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High Performance Sustainable Building

[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]

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FOREWORD

This Department of Energy Guide is for use by all DOE elements. This Guide provides approaches for implementing the High Performance Sustainable Building (HPSB) requirements of DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets*. DOE Guides, which are part of the DOE Directives System, provide supplemental information for fulfilling requirements contained in rules, regulatory standards, and DOE directives. Guides do not establish or invoke new requirements nor are they substitutes for requirements.

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HIGH PERFORMANCE SUSTAINABLE BUILDING

1. Background

a. DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets*, provides the Department of Energy, including the National Nuclear Security Administration, with project management direction for the acquisition of capital assets. The goal of this order is to deliver projects on schedule, within budget, and fully capable of meeting mission performance, safeguards and security, and environmental, safety, and health standards. It contains specific provisions for the application of high performance sustainable building (HPSB) principles to the siting, design, construction, and commissioning of new facilities and major renovations of existing facilities.

b. Through the application of HPSB principles pursuant to the Order, a number of mission, energy security, and environmental benefits will be realized, including:

- reduced total (life-cycle) ownership cost of facilities;
- improved energy efficiency and water conservation;
- safe, healthy, and productive built environments; and
- inherent protection of the natural environment.

2. Purpose

This Guide highlights the DOE O 413.3A drivers for incorporating HPSB principles into Critical Decisions 1 through 4 and provides guidance for implementing DOE O 413.3A HPSB requirements.

3. Guide Scope

a. DOE O 413.3A specifies implementation of HPSB requirements into applicable capital asset acquisitions, and its Contractor Requirements Document specifically requires the application of the HPSB principles to the siting, design, construction, and commissioning of new facilities and major renovations of existing facilities.

b. The HPSB principles derive from a Memorandum of Understanding on *Federal Leadership in High Performance and Sustainable Buildings*, in which signatory agencies committed to follow a set of principles in the siting, design, construction and commissioning of federal buildings. The HPSB principles, which form the core of the Guide, are as follows:

- employ integrated design;
- optimize energy performance;

- protect and conserve water;
- enhance indoor environmental quality; and
- reduce environmental impact of materials.

c. An easy-to-read summary of the HPSB principles is provided in Table 1. Complete descriptions of the HPSB principles are found in Attachment A.

Table 1. HPSB Principles Summary

Employ integrated design principles: • Use a collaborative, integrated planning and design process. • Incorporate life-cycle cost-effective energy, water, materials, and indoor environmental quality principles throughout the design, construction, and life of the building. • Employ total building commissioning practices.
Optimize energy performance: • For new construction, reduce the energy cost budget by at least 30% compared to the baseline building performance rating per ASHRAE Standard 90.1-2004. • For major renovations, reduce the energy cost budget by at least 20% compared to a pre-renovations 2003 baseline. • Install building-level utility meters to track and continuously optimize performance.
Protect and conserve water • Use at least 20% less potable water than the indoor water use baseline calculated for the building. • Reduce outdoor potable water consumption by at least 50%; reduce storm water and polluted water runoff.
Enhance indoor environmental quality • Meet ASHRAE Standards 55-2004, Thermal Environmental Conditions for Human Occupancy, and 62.1-2004, Ventilation for Acceptable Indoor Air Quality. • Establish and implement a moisture control strategy to prevent mold contamination. • Achieve a minimum daylight factor of 2% in 75% of all space. • Specify materials and products with low or no pollutant emissions. • Protect indoor air quality during construction and prior to and after occupancy.
Reduce environmental impact of construction materials
• Use designated recycled-content and biobased-content materials and supplies. • Recycle or salvage at least 50% of the construction, demolition, and land clearing waste. • Eliminate the use of ozone-depleting compounds during and after construction.

d. In 2007, Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, required Federal agencies to comply with the HPSB principles in new construction and major renovation of agency buildings.

e. Although this Guide pertains to DOE O 413.3A capital asset projects, it may also provide useful information on the incorporation of HPSB principles into building-related General Plant Projects and Institutional General Plant Projects at DOE sites.

f. The Guide provides recommendations and options for Federal project directors to consider when implementing HPSB requirements during the capital asset acquisition process to secure approval by the appropriate authorities; none of these recommendations is to be construed as a requirement.

4. Drivers for Incorporating HPSB into Critical Decisions 1 through 4

The following sections contain information on six key drivers for incorporating HPSB into the DOE O 413.3 Critical Decisions 1 through 4:

a. DOE Directives. DOE directives pertaining to HPSB include the following:

(1) DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets.* This Order, along with its contractor requirements document, requires incorporating the HPSB principles in the project management of capital asset acquisitions involving the siting, design, construction, and commissioning of new facilities and major renovations of existing facilities.

(2) DOE O 430.2B, *Departmental Energy and Utilities Management.* This Order requires the integration of DOE energy and utilities management with other DOE facilities management processes over the life cycle of a facility, and it establishes Departmental energy efficiency leadership goals. The Order contains a requirement that capital asset construction or major renovation projects attain Leadership in Energy and Environmental Design (LEED) Gold certification. (This Guide provides a process under DOE O 413.3A that enables compliance with requirements to achieve LEED Gold certification, but the Guide itself contains no requirements.)

(3) DOE O 450.1A, *Environmental Protection Program.* This Order establishes sustainable environmental stewardship goals for DOE sites to achieve through the use of Environmental Management Systems. These Departmental goals directly relate to the acquisition of environmentally preferable products, and recycling of construction debris provisions in the HPSB principles.

(4) The Department of Energy Acquisition Regulations (DEAR). The DEAR supplements the Federal Acquisition Regulation, which codifies uniform

policies for acquisition of supplies and services by executive agencies, and contains clauses for inclusion in contracts. DEAR 970.5223-2, *Affirmative Procurement Program*, and DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*, support HPSB principles in the acquisition of capital assets.

b. *Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding*

This January 24, 2006, Memorandum of Understanding states that the Federal government is committed to designing, constructing, and operating its facilities in an energy-efficient and environmentally sustainable manner, consistent with Federal agency missions. The Memorandum of Understanding encourages the use of life-cycle concepts, consensus-based standards, and performance measurement and verification methods that lead to sustainable buildings. The Memorandum of Understanding establishes five HPSB principles that all agencies are to follow in the design, construction and commissioning of federal buildings (see Table 1 and Attachment A).

c. Executive Order (E.O.) 13423, *Strengthening Federal Environmental, Energy and Transportation Management and its Implementing Instructions*

E.O. 13423 consolidates prior "Greening the Government" Executive Orders and integrates the sustainable practices of those orders into a cohesive approach to environmental, energy, and transportation management. Executive Order 13423 requires Federal agencies to lead by example in advancing the nation's energy security and environmental performance. One of the sustainable environmental and energy practices of Executive Order 13423 is compliance with the HPSB principles of the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding in the design, construction and/or major renovation, and commissioning of Federal Buildings.

d. Energy Policy Act (EPAct) of 2005, Pub. L. No. 109-58

Section 109 of the Energy Policy Act of 2005, *Federal Building Performance Standards*, states that if life-cycle cost-effective, "sustainable design principles are to be applied to the siting, design, and construction of all new and replacement federal buildings." It further states that each building project will "comply with third-party certification standards for high performance sustainable buildings." DOE has issued regulations (10 CFR Parts 433, 434, and 435) as required by Section 109 of the EPAct that establish revised energy efficiency performance standards for new Federal buildings.

e. Energy Independence and Security Act of 2007, Pub. L. No. 110-140

The Energy Independence and Security Act of 2007, Title IV, Subtitle C—High-Performance Federal Buildings—contains annual energy reduction goals for

Federal buildings for the years 2006 through 2015. The law requires the Secretary of Energy to identify a green building certification system and level applicable to Federal buildings, and provide input to semiannual OMB scorecards for energy management activities.

f. Office of Management and Budget Circular A-11 Guidance

Office of Management and Budget Circular A-11 addresses, among other things, the planning, budgeting, and acquisition of capital assets. Part 7 (section 300) of this Circular requires Federal agencies to report whether "sustainable design principles" have been incorporated into the project.

5. Guide Methodology

a. The following sections describe a way by which federal project directors can implement the DOE O 413.3A HPSB requirements in Critical Decisions 1 through 4 of their projects. Federal project directors can fulfill these requirements by incorporating the HPSB principles in the design, construction, and commissioning of new DOE facilities and major renovation of existing facilities.

b. Federal project directors should also be aware that a variety of background, technical, and other HPSB resource information is available from the *Whole Building Design Guide*'s Executive Order (E.O.) 13423 *Technical Guidance for Implementing the Five Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* webpage (http://www.wbdg.org/sustainableEO/index.php). The *Whole Building Design Guid*e is maintained by the National Institute of Building Sciences, with support from over 25 Federal agencies (including the Department of Energy), private-sector companies, and non-profit organizations.

6. Critical Decision-1, Approve Alternative Selection and Cost Range: Implementing HPSB requirements in *the conceptual design report and acquisition strategy.*

a. The Critical Decision-1 requirement pertaining to HPSB defined in Table 2 of DOE O 413.3A is as follows:

> ***Document High Performance Sustainable Building considerations … in the conceptual design report and acquisition strategy, as appropriate.***

b. DOE O 413.3A requires the Federal project director to identify in the conceptual design report and the acquisition strategy how the project will meet or contribute to meeting the HPSB principles. The key to successfully incorporating HPSB into a project is to use integrated design principles, as early as possible, and throughout the life of the project to both establish

expectations up front and provide the framework for tracking progress throughout the project.

c. Establishing an integrated project team so that it includes members with HPSB experience, including a LEED accredited professional and a designated commissioning authority, is highly recommended. A designated commissioning authority should remain with the project through occupancy. It is also highly recommended that the architecture and engineering firms and construction firms chosen for the project have experience in constructing sustainable buildings.

d. For a list of LEED accredited professionals, see http://www.usgbc.org/LEED/AP/ViewAll.aspx.

e. The Federal project director can use the LEED building rating system to certify the project's conformance with the HPSB principles. If the project is intended to achieve a specific LEED rating level as indicated in Attachment B, Table B-1, this should be identified in the conceptual design report and the acquisition strategy. Crosswalks between the LEED new construction rating criteria and the HPSB principles can be found in Attachment B, Table B-2.

f. Discussion of HPSB is recommended as a separate section or document in the conceptual design report. One best practice is to prepare a sustainable design report to identify the sustainable building features envisioned in the preliminary design. As the project progresses, the Federal project director will update the sustainable design report to track the documentation required to certify the project under the LEED rating system. The sustainable design report thus serves as a key organizing tool to facilitate the Federal project director in tracking the project's sustainable building features. An example of a sustainable design report prepared for the Critical Decision-1 process can be found in Attachment C.

g. Federal project directors may also want to take advantage of the *Whole Building Design Guide Executive Order 13423 Technical Guidance* website (http://www.wbdg.org/sustainableEO/index.php) during the Critical Decision-1 process, and throughout the life of the project. This website offers on-line access to sustainable design resources organized around the implementation of the Executive order's sustainable building requirements and HPSB principles, including analytical tools, model contract and specification language, and reports and evaluations of construction products, processes, and materials.

h. Exemptions: The Federal project director should explain, in the conceptual design report and the acquisition strategy, the rationale for claiming any exemptions to incorporating some or all of the HPSB principles into the project. This includes buildings categorically excluded under the Energy Policy Act of 2005 for energy performance requirements, projects that are waived by the acquisition executive or building components and practices determined and documented by the integrated project team as not being life-cycle cost-effective.

7. Critical Decision-2, Approve Performance Baseline: Implementing HPSB requirements into the preliminary design review.

a. The Critical Decision-2 requirement pertaining to HPSB in Table 2 of DOE O 413.3A is as follows:

> ***Incorporate Preliminary … High Performance Sustainable Building provisions into the preliminary design and design review.***

b. During the Critical Decision-2 process, the Federal project director and the integrated project team should evaluate and document how the HPSB principles have been integrated into the preliminary design. The Federal project director and integrated project team should determine the sustainable building features that can be achieved, making tradeoffs between desired features and project realities. If the project is intended to achieve a particular LEED rating level, the Federal project director should ensure that the documentation is updated to identify the level to be achieved, including a checklist identifying the sustainable building features that contribute to achieving the certification. If the Federal project director is adopting the best practice of preparing a sustainable design report, that report should be updated to validate the sustainable building features of the preliminary project design.

8. Critical Decision-3, Approve Start of Construction: Implementing HPSB requirements into the Final Design and the External Independent Review.

a. The Critical Decision-3 requirement pertaining to HPSB in Table 2 of DOE O 413.3A is as follows:

> ***Incorporate Final … High Performance Sustainable Building provisions into the final design and the external independent review.***

b. The Federal project director should ensure that the sustainable building provisions have been incorporated into the final design and the solicitation for construction to enable the project to successfully incorporate the HPSB principles and achieve the desired LEED rating. The Federal project director should identify potential challenges, either technical or financial, that could eliminate or lessen the project's sustainable features, making sure the final design has HPSB-related specifications, such as procurement and use of environmentally preferable products including construction materials, energy-efficient systems, and a plan for recycling of construction debris and surplus materials.

c. The Federal project director should request that the external independent review or independent project review addresses the sustainable building features of the

project by identifying sustainable design as a specific line of inquiry for the review team.

d. As appropriate, the Federal project director should update the sustainable design report to reflect any changes made during the final design process that might impact the project's ability to incorporate the HPSB principles and achieving the LEED rating.

9. Critical Decision-4, Approve Start of Operations or Project Completion: Implementing HPSB requirements into Issuing a Checkout, Testing, and Commissioning Plan.

a. The Critical Decision-4 requirement pertaining to HPSB in Table 2 of DOE O 413.3A is as follows:

> ***Issue a checkout, testing, and commissioning plan that identifies subtasks, systems, and equipment. The commissioning plan ensures that the equipment, systems, and facilities, including High Performance Sustainable Building systems, perform as designed and are optimized for greatest energy efficiency, resource conservation, and occupant satisfaction. The commissioning plan includes checkout and testing criteria required for initial operations.***

b. In Critical Decision-4, the Federal project director should confirm that the HPSB-related systems were included in the project's Checkout, Testing, and Commissioning Plan, and that these sustainable building features were installed correctly and are operating properly. The Federal project director compiles the data and documentation needed to establish that the HPSB principles have been successfully incorporated into the project. If the project is intended to achieve a LEED rating level, the Federal project director will document how each "point" has been obtained on the checklist in order to achieve the LEED rating. If the Federal project director is adopting the best practice of preparing a Sustainable Design Report, this report should be finalized by documenting how each sustainable design feature has been tested and validated, including any commissioning requirements.

10. Acronyms

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
DEAR	Department of Energy Acquisition Regulations
HPSB	High Performance and Sustainable Building
LEED	Leadership in Energy and Environmental Design

11. References

a. 10 CFR Parts 433, 434, and 435, *Energy Conservation Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings and New Federal Low-Rise Residential Buildings*. Available at http://www1.eere.energy.gov/femp/pdfs/fr_notice_cfr433_434_435.pdf

b. DOE O 413.3 A, *Program and Project Management for the Acquisition of Capital Assets*.

c. DOE O 430.2B, *Departmental Energy and Utilities Management*.

d. DOE O 450.1A, *Environmental Protection Program*.

e. E.O. 13423 *Strengthening Federal Environmental, Energy, and Transportation Management*, January 26, 2007, Available at http://www.wbdg.org/pdfs/eo13423.pdf.

f. Instructions for Implementing E.O.13423 "Strengthening Federal Environmental, Energy, and Transportation Management," March 29, 2007. Available at http://www.wbdg.org/pdfs/eo13423_instructions.pdf

g. E.O. 13423 *Technical Guidance for Implementing the Five Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*, available at http://www.wbdg.org/sustainableEO/index.php. This technical guidance also includes model contract and specification language per the *Federal Green Construction Guide for Specifiers*, available at http://www.wbdg.org/design/greenspec.php. The Technical Guidance is updated periodically; therefore, it is recommended that Federal project directors and integrated project teams monitor the WBDG website for new HPSB-related resources.

h. *Federal Leadership in High Performance and Sustainable Buildings—Memorandum of Understanding*, Available at http://www.wbdg.org/pdfs/sustainable_mou.pdf.

i. Energy Star website, new building design guidance, available at http://www.energystar.gov/index.cfm?c=new_bldg_design.new_bldg_design.

j. *Office of Management and Budget Circular A-11*, Part 7, available at http://www.whitehouse.gov/omb/circulars/a11/current_year/s300.pdf.

k. US Green Buildings Council, *Leadership in Energy and Environmental Design* (LEED), available at http://www.usgbc.org.

l. Energy Policy Act (EPAct) of 2005, Pub. L. No. 109-58. Available at http://fossil.energy.gov/epact/epact_final.pdf.

m. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:publ140.110.

GUIDING PRINCIPLES FOR FEDERAL LEADERSHIP IN HIGH PERFORMANCE AND SUSTAINABLE BUILDINGS

(Source: Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding, January 2006)

I. Employ Integrated Design Principles

a. **Integrated Design**. Use a collaborative, integrated planning and design process that

- Initiates and maintains an integrated project team in all stages of a project's planning and delivery;
- Establishes performance goals for siting, energy, water, materials, and indoor environmental quality along with other comprehensive design goals; and ensures incorporation of these goals throughout the design and lifecycle of the building; and,
- Considers all stages of the building's lifecycle, including deconstruction.

b. **Commissioning**. Employ total building commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met. This should include a designated commissioning authority, inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.

II. Optimize Energy Performance

a. **Energy Efficiency**. Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star targets for new construction and major renovation where applicable. For new construction, reduce the energy cost budget by 30 percent compared to the baseline building performance rating per the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) Standard 90.1-2004, Energy Standard for Buildings Except Low-Rise Residential. For major renovations, reduce the energy cost budget by 20 percent below pre-renovations 2003 baseline.

b. **Measurement and Verification**. In accordance with DOE guidelines issued under section 103 of the Energy Policy Act of 2005 (EPAct), install building level utility meters in new major construction and renovation projects to track and continuously optimize performance. Compare actual performance data from the

first year of operation with the energy design target. After one year of occupancy, measure all new major installations using the Energy Star Benchmarking Tool for building and space types covered by Energy Star. Enter data and lessons learned from sustainable buildings into the High Performance Buildings Database. (www.eere.energy.gov/femp/highperformance/index.cfm)

III. Protect and Conserve Water

a. **Indoor Water**. Employ strategies that in aggregate use a minimum of 20 percent less potable water than the indoor water use baseline calculated for the building, after meeting the Energy Policy Act of 1992 fixture performance requirements.

b. **Outdoor Water**. Use water efficient landscape and irrigation strategies, including water reuse and recycling, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities). Employ design and construction strategies that reduce storm water runoff and polluted site water runoff.

IV. Enhance Indoor Environmental Quality

a. **Ventilation and Thermal Comfort**. Meet the current ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, including continuous humidity control within established ranges per climate zone, and ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality.

b. **Moisture Control**. Establish and implement a moisture control strategy for controlling moisture flows and condensation to prevent building damage and mold contamination.

c. **Daylighting**. Achieve a minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks. Provide automatic dimming controls or accessible manual lighting controls, and appropriate glare control.

d. **Low-Emitting Materials**. Specify materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings.

e. **Protect Indoor Air Quality during Construction**. Follow the recommended approach of the Sheet Metal and Air Conditioning Contractor's National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 1995. After construction and prior to occupancy, conduct a minimum 72-hour flush-out with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.

V. Reduce Environmental Impact of Materials

a. **Recycled Content**. For EPA-designated products, use products meeting or exceeding EPA's recycled content recommendations. For other products, use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project.

b. **Biobased Content**. For USDA-designated products, use products meeting or exceeding USDA's biobased content recommendations. For other products, use biobased products made from rapidly renewable resources and certified sustainable wood products.

c. **Construction Waste**. During a project's planning stage, identify local recycling and salvage operations that could process site related waste. Program the design to recycle or salvage at least 50 percent construction, demolition and land clearing waste, excluding soil, where markets or on-site recycling opportunities exist.

d. **Ozone Depleting Compounds**. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.

ALIGNING THE HPSB PRINCIPLES WITH THE LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN NEW CONSTRUCTION (LEED-NC™) RATING SYSTEM

1. The LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ is a voluntary standard that defines high performance sustainable buildings—which are healthier, more environmentally responsible, and more cost effective to operate.

2. LEED certification validates that a building is a high performing, sustainable structure. Certification also benchmarks a building's performance to support ongoing analysis over time to quantify the return on investment of green design, construction, systems, and materials.

3. LEED credits are awarded in the following categories:

   - *Sustainable Sites* (construction related pollution prevention, site development impacts, transportation alternatives, storm water management, heat island effect, and light pollution)

   - *Water Efficiency* (landscaping water use reduction, indoor water use reduction, and wastewater strategies)

   - *Energy & Atmosphere* (commissioning, whole building energy performance optimization, refrigerant management, renewable energy use, and measurement and verification)

   - *Indoor Environmental Quality* (environmental tobacco smoke control, outdoor air delivery monitoring, increased ventilation, construction indoor air quality, use low emitting materials, source control, and controllability of thermal and lighting systems)

   - *Materials & Resources* (recycling collection locations, building reuse, construction waste management, and the purchase of regionally manufactured materials, materials with recycled content, rapidly renewable materials, salvaged materials, and sustainably forested wood products)

   - *Innovation & Design Process* (LEED accredited professional, and innovative strategies for sustainable design)

4. The point-based rating system consists of a series of criteria or requirements, under each of the categories, where credits or points are earned for compliance. Although each specific credit is considered optional, all prerequisites need to be satisfied in order for a project to be eligible for certification. Different levels of green building certification are awarded based on the total credits earned. Table B-1 summarizes the project score

requirements and corresponding certification levels specific to the New Construction (LEED-NC™) rating system.

Table B-1: LEED-NC™ Certification Rating Requirements

Certification Level	LEED-NC™ Score Required
Certified	26-32
Silver	33-38
Gold	39-51
Platinum	52-69

As shown in the crosswalk in Table B-2, the LEED-NC™ rating system corresponds closely with the HPSB principles outlined in the January 2006 Memorandum of Understanding.

Table B-2: Crosswalk between the HPSB Principles and the LEED-NC™ Criteria

HPSB Principle	LEED Criteria
Employ Integrated Design Principles Integrated design	*Innovation & Design Process* Credit 2: LEED Accredited Professional
Commissioning	*Energy and Atmosphere* Prerequisite 1: Fundamental Commissioning of the Building Energy Systems Credit 3: Enhanced Commissioning
Optimize Energy Performance Energy Efficiency	*Energy and Atmosphere* Prerequisite 2. Minimum Energy Performance Credit 1: Optimize Energy Performance (obtain at least 7 points in this area to conform with EPAct 2005 and Executive Order 13423 requirements.)
Measurement and Verification	Credit 5: Measurement & Verification
Protect and Conserve Water Indoor Water	*Water Efficiency* Credit 3.1: Water Use Reduction: 20% Reduction
Outdoor Water	Credit 2: Innovative Wastewater Technologies Credit 1.1 Water Efficient Landscaping: Reduce by 50% Credit 1.2 Water Efficient Landscaping: No Potable Use or No Irrigation *Sustainable Sites* Prerequisite 1. Construction Activity Pollution Runoff
Enhance Indoor Environmental Quality Ventilation and Thermal Comfort	*Indoor Environmental Quality* Prerequisite 1. Minimum IAQ Performance Credit 7.1: Thermal Comfort: Design
Moisture Control	*Energy Efficiency* Prerequisite 1. Fundamental Building Systems Commissioning
Daylighting	Credit 6.1 Controllability of Systems, Lighting Credit 8.1: Daylight & Views: Daylight 75% of Spaces

HPSB Principle	LEED Criteria
Low-Emitting Materials	Credit 4.1: Low-Emitting Materials: Adhesives & Sealants Credit 4.2: Low-Emitting Materials: Paints & Coatings Credit 4.3: Low-Emitting Materials: Carpet Systems Credit 4.4: Low-Emitting Materials: Composite Wood & Agrifiber Products
Protect Indoor Air Quality during Construction	Credit 3.1: Construction Indoor Air Quality Management Plan: During Construction Credit 3.2: Construction Indoor Air Quality Management Plan: Before Occupancy
Reduce Environmental Impact of Materials Recycled Content	*Materials and Resources* Credit 4.1: Recycled Content: 10% (post-consumer + 1/2 pre-consumer)
Biobased Content	Credit 6: Rapidly Renewable Materials Credit 7: Certified Wood
Construction Waste	Credit 2.1: Construction Waste Management: Divert 50% From Disposal
Ozone Depleting Compounds	*Energy and Atmosphere* Prerequisite 3. Fundamental Refrigerant Management Credit 4: Enhanced Refrigerant Management

SUSTAINABLE DESIGN REPORT EXAMPLE

1. A sustainable design report is a living document that describes and tracks the sustainability goals of the project and provides a list of its sustainable design features. It serves as a key organizing tool that the Federal project director and integrated project team can use to monitor the project's sustainability criteria. Sites can use this best practice throughout the project to track the goals, progress towards achieving the goals, and final accomplishments with respect to the facility's sustainable design strategies and/or features in Critical Decision-1 through Critical Decision-4.

2. If the project is expected to obtain a LEED rating, the Federal project director can use the sustainable design report in Critical Decision-1 to identify the sustainable design features envisioned in the conceptual design, included in the preliminary design and then incorporated into the final design. As the project progresses, the Federal project director will update the sustainable design report to track the progress of the design documentation required to establish each point obtained under the LEED rating system.

3. When a Federal project director adopts the best practice of preparing a sustainable design report, the first iteration of this report would be developed during the Critical Decision-1 phase.

    a. The report would reflect the sustainable design features that emerge during the conceptual design process.

    b. The Federal project director would update the report in Critical Decision-2 to reflect the sustainable features of the preliminary project design, and again during Critical Decision-3 to track progress in implementing the sustainability features in the final design and external independent review.

    c. The Federal project director would finalize the sustainable design report in Critical Decision-4 to verify the incorporation of the HPSB elements in the completed project.

4. A sustainable design report contains three primary components:

    a. an introduction and overview,

    b. a matrix of the project's sustainable design features, and

    c. an evaluation of the project's LEED certification status (if the project is intended to achieve a LEED rating).

5. This attachment contains excerpts from a sample sustainable design report derived from the Experimental Sciences Complex at Sandia National Laboratory-New Mexico. The attachment is for illustrative purposes only. The Experimental Sciences Complex is a laboratory facility, so many of the specific requirements, actions, and features may not apply to office or other non-laboratory sites. The Experimental Sciences Complex project

was initially designed to achieve a LEED Gold certification level, and the excerpts in this attachment reflect the sustainable design report at the end of the Critical Decision-1 process. The matrix and LEED checklist are intended to provide helpful examples, but the actual sustainable design categories and design features should be developed and tracked for the specific building under construction. The excerpts in this attachment are presented in the following four tables:

a. Table C-1, Excerpts from Experimental Sciences Complex Sustainable Design Features Matrix. This table replicates portions of the matrix that helps ensure that the sustainable design measures identified are integrated into the project's design and can be tracked as the project progresses. Table C-1 shows the requirements for sustainable sites and energy and atmosphere —two of the five categories of design requirements for this project; the matrix in the actual sustainable design report contains the requirements for all five categories. The requirements were identified during a sustainable design planning process conducted as part of the project kickoff activities. The objectives of the matrix are the following:

   (1) Track those sustainable design features and LEED prerequisites and credits considered applicable to the project.

   (2) Track progress of the project in meeting requirements of applicable LEED prerequisites and credits.

   (3) Facilitate development of the LEED certification design phase documentation submittal so that the project can achieve the desired LEED rating.

b. Table C-2 contains excerpts from the Experimental Sciences Complex sustainable design report's LEED Certification Discussion. These include background information, a discussion of the certification status, and potential LEED points.

c. Table C-3 is the Experimental Sciences Complex LEED-NC Score Checklist. The LEED-NC Score Checklist shows each prerequisite and credit in the LEED-NC program and a determination for application to the Experimental Sciences Complex project of either "yes", "no", or "potentially."

d. Table C-4, Potentially Applicable Experimental Sciences Complex LEED Credits, lists 21 additional "potential" LEED credit points. This listing helps the Experimental Sciences Complex project team evaluate the project's ability to achieve a LEED Gold certification level and to determine which potential LEED credit points warrant further evaluation for application to Experimental Sciences Complex.

Table C-1: Excerpts from Experimental Sciences Complex Matrix of Sustainable Design Features

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
Sustainable Sites (SS)	*Erosion & Sedimentation Control (SSp-1)*	Erosion and Sediment Control Plan	Construction Contractor	Sandia Specification 01065 will be included as part of the ESC construction documents and requires the development and implementation of an erosion and sediment control plan according to U.S. EPA document no. EPA 832/R-92-005, "Storm Water Management for Construction Activities," Chapter 3. This specification will ensure satisfaction of the LEED SS prerequisite, construction activity pollution prevention (SSp-1). The plan will be prepared by the construction contractor and referenced as applicable. The plan will be summarized and referenced in the final SD Report.
	Site Selection (SSc-1)	Avoid development of inappropriate sites	SNL	The site selected for the ESC project is a previously developed area within Technical Area 1. This site meets the criteria for the LEED SS credit, site selection (SSc-1)
	Development Density & Community Connectivity (SSc-2)	Meet a 60,000 square feet per acre development density	SNL	• Selection of the ESC project location within TA 1 definitely meets the intent of this credit, as defined in the LEED-NC Application Guide for Multiple Buildings and On-Campus Buildings. Documentation requirements will include: 1) showing ESC was located in a previously developed area with existing development and infrastructure; 2) verifying the project location is within a designated dense campus growth area; and 3) that the project is resulting in increased development density that meets or contributes to the goals of the campus mater plan.
	Brownfield Redevelopment (SSc-3)	Rehabilitate and develop an environmentally damaged site	SNL	The ESC project site has no history of environmental contamination requiring restoration or rehabilitation. Although the building previously occupying the ESC project site may have required removal of materials that posed potential risk to the environment (such as asbestos or PCBs) prior to demolition, no environment damage to the site surface or subsurface is known to have occurred. This LEED credit will not apply to the ESC project

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
Sustainable Sites (SS)	*Alternative Transportation (SSc-4.1/4.4)*	Adopted features that promote the use of alternative transportation.	SNL	Access to Public Transportation (SSc-4.1): Although there are Albuquerque City Bus Transit System stops all around Tech Area 1, the location of the ESC project appears to be just beyond the ¼ mile requirement of the credit. There are a total of 5 bus routes with one or more stops outside Tech Area 1 in the vicinity of the ESC project site. A more detailed distance assessment will be required to make a final determination for the applicability of this credit to the ESC project. Bicycle Commuter Provisions (SSc-4.2): The ESC design will incorporate a bicycle storage rack located near the entrance to the building (see ESC 100% Title 1 Dwg 748AS4001) and provide a single shower facility in both the women's and men's restrooms (see ESC 100% Title 1 Dwg 748AE1101) . Low-Emitting Vehicle Availability (SSc-4.3): The ESC design will incorporate parking and recharging stations for (2) SNL electric vehicles (see ESC 100% Title 1 Dwg 748AS1001). Parking Capacity (SSc-4.4): The ESC design will not provide new parking for personal owned vehicles and will therefore satisfy the Option 4 requirements for this credit. The ESC design will achieve at least three of the four LEED Alternative Transportation credits (SSc-4.1/4.4)

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
Sustainable Sites (SS)	*Storm water Management (SSc-6.1/6.2)*	Approaches and implemented measures that mitigate storm water flow or improve storm water quality relative to site development.	Civil and Landscape Design	Due to the limited landscape area associated with the ESC project, there is limited opportunity to manage storm water on site. Currently, roof-top runoff is direct to the east side of the ESC building. The landscape plan includes a storm water retention feature (4" to 6" deep) in the south east corner of the site (see ESC 100% Title 1 Dwg 748CG1001 and Dwg 748LI1001). However, the majority of site runoff is directed to storm drain inlets located on H and G Avenues. The capacity of the retention feature is currently be evaluated relative to the pre- and post-development runoff quantities and rates. In addition, treatment of storm water runoff using a chambered storm water manhole to remove suspended solids is under consideration.
	Heat Island (SSc-7.1/7.2)	Landscape and exterior design features that reduce the heat island effect	Architecture/Landscape Design	The ESC project has limited exterior areas available to shade exterior hardscape surfaces such as walkways, services roadways and parking area. Landscape trees and building structure features will shade the hardscape surfaces surrounding the ESC building to some extent. Evaluation of the LEED Heat Island credit for shading site hardscape surfaces (SSc-7.1) is ongoing. ESC 100% Title 1 Dwg 748LP1001 illustrates the landscape design for ESC and Dwg 748CS1002 illustrates the development footprint and associated hardscape surfaces for ESC. The ESC design will incorporate a white, cool-roof membrane meeting the Solar Reflectance Index (SRI) requirement of 78 or greater over much of the laboratory spaces. In addition, the standing seam metal roof system over the high bay area will also meet the SRI requirement. Since the entire roofing system will meet the SRI requirement, an Innovation Credit point may also be obtained due to the resulting 100% roof coverage meeting the SRI requirement.

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
	Light Pollution Reduction (SSc-8)	Adopted measures that reduce the amount of light leaving the site at night.	Electrical Design	The ESC design has limited exterior lighting requirements, due to the absence of a parking area and limited area surrounding the building. The LEED light pollution reduction credit (SSc-8) should be relatively straight forward to achieve. The exterior lighting design for ESC remains under evaluation for LEED credit compliance. The ESC 100% Title 1 design indicates night sky compliant wall-pak metal halide fixtures will be installed over exterior doors.
Energy & Atmosphere (EA)	*Fundamental Commissioning (EAp-1)*	Verify the building's energy related systems are installed, calibrated and operate as intended	Commissioning Authority	Although commissioning specifications have been included in the 100% Title I design phase documents, a commissioning authority has not been identified and the start of commissioning activities has not been established. However, fundamental commissioning of ESC has been identified as an activity to be performed. The LEED fundamental commissioning credit (EAp-1) should be relatively straight forward to achieve.

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
	Minimum Energy Performance (EAp-2) *Optimize Energy Performance (EAc-1.1/1.10)*	Comply with mandatory provisions and prescriptive requirements of ASHRAE 90.1-2004 1) Results of energy analysis, including projected energy use index (BTU/GSF/yr) of selected design. 2) Performance metrics (such as lighting watts/SF, AFUE, CFM/peak fan kW). 3) Cross Reference with the design basis and design analysis. 4) Summary and Recommendations	Mechanical Design	The ESC 100% Title 1 design identifies a number of energy efficiency measures incorporating into the building design, including: • HVAC system design with two partial load boilers that match heating capacities; full economizer controls to allow seasonal free-cooling; and high efficiency motors. • Heat pipe heat recovery system to recovery heat from exhaust air for preheating outside air entering the building. • Building envelope design with specification of R-19 wall cavity insulation, R-30 roof insulation; and insulating glass units with thermally broken frames. • Building fenestration design with horizontal mullion extension shading devices. • Occupancy sensors for lighting control in corridors, bathrooms, conference room, break room, and throughout the interior office spaces. An energy conservation report will be prepared for ESC and will be included as an appendix once available. An energy simulation model for ESC has been developed to evaluate energy efficiency opportunities as well as energy performance relative to ASHRAE 90.1-2004 for LEED Optimize Energy Use credit (EAc-1.1/1.10) results. Currently ESC building simulation results (using Trane Trace 700) indicates a 32% reduction compared to ASHRAE 90.1, resulting in 7 of 10 possible LEED points for energy efficiency. The LEED Minimum Energy Efficiency prerequisite (EAp-2) should be relatively straight forward to achieve as ASHRAE 90.1-2004 compliance is a project requirement.

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
Energy & Atmosphere (EA)	*Refrigerant Management (EAp-3)* *Enhanced Refrigerant Management (EAc-4)*	Reduce use of ozone depleting refrigerants	Mechanical Design	No CFC refrigerants will be specified for ESC HVAC&R systems. As a result, the LEED Refrigerant Management prerequisite (EAp-3) should be straight forward to achieve. The chillers specified for ESC at the 100% Title I design phase will use either R-407-C or R-134A refrigerants. The fire suppression system for ESC is water based. As a result, the Enhanced Refrigerant Management credit (EAc-4) will also be straight forward to achieve. However, calculations demonstrating credit compliance will be required.
	On-Site Renewable Energy (EAc-2.1/2.3)	Implement renewable energy sources	Mechanical Design	The ESC mechanical design team is evaluating the feasibility of implementing a solar hot water heating system for domestic hot water. Details for this evaluation will be included when available. Initial evaluations indicated unfavorable economics; however, a more detailed analysis is ongoing. The LEED On-Site Renewable Energy credit (EAp-2.1/2.3) will not likely be satisfied, as the renewable energy source must account for a minimum of 2.5% of the building energy cost (as determined for EAc-1).

	SD Category	Description of Requirement	Responsible Discipline/ Actions Required/ Status	Features Included in Design
Energy & Atmosphere (EA)	*Enhanced Commissioning (EAc-3)*	Initiate commissioning activities early in the design process and perform additional commissioning activities.	Commissioning Authority	Although commissioning specifications have been included in the 100% Title I design phase documents, a commissioning authority has not been identified and the start of commissioning activities has not been established. Although fundamental commissioning of ESC has been identified as an activity to be performed, initiating commissioning activities prior to development of the construction documents has been identified as an excessive cost element. The ESC design team is currently evaluating the cost associated with enhanced commissioning and the potential for Sandia to perform the enhanced commissioning activities. The LEED Enhanced Commissioning credit (EAc-3) is not likely to be achieved as of 100% Title I design phase.
	Measurement and Verification (EAc-5)	Provide for ongoing accountability of building energy consumption over time	Mechanical Controls Design	Continuous monitoring and control equipment have not yet been defined for such systems as lighting; constant and variable motor loads; variable frequency drive operation; chiller efficiency at variable loads; air and water economizer and heat recovery cycles; air distribution static pressures and ventilation air volumes; boiler efficiencies; building-related process energy systems and equipment; indoor water risers and outdoor irrigation systems. The LEED Measurement and Verification credit (EAc-5) requires development and implementation of an M&V Plan following the International Performance Measurement & Verification Protocol, Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003. M&V details for ESC are under development and the requirements for this LEED credit should be evaluated further as the ESC design progresses.

Table C-2. Excerpts from Experimental Sciences Complex's LEED Certification Discussion

Introduction

The Leadership in Energy and Environmental Design for New Construction (LEED-NC) Green Building Rating System™ has become the industry standard for design, construction, and operation of high performance green buildings. The Experimental Sciences Complex project has been registered with the US Green Building Council (USGBC) for certification under version 2.2 of the LEED-NC rating system. The Experimental Sciences Complex project has committed to achieving a minimum certification level of LEED Silver, and to strive for a certification level of LEED Gold. This section of the Sustainable Design report provides the status of progress towards LEED certification for the Experimental Sciences Complex project.

Certification Status

The LEED-NC rating system is a point-based approach to assign a score to a building. A LEED-NC Score Checklist has been developed for the Experimental Sciences Complex project; this will be maintained throughout the design process to track each LEED prerequisite and credit considered applicable to the Experimental Sciences Complex building project (see Table C-3 of this attachment). The LEED-NC Score Checklist shows each prerequisite and credit in the LEED-NC program and a determination for application to the Experimental Sciences Complex project of either "yes", "no", or "potentially" (indicated by a question mark, "?", on the checklist). A "yes" determination indicates all the requirements associated with the credit or prerequisite can and will be satisfied. A "no" determination indicates that one or more specific aspects of the requirements associated with the credit or pre-requisite is either not applicable or simply will not be satisfied by the Experimental Sciences Complex project. A "potentially" (?) determination indicates that the credit or prerequisite could potentially be satisfied, but requires additional evaluation for applicability to Experimental Sciences Complex and ability to satisfy the credit or prerequisite requirements.

> ***Discussion:*** *Table C-3 contains the LEED-NC Score Checklist for the Experimental Sciences Complex*

Potential LEED Points

The Experimental Sciences Complex LEED-NC Score Checklist indicates that a total of 33 points are considered achievable at the 100% Title I design phase of the Experimental Sciences Complex project. The checklist also indicates that another 21 points are considered to be potentially achievable. Although 33 points would achieve a LEED Silver certification level, loss of any credit points due to unforeseen future circumstances (such as changes to the project scope or value engineering measures) could jeopardize the certification level achievable by the project. In addition, the Experimental Sciences Complex project is striving to attain a LEED Gold certification level. Therefore, satisfying at least some of the 21 LEED credit points designated as "potentially" achievable is important to preserving the LEED Silver certification level and essential to obtaining the LEED Gold certification level.

Discussion: *Table C-4 of this attachment lists the additional 21 "potential" LEED credit points and provides an evaluation of the 21 "potential" LEED credit points to determine those considered more likely (greater than 50% probability) to be applicable and achievable by the Experimental Sciences Complex project and those considered unlikely (less than 50% probability) to be applicable and achievable by the Experimental Sciences Complex project. This information helps the Experimental Sciences Complex project team evaluate the ability to achieve a LEED Gold certification level and to determine which potential LEED credit points warrant further evaluation for application and benefit to Experimental Sciences Complex. The information provided in the Sustainable Design Result Matrix. (Table C-1 of this attachment provides the basis for these determinations.)*

TABLE C-3: LEED-NC Checklist

LEED-NC

Experimental Sciences Complex LEED-NC (Ver 2.2) Score Checklist

Experimental Sciences Complex
Sandia National Laboratories/New Mexico

Yes	?	No			
6	**5**	**3**	**Sustainable Sites**		**14** Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
	1		Credit 2	**Development Density & Community Connectivity**	1
		1	Credit 3	**Brownfield Redevelopment**	1
	1		Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
1			Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
		1	Credit 5.1	**Site Development,** Protect of Restore Habitat	1
		1	Credit 5.2	**Site Development,** Maximize Open Space	1
	1		Credit 6.1	**Stormwater Design,** Quantity Control	1
	1		Credit 6.2	**Stormwater Design,** Quality Control	1
	1		Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
1			Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
3		**2**	**Water Efficiency**		**5** Points
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
		1	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
1			Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes	?	No			
8	**5**	**4**	**Energy & Atmosphere**		**17** Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required

7	2	1	Credit 1	**Optimize Energy Performance**	1 to 10
	1	2	Credit 2	**On-Site Renewable Energy**	1 to 3
	1		Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
	1		Credit 5	**Measurement & Verification**	1
		1	Credit 6	**Green Power**	1

continued…

Yes	?	No			
5	3	5	**Materials & Resources**		**13** Points
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
1			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
		1	Credit 3.1	**Materials Reuse**, 5%	1
		1	Credit 3.2	**Materials Reuse**,10%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
1			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
	1		Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1
	1		Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1
	1		Credit 6	**Rapidly Renewable Materials**	1
1			Credit 7	**Certified Wood**	1

Yes	?	No			
10	4	2	**Indoor Environmental Quality**		**15** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
	1		Credit 1	**Outdoor Air Delivery Monitoring**	1
1			Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems**, Lighting	1
	1		Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
	1		Credit 7.1	**Thermal Comfort**, Design	1

Yes	?	No			
1			Credit 7.2	**Thermal Comfort**, Verification	1
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
		1	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1
Yes	?	No			
1	4		**Innovation & Design Process**		**5** Points
	1		Credit 1.1	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.2	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.3	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.4	**Innovation in Design**: Provide Specific Title	1
1			Credit 2	**LEED® Accredited Professional**	1
Yes	?	No			
33	21	16	**Project Totals (pre-certification estimates)**		**69** Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

TABLE C-4: "Potentially" Applicable Experimental Sciences Complex LEED Credits

LEED-NC Credits Identified as Potentially ("?") Applicable to Experimental Sciences Complex	Probability of Credit Applicability	
	Likely (>50% Possibility)	Unlikely (<50% Possibility)
SSc-2: Development Density & Community Connectivity	1	
SSc-4.1: Alternative Transportation, Public Transportation Access	1	
SSc-6.1: Storm Water Management, Quantity Control		1
SSc-6.2: Storm Water Management, Quality Control		1
SSc-7.1: Heat Island, Non-Roofs	1	
EAc-1.8/1.10: Optimize Energy Performance		2
EAc-2.1: On-Site Renewable Energy		1
EAc-3: Enhanced Commissioning		1
EAc-5: Measurement and Verification		1
MRc-5.1: Regional Materials, 10% Extracted, Processed & Manufactured Regionally	1	
MRc-5.2: Regional Materials, 20% Extracted, Processed & Manufactured Regionally		1
MRc-6: Rapidly Renewable Material		1
EQc-1: Outdoor Air Delivery Monitoring	1	
EQc-6.2: Controllability of Systems: Thermal Comfort	1	
EQc-7.1: Thermal Comfort, Design	1	
EQc-8.1: Daylight & Views: Daylight 75% of Spaces	1	
IDc-1.1/1.4: Innovation in Design	4	
Total	12	9

Note: This table indicates 12 of the 21 "potentially" applicable LEED-NC credit points are considered to have a greater than 50% probability of being satisfied by the Experimental Sciences Complex project. This assumes the Experimental Sciences Complex project will be able to establish all four credits for innovation in design. An additional 12 points would increase the overall score for Experimental Sciences Complex to a total of 45, resulting in a LEED Gold certification level. A target LEED-NC score of 45 points for Experimental Sciences Complex also provides a 6-point cushion for maintaining a Gold certification level in the event unforeseen circumstances eliminate credit points. See Table C-1 of this Attachment for further discussion of each credit point.