Particular emphasis shall be given to the relationship between effective daylight / lighting strategies to be investigated simultaneously to this effort and other load reduction strategies such as orientation and massing that may be evaluated by this activity. It is suggested that for the purpose of comparison amongst designs that the prescriptive and Mandatory requirements of ASHRAE 90.1-2004 be used as a common basis for both the envelope and equipment.

4. **Life Cycle Cost Studies [Based Upon Design Criteria # 8]**

The Design Consultant shall prepare a Life Cycle Cost Study using the procedure as defined by Design Criteria #8 for all designated systems under consideration at this time, specifically Renewable Energy Systems and HVAC systems under consideration. This Life Cycle Cost Analysis shall serve as the basis of comparison among alternate systems.

5. **Commissioning Activities [Design Criteria # 9]**

- a. The Design Consultants shall participate in the development of the Commissioning Plan
- b. The Design Consultants shall participate in the development of the Commissioning Process Report
- c. The Design Consultants shall participate in the OPR Workshop and provide information and documentation to the best of their abilities to assist in the development of the Owner Project Requirements specifically including:
 - 1) All Preliminary Analysis and Information Gathered, including the Program Document, Project Schedule, Organizational Directory, Communication Directory, Site Analysis, Test Borings and Surveys, Code Summary, and selected LEED™ credits.
 - 2) All Design Criteria requirements and selected recommendations including but not limited to; Acoustical performance, thermal performance, lighting performance, daylighting criteria, Indoor Air Quality requirements, etc.

Construction Cost Estimates (CCE)

For each of the designs under consideration as well as the selected Final Concept Design, a Construction Cost Estimate shall be prepared by the Design Consultant and the NJSCC and or its agents utilizing common documents, methods, and assumptions. All Construction Cost Estimates

shall be in the NJSCC Standard Format utilizing the appropriate CSI/Master Format. These estimates shall be reviewed for scope, accuracy, and reasonableness by the other party at which time a reconciled estimate reflecting common consensus shall be produced for each concept solution.

Project Schedule

The Design Consultant shall prepare a revised project schedule in a mutually agreed upon format compatible with Expedition at the beginning and end of this Phase. The schedule must be approved by the NJSCC and its agents prior to proceeding to the next Phase of the School Facilities development.

Design Review and Project Progress Meeting(s)

The Design Review and Project Progress Meeting(s), hereafter referred to as the Project Meetings, are working sessions, led by the NJSCC and/or its agents with participation of all pertinent members of the Project Team. At minimum, participants shall include the Design Professional and their Sub-Consultants, Client School District, designated community representatives, and the NJSCC Project Manager and its agents. The Project Meetings are to be initiated once the OPR, Lump Sum Project Budget and Schedule, and the first iteration of the alternate Conceptual Designs have been completed. The three alternative Conceptual Designs shall be presented to the Project Team so as to emphasize the strengths and weaknesses of each concept based upon all the Design Criteria, using the Project Progress Report Guides as a format, and the specific provisions of the OPR. At which time one or more conceptual designs may be selected for further development, until which time the Project Team has selected a single design that has satisfied all requirements of the OPR and has provided sufficient documentation that the design may be built within the available budget and schedule. The conclusions of this meeting shall be documented by means of the deliverables as described by the Deliverables Checklist due at the conclusion of this phase and specifically including the preparation of a Project Progress Report. The selected design, the preparation and submittal of all associated deliverables of this phase shall constitute a Final Concept Design suitable for proceeding to the Schematic Design Phase.

Value Management / Engineering Review

For each of the designs under consideration as well as the selected Final Concept Design, a Construction Cost Estimate shall be prepared by the Design Consultant and the NJSCC and or its agents utilizing common methods and assumptions. These estimates shall be reviewed for scope, accuracy, and reasonableness by the other party at which time a reconciled estimate reflecting common consensus shall be produced. At the conclusion of each phase the design currently under development shall be the subject of Value Management /Engineering session at which time suggestions shall be solicited, documented, and analyzed as to how greater value may be accomplished. Such suggestions shall be presented to the Design Team so as to inform the design process and facilitate informed decisions as to how to accomplish the highest benefit to the program, with particular emphasis on operation and maintenance costs, relative cost.

Final Concept Design

The Final Concept Design will be documented at a minimum, with a site plan, floor plans, elevations, and computer generated or hand drawn three dimensional exterior and interior views. (A minimum of two views; one exterior and one interior is required). All other related deliverables produced as a result of this Phase and the common analysis defined above including but not limited to a narrative description of the HVAC systems, Mechanical /Electrical, and controls in sufficient detail to allow a proper understanding of its operation, required modeling and analysis as defined above, and related costs shall be provided. This information shall be identified to support the selection of the Final Concept.

Program/Concept Phase Project Progress Report

The Design Consultant shall prepare a Program/Concept Phase Project Progress Report in written form at the completion of this stage. This report should be based upon the Project Progress Report Guides and associated “prompts” or “questions” in this manual and shall include all products and deliverables prepared during this phase.

Program /Concept Phase Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. Site Plans and Site Analysis Drawings: Minimum scale: 1/32"=1'-0" or 1" = 30'-0"
2. Adjacency & Blocking / Stacking Diagrams, Floor Plans and Elevations of the three (3) initial concepts and the selected final concept to be further developed: Minimum scale: 1/16"=1'-0"
3. Computer generated or hand drawn, color, three dimensional Exterior and Interior Views Sketches (Minimum of two (2) required): refer to minimum sheet sizes: size as applicable
4. Construction Cost Estimate: 8 ½" x 11" (SCC Standard Format utilizing the appropriate CSI/Master Format)
5. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 ½" x 11"

A. Completion of Phase Submittal: Program / Concept Design: the submittal shall include all required drawings, Construction Cost Estimate, a Project Progress Report Booklet or Binder and all other required documentation.

Program/Concept Phase submission distribution shall be as follows:

1. SCC Project Manager: One full sized set of all deliverables
2. NJSCC agents: A maximum of four full sized sets of all deliverables (for estimating and review purposes based upon NJSCC's agents request).
3. School District: One full sized set of all deliverables.
4. Commissioning Agent: One full sized set of all deliverables.
5. SCC Technical Services, Trenton: One half size drawing set and one full size set of all other deliverables.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC and the Project Team to review such submissions prior to proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

Program /Concept Phase Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. Site Plans and Site Analysis Drawings: Minimum scale: 1/32"=1'-0" or 1" = 30'-0"
 2. Adjacency & Blocking / Stacking Diagrams, Floor Plans and Elevations of the three (3) initial concepts and the selected final concept to be further developed: Minimum scale: 1/16"=1'-0"
 3. Computer generated or hand drawn, color, three dimensional Exterior and Interior Views Sketches (Minimum of two (2) required): refer to minimum sheet sizes: size as applicable
 4. Construction Cost Estimate: 8 1/2" x 11" (SCC Standard Estimating Format utilizing the appropriate CSI/Master Format)
 5. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 1/2" x 11".
- A. Completion of Phase Submittal: Program / Concept Design: the submittal shall include all required drawings, Construction Cost Estimate, a Project Progress Report Booklet or Binder and all other required documentation.

Program/Concept Phase submission distribution shall be as follows:

1. NJSCC Project Manager: One full sized set of all deliverables
2. NJSCC agents: A maximum of four full sized sets of all deliverables (for estimating and review purposes based upon NJSCC's agents request).
3. School District: One full sized set of all deliverables.
4. Commissioning Agent: One full sized set of all deliverables.
5. NJSCC Architecture and Engineering, Trenton: One half size drawing set and one full size set of all other deliverables.

SCHEMATIC DESIGN PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

The purpose of the deliverables during the Schematic Design is to document the continuing development of the school facilities project and its major components and to establish a Project budget.

- Site Plan and Landscape Plan
- Schematic Design Drawings
- Computer or hand-rendered color, perspective views of proposed Interior and Exterior Views/Sketches
- Schematic Design Drawings
- Single Line Engineering Diagrams for all systems
- Updated Description of MEP and Renewable Energy Systems
- Site Engineering Calculations
- Single Line Structural Diagrams and Calculations
- Updated Code Summary
- Daylighting/ Lighting Analysis of final concept [Design Criteria # 4, 18]
- Updated Homeland Security Compliance documentation [Design Criteria # 6]
- Energy Analysis Model Calculations [Design Criteria # 7]
- NIST Building Life Cycle Cost Analysis [Design Criteria # 8]
- Prepare a Description of the Building Exterior Enclosure System (AKA Envelope Basis of Design) [Design Criteria # 15]
- Service Life Planning Analysis [Design Criteria # 25]
- NJSCC LEED™ for Schools Checklists and supporting documentation
- Schematic Educational Adequacy Review Submission and Educational Specifications, including Municipal Planning Board submission
- Outline Specifications
- Construction Cost Estimate and reconciliation with NJSCC Agent's estimate
- Written report of Value Management / Engineering Review
- Updated Project Schedule at beginning and end of phase
- Schematic Phase Project Progress Report and all other required deliverables in a Project Book or Binder Format
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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SCHEMATIC DESIGN PHASE

Description

Following execution of the Design Consultant Agreement, a Notice-to-Proceed for the Design Phase will be issued to the Design Consultant. The Notice-to-Proceed for the Design Phase is the authorization for the Design Consultant to begin the Work under the Agreement. The design phase will begin with the following scope if the Schematic Phase is first phase of the S.O.W. of the Design Consultant.

The Design Consultant shall proceed with Schematic Design Phase services only upon approval of the Program/Concept Design Phase documents by the NJSCC.

In the Schematic Design phase the physical school facilities project and supporting system configurations continue to be developed based on the approved Final Concept Design. Schematic design concerns itself with scale, proportion and relationships. This phase should also include the development of preliminary systems, equipment and materials under consideration. The Schematic Design 'breaks' the school facilities project down into major building assemblies and systems, and then identifies inter-relationships through the process of Integrated Design by which each element may be evaluated through analysis so as to achieve optimal performance in accordance with the Design Criteria established by the Design Team and the requirements of this Design Manual.

At the inception of this phase, the Design Consultant, in consultation with The Project Team, shall review the Schematic Design Phase Project Progress Report Guide questions, the current OPR, and the Deliverable requirements to solicit comments and suggestions pertaining to the development of systems and assemblies during this phase. In conjunction with this effort, the Design Consultant shall develop a revised Project Schedule that serves to document the anticipated time required of each of the associated activities necessary to complete the Deliverables designated by the Checklist. This Project Schedule shall be submitted to the NJSCC and/or its agents for approval and updated at the end of this Phase. The Design Consultant will meet with the Project Team to review progress as often as deemed necessary, to solicit input and ultimately obtain approval of the NJSCC and or its agents

The development of the Schematic Design shall specifically include the following requirements and produce the associated deliverables:

1. **Visual Comfort [Design Criteria # 3]**
Lighting / Daylighting Analysis documenting anticipated compliance with NJDOE regulations and NJSCC requirements.
2. **Lighting / Daylighting Analysis [Design Criteria # 4]**
Lighting / Daylighting Analysis of the selected design to evaluate and optimize the amount of daylight illumination practical. Daylighting Analysis as described by the Daylighting Design Criteria #4 in Section 2 of this document shall be conducted with computational simulation models during the schematic development of final concept design to optimize the amount of natural daylighting available. Such analysis shall be conducted as many times as deemed appropriate as elements of the design are reconsidered by the Design Team so as

to assure that the criteria for both Daylighting and the Visual Comfort Design Criteria will ultimately be accomplished. Upon selection of a concept design for further development, during Schematic Design and again at Design Development phase, a computational model must be used to quantify anticipated illuminance of surfaces within the designated instructional spaces. Such analysis shall ideally be conducted by the same means used to evaluate electric lighting during this phase so as to coordinate the function of each strategy and associated equipment and/or assemblies.

3. **Indoor Air Quality, Minimum Ventilation Levels [Design Criteria # 5a]**
Description of MEP Systems (Design Intent and Basis of Design) and Single Line Engineering Diagrams to designate intended ventilation control strategy and ventilation rate calculations as per ASHRAE 62.1-2004 as defined by the referenced standard.
4. **Indoor Chemical & Pollutant Source Control [Design Criteria # 5g]**
Description of MEP Systems and Single Line Engineering Diagrams to designate ventilation system for 'negatively pressurized spaces' by dedicated means and filtration media MERV ratings. Specifically identify hazardous waste disposal plumbing associated with instructional use.
5. **Safety and Security: Homeland Security [Design Criteria # 6:]**
The Project Team participating in the Schematic Design Phase is to achieve compliance with the most current applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards. These requirements are to be reviewed and incorporated into the selected conceptual design to be further developed during this phase
6. **Energy Analysis Model Calculations [Design Criteria # 7:]**
This phase requires that energy model calculations using ASHRAE 90.1-2004 "Performance Rating Method" be performed for the selected Conceptual Design.
7. **Life Cycle Cost Analysis [Design Criteria # 8]**
Document anticipated performance of all proposed HVAC, lighting, and renewable energy systems under consideration utilizing the referenced method and data where applicable. The Design Consultant will develop systems maintenance and operating cost estimates for the systems not addressed by the referenced data source.
8. **Commissioning Plan [Design Criteria # 9]**
 - a. The Design Consultants shall provide the Description of MEP and Renewable Energy Systems (Design Intent and Basis of Design) to the Commissioning Agent.
 - b. The Design Consultants shall provide the Description of Building Exterior Enclosure (Envelope) Systems (Design Intent and Basis of Design) see sample, Appendix "K" of ASHRAE Guideline 3-2006.
 - c. Description of the Building Enclosure (Envelope) System, including

thermal resistance values in compliance with the Prescriptive requirements of ASHRAE 90.1-2004.

- d. The Design Consultants shall participate in the update of the Owner Project Requirements and provide any support technical data required. Based on the Commissioning Process, the Owner Project Requirements shall be revised as record of the NJSCC Project Team decisions.
- e. The Design Consultants shall participate in the update of the Whole Building Commissioning Plan

9. **Description of the Building Exterior Enclosure (Envelope) System [Design Criteria # 15]**
(AKA Envelope Basis of Design)

The Design Consultant shall develop an “Envelope Basis of Design” document at this phase so as to verify compliance with the OPR and communicate to the Design Team the rationale for selecting the proposed assemblies. This document shall be revised as necessary during subsequent phases to reflect changes made by the Project Team.

a. **Renewable Energy: Life Cycle Cost Analysis [Design Criteria # 16]**

The Project Team shall identify renewable energy systems under consideration for LCC Analysis by the Design Consultant in accordance with the provisions of the Renewable Energy Design Criteria requirements. At the conclusion of this phase all systems selected by the Project Team shall be identified as included in the OPR.

b. **High Performance Electric Lighting [Design Criteria # 18]**

The Design Consultant shall evaluate all lighting systems under consideration by means of the referenced Life Cycle Cost Analysis method. At the conclusion of this phase all systems selected by the Project Team shall be identified as included in the OPR.

c. **Service Life Planning Analysis [Design Criteria # 25]**

Service Life Planning Analysis, as distinguished from Life Cycle Cost, is a recently developed process by which not only are the operational costs considered in relation to the first (capital) costs but provides an objective means by which to evaluate what is commonly referred to as durability (Service Life). Such analysis, described further in Section 2 of this document, shall be performed during both Schematic Design to inform the selection of materials and assemblies and again during Design Development so as to evaluate the relative value of materials and equipment under consideration, evaluate the final selection, and ultimately to inform future revisions to the District Maintenance Plan and development of the System (Operational) Manuals associated with the Commissioning Process.

At the conclusion of this phase all materials and assemblies selected by the Project Team shall be identified as included in the OPR.

As a minimum the “cost to own” each of the following five critical

building systems shall be calculated utilizing the computation method described in Section 2 of this Design Manual:

Roof

Exterior Walls (Building Envelope)

Fenestration (Windows and Doors)

Interior Walls at High Traffic Areas

Flooring at High Traffic Areas

This methodology may be applied to other components as deemed appropriate by the Project Team.

d. **Description of MEP Systems: (Design Intent and Basis of Design) and Single Line Engineering Diagrams**

The Design Consultant shall develop a “Basis of Design” document at this phase so as to verify compliance with the OPR and communicate to the Design Team the rationale for selecting the proposed systems, specifically elaborating on the ventilation strategy and associated calculations in compliance with ASHRAE 62.1-2004 recommended methods. This document shall be revised as necessary during subsequent phases to reflect changes made by the Project Team.

Update LEED™ Checklist Form

Integral to all phases of the design process should be the periodic evaluation of elective LEED™ Credits anticipated to be achieved. The NJSCC LEED™ for Schools Checklists and supporting documentation shall be revised to reflect changes to the design under development and documented by means of an updated OPR.

Schematic Educational Adequacy Review and Specifications

The Schematic Design shall be reconciled with the Final Educational Specifications. Present any variations to the NJSCC and Project Team and adjust the Educational Specifications or Schematic Design as required prior to NJDOE review.

Submissions to Other Authorities

Upon completion and reconciliation of the Educational Specifications and Schematic Design these documents shall be submitted by the Project Team for review and approval to the following authorities:

1. NJ Department of Education (NJDOE)

The Design Consultant shall prepare and submit the Schematic Educational Adequacy Submission to the NJ Department of Education (NJDOE) in conformance with the NJDOE’s requirements. The NJDOE approval of the Schematic Educational Adequacy Submission (AKA PEC Letter) should have been received prior to the completion of the Schematic Phase and before approval is granted by the NJSCC in order to proceed to the next phase of development. The time required of this submission and review should be

accounted for within the Project Schedule in accordance with the NJDOE anticipated time required of a formal response.

2. **Municipal Planning Authorities**

A non-binding, courtesy submission shall be made to the appropriate municipal planning or zoning authorities as required of the Schematic Educational Adequacy Submissions. Upon request of the authority, the Design Consultant with the participation of the Project Team will make themselves available to review these documents with members of this authority and/or community participants. Their comments, as deemed appropriate by the Project Team are to be incorporated as per the direction of the NJSCC Project Manager.

3. **Other Jurisdictions**

Federal, State, regional, and/or local authorities, as identified by the applicable Legal / Regulatory Approvals and Code Summary document, identifying required submissions subject to either approval and/or advisement shall be completed to the greatest extent possible during this phase prior to approval by the NJSCC Project Manager to proceed to the next phase.

Final Schematic Design Documents

The Design Consultant will prepare Final Schematic Design Documents for the review and approval of the NJSCC. The documents will establish preliminary size and configuration of major school facilities project systems including required site utilities, structural, architectural, parking, elevators, HVAC, plumbing, fire protection, safety and security, tel. /data and electrical systems. Single line engineering diagrams and appropriate descriptive technical information for all systems during this phase is required. Computer generated or hand drawn, color, three dimensional Exterior and Interior Views/ Sketches of Schematic Design and to convey to convey the design concept of special areas such as lobbies, special fenestration features, etc.

Specifications

Outline specifications for the project are to be developed from the latest proposed design. The outline specification shall follow the latest version of CSI/MasterFormat. The specification shall identify all specification sections known at this time as required for a complete project specification. The Design Consultant shall elaborate and describe any special feature of the School Facilities Project, such as communication systems, security systems, fire-protection systems, special structural systems, etc.

Construction Cost Estimate

The Design Consultant will prepare a Schematic Design Construction Cost Estimate. The Design Consultant and the NJSCC and/or its agents shall utilize the same NJSCC Standard Format utilizing the appropriate CSI-MasterFormat, and reconcile the Construction Cost Estimate (CCE) with each other and the prior phase estimate. Should the reconciled Schematic Design CCE exceed the latest approved CCE, the Design Consultant and NJSCC and its Agents shall immediately identify what action the Design Consultant will take to meet the approved CCE before proceeding.

The Design Consultant will participate in a Value Management / Engineering Review effort with

the NJSCC and/or its agents at the completion of the reconciled Schematic Design Construction Cost Estimate. This effort will review major components of the school facilities project that have the greatest potential impact on the cost of construction. The Design Consultant will incorporate such recommendations as agreed upon by the Project Team as necessary and/or desirable so as to achieve the greatest potential value.

Schematic Phase Project Progress Report

The Design Consultant shall prepare a written Project Progress Report in preparation for the Project Review Meeting. This report should be based upon the Project Progress Report Guides questions (AKA “prompts”) contained in Section 4 of this manual and shall include all other products and deliverables prepared during this phase.

Project Review Meeting

The Design Consultant shall present all of the required deliverables, as delineated by the Checklist, to the Project Team for review and comment. The preliminary responses prepared by the Design Consultant in preparation of the Project Progress Report shall be discussed and consensus, where possible, shall be sought. Comments and suggestions as they influence the subsequent development of the Project shall be incorporated into the Final Project Progress Report and updated OPR associated with this phase as a record of the teams design intent.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC and the Project Team to review such submissions prior too proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

Schematic Design Phase Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. Existing Conditions/Survey Documentation, Site Plans and Landscape Plans: Minimum scale 1/32"=1'-0" or 1" = 20'-0"
 2. Floor Plans, Roof Plan, Single Line Engineering Plans and Diagrams & Elevations: Minimum scale: 1/16"=1'-0"
 3. Computer generated or hand drawn, color, three dimensional Exterior and Interior Views/ Sketches of Schematic Design: Refer to minimum sheet sizes: size as applicable
 4. Construction Cost Estimate and Outline Specification: Minimum size: 8 1/2" x 11" (SCC Standard Format utilizing the appropriate CSI/Master Format)
 5. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 1/2" x 11"
- A. Completion of Phase Submittal: Schematic Design submittal shall include drawings, outline Specification; NJDOE Educational Adequacy Submission, Construction Cost Estimate, Project Progress Report Booklet or Binder, and all other required documentation.

Schematic Phase submission distribution shall be as follows:

1. NJSCC Project Manager: One full sized set of all deliverables.
 2. NJSCC and /or its agents: A maximum of four full sized sets of all deliverables (for estimating and review purposes based upon NJSCC and /or its agents request).
 3. School District: One full sized set of all deliverables.
 4. Commissioning Agent: One full sized set of all deliverables.
 5. NJSCC Architecture and Engineering, Trenton: One half size drawing set and one full size set of all other deliverables.
- B. New Jersey Department of Education (DOE) Submittals - Schematic Educational Adequacy Review Phase required documentation.
1. DOE: Full sets as required: number of copies, signed and sealed: Drawings (Site plan and Floor plans), room layouts and charts, Educational specifications, DOE Forms, Board of Education Resolutions and transmittals, etc. required by the DOE.
 2. NJSCC Project Manager, NJSCC and /or its agents, and School District, Commissioning Agent: 1 full sized set of all deliverables.
 3. NJSCC Architecture and Engineering, Trenton: Program / Schematic / Final: Electronic only of all deliverables.

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DESIGN DEVELOPMENT PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

Design Development is intended to further develop the school facilities project design with greater detail.

- Design Development Drawings *
- Interior Finish Color/Material Selection Board(s)
- Color Rendering
- Updated Description of MEP and Renewable Energy Systems *
- Description of Building Exterior Enclosure Systems *
- Building Exterior Enclosure (AKA Wall Assembly) Schedules [Design Criteria # 15] *
- Updated Code Summary including of status of all utility permits, legal, and regulatory approvals completed*
- Updated Homeland Security Compliance Documentation [Design Criteria # 6] *
- Daylighting / Lighting Analysis Study using a computational model [Design Criteria # 4, 18]*
- Energy Analysis Model Calculations [Design Criteria # 7:] *
- NIST Building Life Cycle Cost Analysis [Design Criteria # 8] *
- Domestic Water and Landscape Water Use Analysis [Design Criteria # 21a & b] *
- Service Life Planning Analysis calculations [Design Criteria # 25] *
- Update Description of Building Exterior Enclosure Systems*
- NJSCC LEED™ Checklists and supporting documentation *
- Final Educational Adequacy Review Submission to the NJDOE
- Specifications including General Conditions and all technical sections *
- Construction Cost Estimate at 50% complete and 100% complete; reconciled with NJSCC and /or its agents estimate
- Value Management / Engineering Review Report
- Updated Project Schedule at beginning and end of phase
- Schematic Phase Project Progress Report and all other required deliverables in a Project Book or Binder Format
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

Note: Deliverable Items designated with an asterisk (*) are to be complete by the time of the scheduled 50% Complete Design Development submission.

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DESIGN DEVELOPMENT PHASE

Description

The Design Consultant shall proceed with Design Development Phase services only upon approval of the Schematic Design Phase documents by the NJSCC.

The Design Development Phase refines the school facilities project based on the approved Schematic Design to the point where all the major building architectural and engineering systems have been identified, defined, developed, and coordinated. The following is a description of the minimum information required for the Design Development Submission. Items listed which are not applicable to the proposed structure may be disregarded.

At the inception of this phase, the Design Consultant, in consultation with The Project Team, shall review the Design Development Phase Project Progress Report Guide questions, the current OPR, and Deliverable requirements to solicit comments and suggestions pertaining to the development of systems and assemblies during this phase. In conjunction with this effort, the Design Consultant shall develop a revised Project Schedule that serves to document the anticipated time required of each of the associated activities necessary to complete the Deliverables designated by the Checklist. This Project Schedule shall be submitted to the NJSCC and/or its agents for approval and updated at the end of this Phase. The Design Consultant will meet with the Project Team to review progress as often as deemed necessary, to solicit input and ultimately obtain approval of the NJSCC and or its agents.

The Design Consultant shall prepare a progress set (50% complete) of the Design Development documents to be distributed to the NJSCC and its agents for review and comment. A 50% complete Design Development Construction Cost Estimate and Value Management / Engineering Review shall be completed and reconciled at this time.

The Design Development Phase of the project shall specifically include the following requirements and producing the associated deliverables:

1. **Acoustic Comfort [Design Criteria # 1]**
Document acoustical Sound Transmission Class values associated with Building Enclosure (Envelope) System and interior partitions selected as compared with those identified by the referenced standard.
2. **Visual Comfort [Design Criteria # 3]**
Lighting / Daylighting Analysis documenting anticipated compliance with NJDOE regulations and NJSCC requirements.
3. **Lighting / Daylighting Analysis [Design Criteria # 4]**
Document anticipated compliance with NJDOE regulations and NJSCC requirements. Daylighting Analysis as described by the Daylighting Design Criteria #4 in Section 2 of this document shall be conducted to optimize the amount of natural daylighting available. Such analysis shall be conducted as many times as deemed appropriate as elements of the design are reconsidered by the Design Team so as to assure that the criteria for both Daylighting and the Visual Comfort Design Criteria will ultimately be accomplished. During the Design Development phase, a computational model must be used to quantify

anticipated illuminance of surfaces within the designated instructional spaces. Such analysis shall ideally be conducted by the same means used to evaluate electric lighting during this phase so as to coordinate the function of each strategy and associated equipment and/or assemblies.

4. **Safety and Security: Homeland Security [Design Criteria # 6]**

The Project Team participating in the Design Development Phase is to achieve compliance with the latest current applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards revised. These requirements are to be reviewed and incorporated into the selected Contract Drawings and Specifications to be further developed during this phase.

5. **Energy Analysis Model Calculations [Design Criteria # 7]**

During this phase a computational simulation model shall be employed in compliance with the referenced ASHRAE 90.1-2004 "Performance Rating Method", to determine the anticipated energy performance. Such simulations shall be repeated as deemed necessary by the Design Consultant, as the project evolves, so as to document changes to the anticipated performance as various equipment and assemblies are considered and the building envelope continues to evolve. Such analysis shall be an iterative process, informed by the Daylighting / Lighting Analysis. Prior to proceeding to the development of the Construction Documents such analysis and associated documentation shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of EA Credit 1, Optimize Energy Performance, 14% New, 7% Renovation, if desired of the district.

6. **Life Cycle Cost Analysis [Design Criteria # 8]**

Document anticipated performance of selected HVAC, lighting, and renewable energy systems utilizing the referenced method and data where applicable. The Design Consultant will develop systems maintenance and operating cost estimates for the systems not addressed by the referenced data source.

7. **Commissioning Plan [Design Criteria # 9]**

- a. The Design Consultants shall provide the Description of MEP and Renewable Energy Systems (Design Intent and Basis of Design) to the Commissioning Agent.
- b. The Design Consultants shall provide the Description of Building Exterior Enclosure (Envelope) Systems (Design Intent and Basis of Design) see sample, Appendix "K" of ASHRAE Guideline 3-2006.
- c. Description of the Building Enclosure (Envelope) System, including thermal resistance values in compliance with the Prescriptive requirements of ASHRAE 90.1-2004.
- d. The Design Consultants shall participate in the update of the Owner Project Requirements and provide any support technical data required. Based on the Commissioning Process, the Owner Project Requirements shall be revised as record of the NJSCC Project Team decisions.

- e. The Design Consultants shall participate in the update of the Whole Building Commissioning Plan

8. **Description of the Building Enclosure (Envelope) System [Design Criteria # 15]**
(AKA Envelope Basis of Design)

The Design Consultant shall update the “Envelope Basis of Design” document at this phase so as to verify compliance with the OPR and communicate to the Design Team the rationale for selecting the proposed assemblies. This document shall be revised as necessary during subsequent phases to reflect changes made by the Project Team.

Typical Building Wall Sections documenting compliance at minimum with both the mandatory and prescriptive requirements of the International Energy Conservation Code as amended by the State of New Jersey. Typical Building Wall Sections shall also document compliance with continuous air barrier requirement as described by the referenced standard.

9. **Renewable Energy: Life Cycle Cost Analysis [Design Criteria # 16]**

Update documentation previously developed for selected renewable energy systems in compliance with the referenced method if changes have been made during this phase.

10. **High Performance HVAC [Design Criteria # 17]**

The Design Consultant shall develop ‘Double Line’ MEP Engineering Documents in compliance with both the mandatory and prescriptive requirements of the International Energy Conservation Code as amended by the State of New Jersey.

11. **High Performance Electric Lighting [Design Criteria # 18]**

The Design Consultant shall evaluate all lighting systems selected during this phase by means of the referenced Life Cycle Cost Analysis method. The Design Consultant shall make adjustments to the Contract Documents to reflect the result of this analysis in conjunction with a review of the related budget Construction Cost Estimate.

12. **Water Efficient: Landscaping Water Use Analysis [Design Criteria # 21a]**

Document anticipated water use for the purpose of landscaping is 50% or less than a mid-summer baseline case as calculated by the LEED™ for Schools WE Credit 1.1 method. Landscaping Water Use Analysis shall be performed no later than the Design Development phase so as to inform the selection and design of an irrigation system and/or drought-tolerant landscaping. Such analysis shall consider the aggregate landscaping water consumption, as compared to a ‘baseline estimate’ of mid-summer consumption and calculated by the means described by LEED™ NC 2.2 Reference Guide. Documentation, at minimum, shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of WE Credit 1.1 Water Efficient Landscaping: Reduce by 50%, if desired of the district.

13. **Water Efficient: Water Use Analysis [Design Criteria # 21b]**

Document anticipated water use is 20% or less than the referenced standard. Water Use Analysis shall be performed no later than the Design Development phase so as to inform the selection of plumbing fixtures. Such analysis shall consider the aggregate water

consumption of all plumbing fixtures, with the exclusion of landscaping use, as compared to 'baseline estimate' derived from fixture consumption values found specified in the Energy Policy Act of 1992. Documentation, at minimum, shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of WE Credit 3.1 Water Use Reduction: 20% Reduction, if desired of the district.

14. **Service Life Planning Analysis [Design Criteria # 25]**

Service Life Planning Analysis, as distinguished from Life Cycle Cost, is a recently developed process by which not only are the operational costs considered in relation to the first (capital) costs but provides an objective means by which to evaluate what is commonly referred to as durability (Service Life). Such analysis, described further in Section 2 of this document, shall be performed during both Schematic Design to inform the selection of materials and assemblies and again during Design Development so as to evaluate the relative value of materials and equipment under consideration, evaluate the final selection, and ultimately to inform future revisions to the District Maintenance Plan and development of the System (Operational) Manuals associated with the Commissioning Process.

At the conclusion of this phase all materials and assemblies selected by the Project Team shall be identified as included in the OPR.

At a minimum the "cost to own" of each of the following five critical building systems shall be calculated utilizing the computation method described in Section 2 of this Design Manual:

1. Roof
2. Exterior Walls (Building Envelope)
3. Fenestration (Windows and Doors)
4. Interior Walls at High Traffic Areas
5. Flooring at High Traffic Areas
6. Other components may be analyzed as deemed necessary by the Project Team.

This methodology may be applied to other components as deemed appropriate by the Project Team.

Updated LEED™ Checklist Forms and Letter Templates

Integral to the Design Development process is a reevaluation and further justification of associated LEED™ Credits to be achieved. Complete a NJSCC LEED™ Checklist for the developed concept consistent with this manual. The NJSCC LEED™ Checklists and supporting documentation shall be revised to reflect changes to the design under development and documented by means of an updated OPR.

NJDOE Final Educational Adequacy Review

The Design Development Documents shall be reconciled with the Final Educational Specifications. The Design Consultant shall present any variations to the Project Team and adjust

the Educational Specifications or Design Development Documents as required.

Upon completion of the Final Educational Specifications and the sixty (60%) percent complete “plans and specifications” as defined by the NJDOE Title N.J.A.C. 6A.26.5-4 which have been approved by the Project Team, the Design Consultant shall prepare and submit the Final Educational Adequacy Submission to the NJDOE in conformance with their requirements at the earliest appropriate date. Upon satisfaction of the NJDOE requirements of this submission, the NJDOE shall grant a conditional approval required prior to proceeding to the Construction Document phase. The time required of this submission and review should be accounted for within the Project Schedule in accordance with the NJDOE anticipated time required of a formal response. The conditional approval shall become final upon the issuance by the NJDOE of the Final Eligible Cost (FEC) Letter to the District.

Submissions to Other Jurisdictions

Federal, State, regional, and/or local authorities, as identified by the Applicable Legal/Regulatory Approvals and Code Summary document, requiring submissions subject to either approval and/or advisement shall be completed to the greatest extent possible during this phase prior to approval by the NJSCC Project Manager to proceed to the next phase. The Design Consultant must contact all of the appropriate Regulatory Agencies upon project initiation as described in the Program/Concept Phase and include in its Design Development Submission copies of all applications submitted. If permits have been issued at the close of this phase, include copies of all approvals obtained and describe in writing, restrictions imposed upon the School Facilities Project, if any, as well as any additional cost implications beyond those envisioned in the Initial Construction Cost Estimate (CCE).

Utility Availability/Approval

The Design Consultant must obtain written verification that off-site or on-site utility facilities exist and can service the School Facilities Project from the applicable authorities. Letters pertaining to sanitary, storm, water, fire-protection, gas, electrical, telephone and cable services must be obtained which:

Confirm by field test the availability of adequate service including specific pressures available, consumption or loads and approximate date of service. Design Consultant shall submit copies of the test results.

Establish a firm commitment by the utility, or in the case of on-site utilities, the Client School District, to provide the service.

Contain statements regarding any special regulations and/or requirements which, should they not be included in the Contractual Documents, would result in significant redesign and/or extra cost of construction by having to be included at a later date.

Generally state the extent of work to be done by the provider of the utility and whether there will be any fees to be paid by the Client School District or Contractor.

Final Design Development Documents

The Design Consultant shall prepare Final Design Development Documents for the review and approval of the NJSCC. The Design Consultant will submit a 100% complete Design Development package (as designated by an asterisk in the Deliverables Checklist), suitable for procuring a GMP contract, to the NJSCC for approval before proceeding to the next phase of documentation. A Construction Cost Estimate will be completed and reconciled with the estimate at 100%.

Design Rendering/Sketches

It is recommended that the preliminary layout (wireframe, freehand perspective, axonometric) of the required rendering(s) be submitted at this time for approval by the NJSCC and its Agents. Design "sketches" (free hand, isometrics, etc.) may also be submitted to convey the design concept of special areas such as lobbies, special fenestration features, etc... Upon completion of this phase the final color rendering, assuming all pertinent design decisions are resolved as of this time, shall be delivered at the time of the 100% DD submission.

Interior Finish Color/Material Selection Board(s)

As part of the Final Design Development Documents and associated deliverables the Design Consultant shall prepare Interior Finish Color/Material Selection Board(s) for review and approval by the Project Team. The interior finish colors and material selections should be consistent with" the Basis of Design" and "Service Life Planning" decisions in this phase and the specifications.

Construction Cost Estimate

The Design Consultant will prepare a Final 100% Complete Design Development Construction Cost Estimate in addition to the 50% complete estimate completed earlier. The Design Consultant and the NJSCC and/or its agents shall use the same NJSCC Standard Format utilizing the appropriate CSI/Master Format, and reconcile the Construction Cost Estimate (CCE) with each other and the prior phase estimate. Should the reconciled Design Development CCE exceed the latest approved CCE, the Design Consultant and PMF shall immediately identify what action the Design Consultant will take to meet the approved CCE.

Value Management / Engineering Review

The Design Consultant will participate in a Value Management / Engineering Review effort with the NJSCC and/or its agents at the completion of the reconciled GMP Design Development Documents and Final Design Development Construction Cost Estimates. This effort will review major components of the school facilities project that have the greatest potential impact on the cost of construction. The Design Consultant will incorporate such recommendations as agreed upon by the Project Team as necessary and/or desirable so as to achieve the greatest potential value.

Design Development Phase Project Progress Report

The Design Consultant shall prepare a Design Development Phase Project Progress Report in written form at the completion of this stage. This report should be based upon the Project Progress Report Guides and associated “prompts” or “questions” in this manual and shall include all products and deliverables prepared during this phase. Required Contract Documents; Construction Drawings and Specifications during this Phase, need not be included in the Project Progress Report. These deliverables shall be delivered in the separate sets consistent with the requirements set within.

Project Review Meeting

The Design Consultant shall present all the required deliverables and the Developed Design to the entire Project Team for review, comment, and approval. This should occur in written form, graphic form, and as an oral presentation.

Design Development Phase Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. Site Plan: Minimum scale: 1/32"=1'-0" or 1" = 30'-0"
2. All Floor Plans all trades, Reflected Ceiling Plans: Minimum scale: 1/8"=1'-0",
3. Detail plans: Minimum scale: 1/4"=1'-0"
4. Color Rendering: One (1) original, framed with matte and glazing, required Minimum size: 20"x30" plus a high resolution digital scan(s) on CD. Provide up to four additional framed color digital plots upon request at the size requested not to exceed 30" x42". In addition 1 - 4"x5" Color Copy Negative 10 - 8"x10" Color Prints 1 - 4"x5" Black & White Negative 10 - 8"x10" Black & White (Glossy Prints) 6 - 35mm Color Slides
5. Other Drawings, Wall Sections, Schedules and Details: As applicable to accurately, completely, and legibly portray the scope of work.
6. Elevations: Minimum scale: 1/16"=1'-0" with appropriate enlargements at 1/4" scale indicating all materials, floor to floor heights and section references, etc.
7. Interior Finish Color/Material Selection Board(s) Arch4 or Arch 5 format
8. Construction Cost Estimate and Specification: 8 1/2" x 11" SCC Standard Format utilizing the appropriate CSI/MasterFormat)
9. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 1/2" x 11". Contract Documents shall be provided under separate cover.

A. NJSCC Phase Submittal: Design Development (50% Complete) including specifications, Construction Cost Estimate and all other required documentation

1. NJSCC Project Manager: One full sized set of all deliverables.
2. NJSCC and /or its agents: Three full sized sets of all deliverables (two sets for estimating purposes)
3. School District: One full sized set of all deliverables.
4. Commissioning Agent: One full sized set of all deliverables.
5. NJSCC Architecture and Engineering, Trenton. Electronic copy only of all deliverables.

B. Completion of Phase Submittal: Design Development (100% Complete) submittal shall include a Specification, Construction Cost Estimate, Project Progress Report Booklet or Binder, and all other required documentation.

NJSCC Phase Submittal: 100% Complete Design Development submission distribution shall be as follows:

1. NJSCC Project Manager: One full sized set of all deliverables.
2. NJSCC and /or its agents: A maximum of four full sized sets of all deliverables. (for estimating and review purposes based upon NJSCC and /or its agents request).
3. School District: One full sized set of all deliverables.
4. Commissioning Agent: One full sized set of all deliverables.
5. NJSCC Architecture and Engineering, Trenton: One half size drawing set and

one full size set of all other deliverables.

C. New Jersey Department of Education (NJDOE) Submittals - Final Educational Adequacy Review Phase documentation and copies of any re-submittals.

1. NJDOE: As required: number of copies, signed and sealed: Drawings, room layouts and charts, specifications, educational and otherwise, DOE Forms, Board of Education Resolutions and transmittals required by the NJDOE.
2. NJSCC Project Manager, NJSCC and /or its agents, and School District, Commissioning Agent: 1 full sized set of all deliverables.
3. NJSCC Technical Services, Trenton: Electronic only of all deliverables

D. Other Permit submittals as applicable: Department of Environmental Protection, County Soils Conservation, and Erosion Control, County Planning Board, Local Utility connection permits, etc.

1. As required to governing Authority: number of copies, signed and Sealed: Contract Documents and Technical Specifications, Project Review application, and other support documentation.
2. NJSCC Project Manager, NJSCC and /or its agents, and School District, Commissioning Agent: One (1) full size sized set of all deliverables.

The following further defines the required 100% complete Design Development Guaranteed Maximum Price Progress Deliverable description.

100% Design Development Deliverable Details

The following is an outline of the minimum information required for the Design Development Submission. Items listed that are not applicable to the specific School Facilities Project may be disregarded. Other types of required deliverables such as calculations and analysis defined in Sections 2&3 are not listed below.

A. GENERAL

* Items with an asterisk (*) shall also be required of the 50% DD submission

1. Name of School District, Design Consultant and any Sub-Consultants *
2. Date work is to start and when completion is required *
3. Brief description of building and function *
4. List of School NJSCC or District Furnished Equipment *
5. Existing Conditions Survey *
6. Special conditions pertaining to site: *
 - a. Ground water level
 - b. Adjoining buildings
 - c. Existing utilities
 - d. Other special conditions
7. Drawings for existing building if renovation work required *
8. Cover Sheet *
9. Drawing Index, Legends, and Symbols *

10. Presiding Code Compliance documents *

B. DRAWINGS

1. Site Drawings *

- a. Site plan showing buildings, paving, walls, and curbs, landscaped areas and retaining walls *
- b. Plans showing existing grades in relation to finish grades *
- c. Boring information (Geotechnical Reports should be included in the Specifications as well)
- d. Sections through typical paving, walk, curb
- e. Site drainage pattern, location of utilities and service entry points for the building *
- f. Utility relocations *
- g. Special requirements such as storm water retention, etc. *
- h. Soils Erosion and Sedimentation drawings *

2. Architectural Drawings *

- a. Floor plans, 1/8" scale minimum, showing layouts in enough detail so that quantities of such items as wall finishes, doors, structural elements, and toilet fixtures may be measured. Locations of all fire walls, separations, and rated shafts should be noted with associated fire rating assembly information.

Floor Plans* should also include but not be limited to:

- 1.) Design Criteria # 5g Indoor Chemical & Pollutant Source Control: Floor Plans to designate 'walk-off' mat areas products and required recess if applicable.*
- b. Exterior elevations, 1/16" scale minimum with appropriate enlargements at 1/4" scale indicating all materials, floor to floor heights and section references. *
- c. Section through buildings, showing story heights with all spaces labeled *
- d. Interior Partition Types and U.L. or ASTM Fire Resistance Ratings for all assemblies. *
- e. Interior Partitions should also include but not be limited to:
 - 1.) Design Criteria # 1: Acoustic Comfort: Partition Schedules with acoustic values noted as defined by the referenced standard. *
 - 2.) Design Criteria # 5g Indoor Chemical & Pollutant Source Control: Partition Schedules at designated 'negatively pressurized spaces' shall identify 'deck-to-deck' or 'hard-lid' ceiling details. *
- f. Typical building sections, wall sections, and details of each major type of exterior wall treatment including but not limited to: *

- 1.) Design Criteria # 15: Description of the Building Enclosure (Envelope) System Typical Building Wall Sections: documenting compliance at minimum with both the mandatory and prescriptive Compliance Path described by the referenced standard. *
 - 2.) Design Criteria # 15: Description of the Building Enclosure (Envelope) System Typical Building Wall Sections documenting compliance with continuous air barrier requirement as described by the referenced standard. *
 - 3.) U.L. Fire Resistance ratings for all assemblies *
 - 4.) Design Criteria # 1: Acoustic Comfort: Wall Sections with acoustic values noted as defined by the referenced standard. *
 - 5.) Design Criteria # 5g Indoor Chemical & Pollutant Source Control: Wall sections at designated 'negatively pressurized spaces' shall identify 'deck-to-deck' or 'hard-lid' ceiling details. *
- g. Reflected ceiling plans including ceiling types, heights and locations of lighting, registers and grilles. *
 - h. Finish schedules, including ceiling heights, for all spaces *
 - i. Details of major special items or conditions.
 - j. Door Schedules indicating door, frame, and hardware type as well as fire rating. Door schedules shall also include but not limited to:
 - 1.) Design Criteria # 5g Indoor Chemical & Pollutant Source Control: Door Schedules at designated 'negatively pressurized spaces' shall identify self-closing function.
 - k. Typical Window details
 - 1) Final Interior Finish Color/Material Selection Board(s) for all spaces within the School Facilities Project.
3. Structural Drawings *
 - a. Foundation layout showing number of footings and extent of foundation walls, underpinning, caissons, special conditions *
 - b. Design of typical footing(s), pile cap(s), etc *
 - c. Typical section through grade wall, basement wall, and slab on ground *
 - d. Structural floor plans, including column schedule and floor loads. Section through typical slab design. *
 4. Plumbing Drawings *
 - a. Floor plans showing locations and quantity of fixtures, house tanks, pumps, drains as well as major piping systems including sanitary, storm, domestic water and fire standpipes. All sizes should be indicated. *
 - b. Schematic Riser Diagrams of sanitary, storm, domestic water, and gas and fire standpipe systems with pipe sizes indicated. *

- c. Equipment schedule identifying all equipment and giving their capacities, location, and current characteristics. *
 - d. Site Plan showing new utility work for storm, sanitary, water, gas, fire services, includes piping, manholes, catch basins, and hydrants. Indicate points from which services will be run to the building. *
 - e. Indicate special requirements such as kitchens, laboratories, darkrooms, etc. *
5. Fire Suppression Drawings *
- a. Typical floor plan with performance criteria by hazard and zone *
 - b. Performance Specifications. *
 - c. Indicate special fire protection systems and such as dry chemical/Halon, automatic kitchen system, etc. *
6. HVAC Drawings *
- a. Floor plans showing double line distribution drawings for all floors indicating piping, ductwork, and unitary equipment, depending on system type. All sizes should be indicated. The following must also be indicated: *
 - 1) Perimeter System showing type (Finned-tube radiation, fan-powered, etc.).
 - 2) Interior Systems, showing type, delivery method (VAV, fan-powered, etc.).
 - 3) Services for special equipment.
 - 4) Piping, valves, fire and smoke dampers, air outlets.
 - 5) Delineation of work.
 - b. Schematic Riser and Flow Diagrams sufficient to evaluate basic system design. Indicate duct and piping sizes and systems, and controls. *
 - c. Schematic layout of mechanical equipment rooms, central or local. Indicate fresh air intake, exhaust, return, and supply air including all piping shafts to and from MERs. *
 - d. Equipment Schedule (drawings or specifications) identifying all equipment. Indicate capacities, current characteristics, location and area served by equipment. *
 - e. Indicate any special systems such as computer rooms, kitchen, fuel oil system, etc. *
 - f. Energy model calculations using ASHRAE 90.1-2004 “Performance Rating Method” are performed for the building during Design Development. Section 2 Energy Performance page 40-42 lists several acceptable software programs for Load Calculations and HVAC Sizing to assist in reaching this end. This energy model is a required deliverable and must be included as part of the Design Development Submission to the NJSCC. Achieved level of energy performance above the baseline should also be reported on the phase LEED™ Checklist Forms consistent with all policy.
7. Electrical Drawings *
- a. Floor plan showing all lighting fixtures including exit & emergency, and switching. Delineate scope of work. *
 - b. Floor plans showing all devices for fire alarms, smoke & heat detection,

- sprinkler tamper & water flow, clock system, security, CRT, audio/visual, CATV, communications, intercom, and building automation system and monitoring. *
- c. Floor plans showing all power requirements including equipment location, motors, motor control centers, panels, transformers, telephone cabinets & outlets, elevator connections, empty conduit systems, and all power receptacles. *
 - d. Schematic layout of switchgear room and typical electric & telephone closets. *
 - e. Single line riser distribution diagram indicating incoming service, switchgear, distribution & local panels, motor control centers, transformers, emergency generator, automatic transfer switches, and bus duct and all feeders sized. *
 - f. Equipment schedule for lighting fixtures, switchgear, panels & motor control centers. *
 - g. Schematic riser diagrams of fire alarm, smoke & heat detection, sprinkler alarms, security monitoring and telephone/data systems. *
 - h. Site plan showing incoming power, telephone, data and other services with manholes and related equipment. *
 - i. Site lighting showing light locations & details of pole types. *

C. SPECIFICATIONS

A complete Design Development Specification providing the type and character of all materials and systems to be incorporated in the scope of work, and other data not indicated on the Design Development drawings. The specification shall be comprehensive enough to properly provide architectural and engineering description and clarification of the project's total scope. The specification at this time should also be reflective of USGBC LEED™ compliance, Commissioning, DCA Homeland Security Standards, and any other special criteria defined by the Design Manual and agencies having jurisdiction over the School Facilities Project. Each Section shall describe the full extent of the work included and any special conditions in significant detail to technically understand the exact products and systems selected, submittal requirements, job conditions, warranties and guarantees, installation procedures, and cleaning and protection.

The Design Consultant shall use the latest version of CSI / MasterFormat for the specification. The Design Consultant shall review and include the NJSCC Standard Front End Documents and Division 1 General Conditions, Division 1 Sections may be added by the Design Consultant as applicable. Any District or Design Consultant requested proprietary or sole source equipment, material, item, or system must be specifically identified with reasons sufficiently detailed to support its uniqueness and warrant approval by the NJSCC and inclusion in the Contract documents.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC and the Project Team to review such submissions prior to proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

CONSTRUCTION DOCUMENT PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

The deliverables of Construction Document phase are prepared to set forth in detail the requirements for the construction of the Project and shall consist of the following:

- Construction Drawings (Construction Permit Set)
- Final Specifications
- Homeland Security Compliance Documentation [Design Criteria # 6]
- Updated Description of Building Exterior Enclosure Systems [Design Criteria # 15]
- Updated Code Summary including of status of all utility permits, legal, and regulatory approvals are in place
- Updated Description of MEP and Renewable Energy Systems
- Updated NJSCC LEED™ Checklists and supporting documentation
- Construction Cost Estimate and reconciliation with NJSCC and /or its agents estimate.
- Value Management / Engineering Review Report
- Updated Project Schedule
- Complete CD Survey Document [Appendix F]
- Construction Document Phase Project Progress Report and all other required deliverables in a Project Book or Binder Format
- Building Envelope Peer Review Process [Design Criteria #15c]
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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CONSTRUCTION DOCUMENTS PHASE

Description

The Design Consultant shall proceed with Construction Documents Phase services only upon approval of the Design Development Phase documents by the NJSCC.

The drawings and specifications prepared in the “Design Development Phase” are further developed into the working drawings during this Phase. Based on the approved Design Development Documents and any further adjustments in the scope of the School Facilities Projects or in the CCE authorized by the NJSCC Project Manager, the Design Consultant shall prepare Construction Documents consisting of drawings and specifications and other defined deliverables setting forth in detail the requirements for the construction of the School Facilities Project.

The Construction Documents phase prepares the final Contract Documents consisting of complete, coordinated, contract drawings and specifications that set forth in detail all of the requirements for the construction of the Project. Design Consultant will continuously coordinate the documentation across all design disciplines to minimize potential construction conflicts between trades during construction. The Design Consultant shall submit a “check set” of Contract Documents and related deliverables to the NJSCC Architecture and Engineering at both 50% and 75% Construction Documents for review and approval during this phase. Final Construction Documents produced during this phase shall be used to apply for DCA review and a construction permit.

At the inception of this phase, the Design Consultant, in consultation with The Project Team, shall review the Construction Document Phase Project Progress Report Guide questions, the current OPR, and Deliverable requirements to solicit comments and suggestions pertaining to the documentation of systems and assemblies during this phase. In conjunction with this effort, the Design Consultant shall develop a revised Project Schedule that serves to document the anticipated time required of each of the associated activities necessary to complete the Deliverables designated by the Checklist. This Project Schedule shall be submitted to the NJSCC and/or its agents for approval and updated at the end of this Phase as a record. The Design Consultant will meet with the Project Team to review progress as often as deemed necessary, to solicit input and ultimately obtain approval of the NJSCC and or its agents.

The preparation of Final Construction Documents consisting of complete, coordinated, contract drawings and specifications by the Design Consultant. These documents shall specifically include the following requirements and produce the associated deliverables:

A. **Construction Contract Document** shall specifically include the following:

1. **High Performance Building Envelope; On-Site Control Samples [Design Criteria # 15d]**

The Design Consultant shall identify representative areas within the Construction Documents as On-Site Control Samples to be constructed and approved by the Design Consultant on the basis of design intent. As described by the Design Criteria the number of control samples and extent are intended to be representative of all interface conditions associated with the building envelope as

deemed necessary of the Design Consultant. This must be accomplished with both the Construction drawings and / or in the Specifications, specifically the General Conditions and or section(s) pertaining to wall assemblies such as Unit Masonry, etc.

B. **Final Specifications** shall specifically include the following:

1. **Indoor Air Quality; IAQ Management Plan During Construction: Final Specifications including General Conditions [Design Criteria # 5b]**
The Specifications shall identify the referenced standard procedures with criteria for 'warning' and 'job shutdown' if required.
2. **Indoor Air Quality; Low Emitting Adhesives and Sealants: Final Specifications including General Conditions [Design Criteria # 5c]**
The Specifications shall identify the referenced standard criteria for adhesives and sealants.
3. **Indoor Air Quality; Low Emitting Paints and Coatings; Final Specifications including General Conditions [Design Criteria # 5d]**
The Specifications shall identify the referenced standard criteria for paints and coatings.
4. **Indoor Air Quality; Low Emitting Flooring Systems Final Specifications including General Conditions [Design Criteria # 5e]**
The Specifications shall identify the referenced standard criteria for flooring systems, including all components.
5. **Indoor Air Quality; Low Emitting Composite Wood: Final Specifications including General Conditions [Design Criteria # 5e]**
The Specifications shall identify the referenced standard criteria for Composite Wood and Agrifiber products.
6. **Safety and Security: Homeland Security [Design Criteria # 6]**
The Project Team participating in the Construction Document Phase is to achieve compliance with the most current applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards. These requirements are to be reviewed and incorporated into the Contract Documents to be finalized during this phase. The DCA shall determine compliance with these requirements during the DCA Construction Document review process.
7. **Commissioning Plan: Final Specifications including General Conditions [Design Criteria # 9]**
The Specifications shall identify the referenced standard methods for commissioning, scope of commissioning services, and responsibilities as delineated by the Commissioning Plan and the responsibilities of the Contractor(s) and their sub-contractors as they may relate to these activities.
8. **High Performance Building Envelope; Envelope Testing: Final Specifications including General Conditions [Design Criteria # 15d]**
The Design Consultant shall identify all required in-situ testing and start-up

procedures deemed necessary in the professional judgment of the Design Consultant to assure the performance of systems and associated interface conditions deemed critical to ultimate performance.

9. **High Performance HVAC; AC Refrigerant; Final Specifications including General Conditions [Design Criteria # 17b]**

CFC based refrigerants are prohibited and shall be specifically noted for all refrigerant systems and equipment part of the General Construction Contract.

10. **Commissioning Plan [Design Criteria # 9]**

- a. Participate in developing, reviewing integrating Construction Process Commissioning requirements into the Construction Documents.
- b. Produce Final Specifications including General Conditions cite referenced standard processes for commissioning, scope of commissioning services, and responsibilities as delineated by the Commissioning Plan.
- c. The Design Consultants shall provide the Description of MEP and Renewable Energy Systems (Design Intent and Basis of Design) to the Commissioning Agent.
- d. The Design Consultants shall provide the Description of Building Exterior Enclosure (Envelope) Systems (Design Intent and Basis of Design) see sample, Appendix "K" of ASHRAE Guideline 3-2006.
- e. Description of the Building Enclosure (Envelope) System, including thermal resistance values in compliance with the Prescriptive requirements of ASHRAE 90.1-2004.
- f. The Design Consultants shall participate in the update of the Owner Project Requirements and provide any support technical data required. Based on the Commissioning Process, the Owner Project Requirements shall be revised as record of the NJSCC Project Team decisions.
- g. The Design Consultants shall participate in the update of the Commissioning Plan

11. **Description of the Building Enclosure (Envelope) System [Design Criteria # 15] (AKA Envelope Basis of Design)**

The Design Consultant shall update the "Envelope Basis of Design" document at this phase so as to verify compliance with the OPR and communicate to the Design Team the rationale for selecting the proposed assemblies. This document shall be revised as necessary during subsequent phases to reflect changes made by the Project Team.

Typical Building Wall Sections documenting compliance at minimum with both the mandatory and prescriptive requirements of the International Energy Conservation Code as amended by the State of New Jersey. Typical Building

Wall Sections shall also document compliance with continuous air barrier requirement as described by the referenced standard.

Updated LEED™ Checklists and Letter Template Forms

Integral to the Construction Document phase is a reevaluation and further documentation of associated LEED™ for Schools credits to be achieved. Once this process is complete, the Design Consultant should review and further develop the Final Specifications and drawings to assure all required contractual provisions necessary for compliance with LEED™ have been incorporated into the Construction Documents. The NJSCC LEED™ and supporting documentation shall be revised to reflect changes to the design under development and documented by means of an updated OPR.

Submissions to Other Authorities

The Design Consultant shall submit completed Construction Documents to the NJSCC for review, comment and approval as defined by the approved project schedule. All comments deemed suitable for adoption by the Design Consultant, after the Project Team Review has been completed, are to be incorporated into the Construction Documents prior to their release for bid.

The Design Consultant shall submit Construction Documents and all other required documentation, permits and approvals required but not previously submitted as described by the New Jersey Uniform Construction Code (NJUCC) or otherwise required of the Department of Community Affairs, Division of Codes and Standards (DCA) in order to procure necessary approval and subsequent issuance of permits and field inspections. If prior approvals from Regulatory Agencies and or Utility Authorities have not been furnished during previous phases or if modifications have been made requiring further approval, the Design Consultant must submit letters or signed statements confirming availability and/or approval from the respective Agencies or Authorities as applicable.

High Performance Building Envelope; Envelope Testing Building Envelope Peer Review [Design Criteria # 15c] (AKA Cx Focused Review of Design Documents)

The Building Envelope Peer Review shall be an independent third party peer review of the Construction Documents, at the expense and discretion of the NJSCC, for both constructability and compliance with the OPR, to be conducted simultaneously with the review of the Construction Documents by the DCA, but completed prior to the release of documents for bid. This review shall specifically include compliance with industry best practices and the most recently revised Description of the Building Enclosure (Envelope) System. The Design Consultant shall incorporate all comments as deemed appropriate into the Contract Documents and shall provide a written response for review by the Project Team if suggestions and/or comments are not addressed prior to release of the Contract Documents for bidding.

Final Construction Documents (Construction Permit Set)

The Design Consultant, having continuously coordinated the documentation across all design

disciplines during development of the project so as to minimize potential construction conflicts between trades during construction shall allow sufficient time as designated in the Project Schedule for such final review upon completion of work associated with other trades.

The Design Consultant will review and coordinate their own Contract Documents with the provisions contained in the NJSCC's General Conditions and General Supplementary Conditions requirements (CSI Divisions 0 & 1) to be incorporated in same. .

Design Consultant will also submit completed Construction Documents to the NJSCC and its agents for review, comment and approval. Any pertinent comments of the SCC Project Team review will be incorporated into the documents before the documents are released for construction.

Construction Control Cost Estimate

A Construction Cost Estimate, based on the Construction Documents, is to be developed and submitted by the Design Consultant and the NJSCC and its Agents in the same NJSCC Standard Format utilizing the appropriate CSI/Master Format. The CCE is the Design Consultant's best estimate of the cost of construction at the time bids are received. The Design Consultant will prepare a Construction Document Phase Cost Estimate. The Design Consultant shall advise the SCC Project Manager of any adjustments to previous preliminary statements of probable construction cost indicated by changes in requirements or general market conditions. The Design Consultant and the NJSCC and/or its agents shall reconcile the Construction Cost Estimate (CCE) with each other and the prior phase estimate.

The Design Consultant will participate in a Value Management / Engineering Review effort with the NJSCC and/or its agents at the completion of the reconciled Construction Documents Phase Cost Estimate. This effort will review major components of the school facilities project that have the greatest potential impact on the cost of construction. The Design Consultant will incorporate such recommendations as agreed upon by the Project Team as necessary and/or desirable so as to achieve the approved Final CCE. The final reconciled CCE shall serve as a statement of agreement by the Design Consultant or the Design Consultant shall state to the NJSCC and its Agents, in writing its specific reasons of disagreement.

Construction Document Phase Project Progress Report

The Design Consultant shall prepare a preliminary written Project Progress Report in preparation for the Project Review Meeting. This report should be based upon the Project Progress Report Guides questions (AKA "prompts") contained in Section 4 of this manual and shall include all products and deliverables prepared during this phase. Required Contract Documents; Construction Drawings and Specifications during this Phase need not be included in the Project Progress Report. These deliverables shall be delivered in the separate sets consistent with the requirements set within.

Construction Document Survey Form

The survey form, Appendix F of this document and available electronically from the NJSCC Project Manager, shall be completed and submitted prior to proceeding to the next phase.

Project Review Meeting

The Design Consultant shall present all of the required deliverables, as delineated by the Checklist and SOW, to the Project Team for review and comment. The Construction Drawings shall be complete, outlining in sufficient detail all aspects of the work and at the conclusion of this Phase completed to the point that they are ready for bidding purposes. One set of the drawings is to bear the signature and seal of the Design Consultant to indicate that in its professional opinion the drawings meet the standards of the Design Consultant's profession as well as those established by law.

The preliminary responses prepared by the Design Consultant in preparation of the Project Progress Report shall be discussed and consensus where possible shall be sought. Comments and suggestions as they influence the subsequent development of the Project shall be incorporated into the Contract Documents, the Final Project Progress Report, and updated OPR associated with this phase as a record of the teams design intent.

Construction Document Phase Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. A check set at both 50% and 75% Complete Construction Documents and all related deliverables for all trades defining the scope of construction work at the time of printing. These check sets are for the SCC Architecture and Engineering Department review and distributed in accordance with the general requirements below.
 2. A Complete set of 100% complete Construction Documents for all trades completely defining the scope of construction work.
 3. Construction Cost Estimate and Final Specification: 8 ½" x 11" (SCC Standard Format utilizing the appropriate latest CSI/MasterFormat).
 4. 1 - Narrative Description, Including Pertinent Project Data
 5. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 ½" x 11". Contract Documents shall be provided under separate cover.
- A. Completion of Phase Submittals: Construction Documents (100% Complete for DCA Submittal). All submittals should include a specification, Construction Cost Estimate, Project Progress Report Booklet, or Binder including all other required documentation. These sets are for review prior to the DCA submission.

Distribution shall be as follows:

1. SCC Project Manager: One full sized set of all deliverables.
 2. NJSCC and /or its agents: A maximum of four full sized sets of all deliverables (for estimating and review purposes based upon NJSCC and /or its agents request).
 3. School District: One half size drawing set and one full sized set of all other deliverables.
 4. Commissioning Agent: One full sized set of all deliverables.
 5. NJSCC Architecture and Engineering, Trenton: One half size drawing set and one full sized set of all other deliverables.
- B. Division of Community Affairs Code Enforcement Submittals
1. As required to the DCA: Number of copies, signed and sealed: Contract Drawings and Technical Specifications and calculations, Project Review application, Uniform Construction Code review folders / Sub Code forms, and copies of any and all other permits and approvals from Regulatory Agencies and Utility Authorities including but not limited to: DOE approved Final Education Adequacy Review Documents and other permits required by law or listed in this document and the Agreement.
 2. NJSCC Project Manager, NJSCC and /or its agents, and School District, Commissioning Agent: One (1) full sized set of all deliverables.
 3. NJSCC Architecture and Engineering: Final approved set including field changes only, electronic documentation only.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC to review and approve such submissions prior too proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

BIDDING AND CONTRACT AWARD PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

- Bidding Information and Forms (With NJSCC and / or its agents and NJSCC Procurement)
- Pre-Bid Meeting Documents
- Agenda for Pre-Bid Meeting (With NJSCC and / or its and Commissioning Agent).
- Addenda as required
- Opening of Bids Documentation (If requested by NJSCC)
- Bidding and Contract Award Phase Project Progress Report and all other required deliverables in a Project Book or Binder Format

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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BIDDING AND CONTRACT AWARD PHASE

Description

The Design Consultant shall proceed with Bidding and Contract Awards Phase services only upon approval of the Construction Documents Phase documents by the NJSCC.

Once all permits, funding requirements, approvals, etc. are obtained, the School Facilities Project will be advertised for bid.

In the Bidding and Contract Award Phase the construction documents shall be released for bid and the Design Consultant will respond to questions from the bidders pertaining to the documents for the purpose of establishing clarity. The Design Consultant will assist the NJSCC Project Team with the evaluation of bid submittals and advise the NJSCC as required to assist in the selection of contractor(s) to perform the Work.

At the inception of this phase, the Design Consultant, in consultation with The Project Team, shall review the Bidding and Contract Award Phase Project Progress Report Guide questions, the current OPR, and Deliverable requirements to solicit comments and suggestions pertaining to the procurement of the Project. In conjunction with this effort, the Design Consultant shall develop a revised Project Schedule that serves to document the anticipated time required of each of the associated activities necessary to complete the Deliverables designated by the Checklist. This Project Schedule shall be submitted to the NJSCC and/or its agents for approval and updated at the completion of this Phase. The Design Consultant will meet with the Project Team to review progress as often as deemed necessary, to solicit input and ultimately obtain approval of the NJSCC and or its agents

The Design Consultant will attend a Pre-Bid Meeting organized and facilitated by the NJSCC and/or its agents. The Pre-Bid Conference provides an opportunity for the Contractors bidding a job to review and discuss the Construction Documents and to discuss the general nature and scope of the School Facilities Project with the Design Consultant, the NJSCC and its Agents and the Client School District. Certain renovation projects or projects with unique conditions will also require a site visit. The NJSCC and its Agents will arrange and conduct this conference. The PMF will record and distribute minutes of all meetings.

During the Bid and Contract Award Phase the Design Consultant shall specifically include meeting the following requirements and produce the associated deliverables:

1. **Commissioning Activities [Design Criteria # 9]**
 - a. Design Consultant shall participate in Pre-Bid Conference Commissioning Activities.
 - b. The Design Consultant shall participate in updating of the Owner's Project Requirements and Basis of Design associated with negotiated scope changes and Addenda during this phase.

Bidding and Contract Award Construction Documents

In the event that the Bid and Contract Award Phase has not commenced within sixty (60) days after the Design Consultant submits the Construction Contract Documents and the Final Construction Cost Estimate to the Corporation, any Final CCE shall be adjusted to reflect changes in the general level of prices in the construction industry between the date of submission of the Construction Contract Documents to the NJSCC and the date at which proposals are sought.

In response to questions from the bidders, Design Consultant and will prepare responses to all such comments and issue addenda as deemed appropriate to further clarify / define the documents to all bidders within the prescribed time frame. The Design Consultant shall not provide oral interpretations or information to prospective bidders that will affect the bid price.

Addendum issued before bid opening shall be sent via Registered Mail, fax or overnight mail and is to be confirmed by phone. The cover page of an Addendum shall be similar to the specification cover page but shall be titled Addendum 1 (2, 3, 4, etc.) to specifications for (Package...). The date is the date of issuance of the Addendum. The following statement must appear on the second page of the Addendum: "This Addendum is issued for the purpose of amending certain requirements of the Construction Documents, as noted hereinafter, and is hereby made part of and incorporated in full force as part of the Construction Documents. Unless specifically noted or specified hereinafter all work shall conform to the applicable provisions of the Construction Documents." All items shall be clearly identified as to contract and section and in the same sequential order as the specifications.

The Design Consultant will assist the NJSCC and the NJSCC and/or its agents in evaluating contractor bids and contractor alternative proposals. Three meetings shall have been scheduled for this purpose.

The Design Consultant must be present at the bid opening and assist the NJSCC Procurement and Project Team with tabulation of results.

NJSCC will prepare the necessary construction contract and forward to the Contractor. The executed contract will be returned with payment bond and Insurance certificates with copies provided to all members of the Project Team.

Within thirty days after Contract Award for construction the Design Consultant will produce and deliver; "Conformed Contract Documents" for the Project. The "Conformed Contract Documents" shall incorporate all revisions as a result of the addenda and requests for clarifications created during the Bid Phase prior to Contract Award.

Bid and Contract Award Phase Project Progress Report

The Design Consultant shall prepare a preliminary written Project Progress Report in preparation for the Project Review Meeting. This report should be based upon the Project Progress Report Guides questions (AKA "prompts") contained in Section 4 of this manual and shall include all products and deliverables prepared during this phase. Required Contract Documents; Construction Drawings and Specifications during this Phase need not be included in the Project Progress Report. These deliverables shall be delivered in the separate sets consistent with the requirements set within and the 'A-Z' Design Consultant Agreement.

Project Review Meeting

The Design Consultant shall present all of the required deliverables, as delineated by the Checklist, to the Project Team for review and comment. The preliminary responses prepared by the Design Consultant in preparation of the Project Progress Report shall be discussed and consensus where possible shall be sought. Comments and suggestions as they influence the subsequent development of the Project shall be incorporated into the Final Project Progress Report and updated OPR associated with this phase as a record of the teams design intent.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC and Project Team to review such submissions prior to proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

Bidding and Contract Award Submission Requirements

Format: All drawings shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high

1. A Complete set of 100% complete Construction Drawings ready for bidding for all trades completely defining the scope of construction work.
2. Construction Cost Estimate and Final Specification: 8 ½" x 11" (SCC Standard Format utilizing the appropriate CSI/Master Format).
3. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 ½" x 11". Contract Documents shall be provided under separate cover.

- A. Bid Set of Construction Documents, Project Progress Report Booklet or Binder, Final Specifications, Final Reconciled Construction Cost Estimate and all Addenda.

Distribution shall be as follows:

1. The NJSCC and /or its agents is contracted to manage the printing to Contractors for bidding purposes. The NJSCC and /or its agents shall also handle printing of Bid Sets of Contract Documents for their own internal purposes.
2. Each Design Consultant and their Consultants should receive: One (1) full sized set of all Construction Documents, Specifications and Addenda.
3. NJSCC Project Manager should receive: One (1) full sized set of all Construction Documents, Specifications and Addenda, etc.
4. School District: One (1) full size sized set of all Construction Documents, Specifications and Addenda.
5. Commissioning Agent: One full sized set of all deliverables.
6. NJSCC Technical Services, Trenton: Electronic documentation only; all deliverables.

- B. Conformed Contract Documents" (Within 30 days after award) The "Conformed Contract Documents" shall incorporate all revisions as a result of the addenda created during the bid phase.

Distribution shall be as follows:

1. The NJSCC and / or its agents: Three (3) full sized sets of all deliverables.
2. The Design Consultant: One (1) full sized set of all deliverables.
3. NJSCC Project Manager should receive: One (1) full sized set of all Construction Documents, Specifications and Addenda, etc.
4. School District: One (1) full size sized set of all Construction Documents, Specifications and Addenda.
5. Commissioning Agent: One full sized set of all deliverables.
6. NJSCC Architecture and Engineering, Trenton: Electronic documentation only; all deliverables.

CONSTRUCTION ADMINISTRATION PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

- Conformed Contract Documents
- Construction Observation Reports
- Replies to Requests for Information
- Requisitions for Payment (with the SCC and its agents)
- Change Order Documentation review (with the SCC and its agents)
- Contractor Affidavit of Payment of debts and claims (with the SCC and its agents)
- Punch-Lists (with the SCC and its agents)
- Contractor Supplied Documentation
- Certificates of Substantial and Final Completion
- NIST Building Life Cycle Cost Analysis (as required of CO's, Substitutions)
- Service Life Planning Analysis calculations (as required of CO's, Substitutions)
- High Performance Building Envelope Analysis (as required of CO's, Substitutions)
- Update NJSCC LEED™ Checklists, and supporting documentation
- Release of Liens (with SCC and its agents)
- Final Interior Finish Color/Material Selection Board(s)
- Systems Manual update with maintenance, operation, and other relevant ongoing documentation.
- Construction Administration Phase Project Progress Report and all other required deliverables in a Project Book or Binder Format.
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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CONSTRUCTION ADMINISTRATION PHASE

Description

The Design Consultant shall proceed with Construction Administration Phase services only upon approval of the Bidding and Contract Award Phase by the NJSCC.

Construction Administration is the monitoring process during the actual construction of the Project. The entire Design Consultant team that completed the design and documentation shall remain involved throughout the Construction Administration Phase to maintain continuity of Design Intent.

At the inception of this phase, the Design Consultant, in consultation with The Project Team, shall review the Construction Administration Phase Project Progress Report Guide questions, the current OPR, and Deliverable requirements to solicit comments and suggestions pertaining to the administration and observation of construction during this phase. In conjunction with this effort, the Design Consultant shall review the Construction Schedule prepared by the Contractor and develop their own Project Schedule that serves to document the anticipated time required of each of the associated activities necessary to complete the Deliverables designated by the Checklist. This Project Schedule shall be coordinated with the Construction Schedule and submitted to the NJSCC and/or its agents for approval. The Design Consultant will meet with the Project Team to review progress as often as deemed necessary, to solicit input and ultimately obtain approval of the NJSCC and or its agents.

Conformed Drawings

Within thirty days after Contract Award for construction the Design Consultant will produce and deliver; "Conformed Contract Documents" for the Project. The "Conformed Contract Documents" shall incorporate all revisions as a result of the addenda, accepted alternatives, and requests for clarifications resulting in changes to the Contract Documents, created during the Bid Phase prior to Contract Award.

The conformed drawings must reflect all of the above data. These revised drawings shall be identified by showing justifications in the "Revision Box" and shall be issued for construction use. Only those drawings revised between advertising and Construction Contract award are to be revised and issued at this time.

Construction Project Meetings and Observation

The Design Consultant will attend all pre-construction meeting(s) at the site. The Design Consultant shall attend regular Project Meetings at the site during the period of construction. The NJSCC and/or its agents will be responsible for the Project Meeting Minutes. The Design Consultant shall review and approve the Meeting Minutes as a record of such proceedings. The NJSCC and/or its agents shall review the Schedule of Values to achieve mutual agreement with all parties concerned.

Periodic review of construction progress by Design Consultant will occur no less than weekly in conjunction with the regular Project meeting. During these construction progress reviews the

Design Consultant shall be responsible checking conformance with the Contract Documents and reviewing the Construction Schedule with the NJSCC Project Team. The Design Consultant shall also respond to questions related to the Contract Documents and clarify responses to Requests for Information. The Design Consultant shall report on the status of submittals and RFI's.

The Design Consultant shall perform Construction Observation and prepare an associated report. The Design Consultant shall prepare and submit a written report to the NJSCC and its Agents at the close of each site visit. Additionally, copies of the field report written on the day of a job meeting shall be affixed to the respective job meeting minutes.

The Design Consultant shall review all submittals, tests and reports. The Design Consultant shall observe with NJSCC and/or its agents the performance of all testing and control samples performed by the Contractor including deferred tests as needed. NJSCC and/or its agents and Design Consultant shall define ongoing testing requirements as needed.

In addition the Design Consultant shall conduct field observations as often as necessary to assure the following specific requirements are met:

1. **Acoustic Comfort [Design Criteria # 1]**
Partition, Door, and Window submittals with acoustic values noted shall be verified for compliance identified by the Construction Documents
2. **Thermal Comfort [Design Criteria # 2]**
Compliance with the Description of the Building Enclosure (Envelope) System and thermal resistance values noted as identified by the Construction Documents.
3. **Indoor Air Quality IAQ Management Plan During Construction [Design Criteria # 5b]**
The Design Consultant shall observe preparations and activities for compliance with the Construction Documents.
4. **High Performance Building Envelope; Construction Observation [Design Criteria # 15f]**
The Design Consultant shall prepare Construction Observation Reports at regular intervals during the construction of the entire Building Envelope and associated testing as required of the Construction Documents to assure compliance with Design Intent.
5. **High Performance Building Envelope; On-Site Control Samples (Aesthetic and Functional Mock-Up(s) [Design Criteria # 15d]**
The Design Consultant has identified areas of the built work designated as On-Site Control Samples (AKA in-situ mock-ups) on the Contract Documents that are representative of critical interface (intersection of sub-systems) conditions that are representative of the entire building envelope. Such samples shall be evaluated during the Construction Administration phase by the Design Consultant in conjunction with associated testing to verify compliance with the OPR (Design Intent). The Design Consultant will review the On-Site Control Samples to be constructed and approve before any other similar work associated with the trade may proceed. Particular emphasis shall be given to the following interface conditions; roof transition/ termination, preparation for and installation of sealants, adjoining material compatibility, continuity of the air barrier and drainage planes, and below grade waterproofing.

Submittals and Requests for Information

The Design Consultant shall expedite the flow of shop drawing submittals, Requests for Information (RFI), and other related construction information through the Design Consultant office. The Design Consultant shall expedite the shop drawing review process and provide RFI's to the Contractors in a timely manner.

The Design Consultant will review submittals, including shop drawings, project/maintenance manuals and guarantees that are required by the Construction Documents. During the submittal and shop drawing review process the Design Consultant will also be responsible checking conformance with the Contract Documents and the following specific requirements defined by this Design Manual:

1. **Indoor Air Quality; Low Emitting Adhesives and Sealants [Design Criteria # 5c]**
Adhesives and Sealant product submittals with third party testing values noted as defined by the referenced standard.
2. **Indoor Air Quality; Low Emitting Paints and Coatings [Design Criteria # 5d]**
Paints and Coatings product submittals with third party testing values noted as defined by the referenced standard.
3. **Indoor Air Quality; Low Emitting Floor Systems [Design Criteria # 5e]**
Flooring Systems, inclusive of all components, submittals with third party testing values noted as defined by the referenced standard.
4. **Indoor Air Quality; Low Emitting Composite Wood [Design Criteria # 5f]**
Composite Wood and Agrifiber product submittals with third party testing values noted as defined by the referenced standard.
5. **Safety & Security [Design Criteria # 6]**
Review and approve Sprinkler Hydraulic Calculation and Sprinkler Shop Drawing submittal sealed by licensed engineer in compliance with the referenced standard and submit to DCA.
6. **Safety and Security: Homeland Security [Design Criteria # 6]**
The Design Consultant Team participating in the Construction Administration Phase is to achieve compliance with the most current applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards. The Design Consultant shall review all shop drawings and submittals for compliance with the Contract Documents during this phase.
7. **High Performance HVAC; AC Refrigerant [Design Criteria # 17b]**
HVAC Equipment submittals identify refrigerants other than CFC.

Final Interior Finish Color/Material Selection Board(s)

As part of the Construction Administration Phase, the Design Consultant shall prepare Final Interior Finish Color/Material Selection Board(s) for review and approval by the Project Team. The interior finish colors and material selections should be based upon the actual approved shop drawing submittals by the General Contractor consistent with the Contract Documents. It is

recommended that the Design Consultant request in writing that the General Contractor submit all related shop drawings in a timely manner, early in the submittal process. The Design Consultant shall commence with producing Final Interior Finish Color/Material Selection Board(s) once all these submittals are in place.

In the event that a substitution of a specified material, product or system is submitted and presented in the proper format as outlined in Division 1 General Conditions by the General Contractor, the Design Consultant shall perform a review of the proposed substitution and associated costs and make a recommendation to the NJSCC and/or its agents. In addition the Design Consultant shall perform the following procedures and calculations as deemed applicable to assure compliance with the Design Criteria including but not limited to:

1. NIST Building Life Cycle Cost Analysis for HVAC, Lighting, & Renewable Energy Sources
2. Service Life Planning calculations
3. High Performance Building Envelope Analysis
4. Verifying the substitution complies with the requirements of the associated USGBC LEED™ for Schools credits to be achieved
5. Also refer to Commissioning below

Commissioning Plan [Design Criteria # 9]

1. Design Consultant shall participate in updating of the Owner's Project Requirements and Basis of Design
2. Design Consultant shall provide an update to the Description of MEP and Renewable Energy Systems (Design Intent and Basis of Design)
3. Design Consultant shall provide an update to the Description of Building Exterior Enclosure (Envelope) Systems (Design Intent and Basis of Design)
4. Design Consultant shall participate in the test procedures, mock-ups, and review of associated reports of systems to be commissioned as defined by the Commissioning Plan.
5. Design Consultant shall participate in the review of associated documentation and reports of systems to be commissioned as defined by the Commissioning Plan.
6. Design Consultant shall review and approve adjustments to Commissioning Agents Plan.
7. Design Consultant shall review and approve the Commissioning Agent's Construction Checklists, Construction Phase Commissioning Process Reports, Issues logs etc.

LEED™ Checklist and Letter Template Form

Integral to the Construction Administration Phase is a review of associated LEED™ Credits to be achieved. The particular emphasis shall be placed upon obtaining the correct submittal requirements for LEED™ compliance as well as gathering calculations and supporting documentation required of the USGBC for certification. The Design Consultant should assist in coordinating and checking that the related Commissioning and other processes defined by the Design Manual Section 2 are completed so that the USGBC LEED™ for Schools Credit Requirements are met. The NJSCC LEED™ Checklists, associated calculations and supporting documentation shall be updated as well as revised to reflect content in the shop drawing submittals and any changes during construction affecting LEED™ Credits. This process shall be documented by means of an updated OPR.

Other Construction Administration Processes

The NJSCC and/or its agents will complete preparation, review and approval of Requisitions for Payment and for Change Orders. The Design Consultant will review information and provide recommendations to the Project Team. The Design Consultant will prepare a Certificate of Substantial Completion for the construction.

The Design Consultant will review the Project and prepare a Punch List for the NJSCC. Once the NJSCC and its agents state that the Punch List items have been completed, the Design Consultant will make additional reviews and/or observations as needed of the Project to verify satisfactory completion of the items and provide a final report to the NJSCC.

The Design Consultant will observe and assist the NJSCC and/or its agents with the Contractor's testing and closeout of utilities, operational systems and equipment for readiness, and initial startup. The Design Consultant shall assist the NJSCC and/or its agents in verifying completion of operator training and associated video documentation.

The Design Consultant will provide a Certificate of Final Completion.

Construction Document Phase Project Progress Report

The Design Consultant shall prepare a preliminary written Project Progress Report in preparation for the Project Review Meeting. This report should be based upon the Project Progress Report Guides questions (AKA "prompts") contained in Section 4 of this manual and shall include all products and deliverables prepared during this phase. Any required Contract Documents; Construction Drawings and Specifications, Shop Drawing Submittals and Requests for Information, during this phase need not be included in the Project Progress Report. These deliverables shall be provided either in separate sets consistent with the requirements set within, or the General Conditions Division 1, and the 'A-Z' Design Consultant Agreement.

Project Review Meeting

The Design Consultant shall present all of the required deliverables, as delineated by the Checklist, to the Project Team for review and comment. The preliminary responses prepared by

the Design Consultant in preparation of the Project Progress Report shall be discussed and consensus where possible shall be sought. Comments and suggestions as they influence the subsequent development of the Project shall be incorporated into the Final Project Progress Report and updated OPR associated with this phase as a record of the teams design intent.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for the NJSCC and Project Team to review such submissions prior too proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

Construction Administration Phase Submission Requirements

Format: All drawings by the Design Consultant Team shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high, except as noted below:

1. Shop Drawing Process including but not limited to; Shop Drawings and Product technical data, samples, Operating and Maintenance Manuals, Product parts information, Warranties and Guarantees: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, and Section 2 Design Criteria & Section 3 Deliverables, herein, including all definitions: Minimum size: 8 ½” x 11”
2. For all required reporting such as responses to Requests for Information (RFI’s), Construction Observation Reports, etc.: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, and Section 3 Deliverables, herein, including all definitions: Minimum size: 8 ½” x 11”
3. Final Interior Finish Color/Material Selection Board(s) utilize Arch 4 or Arch 5 as above
4. Project Progress Report Booklet or Binder including all deliverables: Minimum size: 8 ½” x 11”. Contract Documents shall be provided under separate cover.
5. “Conformed Contract Documents” (Within 30 days after award) The “Conformed Contract Documents” shall incorporate all revisions as a result of the addenda created during the bid phase.

Distribution shall be as follows:

1. For Items 1&2 above: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, and Section 3 Deliverables, herein, including all definitions for distribution sequence, number of copies and forms to be utilized. Provide one full size set for the Commissioning Agent.
2. Project Progress Report Booklet or Binder: The NJSCC and /or its agents, the Design Consultant and their Consultants, SCC Project Manager, Commissioning Agent, one (1) full sized set each.
3. Final Interior Finish Color/Material Selection Board(s): A minimum of three (3) sets, one(1) for the SCC and its agents (NJSCC and /or its agents Field Office) , one (1) GC, and one (1) for the Client School District.
4. For Conformed Drawings Distribution shall be as follows:
 - a. The NJSCC and / or its agents: Three (3) full sized sets of all deliverables.
 - b. The Design Consultant: One (1) full sized set of all deliverables.
 - c. NJSCC Project Manager should receive: One (1) full sized set of all Construction Documents, Specifications and Addenda, etc.
 - d. School District: One (1) full size sized set of all Construction Documents, Specifications and Addenda.
 - e. Commissioning Agent: One full sized set of all deliverables.
 - f. NJSCC Architecture and Engineering, Trenton: Electronic documentation only; all deliverables.

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PROJECT CLOSE-OUT PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

- Record Set of As-Built Drawings
- Shop Drawings
- Completed Punch-List
- Substantial Completion Documentation
- Approved Punch-List
- Submission Checklist
- Contractor Final Payment Invoice
- Project Close-Out Phase Project Progress Report
- Final Commissioning Agent's Plan Review
- Final NJSCC LEED™ Checklists and supporting documentation
- NJSCC and/or its agents and Design Consultant prepare and submit final report, documenting that design intent has been met.
- Completed Deliverable Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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PROJECT CLOSE-OUT PHASE

Description

Project Close-Out constitutes the final activities of the Construction Administration Phase.

Responsibilities

The NJSCC and/or its agents have the full responsibility for the planning, scheduling, and execution of project close-out activities. The Design Consultant is responsible to cooperate with the NJSCC and/or its agents in the planning, scheduling, and execution of project close-out activities.

Commencement

The Design Consultant shall proceed with the Project Close-out Phase services only upon approval of the Construction Administration Phase documents by the NJSCC.

The documentation of Project Close-Out is initiated at the Pre-Construction Meeting with the distribution to the Contractor of a Project Close-Out Documentation List. This document is included by the Design Consultant in the project Specifications and advises the Contractor of the documents it is responsible to provide to the NJSCC prior to close-out and final payment.

Development of Punch-Lists and Inspection Reports

Upon written notification by the Contractor to the NJSCC and/or its agents that the Work is complete, pre-tested and ready for inspection, the NJSCC and/or its agents will request a final code inspection. Project Close-Out should include pre-final and final inspections, final payment and similar actions evidencing completion of the work. Other specific requirements are included in the Construction Contract Documents. As used in this Manual, the pre-final and final inspections include the resolution of all Contract and code requirements. Upon receiving a written request from the Contractor, a pre-final and subsequently a final inspection shall be arranged by the NJSCC and/or its agents, who will also arrange for the following people to attend the pre-final and final inspections; The Client School District representatives, Design Consultant, Code Inspectors, NJSCC representatives, and the appropriate Contractor/Subcontractor(s).

The purpose of pre-final and final inspections is as follows:

1. To ensure that the work has been completed in substantial conformance with the approved plans, specifications, changes and related documentation
2. To ensure conformance with all applicable construction codes.
3. To ensure that all installed equipment functions properly and all required training is complete and has been observed by the Commissioning Agent in compliance with the Commissioning Plan. While the inspection may show the equipment functions, the

inspection report must:

- a. Identify when the equipment/system cannot be tested due to inappropriate climatic season and qualifications and or retesting may be required
- b. Designate a scheduled date for testing during the appropriate season. To have required certificates of conformance and tests, certified analyses, laboratory tests, etc., on hand as may be deemed necessary by either the Construction Documents and/or Commissioning Plan.

Immediately after the code inspection is completed, code inspection reports will be prepared and distributed to the Contractor's field representative at the site. The NJSCC and/or its agents and the Contractor are to perform deferred tests as needed at the date projected.

A separate Punch-List will be developed to identify items noted by the Design Consultant, the NJSCC and/or its agents, the NJSCC Project Manager and the Client School District. At the conclusion of the pre-final inspection, the NJSCC and/or its agents will prepare an official consolidated Punch-List with input from and signed by all parties present at the pre-final inspection including the Contractor identifying the work remaining and/or needing correction. If any of the designated signatories declines to sign, the reason must be stated on the Punch-List. The Construction Administration Phase of a School Facilities Project is not considered closed out until the Construction Contract has been closed out.

Correction/Completion of Punch-List Items

The NJSCC and/or its agents are responsible for verifying correction/completion of the work identified on the consolidated Punch-List. The verification process shall include representation from the Project Team.

Determination of Substantial Completion

Substantial Completion means that a pre-final Construction Contract and code inspection was conducted, but that additional work (as delineated in the Punch-List) may remain to be performed or corrected that will be accomplished at a later date at the convenience of the Client School District. It also means the effectual dates of warranties / guarantees begin for those items deemed complete. Items as of yet unresolved will extend their applicable warranty / guarantee periods as necessary to assure a minimum period of operation as stipulated by the Construction Documents from the time of resolution.

There are three principal criteria that must be satisfied as the basis of Substantial Completion; namely, a High Percentage of Completion, Amount of Payments to the Contractor, and the Availability for Use of the School Facilities Project for its intended use.

1. High Percentage of Completion:

At least 95% of the work must be completed for Substantial Completion, the prudent approach is that although there is no rigid formula as to the percentage of work which must be accomplished before Substantial Completion this percentage is deemed acceptable

2. Amount of Payments to the Contractor:
The Amount of Payments to the Contractor may be considered as one basis of Substantial Completion. Work with important or material omissions or technical defects or deficiencies should not be considered substantially complete. However, Punch-List items that do not inhibit the Availability for Use may not prevent an item from being considered Substantially Complete.
3. Availability for Use:
To support a claim of Substantial Completion, the Contractor must (a) establish that the School Facilities Project is capable of adequately serving its intended purpose and (b) show that all code deficiencies cited have been corrected, addressed and accepted by the code inspection agency such that a TCO/Approval has been granted. Thus, where air conditioning is required for the operation of equipment, Substantial Completion will not occur until such equipment is functional and accepted as such by all parties.

If at the conclusion of the pre-final Inspection, the Design Consultant determines that the contractual completion status of the Construction Contract supports the condition of Substantial Completion; the Design Consultant forwards a completed Certificate of Substantial Completion Form along with the Punch-List and other documentation to the NJSCC and/or its agents for approval.

The NJSCC and/or its agents shall then request the issuance of a Temporary Certificate of Occupancy (TCO) from the code inspection agency.

Issuance of a "Temporary Certificate of Occupancy"

When Uniform Construction Code deficiencies / violations have been resolved, the DCA will issue a TCO. This TCO may be issued for the entire School Facilities Project or for a specific area or portion of the project.

Prior to Final Contract Closeout and Acceptance the Design Consultant shall perform or participate in the following specific tasks:

1. **Safety and Security: Homeland Security [Design Criteria # 6]**
The Design Consultant Team participating in the Construction Administration Phase is to achieve compliance with the most recent applicable version of the DCA's requirements in the "Educational Facilities, Homeland Security Standards. The Design Consultant shall verify all specified systems, materials, and products are consistent with the Contract Documents. The DCA shall verify compliance with their requirements by the issuance of a Temporary Certificate of Occupancy and Certificate of Occupancy.
2. **Commissioning Plan [Design Criteria # 9]**
 - a. The Design Consultants shall participate in the development of the Final Commissioning Report.
 - b. The Design Consultants shall participate in the training, and review of associated documentation and reports of systems to be commissioned as defined by the Commissioning Plan.

- c. The Design Consultants shall review and approve Commissioning Agent's Plan, Construction Checklists and Construction Phase Commissioning Reports, Issues Logs, System Manual, etc. The Design Consultant shall assist in resolving any open issues remaining.

NJSCC LEED™ Checklist Forms and Supporting Documentation

Integral to the Project Closeout Phase is an evaluation of associated LEED™ for Schools Credits to be achieved. The particular emphasis shall be place upon verifying the correct submittal requirements for USGBC LEED™ compliance as well as any testing and reporting required have been met. The Design Consultant should assist in coordinating and checking that the related Commissioning and other processes defined by the Design Manual Section 2 are completed so that the USGBC LEED™ for Schools Credit Requirements are met. The LEED™ Checklists, including the supporting documentation shall be updated as well as revised to reflect content in the shop drawing submittals and any changes during construction affecting LEED™ for Schools Credits. This process shall be documented by means of an updated OPR.

Initiation of Final Contract Acceptance Process

When the Punch-List items are completed and signed off as being completed or otherwise resolved, and a TCO has been issued, the NJSCC and/or its agents shall initiate a Final Contract Acceptance form.

Submission of Close-Out Documentation

The Design Consultant Team shall prepare and submit the following as part of their Project Close Out responsibilities:

1. As-Built and Record Sets of Drawings

The Contractor shall keep their Construction Contract drawings current at all times by recording the final location of any changes in the work, pipes, traps, conduits, ducts, footings, anchors, etc.

Upon completion of the School Facilities Project, the Contractor shall submit its As-Built drawings to the Design Consultant through the NJSCC and/or its agents with the Contractor's certification as to the accuracy of the information prior to final payment. All As-Built drawings submitted by the Contractor shall be entitled As-Built above the Title Block and dated.

The Design Consultant shall acknowledge acceptance of the As-Built drawings by signing a transmittal from the General Contractor indicating that they have reviewed them and that to the best of the Design Consultant's knowledge they reflect the As-Built conditions, as they exist. Upon receipt of all of the As-Built drawings from the Contractor, the Design Consultant shall obtain the original Mylars from the NJSCC and/or its agents and transfer the As-Built conditions to the original Mylars by modifying and updating the content of the Conformed Contract Documents to reflect RECORD conditions.

The Design Consultant shall place the following statement on the original drawings: "*The As-Built information added to this drawing has been supplied by the General Contractor. The (Architect) (Engineer) does not assume the responsibility or liability for its accuracy other than conformity with the design concept and general adequacy of the "As-built" information to the best of the (Architect's) (Engineer's) knowledge.*"

Unless noted otherwise in the Design Consultant Agreement, the Design Consultant shall complete the Record Set within 90 days of receipt. Upon completion, the Design Consultant shall deliver the Record Set original Mylars back to the NJSCC and/or its agents who will acknowledge its receipt in writing. The Design Consultant may produce a set of prints or reproducible of those drawings. The original Mylars shall become the property of the NJSCC. Final payment to the Design Consultant is subject to receipt of all documents including the Record Set of drawings.

**2. Contractor Documentation
(Maintenance and Operating Manuals, Warranties / Guarantees, Shop Drawings,
Test Results)**

The Contractor shall forward to the Design Consultant all documentation as described in the Construction Documents, specifically including but not limited to the following; Maintenance and Operating Manuals, Warranties, Guarantees, final corrected Testing and Balancing Reports, Boiler Inspection Certificates, final HVAC pneumatic control drawings (if applicable), parts books, diagrams charts, Shop Drawings, specific written Warranties (Waterproofing, Boiler Inspection Certificates, Elevator Inspection Certificates, etc.) and other document's for the Corporation's use. This information should also be forwarded to the Commissioning Agent by the NJSCC and/or its agents for review and incorporation into the Systems Manual. The General Contractor shall also forward a Consent of Surety to final payment (partial payment if applicable) and Certificate of Occupancy for review by the Design Consultant.

The Design Consultant shall review all such documents for accuracy, completeness and Contract compliance and shall transmit them, along with one set of all of the approved shop drawings that the Design Consultant has retained during the construction of the School Facilities Project, to the NJSCC and/or its agents for distribution. The transmittal shall include a complete listing of all documents by name. The NJSCC and/or its agents verifies operator training with Design Consultant assistance. NJSCC and/or its agents and Design Consultant define ongoing testing requirements as needed.

Submission Checklist

The Submission Checklist shall be completed by the Design Consultant and submitted as the cover sheet of this submission to the NJSCC and/or its agents at the completion of Project Close-out to insure that all of the Design Consultant's contractual responsibilities have been completed.

Design Consultant Approval to Proceed

Upon submission of all final deliverables the Design Consultant shall allow a period of time for

the NJSCC and Project Team to review such submissions prior too proceeding. This period of time required of this effort as stipulated by the NJSCC shall be represented in the Project Schedule. If required, the Design Consultant shall prepare additional submissions as necessary to develop a solution that satisfies the requirements of the project. Final review and acceptance of the documentation by the NJSCC and the issuance of a signed copy of SCC/EDA Form 601 will constitute formal approval.

Contractors Final Payment

When all Punch-Lists have been completed and all required demonstrations and instructions of mechanical and control systems have been provided, the NJSCC and/or its agents will initiate a Final Construction Contract Acceptance form and distribute it to the Design Consultant and Contractor for signature. All parties must return the signed documents within ten (10) working days. Upon receipt of the signed form the NJSCC and/or its agents will forward the Contractor's final invoice to the NJSCC for payment.

Design Consultant's Final Payment

Upon completion of the Construction Administration Phase and the issuance of a Certificate of Occupancy, the final invoice of the Design Consultant may be submitted to the NJSCC and/or its agents for review, recommendation and forwarding to the NJSCC Project Manager for approval and signature. The NJSCC and/or its agents will verify that the Design Consultant has satisfied all aspects of the Contractual Documents by initiating a Final Acceptance of Design Consultant Agreement form. Under no circumstances will the final invoice be processed until all contractual requirements have been satisfied. Upon signature by the NJSCC agents and NJSCC Project Manager, final payment will be authorized.

Final Performance Evaluations of the Contractor

The Design Consultant shall complete and submit the final Contractor performance evaluations to the NJSCC Project Manager.

Project Close-out Phase Submission Requirements

Format: All drawings by the Design Consultant Team shall be submitted on consistent sheet sizes of either: All drawings Arch 4: twenty four (24) inches by thirty (30) inches or Arch 5: thirty (30) inches by forty-two (42) inches with all lettering at least one-eighth (1/8) inch high, except as noted below:

1. Final “As Built” Contract Documents: Same size and format as the “Bid Set” and “Conformed Set” of Contract Documents. Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, and Section 3 Deliverables, herein, including all definitions for any specific additional requirements.
2. For all required reporting such as but not limited to; Punch lists, Substantial Completion Documentation, Inspection Reports, Testing and Balancing Reports, etc.: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, the Commissioning Agents requirements in the OPR, System Manuals, Construction Checklists, Issues log, and Commissioning Plan, any other applicable State of New Jersey requirements and Section 3 Deliverables, herein, including all definitions: Minimum size: 8 ½” x 11”

Distribution shall be as follows:

- A. Final as Built Contract Documents prepared by the Design Consultants
 1. NJSCC Project Manager: One full sized set of all deliverables.
 2. NJSCC and /or its agents: One full sized set of all deliverables.
 3. School District: One full sized set of all deliverables and an electronic copy.
 4. Commissioning Agent: One full sized set of all deliverables.
 5. NJSCC Architecture and Engineering, Trenton: Electronic documentation only of all deliverables.
 6. Design Consultant to submit final “As Built” Contract Document set to the DCA consistent with their requirements.
- B. All reporting and documentation defined in #2: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, the Commissioning Agents requirements in the OPR, System Manuals, Construction Checklists, Issues log, and Commissioning Plan, any other applicable State of New Jersey requirements and Section 3 Deliverables, herein, including all definitions.

At a minimum provide one (1) full sized copy of all deliverables to the NJSCC and /or its agents, the Design Consultant and their Consultants, the NJSCC Project Manager, and the Commissioning Agent

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POST OCCUPANCY REVIEW PHASE

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

Required Deliverables Checklist:

The purpose of the products delivered during Post Occupancy Review is to confirm the intent of the design was met. All warranties shall be in place and performance of project components is evaluated as information for future projects.

- Prepare Final Warranty Inspection Report
- Prepare written Product Inspection Report of recommendations for future projects (with assistance from the NJSCC and/or its agents).
- Completed Deliverables Checklist

The Design Consultant attests to the completion of all items noted on this checklist in fulfillment of terms of the agreement and completion of Work associated with the designated phase.

Design Consultant Signature

Date

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POST OCCUPANCY REVIEW PHASE

Description

The Design Consultant shall proceed with the Post Occupancy Phase services only upon approval of the Project Close -out Phase documents by the NJSCC.

Prior to the expiration of the warranty period, the Design Consultant shall be engaged on School Facilities Projects to perform an inspection of the project to review the adequacy and performance of materials, systems and equipment under warranty and complete a brief survey supplied by the NJSCC of the completed School Facilities Project. Post Occupancy Review Phase occurs after (11) eleven months following Substantial Completion of the School Facilities Project.

The purpose of the products delivered during Post Occupancy Review is to confirm the intent of the design was met and ultimately inform the design of future projects. All warranties shall be in place and performance of project components is evaluated as information for future projects.

Warranty Period

The Design Consultant shall assist the NJSCC and/or its agents in the resolution of the Contractor's obligation under all warranty and guarantee periods for each School Facilities Project when design issues arise.

Warranty Inspection

The Design Consultant shall attend, in conjunction with the NJSCC and/or its agents, prior to twelve (11) eleven months after Substantial Completion or final payment, a one-year warranty walk thru inspection and submit a written report to the NJSCC Project Team on the findings and then advise the NJSCC Project Team on the findings. The Design Consultant shall, upon completion of warranty work by the Contractor (but not later than thirty (30) days after the end of the one-year warranty period), re-inspect the Work, and submit a Final Warranty Inspection Report. The final report shall include a list of all warranty issues identified, current status of correction by the Contractor, and remaining work yet to be completed.

Product Inspection

The Design Consultant shall attend, in conjunction with the NJSCC and/or its agents, approximately (11) eleven months after Substantial Completion, a one-year inspection to review quality and durability of products specified and utilized in the School Facilities Project. A written Product Inspection Report of recommendations for future projects shall be submitted to the NJSCC and/or its agents. The Final Product Inspection Report shall detail findings related to durability and suitability of products specified for the School Facilities Project, including architectural finishes and HVAC equipment. The Design Consultant and NJSCC and/or its agents shall implement other ongoing requirements as defined by Design Consultant in contractual documents.

Commissioning Plan [Design Criteria # 9]

Review completed Commissioning activities and requirements after the Certificate of Occupancy. The Design Consultant shall assist the Commissioning Agent in determining if the activities defined by the Commissioning Plan have been successfully completed.

Post Occupancy Review Phase Submission Requirements

1. For all required reporting during this Phase including but not limited to; Warranty and Product Inspection Reports etc.: Refer to the Contract Documents particularly the Specifications, the Agreement, SCC/EDA Project Management Manual, the Commissioning Agents requirements in the OPR, System Manuals, Construction Checklists, Issues log, and Commissioning Plan, and Section 3 Deliverables, herein, including all definitions: Minimum size: 8 ½” x 11”
 - a. At a minimum provide one (1) full sized copy of all deliverables to the NJSCC and /or its agents, the Design Consultant and their Consultants, the SCC Project Manager, and the Commissioning Agent

NJSCC Design Manual

Appendix A

Project Progress
Report Guides

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INTRODUCTION

SCOPE AND INTENT

The NJSCC now requires formal verbal and written Project Progress Reports to be presented by Project Teams at the following six major design/construction phases:

- Programming
- Schematic Design
- Design Development
- Construction Documents
- Bidding and Contract Award
- Construction Administration

The Reports shall be delivered during the formal Project Review Meetings that are required at the major design/construction phase. (Note: Reports are not required for the Project Close-Out and Post Occupancy Review phases.) The purpose of these reports is to provide Project Teams an opportunity to explain how they are addressing the 25 Design Criteria described in Section 2 of this Manual.

Since Project Teams will be evaluated on how well – and how creatively – they are addressing the NJSCC’s 25 Design Criteria, preparing and presenting informative Project Progress Reports is extremely important.

This Appendix provides guidance on how to prepare the required Reports.

ORGANIZATION AND CONTENT

This appendix contains six individual Guides, one for each Project Progress Report that Design Consultants must prepare.

Each Guide is organized according to the 25 Design Criteria developed by the NJSCC and included in Section 2 of this Manual. Each Criteria is presented, together with a series the individual questions - or “prompts”- designed to help Design Consultants understand some of the key issues they are expected to address in their designs and explain in their Progress Reports.

During Project Review Meetings, NJSCC and/or its agents will use these “prompts” as a basis for questioning Design Consultants about how they are addressing each of the 25 Design Criteria. Design Consultants should, therefore, be prepared to address the prompts during their formal Progress Report presentations. While the Report presentations need not address every “prompt” individually, they should provide information that systematically addresses the key issues raised by the prompts and shall include all other products and deliverables prepared during this phase of work.

USING THE APPENDIX

The NJSCC intends for the information contained in this Appendix to be used in three ways:

1. To help Design Consultants better understand – and therefore better address – the 25 Design Criteria contained in Section 2.
2. To help Design Consultants prepare their required Project Progress Reports.
3. To help NJSCC and PMF personnel effectively review Design Consultant progress toward creating high performance, 21st century schools.

Design Consultants should, therefore, review all the Guides in this Appendix at the beginning of any School Facilities Project in order to clearly understand the design goals the NJSCC has established. This review should be accompanied by a review of the Design Criteria contained in Section 2.

As the School Facilities Project proceeds from phase to phase, Design Consultants should continue to review the Guides for each particular phase, and to do so several times over the course of the phase. At the conclusion of each phase, Consultants should again review the Guide for that phase to help prepare their Progress Report presentation.

NJSCC and/or its agents will use the Guides during Project Review Meetings to evaluate Design Consultant progress on creating high performance, 21st century schools.

PROGRAMMING

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

PG ACOUSTIC COMFORT

- Are there major sources of noise near the site?
- Can the site be used to minimize the impacts of these noise sources?
- Have good classroom acoustics been established as a design goal for the project?
- Can spatial adjacencies in the program work together to limit unnecessary noise?
- Has ANSI/ASA S12.60-2002 for acoustics been reviewed?

PG THERMAL COMFORT

- Are there prevailing breezes that could help naturally ventilate the building?
- How can potential heat gain from southern orientations, fenestration and skylights be mitigated in school spaces, esp. classrooms?

PG VISUAL COMFORT

- Does the site provide special views that should be preserved?

PG DAYLIGHTING

- Has daylighting been established as a specific design goal for the school and, in particular, for the classrooms?
- How will siting and site elements influence the building's access to sunlight?
- Can the site accommodate one-story construction to allow skylights or roof monitors in the classrooms?
- Does the site allow the building to be oriented so as to optimize daylighting opportunities?
- How are the proposed daylighting strategies reflected in the program; specifically, what are the implications for the height and massing of the building?

PG INDOOR AIR QUALITY

- Is the site near any sources of outdoor pollution?

PG SAFETY AND SECURITY

- As part of programming, are basic room placements and adjacencies being considered in terms of their impact on safety and security?
- Is the facility part of a state or countywide emergency shelter plan?
- Has a defined high bay area of the building been designated for use as an emergency shelter?
- Have appropriate shelter spaces been designated, specifically excluding kitchens, open corridors, MEP, storage, science, and shop or computer rooms?
- Does the proposed facility coordinate with district wide and/or DOE security provisions?
- Has the site been studied to find where potential security risks come from, i.e. high traffic corridors, adjacent blighted areas, etc.

PG ENERGY ANALYSIS

- Has the design team selected an energy analysis tool?
- What tool has been selected?
- At what stages in the design processes will the tool be used, and what types of analyses will be performed?

PG LIFE CYCLE COST

- Have durability and maintainability issues been considered as part of the analysis?
- What basic assumptions have been built into the methodology? Have all parties agreed to these assumptions?

PG COMMISSIONING

- Has a commissioning agent been engaged?
- Is the commissioning agent beginning to document operational needs specific to the client's needs and the design team's intent?

PG LEARNING CENTERED DESIGN

- How does the program reflect a "learning centered" approach? (What has been done to accommodate individualized, self-directed, collaborative and activity-based/project-based learning? To what extent is the facility a "3D Textbook"?)
- How have consultations with teachers, administrators and students influenced the development of the program?

PG STIMULATING ARCHITECTURE

- Has teacher, student, staff and community input been solicited to inform the development of this school's program? Has this input helped identify community aspirations for the school? Has this input help generate a feeling of ownership for the school among these key stakeholders?

PG ACCESSIBILITY

- Have special education and/or school health care personnel been involved during the programming process to ensure the facility's design is inclusive for both physically and cognitively disabled students?
- Has the curriculum been examined for any specific requirements for students with either physical or cognitive disabilities? How are these requirements reflected in the program? What measures are planned to ensure the facility is friendly to cognitively disabled students?
- Will all significant spaces within the program be accessible for students with physical and/or cognitive disabilities?
- How have the special service needs of students with disabilities been accommodated in the program (e.g. in the health suite, bathrooms, special classrooms, etc.)?

PG FLEXIBILITY AND ADAPTABILITY

- Have potential future changes to the facility been considered; for example, changes in grade structure, changes in curriculum, changes in community use, possible consolidation or expansion over time, etc? How have these considerations impacted the program?
- Can the school be easily converted into two or more "small schools"? How is this adaptability reflected in the program?
- Is the school adaptable to a year-round and/or 24-7 operation?

PG INFORMATION TECHNOLOGY

- Have the provisions of the statewide technology plan been reviewed?
- Have the provisions of the district technology plan been reviewed?
- Have the DOE core curriculum standards for technology been reviewed?
- How does the technology plan influence programmatic space requirements (For example; are dedicated wireless carts being provided, and if so, where will they be stored? Will long distance learning be provided, and if so, what will the space impacts be?)

PG BUILDING SHELL

- Does the basic program contribute to an energy efficient building envelope? For example, does the program group functions that may need less glazing (auditoriums, kitchens, etc.) on the east and west, and those that will benefit most from daylight (classrooms, corridors, etc.) on the north and south?

PG RENEWABLE ENERGY SYSTEMS

- Is maximizing the cost effective use of renewable energy a design goal for the project?
- Does the site have good solar access – for daylighting, active and passive solar heating, solar hot water, and/or photovoltaic systems?
- Could the site use wind power to generate electricity?
- Have available renewable energy incentives been considered when evaluating various renewable energy technologies and systems?

PG HVAC

- What types of high performance mechanical systems are being considered? How are the site and space planning implications of these systems reflected in the program?
- Have available incentives for high performance HVAC been explored?

PG ELECTRIC LIGHTING

- Have available incentives for high performance lighting been explored?
- Is optimizing 'watts per square foot' performance a design goal for the lighting system?
- Are lighting strategies for each type of space in the facility going to be distinct from each other based on the function and necessary light levels?

PG ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Can existing natural areas on the site be preserved? Does the site selected support the goals of open space preservation and smart growth? Does the site lend itself to naturally controlling storm water runoff?
- Has the site been studied in terms of solar orientation, prevailing breezes, shade trees and significant landforms and vegetation?
- Is there good pedestrian, mass transit, and/or bicycle access? Have safe routes to the school been identified?
- What areas of the site and/or the surrounding community could be used as 'outdoor laboratories' for teaching?

PG ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- What initial goals are being set for the facility in terms of environmental materials? What percentage of materials should have recycled content and what percentage of recycled, sustainable, post-consumer and/or post industrial content should these materials contain? What standards are being followed and applied?
- Will provisions be made to "design-in" areas to collect and store recyclable materials? Will a waste recycling plan be part of the facility management plan? What are the goals for percentage of material to be recycled (by weight) for the facility?
- Does the opportunity exist to preserve a significant portion of an existing building and /or envelope? Are there materials on site that may be reused for the project, such as structural steel beams, crushed concrete serving as aggregate, etc? Are salvage materials available locally?
- What major building material can be sourced within the region or within a 500-mile radius of the facility? What percentage of the building's material will be sourced by this means?
- Is a construction waste management plan for the project being developed?

PG WATER EFFICIENCY

- Does the site lend itself to controlling storm water runoff?
- Could the site accommodate on-site wastewater treatment, a retention pond, etc.?
- What water use goals for the school have been established?
- Are water efficient fixtures, including waterless urinals, being considered?
- Can a cistern be incorporated to store water (from roof runoff or non-potable uses such as irrigation and building maintenance)?

PG COMMUNITY INVOLVEMENT

- Has the Local School District received the Community School Information Packet?
- Has the Local School District established a Community School Working Group?
- Have local governmental, higher educational, and other private organizations been encouraged to participate?
- Has the NJSCC Communications Officer monitored community meetings?
- Has the NJSCC Project Manager facilitated and maintained information exchange with the Communications Officer?
- How has community input to the programming process been obtained: planning meetings, workgroups, surveys, interviews, design charrette, etc.?
- Has there been local collaboration with the NJSCC Project Manager?

PG COMMUNITY USE

- Has the school district considered the opportunity to use the facility after hours and during summer recess for other community activities such as a healthcare center, meeting/conference rooms, fitness center, computer lab, emergency shelter, and the like)?
- Has the school district considered complementary functions such as police sub-stations, child daycare, outdoor events complexes (such as amphitheaters, track, field, stadium), and the like to be funded by other means?
- Are outdoor spaces going to be developed as an integral part of the design?
- Has the district considered the potential for shared use among and between other schools in the district and/or other facilities such as the YMCA, public library, etc.?
- What has been done to accommodate the learning needs of the community? What are their programmatic needs?
- Has the potential for using non-school facilities within the community as extended learning centers been considered? How have these considerations influenced the program?

PG CATALYST FOR ECONOMIC DEVELOPMENT

- Does the selected site require infrastructure improvements beyond the property line and /or immediate street utility connections? Have opportunities for leveraging shared installation of infrastructure been explored?
- Have opportunities for leveraging the school development process - for example, through the financing, design, or construction of complementary uses such as housing, office and/or retail on or adjacent to the site - been explored?
- How does the program relate to/enhance relevant local land use, business improvements and/or economic development plans?
- Does the school facility location contribute to the vitality of an existing urban center?
- How will the school facility support new jobs in the community?

PG SERVICE LIFE PLANNING

- Has the Design Consultant become familiar with the referenced data source and methodology set forth by this Design Criteria?

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SCHEMATIC DESIGN

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

SD ACOUSTIC COMFORT

- Does the basic layout of the classrooms help or hinder good acoustics?
- Do any of the classrooms face sources of outside noise? If so, what measures are proposed to reduce the impact of this noise?
- Are any of the classrooms located next to sources of inside noise? If so, what measures are proposed to reduce the impact of this noise?

SD THERMAL COMFORT

- Are windows and skylights being designed to minimize 'hot spots' caused by direct sunlight?
- Are temperature controls being provided for each classroom?
- Are MEP systems separately controlled at the perimeter of the building envelope, especially areas of glazing?
- Has the thermal massing and orientation of floor and wall assemblies been designed for thermal comfort?
- Has solar orientation been taken into account when analyzing heat gain?

SD VISUAL COMFORT

- Are the basic daylighting and electric lighting designs being developed so that they provide illumination in as uniform a manner as possible, using task or accent lighting as appropriate to meet specific needs?
- Are individual lighting designs being developed for individual room types? Do the designs vary, even within room type, depending on the amount of daylight the room will receive?
- Is the potential for glare being analyzed, and are the lighting/daylighting systems being designed to minimize it?

SD DAYLIGHTING

- What basic strategies are being considered for bringing daylight into the school, particularly the classrooms?
- What strategies are being considered to control unwanted heat gain and glare?
- What tools are being used to analyze the impact of any daylighting strategies on the electric lighting system and on visual comfort and energy use?
- What are the preliminary results of these analyses?

SD INDOOR AIR QUALITY

- Will the HVAC system being considered provide adequate ventilation, especially to the classrooms?

- Does the basic layout of the school keep operable windows and air intake vents away from sources of exhaust?
- Have CO² monitors been provided for spaces with large variable occupant loads?
- Has ASHRAE standard 62.1-2001 been reviewed?

SD SAFETY AND SECURITY

- How have Crime Prevention through Environmental Design (CPTED) principles been applied during this phase of the process?
- Are opportunities for natural surveillance and access control being ‘designed in’?
- What security technologies are being considered? How do they reinforce and extend the impact of the school’s security-focused design features?
- Does the site plan designate emergency vehicle routes and have they been reviewed by the local jurisdictions?
- Have access/egress points been reviewed on the basis of lockdown, evacuation, and relocation plans?
- How do the designated entrances assure security by means of location, locking function, and cameras?
- Have exterior lighting, hydrant locations, and areas of refuge been designed to assure safety?
- Have passive provisions for safety (e.g. clear way-finding, unobstructed views, elimination of doors where possible, etc.) been incorporated in the design?

SD ENERGY ANALYSIS

- Have the energy analysis tool(s) selected for the project been used to project energy consumption at least once during this phase of design?
- Do the results meet or exceed the energy goal for the facility?
- Have innovative energy efficient systems (e.g. geo-thermal, variable speed fans and pumps, mini-cogeneration, enthalpy wheels, local individual room controls etc.) been considered on a life cycle cost basis?
- Have innovative energy storage strategies (thermal mass, desiccant wheels, phase change materials, etc.) been considered on a life cycle cost basis?

SD LIFE CYCLE COST

- Has the life cycle cost methodology selected for the project been used to compare and optimize alternative design strategies at least once during this phase of the process?
- Have durability and maintainability issues been considered as part of the analysis?

SD COMMISSIONING

- Is appropriate design documentation being collected by/delivered to the commissioning agent?

SD LEARNING CENTERED DESIGN

- How is “personalization of space” being accommodated in the design? How will it help foster the notion of ownership and stewardship for the school?

- How are social spaces and “places” distributed around the facility? Have informal gathering areas been incorporated around circulation spaces?
- What strategies are being considered to define individualized learning areas, small group areas, and breakout spaces?
- How does the design reflect a “learning centered” approach? (What in the design accommodates individualized, self-directed, collaborative and activity-based/project-based learning? To what extent is the facility a “3D Textbook”?)
- What has been done to accommodate the learning needs of the community? Is the facility easily adapted for evening courses and community gatherings?
- Does the design provide room for “virtual spaces”, such as information kiosks, digital displays, and the like to feature student/team activities and foster community identity?
- Does the facility have well developed outdoor spaces? Does the school have a strong link to them?

SD STIMULATING ARCHITECTURE

- How have the community aspirations identified in the program phase been incorporated into a “vision” for the school? How is this “vision” being realized in the schematic design?
- How does the schematic design respond to the school’s physical, social, cultural, and economic contexts?
- How is the design providing a setting, character and “feel” that are appropriate for the students who will use it, especially for early childhood and K-5 facilities?
- How is the school’s identity being defined and articulated?

SD ACCESSIBILITY

- What features of the design are a result of consultations with special education specialists and school health care personnel during the schematic design process? Are spaces designed with both physical and cognitive disabilities in mind? Do instruction spaces offer a variety of sub-spaces that are visually and acoustically distinct, and can instructional spaces accommodate a teacher plus other adults (special teachers, personal aides, et al.) if necessary?
- Are key spaces accessible to all students without having to unnecessarily separate students with disabilities from the rest of the student body (i.e. cafeteria, auditorium, libraries, etc.)? Are accessible areas integrated well into each space; i.e. accessible spaces and seating areas are not separated from the rest?
- Do outdoor spaces accommodate the various needs of disabled students?
- How have the special service needs of students with disabilities been accommodated in the design (e.g. in the health suite, bathrooms, special classrooms, etc.)?

SD FLEXIBILITY AND ADAPTABILITY

- Do spaces facilitate short-term reconfigurations of the learning environment to suit different activities and programs? Are spaces being designed so they can accommodate numerous furniture layouts?
- How have potential future changes to the facility - for example, changes in grade structure, changes in curriculum, changes in community use, possible consolidation or expansion over time, etc - been incorporated into the schematic design?
- Will the design allow the school to adapt to year-round and/or 24-7 hour operation?

SD INFORMATION TECHNOLOGY

- Where and how have the selected technology systems been accommodated?

SD BUILDING SHELL

- What basic assemblies and configurations are being considered for the walls, floors, and roofs of the facility? What are the energy implications?
- What types of materials (glazing, shading, insulation, air barriers, structural materials) are being considered? What are the energy implications?
- How will the overall performance of the shell as a whole be optimized?
- How are the impacts of thermal mass being addressed?
- Are light colored surfaces being considered as a means of reducing heat gain?
- Can landscaping be used to reduce heat gain on the building envelope?

SD RENEWABLE ENERGY

- What renewable energy strategies are being considered for the school?
- How much energy will they save?
- What are their life cycle cost benefits?
- How will they impact the site plan or the building design?
- How will they impact other building systems?

SD HVAC

- What type of HVAC system is being considered for the school?
- Why is this system optimal from a comfort/energy performance perspective?
- How are the interactions between the HVAC system and other key building systems being analyzed and optimized?
- Is natural ventilation being considered? If so, are its potential impacts on HVAC performance being factored into the analytic process?

SD ELECTRIC LIGHTING

- Is the design team optimizing a 'watts per square foot' method to design the high performance lighting system? How are lighting consultants optimizing the interaction between the electric lighting system and potential daylighting strategies as part of an integrated design?
- What electric lighting strategies are being proposed for specific types of spaces in the facility (e.g. classrooms, labs, cafeteria, etc.)? What is the energy and visual performance benefits of these individual strategies?
- How does each strategy interact with the daylighting strategies being used? How are these interactions being analyzed and optimized?

SD ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Does the design preserve and/or restore existing natural areas of the site? Does it help control stormwater runoff with various measures such as pervious paving, stormwater retention features and strategic landscaping? Is environmental landscaping (xeroscaping,

indigenous and low-irrigation vegetation) also integrated in such areas to reduce the need for costly maintenance of grass lawns?

- If feasible, is the building, particularly the classroom wings, oriented in a predominantly east-west direction to facilitate access to daylight?
- Is the facility designed for convenient access to public transportation? Does it provide amenities such as secure bike storage and changing rooms to accommodate alternate means of transportation?

SD ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- What environmentally preferable materials and products are being considered for the facility and where will they be used?
- How does the basic design facilitate recycling by students and staff?
- How has the construction waste management plan for the project evolved during schematic design?

SD WATER EFFICIENCY

- Is water efficient landscaping part of the preliminary site design?
- Is irrigating only the athletic fields being considered?
- Are water reduction techniques being considered for school plumbing fixtures and equipment?
- Is capturing and reusing rainwater being considered?
- Are innovative wastewater/ gray-water treatment and/or reuse techniques being considered?

SD COMMUNITY INVOLVEMENT

- Have the Design Consultants made a presentation(s) of their proposal to the Community Board, District, NJSCC, PMF and public representatives? How have comments and other responses to their presentations been incorporated into the schematic design of the project?

SD COMMUNITY USE

- Have the community programs and facilities identified in the Program Design Phase been incorporated?
- How have issues such as independent access, control, separation of uses and users, etc. been considered in the placement and design of any shared use programs or facilities?
- Have the partners committed their respective funds to non-eligible costs?

SD CATALYST FOR ECONOMIC DEVELOPMENT

- How have the economic development opportunities identified in the program phase influenced the schematic design?

SD SERVICE LIFE PLANNING

- Have materials and assemblies associated with the building envelope and high traffic areas under consideration by the Project Team been evaluated on the basis of Service Life

- Planning Analysis?
- Have the assumptions made in the analysis been verified with operation and maintenance staff for accuracy?
 - Does the current District Maintenance Plan address these components and have the assumptions made been reconciled with the Analysis?
 - Has the Project Team identified other assemblies than those required of the Design Criteria for which such analysis system may be desired?

DESIGN DEVELOPMENT

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

DD ACOUSTIC COMFORT

- How do the proposed materials and finishes, especially those used in the classrooms, contribute to reducing sound reverberation?
- Have the classrooms been analyzed in terms of projected acoustic performance?
- Will the proposed heating/ventilating/air conditioning (HVAC) system for the classrooms create noise? If so, how will the impacts of this noise be dealt with?

DD THERMAL COMFORT

- How have HVAC distribution layouts been designed to ensure all parts of a room receive adequate ventilation?
- How do proposed floor, wall and roof assemblies impact the thermal comfort strategy of the design?

DD VISUAL COMFORT

- Do the daylighting and electric lighting system designs provide illumination as uniformly as possible, using task or accent lighting as appropriate to meet specific needs?
- What tools have been used to model the interactions of both these systems in terms of their impacts on visual comfort?
- Have direct/indirect lighting fixtures been selected for general illumination in classrooms?
- What shading strategies (internal and external) have been selected?
- Have individual lighting designs been developed for individual room types? Do the designs vary, even within room type, depending on the amount of daylight the room will receive?
- Has the potential for glare being analyzed, and have the lighting/daylighting systems been designed to minimize it?
- Are the color and texture of wall, floor, and ceiling surfaces being taken into account in terms of their interaction with the lighting and their combined impact on the visual environment?
- Have the color and texture of wall, floor and ceiling surfaces been taken into account in terms of their interaction with lighting and their combined impact on the visual environment?

DD DAYLIGHTING

- What daylighting strategies have been selected for the school, particularly the classrooms?
- Are the classrooms receiving as much daylight as possible, while avoiding glare and unwanted heat gain?
- What types of glazing have been selected (for windows, clerestories, skylights and/or roof monitors) and why are they more energy and cost-effective than alternatives?

- How will the daylighting and electric lighting systems interact?
- What analyses have been done to optimize these interactions?
- How has the design consultant incorporated both daylighting and views to benefit as many users as possible and how has the anticipated performance been verified and coordinated with the MEP systems?
- Will the combined daylighting/electric lighting strategies reduce energy use and lower the school's operating costs over time?
- Has the possibility of reducing the number of light fixtures, or the number of lamps, in daylighted rooms been investigated?

DD INDOOR AIR QUALITY

- Will the HVAC system provide adequate ventilation, especially to the classrooms?
- Is the HVAC system designed to minimize conditions conducive to mold/microbial growth?
- Does the design include individual exhaust/ventilation strategies for areas that may be sources of pollution, such as: kitchens, restrooms, science labs, janitor's closets, copy rooms, and vocational/industrial shop rooms?
- Does the design include CO₂ monitors for spaces with large variable, occupant loads?
- Are all the selected interior materials and products low emitters of indoor air contaminants?
- Have recessed grates or "walk-off mats" at entrances been included?
- Have specified materials been evaluated on the basis of pollutant source control?

DD SAFETY AND SECURITY

- How have Crime Prevention Through Environmental Design (CPTED) principles been applied during this phase of the process?
- Have opportunities for natural surveillance and access control been "designed in"?
- What security technologies have been selected? How do they reinforce and extend the impact of the school's security-focused design features?
- If a portion of the facility has been designated as an emergency shelter, has an emergency generator with an auto transfer switch been included?

DD ENERGY ANALYSIS

- Has the energy analysis tool(s) selected for the project been used to project energy consumption at least once (preferably several times) during this phase of design?
- Do the results meet or exceed the energy goal for the facility?

DD LIFE CYCLE COST

- Has the life cycle cost methodology selected for the project been used to compare and optimize alternative design strategies at least once (preferably several times) during this phase of the process?

DD COMMISSIONING

- Is appropriate design documentation being collected by or delivered to the commissioning agent?

DD LEARNING CENTERED DESIGN

- How is “personalization of space” being accommodated in the design?
- What types of small scale socialization and/or gathering spaces are being incorporated in the design?
- What techniques have been used to define individualized learning areas, small group areas, and breakout spaces?
- How are outdoor spaces being developed? Does the design create strong links to them via transition spaces between the inside and the outside?
- How are furniture, space-defining elements suspended from the ceiling, and other independent building elements contributing to the formation of learning-centered spaces?
- How is the “3D textbook” concept reinforced in the detailing of the school’s design?

DD STIMULATING ARCHITECTURE

- How is the design goals articulated in the schematic design phase being accomplished in the design development phase?

DD ACCESSIBILITY

- How is input from special education personnel reflected in the detailing of critical areas (health suites and bathrooms, etc.) for disabled students? Are spaces detailed with both physical and cognitive disabilities in mind?
- How have the instruction spaces been designed to offer a variety of sub-spaces that are visually and acoustically distinct? How can the spaces accommodate a teacher plus other adults (special teachers, personal aides, et al.) if necessary?
- How have specialized program areas, outdoor spaces and bathrooms been developed to accommodate students with special needs?
- How will proposed furnishings, fixtures, and equipment (FF&E) accommodate students with physical and/or cognitive disabilities (e.g. tables with rounded edges and corners, height-adjustable desks, lockers at the end of locker rows, etc.)?

DD FLEXIBILITY AND ADAPTABILITY

- How is flexibility - in plan and section - being achieved in individual spaces, especially the classrooms?
- How do the assemblies and systems selected in this phase reinforce design strategies adopted earlier to make the facility adaptable over time?
- Are the lighting and IT systems configured to allow for maximum flexibility in room utilization, especially in the classrooms?

DD INFORMATION TECHNOLOGY

- How have the selected technology systems been integrated with design strategies for specific spaces? Do the locations of projection equipment, whiteboards, monitors, etc. work well with the lighting/daylighting and heating/cooling strategies? Do room configurations positively support the use of technology in those rooms?
- How will selected technology systems be integrated with other building components (for example MEP, structural, fire protection, etc.)?

DD BUILDING SHELL

- What basic assemblies and configurations are being considered for the walls, floors and roofs of the facility?
- What types of materials (glazing, shading, insulation, air barriers, structural materials) have been selected and why are they better, from an energy and life cycle cost perspective, than other alternatives?
- How have trade-offs (between amounts of window versus wall, between one type of glazing versus another, etc.) been analyzed, and how has the performance of the building shell as a whole been optimized?
- How are the impacts of thermal mass being factored in?
- Are light colored surfaces, particularly roofing, being considered as a means to reduce heat gain?
- How do the final details address specific area of concern for building envelope performance including: thermal bridging, moisture transfer, air infiltration, water intrusion, etc.?

DD RENEWABLE ENERGY

- How are the renewable energy strategies selected for the school being incorporated into the design?
- What are their life cycle cost benefits?
- How much energy will they save?
- How will they impact and interface with other building systems (lighting, electrical, HVAC, building shell)?
- Will other building components interfere with the renewable energy systems (e.g. will the placement of a rooftop HVAC unit prevent sunlight reaching a solar collector, etc.)?
- Are there non-energy benefits associated with the proposed renewable energy systems; for example: peak shaving benefits, off-setting cost advantages (e.g. using photovoltaics as building materials; using the renewable system as a teaching tool; etc.)?

DD HVAC

- What type of HVAC system has been selected for the school? Why is this system optimal from a comfort/energy performance standpoint?
- How will the system perform from a life cycle cost perspective?
- How have the interactions between the HVAC system and other key building systems (lighting, daylighting, building shell) been analyzed and optimized?
- Has natural ventilation been considered? If so, have its potential impacts on HVAC performance been factored into the analysis process?
- Has the HVAC equipment been “right sized” to meet predicted demand? What control system(s) has been selected and how will it affect performance?
- What level of control will individual teachers have over the heating, ventilating and air conditioning of their classrooms?
- Is the entire system configured for easy operation, maintenance and repair?

DD LIGHTING

- What electric lighting systems(s) have been selected for the school and, in particular, for

the classrooms?

- What are their energy and visual performance benefits?
- How do they interact with the daylighting strategies being implemented? How have these interactions been analyzed and optimized?
- What control system(s) have been selected and how will they affect performance?
- What level of control will teachers have over the lighting in their classrooms?
- Will the lighting design permit the facility to meet the proposed 'watts per square foot' goals?

DD ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Does the final design preserve existing natural areas on the site?
- Does the design help control stormwater runoff?
- Does the design minimize areas covered with impervious surfaces (e.g. parking lots, paved walkways, etc.)?
- Do landscaping strategies, particularly tree planting, enhance the building's high performance features (i.e. by providing shade where it's needed but not blocking sunlight that's used for daylighting)?
- Have exterior lights been designed to focus downward to minimize night light pollution?

DD ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- What environmentally preferable materials and products have been selected for the facility and where will they be used? What percentage of materials will have recycled content and what percentage of recycled, sustainable, post-consumer and/or post-industrial content will these materials contain? Which materials will be highly durable and easy to maintain?
- How does the design facilitate recycling by students and staff? Is recycling "designed-in" as an integral part of the building to collect and store recyclable materials?
- How has the construction waste management plan for the project evolved during design development?
- What building materials are being sourced within the region or within a 500-mile radius of the facility? What percentage of the building's material will this material represent?
- How has the construction waste management plan for the project evolved during schematic design?

DD WATER EFFICIENCY

- Has high efficiency irrigation technology been selected for athletic fields?
- Does the design use captured rainwater or recycled water for irrigation?
- Does the design include high efficiency equipment (dishwashers, laundry, cooling towers)?
- Does the design include water saving strategies such as: low-flow showerheads; automatic lavatory faucet shut off controls; waterless urinals; etc.?
- Does the design include innovative wastewater/ gray-water treatment and/or reuse techniques?

DD COMMUNITY INVOLVEMENT

- Have the Design Consultants made presentations of their proposal to the Community Board, District, NJSCC, PMF and public representatives?
- How have comments and other responses to their presentations been incorporated into the design of the project?

DD COMMUNITY USE

- Have use classifications changed as a consequence of the shared use programs or facilities? If so, how have these changes impacted design details such as egress requirements, building assembly ratings, etc.?
- What design details have been used to ensure independent access, control, separation of uses and users, etc. for the shared use programs or facilities?
- Do the shared uses have any specific design or construction requirements? Do the shared use partners, if any, have special needs or requirements?

DD CATALYST FOR ECONOMIC DEVELOPMENT

- How have the economic development opportunities identified in the program phase been incorporated into the design?

DD SERVICE LIFE PLANNING

- Have materials and assemblies associated with the building envelope and high traffic areas selected by the Project Team been evaluated on the basis of Service Life Planning Analysis?
- Have the anticipated performance and required maintenance activities been provided to the District for inclusion in future District Maintenance Plans?

CONSTRUCTION DOCUMENTS

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

CD ACOUSTIC COMFORT

- Are the walls of classrooms that are located next to noise sources designed so that they reduce sound transmission?
- Has all potentially noisy equipment been detailed to minimize negative impacts of sound transmission?
- Have equipment manufacturer's installation recommendations been employed? If not, why not?

CD THERMAL COMFORT

- Do HVAC distribution layouts in their final configurations ensure all parts of a room receive adequate ventilation?
- Have controls been installed to provide teachers adequate control over the thermal comfort of their classrooms?

CD VISUAL COMFORT

- In their final configuration do the daylighting and lighting systems provide illumination in as uniform a manner as possible, using task or accent lighting as appropriate to meet specific needs?
- Have direct/indirect lighting fixtures been specified for general illumination in classrooms?
- What shading strategies (internal and external) have been specified?
- Have the final configurations of other building components - like the color of the walls, floor or ceiling - been changed in ways that might influence system performance?
- Have the potential impacts of these changes on visual comfort been accounted for?

CD DAYLIGHTING

- Will the construction details for the daylighting components (the windows, light-shelves, roof monitors, skylights, shading devices, etc.) modify the performance of the system as a whole; i.e. will the required amount of daylight still reach the classrooms, will glare and heat gain still be controlled, etc?
- What will be the impact - on operating costs and on visual comfort - of any changes in performance?
- Will the final construction details of other building components (for example, the color and reflectance of roofing materials adjacent to skylights or roof monitors) change the dynamics of the daylighting system and impact performance? What will be the impact - on operating costs and on visual comfort - of any changes in performance?

CD INDOOR AIR QUALITY

- How will the finally configured HVAC system provide adequate ventilation, especially to the classrooms?
- How will the system minimize conditions that are conducive to mold/microbial growth?
- What individualized exhaust strategies have been incorporated?
- Have CO² sensors in large assembly areas been included?
- Are all the selected interior materials and products - and their installation methods - low emitters of indoor air contaminants?
- Are recessed grates or “walk-off” mats installed at entrances to reduce the amount of dirt entering the building?

CD SAFETY AND SECURITY

- What type of exterior lighting has been specified and how will it improve security?
- Have durable materials been specified in critical areas such as entrances?
- What security technologies have been specified? How do they reinforce and extend the impact of the school’s security-focused design features?

CD ENERGY ANALYSIS

- Are the materials, systems and equipment specified in this phase consistent with the materials, systems and equipment inputs used in previous energy performance analyses?
- Have any other inputs (use/schedule, rate structure, incentives, fuel sources, etc) changed since previous phases? How will these changes impact previous energy analysis results?

CD LIFE CYCLE COST

- Have the energy analysis tool(s) selected for the project been used to project energy consumption at least once during this phase of design?
- Do the results meet or exceed the energy goal for the facility?

CD COMMISSIONING

- Have commissioning requirements been included in the construction documents?

CD LEARNED CENTERED DESIGN

- How have the building’s MEP systems and data infrastructure been detailed to accommodate the learning-centered design strategies developed earlier in the process, i.e. individualized learning areas, social/gathering spaces, breakout areas, etc.?

CD STIMULATING ARCHITECTURE

- How do the materials, finishes, and details incorporated into the construction documents support the design goals articulated in the schematic design and design development phases?

CD ACCESSIBILITY

- Does the detailing of critical areas for disabled students (health suites, bathrooms, etc.) have the benefit of input from special education and/or school health care personnel?
Are spaces designed with both physical and cognitive disabilities in mind?
- How do the specified furnishings, fixtures, and equipment (FF&E) accommodate students with physical and/or cognitive disabilities?

CD FLEXIBILITY AND ADAPTABILITY

- How is flexibility being achieved in the way the project is being detailed? What kinds of furnishings have been chosen to accommodate flexibility?
- Do the electrical, IT, telecom, and security systems have sufficient excess capacity to expand and change over time?

CD INFORMATION TECHNOLOGY

- Where have technology system/server rooms been accommodated?
- Have the selected technology systems be integrated with other building components (for example MEP, structural, fire protection)

CD BUILDING SHELL

- How do the final construction details for the wall, floor and roof assemblies maintain the original design intent in terms of energy performance. (For example, do the assemblies allow insulation to be installed at the thickness originally specified, do air barriers cover all the areas they are supposed to, can areas - such as roof cavities - that need ventilation be adequately vented in the current configuration, etc.?)
- How do the final details address specific areas of concern for the building envelope, including: thermal bridging, moisture transfer, air infiltration, water intrusion, etc.?

CD RENEWABLE ENERGY

- Will the renewable energy systems as detailed and specified perform as designed and analyzed in earlier phases of the project?
- How are the renewable energy systems in their final configurations anticipated to perform from a life cycle standpoint?
- What warranty periods have been specified for the systems?

CD HVAC

- Do the equipment and products specified for the HVAC system continue to meet the design and performance goals established previously?
- What analyses have been done to ensure the system is “right sized” for the expected demand?

CD ELECTRIC LIGHTING

- What lamps, ballasts and fixtures have been specified?
- Why are they the best choices in terms of visual comfort, energy use, and long term performance?
- Will the system as finally configured and specified be easy to operate, maintain and repair?
- What is the impact of the system as finally configured on electricity use?
- Does the system as finally configured minimize waste heat generation?
- Has this been taken into account in sizing the cooling system?
- What controls have been specified?
- How will they help save energy and operating costs?
- What level of control will individual teachers have over the heating, ventilating and air conditioning of their classrooms?
- Do the lighting fixtures and equipment specified still correspond to the inputs used in previous energy, lighting, and/or cost analyses? Will the “watts/square foot” goals still be met?

CD ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Have hardy, indigenous plants been specified in the landscaping plan?

CD ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- Are the construction documents and specifications clear and explicit concerning the required environmental performance and source of the materials and products specified?
- Is language included in the documents requiring that a proposed material or product substitution must be equal to or better than the specified product in terms of its environmental attributes and source?
- Has language concerning the construction waste management plan been incorporated in the general conditions, demolition specs, and other specifications as appropriate?

CD WATER EFFICIENCY

- Has high efficiency irrigation technology been specified for athletic fields?
- Has high efficiency equipment (dishwashers, laundry, cooling towers) been specified?
- Have water saving strategies (such as low-flow showerheads, automatic lavatory faucet shut off controls, waterless urinals, etc) been specified?
- What innovative wastewater treatment techniques does the design include?
- What will be the impact of all these water saving strategies – in their final configurations – on water use at the school? Will the results meet the school’s water use goals?

CD COMMUNITY INVOLVEMENT

- Have changes occurred in the project that will require significant redesign of key components?
- How will the community be meaningfully involved in these redesign efforts?

CD COMMUNITY USE

- Have the specific design or construction requirements in the shared use spaces been incorporated into the construction documents? Have the special needs or requirements of the shared use partners been incorporated and/or reviewed by the partners?

CD CATALYST FOR ECONOMIC DEVELOPMENT

None

CD SERVICE LIFE PLANNING

- Has the anticipated performance and required maintenance activities been provided to the Commissioning Agent for inclusion in the Systems Service Manual?

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BID AND CONTRACT AWARD

Design Consultant: _____ **Date:** _____
Project Name: _____ District: _____
DOE # _____ NJSCC Project # _____

BC ACOUSTIC COMFORT

- Have any substitutions been proposed – alternate wall/floor/ceiling materials, different types of HVAC equipment – that could impact acoustical quality, particularly in the classrooms?
- If these substitutions are accepted, how will they impact overall acoustic comfort?

BC THERMAL COMFORT

- Have any substitutions been proposed – alternate glazing materials, different types of insulation, different types of ventilation hardware - that could affect thermal comfort, especially in the classrooms?
- If these substitutions are accepted, how will they impact the thermal comfort of students and teachers, the energy performance of the building and its life cycle cost?

BC VISUAL COMFORT

- Have any substitutions been proposed – alternate glazing materials, different types of lamps or light fixtures, alternate colors for walls, floors or ceilings - that could affect visual comfort, especially in the classrooms?
- If these substitutions are accepted, how will they impact the visual comfort of students and teachers, the energy performance of the building and its life cycle cost?

BC DAYLIGHTING

- Have any substitutions been proposed – alternate glazing materials, different types of shading – that could impact the intended performance of the daylighting system?
- If these substitutions are accepted, how will they impact system performance, visual comfort and life cycle cost?

BC INDOOR AIR QUALITY

- Have any substitutions been proposed – alternate materials, a different ventilation system – that could impact indoor air quality?
- Are all substitute materials low emitters of indoor contaminants?
- Do substitute materials require different cleaning processes that may contaminate indoor air?
- Are substitutions being proposed for materials or assemblies designed to act as barriers to sources of indoor contaminants? Will the substitute materials/assemblies also act as effective barriers?

BC SAFETY AND SECURITY

- Have any material substitutions been proposed that could reduce the durability – and increase the vulnerability – of critical areas in the building (like entrances)?
- Have any security technology substitutions been proposed?
- How well the alternative technologies will fit in with and complement the school's design-focused security measures?
- How will the substitute technologies interface with other controls systems in the school (e.g. those for the lighting and HVAC systems)?
- If substitutions are accepted, will they be as easy to operate, maintain and repair as the originally specified products and systems?

BC ENERGY ANALYSIS

- Is the energy analysis tool(s) selected for the project being used to evaluate the energy consumption consequences of significant materials, products or system substitutions?

BC LIFE CYCLE COST

- Is the life cycle cost methodology selected for the project being used to analyze significant material or product substitutions in terms of their impacts on overall performance and cost effectiveness?

BC COMMISSIONING

- Has the commissioning plan been clearly explained to potential bidders?

BC LEARNING CENTERED DESIGN

- Have any substitutions been proposed – alternate designs, furniture, systems, different types of materials, etc.- that could affect the success of the original, learning-centered design intent?

BC STIMULATING ARCHITECTURE

- Have any substitutions been proposed for key architectural elements – alternate designs, different types of materials, etc. - that could affect the design goals established for the school?

BC ACCESSIBILITY

- Have any substitutions been proposed that will impact the accessibility of the design?

BC FLEXIBILITY AND ADAPTABILITY

- Have any substitutions been proposed for key elements of the design – alternate designs, different furniture manufacturers, etc - that could affect the overall flexibility of the school?

BC INFORMATION TECHNOLOGY

- Have any technology substitutions been proposed that could impact intended performance?

BC BUILDING SHELL

- Have any substitutions been proposed – alternate glazing materials, different types of insulation, alternate roofing products – that could impact the intended performance of the building shell?
- If these substitutes are accepted, how will they impact the energy performance and life cycle cost of the whole facility? Will they impact existing construction details? Will any redesign be required?

BC RENEWABLE ENERGY

- Have any substitutions been proposed – to specific systems or to the materials from which the systems are constructed - that could impact intended performance?
- If these substitutions are accepted, how will they impact the energy performance and life cycle cost of the whole facility?

BC HVAC

- Have any substitutions been proposed – alternate equipment, different types of controls, alternate hardware (e.g. diffusers) - that could modify system performance?
- After the substitutions, will the system still be “right sized” to meet the demand (not over- or under-sized)?
- If these substitutions are accepted, how will they impact the energy performance of the building and its life cycle cost?

BC ELECTRIC LIGHTING

- Have any substitutions been proposed – alternate lamps, ballasts or controls, etc. - that could impact the intended performance of the electric lighting system?
- Will these substitutions provide the same level of visible comfort as the design calls for?
- Will they add any additional waste heat to the space?
- Will they work correctly with the specified control system(s)?
- If these substitutions are accepted, how will they influence energy performance and life cycle costs?

BC ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Have any substitutions been proposed – different plants, alternate materials for parking lots or walkways, alternate exterior light fixtures – that could reduce the environmental quality of the site plan?
- Will any of these substitutions impact the performance of the building (for example, fewer trees may mean less shade and more heat gain in daylight classrooms)?
- Have these impacts been analyzed? How will they affect the overall life cycle cost of the facility?

BC ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- Are all proposed substitutions equal to or better than the specified products in terms of environmental attributes?
- Are the substitutions also functionally equivalent to the specified products? (In other words, if they are accepted they will not adversely affect the performance of the system or assembly in which they are used.)
- What analyses have been done to ensure substitutions will not degrade environmental quality or system performance?

BC WATER EFFICIENCY

- Have any substitutions been proposed – alternate plumbing fixtures, different types of landscape vegetation, an alternate irrigation system - that could reduce the water efficiency of the school?
- If these substitutions are accepted, how will they impact water use and overall life cycle costs at the facility?

BC COMMUNITY INVOLVEMENT

- Have changes occurred in the project that will require significant redesign of key components?
- How will the community be meaningfully involved in these redesign efforts?

BC COMMUNITY USE

- Have the funds for any ineligible costs associated with the shared use programs or facilities been received and placed in escrow?

BC CATALYST FOR ECONOMIC DEVELOPMENT

None

BC SERVICE LIFE PLANNING

None

CONSTRUCTION ADMINISTRATION

Design Consultant: _____ **Date:** _____
Project Name: _____ **District:** _____
DOE # _____ **NJSCC Project #** _____

CA ACOUSTIC COMFORT

- Is the building being constructed as designed to achieve acoustic comfort?
- Have any change orders been proposed – alternate wall/floor/ceiling materials, different types of HVAC equipment – that could impact acoustical quality, particularly in the classrooms?
- If these change orders are accepted, how will they impact overall acoustic comfort?

CA THERMAL COMFORT

- Is the building being constructed as designed for optimal thermal comfort, especially in the classrooms?
- Have any change orders been proposed – alternate glazing materials, different types of insulation, different types of ventilation hardware - that could affect thermal comfort, especially in the classrooms?
- If these change orders are accepted, how will they impact the thermal comfort of students and teachers, the energy performance of the building and its life cycle cost?

CA VISUAL COMFORT

- Is the building being constructed as designed to enhance visual comfort, especially in the classrooms?
- Have any change orders been proposed – alternate glazing materials, different types of lamps or light fixtures, alternate colors for walls, floors or ceilings - that could affect visual comfort, especially in the classrooms?
- If these change orders are accepted, how will they impact the visual comfort of students and teachers, the energy performance of the building and its life cycle cost?

CA DAYLIGHTING

- Is the building, especially the classrooms, being constructed as designed to provide as much natural light as possible?
- Have any change orders been proposed – alternate glazing materials, different types of shading – that could impact the intended performance of the daylighting system?
- If these change orders are accepted, how will they impact system performance, visual comfort and life cycle cost?

CA INDOOR AIR QUALITY

- Is the impact of the construction process on indoor air quality – for workers and, in the case of renovations, for students and teachers – being managed?
- Is the building being constructed as designed to ensure high indoor air quality?

- Have any change orders been proposed – alternate materials, a different ventilation system – that could impact indoor air quality?
- Are all alternate materials low emitters of indoor contaminants?
- Do alternate materials require different cleaning processes that may contaminate indoor air?
- Are change orders being proposed for materials or assemblies designed to act as barriers to sources of indoor contaminants? Will the alternate materials/assemblies also act as effective barriers?
- Is there a plan to “flush out” the facility for at least 72 hours after construction and before occupancy?

CA SAFETY AND SECURITY

- Is the building being constructed as designed to improve security?
- Are security technologies being installed as designed?
- Have any material change orders been proposed that could reduce the durability – and increase the vulnerability – of critical areas in the building (like entrances)?
- Have any security technology change orders been proposed?
- How well the alternative technologies will fit in with and complement the school’s design-focused security measures?
- How will the alternate technologies interface with other controls systems in the school (e.g. those for the lighting and HVAC systems)?
- If change orders are accepted, will they be as easy to operate, maintain and repair as the originally specified products and systems?

CA ENERGY ANALYSIS

- Is the energy analysis tool(s) selected for the project being used to evaluate the energy consumption consequences of proposed materials, products or system change orders?
- Do the change orders impact the school’s ability to meet its energy goal for the facility?

CA LIFE CYCLE COST

- Is the life cycle cost methodology selected for the project being used to analyze proposed material or product change orders in terms of their impacts on overall performance and cost effectiveness?

CA COMMISSIONING

- Has the commissioning plan been implemented?
- Has the functional performance of key systems been tested and verified?
- Are the results documented in a commissioning report?

CA LEARNING CENTERED DESIGN

- Have any change orders been proposed – alternate designs, furniture, systems, different types of materials, etc. - that could affect the success of the original, learning-centered design intent?

CA STIMULATING ARCHITECTURE

- Have any change orders been proposed for key architectural elements – alternate designs, different types of materials, etc. - that could affect the design goals established for the school?

CA ACCESSIBILITY

- Have any change orders been proposed that will impact the accessibility of the design?

CA FLEXIBILITY AND ADAPTABILITY

- Have any change orders been proposed for key elements of the design – alternate designs, different furniture manufacturers, etc - that could affect the overall flexibility of the school?

CA INFORMATION TECHNOLOGY

- Are the technology systems delineated in the shop drawings consistent with the design intent established in earlier projects of the program?

CA BUILDING SHELL

- Is the building shell being constructed as designed to achieve a high level of energy efficiency?
- Have any change orders been proposed – alternate glazing materials, different types of insulation, alternate roofing products – that could impact the intended performance of the building shell?
- If these change orders are accepted, how will they impact the energy performance of the building and its life cycle cost?
- If these change orders are accepted how will they impact existing construction details? Is any redesign required?

CA RENEWABLE ENERGY

- Are the renewable energy systems being installed as designed to achieve high performance?
- Have any change orders been proposed – to specific systems or to the materials from which the systems are constructed - that could impact intended performance?
- If these change orders are accepted, how will they impact the energy performance and life cycle cost of the whole facility?

CA HVAC

- Is the HVAC system being installed as designed to achieve high performance?
- Have any change orders been proposed – alternate equipment, different types of controls, alternate hardware (e.g. diffusers) - that could modify system performance?
- After the change orders, will the system still be “right sized” to meet the demand (not over- or under-sized)?

- If these change orders are accepted, how will they impact the energy performance of the building and its life cycle cost?

CA ELECTRIC LIGHTING

- Is the electric lighting system being installed as designed to achieve high performance?
- Have any change orders been proposed – alternate lamps, ballasts, controls, etc. - that could impact the intended performance of the electric lighting system?
- Will these change orders provide the same level of visual comfort as the design calls for?
- Will they add any additional waste heat to the space?
- Will they work correctly with the specified control system?
- If these change orders are accepted, how will they affect energy performance and life cycle costs?

CA ENVIRONMENTALLY RESPONSIVE SITE PLANNING

- Is the site being constructed and landscaped in the environmentally responsive way it was designed?
- Have any change orders been proposed – different plants, alternate materials for parking lots or walkways, alternate exterior light fixtures – that could reduce the environmental quality of the site plan?
- Will any of these change orders impact the performance of the building (for example, fewer trees may mean less shade and more heat gain in daylit classrooms)?
- Have these impacts been analyzed? How will they affect the overall life cycle cost of the facility?

CA ENVIRONMENTALLY PREFERABLE MATERIALS AND PRODUCTS

- Are efforts being made to minimize construction waste?
- Is some percentage of demolition and/or land clearing waste being salvaged or recycled?
- Is the building being constructed using the environmentally preferable products specified?
- Are all proposed change orders equal to or better than the specified products in terms of environmental attributes?
- Are the change orders also functionally equivalent to the specified products? (In other words, if they are accepted they will not adversely affect the performance of the system or assembly in which they are used.)
- What analyses have been done to ensure change orders will not degrade environmental quality or system performance?

CA WATER EFFICIENCY

- Are the building and grounds being constructed as designed to conserve water?
- Have any change orders been proposed – alternate plumbing fixtures, different types of landscape vegetation, an alternate irrigation system - that could reduce the water efficiency of the school?
- If these change orders are accepted, how will they impact water use and overall life cycle costs at the facility?

CA COMMUNITY INVOLVEMENT

None

CA COMMUNITY USE

- Are any special reviews and/or inspections required by the shared use partners? If so, what are they and how are they implemented?

CA CATALYST FOR ECONOMIC DEVELOPMENT

None

CA SERVICE LIFE PLANNING

- Have proposed substitutions to the materials and assemblies associated with the building envelope and high traffic areas been evaluated on the basis of Service Life Planning Analysis?
- Have the anticipated performance and required maintenance activities been provided to the Commissioning Agent for inclusion in the Systems Service Manual?

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NJSCC Design Manual

Appendix B

NJSCC LEED™ Policy and Instructions
NJSCC LEED™ Checklist

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NJSCC LEED™ POLICY AND INSTRUCTIONS

Executive Order #24 by Governor James McGreevey states in paragraph 3 *'All new school designs shall incorporate the guidelines developed by the United States Green Building Council known as "Leadership in Energy & Design ("LEED™"), Version 2.0 (LEED for Schools is currently applicable to all school projects) to achieve maximum energy efficiency and environmental sustainability in the design of schools.'*

The Design Consultant shall ensure to the best of their abilities that each Project shall be eligible to meet or exceed the requirements for certification as established by the USGBC LEED™ for Schools Rating System as described in the publications "LEED for Schools Reference Guide". This and associated documentation is available at the US Green Building Council website <http://www.usgbc.org>. By using the LEED™ for Schools certification requirements as a guideline, the Design Consultant shall document and certify to the NJSCC by means of the NJSCC LEED Checklist Form attached with associated documentation as required of the USGBC to validate that the requirements of each Credit have been met (The associated documentation shall include but is not limited to: calculations, written descriptions, construction documents, explanations / justifications, submittals, forms, and all other required documentation necessary of certification.). The Design Consultant shall be required to provide this checklist to the New Jersey Schools Construction Corporation (NJSCC) and/or its agents at each phase of each Project, from Programming through Post Occupancy, as identified by the Commissioning Plan. The Commissioning Agent shall review this documentation at each designated phase and verify that the Construction Documents and designated procedures therein are likely to meet the intent of the pre-requisites and credits identified by the most recent checklist submission.

Certification and evaluation on behalf of the US Green Building Council is not required.

NJSCC Policy on LEED™™

1. Adopt LEED™ for Schools as a benchmark for the design, evaluation and construction of NJSCC managed school facilities projects that involve new construction. Projects shall meet all LEED™ prerequisites and achieve sufficient criteria to score at least 29 points on the LEED™ rating scale, wherever possible. Although not required under LEED™, NJSCC shall adopt a best practices approach for the design process that involves a "charette" or series of brainstorming sessions in which all stakeholders (architect, engineer, PMF, NJSCC Project Manager, school district, contractor, in cases of design/build approach and the public*) meet to ensure that green design principles are integrated into the project at an early stage. A checklist completed by the project architect will document the LEED™ criteria incorporated and the overall score of the project. Third party review and verification through an audit process shall reside in NJSCC's and/or its agents.
2. LEED™ "certification" shall not be pursued. Documentation costs, together with registration and certification fees, and the bureaucracy and related time of another third party review of NJSCC projects, militate against formal certification through the USGBC at this time.
3. NJSCC will form a contractual alliance with an academic institution, such as the New Jersey Institute of Technology, to develop a methodology, data collection and "feedback loop" to

verify the costs of LEED™ implementation, including design and engineering, construction, materials procurement, and resulting life cycle efficiencies, as well as overall effectiveness of the program. Following a set time frame, twelve to eighteen months, an assessment shall be conducted of the program and suggestions for changes/improvements made i.e., achieve higher LEED™ rating level, seek USGBC certification for all projects.

4. NJSCC shall avoid extracting individual criterion from LEED™ and imposing these as prescriptive design requirements. LEED™ is based on an integrated system of decision-making and evaluation. It is designed to encourage the design team to think holistically and in an integrated manner.
 5. E.O. 24 does not differentiate between Abbott and non-Abbott school districts. If LEED™ is to be implemented by non-Abbott (non-NJSCC managed projects), and NJSCC grants conditioned on LEED™ compliance, then this requirement must be imposed through DOE rulemaking and the DOE, Facilities Division, must be appropriately staffed to evaluate and approve projects at the educational adequacy and final approval stages for incorporation of LEED™ criteria.
- * Paragraph 3 of E.O. 24 "strongly encourage[s]" NJSCC "to provide opportunity for the community at large to have meaningful participation... in the design of the school facilities."

NJSCC LEED Checklist

The Design Consultant certifies to the NJSCC that the Project named herein is eligible to receive a minimum of 29 points, as identified below, in accordance with LEED™ for Schools criteria in accordance with the Design Manual.

SCC Package Number:	School Name
DOE Number:	PMF Representative Title
Design Consultant	Project Management Firm (PMF)

Instructions:

The following checklist, with a separate accompanying brief written description of the proposed strategy, shall be completed at the conclusion of each designated project phase by the Design Consultant (DC) to denote credits anticipated to satisfy the USGBC LEED™ for Schools Rating System criteria. The Commissioning Agent shall review and submit this checklist to leed.report@njit.edu prior to authorizing the DC to proceed to the next phase. No other similar documentation shall be deemed to satisfy this requirement of the SCC.

- SS Sustainable Sites
- WE Water Efficiency
- EA Energy & Atmosphere
- MR Materials & Resources
- EQ Indoor Environmental Quality

- ID Innovation & Design Process

Available Points	Program Phase	Schematic Design	Design Dev.	Construction Doc.	Construction Admin.	Project Closeout
PTS.	PG	SD	DD	CD	CA	CO

SS	Prereq 1	Construction Activity Pollution Prevention	0						
SS	Prereq 2	Environmental Contamination Free Site	0						
SS	Credit 1	Site Selection	1						
SS	Credit 2	Development Density & Community Connectivity	1						
SS	Credit 3	Brownfield Redevelopment	1						
SS	Credit 4.1	Alternative Transportation, Public Transportation Access	1						
SS	Credit 4.2	Alternative Transportation, Bicycle Use	1						
SS	Credit 4.3	Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles	1						
SS	Credit 4.4	Alternative Transportation, Parking Capacity	1						
SS	Credit 5.1	Site Development, Protect or Restore Habitat	1						

SS	Credit 5.2	Site Development, Maximize Open Space	1						
SS	Credit 6.1	Stormwater Design, Quantity Control	1						
SS	Credit 6.2	Stormwater Design, Quality Control	1						
SS	Credit 7.1	Heat Island Effect, Non-Roof	1						
SS	Credit 7.2	Heat Island Effect, Roof	1						
SS	Credit 8	Light Pollution Reduction	1						
SS	Credit 9	Site Master Plan	1						
SS	Credit 10	Joint use of Facilities	1						
WE	Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1						
WE	Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1						
WE	Credit 2	Innovative Wastewater Technologies	1						
WE	Credit 3.1	Water Use Reduction, 20% Reduction	1						
WE	Credit 3.2	Water Use Reduction, 30% Reduction	1						
WE	Credit 4	Process Water Use Reduction, 20% Reduction	1						
EA	Prereq 1	Fundamental Commissioning of the Building Energy Systems	0						
EA	Prereq 2	Minimum Energy Performance	0						
EA	Prereq 3	Fundamental Refrigerant Management	0						
EA	Credit 1	Optimize Energy Performance, 10.5% New, 3.5% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 14% New, 7% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 17.5% New, 10.5% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 21% New, 14% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 24.5% New, 17.5% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 28% New, 21% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 31.5% New, 24.5% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 35% New, 28% Renovation	1						

EA	Credit 1	Optimize Energy Performance, 38.5% New, 31.5% Renovation	1						
EA	Credit 1	Optimize Energy Performance, 42% New, 35% Renovation	1						
EA	Credit 2	On-Site Renewable Energy, 2.5% of Annual Energy Cost	1						
EA	Credit 2	On-Site Renewable Energy, 7.5% of Annual Energy Cost	1						
EA	Credit 2	On-Site Renewable Energy, 12.5% of Annual Energy Cost	1						
EA	Credit 3	Enhanced Commissioning	1						
EA	Credit 4	Enhanced Refrigerant Management	1						
EA	Credit 5	Measurement & Verification	1						
EA	Credit 6	Green Power	1						
MR	Prereq 1	Storage & Collection of Recyclables	0						
MR	Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1						
MR	Credit 1.2	Building Reuse, Maintain 95% of Exist. Walls, Floors & Roof	1						
MR	Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1						
MR	Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1						
MR	Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1						
MR	Credit 3.1	Materials Reuse, 5%	1						
MR	Credit 3.2	Materials Reuse, 10%	1						
MR	Credit 4.1	Recycled Content, 10% (post-consumer + ½ pre-consumer)	1						
MR	Credit 4.2	Recycled Content, 20% (post-consumer + ½ pre-consumer)	1						
MR	Credit 5.1	Regional Materials, 10% Extracted, Processed & Mfd. Regionally	1						
MR	Credit 5.2	Regional Materials, 20% Extracted, Processed & Mfd. Regionally	1						
MR	Credit 6	Rapidly Renewable Materials	1						

MR	Credit 7	Certified Wood	1						
EQ	Prereq 1	Minimum IAQ Performance	0						
EQ	Prereq 2	Environmental Tobacco Smoke (ETS) Control	0						
EQ	Prereq 3	Minimum Acoustical Performance	0						
EQ	Credit 1	Outdoor Air Delivery Monitoring	1						
EQ	Credit 2	Increased Ventilation	1						
EQ	Credit 3.1	Construction IAQ Management Plan, During Construction	1						
EQ	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1						
EQ	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1						
EQ	Credit 4.2	Low-Emitting Materials, Paints & Coatings	1						
EQ	Credit 4.3	Low-Emitting Materials, Flooring Systems	1						
EQ	Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1						
EQ	Credit 4.5	Low-Emitting Materials, Furniture & Fixtures	1						
EQ	Credit 4.6	Low-Emitting Materials, Misc. Materials	1						
EQ	Credit 5	Indoor Chemical & Pollutant Source Control	1						
EQ	Credit 6.1	Lighting System Design and Controllability	1						
EQ	Credit 6.2	Thermal Comfort Controllability	1						
EQ	Credit 7.1	Thermal Comfort, Design	1						
EQ	Credit 7.2	Thermal Comfort, Verification	1						
EQ	Credit 8.1	Daylight & Views, Daylight Classroom Spaces	1						
EQ	Credit 8.2	Daylight & Views, Views for 90% of Spaces	1						
EQ	Credit 8.3	Daylight & Views, Daylight for 75% of Spaces	1						
EQ	Credit 9	Enhanced Acoustical Performance	1						
EQ	Credit 10	Mold Prevention	1						
ID	Credit 1.1	Innovation in Design: Provide Specific Title	1						

ID	Credit 1.2	Innovation in Design: Provide Specific Title	1						
ID	Credit 1.3	Innovation in Design: Provide Specific Title	1						
ID	Credit 1.4	Innovation in Design: Provide Specific Title	1						
ID	Credit 2	LEED™® Accredited Professional	1						
ID	Credit 3	The School as Teaching Tool	1						

Total	79	0	0	0	0	0	0
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Certified 29-36 points Silver 37-43 points Gold 44-57 points Platinum 58-79 points

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NJSCC Design Manual

Appendix C

NJ Department of Community Affairs

**Best Practices Standards
For Schools Under Construction
Or Being Planned For Construction**

**This document has been provided for the convenience of the Design Consultant.
The Design Consultant shall verify with the DCA that they are using the most
current applicable version of such best practice requirements.**

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**BEST PRACTICES STANDARDS
FOR SCHOOLS UNDER CONSTRUCTION
OR BEING PLANNED FOR CONSTRUCTION**

I. Site Layout

- A. School buildings shall be provided with a securable perimeter. A securable perimeter means that all parking, drives, and roads are located a specified distance away from any exterior building wall.
 - 1. Parking may be within this perimeter provided that access to it is controlled and only known vehicles are permitted and parked there.
 - 2. School drop-off areas may be within this perimeter provided that access to them can be controlled so that only known vehicles are permitted entry to areas within the perimeter.
 - 3. Access to loading areas for delivery vehicles should be access-controlled. Access controlled means a system of physical barriers and/or security personnel combined with delivery controls.
- 4. Roads and drives shall be arranged such that they do not provide a paved approach leading directly to building entrances. Bollards or similar physical barriers shall be used to block any paved surfaces such as walks where a vehicle could be driven directly toward a building entrance. They shall be located at the closest point of uncontrolled access.
 - a. Bollards or similar physical barriers shall be spaced 3 to 5 feet apart, measured on center; height shall be 39 to 40 inches above grade. Bollards shall be fully embedded into a concrete strip foundation with a depth determined by design vehicle impact. Similar physical barriers, such as planters, shall be heavy enough as determined by design vehicle impact.
- B. Where the securable perimeter is located less than 148 feet (45 meters) from instructional areas then glass having an exposure to that perimeter shall be shatter resistant. Acceptable materials are thermally tempered glass, heat strengthened or annealed glass with an attached 4-mil minimum safety film.
- C. Where the securable perimeter is located less than 82 feet (25 meters) from instructional areas then glass having an exposure to that perimeter shall have enhanced shatter resistance. Acceptable materials are thermally tempered glass with an attached 4 mil minimum safety film, laminated thermally tempered or laminated annealed glass. Any glazing assembly which can be shown to meet GSA glazing protection level 3b is also accepted.
- D. Where the securable perimeter is located less than 82 feet from instructional areas then the primary structural frames of the building shall be designed to resist progressive collapse in accordance with the DCA progressive collapse design methodology.

- E. All trash containers, mailboxes, and package pick-up areas shall be located at least 33 feet from the building entrances (i.e. all exterior doors that can be entered).
- F. Where parking is provided beneath school buildings, then access to the parking shall be limited to staff and controllable both electronically and, during periods of high alert (orange or red) by security personnel. Such areas shall also be controlled by crash barriers which will prevent unauthorized access and the primary structural elements shall be designed to resist progressive collapse.

II. Building Layout

- A. Essential Officials: The interior of offices of those necessary for enacting emergency procedures, such as Principal and Vice-Principal, shall not be visible from streets or public areas (non-school property areas).
- B. Rooms and areas housing utilities such as, but not limited to, electric, gas, emergency generators, fuel tanks, and affiliated switch gear shall be as follows:
 - 1. Such rooms/areas shall be physically isolated from the main entrance and parking;
 - 2. Such rooms/areas shall have the capability of being locked and alarmed;
 - 3. The location of utility service entrances shall be concealed from public view, where possible;
 - 4. Utilities service entrance features mounted on the exterior of the building shall be protected from tampering by enclosing them with walls or fences. Access to such areas shall be by lockable doors;
 - 5. Fuel storage tanks shall be physically separated from generators (i.e. non-integral tank and generator). The associated fuel lines shall be protected from damage;
 - 6. Duration of power provided by generator fuel tank shall be known by the school's emergency management personnel and posted in the emergency control center.
- C. Emergency control centers shall not be adjacent to or visible from public lobby areas or the street.

III. Specific Standards

- A. Exterior Lighting:
 - 1. Site lighting:
 - a. Lighting shall be installed on the building exterior, along the perimeter of occupied area and, if applicable, the space between the building exterior and perimeter of occupied area. Lighting illumination levels shall be such that camera operation can function according to manufacturer specifications, but not less than 0.2 foot candles, measured at walking surface level, in any case.
 - b. Walking surfaces that connect remote exterior school areas (i.e.

parking areas to building entrances) shall have lighting installed as per "a." above.

2. Parking:

- a. Lighting shall be installed in all parking areas. Lighting illumination levels shall be such that camera operation can function according to manufacturer specifications, but not less than 0.2 foot candles, measured at walking surface level, in any case.

B. Entrance/ Access:

1. Doors and windows that can be accessed from grade shall have the capability of being locked and alarmed when the building is not in operation;
2. Doors and hatches that can be accessed from the roof shall have the capability of being locked and alarmed at all times.

C. Heating, Ventilation and Air conditioning (HVAC):

1. Access to air intakes shall be restricted and secure:
 - a. Intakes installed on the roof shall be screened; maximum size of openings in screen shall be 1.75 inch². Access to the roof shall have the capability of being locked;
 - b. Intakes installed on the exterior wall of the building shall be screened and no lower than the third floor above grade; maximum size of openings in screen shall be 1.75 inch²;
 - i. Exception: Screened intakes installed on the second floor above grade shall be sloped at 45 degrees minimum, measured from the horizontal axis; or
 - ii. Exception: Screened intakes installed at grade or on the first floor less than 12 feet above grade shall have chemical, biological, radiological and nuclear (CBRN) notification and detection, or be physically protected (i.e. enclosed by fence or wall) from uncontrolled approach.
 - c. Intake air dampers that are centrally operated, motorized, low-leakage and fast acting (less than 30 seconds) shall be installed.
2. Mechanical rooms that house HVAC equipment shall have the capability of being locked and alarmed; this requirement shall also apply to interior air return grilles in rooms or spaces where people are not readily observable;
3. If zoning options are installed, they shall be provided with controls having the capability to shut down individual zones and spaces. In addition, the system shall be controllable from the emergency control center and have a switch that operates all zones;

- a. Smoke control systems shall have an independent control switch in the emergency control center;
4. HVAC filtration shall be at the highest level compatible with the system design;
5. HVAC systems shall be ducted;
 - a. Exception: Non-ducted systems, plenum, with ceilings no lower than 11 feet measured from the floor;
 - b. Exception: Non-ducted systems, plenum, with ceilings that cannot be accessed without special tools (i.e. drop ceiling panels secured in place).
- D. Fire Protection, where installed:
 1. Fire protection systems shall be connected to the emergency or standby power supply, as applicable;
 2. Rooms/areas that contain equipment for the functioning of the fire protection systems shall have the capability of being locked or alarmed;
 3. Fire sprinkler system piping (feed mains and cross mains) shall be looped and valved so that any damaged area can be isolated and the remainder of the system will remain functional.
- E. Elevators:
 1. Machinery rooms shall have the capability of being locked or alarmed;
 2. Where possible, elevators shall be controlled electronically (card activated) or key activated.
- F. Emergency Control Center and Communication:
 1. There shall be not less than two points of access to the public address system;
 2. Circuits for telephone, public address and alarms systems shall be redundant.
 3. Required Control Center:
 - a. The control center shall contain controls for HVAC, fire alarm, fire sprinkler, public address systems, communications, security, and video requirement;
 - b. There shall be a standby power supply for the building's critical functions. In addition to the emergency system, the supply shall have sufficient capacity to power all required emergency lighting, emergency control systems, and maintain heat for at least 36 hours;
 - c. An onsite, remote back-up control center shall be installed that shall

have the capacities in “a.” above; the back-up control center shall be installed as far away as practical from the main control center;

- d. The emergency control center and the back up shall not be adjacent to or visible from public lobby areas or the street, and shall not be located near each other.

G. Video Surveillance:

1. Video surveillance cameras shall be installed throughout the exterior and interior of the building, including adjacent parking. Covering areas shall include, but not limited to the following:

- a. Building approach areas for vehicles and pedestrians.
- b. Areas outside the building that are not readily visible.
- c. Loading areas.
- d. Infrequently occupied areas that are not locked or alarmed such as, but not limited to, auditoriums.
- e. Main entrances and lobbies.
- f. Corridors and stairways.

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NJSCC Design Manual

Appendix D

Definitions
Abbreviations

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Definitions

“Addenda” means documentation prepared by the Design Consultant Team and issued to the Contractors during the bidding process. This process is to clarify, change, correct, or modify by adding or removing or adjusting a portion of the scope of work defined by the Contract Documents

“Agreement” means the Design Consultant Agreement (and all appendices) or Professional Services Consultant Agreement between the SCC and the Design Consultant (Professional Services Consultant) for the provision of design and construction administration, and other services for the School Facilities Project, as such Agreement may be amended from time to time in accordance with the provisions hereof.

“Amendment” means an amendment to the Agreement executed by the SCC and the Professional Services Consultant.

“Authority” means the New Jersey Economic Development Authority, created pursuant to P.L.1974, c.80, as amended (N.J.S.A. 34:1B-4 et seq.) or any successor thereto The Corporation is a subsidiary of the Authority, created in accordance with N.J.S.A. 34:1B-159.

“Bidding and Contract Award Phase” means a Phase of the Construction Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Bidding Information and Forms” means the SCC/AG prepared standard “Front End” Documents to be included in the Contract Documents, Final Specifications for Bid and completed by the Bidder.

“Blocking and Stacking Diagrams” means the drawings to be prepared by the Design Consultant reflecting a vertical and horizontal spatial translation of the programmatic and site requirements of the School Facilities project’s development as defined by Section 3 Deliverables. These products, one for each concept, shall be prepared during the generation of three (3) Concept Designs during the Program/Concept Phase as defined by Section 3 Deliverables.

“Building Envelope Component (Wall Assembly) Schedules” shall mean a list (schedule) of all exterior wall assemblies to be employed in the building envelope with pertinent criteria designating compliance with the OPR requirements, specifically including information pertaining to fire resistance, acoustic value, thermal value, etc. with the referenced test assembly designation and/or wall section.

“Building Envelope Peer Review ”

The Building Envelope Peer Review (AKA Cx Focused Design Reviews) shall be an independent third party peer review of the Construction Documents, by the NJSCC and/or its agents, for both constructability and compliance with the OPR, specifically

including verification with the most recently revised Description of the Building Enclosure (Envelope) System document. This review shall be conducted simultaneous to the review of Construction Documents by the Department of Community Affairs at completion of the Construction Documents phase but prior to the release of documents for bid. The Design Consultant shall participate in the review process and develop

“Change Order” or “Change Order Documentation” means a written order by the Corporation, directing or authorizing some change to the Construction Contract, including, but not limited to, an increase or decrease in the Construction Work, or an acceleration of time for the performance of such Construction Work, or a change in the sequence in which such Construction Work is performed. Included in each Change Order will be any adjustment to the Design Consultant’s Compensation warranted by the change in the Construction Contract. SCC/EDA Forms 500, 501, 502, 503, or 504 shall be used for this process.

“Claim” means a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contractual Documents, payment of money, extension of time or other relief with respect to the terms of the Contractual Documents and shall also mean other disputes and matters in question between the parties arising out of or relating to the Contractual Documents.

“Claims Adjustment Committee” means the committee established by the SCC for the purposes of resolving any Claims of the Design Consultant.

“Client School District” means the school district, in which the School Facilities Project is located as such school district is identified in the Agreement. There may be more than one Client School District.

“Code Summary” means documentation on respective Contract Documents of the presiding codes adopted through the Uniform Construction Code (N.J.A.C. 5:23) by the Division of Community Affairs; Division of Codes and Standards. This summary shall also include specific section references, content and calculations applicable to the specific School Facilities Project.

“Color Rendering” means an original perspective color rendering in its native format or medium, framed, exterior view, a minimum of 20”x30” plus a high resolution digital scans on CD of same. This perspective color rendering may be hand drawn or computer generated

“Commissioning” means Full Building Commissioning in accordance with NJSCC Commissioning Protocol, 21st Century Schools Design Manual and the obligations of a Commissioning Agent, the Agreement between the SCC and the Design Consultant, and the related version of ASHRAE Guidelines as defined therein.

“Commissioning Plan”

The Commissioning Plan (Cx Plan) shall have the definition as ascribed to it by

American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 0 -2005, The Commissioning Process. This document is described by the referenced standard as the “a document that outlines the organization, schedule, allocation of resources, and documentation requirements of the Commissioning Process”. At minimum such documentation shall include all services delineated by the Commissioning Agent (CxA) Scope of Work and deemed necessary to reasonably assure compliance with the OPR by means of the verification process described within said document. This document shall be developed at the earliest phase of the Design Process and revised at each subsequent phase by the CxA with the participation of all team members.

“Commissioning Process Report”

The Commissioning Process Report (Cx Report) shall have the definition as ascribed to it by American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 0 -2005, The Commissioning Process. This document, often included as an appendix to the Cx Plan, is described by the referenced standard as a periodic document by which the activities of the Commissioning Process may be recorded on a continual basis over the course of the process. This document ultimately forms the substance of a Final Commissioning Process Report to be delivered and approved by the Owner at completion of the project. This document, as a record of events, shall be developed at the earliest phase of the Design Process and revised at each subsequent phase by the CxA with the participation of all team members.

“Conceptual Designs” or Initial Integrated Design Session(s) means the stage of the Program/Concept Design Phase of the School Facilities Project when three (3) alternative concept solutions are produced as defined by Section 3 Deliverables. The three (3) concept solutions for school facilities project are to be located on the proposed site and are based on the approved final Educational Specifications and the Owner Performance Requirements, inclusive of the requirements and recommendations of this Manual and the selected LEED™ for Schools credits.

“Conformed Drawings” means a complete set of Contract Documents that shall incorporate all revisions as a result of the addenda created during the bid phase. Within thirty days after award of the Contract for Construction the Design Consultant will produce and deliver Conformed Contract Documents for the Project.

“Conformed Final Specifications” means that portion of the Contract Documents consisting of the final written requirements in their entirety of materials, equipment, systems, standards and workmanship for the Work, and performance of related services after bid, DCA Review, addenda issuance, ”Building Envelope Peer Review” and prior to construction..

“Contractor Affidavit of Payment” means an affidavit submitted by the Contractor requesting payment, stating that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner might be responsible has been paid or otherwise satisfied. The Contractor shall list any indebtedness or known

claims in connection with the construction contract that have not been paid or otherwise satisfied. The Contractor shall use SCC/EDA Forms 810-816 for invoice backup.

“Construction Administration Phase” means a Phase of the Construction Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Construction Administration Services” means the services required to be performed by the Design Consultant pursuant to the Contractual Documents necessary for the administration and oversight of the construction of a School Facilities Project so as to ensure that the construction is being conducted as is required by the Construction Contract Documents.

“Construction Change Directive” (CCD) means a written order, directing or authorizing some change, in whatever degree, to the Construction Work but for which compensation has not yet been determined. All parties preparing a Construction Change Directive shall utilize SCC/EDA Forms 506 & 506A.

“Construction Cost Estimate” or "CCE" means the estimated cost of construction at time of bid (and projected out to the midpoint of construction) for the School Facilities Project, which amount does not include the costs of permits, acquisition of land, site development, furnishings, contingencies, professional fees, financing costs, and any other similar types of costs. The Initial CCE for each School Facilities Project shall be set forth in the Project Description and will be the approved CCE. The Design Consultant will be required to reconcile estimated costs to the approved CCE with each design submittal. Upon approval by the SCC of each cost estimate, the new estimate will become the current approved CCE. All parties preparing a CCE shall utilize the same Construction Documents and SCC/EDA Form 631 and SCC Standard Estimating Format.

“Construction Contract Documents” means the agreement between the SCC and the Contractor governing the construction of all or a portion of the School Facilities Project and all other documents setting forth the obligations of the Contractor with respect to construction of the School Facilities Project.

“Construction Documents” or CD’s means the documents required to be prepared and submitted by the Design Consultant during the Construction Documents Phase as set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Construction Documents Phase” means a Phase of the Design Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Construction Documents Survey” means the electronic survey form, as represented in Appendix F, of this document that is intended to record a the selected materials and equipment that compose the project.

“Construction Management Firm” or "CMF" means the firm that has been selected by the SCC to provide construction management services to the SCC in connection with the School Facilities Project. There may or not be a CMF during the Term of this Agreement. Such firm, if one has been selected, shall be identified in the Agreement.

“Construction Milestones” means the dates by which critical activities of the Construction Phase must be completed. The Construction Milestones for each School Facilities Project shall be identified in the Agreement.

“Construction Observation Reports” means a report prepared by the Design Consultant to maintain a concise record of site visits and related observations about the School Facilities Project’s construction. The Design Consultant shall use the SCC/EDA Form 672 adapted for the Design Consultant or AIA G711 Architect’s Field Report.

“Construction Phase” means that phase of this School Facilities Project during which the construction of the School Facilities Project is undertaken by a Contractor or Contractors. The Construction Phase shall have subsumed within it the Bidding and Contract Award Phase, the Construction Administration Phase and the Post Occupancy Review Phase.

“Construction Work” means the services performed by the Contractor or any Subcontractor pursuant to the Construction Contract Documents, whether completed or partially completed and includes all other labor, materials, equipment and services provided or to be provided to fulfill such obligations.

“Consultant-Performance Evaluation Policy and Procedure” means the policies and procedures developed by the SCC for the purpose of evaluating the performance or Work of a Design Consultant under the Contractual Documents.

“Contract Change Request” or "CCR" means a request for a change in the Construction Contract documents. A CCR may be made by the Corporation or the Contractor. NJSCC Forms 500, 501, 503, 504, and 505 shall be used for this purpose accordingly.

“Contractor” means that person or firm or those persons or firms engaged by the SCC to undertake the construction of the School Facilities Project pursuant to the Construction Contract Documents. There may be either a single "general" Contractor who has overall contractual responsibility for delivering all of the construction services needed to complete the School Facilities Project or there may be multiple Contractors who have responsibility for delivering particular aspects of the School Facilities Project.

“Contractor Supplied Documentation (As-Built)” means Construction Contract drawings that the Contractor has kept up to date at all times by recording the final location of any changes in the work, pipes, traps, conduits, ducts, footings, anchors, etc. Upon completion of the School Facilities Project, the Contractor shall submit its As-Built

drawings to the Design Consultant through the NJSCC and /or its agents with Contractor's certification as to the accuracy of the information prior to final payment. All As-Built drawings submitted by the Contractor shall be entitled As-Built above the Title Block and dated.

“Contractual Documents” means all documents setting forth the obligations and responsibilities of the Design Consultant and the SCC with respect to the School Facilities Project and includes, but is not limited to, the Request for Proposal, the Design Consultant's Technical and Fee Proposal, the Agreement between the SCC and the Design Consultant, the Project Description, 21st Century Schools Design Manual, any Amendments and addenda, appendices attached thereto, and all exhibits and schedules attached such documents.

“Corporation Project Manager” means the Corporation's representative authorized to act on behalf of the Corporation with respect to the School Facilities Project and the Contractual Documents.

“Current Working Estimate” or "CWE" means the estimated cost to complete the School Facilities Project and includes the cost of construction, permits, acquisition of land, site development, furnishings, contingencies, professional fees, financing costs, and any other similar types of costs. The Initial CWE for each School Facilities Project shall be set forth in the Project Description. All parties preparing a CCE shall utilize the same Construction Documents and SCC/EDA Form 630 and SCC Standard Estimating Format.

“Day” or “Days” mean(s) a calendar day or days, except as otherwise specifically provided for in the Contractual Documents.

“Description of MEP Systems and Renewable Energy Systems” shall have the definition as ascribed to it by American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 1- 1996R; The HVAC&R Technical Requirements for The Commissioning Process. This document also referred to as the 'Basis of Design' document shall be developed during Schematic Design and serve to document all assumptions made in the process of developing the mechanical, electrical, plumbing and renewable energy systems so as to meet all the pertaining requirements of the OPR. This document shall be revised at subsequent design phases if changes have been made.

“Description of the Building Enclosure (Envelope) System”
Description of the Building Enclosure (Envelope) System (AKA Envelope Basis of Design) shall have the definition as ascribed to it by American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 3 -2006, Exterior Enclosure Technical Requirements For The Commissioning Process. This document also referred to as the 'Basis of Design document shall be developed during Schematic Design and serve to document all assumptions made in the process of developing the envelope so as to meet all the pertaining requirements of the OPR. This document shall be revised at subsequent design phases if changes have been made.

“Deliverables” means, among other things, technical data, plans, specifications, minutes, approvals, recommendations, drawings, reports, computer discs and or digital files, spare parts lists, instruction books, operating and maintenance manuals, warranties, guarantees, documents, writings, materials, services or any other thing the delivery of which, however accomplished, is required to be delivered by the Design Consultant or other contracted party, explicitly or implicitly, by the Contractual Documents.

“Description of Structural System” means a brief description and analysis prepared by the Design Consultant Team during the concept stage of the Program/Concept Phase of the alternative structural systems considered and the rational for the final system selection as defined by Section 3 Deliverables. This analysis shall include a comparative systems cost analysis prepared to determine the final recommendation.

“Design Consultant” means the Architect or Engineer or other Professional Services Consultant and or Design Consultant Team selected by the SCC to provide design services and Construction Administration Services in connection with the School Facilities Project.

“Design Consultant Project Manager” means that person designated by the Design Consultant to serve as its representative during the Term.

“Design Development Documents” means the documents required to be prepared and submitted by the Design Consultant during the Design Development Phase as set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Design Development Phase” means a Phase of the Design Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Design Milestones” means the dates by which critical activities of the Design Phase must be completed by the Design Consultant. The Design Milestones for each School Facilities Project shall be identified in the Agreement.

“Design Phase” means that phase of the Agreement in which the design of the School Facilities Project is undertaken by the Design Consultant. The Design Phase shall consist of the Schematic Design Phase, the Design Development Phase and the Construction Documents Phase and may also include the Program/Concept Phase.

“DOE” means the New Jersey Department of Education.

“DOE Scope of Work” or “SOW” means the DOE-issued document identifying the Work to be performed for the School Facilities Project. The DOE Scope of Work may be amended, from time to time, in accordance with the provisions of the Agreement. The DOE Scope of Work is included in the Project Description.

“Electronic Document” means all deliverables and design and construction documentation required for submissions. This includes drawings, which shall be submitted in AutoCAD (latest Release), specifications, submitted in Microsoft Word, (latest version) and graphic images in .jpg or .bmt format. Electronic data shall be submitted on CD ROM discs, in addition to hard copy as required herein.

“Effective Date” means the date on which this Agreement became effective, and for purposes of this Agreement, is that date so identified and set forth.

“Energy Analysis”

Energy Analysis during the evaluation of alternate concept design the Design Consultant is encouraged to make use of Architectural Design Tools identified the Energy Performance Design Criteria. Upon selection and development of the final concept design during the Schematic Design Phase a computational model shall be employed in compliance with the referenced Performance Rating System, to determine the anticipated energy performance. Such simulations shall be repeated as deemed necessary by the Design Consultant as the project evolves so as to document the anticipated performance as equipment and assemblies documented in the OPR are updated. Such analysis shall be informed by the Daylighting / Lighting Analysis. Prior to proceeding to the development of the Construction Documents such analysis and associated documentation shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of EA Credit 1, Optimize Energy Performance, 14% New, 7% Renovation.

”Estimated Utility Loads and Availability” means a written reporting of estimated demand calculations of the School Facilities Project’s utility demands including but not limited to electricity, water, sanitary, storm, fire protection, gas, telephone, fiber optic, and cable prepared by the Design Consultant. This report also should include copies of letters to and from applicable authorities that respective off site utilities exist, are of sufficient capacity, and can service the project. This is prepared during the Schematic Design Phase or earlier and further defined as the associated systems are developed.

”Existing Conditions Survey or Site Survey” means a drawing or set of drawings prepared by and based upon a survey conducted by a New Jersey Licensed Surveyor identifying all existing conditions for a projects associated parcel or parcels. The level of survey detail required for land conveyance is established by the American Land Title Association, the National Society of Professional Surveyors and is established by the 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys. This is a nationally recognized standard adopted by many national title Insurance companies, banks and mortgage institutions as the minimum standard for boundary/title survey detail and accuracy.

“Exterior and/or Interior Views Sketches” means computer generated or hand drawn color, three dimensional exterior and/or interior views or sketches of the School Facilities Project prepared by the Design Consultant during the Program/Concept and Schematic Design Phase as defined by Section 3 Deliverables. A minimum of two views; one

exterior and one interior is required.

“Fee Proposal” means the Fee Proposal submitted by the Design Consultant in response to a Request for Fee Proposals (RFP).

“Final Completion” means that point in time on a School Facilities Project when all requirements of the Construction Contract Documents have been performed, when all items on the Punch List have been performed, when a Certificate of Occupancy, a Certificate of Continued Occupancy, or a Certificate of Completion, as applicable, has been issued and when final payment under the Construction Contract Documents may occur.

“Final Construction Cost Estimate” or "Final CCE" means the CCE for the School Facilities Project set forth in the Final Project Report.

“Final Current Working Estimate” or "Final CWE" means the CWE for the School Facilities Project set forth in the Final Project Report.

“Final Educational Adequacy Review Submission” means Program Documents, Educational Specifications completed DOE Project Application Package, site plan and school facility drawings and documents, in conformance with the requirements of N.J.A.C. Title 6A: 26-Subchapter 5 Review of Capital Projects for Educational Adequacy.

“Final Inspection” means that inspection performed by the NJSCC and its agents during the Project Close- out Phase and prior to issuance of the Final Construction Contract Acceptance form to the General Contractor(s). The purpose of this inspection is to determine if all of the conditions of the Contract for Construction, Contract Documents and Punch-list have been performed and a Certificate of Occupancy or Certificate of Continued Occupancy has been issued.

“Final Interior Finish Color/Material Selection Board(s)” means the Design Consultant shall prepare Final Interior Finish Color/Material Selection Board(s) for review and approval by the Project Team during the Construction Administration Phase. The interior finish colors and material selections should be based upon the actual shop drawing submittals by the General Contractor consistent with the Contract Documents. The Design Consultant shall commence with producing Final Interior Finish Color/Material Selection Board(s) once all these submittals are in place.

“Final Project Report” means the final report submitted to the SCC by the DOE which report is DOE's direction to the SCC to undertake construction of the School Facilities Project described therein.

“Final Specifications” means that portion of the Contract Documents consisting of the final written requirements in their entirety of materials, equipment, systems, standards and workmanship for the Work, and performance of related services ready for bid. This

portion of the Contract Documents should follow the latest version of the CSI/Master Format.

“Fiscal Year” means the fiscal year of the SCC, which commences on January 1st of each year and ends on December 30th of the same year.

“Homeland Security Compliance Documentation” means Construction Documents and/or a written description as applicable per phase prepared by the Design Consultant indicating how compliance with the most current applicable Division of Community Affairs; Division of Codes and Standards document “Educational Facilities, Homeland Security Standards is to be achieved.

“Initial Construction Cost Estimate” or "Initial CCE" means the CCE for the School Facilities Project set forth in the Project Description and set forth at projects inception. The Initial CCE shall be continually updated by the Design Consultant throughout the design and construction of the School Facilities Project as set forth in this Agreement.

“Initial Current Working Estimate” or "Initial CWE" means the CWE for the School Facilities Project that is set forth in the Project Description and at the project’s inception. The Initial CWE shall be continually updated by the Design Consultant throughout the design and construction of the School Facilities Project as set forth in this Agreement.

“Integrated Design” means a process of design in which multiple disciplines in seemingly unrelated aspects of the design process are integrated in a manner that permits synergistic, design goals to be considered and accomplished in addition to conventional design issues such as form, function, performance and initial cost. The goal is to achieve higher value, defined as increased benefits at a lower cost than the total for all components combined. A key to successful integrated design is the participation of people not only from different specialties of design, such as Architecture, Mechanical, Lighting and Electrical, Plumbing, and Civil Engineering, Interior Design and Landscape Architecture but others, such as the users, operators ,and community at large customarily not involved in such efforts until late in the process, if at all. By establishing means of communication with each other at strategic points in the design process, these participants can often identify solutions to design needs that are not only mutually agreeable but accomplish greater value to the participants when evaluated by their own needs.

“Interior Finish Color/Material Selection Board(s)”mean the Design Consultant shall prepare Interior Finish Color/Material Selection Board(s) for review and approval by the Project Team before the completion of Design Development Phase. The interior finish colors and material selections should be consistent with” the Basis of Design” and “Service Life Planning” decisions in this phase and the specifications.

“Key Team Member” means a principal, partner or officer of the Design Consultant, or a project executive, project manager, senior principal, studio head, or job captain of that firm, identified in the Technical Proposal as having a responsible role in the successful

completion of a School Facilities Project and who generally spends or is expected to spend 20 percent or more of his/her time on any phase of a School Facilities Project.

“Land Acquisition Approval” means an approval by the DOE of the acquisition of land for School Facilities Project purposes.

“Landscaping Water Use Analysis”

Landscaping Water Use Analysis shall be performed no later than the Design Development phase so as to inform the selection of an irrigation system and/or drought-tolerant landscaping. Such analysis shall consider the aggregate landscaping water consumption, as compared to a ‘baseline estimate’ of mid-summer consumption and calculated by the means described by LEED™ for Schools Application Guide. Documentation, at minimum, shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of WE Credit 1.1 Water Efficient Landscaping: Reduce by 50%, if desired of the district.

“LEED™” means Leadership in Energy and Environmental Design, for Schools, or later as adopted by the US Green Building Council (USGBC).

“LEED™ Checklists” means the Design Consultant shall complete or update the LEED™ Checklists forms in the Design Manual at the end of each Phase. The Design Consultant shall also complete or update requirements for supporting documentation throughout the project beginning at the Design Development Phase, review all documentation during the development of each phase, and submit these products as deliverables at the completion of each phase.

“Life Cycle Cost Analysis”

Life Cycle Cost Analysis (LCCA) as described by the Design Criteria in Section 2 of this document is an objective means available to the Project Team to assess the true cost of ownership for systems under consideration over their expected service life. Such analysis anticipates not only the first cost but also the cost of operations and maintenance as well as the cost to finance by uniform means. As such analysis is only as useful as the information is both impartial and accurate the Design Manual has adopted the referenced NIST method employed the General Service Administration to be performed for all designated systems.

“Lighting / Daylighting Analysis”

Daylighting Analysis as described by the Daylighting Design Criteria in Section 2 of this document shall be conducted with either physical or computational models during the development of alternate concept designs to optimize the amount of natural daylighting available. Such analysis shall be conducted as many times as deemed appropriate as elements of the design are reconsidered by the Design Consultant so as to assure that the criteria for both Daylighting and the Visual Comfort Design Criteria will ultimately be accomplished. Upon selection of a concept design for further development, during Schematic Design and again at Design Development phase, a computational model must be used to quantify anticipated illuminance of surfaces within the designated instructional spaces. Such analysis shall ideally be conducted by the same means used to evaluate

electric lighting during this phase so as to coordinate the function of each strategy and associated equipment and/or assemblies.

“Lighting / Daylighting Studies” means the Design Consultant shall produce three dimensional study models or a summary and response of the conceptual designs to the site’s controlling Daylighting criteria. This is required of each of the alternate designs under consideration. The criteria shall be based upon the practical availability, actual sun angle/ solar paths and emitted solar radiation in relation to the site and proposed building orientation year round and the quality of lighting when developing each concept alternative. The alternative selections of window and glazing types, size of openings and possible shading devices shall be considered.

“Lump Sum Budget Amount - Program Sub-Phase” means the total lump sum payable to the Design Consultant as Compensation for Services rendered during the Program Sub-Phase, if any, including allowances.

“Lump Sum Amount - Design and Construction Phases” means the lump sum amount of Compensation payable to the Design Consultant for Services rendered during the Design Phase (excluding the Program Sub-Phase) and the Construction Phase, including allowances. The Lump Sum Amount - Design and Construction Phases, exclusive of allowances, shall be calculated by application of a percentage to the total square footage of the School Facilities Project.

“Minor Product” means any accessories and/or minor component associated with systems and/or assemblies, as defined by the MasterFormat 2004 designated specifications sections, may be identified as a single manufacturer followed by the words "or approved equal". The listed manufacturer of a minor product must not void any warranty offered by a company for a comprehensive system, not decrease performance or quality, and shall be compatible with the system or assembly which it may be part of.

“New Jersey Schools Construction Corporation” or “SCC” or the “Corporation” means the entity formed pursuant to N.J.S.A. 34:1B-159 as a subsidiary of the Authority for the purpose of implementing provisions of the Educational Facilities Financing and Construction Act, P.L. 2000, c. 72. The non profit Corporation is the Party that has engaged the Design Consultant pursuant to this Agreement.

“Notice of Claim” means a notice submitted by the General Contractor(s) to the NJSCC and/or its agents identifying a claim that is being made to increase or decrease the Contract Sum. The General Contractor(s) shall use and complete SCC/EDA Form 505 for this purpose.

“Notice-to-Proceed” (NTP) means a notice from the SCC to the Design Consultant directing the Design Consultant to commence performing its responsibilities pursuant to the Agreement. Each School Facilities Project identified in the Agreement may have its own Notice-to-Proceed for the Design Phase and Notice-to-Proceed for the Construction

Phase. A Design Consultant may be directed to provide Services in connection with each School Facilities Project identified in Appendix A (Special Conditions of the Agreement) pursuant to one or more separate Notices to Proceed for such project's: (i) Program/Concept Phase; (ii) Schematic Design Phase through Construction Documents Phase, (iii) Construction Phase, or (iv) any other appropriate Sub-Phases.

“On-Site Control Samples [Design Criteria # 15d](Aesthetic and Functional Mock-Up(s))”

Area of the built work shall be designated as On-Site Control Samples (AKA In-Situ Mock-Ups, Aesthetic and Functional Mock-Up(s)) during the development of the Construction Documents that are representative of critical interface, the intersection of single-source sub-systems) conditions that are representative of the entire building envelope. Such samples shall be evaluated during the Construction Administration phase by the Design Consultant in conjunction with associated testing to verify compliance with the OPR (Design Intent). Particular emphasis shall be given to the following interface conditions; roof transition/ termination, preparation for and installation of sealants, adjoining material compatibility, and below grade waterproofing.

“Opening of Bids Documentation” means all submitted Bid proposals are opened publicly at the location, date and time specified in the Advertisement for Bid. After the opening of bids they are checked if they are responsive and all forms and registrations have been included. The SCC and its Agents participate in the bid opening. The results are read out loud and tabulated.

“Outline Specifications” means that portion of the Contract Documents consisting of a complete summary outline of all written requirements of materials, equipment, systems, and standards. This portion of the Contract Documents should follow the latest version of the CSI/Master Format.

“Operating and Maintenance Documentation for Building Systems”

The Operating and Maintenance Documentation for Building Systems (O&M Manuals) shall have the definition as ascribed to it by American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 4 -1993, Preparation of Operating and Maintenance Documentation for Building Systems. This document is described by the referenced standard “is to guide those responsible for the design, construction, and commissioning of HVAC building systems in the preparation and delivery of operating and maintenance (O&M) documentation that; is simple to prepare and update, is delivered on time, is easy to use, and provides accurate and relevant information”. At minimum such documentation shall address, in addition to the prescribed HVAC systems, documentation associated with all commissioned systems, specifically including those cited by the Design Criteria #9 and any other system addressed by the Commissioning Plan. This document shall be developed during the Design Process and revised at each subsequent phase by the CxA with the participation of all team members.

“Owner Project Requirements”

The Owner Project Requirements (OPR) shall have the definition as ascribed to it by

American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 0 -2005, The Commissioning Process. This document also referred to as the 'design intent' or 'project intent' document is described by the referenced standard as the "heart and soul of the Commissioning Process". The initial draft of this document is the work product (deliverable) associated with the OPR Workshop activity conducted by the Commissioning Agent (CxA) described by the guideline and shall specifically include a discussion of the project objectives, programmatic uses, performance criteria, and maintenance and operations requirements specific to the particular project. At minimum such documentation shall review the following documents for inclusion of pertinent objectives and/or requirements; Long Range Facility Plan (most current, certified revision), Educational Specifications, Facility Efficiency Standard, Educational Facility Program Standards, District Technology Plan, District Comprehensive Maintenance Plan, SCC Design Manual, and District specific technical requirements (if available). This document shall be developed at the earliest phase of the Design Process and revised at each subsequent phase by the CxA with the participation of all team members.

"Package" means the collective group of School Facilities Projects that have been included in the scope of work as defined by the Agreement.

"Party" means one of the parties to this Agreement, which are the Corporation and the Design Consultant.

"Permit Application" means that part of the Construction Documents Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant in compliance with the requirements of the Division of Community Affairs (DCA).

"Post Occupancy Review Phase" means a Phase of the Construction Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

"Pre-Bid Meeting Agenda" means an outline and/or detailed description of the issues to be addressed during the Pre-Bid Meeting. The agenda will be distributed to all attendees at the start of the meeting. The Design Consultant shall assist the NJSCC and /or its agents with the preparation of the Pre-Bid Meeting Agenda. Design Consultant will attend a pre-bid meeting organized and run the NJSCC and its Agents. The Agenda shall be prepared using SCC/EDA Form 645.

"Pre-Bid Meeting Documents" means the documents prepared by the Design Consultant, and SCC and its Agents for the Pre-Bid Meeting, this includes but not limited to the Pre-Bid Meeting Agenda SCC/EDA Form 645 and the Meeting Sign-In Sheet SCC/EDA Form 642.

"Pre-Development Activities" means activities undertaken under the oversight of the Corporation in connection with the development of a School Facilities Project and includes such activities as site acquisition and development, preliminary design work,

acquisition and installation of temporary facilities, and undertaking feasibility studies to determine the viability of new construction versus rehabilitation. Pre-Development Activities of the Design Consultant, if any, shall be initiated during the Program Sub-Phase, in accordance with the Supplemental Scope of Services and the Special Conditions (as an Appendix of the Agreement).

“Pre-Development Activities Schedule” means the schedule established by the NJSCC and /or its agents for Pre-Development Activities, which shall not be inconsistent with the Schedule.

“Pre-Development Approval” means the DOE approval of Pre-Development Activities.

“Pre-final Construction Contract and Code Inspection” means that inspection performed by the NJSCC and its agents during the Project Close- out Phase and prior to issuance of the Certificate of Substantial Completion Form (NJSCC/EDA Form 701) to the General Contractor(s). The purpose of this inspection is to determine if Substantial Completion has been achieved

“Preliminary Project Report” means the preliminary project report prepared by the DOE and issued to the Authority or Corporation, containing a general description of the School Facilities Project approved by the DOE.

“Product Inspection Report” means a Product Inspection Report written by the Design Consultant of recommendations for future projects shall be submitted to the NJSCC and /or its agents to forward to the SCC. The Final Product Inspection Report shall detail findings related to durability and suitability of products specified for the School Facilities Project, including architectural finishes and HVAC equipment. This report is based upon a one year inspection 12 months after Substantial Completion.

“Professional Services Consultants” means consultants, including Design Consultants, providing professional services associated with research, development, design and construction administration, alteration, or renovation of real property, as well as incidental services that members of these professions and those in their employ may logically or justifiably perform. These consultants may provide services including studies, investigations, surveys, evaluations, consultations, planning, programming, conceptual designs, plans and specifications, cost estimates, construction management, inspections, shop drawing reviews, preparation of operating and maintenance manuals, and other related services.

“Professional Services Consultant Agreements” means the agreements between the SCC and Professional Services Consultants in connection with a School Facilities Project and, unless otherwise noted, shall include this 21st Century Schools Design Manual and the Agreement.

“Project Communication and Organizational Directory” means a document, including an electronic version, consisting of all information necessary to allow proper

communication among all persons involved in a school facilities project.

“Project Management Firm” or "PMF" means the agent engaged by the SCC, at its sole option, to provide overall construction management services, oversight, direction, coordination and reporting in connection with School Facilities Projects undertaken by the SCC. Such firm, if one has been selected, shall be identified.

“Project Progress Report” means formal written Project Progress Reports are required during each of the first six phases of Work. (Reports are not required for the Project Close-Out or Post-Occupancy Review phases) The Reports shall be delivered in written form as well as oral presentation during the formal Project Review Meetings that are required at the end of each major design/construction phase. The primary purpose of these reports is to provide Project Teams an opportunity to explain how they are addressing the requirements, recommendations, and associated required deliverables of the 25 Design Criteria described in Section 2 of this Manual. All required deliverables identified in the respective Required Deliverables Phase Checklist should be included in this report. This information shall be delivered in a project book or binder.

“Project Review Meetings” means purpose of these meetings, with the entire Project Team, shall be to review all design/construction activities over the course of the phase, to ensure that all required activities have been accomplished, all deliverables are submitted, the project is within the budget and schedule, and to evaluate Project Teams on their progress.

“Program/Concept Phase” means a Phase of the Design Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Program / Concept Design Drawings” means all of the drawings to be prepared by the Design Consultant during the Program/Concept Design Phase of the School Facilities project’s development as defined by Section 3 Deliverables.

“Program Document / Educational Specifications” means Program Documents and Educational Specifications based upon the approved L.R.F.P. and F.E.S. Model and in conformance with the requirements of N.J.A.C. Title 6A: 26-Subchapter 5 Review of Capital Projects for Educational Adequacy.

“Programmatic Requirements” means those School Facilities with Project-specific requirements established or approved by the DOE or the SCC.

“Project Close-Out Phase” means a Phase of the Construction Administration Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Project Description” means the document(s) identifying and describing the School Facilities Project. The Project Description may be amended, from time to time, in

accordance with the provisions of the Agreement. The Project Description may include the DOE Scopes of Work and may also include the preliminary project report, prepared and approved by the DOE and issued to the SCC. The Project Description shall contain, in addition to other things, a general description of a School Facilities Project, along with the Initial CCE and the Initial CWE and is an attachment to the Agreement.

“Punch List” means the list, prepared before Substantial Completion, of incomplete or defective work to be performed or remedied by a Contractor after Substantial Completion. The initial punch list shall be prepared and implemented by the NJSCC and/or its agents. When the NJSCC and/or its agents is satisfied the punch list is complete, the NJSCC and/or its agents shall forward all supportably documentation to SCC for review and approval.

“Requests for Information” means a request from the Contractor to confirm the interpretation of a detail, specification or note on the construction drawings or to secure a documented directive or clarification, interpretation, or additional information from the architect or owner that is needed to continue work. The Contractor shall use SCC/EDA Form655 for a Request for Information.

“Request for Proposals” or “RFP” means the request issued by the SCC for proposals from Professional Services Consultants, which request may include a request for a Technical Proposal and/or a request for a Fee Proposal.

“Release of Liens” means a sworn statement of the Contractor stating that all releases or waivers of liens have been received The Contractor shall utilize SCC/EDA Form 820 “Partial Waiver and Release of Liens” or SCC/EDA Form 821 “Final Waiver and Release of Liens”. The Contractor is required to list any exceptions to the sworn statement and may be required to furnish to the Owner a lien bond or indemnity bond to protect the Owner with respect to such exceptions.

“SCC Project Manager” or “PO” or “Senior PO” means one of the SCC’s representative authorized to act on behalf of the SCC with respect to the School Facilities Project and the Contractual Documents.

“Schedule” or **“Project Schedule”** means the time frames established by the Design Consultant to complete the Work within the Design Milestones and the Construction Milestones which sets forth the dates by which each of the Phases in the Design Phase and the Construction Phase shall be completed. The Schedule may be established as provided as an Appendix (Special Conditions of the Agreement).

“Schematic Educational Adequacy Review Submission” means Program Documents, Educational Specifications, completed DOE Project Application Package, site plan and building plans and in conformance with the requirements of N.J.A.C. Title 6A: 26-Subchapter 5 Review of Capital Projects for Educational Adequacy.

“Schematic Design Documents” means the documents required to be prepared and

submitted by the Design Consultant during the Schematic Design Phase as set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“Schematic Design Phase” means a Phase of the Design Phase as more fully set forth in this 21st Century Schools Design Manual and the Agreement between the SCC and the Design Consultant.

“School Facility” means and includes any structure, building or facility used wholly or in part for academic purposes.

“School Facilities Project” means the acquisition, demolition, construction, improvement, repair, alteration, modernization, renovation, reconstruction, maintenance, etc., of all or any part of a School Facility or of any other personal property necessary for or ancillary to any School Facility; and for the purposes of the Agreement, the Design Consultant shall be responsible for all School Facilities Projects identified in the Agreement and the phrase "School Facilities Project" shall include all projects so identified. The Design Consultant shall be responsible for all School Facilities Projects identified in the Special Conditions, attached as an Appendix of the Agreement, and the term “School Facilities Project” shall include all projects so identified.

“School Facilities Project Team” or “Project Team” or “Team” means the team(s) identified by the SCC for the School Facilities Project. Such team(s) shall consist of, but not be limited to, representatives of the Client School District, the Community, all representatives of the SCC lead by the Project Manager, the Design Consultant Team, the Project Management Firm (PMF) or Construction Management Firm (CMF), the Commissioning Agent, the Contractor, and any other Professional Services Consultants engaged in connection with the School Facilities Project. The School Facilities Project Team may also include, at the option of the SCC, representatives of the DOE. Other groups may be added when appropriate.

“Scope of Work” means the document describing the work to be physically completed for the School Facilities Project, issued by the DOE or by the Corporation (or its agents). The Scope of Work may be amended, from time to time, in accordance with the provisions of this Agreement. The Scope of Work may be included in the Project Description attached as Appendix to the Agreement.

“Service Life Planning Analysis”

Service Life Planning Analysis as distinguished from Life Cycle Cost is a recently developed process by which not only are the operational costs considered in relation to the first (capital) costs but attempts to provide an objective means by which to evaluate what is commonly referred to as durability (Service Life). Such considerations are of particular significance to schools with an anticipated long useful life so as not to burden the District and ultimately the taxpayer with costs associated with Operations and Maintenance (O&M). Such analysis has been criticized in the past for being unduly burdensome and subject to bias of those performing the calculations. So as to address

these concerns the SCC has adopted a simplified method which focuses on a few primary systems critical to O&M and established a nationally recognized impartial source of data as the basis by which such calculations shall be performed. Such analysis, described further in Section 2 of this document, shall be performed during both Schematic Design and Design Development so as to consider the relative value of materials and equipment under consideration, evaluate the final selection, and ultimately to inform the revisions to the District Maintenance Plan and development of the System (Operational) Manuals associated with the Commissioning Process.

“Services” means the services to be performed by the Design Consultant pursuant to the Contractual Documents, whether completed or partially completed and includes all other labor, materials and equipment provided or to be provided to fulfill such obligations.

“Single Line Engineering Diagrams” means single line drawings prepared by the Design Consultant Team defining each of the proposed buildings systems including but not limited to HVAC, Fire Protection, Electrical, Plumbing, Technology/Data, Telephone, and Security, Structural, etc. during the Schematic Phase, as defined by Section 3 Deliverables.

“Site” means the site(s) proposed or selected for the School Facilities Project.

“Site Engineering Calculations” means calculations prepared by the Design Consultant Team defining the sizing and related solution of each of the proposed site systems including but not limited to storm water runoff and detention calculations, drainage calculations, sanitary and storm water systems design, site grading/ cut and fill calculations, road design, soil erosion and control, LEED™ Credit compliance calculations, building utility service sizing, retaining wall design calculations, etc. as deemed necessary for the proposed site solution. These requirements are further defined by Section 3 Deliverables.

“Site Plan and Landscape Plan” means an initial developed Site Plan and Landscape Plan prepared by the Design Consultant during the Schematic Phase, as defined by Section 3 Deliverables.

“Site Analysis” means composite site analysis drawings that combine all the site information and criteria provided by the NJSCC, the Project Team, and other sources, compiled and graphically presented by Design Consultant. These diagrams shall include but not be limited to City planning and zoning/land use requirements, State planning requirements, existing infrastructure locations and capacities, existing pedestrian and vehicular circulation, Character of immediately adjacent urban area, soil conditions (through the NJSCC consultant), traffic evaluation (through the NJSCC consultant), environmental conditions (through the NJSCC consultant), sources of noise and or vibration, solar orientation, security, etc.

“Space Adjacency Diagrams” means the drawing(s) to be prepared by the Design Consultant during the Programming stage of the Program/Concept Design Phase as

defined by Section 3 Deliverables. This drawing(s) represent an idealized interpretation of the functional relationships and proximity of spaces of the program document.

“Special Conditions” means that document attached as Appendix to the Agreement, and made a part thereof, as such document may be amended from time to time, which identifies, among other things, the School Facilities Project(s) for which the Design Consultant shall be responsible, and the required Program/Concept Phase Services, if any.

“Specifications” mean that portion of the Contract Documents consisting of the written requirements of materials, equipment, systems, standards and workmanship for the Work, and performance of related services. This portion of the Contract Documents should follow the latest version of the CSI/Master Format.

“State” means the State of New Jersey.

“Single Line Structural Diagrams and Calculations” means preliminary foundation plans and single line structural system framing drawings prepared by the Design Consultant Team during the Schematic Phase, of the structural system selected for further development, as defined by Section 3 Deliverables. This shall be accompanied by structural calculations including but not limited to; seismic zone, design loads and allowable material stresses used as per presiding codes. Progressive collapse design approach if applicable shall also be defined.

“Subconsultant” means the Professional Services Consultant to whom another Professional Services Consultant sublets part of the work for which the latter is responsible.

“Subcontractor” means the contractor to whom a Contractor, Professional Services Consultant or other Subcontractor sublets part of the work for which such Contractor, Professional Services Consultant or other Subcontractor is responsible.

“Submittal” means all documents required to be submitted by the Contractors, including, but not limited to, shop drawings, reports, calculations, product data and samples.

“Substantial Completion” means that point in time when all essential requirements of the Construction Contract Documents have been performed so that the purpose of the Construction Contract Documents is accomplished. The following conditions must be met; a high percentage of completion thus the Punch-list has been created; when there are no important or material omissions or technical defects or deficiencies, as defined by the SCC; the General Contractor has received a proportionate amount of payments for the Work, and when the School Facilities Project is ready for occupancy in accordance with its intended purpose and a Temporary Certificate of Occupancy has been issued. If all the conditions are met a Certificate of Substantial Completion Form (NJSCC/EDA Form 701) issued by the Design Consultant to the General Contractor(s).

“Supplemental Scope of Services” means those additional Services set forth in an Appendix to the Agreement beyond Basic Services in the Agreement, which the Design Consultant shall be required to provide in accordance with the terms established in the Special Conditions (Appendix of the Agreement).

“System Manual”

The System Manual shall have the definition as ascribed to it by American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 0 -2005, The Commissioning Process. This document is described by the referenced standard as the means of providing users not participating in the design and construction process the information necessary to understand, operate, and maintain the systems and assemblies incorporated into the work and future updates and corrections as they occur during occupancy. Such documentation shall be developed in accordance with American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 4-1993 -- Preparation of Operating and Maintenance Documentation for Building Systems. The development of this document shall begin at the earliest phase of the Design Process as an outline and continue to be developed at each subsequent phase by the CxA with the participation of all team members.

“Technical Proposal” means the proposal submitted by the Design Consultant in response to a Request for Technical Proposals or RFP.

“Term” means the term as stipulated in the Agreement.

“Test Borings” means soil samples taken to comply with the requirements set forth for soil test borings in the presiding NJ State codes. Samples are taken by a qualified soils testing lab and soil boring contractor to determine a site’s soil and water characteristics. The results are analyzed by laboratory testing methods and visual analysis and a report issued.

“21st Century Schools Design Manual” means” the Manual for Design Consultants" or “Manual” are the manual of the SCC governing the procedures to be followed by Design Consultant along with the Agreement Between the SCC and the Design Consultant with respect to School Facilities Projects. The Design Consultant shall be bound by the 21st Century Schools Design Manual in effect as of the date of execution of the Agreement, unless otherwise instructed by the SCC pursuant to an Amendment.

“Uniform Construction Code” means the New Jersey Uniform Construction Code as set forth in N.J.A.C. 5:23-1 et seq.

“Unit of Fiscal Integrity” means that unit within the Office of the Attorney General created by Section 70 of the Educational Facilities Financing and Construction Act, P.L.2000, c.72.

“Value Engineering” or “Value Management” means those services to be performed by the NJSCC and /or its agents and Design Consultant in accordance with the

recommendations of the Society of American Value Engineers at any appropriate time during each phase of the Design Phase of the work and shall include but not be limited to all building systems, mechanical systems, roofing systems, finishes, energy management systems, lighting and power systems, site work, as well as maintainability and operability considerations.

“Warranty Inspection Report” means a report prepared by the Design Consultant upon completion of warranty (and Guarantees) work by the Contractor (but not later than thirty (30) days after the end of the one-year warranty period), and after re-inspection of the Work. The Final Warranty Inspection Report shall include a list of all warranty issues identified, current status of correction by the Contractor, and remaining work yet to be completed.

“Water Use Analysis”

Water Use Analysis shall be performed no later than the Design Development phase so as to inform the selection of plumbing fixtures. Such analysis shall consider the aggregate water consumption of all plumbing fixtures, with the exclusion of landscaping use, as compared to ‘baseline estimate’ derived from fixture consumption values found specified in the Energy Policy Act of 1992. Documentation, at minimum, shall be sufficient for submission to the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED™) for Schools Rating System, in fulfillment of WE Credit 3.1 Water Use Reduction: 20% Reduction, if desired of the district.

“Work” means the services performed by the Design Consultant pursuant to the Contractual Documents, whether completed or partially completed and includes all other labor, materials, equipment and services provided or to be provided to fulfill such obligations.

Abbreviations

The following abbreviations are used throughout this document.

ANSI	American National Standards Institute
ANSI/ASA	American National Standards Institute / Acoustical Society of America
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing & Materials
IBC	International Building Code
ICC	International Code Council
LEED™	USGBC Leadership in Energy and Environmental Design
NJAC	New Jersey Administrative Code
NJBPU	New Jersey Board of Public Utilities
NJDCA	New Jersey Department of Community Affairs
NJDEP	New Jersey Department of Environmental Protection
NJSCC	New Jersey Schools Construction Corporation
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
NJUCC	Uniform Construction Code, State of New Jersey
US DEP	US Department of Environmental Protection
US DOE	US Department of Energy
USGBC	US Green Building Council

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NJSCC Design Manual

Appendix E

NJSCC Construction Documents Survey

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CONSTRUCTION DOCUMENT SURVEY

Project Description:

School Facility Name:

School Type (Grade Structure):

ECC, ES, MS, HS, K-8, K-12, other

Project Type:

New Construction (NC) / Addition (NCA) / Renovation of Existing and
Addition (NRA) / Renovation

School Facility Address (street address and municipality)

Permit Submittal Date of Issuance (if applicable)

Bidding Documents Date of Issuance (if applicable)

Design Professional(s): (name only, if applicable)

Architectural

Civil

Electrical

Fire Alarm

Plumbing

Sprinkler

Structural

Other

Code Summary Description:

Building Size (SF)

Site Size (SF)

Construction Type (IBC Designation)

Use Type (IBC Designation)

Number of Stories

Number of Parking Stalls

Fire Suppression System (Sprinklers)

Programmatic Description:

Number of Classrooms
Number of Small Instructional Spaces (AKA Special Ed):
Number of Cafeteriums:
Number of Cafeterias:
Number of Kitchens (Fully Equipped):
Number of Satellite Kitchens (Food Warming Only):
Number of Assembly/Performance Spaces:
Number of Music and/or Art Instruction Spaces:
Number of Technology / Language Instructional Spaces:
Number of Science / Computer Laboratory Spaces:
Number of Vocational / Home Arts Instructional Spaces:
Approximate Size and Location of Outdoor Play Spaces:
 Surface / Rooftop

Stage (raised):
Unique Programmatic Spaces (noted)

Building Structural System:

Primary Foundation Type:
 Pile / Caisson / Shallow / Matt – Raft / Grade Beam / Other (describe)

Primary Super-Structure System:
 Wood Frame / Steel Frame / Reinforced Concrete Frame / Other
 (describe)

Building Envelope Description:

Primary Exterior Wall Assembly:
 Brick Veneer w. CMU Backup / Brick Veneer w. Steel Stud Backup /
 CMU / Curtain Wall Assembly, Metal Panel / Pre-Cast Concrete / Other
 (describe)

Secondary Wall Assembly Material:
 Brick Veneer w. CMU Backup / Brick Veneer w. Steel Stud Backup /
 CMU / Curtain Wall Assembly, Metal Panel / Pre-Cast Concrete / Other
 (describe)

Window Type:
 Fixed / Casement / Awning – Hopper / Double – Hung / Tilt / Other
 (describe)

Window Material: (including spec. section if available)

Aluminum (thermally broken), Aluminum (non broken), Aluminum Clad Wood, Vinyl Clad Wood, Fiberglass, Other (describe)

Window Treatment (Sun Control)

Exterior Light Shelf (or shade) / window blinds / integral window blinds / rolling shades / Other (describe)

Primary Roof Assembly:

Built-Up Membrane / Modified Bitumen / Single Ply Thermoplastic – thermoset / Protected (IRMA) / Sprayed Polyurethane / Asphalt Shingle / Slate / Tile / Metal / Other (describe)

Secondary Roof Assembly:

Built-Up Membrane / Modified Bitumen / Single Ply Thermoplastic – thermoset / Protected (IRMA) / Sprayed Polyurethane / Asphalt Shingle / Slate / Tile / Metal / Other (describe)

Interior Assemblies and Finishes:

Classroom Primary Finish Flooring Material

Vinyl, Tile (VCT) / Vinyl, Sheet / Linoleum / Carpet, Sheet / Carpet, Tile / Ceramic Tile / Hardwood / Terrazzo / Terrazzo Tile / Sealed Concrete / Resinous Flooring / Other (describe)

Classroom Primary Finish Ceiling Material

Acoustical Ceiling Tile / Vinyl Faced Acoustical Ceiling Tile / Gypsum Board / Other (describe)

Classroom Demising Wall Assembly:

Gypsum Board Assembly on Steel Stud / CMU Assembly / Other ?

Stairwell Interior Wall Assembly

Gypsum Board Assembly on Steel Stud / Painted CMU Assembly / Glazed CMU Assembly / Other (describe)?

Corridor Wall Assemblies:

Gypsum Board Assembly on Steel Stud / Painted CMU Assembly / Glazed CMU Assembly / Other (describe)?

Corridor Finish Flooring Material

Vinyl, Tile (VCT) / Vinyl, Sheet / Linoleum / Carpet, Sheet / Carpet, Tile / Ceramic Tile / Hardwood / Terrazzo / Terrazzo Tile / Sealed Concrete / Resinous Flooring / Other (describe)

Corridor Finish Ceiling Material
Acoustical Ceiling Tile / Vinyl Faced Acoustical Ceiling Tile / Gypsum Board / Other (describe)

Restroom 'Wet' Wall Assembly
Gypsum Board Assembly on Steel Stud / CMU Assembly / Other ?

Restroom Finish Flooring Material
Vinyl, Tile (VCT) / Vinyl, Sheet / Linoleum / Carpet, Sheet / Carpet, Tile / Ceramic Tile / Hardwood / Terrazzo / Terrazzo Tile / Sealed Concrete / Resinous Flooring / Other (describe)

Restroom Finish Ceiling Material
Acoustical Ceiling Tile / Vinyl Faced Acoustical Ceiling Tile / Gypsum Board / Other (describe)

Mechanical System(s) Description:

Primary HVAC Terminal Equipment:

(when functions are combined please provide redundant responses)

Equipment Type

Equipment Manufacturer and Model

Fuel Source

Electric / Natural Gas / Fuel Oil / Propane

Primary Heating System:

Equipment Quantity and Type

Boiler - Cast Iron / Membrane Watertube / Electric / Firebox / Firetube / Other

Equipment Manufacturer and Model

Fuel Source

Electric / Natural Gas / Fuel Oil / Propane

Primary Cooling System:

Equipment Quantity and Type
Chiller - Centrifugal / Reciprocating / Screw / Absorption / Scroll / Other

Equipment Manufacturer and Model

Fuel Source

Primary Ventilation System:

Equipment Type

Equipment Manufacturer and Model

Heat Rejection System:

Equipment Type
Air Cooled / Water Cooled / Evaporative

Equipment Manufacturer and Model

Energy Recovery System:

Equipment Type

Equipment Manufacturer and Model

Emergency Generator:

Equipment Type

Equipment Manufacturer and Model

Fuel Source

Electric / Natural Gas / Fuel Oil / Propane

Lighting Description:

Classroom Primary Lighting Fixtures:

Direct-Indirect Fluorescent Pendants / Fluorescent Trouffers / Ceiling Mounted Surface Fluorescent Fixtures / Incandescent Downlights / Ceiling Mounted Surface Incandescent Fixtures / HID Pendants / Other (describe)

Corridor Primary Lighting Fixtures:

Direct-Indirect Fluorescent Pendants / Fluorescent Trouffers / Ceiling
Mounted Surface Fluorescent Fixtures / Incandescent Downlights / Ceiling
Mounted Surface Incandescent Fixtures / HID Pendants / Other (describe)

Restroom Primary Lighting Fixtures:

Direct-Indirect Fluorescent Pendants / Fluorescent Trouffers / Ceiling
Mounted Surface Fluorescent Fixtures / Incandescent Downlights / Ceiling
Mounted Surface Incandescent Fixtures / HID Pendants / Other (describe)

High Bay Space Primary Lighting (Gymnasium):

Direct-Indirect Fluorescent Pendants / Fluorescent Trouffers / Ceiling
Mounted Surface Fluorescent Fixtures / Incandescent Downlights / Ceiling
Mounted Surface Incandescent Fixtures / HID Pendants / Other (describe)

High Bay Space Primary Lighting (Assembly):

Direct-Indirect Fluorescent Pendants / Fluorescent Trouffers / Ceiling
Mounted Surface Fluorescent Fixtures / Incandescent Downlights / Ceiling
Mounted Surface Incandescent Fixtures / HID Pendants / Other (describe)

Emergency Generator:

Other:

Commissioning Requirements (noted in spec section Div. 1 or 15)

Describe scope of commissioning and responsible parties, note applicable
page numbers for future reference

Typical Classroom 'Floor to Finish Ceiling' Height

Typical Classroom 'Floor to Floor/Roof' Height

Typical Classroom Dimensions (W x L and NSF if available)

Note which side of typical classroom with exterior exposure and
orientation

On-Site Renewable Energy Systems

(BIPV, wind generator, etc.)

Number of Elevators:

Number of Stairwells:

NJSCC Design Manual

Appendix F

Design Manual Variance Request Form

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DESIGN MANUAL VARIANCE REQUEST FORM

Date: _____

Contract No: _____

Package Name: _____

PMF/CMF: _____

PMF/CMF PM: _____

Design Consultant: _____

Sub Consultant: _____

A Variance is requested from the following Design Manual Requirement(s):

	Design Phase	Page No.	Requirement
1.			

Describe the reason(s) why a Variance is requested from the Design Manual Requirement(s) list above:

	Design Phase	Page No.	Reason(s) / Justification (provide separate attachment if required)
1.			

Describe the substitute procedure(s) and /or deliverable(s) and / or the cost savings to be provided by the Design Consultant Team in place of meeting the Design Manual Requirement(s) list above:

	Design Phase	Page No.	Substitute Procedure(s) and / or Deliverable(s) & Cost Impact(s) (provide separate attachment if required)
1.			

Recommended:			
PMF:	Signature _____	<input type="checkbox"/> Recommended	<input type="checkbox"/> Not Recommended
	Project Manager Printed Name _____	Date: _____	
NJSCC:	Signature _____	<input type="checkbox"/> Recommended	<input type="checkbox"/> Not Recommended
	NJSCC Project Officer Printed Name _____	Date: _____	

Approved:			
NJSCC:	Signature _____	<input type="checkbox"/> Approved	<input type="checkbox"/> Not Approved
	NJSCC Architecture & Engineering Printed Name _____	Date: _____	
NJSCC:	Signature _____	<input type="checkbox"/> Approved	<input type="checkbox"/> Not Approved
	NJSCC Regional Director Printed Name _____	Date: _____	

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