Washington Office of Superintendent of
PUBLIC INSTRUCTION

Washington Sustainable Schools Protocol: Criteria for High-Performance Schools

2023

WASHINGTON SUSTAINABLE SCHOOLS PROTOCOL

Criteria for High-Performance Schools

2023

T.J. Kelly
Chief Financial Officer

Prepared by:

- **Randy Newman**, Director of School Facilities
  randy.newman@k12.wa.us | 360-725-6267
- **Morgan Powell**, High Performance Schools Coordinator
  morgan.powell@k12.wa.us | 360-725-6269
- **Shellie Neuman**, Administrative Assistant
  shellie.neuman@k12.wa.us | 360-725-4953

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2023 EDITION

Released 2023. Applicable to state-funded School Construction Assistance Program (SCAP) projects and skill centers and other major projects that are non-SCAP, state-funded projects, receiving full or partial design or construction funding.

Projects receiving state capital funds through SCAP will apply the version of WSSP in effect at the D4 approval date. Projects receiving state capital funds through a direct appropriation or through another grant program will apply the version of WSSP in effect at the time of budget appropriation.

ACKNOWLEDGEMENTS

The Washington State K–12 High-Performance Schools Protocol, referred to as Washington Sustainable Schools Protocol (WSSP) or WA-CHPS, is an adaption of the CHPS Criteria. The Washington Office of Superintendent of Public Instruction (OSPI) has been granted license by The Collaborative for High Performance Schools (CHPS) to use, disclose, reproduce, prepare derivative works, and distribute copies to the public. The Collaborative for High Performance Schools®, CHPS®, the CHPS logo, and the Green Apple Awards® are registered trademarks with the United States Patent and Trademark Office. The CHPS CriteriaTM, CHPS National Core CriteriaTM, CHPS VerifiedTM, CHPS Verified LeaderTM, CHPS Designe dTM, CHPS PreFABTM, Operations Report CardTM, and ORCTM are copyrighted by CHPS, Inc. End users of WSSP are permitted to use and/or copy the content without further consent. However, CHPS, Inc. prior permission must be granted in order to relicense, publish, or develop derivative works from CHPS materials.

Original Advisors

The Washington Sustainable Schools Protocol was developed under a collaboration of many agencies and organizations within the state of Washington and the Pacific Northwest. The Working Draft of this Protocol, which incorporated guidance from the Washington Sustainable Schools Protocol Committee, was developed by the New Buildings Institute, O'Brien & Company, and Eley Associates under contract to the Northwest Energy Efficiency Alliance. The Final 2006 Protocol incorporated lessons learned from the Washington Sustainable Schools Protocol Pilot Projects and guidance from the Washington Sustainable Schools Protocol Team. It was produced by O'Brien & Company, under separate contract to the Northwest Energy Efficiency Alliance.

WSSP 2023 Update

This edition remains focused on healthy, safe, and environmentally sensitive school facilities. The update team has drawn from many sources, including the CHPS National Core Criteria, WELL Building Standard, LEEDv4.1 and the International Green Construction Code, to add new ideas in sustainable school design.

The WSSP 2023 team members are:

- Brian Carter, Integrus Architecture
- Brian Cawley, Hargis Engineers
- Drew Phillips, Forma Construction
- Greg Forsyth, Spokane School District
- Heidi Burkart, Office of Superintendent of Public Instruction
- Jed Reynolds, McKinstry
- Jeff Tweeten, Bellevue School District
- Kas Kinkead, Cascade Design, TAC member
- Jesse Walton, Mahlum Architects
- Mark Brown, Office of Superintendent of Public Instruction
- Matt Daly, Shoreline School District
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- Michael Baranick, Hargis Engineers
- Mike Roberts, Hargis Engineers
- Urban Pesticide Education Strategy Team

OVERVIEW

This document is designed to help school districts plan and implement the requirements in chapter 39.35D Revised Code of Washington (RCW) - High Performance Public Buildings. State-assisted major school construction projects are required to meet a green building standard. Schools can use the Washington Sustainable Schools Protocol (WSSP) or the Leadership in Energy and Environmental Design (LEED) standard.

The "High-Performance Guidelines for School Districts", the "WSSP Scorecard", the "Guide to Annual Reporting", as well as other high performance school resources are available on the OSPI high performance schools website.

The WSSP is based on the Collaborative for High Performance Schools (CHPS) Criteria, but explicitly defines a high-performance school for the state of Washington. No interchangeability between WSSP, CHPS, and LEED is expressed or implied. A school complying with WSSP may contain many of the elements needed for LEED certification, but there is no reciprocity between the two programs. Teams wishing to pursue LEED certification, to be CHPS Verified, or to specify high performance prefabricated classrooms under CHPS PreFAB program, must do so independently.

Protocol Updates

A pilot version of WSSP was produced in 2004 and was used until WSSP 2006 was finalized. It was necessary to undertake an update in 2010 to keep up with changing code requirements and incorporate lessons learned. The basic premises and goals remained the same. Many more points were added in 2010, as well as additional ways to achieve points, making WSSP more adaptable to specific needs and conditions. The 2015 update focused on Washington State energy and building code changes, new technology that is more readily available within budget constraints, and new ways to provide students and staff with healthy environments. WSSP 2015 Second Edition was released in March 2017 to make minor corrections and additional code-compliance changes.

The 2023 update includes significant changes to the Energy portion of the protocol to comply with changes made to Washington State Energy Code and legislation since the time of the last WSSP update. Several credits were also updated to help schools comply with the Clean Buildings Performance Standard.

School Health and Safety Code

The State Board of Health adopted modernized rules governing environmental health and safety for primary and secondary schools in August 2009, and will be promulgated under Washington Administrative Code (WAC) 246-366A. As of this publication, those rules have not been implemented under restrictions imposed by the Legislature. However, existing school health rules continue to apply. It is not known when the Board's modernized rules will replace the existing rules. The existing rule is WAC 246-366.

Credit, Point Requirements and Documentation

The WSSP is useful as a goal setting and planning tool. Districts can use it to clearly communicate their design goals. It allows designers to deliver a Washington Sustainable School while addressing

the regional, district, and site-specific constraints relevant to a particular district. Districts are reminded to work with their local jurisdictions to ensure they are meeting local requirements when implementing innovative strategies. In addition, local jurisdictions may set higher requirements than the state or WSSP, and therefore, may be higher than those expressed in the "Required Credits" of this protocol.

The WSSP Protocol addresses the multiple facets of high-performance schools by providing credits in the categories of energy efficiency, water efficiency, site planning, materials, and indoor environmental quality. It offers a section that emphasizes district and school comprehensive planning, operations, and educational activities that cross the categories. In addition, schools may take innovative actions that go above and beyond what is described in existing credits offered within the main categories.

WSSP 2023 includes 95 optional credits and 28 required (R) credits. The most points a project can earn is 238. School district planners are encouraged to earn as many points as possible and appropriate for a given project above the required threshold. In other words, treat the minimum point thresholds as a target to beat.

Required credits, also referred to as prerequisites, often reflect actions that are required by federal, state, or local laws and codes, although they may exceed, or be slightly different, than those requirements. Required credits are identified on the scorecard with an "R," and do not have point value, unless, for some credits, projects can earn points for designing beyond minimum requirements. A project granted an exemption, variance, or exception to the underlying legal requirements that are the full basis of the credit, may be deemed to be in compliance with the WSSP prerequisite. An "E," for exemption, a "V" for variance, or "EX" for exception should be noted on the project scorecard.

WSSP is a self-certified CHPS-Designed protocol. Schools pass or fail based on meeting the required prerequisite credits and minimum point levels. Third-party CHPS-Verified compliance is not currently available for WSSP projects.

New School (Facility)

A new school must meet all the required credits and must earn the minimum number of points established for each district class. A Class I district with 2,000 full-time equivalent (FTE) pupils or more must earn a minimum of 66 points. Class II districts, with fewer than 2,000 FTE pupils, the minimum is 58 points.

New Building on Existing School (Facility)

A new building on an existing facility may not affect certain attributes or characteristics addressed by a required credit, particularly in the Site and Water categories. A new building on an existing facility must meet all of the applicable required credits based on the scope of the project, per Table 1. These projects must also earn the same minimum number of points established for each district class as a new school (facility).

Modernization

Major modernizations are subject to the high-performance building requirements. The high-performance public building RCW defines a major modernization as greater than 5,000 gross square feet of occupied or conditioned space as defined in the Washington state energy code **and** the cost to modernize is greater than 50% of the assessed value of the existing building. Major modernizations are typically a substantial improvement to an existing school of at least two of the following major components: lighting, HVAC, building envelope, interior surfaces, and site. A modernization may have no work associated with one or more of the WSSP credit categories. Therefore, the scope of the project work dictates the required credits that need to be met, per Table 1. The minimum number of points for compliance has also been reduced given the reduced scope of work and opportunity to earn points. Class I districts must earn a minimum of 49 points and Class II districts must earn a minimum of 43 points in addition to meeting the applicable required credits.

Building additions are considered modernizations when determining minimum point requirements for WSSP compliance. Projects that are a combination of a new building and a modernization may use the modernization rules for credit compliance if the modernization is greater than 50% of the resulting project square feet.

Documentation

Schools are expected to document compliance with WSSP. Compliance documentation may be as simple as a copy of a joint-use agreement. Compliance documentation for a more complicated credit, such as superior energy performance, may be in the form of engineering calculations performed as part of an Energy Life Cycle Cost Analysis (ELCCA). The contractor may be required to provide a cut-sheet (submittal) that substantiates compliance with a material specification included in the bid documents. These documents, as well as all other documents that show compliance with the high-performance requirements, often noted within the credit language itself, should be maintained with the district project records.

OSPI requires certain levels of documentation be provided through the School Construction Assistance Program (SCAP) D-Form Process. Details of the documentation required by OSPI are outlined in the High-Performance Guidelines for School Districts, and in the documentation section of this protocol. Other grant program and direct appropriation projects have documentation requirements outlined within the program.

Table 1: Required Credits for New Building on an Existing Facility and Modernization

Required/Prerequisite Credit	Building System or Attribute	New Building on Existing Facility	Modernization
S1.0 Code Compliance		Always required	Always required
S3.0 Construction Stormwater Pollution Prevention	Site	Required only when site work is being performed (grading, landscaping, parking lots) and local permit is required	Required only when site work is being performed (grading, landscaping, parking lots) and local permit is required
S3.1 On-site Stormwater Management and Flow Control	Site	Always required unless exempt by state or local jurisdiction	Not required unless specifically required by jurisdiction
S3.2 Stormwater Treatment	Site	Always required unless exempt by state or local jurisdiction	Not required unless specifically required by jurisdiction
W1.0 Landscape Water Use Budget	Site	Required only for outdoor water system improvements	Required only for outdoor water system improvements
W1.2 Control Irrigation Water Use	Site	Required only for outdoor water system improvements	Required only for outdoor water system improvements
W1.4 Flow Switches and Irrigation Water Meters	Site	Required only for outdoor water system improvements	Required only for outdoor water system improvements
M1.0 Storage and Collection of Recyclables and Compostables.		Always required	Comply with local codes
E1.0.1 Energy Code Minimum		Always required	See WSEC for requirements and exceptions.
E1.0.2 Energy Star Certified Equipment	Equipment	Always required	Always required for new equipment
E2.0 Audio and Visual Systems Control	Equipment & Building Automation	Always required	Always required for new equipment IF DDC work is included
E2.1 Daylight Responsive Controls	Lighting	Always required	See WSEC for requirements and exceptions.
E4.0 Fundamental Commissioning	HVAC, All Electrical Lighting	Always required	Always required

Required/Prerequisite Credit	Building System or Attribute	New Building on Existing Facility	Modernization
E5.0 Minimum Energy Metering	HVAC	Required only for buildings with GSF conditioned >50,000	See WSEC for existing building requirements
IEQ1.0 Permanent Shading		Required if applicable (WAC 246-366-050(9))	Required if applicable (WAC 246-366-050 (9))
IEQ1.1 Outdoor View Windows		Always required (WAC 246-366-050 (8))	Always required (WAC 246-366-050 (8))
IEQ2.0.1 Electric Lighting Quality		Always required (WAC 246-366-120)	Always required (WAC 246-366-120)
IEQ3.0.1 Permanent Ventilation		Always required	Always required
IEQ4.0 Minimum Acoustic Performance		Always required (WAC 246-366-110)	Always required (WAC 246-366-110)
IEQ5.0 Thermal Code Compliance		Always required	Always required
IEO3.0 Operational Performance Monitoring		Always required	Always required
IEO3.1.1 Post Occupancy Evaluation – Occupant Survey		Always required	Always required
IEO3.2.1 ELCCA/LCCA	All Energy Using	ELCCA required only for buildings =/>25,000 GSF	ELCCA required only for modernizations =/>25,000 GSF, cost >50% of the assessed value and affects energy-using systems
IEO3.4.0 Asset Preservation Program		Always required	Not required
IEO3.4.1 Operations & Maintenance Staff Involvement		Always required	Always required

SITE

Site Selection

Purpose: Choose sites that protect students and staff from outdoor pollution and minimally impact the environment. Channel development to centrally located areas with existing infrastructure to protect greenfields, minimize transportation requirements, and preserve habitat and natural resources.

The site is a crucial element in determining the overall sustainability of the school design. Sites are sometimes purchased years in advance, and some of these credits may be out of the control of the districts and/or designers at the time the school is being built. In addition, some of these credits may be more difficult for rural/suburban areas where distances between home and school can be significant. However, districts considering multiple sites can substantially lower the environmental impact of the school by choosing centrally located sites, sharing parks or facilities with community organizations, preserving open space, and protecting environmentally sensitive areas.

S1.0 Code Compliance

Required: School Facilities Compliance. Comply with all siting and environmental impact study requirements of the most current edition of the School Facilities Manual, issued by OSPI.

S1.1 Sensitive Areas

1 point: Environmentally sensitive or important areas should be avoided. Do not develop buildings or improvements on sites that meet any of the following criteria:

- Washington State Growth Management Act Critical Areas as identified by the city and county, per WAC 365-190.
- Important farmland as defined by the US Department of Agriculture.
- Land whose elevation is lower than five feet above the elevation of the 100-year flood as defined by FEMA.
- Land that provides habitat for any species on the federal or state threatened or endangered list.
- Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233, and Part 22, OR as defined by local or state rule or law–whichever is more stringent.
- Land which prior to acquisition for the project was public parkland, conservation land, or land acquired for water supply protection.
- Previously undeveloped land that is within 50 feet of a water body, defined as seas, lakes, rivers, streams, and tributaries that could support aquatic life, recreation, or industrial use, consistent with the terminology of the Clean Water Act.
- Land located in a tsunami inundation zone as defined by the Washington State Department of Natural Resources tsunami hazard map.

Resources

Important Soils: The Natural Resources Conservation Services (NRCS) division of the United States Department of Agriculture maintains the definitions and soil surveys that designate areas as "important farmland." Lists of Prime and Statewide Important Farmland Soils are maintained for each soil survey area and may be obtained from the Field Office Technical Guide located in each

NRCS field office. County and state offices of the NRCS keep maps showing the status of land within their jurisdiction.

100-Year Flood Plains: Washington is in FEMA's Region X.

Wetlands: The term wetland is defined in Title 40 CFR as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes. bogs, and similar areas." [Source: CFR: Title 40.330.4[1]]

The US Army Corps of Engineers, the Washington State Department of Ecology, Fish and Wildlife, and the Department of Natural Resources, all work in parallel to regulate waterways (which include wetlands) in Washington. Federally, the primary laws are the Clean Water Act and the Coastal Zone Management Act. The main state laws are the State Water Pollution Control Act, the Growth Management Act, and the Shoreline Management Act. (Resource: How Ecology Regulates Wetlands, Washington State Department of Ecology, Publication 97-April 1998.)

Tsunami Inundation Zone: The Washington State Department of Natural Resources maintains inundation models based on the shape of the ocean floor, the topography of the land, and the expected size and shape of tsunami waves. The result of the modeling is a series of maps that show the expected depth of water and the speed of the currents from an earthquake-generated tsunami. The inundation maps can be found on the Washington State Department of Natural Resources Tsunamis webpage.

S1.2 Greenfields

1 point: Do not build on greenfields.

When choosing between multiple sites, use previously developed sites instead of greenfields.

Greenfields are sites that are undeveloped, or graded, that could support open space, habitat, or agriculture, and are being considered as a site for expanding urban development.

An urban redevelopment site reduces environmental impacts by utilizing established infrastructure and preserving undeveloped lands. If the chosen site already contains a building, additional points may be earned with Materials Credit M1.3: Building Reuse.

[1] The Code of Federal Regulations (CFR) is a publication of the United States Federal Government that lists rules authorized by the executive departments and agencies.

S1.3 Central Location

1 point: Locate sites where at least 50% of students live within the following distances from the school:

- Elementary Schools: within one mile
- Middle Schools/Junior High: within two miles
- High Schools: within four miles

School districts and families invest significant time, energy, and money transporting students to and from school. Cars driven by parents, guardians, or the students themselves are the largest resource users and sources of school transportation-related pollution. Centrally located sites allow more students to walk or bike to school as well as reducing the distance cars must travel.

For rural districts, this credit may be difficult to achieve since distances between home and school are much greater.

To earn this point, calculations must be based on the planned number of students indicated on the D5 submittal. Additional transportation-related points are covered in Site Credit 2: Transportation, as well as a transportation options credit (see Integrating, Education, and Operations section).

S1.4 Joint Use On-Site

Shared Use = 1 point

Shared *and* Dedicated Use = 2 points

Make portion(s) of the school building or grounds available for either shared or dedicated use by community and other appropriate organizations. One point if the space is "shared" use.
An additional point (*total of two points*) if the space is dedicated for use by the community and other appropriate organizations.

Across the country, schools are being integrated with a variety of facilities, from Boys and Girls Clubs to police stations and park districts. These credits apply to both existing and newly created spaces. Joint use can have significant benefits, including increased campus security, improved community integration, and reduced site acquisition and construction costs. School districts should have formal agreements for all building users in place before occupancy. Dedicated use does not preclude school use if it is appropriate, but the other organization should be the primary and priority user. A formal written agreement is required to achieve this credit.

Best Practice:

- Install water deduct meters on playfields if irrigation management and costs will be shared amongst property owners/users. The deduct does not have to be utility-owned; it can be for data collection purposes only. See Credit W1.4 for more information.

S1.5 Joint Use Off-Site

1 point: Share Park or recreation space with local park boards or other organizations (off-site).

Using parks or other spaces off-site may help reduce the development footprint of the school project and make better use of existing community assets. The school or district must have a formal written agreement with the off-site facilities management.

S1.6 Protect Open Space

2 points: Design a building footprint that does not exceed 60% of the total building square footage, a Floor Area Ratio (FAR) equal to or greater than 1:4.

Reducing a building footprint will minimize the area of the site permanently disturbed by buildings. Multi-story schools help preserve existing open space. Combined strategies for reducing the building footprint and minimizing parking (S2.3) can minimize the effects on existing ecosystems and maintain open space.

The building footprint is defined as the ground surface occupied by the structure and excludes awnings, overhangs, and projections from the building. Sidewalks are not included in this calculation. Calculate the FAR by taking the total floor area of the building footprint (ft2)/total floor area of the building (ft2).

S1.7 Tree Canopy

1 point: Increase tree canopy by 10% over existing tree cover.

S1.8 School Carbon Sequestration Data

1 point: Use the I-Tree Planting Calculator to assess the amount of CO2 sequestered (in lbs./sq.ft. or kg/sq.m.) by vegetation such as all trees and shrubs on the baseline site compared to the proposed site.

Transportation

Purpose: Reduce dependence on fossil fuels and reduce pollution and land development impacts from automobile use.

S2.1 Public Transportation

1 point: In urban areas, locate the school within ½ mile of a commuter rail or light rail station or within ¼ mile of one or more bus lines. In rural and suburban areas, with limited or non-existent rail/bus service, provide busing to the school.

When available, public transportation can provide significant reductions in energy impacts. Some school districts offer reduced or subsidized fares for students and staff using public transportation. If sufficient capacity exists, schools can use public transportation to replace district-provided bus service.

Notes: Schools near high traffic areas must ensure safe student access. In addition, transportation-related pollution (and the site's air quality – including wood burning) must be considered when investigating the project's potential for natural ventilation.

S2.2 Bike and Walk to School

1 point: Provide bike lanes or sidewalks that extend to the end of the property and provide suitable means for securing bicycles for at least 5% of students above grade 3 and staff (at peak periods) in an elementary or middle school, and 3% of building staff and students (at peak periods) in a high school.

And either

Integrate the Engineering and infrastructure component of the Washington Safe Routes to School in the planning and design process. The education and enforcement components can be implemented for credit under PEO3.3 Transportation Options.

Or

Complete a School Walk Route Map or Plan in accordance with WAC 392-151-025 and/or WAC 392-141-340.

Bicycle racks/storage should be safe, convenient, and at accessible locations, near building entrances, in well-lit locations, and preferably within site-lines of administrative offices.

Walking and biking to school can be healthy alternatives to getting back and forth from school and provides environmental benefits as well. The School Walk and Bike Routes guide, updated in February 2015, produced by Washington State Department of Transportation, Washington Traffic Safety Commission, Washington State Department of Health, and OSPI explains the laws, identifies potential partnerships, suggests processes, and recommends procedures for biking and walking to school programs.

Bicycles are a popular and pollution-free form of transportation. To protect pedestrians and bicyclists, bike lanes and sidewalks must extend to the end of the school property. Work with local planners to develop safe pedestrian and bike connections to likely destinations, such as public transportation and town centers.

Resources
School Walk and Bike Routes: A Guide for Planning and Improving Walk and Bike to School Options for Students, February 2015, (http://guide.saferoutesinfo.org/).

S2.3 Electric Buses or District Vehicles

1 point: Develop and implement a plan for acquiring at least 1 electric bus.

2 points: Develop and implement a plan for 50% of all other (non-bus) vehicles owned or leased to serve the school to be electric vehicles.

Resources
Chargepoint is one example of an EV service provider that is being used by a number of school districts in Washington. Chargepoint has a program to help install, charge, and collect for electric charging stations.

S2.4 Minimize Parking

1 point- Provide preferred parking totaling **10% of staff and student spaces** for carpools or vanpools and alternative fuel vehicles,

And

Size parking capacity not to exceed **2.25 spaces** per classroom plus parking for 20% of students at

High Schools, or three spaces per classroom for Elementary and Junior/Middle Schools.

Or

Provide preferred parking totaling **5% of staff and student spaces** for carpools, vanpools, and alternative fuel vehicles, and size parking capacity not to exceed local codes.

Or

Add no new parking for modernization projects and provide preferred parking totaling **5% of staff and student spaces** for carpools, vanpools, and alternative fuel vehicles.

Excess parking spaces encourage increased automobile use, contribute to urban heat island effects, and can increase pollution from stormwater runoff. To accommodate overflow parking, strategies include dual use of school space (such as playgrounds), using pervious paving (such as grass pavers), and/or developing inter-local agreements with neighboring businesses and institutions.

Design parking so as not to exceed listed amounts and include clearly marked, preferred parking areas for carpools, vanpools, and alternative fuel vehicles. Alternative fuel vehicles get better fuel mileage than conventional gasoline vehicles and reduce the pollution associated with automobile use.

Stormwater Management

Purpose: Manage stormwater during and after construction to control erosion and runoff, reducing the negative impacts on water and air quality.

S3.0 Construction Stormwater Pollution Prevention

Required: Implement a site stormwater pollution prevention plan (SWPPP) that follows the best management practices outlined by the Washington State Department of Ecology's **Stormwater Management Manuals** (for Western Washington: Volume II, Construction Stormwater Pollution Prevention, and for Eastern Washington, Chapter 7: Construction Stormwater Pollution Prevention), and the local ordinance requirements.

Construction site stormwater runoff is regulated at the state and local levels. Check with your local agencies for local permit requirements. Construction sites disturbing **one-acre** or more and discharge to waters of the state will likely need coverage under the *Construction Stormwater General Permit* issued by Department of Ecology. Projects exempted by state or local jurisdictions are exempt from this requirement.

Resources
Washington State Department of Ecology's *Stormwater Management Manual for Eastern Washington,* see Chapter 7: Construction Stormwater Pollution Prevention.

Washington State Department of Ecology's Stormwater Management Manual for Western Washington: Construction Stormwater Pollution Prevention.

S3.1 On-Site Stormwater Management and Flow Control

Required, **1 point**: Meet state and local requirements for on-site management and flow control of stormwater on the developed site. Projects exempted by state or local jurisdictions are exempt from this requirement.

Apply Low Impact Development (LID) performance standards for either Eastern or Western Washington to enhance stormwater management and flow control.

Washington's stormwater management requirements are among the most stringent in the US. Stormwater runoff is water that flows across surfaces, moves laterally through the upper soil horizons, through pipes or other features into a defined surface water body, constructed drainage facility, or natural low area. Stormwater can carry sediment and pollutants from the site into drainage facilities, onto adjacent properties, and/or into local bodies of water.

On-site infiltration reduces the rate and quantity of stormwater runoff that could leave the site. Stormwater treatment reduces the contaminants leaving the site, thus addressing water quality. Reducing the amount of runoff is the most effective way to minimize the negative impacts of runoff.

Resources

Low Impact Development: Technical Guidance Manual for Puget Sound, 2012, published by Puget Sound Partnership and Washington State University.

Department of Ecology: 2012 Stormwater Management Manual for Western Washington and Volume V Runoff Treatment BMPs.

Stormwater Manual for Eastern Washington, Chapter 5, Runoff Treatment, WA department of Ecology Stormwater Manual for Eastern Washington

Eastern Washington LID Guidance Manual.

S3.2 Stormwater Treatment

Required, 1 point: Install treatment systems designed to meet site-specific requirements outlined in Washington State Department of Ecology's **Stormwater Management Manual** for either Western or Eastern Washington and the local jurisdiction requirements. Projects exempted by state or local jurisdictions are exempt from this requirement.

Apply Low Impact Development (LID) performance standards for either Eastern or Western Washington to enhance stormwater treatment.

Treatment best management practices (BMPs) can accomplish significant levels of pollutant load reductions if properly designed, installed, and maintained. Common treatment systems include infiltration basins and trenches, porous pavement, vegetated filter strips, grassy swales, filtration basins, constructed wetlands, rain gardens, and compost amended filter strips.

S3.3 Soil Management

1 point: Implement the Department of Ecology's **BMP T5.13** "*Post-Construction Soil Quality and Depth*" that provides guidelines for amending soils with compost post-construction, or local government guidelines and procedures similar to those recommended in Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13.

Soil quality is directly related to stormwater impacts, and so to, the health of streams and aquatic resources and the sizes of our stormwater facilities. Soil quality also determines landscape success: plant survival, growth, disease resistance, and the reduction of maintenance.

This BMP is required in many jurisdictions in the state.

Proper soil management can:

- Provide high rates of water infiltration and retention.
- Minimize surface water runoff and erosion.
- Trap sediments, heavy metals, and excess nutrients; and biodegrade chemical contaminants.
- Encourage vigorous protective vegetative cover.
- Support beneficial soil life that fights pests and disease and enhances the availability of plant nutrients—reducing need for fertilizers and pesticides.

Resources

Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13 in Ecology's Stormwater Management Manual for Western Washington.

Site Use and Outdoor Surfaces

Purpose: Reduce heat islands to minimize impact on microclimate and human and wildlife habitat while creating outdoor spaces for learning and teaching.

S4.1 Outdoor Learning Spaces

2 points: **Outdoor Learning Spaces**. Provide an outdoor classroom or lab for students to experience their learning beyond the walls of a school building.

Educators all over Washington are expanding their notion of "classroom" beyond the walls of a school building. In many districts, schools are building outdoor classrooms and labs to enhance learning and teaching across the curriculum.

These unique learning spaces expand opportunities for integrated and real-life learning across content areas. Outdoor classrooms provide the opportunity for students to experience their learning situated in place, embedded in their community and the landscape. Furthermore, a novel learning environment can energize learners.

Many schools already have outdoor learning spaces, and others are just getting started in creating them. This document offers some considerations in creating and maintaining outdoor learning spaces. The following list was compiled with input from OSPI's Environmental and Sustainability Education office, OSPI's School Facilities Technical Advisory Committee, the Washington

Department of Health, and others.

To earn this credit, projects must document that the list below has been considered, and that all applicable aspects of the Department of Health's Health & Safety Rule (WAC 246-366) have been and will be followed including site and plan review and ensuring access to toilets and handwashing.

Facility Consideration for an Outdoor Classroom: Adjacencies and proximities
Direct connection between classrooms and the outdoor learning space provides the highest benefit for outdoor learning. Teachers need to feel ownership over the space so that they have the opportunity to conveniently utilize the space outside their door and incorporate the outdoor area into daily lesson plans.

Guidelines
Directly connected outdoor classroom

1. Secure lockable perimeter: teachers must feel comfortable enough to leave classroom materials or project work outside knowing they will not be tampered with. A perimeter fence or closed courtyard are options that can create security and increase usability.
2. Screening from other classrooms. Provide plantings that block views from other classrooms to avoid distractions or locate the outdoor lab so that other classrooms would not be disrupted during activities outside. Balance safe visibility with the need for screening. Refer to CPTED guidelines.
3. Directly connected outdoor classrooms do not need to be large and may not require the entire class to gather outside. Small group learning can be located in outdoor areas when windows provide visual control by the teacher inside the adjacent classroom.
4. Consider standing worktables as seats and benches may be wet.
5. Consider provisions for layout of class materials – surfaces should be wide enough to accommodate papers books and displays or project space.

Separated outdoor classrooms.
Isolated outdoor classrooms require more infrastructure in order for them to be used. Since they are not "owned" by any teacher or curriculum they must satisfy a higher standard and must accommodate a wider range of ages and different curriculum.

- Enough space for an entire classroom to gather to listen to the teacher and include small group learning areas.
- Electrical connections and Wifi connections allow flexibility.
- Water hydrants that can be secured and locked when not in use.
- Storage for several different teachers/subject areas.
- Perimeter control or situated within a campus that has secured perimeter.
- Screened from classrooms, but visible to administration areas and other areas that provide visual access – i.e., police patrols.
- Covered area with seating and worktables enough to accommodate an entire class.

Resources
Environmental Education Alliance of Georgia website provides an Outdoor Learning Guide full of resources and information about outdoor learnings areas.

Planning First to Make Your Outdoor Classroom Last is a best management practices guide to creating and sustaining outdoor classrooms (in Georgia).

Children and Nature Network Research Library is a curated research library of scientific literature on evidence-based studies of children and nature.

The Boston Schoolyard Initiative has a comprehensive guide for their urban outdoor classrooms.

The University of Tennessee Extension has developed a guide titled Developing an Outdoor Classroom to Provide Education Naturally.

S4.2 School Gardens

1 point: Provide dedicated space and infrastructure for a future school garden.

2 points: Provide a complete installation of a school garden.

School gardens promote learning about the environmental systems that connect land and human health. School Gardens can provide a diverse learning environment as well as a beautiful respite. They provide a hands-on learning environment to apply science and math concepts as well as team building, leadership, and other valuable social skills. Students who are not engaged by traditional learning methods often find the experience and learning in the garden a welcome path to understanding.

A variety of garden spaces may be developed including pollinator gardens, butterfly gardens, a garden for animal husbandry such as raising turtles, rabbits, or fish, an edible garden of flowers or vegetables, a rain garden, a rock garden. Roof gardens will also qualify.

Gardens can be integrated into curriculum. They should promote ecologically sustainable practices such as building soil health, alternatives to the use of chemical fertilizers, soil amendments, pesticides & herbicides. School gardens may be the site of school-wide food waste and organic materials composting.

For 1 point provide a dedicated space and infrastructure for a future school garden that meets the requirements listed below.

For 2 points provide a complete school garden installation that meets the requirements listed below as part of, or concurrent with, the major project.

Garden size = 200 square feet minimum for schools with 499 and less FTE students, 500 square feet minimum for schools with more than 500 FTE students. Square feet minimum includes planting area only. The garden may be in a single area or in multiple areas or planters.

The garden must have a permanent source of water for irrigation. The source may be access to a tap and hose, an installed irrigation system, or access to a rain barrel or other storage collection system.

Signage must be provided to designate the area as a school garden and to differentiate it from the surrounding grounds.

Provide dedicated storage space for garden maintenance supplies and tools.
A long-term ecologically sustainable maintenance plan must be developed by the school administration to ensure the garden is implemented and continues to thrive.

Resources
School Gardens Integrated Pest Management, Washington State University.

S4.3 Reduce heat Islands-Site

1 point: Provide shade (at plant maturity) on at least **30%** of non-roof, impervious surfaces on the site, including parking lots, walkways, plazas, etc.

Or

Use light-colored materials with a solar reflectance of at least 0.30 for **50%** of the site's non-roof, impervious surfaces.

Or

Use an open-grid pavement system (net impervious area of less than 50%) for a minimum of **30%** of the parking lot area.

A combination of shading and high solar reflectance may be used to meet the credit.

2 points: Use an open-grid pavement system (net impervious area of less than 50%) for a minimum of 50% of the parking lot area.

Employ design strategies, materials, and landscaping designs that reduce heat absorption. Note albedo/reflectance requirements in the drawings and specifications. Provide shade using native or climate-tolerant trees and large shrubs, vegetated trellises, or other exterior structures supporting vegetation. Substitute vegetated surfaces for hard surfaces. Use concrete or explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light colored surfaces. Use pervious pavers or pervious concrete. Optimize interior landscape island spacing to maximize the shaded area in the parking lot.

S4.4 Reduce Heat Islands-Roof Design

1 point: Install an ENERGY STAR® labeled Cool Roof for a minimum of 75% of the roof surface, with a minimum initial solar reflectance of 0.65, and after 3 years 0.50 on low-sloped roofs 2:12 or lower and an initial 0.25, and >= 0.15 after 3 years, on steep-sloped roof > 2:12.

Or

Install a "green" (vegetated) roof for at least 50% of the roof area.

Or

Install high-albedo (reflectivity) and vegetated roof surface that, in combination, meet the following criteria:

- Area Roof Meeting Minimum SRI **+ Area** of Vegetated Roof **≥** Total Roof Area

There is more than one definition of a "cool roof." The California Energy Commission's Title 24 requires new building roof products to be Cool Roof Rating Council (CRRC). The USGBC's LEED uses an initial SRI of 82 for low-sloped and 39 for steep sloped. Energy Star minimums, listed above in the credit language, do not consider thermal emittance.

Cool roofs can significantly reduce school cooling loads and urban heat island effects by reflecting the sun's energy, instead of absorbing, retaining, and radiating it into the occupied spaces below. With cool roofs, both the reflectivity and emissivity are important. Solar reflectance is the ratio of the electromagnetic energy reflected by a surface to the total amount incident upon it. A solar reflectance of 0.0 means all the solar energy hitting the surface is absorbed and none is reflected. Emissivity is the ability of a material to shed infrared radiation. In other words, surfaces with high emissivity lower their surface temperatures by shedding infrared radiation. Bare metals, for example, have low emissivity and stay hotter for longer periods than materials with high emissivity. The EPA's ENERGY STAR® program includes a database of high-reflectance roofing materials. To ensure high emissivity, do not use bare metal roofing products.

Climate has the biggest impact on energy savings from cool roofs. Cool roofs achieve the greatest cooling savings in hot climate zones one through three but can increase energy costs in colder climates due to reduced beneficial wintertime heat gains. Washington State is in climate zones four, five, and six. Use a cool roof calculator to determine the life-cycle cost. EPA ENERGY STAR rating defines ENERGY STAR labeled products as "roof products [that] save money and energy by reducing the amount of air conditioning needed to keep a building comfortable."

The calculator for ENERGY STAR labeled roof products states: "No savings are available for a building that is not air conditioned . . ." Cool roofs can also increase heat loss during heating months. This needs to be evaluated against the cost savings anticipated during the cooling months.

Green roofs can reduce heat gain/loss and cooling needs. Green roofs can also act as sound insulation. Other potential benefits are reduction in the size of HVAC equipment, insulation, and roof drains. Green roofs can potentially incorporate cooling and/or water treatment functions and stormwater management requirements, depending on the local jurisdiction.

Resources

Energy Star Table 1 for low-sloped roofs.

Solar Reflectance Calculator.

Lawrence Berkeley Labs Heat Island Group.

Green Roofs for Healthy Cities.

Cool Roofs Rating Council.

ENERGY STAR Products and Program Requirements for Roof Products

Outdoor Lighting

Purpose: Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

S5.1 Light Pollution Reduction

1 point: Do not exceed **Illuminating Engineering Society of North America** (IESNA) foot-candle level requirements as stated in the **IESNA RP-33** *Recommended Practice for Exterior Environmental Lighting* or applicable sections of the IESNA Lighting Handbook, Current Edition:

And

Design interior and exterior lighting (*excluding sports fields*) such that zero direct-beam illumination leaves the building site.

Consult IESNA *Recommended Practice Manual: Lighting for Exterior Environments for Commission International de l'Eclairage* (CIE) zone and pre- and post-curfew hour descriptions and associated ambient lighting level requirements. Ambient lighting for pre-curfew hours for CIE zones range between 0.01 foot-candles for areas with dark landscapes such as parks, rural, and residential areas, and 1.5 foot-candles for areas with high ambient brightness such as urban areas with high levels of nighttime activity.

Design site lighting and select lighting styles and technologies to have minimal impact off-site and minimal contribution to sky glow. Minimize lighting of architectural and landscape features. There are fixtures that are certified dark sky compliant listed at the **International Dark Sky Association** web site (below). Lighter colored surfaces used to achieve credit S4.1 may also help reduce lighting requirements.

Although sports fields are excluded from this point, sports fields have a significant impact on the environment. It is recommended that steps be taken to reduce the impact of sports field lighting through field placement, beam shielding, and timing controls consistent with current technology.

Resources
The Illuminating Engineering Society of North America.

The International Dark Sky Association.

WATER

Outdoor Systems

Purpose: Reduce water use for landscaping and ornamentation.

W1.0 Landscape Water Use Budget

Required: Develop a landscape water budget that conforms to the requirements set forth in the Irrigation Association Best Management Practices, Appendix B. Develop a landscape plan and Estimated Water Use for the site-specific landscaping.

The following are exempt:

- Those portions of a site irrigated with water that is not supplied by the utility.
- Turf portions of school-owned sports and athletic fields.

For each proposed landscape design not exempted, a state-registered landscape architect, Washington-certified nurseryman (WCN), or Washington-certified landscaper (WCL) will certify that the estimated annual water use will not exceed the irrigation water budget, as calculated pursuant to the methodology contained in the engineering standards. Copies of supporting calculations will be submitted to the utility.

To comply with this credit, calculate the estimated water use (EWU) landscape and the Maximum Applied Water Allowance (MAWA) for the landscape. The EWU must not exceed the MAWA. Once a water budget is established, design the landscape to meet established budget baselines.

MAWA is the most irrigation water allowed for the landscape on an annual basis. It takes into account local conditions and the size of the landscape area and is calculated as follows:

MAWA = (ET) (LA) (0.8) (0.62)
Where:
MAWA = Maximum Applied Water Allowance (gallons per year).
ET = Evapotranspiration Rate for the site (inches per year): The amount of water that transpires from plants and evaporates from adjacent soil surfaces. ET takes into account local soil conditions and the local, average annual net rainfall (total rainfall minus runoff).
LA = Landscaped Area (sf).
0.8 = ET Adjustment Factor. This factor adjusts for plant factors and irrigation efficiency.
0.62 = Conversion Factor. This converts the maximum applied water allowance to units of gallons per year.
1 gal = 0.001337 CCF.

To estimate total annual irrigation water use, calculate the EWU for each plant zone according to the equation below, then sum up the EWUs for all zones in the landscaped area:

EWU = (ET) (PF) (LA) (0.62) / IE
Where:
EWU = Estimated Water Use (gallons per year).
ET = Evapotranspiration Rate for the site (inches per year).
PF = Plant Factor for the zone (For low water use plants PF = 0 to 0.3, medium water use

plants, PF = 0.4 to 0.6, high water use plants, PF = 0.7 to 1; all irrigated turf grass, PF = 0.8 to 1).
LA = Landscape Area (sf) for the zone.
0.62 = Conversion Factor (to gallons per sf). This converts EWU to units of gallons per year.
IE = Irrigation Efficiency (0.625 for conventional overhead spray systems, 0.925 for low volume or drip irrigation systems).

Sports or activity fields are considered recreational areas and may require water in addition to the MAWA. A statement should be included with the landscape design plan, designating recreational areas to be used for such purposes and specifying any needed amount of additional water above the MAWA.

Example: What is the annual water use budget for a 50,000-sf landscaped area in Bellevue?
The ET for Bellevue is 14.5," so the MAWA is about 0.36 million gallons/year.

MAWA = (ET) (LA) (0.8) (0.62)
MAWA = 14.5" (50,000) (0.8) (0.62) = 359,600 gallons/year
359,600 gallons/year x 0.001337 CCF/gal = 479.7 CCF/year

Resources
Irrigation Association, Landscape Irrigation Best Management Practices.

Irrigation Water Management Society. The daily irrigation index and weekly watering forecast for the Seattle region.

Good sources for site-specific data to calculate the net evapotranspiration: golf course weather stations; local weather stations; parks departments; USDA Natural Resources Conservation Service; and the Washington State University, Agricultural Extension Office.

W1.1 Irrigation Water Reduction

50% reduction = 1 point: Reduce water consumption of water supplied for irrigation by a water district or utility, after plant establishment period, by 50% of Maximum Applied Water Allowance as determined in credit W1.0.

100% reduction = 2 points: For an additional point, eliminate water consumption for irrigation use of water supplied by water district or utility, after plant establishment period.

A water district is a local government institution that supplies water to farms, homes, and businesses in a rural area. For the purposes of this credit, plant establishment is defined as two years from building occupancy. The irrigation water use during this period of time is exempt from this credit for the purposes of adequately establishing plants. Plant establishment is critical for the long-term health and performance of plantings.

Once the Maximum Applied Water Allowance has been determined for the site, develop a landscape plan that will allow for a 50% reduction of water use by using native, drought tolerant plantings in place of ornamental plants and turf.

Achieve 100% reduction consumption of water supplied by water district by installing a greywater or non-potable irrigation system or turning off the permanent irrigation system after two years. Water resources are a growing concern in Washington, even in the rain-drenched west, as expanding populations and multiple uses increase the demand for limited supplies. Precipitation patterns in much of Washington make it difficult to store enough rainwater for irrigation through the dry summers, though school grounds may not require irrigation during summer months. High efficiency irrigation technologies such as micro irrigation, moisture sensors, and weather-data based controllers save water by reducing evaporation losses or operating only when needed. However, these systems require careful design, as well as additional operations and maintenance requirements. For example, some drip irrigation systems may be more vulnerable to vandalism; moisture sensors must be carefully placed to represent the soil type and exposure of individual irrigation zones accurately; and timers and controls, if not weather-data based, need to be adjusted seasonally.

EPA has released a final specification for WaterSense labeled spray sprinkler bodies. The efficiency and criteria established for WaterSense certified has been met by many spray sprinkler body manufacturers.

Resources
Irrigation Association, *Turf and Landscape Best Management Practices,* (http://www.irrigation.org)

EPA Water Sense, Landscape Irrigation Services, EPA's website for the WaterSense program

Local water utility staff, water efficient landscape consultants, certified irrigation designers www.irrigation.org and master gardeners would also be good resources for helping achieve this credit.

Washington Native Plant Society,www.wnps.org

Using rainwater and gray water, American Rainwater Catchment Systems Association, www.arcsa.org/default.aspx.

W1.2 Control Irrigation Water Use

Required: Develop an irrigation schedule, by zone, based on historic rates of evapotranspiration, plant water requirements, soil type, and system efficiency.

And input into controller after plant establishment.

Or

Any irrigation systems used for playfields must have weather-based irrigation controllers (WBIC) that meet or exceed Smart Water Application Technology (SWAT) protocols to manage operation of irrigation systems when there is adequate ambient moisture.

1 point: Irrigation systems used for campus landscape, gardens, and recreational areas must have weather-based irrigation controllers (WBIC) that meet or exceed SWAT protocols.

Irrigation scheduling takes into account the following: DU (distribution uniformity of system or efficiency); soil type and depth (intake rate and water holding capacity); and precipitation rate of each zone based on head type and area and plant water requirements.

Using the formulas provided by the Irrigation Association, calculate the yearly schedule for the system. Establish the date the irrigation system is turned on and off and determine the appropriate schedule for the system based on ET for the established water window. Use the seasonal adjust setting on the controller and set based on the time of year and required water.

Even with a climate-based or soil-based control system, knowledge of the irrigation system and site conditions (and potentially a full schedule) is still necessary to set-up the controller to properly manage irrigation water use.

See the Irrigation Association Landscape Irrigation Best Management Practices, Appendix C for a discussion of different ways to manage the irrigation; dependent on the type of controller installed on the project.

Irrigation design takes the following into consideration: DU - Distribution uniformity; root zone depth of plants; intake rate and water holding capacity of soils; precipitation rates of emitters, sprays or rotors; efficiency of irrigation system; soil characteristics, including the percentages of sand, loam, and clay - and depth of soil, combined with the percentage of volume of organics and the hydraulic conductivity of the soil; plant types (lawn vs. ornamental); slopes of planting beds or lawn areas; rainfall patterns; climate factors; and evapotranspiration.

To properly manage water usage, a seasonally dependent time factor also needs to be managed - namely when the system is on or off, and how much, how often, and when irrigation water needs to be delivered during different periods of the year. The management of this time sequence is done by setting the irrigation controller's schedule for the months of operation relative to the factors listed above. Commonly, the establishment and implementation of such a schedule for each site can realize upwards of 40% savings. All automatic irrigation systems have an irrigation controller. This credit requires that detailed calculations are made and input into the controller.

Using the formulas as provided by the **Irrigation Association**, or others, calculate the yearly schedule for the irrigation controller. Establish the date the irrigation system is turned on and turned off and determine the appropriate schedule for irrigation during the watering system for a minimum of four different watering programs.

Controllers should provide at least four separate programs in order to establish a minimum of four separate periods during the watering season. For example, in Puget Sound Lowlands, calculate the appropriate schedule for a monthly grouping of April, May, and June as one period, July and August as a second, September and October as a third, and the period that the system is off as a fourth. Input the soil, plant, and climate characteristics, especially the evapotranspiration rates for each of the program periods, as outlined in the Irrigation Association's Landscape Irrigation Scheduling and Water Management, March 2005.

Resources
Irrigation Association: *Landscape Irrigation Scheduling and Water Management*, www.irrigation.org

Washington Native Plant Society, www.wnps.org

Smart Water Application Technologies, www.irrigation.org

W1.3 Irrigation Systems Testing and Training

1 point: Create an irrigation commissioning plan to verify the irrigation system and controls are operating as intended and that effective training for system upkeep and maintenance has been provided.

1 point: The Landscape Architect will provide a baseline irrigation run time schedule for post establishment irrigation for all zones, including sports fields, which shall be input by the contractor into the irrigation controller prior to final hand-off of the irrigation system to the owner. The irrigation audit shall include coverage test and confirmation that the entire system has been installed per design.

Irrigation Commissioning is the process of verifying all the components, and the system as a whole, achieve the project requirements as designed by the landscape architect.

Commissioning of the irrigation system includes testing and monitoring of the system during construction, training of the maintenance staff, and post installation audit. Follow the recommendations of the Irrigation Association, Landscape Irrigation Best Management Practices, Appendix A.

An audit should be performed on the irrigation system after installation to ensure proper head spacing was achieved during construction. Audit to be performed based on the Irrigation Association Irrigation Audit Guidelines.

Required Low Quarter Distribution Uniformities as follows: (verify compliance with local ordinances).

- Sprays: 55%
- Rotors: 70%
- Drip: 80% Emission Uniformity
-

Irrigation Commissioning must be included in the design contract and the construction specifications.

W1.4 Flow Switches and Irrigation Water Meters

Required: Install a flow switch or flow sensor to monitor the flow rate and pressure of water.

1 point: Install an irrigation water meter, deduct meter, or submeter for measuring irrigation used in outdoor activities. District-owned meters must be connected to the building automation system.

A water flow meter is a type of measurement instrument fitted onto a pipe through which the

water flows. The meter continuously monitors the water flowing through the pipe to calculate the volume of water flow.

Water flow meters help with effective management of water consumption in the following ways:

- Installing and collecting information from meters lets users determine the existence of a leak.
- Users can distinguish water usage among different groups using a school facility.
- Water use can be separated by water used inside buildings from water used for landscaping.
- Water use can be managed more efficiently contributing toward resource conservation.

Resources
Water Service Meter Requirement, *Washington State Department of Health,* (doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-595.pdf)

Indoor Systems

Purpose: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

W2.0 Lead-Free Potable Water System

Required: All products that are part of the potable water system (pipes, pipe fittings, plumbing fittings, and plumbing fixtures) are **certified** as meeting the lead fee requirement of the 2014 Safe Drinking Water Act (SDWA).

The reduction of Lead in Drinking Water Act went into effect on January 4, 2014. The Act has reduced the lead content allowed in water system and plumbing products by changing the definition of lead free in Section 1417 of the SDWA from not more than 8% lead content to not more than a weighted average of 0.25% lead with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and plumbing fixtures.

The SDWA prohibits the use of pipes, pipe fittings, plumbing fittings, and plumbing fixtures in the installation or repair of any public water system or facility providing water for human consumption if they do not meet the lead-free requirement. However, there is no mandatory federal requirement for lead-free product testing or third-party certification under the SDWA. If a product has not been certified, it may still meet the lead-free requirement, and contacting the manufacturer may be the only way to confirm the lead content.

In the United States, the following eight American National Standards Institute (ANSI) accredited third-party certification bodies provide product certification to the SDWA lead-free requirements of potable water system and plumbing projects:

Table 2: ANSI Accredited Third-Party Certification Bodies

Name and Webpage	Name and Webpage
CSA Group	NSF International
IAPMO R & T, Inc.	Truesdail
ICC - ES	UL
Intertek	WQA

Resources

EPA brochure explaining how to identify lead free certification marks for drinking water systems and plumbing products.

EPA website that includes the current Federal Law Section 1417 of the Safe Drinking Water Act: 432 U.S.C. Section 300g-6

EPA's summary of the Reduction of Lead in Drinking Water Act and Frequently Asked Questions

MATERIALS AND WASTE

Efficient Material Use and Waste Management

Purpose: Promote the efficient use of materials to reduce the amount of construction and occupant waste.

MW1.0 Storage and Collection of Recyclables and Compostables

Required: Space shall be provided for the storage of recycled materials, compost, and solid waste for all new buildings.

And

Provide dedicated, easily accessible areas, within the building/facility, for the separation, collection, and storage of materials for recycling and composting. Also provide at least one centralized collection point for all materials to be staged for removal from the site (e.g., loading dock), or for transport to composting location. The staging area shall be designed to meet the needs of the occupancy, efficiency for pickup, and shall be available to haulers.

And

Regularly inform all building occupants about what materials can and cannot be recycled and composted and educate building occupants about the environmental and economic benefits.

And

Provide means for recycling in each teaching and learning space. Administration areas must have one central recycling station set up per 20 employees, if not one at each desk.

And

When local waste service providers have ability to divert food waste, provide means for collection of organic waste in food preparation and dining areas.

1 point: Provide means for recycling and composting at sports fields.

1 point: Provide means for collection of compostable paper products in dining areas and restrooms.

In Washington, all jurisdictions shall require that space be provided in new buildings for the storage of recycled materials, compost and solid waste. Modernizations must follow local ordinances for existing building renovations and alterations. Schools may refer to the EarthGen for resources, tools, and tips on writing and implementing a recycling or composting program.

Reserve space for recycling and composting functions during the space programming process and show areas dedicated to the collection of recycled materials on space utilization plans.

Plan for and provide adequate and accessible space indoors for building occupants to deposit garbage and recyclable materials. In appropriate areas, provide space for compostable materials. Each recycling or compost collection bin should be placed next to a garbage bin, should be labeled with the materials that can be recycled or composted in that bin, should accommodate a **75% diversion rate**, and should be easily accessible to students, teachers, staff, compost, and recycling collection workers. Consider bin designs that allow for easy cleaning to avoid health concerns. Color-coding bins works well. Ensure the spaces are compatible with the policies of local waste handling companies. Control odors by separately venting these areas. Solid waste, compost and recycling materials should not be located near the ventilation air intake. Understand compost and how to manage this waste. Organic materials typically account for 30% of the overall waste stream.

Innovation: Schools are encouraged to go beyond the minimum requirements. If an innovative system is developed consider applying for an innovation or operational credit in the Integration, Education, and Operations category.

Resources
Washington Department of Ecology Waste 2 Resources, Washington State Department of Ecology Waste reduction website

Seattle Public Utilities Reduce Waste, (http://www.seattle.gov/util/ForBusinesses/GreenYourBusiness/ReduceWaste/index.htm)
Environmental protection Agency website on recycling and composting

MW1.1 Construction Site Waste Management

Required: Develop and implement a construction site waste management plan and provide documentation of waste disposal at the conclusion of the project.

>50% = 1 point
>/=75% = 2 points
>/=90% = 3 points

Document the percent (by weight) of construction and demolition waste diverted from the landfill, excluding hazardous or dangerous materials and land clearing debris.

Include construction site waste management in the construction bid documents. Prior to construction commencing on site, the general contractor, or his designee, will develop and have reviewed and approved a construction site waste management plan. The plan will cover all contractor work on site. The plan will identify licensed haulers and processors of recyclables; identify markets for salvaged materials; identify deconstruction, salvage, and recycling strategies and processes; include waste auditing; and document the cost for recycling, salvaging, and reusing materials. Source reduction on the job site should be an integral part of the plan. Include a section in the project specifications that outlines the contractor's requirements during demolition and construction.

The plan should address recycling of corrugated cardboard, metals, concrete, brick, asphalt, beverage containers, clean dimensional wood, plastic, glass, gypsum board, and carpet. It should also evaluate the availability and cost-effectiveness of recycling rigid insulation, engineered wood products, and other materials.

Compliance calculations for this credit must be **based on weight**. Many recycling and landfill facilities weigh incoming materials. Shipments that cannot be weighed can be estimated based on their volume and density. Land-clearing debris (soils and vegetation) should not be included in the calculation; however, land clearing debris may often be reused on another site or chipped for reuse to avoid taking it to the landfill. Burning is not allowed. Hazardous and dangerous waste should not be included.

To calculate the diversion rate, divide the total amount of diverted material (by weight) by the total diverted material plus the total landfill garbage (by weight) then multiply by 100.

Resources
King County *Green Tools Program* Construction Recycling web page, (http://your.kingcounty.gov/solidwaste/greenbuilding/index.asp)

Seattle Public Utilities Reduce Waste, (http://www.seattle.gov/util/ForBusinesses/GreenYourBusiness/ReduceWaste/index.htm)

Washington Department of Ecology Managing Construction and Demolition Waste, Washington Department of Ecology website on dangerous waste

MW1.2 Building Reuse - Structure and Shell

50% = 1 point
75% = 2 points
95% = 3 points

Maintain a minimum of 50%, (or 75% or 95%) of existing building structure and shell *(exterior skin and framing, excluding window assemblies)*.

Hazardous and unsound materials or systems that are remediated as part of the project scope are to be excluded from the calculation of the percent maintained (ex. asbestos removal).

Reusing parts of the building can save significant money and resources while greatly reducing the amount of construction waste. When materials are reused, the environmental benefits start with resource savings and extend down through the entire lifecycle of the material. One of the benefits is reduced energy spent extracting, processing, and shipping the materials to the site. Depending on the amount of building reused, school districts can significantly reduce their construction and material costs. However, the building envelope will significantly affect many important high-performance areas, such as space programming, energy performance, opportunities for daylighting, and other indoor environmental qualities. In addition, care must be taken to ensure that any environmental hazards such as toxins, lead, asbestos, and PCB's have been identified and

addressed. Develop a list of benefits and tradeoffs, and make the decision based upon the overall integrated design tradeoffs.

Calculating the percent of building reused is a three-step process:

Step 1. Approximate total structural materials and reused structural materials (foundation, slab on grade, beams, floor, and roof decks, etc.) in terms of cubic feet. Divide the reused structural materials (cf), by the total structural materials (cf), to get the percent of structural materials that are reused.

- Divide the reused structural material (in cubic feet) by the total structural materials (cf) to find the structural material reuse percentage.

Step 2. Approximate total shell materials and reused shell materials (roof and exterior walls) in terms of square feet. Divide the reused shell materials (sf), by the total shell materials (sf), to get the percent of shell materials that are reused.

- Divide the reused shell materials (in square foot) by the total shell materials (sq.ft.) to find the shell materials reuse percentage.

Step 3. Calculate the approximate building reuse percentage by adding together the structural and shell reuse percentages from Step 1 and Step 2 and dividing the sum by two.

- Divide the structural materials reuse percentage + Materials reuse percentage by two to find the building reuse percentage.

Resources

US EPA Lifecycle Building Challenge, (http://www.lifecyclebuilding.org/index.php)

National Trust for Historic Preservation: The Environmental Value of Building Reuse, (http://www.preservationnation.org/information-center/sustainable-communities/green-lab/valuing-building-reuse.html)

MW1.3 Building Reuse - Interior Non-Structural Elements

1 point: Maintain and reuse at least 50% of interior non-structural (walls, interior partitions, doors, relites, floor coverings, and ceiling systems) materials.

Percentage of maintained and reused non-structural building portions will be calculated as the total area (sf) of reused non-structural materials divided by the total area (sf) of the non-structural elements.

To calculate the interior non-structural building reuse percentage, divide the reused interior non-structural components (in square foot) by the total interior non-structural components.

This credit does not include the use of salvaged materials installed from offsite.

All building elements for reuse should be free of hazardous and dangerous components and be free of mold and mildew. Do not reuse materials such as lamps, ballasts, flooring, ceiling tile and insulation that may contain PCB's and asbestos. Do not reuse walls and other pervious building surfaces and materials that may have been exposed to high moisture levels.

Keep demolition plans and calculations that were used in the determination.

Resources
Washington State Department of Ecology on PCB's in construction materials, Department of Ecology WA State on PCBs

MW1.4 Materials Reuse

1 point, **5% Performance:** Install salvaged or refurbished materials using either a percentage approach or prescriptive approach for one or two points. Calculate using material costs.

Performance Approach #1: Install salvaged or refurbished materials for 5%, based on cost, of the total value of building materials.

Or

Prescriptive Approach #1: Specify salvaged or refurbished materials for 25% of one of the following major interior finish materials:

- Flooring (sf)
- Casework (sf)
- Acoustical ceiling tile (sf)
- Wall coverings (sf)
- Tile (sf)

2 points, **10% Performance:**
Performance Approach #2: Install salvaged or refurbished materials for 10% of building materials.

Or

Prescriptive approach #2: Specify salvaged or refurbished materials for 50% of one (or 25% of two) of the following major interior finish materials:

- Flooring (sf)
- Casework (sf)
- Acoustical ceiling tile (sf)
- Wall coverings (sf)
- Tile (sf)

This credit applies to materials that are salvaged and refurbished from off the project site and salvaged materials from the same building site used for a different purpose. For example, doors, cabinets, and wood flooring from an old office building in the downtown area are used for the same purpose in the new school building. Those items may be counted as material reuse. The same school project uses crushed concrete for backfill. The crushed concrete is from the old public tennis court that existed on the site where this new school is being built. That concrete also counts towards earning this credit.

For materials salvaged within the construction site, and used for the same purpose, refer to credit M1.3 Building Reuse – Interior Non-Structural.

Calculate percentages for this credit using total and refurbished/salvaged materials costs. Exclude

all construction labor costs, all contractor mechanical and electrical material costs, and contractor fees (overhead, profit, insurance, and bond). If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value; otherwise, use actual cost to the project. A default value of 35% of the Total Construction Cost can be used for the Total Project Material Cost.

Salvaged materials or products are re-used for a similar purpose or application rather than processed or remanufactured for a different use (beams and post, brick, doors). Commonly refurbished building materials include wood flooring/paneling/cabinets, doors and frames, mantels, ironwork, and decorative lighting fixtures. Ensure the materials, especially structural elements, comply with all applicable codes and all reused materials are free of hazardous or dangerous elements. Research the existing materials before choosing to reuse them.

To calculate performance approach percentages using materials costs divide the salvaged plus the refurbished material cost by the total material cost then multiply by 100.

Resources
Building Materials Reuse Association, (http://bmra.org/)

MW1.5 PCB/T12 Lighting Removal

Required: Remove and replace all T-12 lighting fixtures and ballasts manufactured in or before 1979.

1 point: Replace removed fixtures with Energy Star certified LED lighting.

Schools built or renovated before 1980 that have not had a complete lighting upgrade since that time likely have PCB-containing lights. The use of older magnetic ballasts or T12 lamps increases this possibility. Polychlorinated biphenyls, or PCBs, are a group of human-made compounds found in air, water, land, and sediments. PCBs have toxic effects to the immune, reproductive, nervous, and endocrine systems in people and other organisms. While the manufacture of PCBs in the U.S. was banned in 1979, they remain in buildings built or renovated before or around that time. PCB-containing light ballasts still in use are long past their intended lifespan and can leak, smoke, or burn when the ballast fails. This causes a safety and exposure hazard for students and staff in schools. Proactive replacement of old PCB-containing lights helps schools avoid these hazards and costly cleanups.

Resources
PCB Light replacement in Schools, Washington State Department of Ecology
Polychlorinated Biphenyl (PCB)-Containing Fluorescent Light Ballasts in School Buildings, Environmental Protection Agency

Materials Procurement

Purpose: Create healthy indoor learning environments and increase demand for environmentally preferable building products by specifying products with recycled content, rapidly renewable raw materials, wood, and wood-based products from sustainably managed forests and local or Washington manufactured products. Consider the use of materials that minimize or eliminate the

need for secondary finishes such as concrete and masonry. Understand the content of building materials by choosing those that provide transparent reporting of multiple environmental attributes including the effects on human health, the effects on the environment and social sustainability.

Credits that rely on the total cost of materials may be calculated using the actual total materials cost or a 35% factor may be applied to the total construction costs to establish a default total materials cost for the project. The approach selected (actual or 35% default) must be used consistently across all credits based on total materials cost.

MW2.1 Recycled Content

10% = 1 point, 20% = 2 points, Performance Approach: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer recycled content constitutes at least 10% (or 20%) of the total cost of the materials in the project.

Or

4 materials = 1 point, 8 materials = 2 points, Prescriptive Approach: Install at least four (or eight) building products or materials from the **Construction Products category** of the *EPA Comprehensive Procurement Guidelines*. The products or materials MUST meet or beat the recycled-content recommendations included in the EPA guideline.

To calculate the cost of materials: exclude all labor costs, all mechanical and electrical material costs, and all contractor fees (overhead, profit, insurance, and bond).
The number and variety of products using recycled content materials expands every year. Using these materials closes the recycling loop by creating markets for materials collected through recycling programs across the country. It also reduces the use of virgin materials and landfill waste. Recycled-content alternatives exist for all major building materials and surfaces.

Recycled content is classified as either post-consumer (collected from end users) or pre-consumer. Pre-consumer (formerly known as post-industrial) is collected from manufacturers and industry. The objective is to maximize post-consumer recycled content.

Fly ash generated from municipal solid waste incinerator or as a coal-combustion by-product from hazardous or medical waste or tire-derived fuel is not acceptable.

Recycled content claims must be in accordance with the International Organization of Standards (ISO) document ISO 14021-1999 – Environmental labels and declarations.

The US EPA's Comprehensive Procurement Guidelines program provides fact sheets for various product categories, as well as a list of materials with recommended recycled content levels.

A default value of 35% of the Total Construction Cost can be used for the Total Project Material Cost.

Performance Approach

The total recycled content value is calculated in five steps. Exclude all labor costs, mechanical and electrical material costs, and all contractor fees (overhead, profit, insurance, and bond) in these calculations.

Step 1. For each material, identify the percentage of post-consumer recycled content (by weight), the percentage of pre-consumer recycled content (by weight), and the material cost.

Step 2. For each material, use info from Step 1 to calculate the post-consumer Recycled Content Value, as shown below:

Post-Consumer Recycled Content Value [$] = Material Cost [$] x Post-Consumer Recycled Content [%]

Step 3. For each material, use info from Step 1 to calculate the pre-consumer Recycled Content Value, as shown below:

Pre-Consumer Recycled Content Value [$] = Material Cost [$] x Pre-Consumer Recycled Content [%]

Step 4. Sum the total value of all materials.

Step 5. Calculate Recycled Content Percentage for this Credit by combining the value of post-consumer recycled content (from Step 2) plus one-half of pre-consumer recycled content (from Step 3) as a percentage of total value of all materials, as shown below.

To calculate the recycled content percentages, add together the post-consumer value and ½ of the pre-consumer value of materials used on the project, divide that by the total project material cost, then multiply by 100.

Prescriptive Approach

Install at least four materials designated in the Construction Products category of the *EPA Comprehensive Procurement Guidelines for Construction Products*. The project-specified products must meet the recycled-content recommendations in the EPA guideline. For the purposes of these prescriptive points, nylon carpeting with at least 50% recycled-content materials can be used in addition to the carpet with recycled polyester (PET resin) materials listed on the EPA's site. (Some PET carpets are not sufficiently durable for school applications.)

For the additional point, install at least 8 materials included in the EPA guideline. Six must be from the Construction Products Category. All products must meet the recycled-content recommendations in the EPA guideline.

Resources

Type II, ISO 14021: Verifiable single-attribute environmental claims for issues such as energy consumption, emissions, or recycled content. Can be first-party, self-declared manufacturer claims. However, many manufacturers are beginning to seek third-party verification of those claims in response to industry demand.

EPA's Comprehensive Procurement Guidelines (CPG), (http://www.epa.gov/epawaste/conserve/tools/cpg/index.htm)

Greenspec Directory of Green Building Materials, (http://www.buildinggreen.com)

MW2.2 Rapidly Renewable Materials

1 point: Install rapidly renewable building materials for **2.5%** of the total value of all building materials, excluding mechanical and electrical.

Or

Prescriptive Approach: Specify rapidly renewable materials for 50% of one of the following major interior finish or structural materials:
Flooring, casework, acoustical ceiling tile, wall covering, tile, exterior walls, and roof.
A product must contain **25%** rapidly renewable raw materials based on weight to qualify under the prescriptive approach.

Rapidly renewable resources are those materials that substantially replenish themselves faster than traditional demand (*planted and harvested in no greater than a 10-year cycle*). Products in this category include, but are not limited to, bamboo used for flooring and casework, wheat grass used for casework, wood products made from fast-growing trees such as poplar and Monterey pine, and sheet flooring made from linseed oil. Ensure the products are low emitting and durable.

To earn this credit, determine the percentage of total building materials from rapidly renewable sources. Exclude all labor costs, all mechanical and electrical material costs, and all contractor fees (overhead, profit, insurance, and bond).

To calculate the rapidly renewable materials percentage, divide the rapidly renewal material cost by the total project material cost and multiply by 100.
A default value of 35% of the Total Construction Cost can be used for the Total Project Material Cost.

MW2.3 Certified Wood

50% = 1 point: At least **50% of the cost** of wood and wood-based materials and products are from a sustainable forest certified by a third party, or from a voluntary Forest Carbon program certified under the American Carbon Registry. This includes, but is not limited to, framing, flooring, finishes, and built-in cabinetry.

Chain-of-custody = 1 point: One additional point is available if all of the certified wood also has chain-of-custody tracking.

Forests regulated under Washington's Chapter 76.09 RCW – Forest practices will also be recognized as complying.

NWFA Responsible Procurement Program (RPP) may be used instead of FSC Certification for flooring products only.

Certified wood and wood-based material is available for a variety of applications including framing and interior finishes (ceilings, casework, millwork, and flooring).

Compliance for this credit is based on the cost of the certified products as a percentage of the total

cost of new wood and wood-based products. The following equation can be used to determine point level.

Certified Wood % = (Certified and Wood-Based Material Cost ($))/(Total Wood and Wood-based Material costs ($)) x 100

Wood-based products include all new wood consumed by the overall project including, but not limited to casework, formwork, shoring, structural framing and general dimensional framing, flooring, finishes, fixed furnishings, and non-rented temporary pedestrian barriers used in construction.

The National Wood Flooring Association has developed the Responsible Procurement Program that provides a management structure for wood sources to transition over time to meet the Forest Stewardship Council (FSC) standards.

There are three main sustainable forestry management systems in North America:

1. **The Forest Stewardship Council (FSC)** international system provides standards for the sustainable growth and harvest and provides a chain of custody process for certified wood products that tracks the wood from harvesting through milling, distribution, and retail. The sustainable forests in the FSC system are certified by a third party. (https://us.fsc.org/)
2. **The Sustainable Forestry Initiative (SFI)** is the most used program in the Washington region and required for all American Forest & Paper Association (AF&PA) members. Verification of conformance with SFI program requirements is first, second, or third party audited. However, for certification and to claim this point, third party auditing is required to ensure conformance with the SFI Standard. SFI program participants who have successfully completed independent third-party certification to the SFI Standard may also choose to have their facilities certified for chain-of-custody. (http://www.sfiprogram.org/)
3. **The Canadian Standards Association (CSA)** is an independent non-profit organization accredited by the Standards Council of Canada. CSA is primarily focused on Canadian forests. Third-party certification is required. Chain of custody is available. (http://www.csagroup.org/)
   American Tree Farm System is a program of the American Forest Foundation and is primarily focused on non-industrial forests in the US. Third-party certification is required. Chain of custody is available on a limited scale. (http://www.treefarmsystem.org/).
   Another certification program is the PEFC – Programme for the Endorsement of Forest Certification Schemes PEFC: (http://www.pefc.org/index.php).

Resources
National Wood Flooring Association-Responsible Procurement Program for wood flooring, (http://www.nwfa.org/rpp.aspx)

Public Registry, American Carbon Registry

MW2.4 Regional/Local Materials

20% Manufactured and extracted, harvested, or recovered = 1 points: For one point: 20% of the building materials are manufactured, extracted, harvested, or recovered from within a 500-mile

radius of the site.

Or

20% Manufactured and extracted, harvested, or recovered in Washington State = 2 points: Use resources, building materials, products that are Washington State manufactured and extracted, harvested, or recovered for 20% of the construction materials.

Maximum of 2 points.

This credit applies to new materials only. To earn this credit, show that the required percentage of project materials, by cost, are manufactured (or manufactured and extracted) within a 500-mile radius of the project, or are extracted, harvested, or recovered, and manufactured in Washington State. Do not include any contractor labor costs, mechanical and electrical materials, and contractor fees (overhead, profit, insurance, bonds, etc.).

Buying regional/local materials is only one aspect of sustainable purchasing. Some materials may be local but are not chosen because more distant products have higher recycled content, longer lifespan, or lower costs. It will be up to the team to determine the project's priorities.

Base percentage calculations in terms of dollar value:

Regional or WA Material % = (Regional or WA Material Cost ($))/(Total Project Material Cost ($)) x 100

For items such as window wall systems that have multiple materials forming the final building product, the manufacturing location refers to the location of final assembly of components into the building product that is furnished and installed.

A default value of 35% of the Total Construction Cost can be used for the Total Project Material Cost.

Resources
Made in Washington

MW2.5 Environmentally Preferrable Products – Multiple Attributes

1 - 2 points: Earn one point for each major building product that meets the Environmentally Preferable Products (EPP) established criteria and is certified for at least 2 of the attributes under a nationally recognized certification program (see below Table 3).

Maximum of 2 points.

A "major" product is defined as those building products covering more than 50% of a building surface (such as flooring, roofing, walls, ceiling) or serving a structural function throughout the majority of the building.

If claiming points under this credit you may not claim points for the same materials under M1.4, M2.1 or M2.2.

Multi-attribute Environmentally Preferable Products (EPP)
This environmentally preferable products (EPP) credit offers points for specifying and installing multi-attribute building products that are certified under applicable certification programs. An EPP is defined in accordance with ASTM as a "material, component, system, or service that has measurable and statistically significant, positive, or reduced negative environmental impacts when compared with other material(s), component(s), and system or service(s) that serve similar purpose(s)."

The product comparison may consider raw materials acquisition, production and manufacturing location, greenhouse gas emissions, hazardous material content, water efficiency, reuse, recycled content, supply chain, life-cycle cost, life-cycle benefit or disposal options of the product or service. The owner-established (project) criteria will include all or at least 4 of the attributes listed above. The EPP evaluation should compare products that perform as well or better than others and are similar in price.

Standards and certification programs are useful when you are purchasing environmentally preferable products and writing specifications for bid documents. Standards establish human health, environmental, and social criteria used to evaluate and certify products and services.

Nationally Recognized Certification Programs
The following table outlines **some** of the most commonly used and respected green product certifications in the marketplace.

Table 3: Some Green Product Certifications

Product Certification	Type of Standard or Certification	Managing Organization	Issue of Focus
SCS Global	Third-party certification	Scientific Certification Systems	Wide range of products (i.e., carpets, textiles, wood products, insulation, and more)
Green Seal	Third-party ISO Type 1 certification	Green Seal	Wide range of sectors (paints, adhesives, lamps, electric chillers, windows, window films, occupancy sensors)
Cradle to Cradle	Third-party certification	Cradle to Cradle Products Innovation Institute C2CPII	Wide range of sectors (metals, fibers, dyes, plastics)
Greenguard	Third-party certification	Greenguard Environmental Institute (GEI)	Indoor air quality

Resources and additional certification programs
US Environmental Protection Agency Safer Choice

Washington Department of Ecology Environmentally Preferable Purchasing resouce guide https://fortress.wa.gov/ecy/publications/summarypages/0807049.html

Comprehensive Procurement Guideline (CPG) Program, US EPA

UL Spot has over 45,000 products, easily searchable credible source of sustainable product information

Declare by Living Future Institute

MW2.6 Environmental Product Declaration

2 points: Select 10 products or materials (that are each at least 2% of the total value of all building materials and products based on costs) that contain a third-party certified Environmental Product Declaration (EPD) (cradle to cradle) conforming to the requirements of ISO 14025 on Type III environmental declarations and/or ISO 21930 on environmental declarations of building products.
1–5 points: An additional 1 point for each product declaration that demonstrates a 10% or higher reduction (in comparison to the industry baseline) in one half of the impact categories (global warming potential category is required).

There is a growing need to understand the true environmental impact of building products. An Environmental Product Declaration (EPD) provides quantifiable environmental data to compare products that fulfill the same function. A product EPD will show the life-cycle environmental impacts of the material such as global warming and ozone depletion, product ingredients including recycled content, performance attributes and service life as well as water and energy use. To earn points for EPD the document must be valid as of the date of project submittal and must be third-party certified.

Environmental Product Declarations must address the requirements found in Appendix A of the ISO standards. The Declaration must justify the omission of any impact category in narrative form within the document.

ISO 14025 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14025 establishes the principles and procedures for developing Type III environmental declarations (EPD). It specifically establishes the use of the ISO 14040 series of standards on life-cycle assessment in the development of these declarations. Type III environmental declarations prepared in accordance with this standard are intended to present quantified environmental life cycle product information to enable comparisons between products fulfilling the same function.

ISO 21930 Sustainability in building construction -- Environmental declaration of building products

Building on the framework and requirements described in ISO 14025, ISO 21930 contains

specifications and requirements for Type III environmental declarations (EPD) of building products. The standard recommends that Type III declarations for building products account for all life cycle stages of the product. Omissions of life cycle stages must be justified.

ISO 21930 requires that environmental information covering all life cycle stages ("cradle to grave") be subdivided into at least three life cycle stages for reporting purposes: product stage (raw material supply, transport to production, manufacturing: "cradle to gate"); building stage (transport to building site, building installation, use, maintenance and repair, replacement); end of life stage (demolition, transport, disposal / recycling). ISO 21930 also specifies the minimum requirements for the verifiers in terms of competence (ISO 19011:2002, clause 3.14) including:

1. Knowledge of relevant industry, product, and product-related environmental matters.
2. Process and product knowledge of the product category.
3. Expert on LCA and methodology for LCA work.
4. Knowledge of the relevant standards in the field of environmental labeling and declarations, and life cycle assessment.
5. Knowledge of the regulatory framework in which requirements for environmental declarations have been prepared.
6. Knowledge of the program for Type III.

Resources
The International EPD System. EPD Using and Creating EPDs, (http://www.environdec.com/)

International Standards Organization, (http://www.iso.org/iso/home.htm)

ASTM International Environmental Product Declarations

Sustainable Minds Transparency Catalog to find products with EPD's

MW2.7 Building Materials Health Product Disclosure

1 point, Performance Approach: Provide a published Health Product Declaration (HPD) with a disclosure level of 1000ppm for at least 20 permanently installed products from at least five different manufacturers in accordance with the Health Product Declaration Standard Version 1.0, 2.0, or 2.1.

Products with an HPD with full disclosure of known hazards will count as two products for these calculations.

Or

Prescriptive Approach: Specify that a published Health Product Declaration (HPD) with a disclosure level of 1000ppm must be provided for 50% (by cost) of one of the following major interior finish or structural materials. Products with an HPD with full disclosure of known hazards may be selected and counted as double value.

- Adhesives & Sealants
- Paints & Coatings
- Flooring Systems

- Composite Wood and Agrifiber Products
- Furniture & Furnishings
- Ceiling & Wall Systems

The Health Product Declaration Open Standard is a streamlined methodology for reporting language to enable transparent disclosure of the content in a material and the related health information. The standard was developed by the Health Product Declaration Collaborative. The standard is a free resource for manufacturers to use as a reporting tool.

Designers and specifiers may collect the completed HPD Template directly from the manufacturer. The Health Product Declaration does not need to be third-party certified to be applicable to this criterion. Third-party certification of a Health Product Declaration is not required at this time.

Definitions

- "Published" means the HPD is publicly accessible – either published by the manufacturer on the manufacturer website with other technical data and/or in a registry such as Pharos provides.
- "Complete" means the HPD has been completed as required in the HPD Standard. See the "Checklist for a Complete HPD" in the Health Product Declaration Standard 1.0, 2.0, or 2.1.
- "Full Disclosure of Intentional Ingredients" means the HPD discloses the identity of each ingredient added to the product by the manufacturer or suppliers that exist in the product as delivered for final use.
- "Full Disclosure of Known Hazards" means the HPD discloses the role and hazard traits of each ingredient but may mask the identity of certain ingredients that are restricted by IP and/or trade secret policies.
- "Full disclosure of intentional ingredients" means the HPD discloses the role and hazard traits of every ingredient in the product. This is a much higher standard that is not required by this credit, but its use is encouraged where appropriate.

Resources

Health Product Declaration Collaborative, (http://hpdcollaborative.org/)

ENERGY

Energy Efficiency

Purpose: To reduce the amount of energy used to operate the building through better building design and more efficient systems and equipment. Reducing the building load and energy use reduces the associated costs and environmental impacts.

E1.0 Minimum Energy Performance

E1.0.1 Energy Code Minimum.

Required: The school design and construction must be **Washington State Energy Code (WSEC) Commercial Provisions compliant.**

E1.0.2 Energy Star Certified Equipment.

All major appliances, commercial food service equipment, electronics, audio visual, and office equipment must be ENERGY STAR Certified if certification is available for the product type, and required features and functionality are not sacrificed.

Apply the edition of the Washington State Energy Code, Commercial Provisions, herein after referred to as WSEC that is in effect at the time the project is permitted. Within the City of Seattle meet the Seattle Energy Code, Commercial Provisions in effect at the time of permit.

E1.0.1 Energy Code Minimum

Energy-efficient schools reduce the cost of utilities while conserving non-renewable energy resources and reducing atmospheric emissions of pollutants and greenhouse gases. The WSEC has been a major factor in advancing energy efficiency in schools. Support for the WSEC is provided by the Northwest Energy Efficiency Council (NEEC).

Most energy utilities (power and natural gas), offer significant financial incentive in the form of rebates, grants, and technical support to design, construct, and commission facilities that exceed WSEC "code minimum."

While the WSEC is considered an aggressive baseline for energy efficient construction practices, there are numerous cost-effective, practical, and straightforward measures that can reduce energy use by 10-50% from the WSEC. Refer to E1.2 for strategies to achieve this.

Whether you are meeting the code or going beyond the code, it will be important to ensure the energy efficiency designed is actually achieved in practice. Commissioning, maintenance, and training, as well as measurement and verification are vitally important to the performance of the school and its systems. Also Enhanced Commissioning (E-Cx) ensures that operability and maintenance are considered in the design of the building, and after construction systems operate to their design intent. Once built, no building can perform optimally without maintenance. In addition, training is critically important to ensure that teachers and facilities staff understand how to operate and maintain building systems. When turnover occurs, appropriate documentation must

be on hand to ensure that new staff is properly trained. Promoting a measurement and verification program that records the energy meters and presents the information in a graphical format will give building operators a report on system operation. This can be achieved through Monitoring-Based Commissioning (MBCx).

Where local jurisdiction energy efficiency requirements exceed WSEC, credit may be taken under E1.2 for performance beyond state code minimums; for example, the Seattle Energy Code (SEC) exceeds WSEC.

Resources
The Northwest Energy Efficiency Council (NEEC) provides support for the Washington Non-Residential Energy Code and offers compliance forms (Excel and pdf) and information on obtaining a comprehensive Technical Reference Manual, (http://www.neec.net/energy-codes)

ASHRAE 30 Percent Advanced Energy Design Guide for K-12 School Buildings – free download
ASHRAE 50 Percent Advanced Energy Design Guide for K-12 School Buildings – free download (with registration), (https://www.ashrae.org/standards-research--technology/advanced-energy-design-guides/50-percent-aedg-free-download)

Better Bricks, tools, and resources for energy efficiency, (http://www.betterbricks.com/)

New Buildings Institute: Design Guidelines, (http://www.newbuildings.org/advanced-design)

WA State Department of Enterprise Services Energy Program, (http://des.wa.gov/services/facilities/Energy/Pages/default.aspx)

E1.0.2 ENERGY STAR Certified Equipment

ENERGY STAR products are independently certified to save energy without sacrificing features or functionality. Many certified products qualify for a product rebate through ENERGY STAR partners programs, such as local utility providers.

Most major appliances come with two price tags: the purchase price and the cost of operating the product. ENERGY STAR certified appliances help consumers save money on operating costs by reducing energy use without sacrificing performance.

ENERGY STAR certified audio/video equipment can be up to 70% more efficient than conventional models. Blu-Ray players that earn the ENERGY STAR label are, on average, 45% more efficient than conventional models.

Appliances and equipment that are not ENERGY STAR Certified are acceptable if the annual energy use is equal to or less than the ENERGY STAR certified equal, and the alternate appliance or equipment is incentivized by a local utility.

Resources
ENERGY STAR Certified products lists

ENERGY STAR Low Carbon IT Campaign

AVISTA, an energy service provider with 1.6 million customers in the Pacific Northwest offers rebates for many energy efficient types of equipment. This is the link to the Washington Rebates webpage.

Austin Public Schools Case Study

E1.1 Superior Energy Performance – Prescriptive Component Design

1–14 points: Comply with more than the minimum required credits in WSEC Section C406 to achieve points.

The available efficiency package options with their applicable credit weight for education buildings are listed below for reference:

1. More efficient HVAC performance in accordance with Section C406.2 (2 credits).
2. Reduced lighting power in accordance with Section C406.3.1 (2 credits).
3. Reduced lighting power in accordance with Section C406.3.2 (4 credits).
4. Enhanced lighting controls in accordance with Section C406.4 (1 credit).
5. On-site supply of renewable energy in accordance with Section C406.5 (3 credits).
6. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6 (0 credits – not applicable for school buildings).
7. High performance dedicated outdoor air system in accordance with C406.7 (4 credits).
8. High-efficiency service water heating in accordance with Section C406.8.1 & C406.8.2 (0 credits – not applicable for school buildings).
9. High performance service water heating in multi-family buildings in accordance with C406.9 (0 credits – not applicable for school buildings).
10. Enhanced envelope performance in accordance with Section C406.10 (3 credits).
11. Reduced air infiltration in accordance with Section C406.11 (1 credit).
12. Enhanced commercial kitchen equipment in accordance with Section C406.12 (0 credits – not applicable for school buildings).

This credit is available for projects that do not claim points under E1.2 or E1.3.

E1.2 Superior Energy Performance – Whole Building Design

See tables below. Reduce the predicted energy use intensity (pEUI) of the proposed design to be better than the energy use intensity target (EUI_t) as defined by the Clean Buildings Performance Standard (CBPS).

The EUI_t shall be adjusted by both the operating shift normalization and new construction factors as defined in the tables below. For New Construction, select either Table 1 or 2. For Alterations, select either Table 3 or 4. Note that the average weekly operating hours is defined as the hours that

the majority of the building is open to serve the public.

The pEUI shall be gross EUI before the application of any onsite or offsite renewables.

Table 1: Average Weekly Operating Hours of 50 Hours or Less

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
EUI_t	49.0	48.0	50.0	49.0	
Adjusted EUI_t (1)	44.1	43.2	45.0	44.1	
Adjusted NC EUI_t (2)	30.9	30.2	38.3	37.5	

Percent Savings of pEUI vs. Adjusted NC EUI_t

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
5%	29.3	28.7	36.3	35.6	1
10%	27.8	27.2	34.4	33.7	2
15%	26.2	25.7	32.5	31.9	4
20%	24.7	24.2	30.6	30.0	6
25%	23.2	22.7	28.7	28.1	8
30%	21.6	21.2	26.8	26.2	10
35%	20.1	19.7	24.9	24.4	12
40%	18.5	18.1	23.0	22.5	14
45%	17.0	16.6	21.0	20.6	16
50%or>	15.4	15.1	19.1	18.7	20

Table 2: Average Weekly Operating Hours of 51 to 167 Hours

% Savings	Climate Zone 4C: ES/MS	4C HS	Climate Zone 5B: ES/MS	5B HS	WSSP Points
EUI_t	49.0	48.0	50.0	49.0	
Adjusted EUI_t (1)	53.9	52.8	55.0	53.9	
Adjusted NC EUI_t (2)	37.7	37.0	46.8	45.8	

Percent Savings of pEUI vs. Adjusted NC EUI_t

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
5%	35.8	35.1	44.4	43.5	1
10%	34.0	33.3	42.1	41.2	2
15%	32.1	31.4	39.7	38.9	4
20%	30.2	29.6	37.4	36.7	6
25%	28.3	27.7	35.1	34.4	8

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
30%	26.4	25.9	32.7	32.1	10
35%	24.5	24.0	30.4	29.8	12
40%	22.6	22.2	28.1	27.5	14
45%	20.8	20.3	25.7	25.2	16
50% or >	18.9	18.5	23.4	22.9	20

Footnotes:
(1) The EUI_t is adjusted based on a building operating shift normalization factor of 1.1. This table shall be utilized if the average weekly operating hours for the majority of the building is 51 to 167 hours.
(2) The CBPS requires a 15% EUI reduction for New Construction (NC), i.e., projects permitted after June 30th, 2016. The reduction has been increased to 30% for Climate Zone 4C based on historical energy modeling results.

Table 3: Average Weekly Operating Hours of 50 Hours or Less for Alterations

% Savings	Climate Zone 4C: ES/MS	4C HS	Climate Zone 5B: ES/MS	5B HS	WSSP Points
EUI_t	49.0	48.0	50.0	49.0	
Adjusted EUI_t (1)	44.1	43.2	45.0	44.1	
Adjusted NC EUI_t (2)	37.5	36.7	45.0	44.1	

Percent Savings of pEUI vs. Adjusted NC EUI_t

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
5%	35.6	34.9	42.8	41.9	1
10%	33.7	33.0	40.5	39.7	2
15%	31.9	31.2	38.3	37.5	4
20%	30.0	29.4	36.0	35.3	6
25%	28.1	27.5	33.8	33.1	8
30%	26.2	25.7	31.5	30.9	10
35%	24.4	23.9	29.3	28.7	12

Footnotes:

(1) The EUI_t is adjusted based on a building operating shift normalization factor of 0.9. This table shall be utilized if the average weekly operating hours for the majority of the building is 50 hours or less.
(2) An EUI reduction of 15% has been applied to Climate Zone 4C only based on historical energy modeling results.

Table 4: Average Weekly Operating Hours of 51 to 167 Hours for Alterations

% Savings	Climate Zone 4C: ES/MS	4C HS	Climate Zone 5B: ES/MS	5B HS	WSSP Points
EUI_t	49.0	48.0	50.0	49.0	
Adjusted EUI_t (1)	53.9	52.8	55.0	53.9	
Adjusted NC EUI_t (2)	45.8	44.9	55.0	53.9	

Percent Savings of pEUI vs. Adjusted NC EUI_t

% Savings	Climate Zone 4C: ES/MS	4C: HS	Climate Zone 5B: ES/MS	5B: HS	WSSP Points
5%	43.5	42.6	52.3	51.2	1
10%	41.2	40.4	49.5	48.5	2
15%	38.9	38.1	46.8	45.8	4
20%	36.7	35.9	44.0	43.1	6
25%	34.4	33.7	41.3	40.4	8
30%	32.1	31.4	38.5	37.7	10
35%	29.8	29.2	35.8	35.0	12

Footnotes:
(1) The EUI_t is adjusted based on a building operating shift normalization factor of 1.1. This table shall be utilized if the average weekly operating hours for the majority of the building is 51 to 167 hours.
(2) An EUI reduction of 15% has been applied to Climate Zone 4C only based on historical energy modeling results.

E1.3 Zero Net Energy

35 points: Design and construct the building to be zero net energy.

A Zero Net Energy Building, or ZNE Building, is a building that, over the course of a year (post occupancy), consumes an amount of energy less than or equal to the renewable energy generated on the site.

K–12 schools can educate the broader public about sustainability and green building and show a commitment to reducing climate impacts.

ZNE buildings are less vulnerable to the instability of energy prices and are more resilient to the impacts of severe weather events. ZNE buildings may create safe havens for students or even the local community during emergencies as a place where the power stays on because these buildings have the ability to generate their own power.

The New Buildings Institute (NBI) suggests 5 steps to advance ZNE in schools and public buildings:

1. Set a ZNE commitment with performance goals for your district, campus, or building.

2. Educate decision makers, capital projects and planning staff, facility managers and operators about ZNE benefits, costs, and performance goals.
3. Incorporate energy performance criteria into the design, construction, and planning contracts.
4. Draw inspiration and lessons learned from case studies of other ZNE schools and public buildings.
5. Take advantage of ZNE incentive programs and technical assistance

Projects earning the 35 points for Zero Net Energy must receive a post-occupancy evaluation from a third-party, to verify Zero Net Energy performance over a 12 consecutive month period. ZNE projects have exceeded the Superior Energy Performance credits and therefore may not earn points for E1.1 and E1.2. Also, may not earn points for On-Site Renewables E3.1 if ZNE.

Resources
Zero Energy Design Guide by ASHRAE

New Buildings Institute (NBI)
U.S. Department of Energy Office of Energy Efficiency & Renewable Energy

A Common Definition of Zero Energy Efficiency Buildings, September 2015, prepared for the U.S. Department of Energy Office by The National Institute of Building Sciences.

Building Automation System
Purpose: To centralize control of a building's energy consuming fixtures and equipment through the use of user-friendly automatic controls.

A building automation system (BAS) is typically installed in new schools. Care must be taken to specify and install a system that is able to be used by the district maintenance staff. An appropriate control system is the simplest system that adequately addresses the school's needs. Increased complexity does not always mean increased value for the district. A building automation system can potentially save significant energy, but only if the staff understands how to operate it.

A BAS will allow for comparison between various types of building loads throughout all spaces of the school (including portables). Energy savings and improved indoor air quality can result by optimizing a building's performance.

Environmental comfort and energy-using building systems, including heating, ventilation and air conditioning equipment, lighting, security systems and audio-visual equipment controls may be integrated with a single building automation system.

The HVAC control systems shall be direct digital control (DDC). The design will include:

1. **Sensors should be provided as follows:**
    a. Sensors to monitor and trend at the operator interface-controlled variables. Control variables may include air and/or water flow, temperature, pressure, CO_2, and pump or fan speed.
    b. Sensors to trend outdoor air temperature.

c. In marine and humid climates, sensors to trend humidity.
d. Sensors to monitor and trend equipment status for all equipment with motors greater than 1/2 hp.
e. Indication and trending of damper and valve commanded position.
f. Sensors to monitor building electrical and natural gas demand and consumption.
g. Sensors to monitor indoor and outdoor CO_2.

Relevant multiplexed data from microprocessors located in chillers, boilers, humidifiers, VAV box controllers, variable speed drives, and other HVAC equipment with multiplexing capabilities may be used in lieu of specifying separate sensors.

Wells and other ports will be specified for the installation of calibration devices to facilitate calibration of sensors.

Exceptions:
- Unit heaters, cabinet heaters, radiation and convectors located in vestibules, storage rooms, janitor closets, and other unoccupied areas.

2. **Points Matrix:** A point matrix, including all hardwired input and output devices connected to the automation system, all set points, upper and lower control limits.
3. **Trend Capabilities**: Trend requirements including a trend point list and preprogrammed sample of point (performed by controls contractor), sample rate, storage interval, upload interval, custom trend abilities, alarms, and automated trend data review and notification (automated diagnostics).
4. **Flexible Scheduling**: Scheduling options that allow operators to schedule individual spaces independent of other spaces, or to set a facility-wide schedule.
5. **System Architecture**: A system architecture capable of allowing sampling of these points to facilitate building commissioning and diagnostics without significantly affecting system performance.
6. **Data Storage**: A data storage system with adequate capacity to record trend data for use by building operators. Data export requirements must facilitate user-friendly **Optional/Required** data access and manipulation.
7. **Operator Interface**: An operator interface designed for remote/web access, monitoring requirements, trend-log reporting and diagnosing building problems through a user-friendly interface. This includes providing a visual (non-text based) operations and reporting interface to facilitate rapid system assessment that utilizes color coding, diagrams of floor plans and graphing capabilities.

Alternative Sources of Energy

Purpose: To increase the amount of renewable energy used in place of finite and polluting non-renewable energy sources. On-site sources of energy reduce transmission losses and also may serve an educational function.

E3.1 On-Site Renewable Energy

5% = 2 points
7.5% = 4 points

10% = 5 points
15% = 7 points
20% = 8 points
25% = 10 points
30% = 12 points

Points in E3.1.1, E3.1.2, and E3.1.3 may not be combined with points in E1.3.

E3.1.1 On-Site Renewable

Use on-site renewable energy for a portion of a school's energy use. Point levels correspond to the percentage of energy use supplied by this method.

On-site Renewable Energy Sources include, but are not limited to:

- Photovoltaic
- Wind
- Waves
- Tides
- Biogas
- Geothermal
- Micro-hydro
- Solar thermal
- 100% biodiesel or ethanol
- Biomass

On-site renewable energy has many benefits. Renewable sources, such as photovoltaic, wind turbines, and geothermal sources use the sun, air, and earth instead of non-renewable, polluting sources, such as coal or natural gas. Fuel cells can be powered by (renewable) biogas as well as non-renewable natural gas.

Sources covered under this credit must be located at the school site, eliminating the environmental impacts and transmission losses associated with remote sources. However, for a new building on an existing school campus, or a new school contiguous to an existing school, the on-site renewable energy source may be located on the school campus, or on the contiguous school campus, and may be shared as long as the source is owned by the school district. On-site sources can become effective components of school curriculums, educating students on a wide variety of energy and science issues.

The costs and feasibility of on-site renewable energy and distributed generation vary significantly with location, technology, site-specific constraints, and maintenance concerns.

Sources should be installed using net metering. Net metering attaches the on-site system to the electrical power grid. When the school produces more energy than it uses, the excess energy is traded back to the local energy provider. In essence, this "spins the meter backwards" and is vital to the cost-effectiveness of the system. In general, facilities with on-site renewable energy and net metering can only receive credit up to the amount of energy they use. In other words, buildings can only "zero-out" their utility bill and not make a profit from selling their excess energy. Check with

your utility to determine if they participate in net metering and how they would account for your building's net contribution to the grid. See also RCW39.35C.040 Sale of Conserved Energy.

On-site renewable calculation:

- Use the energy modeling from E1.0 and E1.3 for the school building systems to estimate the amount of energy used annually.
- Calculate the amount of energy the particular on-site renewable system can supply annually,
- Calculate the percentage of energy provided by renewable energy.

Solar ready buildings must provide pathways, spaces, and structure to support future retrofit of systems and equipment. For example, a "solar ready" design may include large roof areas sloping South or West with structure capacity for future photovoltaic array, electrical conduit from the roof to the electrical room with space for PV system inverters and controls, and space in main switchboard for net-metering.

A zero net energy capable building is designed and constructed so that on-site renewable energy systems will produce enough energy (when installed) on an annual basis as is used by the sum of all the building systems. The initial building design and construction must include:

- Structural modifications to the roof design to accommodate additional weight.
- Additional roof and wall penetrations (including conduit) needed for electrical wiring.
- Site (underground) infrastructure (conduit) in place and a reserved equipment area on the site
- Electrical and mechanical rooms sized to accommodate additional system components.

E3.1.2 Solar Ready

3 points: Design a structurally-sound building to allow for a solar array that maximizes the available roof area.

E3.1.3 Service Water Heating

2 points (elementary schools), 4 points (middle schools), 6 points (high schools), 8 points (high schools with pools): Use site-solar or site-recovered energy for at least 25% of the annual service water-heating energy used.

Energy production used to earn this credit may not be used to earn points for percentage of energy supplied by renewables (E3.1.1).

Commissioning

Purpose: To document that active building systems are designed, installed, and operate per Owner's Project Requirements (OPR), Basis of Design (BOD) and construction documents (CDs).

E4.0 Fundamental Commissioning

Required- The commissioning provider (CxP) and the District will comply with requirements outlined in WSEC and WACs 392-344-067 and 392-343-080 regarding:

- Cx Plan
- Commissioned Systems
- Supporting Documents (system documentation, record documents, and training)
- Cx Report
- Systems Balancing (TAB)
- Functional Testing (FT)
- Systems Operation Training

WAC 392-343-080 requires on-site physical inspection remote monitoring-based Cx is not sufficient. The CxP must be an independent third party regardless of project delivery method (design-build or GC/CM).

And

The District will develop the Owner's Project Requirements (OPR) and the Design Team will develop the Basis of Design (BOD) documents.

And

Conduct a controls summit to clarify sequences of operation for networked control systems, when applicable (see Building Automation System). The controls summit must occur prior to final shop drawing.

And

Review test, adjust, and balance (TAB) report, including duct pressure testing when applicable.

And

Verify functional and maintenance training of O&M Staff, and document training is completed in the Final Commissioning Report.

And

Assure, through contractual arrangements, involvement by the CxP in reviewing building operation after one academic year of building use with O&M staff and occupants.

And

Verify warranty documentation from equipment suppliers and sub-contractors, including extended warranty requirements, if any.

New buildings, additions, renovations, alterations, and modernizations shall comply with RCW39.35D for commissioning, when applicable.

Commissioning Requirements: Commissioning will include documentation, reports, and acceptance as specified by Washington's applicable energy code and WAC 392-343-080, and the commissioning provider (CxP) must be qualified per WSEC and not contractually or otherwise associated with the project design team or contractor. In addition, per WAC 392-344-067, the commissioning program will include the Essential Attributes defined by the Building Commissioning Association (BCxA).

The following systems will be commissioned per WSEC:

- Mechanical (HVAC) to include test, adjust & balance (TAB)
- Service Water Heating System
- Controlled Receptacles and Automatic Lighting Controls
- Additional Systems required by Section C406 – Efficiency Packages or C407 – Total Building Performance.
- Metering systems
- Refrigeration

The Owner may require commissioning of additional systems, such as renewable energy, standby or emergency power, electronic security, specialty plumbing, irrigation, and others. Noting when required by C406 or C407, additional systems must be commissioned per WSEC, for example rooftop photovoltaic (PV) power systems.

Districts are encouraged to follow the ASHRAE Guideline 0 three-step OPR Development process: 1) Workshop, 2) Draft OPR, and 3) OPR Approval.

The Basis of Design (BOD) is prepared by the Design Team in response to the OPR; the BOD includes commissioned system design criteria and narrative descriptions; conceptual diagrams and typical fixture and major equipment cutsheets are helpful.

Drawings: Construction documents will require that within 90 days after the date of system completion, record drawings of the actual installation be provided to the building owner. However, WSEC allows a maximum of 180 days.

- Record drawings will include, as a minimum, the location and performance data on each piece of equipment; general configuration of duct and pipe distribution system, including sizes; and the terminal air and water design flow rates.

Manuals: Construction documents will require that an operating manual and a maintenance manual be provided to the building owner. The manuals will be in accordance with industry-accepted standards and will include, at a minimum, the following:

- Submittal data includes equipment size and selected options for each piece of equipment requiring maintenance.
- Operation and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions will be clearly identified.
- Names and addresses of at least one service agency.
- HVAC control system maintenance and calibration information, including wiring

diagrams, schematics, and control sequences with schedules, setpoints and alarms.
- A narrative of how each system is intended to operate including suggested set points.

Systems Operation Training.
- Training of the maintenance staff for equipment included in the manuals shall comply with requirements in WSEC, at a minimum.

System Balancing
- Construction documents will require that all HVAC systems be balanced per TAB industry standards. Air and water flow rates will be measured and adjusted to deliver final flow rates within 10% of design rates.
- Air System Balancing: Air systems will be balanced in a manner to first minimize throttling losses. For fans with system power of greater than 1 hp, fan speed will be adjusted to meet design flow conditions.
- Hydronic System Balancing: Hydronic systems will be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller will be trimmed, or pump speed will be adjusted to meet design flow conditions. Each hydronic system will have either the ability to measure pressure across the pump or have test ports at each side of each pump.

Prepare a final commissioning report following the WSEC or comparable format. Review with the District, verifying that systems are operational perthe Owner's Project Requirements (OPR), Basis of Design (BOD), and Construction Documents (CDs). Follow WSEC requirements for final report.

First-year Review. The CxP shall visit the project site prior to the end of the one-year warranty period to observe commissioned systems and equipment performance and interview selected O&M staff and school occupants for issues and concerns. Prepare a brief first-year Cx site visit report summarizing findings including suggested action to resolve noted issues and concerns.

Resources
Building Commissioning Association

E4.1 Enhanced Commissioning

E4.0 must be achieved first before going to E4.1.

Purpose: The purpose of Enhanced Commissioning is to optimize performance of the commissioned systems with additional Cx work in each phase of the project.

3 points: Conduct a Commissioning Review: The Commissioning Provider (CxP) required by E4.0 and State regulations as referenced in E4.0 will:
- Conduct a commissioning design review of the Owner's Project Requirements (OPR), Basis of Design (BOD), and design documents prior to mid-construction documents phase to include control diagrams and sequences.
- Review contractor submittals applicable to systems being commissioned for compliance with OPR and BOD.
- Ensure commissioning milestones are included in the project schedule.

Verification and Assurances
The Commissioning Provider will:

- Participate inOPR development.
- Witness air barrier leakage testing.
- Review building IAQ flush-out when applicable.
- Verify building occupant training regarding optimal operation of commissioned systems they interface with has been completed.
- Conduct O&M staff training to optimize building performance over time, such as through trend-log analysis.
- Conduct seasonal testing and review performance quarterly during the first year of operation.

E 4.1.1 Energy Measurement & Verification (M&V)

1 point: The commissioning provider will assist the building owner in setting up first-year Energy Star Portfolio Manager reporting and compare actual energy use with modeled energy use and resolve differences.

Buildings, even simple structures, are complex systems of electrical, mechanical, and structural components. High performance buildings are healthy, efficient, environmentally sensitive structures whose performance can be significantly affected if the building has not been designed and constructed per the OPR, BOD and construction documents. Commissioning is a rigorous quality assurance program administered by a knowledgeable third party that ensures the building performs as expected.

The CxP should lead OPR development, ideally before design begins, but no later than Schematic Design phase.

This credit ensures the design is developed in a way that meets the objectives of the building program including, in particular, its mechanical systems and energy requirements. However, it is important to coordinate the commissioning program with the overall environmental goals of the project. The WSSP highly recommends a facilitated integrated design workshop (See Planning, Education, Operations category) BEFORE the schematic design process has concluded. This credit assumes that the CxP either participates in the integrated design workshop or is familiar with the results of the workshop.

Additionally, this credit follows-up post-occupancy to assure building performance goals are achieved during the first year of operation.

Resources
ASHRAE Standard 202, (ashrae.org)

Commissioning Report Templates are available for free, (http://www.bcxa.org/resources/templates/index.htm)

Building Commissioning Association, (www.bcxa.org)

Metering and Management

Purpose: To optimize the building's energy performance by monitoring and managing current energy used for heating, cooling, ventilation, lighting, and other services.

E5.0 Minimum Energy Metering

Required: Energy Metering System Per Code

Install an energy use metering system to measure, monitor, record and display each energy source and end-use per WSEC. Required for new buildings and additions with more than 20,000 sq. ft. gross conditioned floor area, for all energy sources (with exceptions), and sub-metered for HVAC and domestic hot water. Additionally, a data acquisition and display system is required. See WSEC for provisions that apply to existing building upgrades (modernizations and additions).

E5.1 Energy Metering – Other

E5.1.1 Energy Metering System – Not Code Required

4 points: Install an energy use metering system that meets the code required on a project that does not meet the square foot threshold.

E5.1.2 Energy Use Metering Display

For each building subject to Section C409.2 and C409.3, either a single visible display in a location with ready access, or a single web page or other electronic document available for access to building operation and management personnel or to a third-party energy data analysis service shall be provided in the building; for metering data acquisition systems and energy displays monitored by a third-party energy data analysis service, building operation and management personnel shall retain access to the metering data acquisition system and energy dis-play. The display shall numerically provide the current energy consumption rate and energy consumption total for each whole building energy source and each end use category. The energy display shall also graphically and numerically display logged data from the data acquisition system for energy consumption and energy consumption rate for each whole building energy source and each end use category for any selected day, week, month, or year.

E5.2 Energy Storage

2 points: Implement a new technology, strategy, or technique that produces actual and measurable results for on-site electric power storage that:

- Reduces the peak demand from the grid.
- Provides a reliable source of electric power.
- Provides storage for renewable energy generated (beyond what is used on the site).

Demand for electric power at a school fluctuates throughout the day, typically higher during morning start-up. Electric power providers charge commercial customers for the peak demand used during a 15-minute interval. Demand charges can be one of the highest costs on a commercial utility bill and are often not considered as an opportunity for energy-related cost savings.

This credit is to encourage the use of new technologies or strategies to reduce the peak demand of

electric power (from the grid) at a school facility while supporting the electric power providers preference of reducing customer (needs) demand in lieu of building additional power-plant capacity.

Other forms of energy storage are emerging. Consider innovation points under IEO1.4.

Resources
Energy Storage Association works to promote the adoption of competitive and reliable energy storage systems for electric service.

US Department of Energy on Energy Storage is working to develop new storage technologies to tackle the challenge of energy storage.

E6.0 Building Enclosure Commissioning (BECx)

2 points: Employ the services of a professional consultant to commission the Building Enclosure including:

- Weather barrier (I.e., Water Resistive Barrier, as currently termed by International Building Code)
- Air barrier
- Thermal envelope including insulation, fenestration, rough opening membrane flashings and sheet metal flashings (that are to keep the framing cavities' insulation dry thus thermally resistive) and massing.
- Roof Assembly and its vapor retarder/barrier to guard against air leakage and resultant roof condensation.
- BECx activities must include and be overseen by a qualified building envelope consultant.
- Define enclosure performance requirements in the OPR.
- Review design details for constructability and performance
- Prepare building enclosure details, specifications, and test plans.
- Review product test data.
- Observe construction beginning with mock-ups and testing of same where applicable, as well as part-time observation of ongoing phases of construction that affect the building enclosure and its long-term successful performance.
- Witness testing of enclosure barriers and envelope, including water penetration, air leakage and infrared thermography to verify system success.
- Prepare BECx review, site-visit, field reports for specific observation site visits, and test reports.

Review enclosure O&M Manual.

Ensure Owner O&M staff are trained on enclosure maintenance.

As buildings systems become increasingly energy efficient, the building envelope becomes more important in meeting long term energy efficiency goals, including lower WA State Clean Buildings Bill energy use intensity (EUI) targets every five-year compliance cycle.

Additionally, with increasingly tight envelopes, moisture management to keep insulation and

specific building components dry is more important so as to maintain indoor air quality and reduce risk of adverse conditions including among others structural impact and degradation, such as wood decay (e.g., wet rot) and/or steel corrosion from condensation and/or moisture intrusion.

This credit requires independent third-party building enclosure commissioning (BECx) per ASTM E2813, the National Institute of Building Sciences (NIBS) Guideline 3 or an equivalent approach. BECx testing should include: hose-stream test, (e.g. similar to AAMA 501.2) on weather barrier; controlled-spray water testing (I.e. preferably ASTM E1105, or similar AAMA test method) of fenestration (I.e. of the in-situ mock-up and at least one of each type of window and skylight) and their typical intersections with wall cladding or roofing; air barrier leakage test on air barrier (including all spaces and voids inside the air barrier, plus HVAC ducts and plenums between air handling equipment low-leakage dampers and exterior louvers & hood intakes, reliefs & exhausts); flood testing of above-grade waterproofed decks, such as, plaza or podium decks where insulation is below the waterproofing membrane; and infrared thermography on the thermal envelope including fenestration (windows, doors, translucent panels, and similar) and low-slope roof systems. Where energy efficiency credit is taken for shading and thermal massing, performance should be confirmed, such as no summer direct solar gain via vertical fenestration and thermal mass density.

The WSEC has code minimum requirements for air barrier leakage test performance; projects should seek to cost-effectively exceed these minimums as recommended by the BECx professional.

Resources
NIBS Guideline 3.

INDOOR ENVIRONMENTAL QUALITY

Daylighting and Views

Purpose: Improve student performance and well-being through quality daylighting designs that minimize glare and direct sunlight penetration and integrate views in day lit spaces. Provide a connection between indoor spaces and the outdoor environment through the introduction of daylight and views into the occupied areas of the building. Daylighting is fundamentally important to high performance design, from the standpoint of student and teacher preference, and should be a primary source of illumination in classrooms.

IEQ1.0 Permanent Shading

Required: Comply with the minimum exterior sun control requirements in WAC 246-366-050 (9), if applicable**.**

1 point: Eliminate direct sun from day lit spaces (other than instructional areas, assembly rooms and meeting rooms covered by the WAC) from March 21st until September 21st through the use of permanent or automated shading devices.

Install permanent shading devices such as various louvers, fins, light shelves, or automated blinds or shades to eliminate direct sun for day lit spaces.

IEQ1.1 Outdoor View Windows

Required: Comply with the minimum outdoor view window requirements in WAC 246-366-050 (8).

1 point: Provide a direct line of sight to vision glazing from 90% of critical task areas and office spaces, not including copy rooms, storage areas, mechanical, laundry and other low occupancy support areas.

To qualify, a space will have view glazing equal to or greater than **7%** of the floor area. View glazing will be transparent, but not translucent, and only include window area above 2.5 ft. or below 7.5 ft. from the floor.

Resources
Lighting Design Lab in Seattle, (https://www.lightingdesignlab.com/)

WAC 246-366, (http://apps.leg.wa.gov/WAC/default.aspx?cite=246-366)

IEQ1.2 Daylighting Classrooms

25% = 1 point
50% = 2 points
75% = 3 points
90% = 4 points

- 1 Point 25% of all classroom area is day lit.
- 2 Points 50% of all classroom area is day lit.

- 3 Points 75% of all classroom area is day lit.
- 4 Points 90% of all classroom area is day lit.

In determining whether classroom area qualifies as day lit under this criterion, each classroom shall be divided into a grid no more than 2 feet square and laid out across the classroom area at a work plane height of 30 inches above finished floor. Each grid shall then meet one of the following options. The percentage of the classroom area that falls within a grid area that meets one of the following options shall be the basis for qualification.

Note: Laboratories and computer rooms are excluded from the percentage calculations.

Option 1: Simulation – Single Point in Time Illuminance:
The following requirements must be satisfied in order for a classroom to qualify as day lit.

- Achieve an average horizontal daylight illumination of not less than 300 lux (28 foot-candles) for a clear sunny day at 1:00 pm Daylight Savings Time on March 21.
- At a minimum, direct sun can be eliminated for day lit spaces with the use of operable shading devices.

Or

Option 2: Simulation – Spatial Daylight Autonomy:

- Demonstrate through annual computer simulations that spatial daylight autonomy300/50% (sDA300/50%) is achieved in each qualifying grid area.
- Where annual sunlight exposure1000,250 (ASE1000,250) than 10% is achieved in each qualifying grid area provide automated glare control via motorized blinds or shades.

The sDA and ASE calculation grids should be no more than 2 feet square and laid out across the classroom area at a work plane height of 30 inches above finished floor. Use an hourly time-step analysis based on typical meteorological year data, or an equivalent, for the nearest available weather station. Include any permanent interior obstructions. Movable furniture and partitions may be excluded.

Daylighting designs should be coordinated with lighting controls and other energy-related features. Design teams may select one of two simulation options:
Option 1: Single Point in Time Illuminance Calculations or Option 2: Spatial Daylight Autonomy Calculations for the requirements are to be made using a computer simulation.

Computer Simulation Tool
Several digital simulation tools for annual and point-in-time daylighting analysis exist that are built into common 3D modeling platforms. Generally, the most accurate use the physically based Radiance-simulation engine. A minimum analysis grid of 2 ft. by 2 ft. will be used. The grid will be positioned so no analysis points are located closer than 3 ft. to a glazed wall. The average illumination calculations should then be performed for the equinox in accordance with both requirements.

Daylighting in classrooms must be uniformly distributed, with no direct-beam sunlight penetration

and minimal glare. Fixed or operable means of sun-glare control, such as roll down fabric shades and/or horizontal louver venetian) blinds, must be specified to control sunlight during times when fixed shading devices are insufficient means of glare control. There are several daylighting labs in the region, including two in Washington (Seattle and Spokane) that provide technical guidance on daylighting design and simulation.

Resources
Whole Building Design Guide, (http://www.wbdg.org/resources/daylighting.php)

University of Washington Integrated Design Lab, (https://idl.be.uw.edu/)

Electric Lighting Quality

Purpose: provide an artificial lighting environmental that promotes effective learning, teaching, and occupant health. All K–12 classrooms must be adaptable to support a wide variety of educational media and learning activities.

IEQ2.0 Electric Lighting Quality

IEQ2.0.1 Electric Lighting Quality

Required: Comply with all requirements in WAC 246-366-120. School spaces will be designed so lumen maintenance lifetime conditions meet the minimum average illumination levels as identified in WAC 246-366-120.

Contrast should be minimized with a focus on uniformity in classroom spaces.

Brightness and glare should be minimized to ensure a comfortable learning environment. Luminaires will be used with a luminance less than 2,500 cd/ m^2 between 45° and 90° from nadir, excluding whiteboard wall wash luminaires.

Luminaires within 10 feet of the teaching wall will be separately switched from the other general luminaires for AV mode. Luminaires (with or without specific luminaires aimed at the whiteboards) will provide an average illumination of 15 footcandles on the whiteboards with an average: minimum uniformity less than 3:1.

Lamp sources will have a minimum CRI/ CQS of 80. The lighting systems should operate in general illumination mode and AV mode.

The lighting system should be designed with flexibility in mind and allow the users to fully control the lighting level within the space.

IEQ2.0.2 Electric Lighting Quality – Dimming

After meeting all requirements above, dim all luminaires in the classrooms, excluding whiteboard luminaires. Provide switches that allow for manual dimming below the levels set by the photocells based on natural lighting entering the space.

IEQ2.0.3 Electric Lighting Quality – Luminaire Color

After meeting all requirements above, provide a lighting system that is designed to change the color of the luminaires (approximately 3,000 K – 5,000 K) based on the respective color of the sunlight throughout the day. (Systems may be called tunable white, circadian rhythm, human-centric lighting, etc.) System may have the ability to have a temporary override (up to 60 minutes) for "calm" (3,000 K) and/ or "test" (5,000 K) settings.

The more that teachers teach, and students learn by the glow of computers and video screens, the more critical the need for high-quality, adjustable-level lighting. The quality and quantity of light directly affect learning performance and the visual comfort of both student and instructor.

Care must be taken to integrate the daylight so that electric lighting is dimmed or turned off when natural light levels are adequate. A lighting computer program will be used to determine the performance characteristics of the electric lighting system in typical classrooms. Minimum required calculations will include point-by-point analysis of horizontal illumination levels at desk height in both modes, vertical illumination levels of the teaching wall in general lighting mode, and vertical ambient illumination on the projection screen in AV mode. Calculations must be carefully set up to analyze only the specific tasks or zones as defined in the requirement. Use of a lighting analysis program employing radiosity and/or ray tracing is necessary. Some acceptable software packages include AGI32, Radiance and LightPro.

Resources

Lighting Design Lab

Lighting and Human Performance II (free from EPRI), (http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001006415)

Indoor Air Quality

IEQ3.0 Minimum requirements for Ventilation and Filtration

IEQ 3.0.1 Permanent Ventilation

Required: Comply with ventilation requirements for primary and secondary schools in WAC 246-366-080

At a minimum meet the performance requirements for ventilation of the International Mechanical Code with Washington statewide amendments.

And

Construction Filtration

Temporary filters: If permanent air handlers must be used during construction, install filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 at each return air grille as determined by ASHRAE 52.2. Replace all filtration media immediately prior to occupancy.

And

Permanent and Construction Moisture Control
All surface grades, drainage systems, and HVAC condensate must be designed to prevent the accumulation of water under, in, or near buildings, including portables. Irrigation systems must not spray on buildings.

In addition, during the *Design Development* stage of a project, particular emphasis should be made to detailing the building envelope to eliminate the possibility of future moisture infiltration.

Building materials, especially wood, porous insulation, paper, fabric, and other porous materials must be kept dry before, during, and after installation to prevent the growth of mold and bacteria. Before installation, store all materials in a manner that assures they stay dry. If stored outside, cover building materials with plastic to protect from the rain and other sources of moisture and keep off of the ground. Immediately discard all water-damaged materials and replace with new, undamaged materials.

If building envelope components (*foundation, framing and/or sheathing*) are significantly impacted by moisture during the framing process, mitigation measures to reduce the moisture content to acceptable levels must be implemented prior to installation of insulation, wall cover, and other interior finishes.

IEQ3.0.2 Increased Ventilation (beyond WAC and Code requirement)

1 point: In all general classrooms, set the ventilation to be 21 cfm/person or greater. Ventilation rate must be maintained during all occupied hours. Increase HVAC heat recovery system efficiency beyond code to assure this approach is energy neutral. Do not take additional energy efficiency credit for this modification.

Reliance on natural ventilation alone, without mechanical support, is not recommended for schools. Natural ventilation in areas with poor outside air quality is not recommended. Additionally, during allergy and pollen season, occupants may require protection from outside air contaminants.

Resources
ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality, (http://www.ashrae.org/)

EPA Creating Healthy Indoor Environments in Schools, access the IAQ Tools for Schools to design a program and find tools for implementation, (http://www.epa.gov/iaq/schools/index.html)

WAC 246-366, Washington State Board of Health Primary & Secondary School Regulations, (http://apps.leg.wa.gov/WAC/default.aspx?cite=246-366)

WHO, Roadmap to Improve and Ensure Good Indoor Ventilation in the Context of COVID-19"(2021) https://www.who.int/publications/i/item/9789240021280

Clean Air in Buildings Challenge, EPA https://www.epa.gov/indoor-air-quality-iaq/clean-air-buildings-challenge

IEQ3.1 Outdoor Moisture Management

Required: Design surface grades to slope away from the building and the building foundation to drain away rainwater, snowmelt, and HVAC condensate to prevent ponding, pooling, or otherwise saturating the building envelope or foundation.

Rain leaders, or downspouts, must be directed to infiltration structures, on site storage, rain gardens or daylight provided that surface drainage moves water well away from the building and does not result in unintended ponding or pooling.

Lawn irrigation systems are also required to be designed to prevent spray on building walls.

And

HVAC systems that use evaporation drip pans for condensate removal are prohibited.

IEQ3.2 Low-Emitting Interior Finishes

Required: Use products that have been independently tested and certified for VOC emissions by a qualified third party. Testing for VOC emissions will be in accordance with the following:

- Interior carpet, hard surface flooring, building insulation, acoustical ceilings, wall panels, adhesives and sealants shall be tested and determined complaint for emissions of VOCs in accordance with California Department of Public Health (CDPH) Standard Method v1.2, using the applicable exposure scenario (school classroom).
- For wet-applied products, the VOC material content must be disclosed in the third-party certificate or in the manufacturer's product documentation, and must meet the applicable VOC content standard rule listed below:
    - Interior adhesives and sealants must meet South Coast Air Quality Management District Rule 1168
    - Interior Paints and Coatings must meet South Coast Air Quality Management District Rule 1113 or CARB 2019 Suggested Control Measure for Architectural Coatings
    - Concrete sealers must meet South Coast Air Quality Management District Rule 1113

1 point: All interior composite wood products must contain no added urea formaldehyde. Formaldehyde content must be disclosed in a third-party certification or the manufacturer's product documentation.

Designers should request emissions test data from manufacturers to ensure the chemical emissions are within safe levels or obtain products that have been certified by a third party, or otherwise indicate the applicable standards they meet.

Many manufacturers have developed sample material specifications to identify materials that meet the standards listed above.

Products/materials used to earn points under this credit may not be used to earn points for M2.5.

Resources
Sustainable Minds Transparency Catalog

South Coast Air Quality Management District (SCAQMD), (http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1168.pdf?sfvrsn=4)

Green Seal GS-11 Paints and Coatings, (http://www.greenseal.org/GreenBusiness/Standards.aspx?vid=ViewStandardDetail&cid=0&sid=6)

Green Label Plus – Carpet and Rug Institute, (http://www.carpet-rug.org/CRI-Testing-Programs/Green-Label-Plus.aspx)

SCS Global Services

UL Spot has over 45,000 products, easily searchable credible source of sustainable product information.

IEQ3.3 Low-Emitting Furniture

1 point: 100% of the new or newly refurbished/remanufactured student and administrative workstations (desk/table and chair or a desk/chair combination, and individual pieces) are low-VOC-emitting.

Furniture may be tested for VOC emissions following the procedures in ANSI/BIFMA M7.1-2011. Furniture shall also meet the TVOC and formaldehyde emissions guidelines in ANSI/BIFMA X7.1-2011.

Resources
Business & Institutional Furniture Manufacturers Association (BIFMA). ANSI/BIFMA M7.1-2011 Standard Test Method for Determining VOC Emissions from Office Furniture Systems, (https://www.bifma.org/?page=standardsoverview).

IEQ3.4 Source Control

3 points: Design to minimize and control sources of indoor air pollutants.

At a minimum, meet requirements for protection of indoor air quality outlined in most current Environmental Health and Safety Standards for Primary and Secondary Schools, WAC 246-366.

Control and trap soil, pollutants, and moisture at building entrances by providing an entry mat system, either permanent (grilled, grated, slotted, absorptive in any combination) or roll-out mats (if maintained under contract or by school staff). Entry mat systems should meet the EPA IAQ Design Tools for Schools specifications, or CA CHPS EQ2.1.2 at all entrances.

And

Where chemical use occurs (including housekeeping areas, chemical mixing areas), use structural deck-to-deck partitions with separate outside exhausting, no air recirculation, and negative

pressure.

And

Install range hoods vented to the outside for all cooking appliances (such as stoves and ovens).

And

Install approved fume hoods in lab and preparation spaces for working with chemicals and for demonstrations. Demonstration hoods should be clear (see through) on all sides. All pottery kilns, 3D printers, laser printers, etc. are to be vented to the outside.

And

All plumbing in areas where hazardous chemicals are being used must be resistant to corrosion and degradation if they were to inadvertently come in contact with those materials.

And

Design to physically isolate activities associated with chemical contaminants from other areas (programs) in the building.

And

Provide dedicated systems (direct exhaust, no return air, room under negative pressure) to contain and remove chemical pollutants at their source.

And

Eliminate or isolate high hazard areas and design all housekeeping chemical storage and mixing areas (central storage facilities and janitors' closets) to allow for secure product storage.

And

Design copy/fax/printer/printing (including 3-D and laser) rooms, electrical rooms, with structural deck-to-deck partitions and dedicated exhaust ventilation systems.

And

Do not acquire fossil fuel powered machinery that is mobile and whose specific function is for use inside the building such as polishers and burnishers.

During design, schools may want to utilize the EPA's IAQ Design Tools for Schools; Controlling Pollutants and Sources to identify sources of pollutants and design the facility to control source contaminants. Design considerations include walk-off mats, air-intake locations, material and furniture selection, hazardous, and dangerous material use and storage, housekeeping, food

services, technical programs creating air and water pollutants, among others. If used, maintain a copy of the EPA's IAQ checklist for reference when developing the Indoor Air Quality Management Plan. Credit for the IAQ Plan can be taken in IEO3.4.5.

Resources
EPA IAQ Design Tools for Schools: Controlling Pollutants and Sources, (http://www.epa.gov/iaq/schooldesign/controlling.html)

EPA Creating Healthy Indoor Environments, (http://www.epa.gov/iaq/schools/index.html)

WAC 296-828 L&I Hazardous Chemicals in Laboratories, (http://apps.leg.wa.gov/WAC/default.aspx?cite=296-828)

IEQ3.5 Ducted HVAC Returns

1 point: Install all ducted HVAC returns.

The benefit of ducted returns is the ability to control the air flow out of the classroom as well as into the classroom with a ducted supply air system. This allows pressure gradient control: the ability to maintain a slightly positive pressure gradient to outdoors. Plenum returns are easily contaminated with dust and microbial growth.

IEQ3.6 Construction IAQ Management

IEQ3.6.1

1point: During construction, meet or exceed all of the following minimum requirements:

Temporary construction ventilation: Continuously ventilate with temporary equipment (not the permanent HVAC system) affected spaces during installation of materials that emit volatile organic compounds (VOC) and for at least 72 hours after installation. Ventilate longer than 72 hours if necessary to remove odors. Exhaust the air directly to the outside; do not re-circulate to other enclosed spaces.

And

Duct protection: Turn the permanent mechanical system off and protect HVAC supply and return openings from debris generated during dust-producing activities such as drywall installation and finishing. Provide temporary ventilation as needed. Additionally, specify that ductwork be sealed when transported to the construction site and store ductwork in clean, dry conditions and keep sealed during storage. Wipe down internal surfaces of ductwork immediately prior to installation to remove dust.

And

Preconditioning: Allow products with odors and significant VOC content to off-gas, off-site in a

dry, well-ventilated area for at least two weeks prior to delivery to the construction site. Remove products from their containers and packaging to maximize off-gassing of VOCs.

And

Sequencing: Install any necessary odorous and/or VOC-emitting products and allow to off-gas prior to installation of porous and fibrous materials.

And

HEPA vacuuming (carpets and upholstery): After installation, vacuum carpeted and soft surfaces with a high-efficiency particulate arrestor (HEPA) vacuum as needed and just prior to occupancy.

And

HEPA duct cleaning: Prior to installation, inspect ducts for dust and debris. Remove any dust, dirt, and residual oil. Prior to substantial completion and prior to using the permanent mechanical system, inspect the ducts again for dust and other debris that may have collected during construction. Immediately remove any dust using a HEPA vacuum. Bid specifications must require that new ducts be pre-cleaned and sealed prior to shipping to the job site.

IEQ3.6.2

After Construction select one of the following two options, to be implemented after construction ends and the building has been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles, and furniture must be installed, and major VOC punch list items must be finished.

Option 1: Building Flush-out Before Occupancy
Install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot (4 267 140 liters of outdoor air per square meter) of gross floor area while maintaining an internal temperature of at least 55°F.

During building flush-out, the following measures must be in place:

- All inside doors must be open and all exterior doors must be closed.
- There should be no construction activity inside or adjacent to the building during the flush-out, specifically not near outside air intakes.

Option 2: Building Flush-out After Occupancy
The school may alternatively conduct the flush-out while the building is occupied provided the specified testing occurs prior to building occupancy, followed by flush-out.

Step 1: The square root of the total number of classrooms must be tested for compliance with the following criteria. Any non-compliant rooms must be remedied and re-tested at the same sampling point until they are compliant. Two additional classrooms per non-compliant classroom must also be tested in all items below in the event of non-compliance. Conduct all testing before occupancy with the building ventilation system started at the normal daily start time and operated at the

minimum outdoor airflow rate for the occupied mode throughout the test. Conduct testing using protocols consistent with the methods listed in Table 5 below. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use. Demonstrate that contaminants do not exceed the concentration levels listed in Table 5.

Step 2: Once tested, classrooms have met compliance in step 1, and concurrent with initial occupancy, the building must be ventilated at a minimum rate of 0.30 cubic foot per minute (cfm) per square foot of outdoor air (1.5 liters per second per square meter of outdoor air) or the design minimum outdoor air rate, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air (4 270 liters of outdoor air per square meter) has been delivered to the space.

Table 5: IAQ Testing After Construction Protocols and Containment Levels

Contaminant	Maximum concentration	ASTM and U.S. EPA methods	ISO method
Formaldehyde	16 ppb	ASTM D5197; EPA TO-11 or EPA Compendium Method IP-6	ISO 16000-3
Particulates (PM10 for all buildings; PM2.5 for buildings in EPA nonattainment areas, or local equivalent)	PM10: 50 micrograms per cubic meter PM2.5: 15 micrograms per cubic meter	EPA Compendium Method IP-10	ISO 7708
Ozone (for buildings in EPA nonattainment areas)	0.075 ppm	ASTM D5149 - 02	ISO 13964
Total volatile organic compounds (TVOCs)	500 micrograms per cubic meter	EPA TO-1, TO-15, TO-17, or EPA Compendium Method IP-1	ISO 16000-6
Target chemicals listed in CDPH Standard Method v1.2, Table 4-1, except formaldehyde	CDPH Standard Method v1.1–2010, Allowable Concentrations, Table 4-1	ASTM D5197; EPA TO-1, TO-15, TO-17, or EPA Compendium Method IP-1	ISO 16000-3, 16000-6

Contaminant	Maximum concentration	ASTM and U.S. EPA methods	ISO method
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	EPA Compendium Method IP-3	ISO 4224

Each of the listed construction practices will improve indoor air quality by minimizing the amount of indoor pollutants that are distributed and retained by the surface materials and ventilation systems during construction. Flushing out the building with tempered 100% outside air will help remove indoor pollutants prior to occupancy.

Resources
EPA Creating Healthy Indoor Environments in Schools, (http://www.epa.gov/iaq/schools/)

Acoustics

Purpose: Provide the acoustical qualities necessary for good speech communication between students and teachers in classrooms and other learning spaces.

IEQ4.0 Acoustic Performance

Background Noise:
Table 6 provides the maximum unoccupied background noise levels generated from HVAC system noise, which is quantified as the Noise Criterion (NC). Furthermore, the overall noise levels from all sources of environmental, interior, and HVAC system noise shall not exceed the maximum dBA criteria at any student location within the unoccupied classroom (measured as a noise average Leqx where x is thirty seconds or more) The prerequisite 45 dBA average background noise level is considered *not* conducive to effective instruction and represents minimal compliance with the noise levels required by the State of Washington (WAC 246-366-110, *Sound Control*). School districts and designers are strongly encouraged to move beyond these prerequisites and achieve background noise levels of NC 30 (HVAC noise) and 40 dBA (all noise sources) for all classrooms (see IEQ4.1). (ANSI S 12.60-2010).

Compliance with this prerequisite must be determined with the classroom HVAC system and noise generating components in normal operation during conditions representing reasonable worst-case equipment loads. Specifications for noise measurement equipment and procedures are defined in the American National Standard – "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-2010).

Exterior or environmental noise from traffic, aircraft, rail, industrial sites, mechanical equipment at school sites should be quantified in terms of dBA to understand the potential impact to critical spaces through the building envelope. Windows, walls, and doors should be designed to sufficiently reduce exterior sources to meet the criteria.

Column IEQ 4.0 is required for all projects. Column IEQ 4.1 is optional for one WSSP credit.

Table 6: Background Noise Level Criteria

Space Type	Acoustic Criteria for NC/dBA	Acoustic Criteria for NC/dBA
	IEQ4.0 (Minimum Req.)	**IEQ4.1 (1 point)**
Classrooms, Core Learning Spaces, and Libraries	NC-35 / 45 dBA	NC-30 / 40 dBA
Corridors, Common Areas, and Gymnasiums	NC-45 / 50 dBA	NC-40 / 45 dBA

Sound Transmission and Impact Insulation:
Table 7 provides the acoustic performance criteria to address noise that intrudes into classrooms from adjacent spaces within the building. Interior noise sources shall be isolated through the proper design and construction of building assemblies.

Minimum Sound Transmission Class (STC) and Impact Insulation Class (IIC) performances of wall and floor-ceiling assemblies between classrooms and core-learning spaces are provided with the intention of reducing distractions and disturbances between these adjacencies that can otherwise interfere with learning. When these assemblies are tested in the field, a Noise Isolation Class (NIC) rating that is within 5-points of the STC criteria is considered to be in compliance. Compliance with the sound ratings for interior partitions shall be demonstrated through testing as specified in ANSI Standard S12.60.

Table 7: Acoustic Performance Criteria

Space Type	Adjacent Space Type	Acoustic Criteria for STC	Acoustic Criteria for STC
		IEQ4.0 (Minimum Req.)	**IEQ4.1 (1 point)**
Classrooms and Core Learning Space	Classrooms and Core Learning Space	STC 45	STC 50
Classrooms and Core Learning Space	Corridor, Hallway, or Common Area	STC 40	STC 45
Classrooms and Core Learning Space	Gymnasium, Band/ Music Room, Cafeteria, or Mechanical Room	STC 55	STC 60
Classrooms and Core Learning Space	Bathroom	STC 50	STC 55

Classrooms and Core Learning Space	Classrooms and Core Learning Space	IIC 45	IIC 50

Room Reverberation:
Table 8 provides the maximum average (*unoccupied*) reverberation times (RT) for the most critical spaces. Surface treatments, materials, and finishes in a space impact the clarity of speech as a listener must deal with delayed reflected sound that can reduce the intelligibility of speech coming directly from a speaker or other sound source. By introducing a sufficient amount of acoustic surfaces, students can understand the vast majority of speech, rather than potentially feeling lost or overwhelmed by a lack of intelligibility. This condition is increasingly more challenging for students located farther from the teacher. Therefore, optimal room reverberation will provide a more equal learning experience at different student locations within a classroom or learning space.

A space will be compliant when the average measured RT at mid-frequencies (500, 1000, and 2000 Hertz) does not exceed the RT criteria. Acoustic materials must have a Noise Reduction Coefficient (NRC) rating, to understand how much absorption they provide. Acoustical experts will further know how much they provide each of the middle frequencies. Thinner acoustic materials typically provide less absorption at lower frequencies.

Table 8: Room Reverberation Criteria

Space Type	Volume	Acoustic Criteria for RT (Seconds)	Acoustic Criteria for RT (Seconds)
		IEQ4.0 (Minimum Req.)	**IEQ4.1 (1 point)**
Classrooms and Core Learning Spaces	$V \leq 10{,}000\ ft^3$	RT ≤ 0.6	RT ≤ 0.6
Classrooms and Core Learning Spaces	$10{,}000\ ft^3 < V$	RT ≤ 0.7	RT ≤ 0.7
Gymnasiums	$V \leq 150{,}000\ ft^3$	RT ≤ 1.7	RT ≤ 1.3
Gymnasiums	$150{,}000\ ft^3 < V$	RT ≤ 2.0	RT ≤ 1.5
Multi-Purpose, Commons, Cafeterias	$V \leq 100{,}000\ ft^3$	RT ≤ 1.5	RT ≤ 1.2

Multi-Purpose, Commons, Cafeterias	100,000 ft^3 < V	RT ≤ 1.7	RT ≤ 1.4

Good acoustical qualities are essential in general classrooms where speech communication is an important part of the learning process. Excessive background noise or reverberation in such spaces interferes with speech communication and thus presents an acoustical barrier to learning. With good classroom acoustics, learning is easier, deeper, more sustained, and less fatiguing. Teaching is more effective and less stressful with good acoustical characteristics in a classroom. There can be more verbal interaction and less repetition between teacher and students when spoken words are clearly understood.

Everyone in a classroom, including teachers, will benefit. Special beneficiaries are young children in early stages of language acquisition and persons with hearing difficulty, second language challenges, speech problems, attention deficit, or other learning disabilities. Conformance with the provisions of this prerequisite will improve the quality of education by removing or significantly reducing any residual acoustical barriers for *all* students and teachers, including those with communication challenges. Good architectural design practice and attention to detail throughout the construction or renovation process can ensure conformance to the acoustic requirements.

Compliance with this prerequisite must be determined with the classroom ventilation system and noise generating components, such as compressors and fans, in normal operation during conditions representing reasonable worst-case equipment loads. Specifications for noise measurement equipment and measurement procedures are defined in the American National Standard – "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-2010).

Resources
National Clearinghouse for Educational Facilities, (http://www.ncef.org/)

Washington Administrative Code, WAC 246-366-110, *Sound Control,*
https://apps.leg.wa.gov/WAC/default.aspx?cite=246-366-080

National Clearinghouse for Educational Facilities, (http://www.ncef.org/)

A part of AMCA's Fan Application Manual, aimed primarily at the designer of air moving systems, showing methods to improve fan inlet and outlet connections, resulting in reduced noise and energy consumption at optimum fan performance. (http://www.amca.org/)

IEQ4.2 Sound Amplification

1 point: Provide accommodations for a sound amplification system and an assistive listening system in all classroom spaces.

- A sound amplification system to amplify the teacher's voice, via wired or wireless microphones, and to amplify audio visual presentations.
- A dedicated or portable assistive listening device (system) to amplify the teacher's voice, via

wired or wireless microphones, and to amplify audio visual presentations.

A properly designed sound system is an effective method for increasing the speech level in a classroom, thereby increasing the signal-to-noise ratio (SNR), signal being the voice you want to hear above all the other background noise. In addition to improved speech intelligibility, the use of a sound system can significantly reduce voice fatigue for the teacher or presenter and improve speech perception. It is important to note that amplified speech does not reduce the requirement for background noise control, because communication between students, and between student and teacher, must continue to be facilitated by a low background noise level.

For compliance with this credit, the sound system must:

- Provide uniform sound distribution at all student seating areas within a classroom. Uniformity is confirmed if measurements across all student seating areas are within +/- 2 dB in the 1/1-octave band centered on 2000 Hertz.
- Provide distribution to all student seating areas within a classroom utilizing either dedicated or portable assistive listening systems.
- Provide a minimum signal-to-noise ratio of 15 dB across all student seating areas. Uniformity is confirmed if A-weighted amplified speech sound level measurements are 15 dB above background sound levels across all student seating areas.
- In addition, designers are encouraged to meet the maximum unoccupied background noise levels of 40 dBA, as set in IEQ4.1. Relying solely on amplification is not considered best practice.

Resources

Assistive Technology. 2005. 7 December 2005. The American Speech-Language-Hearing Association, (http://www.asha.org/public/hearing/treatment/assist_tech.htm)

IEQ4.3 Acoustical Consultant

1 point: Retain the services of an experienced acoustical consultant (with a minimum of ten years' experience in Educational Facilities). Prior to the conclusion of Schematic Design, the consultant must be involved in the design process and provide integrated team review, outline specifications and acoustic performance requirements, code sheet requirements, and general acoustic performance input.

By Design Development, provide review and recommendations of architectural and mechanical systems, specifications, and basic system details or edits.

By the Bid Period, have provided Contract document coordination, review, and input.

During construction and prior to occupancy, provide submittal review for acoustic related items, and site observations of installed acoustic components and systems.

Thermal Comfort

Purpose: Provide consistent thermal comfort to support optimum health, productivity, and comfort.

IEQ5.0 Thermal Code Compliance

Required: Comply with ASHRAE Standard 55 - Thermal Comfort Conditions for Human Occupancy, for thermal comfort standards within established ranges per climate zone. For buildings designed with occupant-controlled naturally conditioned spaces ensure an adaptive comfort standard has been established.

Satisfaction with the thermal environment is important because it influences productivity and health of building occupants. There are large variations from person to person in terms of thermal comfort. Center for the Built Environment (CBE) Thermal Comfort Tool for ASHRAE 55 can be used to do thermal comfort calculations.

Indoor design temperature conditions for general comfort applications will be determined in accordance with ANSI/ASHRAE 55 or the chapter titled "Thermal Comfort" in the ASHRAE Handbook Fundamentals.

Resources
ASHRAE Standard 55, (http://www.ashrae.org/)

ASHRAE Center for the Built Environment (CBE) Thermal Comfort Tool, (http://smap.cbe.berkeley.edu/comforttool)

IEQ5.1 Radiant Heated Floors

2 points: Provide radiant heated floors in all general classrooms that serve elementary students grade K through 5.

Elementary students are apt to spend time on the floor. Often floor covering in elementary schools are hard surfaces that are cold even during normal school hours. Radiant heating systems supply heat directly to the floor. The systems depend largely on radiant heat transfer -- the delivery of heat directly from the hot surface to the people and objects in the room via infrared radiation. Radiant floor heating should be considered when designing the building heating system.

Radiant heating is the effect you feel when you can feel the warmth of a hot stovetop element from across the room. When radiant heating is located in the floor, it is often called radiant floor heating or simply floor heating.

Radiant heating has a number of advantages, including being more efficient than forced-air heating because it eliminates duct losses. Radiant heating is beneficial for students with allergies because it doesn't distribute allergens like forced air systems can.

User Control

IEQ6.1 User Control-Windows

1 point: Provide a minimum of two operable windows in each standard classroom.

Operable windows are important for personal comfort and can contribute to improved student

performance. In addition to providing fresh air, they provide a connection to the outdoors.

Provide at least two operable windows in each classroom. It is recommended to **interlock controls with the HVAC system** to optimize energy efficiency. During building orientation teachers and staff must be taught how to properly use the HVAC controls in their rooms and how opening doors and windows affect ventilation and comfort.

IEQ6.2 User Control-Temperature

1 point: Provide a temperature control in each classroom that is adjustable by the occupants during occupied hours.

Individual classrooms will vary in temperature depending on their orientation and other building conditions. Provide individual or integrated controls systems to allow teachers and staff to regulate the temperature of each individual classroom.

Temperature control systems should not give teachers and staff free range to adjust the temperature to whatever they desire. Install systems that allow temperature adjustments in a room to within 1-2 degrees of the standard setting for the season (e.g., 70° in winter). This will improve their comfort while not having a significant adverse impact on the building's energy efficiency. Establishing a standard temperature setting for the entire building is an important corollary action.

INTEGRATION, EDUCATION, & OPERATIONS

The purpose of this section is to capture and acknowledge activities before and after construction of a high-performance school that lead to its on-going success. Planning, through integrated design, brings together various disciplines involved in designing, building, and occupying a school facility. The school can also become a hands-on teaching tool for students to learn about the benefits of high-performance design. There are also post-construction activities that districts can do to assure the goals of the high-performance design are achieved once the building is in operation.

Integration

Purpose: To have the entire project team incorporate sustainable building strategies in early programming and ongoing design decision-making. This approach helps maximize systems integration and associated efficiencies and cost-benefits, as well as identify other sustainable opportunities.

IEO1.1 Integrated Design Workshop

1 point: Integrated Design Workshop. Conduct a workshop no later than mid-schematic design phase. Include project stakeholders to collaboratively develop a range of sustainable building strategies for all five categories of the WSSP, document the project's sustainable building goals, and incorporate them as an ongoing part of programming and design decision-making.

A second workshop held prior to the construction drawings phase is highly recommended.

Sustainable building design requires new and often innovative design approaches that cross boundaries of professional expertise and need to be considered comprehensively to be successfully incorporated. Experience with project teams in Washington and across the country has shown that projects that successfully incorporate a wide range of sustainable building strategies are those that involve project stakeholders in early design programming, analysis, and design decisions. For best results, this process should begin with a collaborative workshop held no later than mid-schematic design phase, with another workshop prior to construction drawings phase.

An Integrated Design Workshop is an important first step in achieving the benefits of integrated design. A collaborative team process can carry out the ideals expressed in the workshop by continuing an interdisciplinary dialogue through the design process, by documenting design

decisions related to this effort, and by ensuring sustainable building strategies are incorporated in construction documents and the construction process itself.

To earn this credit, it is suggested the workshop be a minimum of 3 hours; however, more time is suggested. Software programs are available that can be used during the workshop to provide immediate feedback on the feasibility of strategies being considered.
Stakeholders should include district representatives, design consultants, construction representatives (if available), and school occupants. Examples of attendees in these categories include:

- District Representatives – Capital projects staff, building operations and maintenance staff, representative administrators, and school board member.
- Design Consultants – Architect and sub consultants (civil, structural, electrical, mechanical, acoustic, landscape, etc.), value engineer. Energy providers and local building and planning officials also can be valuable contributors.
- Construction Representative, if available – General contractor, commissioning agent.
- School Occupants – Teachers, principal, maintenance, custodial, and operations staff, students, and representative parents.

In Integrated Design Workshops, open dialogue is encouraged and expected. Operate with a few fundamental ground rules:

- A neutral, non-confrontational environment.
- Life cycle value needs to be considered along with imperatives of first cost.
- Reservations are noted with the expectation that strategy proponents will provide additional investigation to further refine and justify that particular strategy.

Deliverables from the Integrated Design Workshop will guide the collaborative process for the remainder of the project, and include:

- Sustainable building mission statement.
- Set of high-level sustainable building goals that relates to the specific project's priorities.
- Summary of sustainable strategies to be incorporated or investigated further.
- Identification of project team member(s) responsible for specific sustainable strategy development, including a timeline for reporting back to the team.
- Preliminary WSSP Scorecard indicating credits easy to achieve, credits of moderate difficulty that require further investigation, and credits unlikely to be achieved (easy, moderate, difficult, OR yes, maybe, no).
- Use the meeting notes or sustainable narrative that results from this workshop as the Sustainable Narrative due to OSPI with the D9 High-Performance Building submittal.
- Use the meeting notes when developing the Owner's Project Requirements (OPR).

IEO1.2 Enhanced Integrated Design

1 point: Advanced Design Modeling

Utilize an advanced BIM decision-making tool for integrated sustainable design; whole building life cycle assessment (WBLCA); or environmental impact modeling tool such as Tally, Athena, One Click, or Skanska's Embodied Carbon in Construction Calculator (EC3); or others that facilitate calculation of embodied and/or operating carbon emissions.

1 point: Cross-Category Workshops
During the integrated design workshop, set aside time to specifically discuss design opportunities to improve multiple high-performance outcomes by identifying criteria across categories (Site, Water, Materials and Waste, Energy, Indoor Environmental Quality) that contribute to the achievement of other category credits and/or design strategies that also promote human health, nutrition, or wellness.

IEO1.3 Durability

1 point: Implementation of Durability, Efficiency and Maintainability Features
Provide Architect's certification that major components of the facility are designed to exceed the 50-year useful service life envisioned by the state of Washington. A criterion for this certification is the design professional's evaluation of the building systems design life. The architect's certification should outline the specific features and indicate how they will improve service life, given reasonable use and maintenance.

A commonly held and common-sense definition of sustainable buildings is: They should be durable, efficient to operate, and easy to maintain. Promoting durability, efficiency of operation and ease of maintenance should be one focus of the integrated design workshop.

This point gives credit to implement goals and strategies related to durability developed in the integrated design workshop.

Often it is difficult to track the precise costs of items that serve these ends. Such items may involve more than one design discipline and serve more than one purpose. For example, upgrading the type and extent of masonry cladding may increase building life and decrease maintenance, as well as contribute to the thermal envelope and energy performance.

The following are required to be considered during the design professional's durability evaluation:

- Foundation, substructure, retaining walls.
- Type and extent of durable envelope materials (insulated concrete forms, masonry, cladding, roofing, windows, etc.)
- External railings, doors, staircases, ramps.
- Maintainability and useable life of major heating, ventilation, lighting, communications, and data systems.
- Expected useful life and replacement cost of major interior finishes including flooring, wall covering, ceilings and doors and door hardware.

The Washington State School Construction Assistance Program requires that facilities built with state-assistance funds be used for at least 30 years before they are eligible for additional funding.

Resources
School Construction Assistance Program,
(http://www.k12.wa.us/SchFacilities/Programs/SchoolConstructionProjects.aspx)

IEO1.4 Faculty and Staff Changing and Shower Facilities

1 point: Provide a minimum of one onsite changing room and shower facility for faculty and staff, separate from any facility designated for students (toilet rooms, locker rooms). If only one is provided design for unisex use. If 2, then one for each gender, or as determined best suitable to serve the non-student population.

EO1.5 Innovation

2 points maximum, 1 point per innovation

Implement a new technology, strategy, or technique that produces actual and measurable results, is not used to comply with a point in another WSSP credit, and that strives for at least one of the following goals:

- Improves the health and performance of students and staff.
- Improves the performance and efficiency of the school facility, or operation of the facility.
- Restores the natural environment and/or addresses GHG reductions.
- Achieves Living Building status as defined by the Living Future Institute.
- Demonstrate exceptional performance in an existing criterion area through submission of a narrative explaining how the intent was exceeded by a significant amount.]

The following may be considered for innovation points, in addition to others that meet the goals stated above:

- Strategies or technologies not tried in school buildings.
- Master plans that incorporate high-performance elements.

IEO1.6 Biophilic Design

1 point: Biophilic Design

Document and implement a holistic Biophilic Plan to strengthen connections between building users and natural ecosystems. The plan must incorporate a minimum of six biophilic features, with at least two elements in each of the three categories: Nature in the Space (physically experiencing nature), Nature of the Space (spatial configurations), and Natural Analogues (nature-inspired elements).

Biophilic Plan will likely include multiple strategies working together to create an overall experience for all users that is grounded in place and nature.

1 point: Responsive Design

Provide a minimum of two interior or exterior features that create safe and calming spaces, provide sensory input, or contribute to a sense of community. Features may include the sites' cultural, spiritual, archeological, or architectural history.

1 point: Educational Materials

Provide educational materials for students and teachers that document the successful biophilic design strategies.

Purpose: To contribute to user health and wellness by providing an experience that is grounded in place and connected to nature.

"The opportunity of biophilic design is to connect to the particular ecology of the place, to its

culture, history and beauty and to create a building that will regenerate life"
- Amanda Sturgeon, FAIA, ILFI TrimTab Issue 29, August 30, 2016.

A fundamental function of a school building is to shelter students and staff from the harsh elements present in the natural world, allowing occupants to focus on student growth and development. While shelter from some elements is necessary, current research indicates benefits to strengthening human connections to natural systems such as daylight, fresh air, moving water and plant life.

Modeled after the Living Building Challenge and Well Building Standard, the purpose of this credit is to create an experience for users that is fundamentally grounded in place and connected with nature. Often projects are located on sites where native ecosystems have been significantly altered by previous development. These projects are opportunities to re-introduce natural elements and/or restore existing systems still present on site. For example, a project could restore a stream of water to a more natural state and provide views and trails to the stream at multiple locations throughout the project. Another strategy may implement a series of indoor and outdoor spaces planted with native plants, and accessible to users with views, operable windows, doors, and pathways.

Successful Biophilic Plans strengthen connections to existing natural systems throughout the project and introduce natural elements conducive to human health and wellness both indoors and outdoors.

Projects achieving this credit must:

- Conduct an integrated design charrette with the client and building users to specifically address biophilic design strategies. Employ targeted engagement tools such as:
  - Narratives describing strategies employed.
  - Outline documenting building user groups and how each is accommodated.
  - Building and site drawings highlighting spaces addressed by plan, installation locations, and access points.
- Successfully implement biophilic design strategies from the charrette.

For 1 additional point:

- Provide educational materials for students and teachers that document the successful biophilic design strategies, such as:
  - A dedicated section within a larger Building User Guide.
  - Supporting materials that align with curriculum, such as the Next Generation Science Standards and Washington's Integrated Environmental and Sustainability Learning Standards.

Resources

International Living Future Initiative, *Biophillic Design Initiative*

Heerwagen, Judith H., et al. Biophilic Design: the Theory, Science, and Practice of Bringing Buildings to Life. Wiley, 2008

Terrapin Bright Green: 14 Patterns of Biophilic Design, Improving Health & Well-Being in the Built

Environment, 2014

IEO1.7 Pursue Additional Funding Sources

2 points: Pursue private and public funding in support of initiatives/features that provide long-term environmental benefits to the building and site.

Financial assistance is available to offset incremental costs associated with designing and building a high-performance school. Pursue government agency, utility provider and private business rebates, incentives, tax credits and other financial support for all environmental initiatives, including energy efficiency, renewable energy sources, natural resource conservation, pollution reduction and site restoration.

Funding from the School Construction Assistance Program and direct appropriations for new construction and modernizations from the state capital budget do not qualify for this credit.

Resources

The US Energy Department Energy database of tax credits, incentives, and rebates by state.

The Office of Energy Efficiency & Renewable Energy

IEO1.8 Safer Schools by Design

2 points: Design safer schools by including at least 4 of the elements of safe school design in new building, addition, and modernization projects.

Conduct a Crime Prevention Through Environmental Design (CPTED) workshop with key project stakeholders and a CPTED professional at the outset of, or before, schematic design to identify site, building, and interior issues, and define strategies aligned with CPTED principles. The design team must incorporate these strategies in the project design.

Design safer schools by doing more than considering school safety in plans and designs per chapter 28A.335.010(2) RCW – School buildings, maintenance, furnishing, and insuring–School building security. By implementing safety in design, school districts are better able to protect students and staff. Include at least 4 of the elements of safe school design in the new building, addition, or modernization project.

The School Facility Design Safety Guidance document includes the following elements to choose from:

1. Fencing
2. Lighting
3. Windows
4. Natural Surveillance
5. Landscaping
6. Access Control
7. Perimeter security control
8. Design of Entrances and Main Office

Resources
Office of Superintendent of Public Instruction School Facility Design Safety Guidance document

Prevention Through Environmental Design. Access CPTED design guidelines to follow during design or when conducting a security property assessment

Education

Purpose: To engage students and teachers in learning about the benefits of green building, using their own building as a learning tool.

IEO2.1 Green Building Learning

1 point: Develop student-learning opportunities by using the building structure and site, through demonstration areas, exposed systems, lesson plans, teaching aids, interpretive graphics, and signage.

1 point: Provide students, teachers, and staff with knowledge of each aspect of the high-performance design and their responsibility for use and preservation.

Operations

Purpose: To encourage pre-construction and post-construction activities that contribute to the understanding of high-performance schools, as well as implementing operational plans and systems that assure the goals of the high-performance design are achieved once the building is in operation.

IEO3.0 Operational Performance Monitoring

Required: The project energy and water use will be tracked in EPA's Energy Star Portfolio Manager for a period of 5 years following either building occupancy or board acceptance.

Major school district projects that fall under the chapter 39.35D RCW High-Performance Public Buildings must monitor, document and report operating benefits and savings to OPSI for a period of five years following building occupancy or board acceptance. Operating benefits and savings are defined as energy and water use. Monitoring, documenting, and reporting energy demand and solid waste is at the discretion of the school district.

EPA has created Energy Star Portfolio Manager, a free, online tool to measure and track energy and water consumption, as well as energy demand, waste, and greenhouse gas emissions. It has become the industry-leading benchmarking tool across all property types, including school, office buildings, healthcare, manufacturing/industrial and retail. Energy Star Portfolio Manager makes it easy to compare the targeted energy use to the actual energy use of a single property or compare the energy use of a whole portfolio of properties, all in a secure online environment.

An Energy Star Portfolio Manager account is required in order to add the new property. Account owners (districts) must "connect" with OSPI School Facilities and Organization in order to "share"

the new property. Energy and water use must be uploaded or entered manually to the property at a minimum of once every year in March, but preferably every quarter. The more often energy and water use is entered into Portfolio Manager the more benefit the program can be to the district. Benefits of more frequent tracking include the ability to see spikes in use, the ability to use the data to help predict operating costs for a future budget year and to prioritize buildings for a modernization or retrofit project based on high or low energy and water use.

Resources
A full suite of detailed instructions and basic and advanced training is available on the ENERGY STAR Portfolio Manager website.

IEO3.1 Post Occupancy Evaluation

IEO3.1.1 Post Occupancy Evaluation - Occupant Survey

Required: Conduct a Post Occupancy Evaluation (POE) at least one year after the building is occupied, but no longer than two years after. A written plan for a POE must be in place at the time of the final (D11) high-performance submittal. The POE evaluation will include at a minimum:

- Surveys of occupants regarding comfort, including thermal comfort, air quality, lighting, building furnishings, spatial layout, and acoustical comfort.

IEO3.1.2 Comprehensive Post Occupancy Evaluation

2 points: In addition to the required elements listed above the PEO includes additional topics such as security, accessibility, transportation, and green building features, as well as an analysis of the actual resource use (energy and water).

And

The POE investigates connections between the facility and health, user satisfaction, academic achievement, and other fundamental goals of facility construction.

A POE is a formal process that measures the building performance and success of the design. It is an important means of building a body of knowledge about the impact of building strategies employed in a particular building. This knowledge will be useful for school districts in planning future capital projects and in implementing green building requirements. The POE should endeavor to include all building users in the survey and response.

A Post Occupancy Evaluation is important because:

- It helps to point out whether the initial design and programming efforts were on target.
- It evaluates whether the project satisfies the needs of its users.
- It makes recommendations for change if the needs are not satisfied.
- It helps to quantify the contributions of the design, potentially to a larger audience (the community) where it could increase the visibility of good school design.
- It helps save money on renovations and re-design of problematic places.
- It builds credibility for the school district as a responsible entity that cares about how

people use places and how places reinforce the efforts of the people who use them.
- It contributes to the body of design knowledge about schools.

At a minimum, the POE required for earning this credit includes occupant surveys regarding comfort, including thermal comfort, air quality, acoustical comfort, lighting, spatial layout and building furnishings.

To earn two points the POE will include an analysis of energy and water use, and additional topics such as security, accessibility, and transportation. This comprehensive evaluation will also investigate connections between the facility and health, user satisfaction, academic achievement, and other fundamental goals of facility construction.

The CHPS Operations Report Card™ (ORC) is an available resource to Washington schools. With the ORC, you can benchmark the performance of your schools against the expected results and develop data-driven improvement plans if necessary. The ORC evaluates seven metrics: indoor air quality, energy efficiency, visual quality, acoustics, thermal comfort, water conservation, and waste reduction.

Resources
Center for the Built Environment, University of California, Berkeley, POE program is available to Washington schools, (http://www.cbe.berkeley.edu/)

WSU Energy Extension Program,
(http://www.energy.wsu.edu/ResearchEvaluation/ProgramEvaluation.aspx)

New Buildings Institute, (www.newbuildings.org)

NEEC's Smart Buildings Center tool lending library has diagnostic tools available to building owners and managers,

IEO3.2 Energy and Life Cycle Cost Analysis

IEO3.2.1 Energy Life Cycle Cost Analysis

Required: As part of the early design process, perform an Energy Life Cycle Cost Analysis (ELCCA) to meet chapter 39.35 RCW – Energy Conservation in Design of Public Facilities requirements.

For major facilities that are (1) new buildings having twenty-five thousand gross square feet or more of usable floor space, (2) renovation, modernization, addition, alteration or repair of a facility having greater than twenty-five thousand square feet, work completed within a 12-month period, the project cost is more than 50 percent of the assessed value of the existing facility and the project affects energy-using systems.

IEO 3.2.2 Energy Life Cycle Cost Analysis (not required)

1 point: Perform an ELCCA for all other facilities (1) new building projects larger than five thousand gross square feet, but less than twenty-five thousand gross square feet of usable floor space, (2) renovation, modernization, addition, alteration, or repair of a facility where the cost is less than 50

percent of the assessed value of the existing facility.

IEO3.2.3 Energy Life Cycle Cost Analysis Update

1 point: Update the ELCCA energy model based on final construction drawings. This is a valuable tool that can be used to compare designed performance with actual performance.

IEO3.2.4 Life Cycle Cost Analysis

1 point: Perform a Life Cycle Cost Analysis (LCCA) showing 50-year net present value.

The ELCCA is required for many public buildings in Washington. The State ELCCA program is administered by the Department of Enterprise Services (DES). Guidance and spreadsheets are available on their web page:
(http://des.wa.gov/services/facilities/Energy/ELCCA/Pages/default.aspx)

Typically, first cost is the primary economic factor when analyzing whether to proceed with a specific strategy, sustainable or not. However, it is in the long period of operation when the employed strategy will prove economically advantageous or not.

A Life Cycle Cost Analysis (LCCA) is a method for assessing the total cost of ownership for a new facility or a building system. The analysis is done to estimate the total costs of project alternatives that take into consideration costs of acquisition, initial capital investment, ongoing operating and maintenance costs, and other costs beneficial for the analysis. The results of the analysis allow school districts to select the design that ensures the new facility or building system provides the lowest total cost of ownership consistent with the project's intended quality, function, and lifespan.

There are a variety of methods to use to conduct an LCCA, varying in complexity. The National Institute of Building Sciences describes LCCA in its Whole Building Design Guide. The discussion includes a description of "Present Value" Analysis required to earn this credit. This method converts cash flows to present values by discounting them to a common point in time. Washington State Office of Financial Management has developed an LCCA tool to be used on state-funded projects required to conduct LCCA. The tool, LCCT, is available at the link below.

The spreadsheet available through the Washington State ELCCA program is available electronically and can be modified to address alternatives other than energy.

Resources
Washington State Department of Enterprise Services ELCCA guidelines,
(http://des.wa.gov/services/facilities/Energy/ELCCA/Pages/default.aspx)

Washington State OFM LCCT for LCCA, (http://www.ofm.wa.gov/budget/forms.asp)

FEDS Software, Pacific Northwest National Laboratory, (www.pnl.gov/FEDs)

Whole Building Design Guide, National Institute of Building Sciences, (http://www.wbdg.org/)

Building Life-Cycle Cost (BLCC) Programs, U.S. Department of Energy, Energy Efficiency and

Renewable Energy, Federal Energy Management Program, (http://energy.gov/eere/femp/federal-energy-management-program)

Energy-10, National Renewable Energy Lab, (http://www.nrel.gov/)

IEO3.3 Monitoring-Based Commissioning

4 points: Develop an ongoing commissioning program.

The monitoring-based commissioning (MBCx) program includes procedures and a list of points and equipment to be systematically assessed at set intervals. The program includes three phases of work: continuous monitoring, evaluation, and implementation. Include the more energy intensive systems and those more prone to performance problems. Building operators will use data collected through the energy metering equipment to make informed decisions about optimization and efficiency. Implementation of energy savings measures are often a result of the monitoring and evaluation phases. The MBCx program is ideally managed by the district but may need to be outsourced to others.

The initial commissioning plan is the basis for the MBCx program plan. The MBCx plan will address the following:

- Roles and responsibilities
- List of points and equipment
- Measurement requirements
- Acceptable values for peak performance
- List of elements to be used for evaluation criteria
- A plan for the plan for action to correct operational errors and efficiencies
- Training
- Evaluation schedule

Resources

NEEC's Smart Buildings Center tool lending library has diagnostic tools available to building owners and managers,

IEO3.4 Project or District Long-Term Operations

Choose all of the operations activities that apply to this school. Plans and programs may be developed for the individual school or for the entire district. This section includes 21 possible points for operations and maintenance activities that often generate strong returns on the investment.

The benefits of having such operations measures and strategies in place, for the long-term, should be communicated to all stakeholders, including the students, the staff, the community, the county and state officials and other school districts.

IEO3.4.0-Asset Preservation Program (APP) Reporting

Required: Newly constructed state-assisted school buildings, board accepted after December 31, 1993, must participate in the Asset Preservation Program (APP) in order to be eligible for future state assistance. A district Asset Preservation System (maintenance plan) is required as part of the APP. The building maintenance plan must include maintenance and operational issues related to high-performance features.

Resources

OSPI School Facilities, Asset Preservation Program, (http://www.k12.wa.us/SchFacilities/Programs/AssetPreservation.aspx)

IEO 3.4.1-Operations and Maintenance Staff Involvement in Capital Planning, Design and Construction

Required: Involve at least 3 key Operations & Maintenance staff, including resource conservation managers, custodians, electricians, mechanical and control system staff, grounds and building services staff in every phase of the project, from pre-planning through close-out. Staff selection to participate is at the discretion of the school district or project team.

IEO3.4.2- Asset Preservation System (APP) on Modernizations

1 point: A state-assisted school building modernization project is not required to participate in the Asset Preservation Program (APP), therefore no asset preservation system (maintenance plan) for OSPI purposes is required. To earn the point, the district will provide an asset preservation plan that meets the requirements in the APP program and include maintenance and operational issues related to high-performance features.

IEO3.4.3 Green Power and Carbon Offsets

1 point (50%), 2 points (100%): Enter into a contract for a minimum of five years to provide at least 50% (1 point) or 100% (2 points) of the project's energy from green power, carbon offsets or renewable energy certificates (RECs). Any combination of the three.

Projects in districts served by utility providers whose base power (by at least 50%) is green may take the appropriate points for this credit without establishing a contract. Green power and RECs must be Green-e Energy certified or the equivalent. The offsets must be from greenhouse gas emissions reduction projects within the U.S.

Using renewable energy reduces environmental impacts associated with production and consumption of conventional fuels, including air and water pollution, and natural resource destruction. Perhaps more directly relevant to school districts, these environmental impacts have associated economic and human health impacts for our general population, and when located near schools, for our students.

An alternative to producing renewable energy on-site (Credit E3.1.1) and still support the use of renewable energy in Washington State is to purchase it through a utility green pricing program, or as renewable energy certificates available through certificate marketers listed by the U.S. Department of Energy's Green Power Network (See Resources).

Chapter 19.29A.090 RCW - Voluntary option to purchase qualified alternative energy sources requires electric utilities to offer customers renewable "green" power options.

Resources
Green Power Partnership, U.S. Environmental Protection Agency

Green Power Options for Washington Customers, Washington Utilities and Transportation Commission,

Resource Conservation Plan and Greenhouse Gas Reduction Plan
1 point: Develop and implement a Resource Conservation Plan including energy, water, and materials conservation.

And

Develop a Greenhouse Gas Reduction plan. Include plans for reduction of water, energy, and vehicle miles traveled. Include goals with target dates.
A district-wide Resource Conservation Plan and Greenhouse Gas Reduction Plan can meet the credit requirements.

Resources
U.S. Department of Energy Staff Offices Energy Conservation Plans,
EPA Greenhouse Gas Emissions

IEO3.4.5 Indoor Air Quality (IAQ) Management Plan
2 points: Use EPA's *Design Tools for Schools* as a design reference and resource. Implement the EPA's *Tools for Schools Program* or an alternative, equivalent in scope and effectiveness. A school specific IAQ management plan must be implemented.

Resources
EPA's IAQ Tools for Schools Action Kit

IEO3.4.6- Integrated Pest Management (IPM) Plan
1 point- Develop and implement a formal IPM Plan that follows the model IPM plan for schools in Washington State developed by Urban Pesticide Education Strategy Team (UPEST). A district wide IPM that includes the new school can be used to satisfy this credit.

Design for IPM
1 point: Incorporate pest prevention through design principles that will prevent pest entry or harborage. This includes:

- Using ¼" hardware cloth on all ventilation openings.
- Caulk all cracks.
- Seal around all pipe penetrations.
- Keep landscape plantings at least two feet from all buildings.

- Facades should be designed to discourage birds from roosting or excavating.
- Select pest-proof dumpsters that seal tightly and are easy for people to open and close. Garbage areas need to be easily cleanable and not located where fresh air intakes will entrain odors.
- Use door sweeps on all exterior doors.
- Make all kitchen surfaces easy to degrease.

Resources
For more information, refer to "Model Pesticide Safety and IPM Guidance Policy for School Districts"

EPA Managing Pests in Schools

Stop School Pests is hosted by the IPM Institute of North America. Stop School Pests provides free online training courses for K–12 school employees to learn how to write and implement an Integrated Pest Management Plan

Oregon State Schools IPM Program. Oregon State University manages the Oregon State Schools IPM program. This site provides publications and forms available for implementing an IPM plan.

Washington School IPM HYPERLINK "https://schoolipm.ifas.ufl.edu/" HYPERLINK "https://schoolipm.ifas.ufl.edu/" "National School IPM Information Source." The University of Florida Institute for Food and Agricultural Sciences. National School IPM Information Source.

IEO3.4.7 Transportation Options Program

1 point: Develop and implement a Transportation Options Program, with input from the local community and other stakeholders. The goal of the plan is to improve the school's connection to the community by offering students and staff more transportation choices such as public buses, rail, biking, and walking. Implement the education and enforcement components of the Safe Routes to School program.

Resources
Start with your city or county office and the Dept. of Transportation, Washington's Safe Routes to Schools, (http://www.wsdot.wa.gov/localprograms/saferoutes/)

IEO3.4.8 Operations and Maintenance Personnel Training

1–2 points: Training is the foundation of effective maintenance programs and is an essential tool to maintaining buildings in optimum condition. Effective maintenance protects indoor air quality, thermal and visual comfort, and superior energy performance. Students, teachers, and staff rely on the buildings systems to provide a comfortable environment to learn and teach. To keep the building systems and materials in optimum working order building maintenance personnel must understand the design intent and know how to use and treat the systems and materials.

Facilities and maintenance staff will receive operations and maintenance training on all systems included in the commissioning scope of work, as well as systems related to high-performance –

lighting, shading controls, all floor, and wall finishes, audio systems, etc. depending on the scope of the project. Training will be a combination of Operations & Maintenance document review and field observations.

Building Operator Certification (BOC) is the leading training and certification program for building engineers and maintenance personnel developed by and offered through Northwest Energy Efficiency Council (NEEC). BOC training can help existing staff learn new skills to help further their own professional career in building management and keep buildings they manage at peak performance. BOC training is for all building trades' professionals, building managers, building systems operators and custodial staff.

1 point: BOC Level 1, maintained for 2 years, for at least 2 staff that have responsibility to maintain the new building systems included in the commissioning.

2 points: BOC Level 2, maintained for 2 years, for at least 2 staff that have responsibility to maintain the new building systems included in the commissioning **or** BOC Level 1 for all O & M staff that have primary responsibility for maintaining the new facility, including electrical, mechanical, custodial, building services, grounds, controls, resource conservation managers.

BOC has a partnership agreement with Washington Association of Maintenance and Operations Administrators (WAMOA) to offer K-12 school building operators a discount.

BOC certification and re-certification fees are paid by the school district. BOC Level 1 must be completed prior to the new facility occupancy date.

Resources
Northwest Energy Efficiency Council (NEEC) Building Operator Certification training is offered through NEEC

IEO3.4.9-Food Related Waste Management

1 point: Develop and implement a plan for food waste management **at this school.**

1 point: Food Services **at this school** uses only re-usable trays.

Develop and implement a plan for food waste management at this school. Design the school to address special handling options for food preparation and food wastes. The plan may include handling food waste on-site or off-site. Some options include composting, worm bins, municipal collection, vegetable/herb gardens, etc.

Use only re-usable trays for food service. There is an energy and water cost, but it's minimized with the new steam-condensing dishwashers and the reduced trash volume.

Resources
Dept. of Ecology Publication: Managing Food Scraps at Institutions and Agencies - A Guide for Washington State, **(**http://www.ecy.wa.gov/biblio/0607033.html)

The Lunch Line with Recycling in Mind. Snohomish County, WA., (http://snohomishcountywa.gov/DocumentCenter/View/3768)

School Composting: The Next Step in Recycling. A Manual for Connecticut Schools, (http://www.ct.gov/deep/cwp/view.asp?a=2718&q=325392)
The Cost and Environmental Benefits of Using Reusable Food Ware in Schools

IEO3.4.10 Waste Food Reduction Program

1 point: Initiate a reducing wasted food awareness campaign.
2 points: >15% less edible food waste goes to compost or landfill; Implement a Wasted Food Reduction Program to reduce the amount of food fit for consumption that is being wasted
3 points: >25% less edible food waste goes to compost or landfill; Reference the EPA's Food Recovery Hierarchy for preferred reduction strategies.

K–12 schools have a special role in reducing wasted food on their site. Reducing the amount of wasted food can reduce the cost of edible food, and the cost of disposal, but also educates the next generation about the importance of planning, sharing, recovering, and reusing wasted food to conserve natural resources.

The Wasted Food Reduction Program may be written for an individual school or for the entire district but **must be implemented at the school taking WSSP credit**.

Reductions (>15% or >25%) must be from documented baseline food waste audits conducted at similar schools, within the district, within the past 2 prior years.

Resources
US EPA's Washington School Food Share Program Toolkit that outlines the steps and guidelines by which schools can legally and with federal program support collect the leftover, edible food in the cafeteria and set it aside for donation to food banks.

Washington State Department of Ecology website provides information on food waste prevention, recovery, and donation

The EPA Sustainable Management of Food provides the Food Recovery Hierarchy

IEO3.4.11 Fuel Efficient Buses and Maintenance Vehicles

1 point: At least 20% of the district-owned buses and 20% of the district-owned maintenance vehicles that are diesel (only those that travel on the roads and highways) serving this school are built in or after 2007 when the latest standards we updated. If district bus service is provided under contract from a third party, then 20% of the buses used to service this school must meet the requirement. The same is true if the school is served by public bus service.
Resources
Dept. of Ecology School Bus Program and Cleaner Fuels

IEO3.4.12 Environmentally Preferable Supplies Purchasing Policy

1 point: Develop and implement an environmentally preferable purchasing policy at the school or district level. The plan must include the environmental performance indicators that are to be used to judge purchasing decisions. The plan should include typical products and materials and weighting of the indicators. Typical products and materials generally include office supplies and classroom supplies. The plan should ensure the protection of the students, staff, and workers.

Resources

Safer Choice products have been reviewed and labeled by the EPA against strict human health and environmental criteria. WA Department of Ecology

Environmentally Preferable Purchasing in Washington State

IEO3.4.13 Green Cleaning Policy and Program

Develop and implement a Green Cleaning Policy and Program at the school or district level. The policy will include:

- Defining the key terms, such as "green" and "green cleaning".
- Explaining the green team's role and responsibilities, if applicable.
- Key expectations such as reporting spills, keeping personal space free of clutter, etc.
- Inappropriate activities such as bringing cleaning supplies from home.
- Purchase decision guidelines and approved products and vendors.
- Education and communication to key audiences.
- Methods to track progress.

Resources

Cleaning for Healthy Schools, (http://www.cleaningforhealthyschools.org)

Green Clean Schools; Healthy Schools Campaign, (http://healthyschoolscampaign.org/programs/gcs/guide.php)

Safer Choice products have been reviewed and labeled by the EPA against strict human health and environmental criteria. WA Department of Ecology

Greening Your Purchase of Cleaning Products; EPA

Cleaning for Asthma-Safe Schools (CLASS)

Informed Green Solutions – Cleaning for Safer Environments
Infection Control Handbook for Schools – 2021 update Cleaning for Asthma-Safe Schools (CLASS) (ca.gov)

IEO3.4.14 Register and Participate in 1 or more Green School Programs

Programs that meet the requirements listed above include Washington Green Schools, King County Green Schools, EPA's Cool Schools Challenges, plus others.

To earn the point **this school must participate** in a green school's program that engages staff, students, and the school community in sustainable school management techniques that provide for student learning, resource conservation, health, and safety.

DOCUMENTATION AND REPORTING

The D-Form Process

D-3 Application for Project Approval

In the Additional Project Information section, indicate which high-performance standard will be pursued, or exemption:

___ Washington Sustainable Schools Protocol
___ LEED (Silver)
___ LEED for Schools (Silver)
___ Exempt by Law____ Exempt-Not Practicable*

*The district must include a letter of request that explains the exemption. OSPI will respond with a determination. A sample letter is included in the Forms and Examples section of this guideline.

D-5 Application for Preliminary Funding Status

Submit a preliminary design WSSP or LEED scorecard only. See the OSPI School Facilities Website for digital copies of these and other high-performance related documents.

D-7 Application to Proceed with Bid Opening or Negotiate MACC

An Energy Life Cycle Cost Analysis (ELCCA) is required by 39.35 RCW for all projects more than 25,000 square feet or modernizations of greater than 50 percent of the assessed value. The ELCCA is referred to as the Energy Conservation Report. Indicate cost of the report on the D-7 and include the DES review letter with D-7 package. No separate high-performance submittal is required.

D-9 Application for Authorization to Sign Contracts or MACC Agreement

Submit the three documents listed below with the D-9. Use the WSSP Scorecard for WSSP projects. Use a LEED scorecard if certifying a project with USGBC's LEED program.

Final design-phase WSSP or LEED scorecard

Sustainable Building Strategy

Provide a two-to-four-page narrative of the selected sustainable features. (Often generated during the eco-Charette or Integrated Design planning meetings.)

Energy Life Cycle Cost Analysis executive summary, if applicable.

The executive summary typically includes the narrative of alternate systems studied and the energy cost and energy use data for the selected system. Do not submit the third-party review of the analysis.

D-11 Application to Release Retainage

Submit the following two documents prior to, or as part of, the D-11 process:

Final WSSP or LEED scorecard.

Post Occupancy Evaluation Plan

Certification Letter. State that the district has provided the high-performance submittals listed above in D-5, D-9, and the finals in D-11, and that annual monitoring and reporting to OSPI will take place for five years. Address and submit this letter to the Disbursement Officer in the OSPI School Facilities and Organization department. A sample letter is included on the D-Forms webpage under School Facilities and Organization.

ANNUAL REPORTING

Annual reporting is required by law for five consecutive years following the local board acceptance date of the project. Districts that prefer to begin reporting following occupancy may do so. All projects will use the Environmental Protection Agency's Energy Star Portfolio Manager to monitor and report energy and water use.

Reporting requirements

- The annual report includes monthly energy and water use. Reporting is by meter, by energy source, and by use (i.e., exterior, and interior water use). If you are reporting energy and water, use from a meter that serves multiple buildings (the high-performance building and another building), please be certain to indicate that on the Portfolio Manager building profile.
- Annual reports are due to OSPI in March of each year. Districts should consider completing this annual report concurrent with the Asset Preservation Program (APP) annual assessment that is due prior to April 1 each year. The first reporting year may be a partial year (less than 12 months).
- Account owners (districts) must "connect" with OSPI School Facilities and Organization in order to "share" the new Portfolio Manager property. Energy and water use must be uploaded or entered manually to the property at a minimum of once every year in March, but preferably every quarter.

GLOSSARY

ASHRAE – American Society of Heating, Refrigeration, and Air Conditioning Engineers.

ASTM – American Society for Testing and Materials.

B-20 – The term for a blend of 20% renewable bio-derived diesel fuel with 80% petroleum-based diesel fuel.

Basis of design (BOD) – The information necessary to accomplish the owner's project requirements, including system descriptions, indoor environmental quality criteria, design assumptions, and references to applicable codes, standards, regulations, and guidelines.

Biodiesel – A domestic, renewable fuel for diesel engines, derived from natural oils like soybean oil that meets the specifications of American Society for Testing and Materials D 6751. Biodiesel is not the same thing as raw vegetable oil. It is produced by a chemical process that removes the glycerin from the oil.

Biomass – Any biological material that can be used as fuel. Biomass fuel is burned or converted in systems that produce heat, electricity, or both. In this document, biomass-fired systems refer to systems that are fueled by clean wood chips from forestry or sawmill operations.

BOC – Building Operator Certification is the leading training and certification program for building engineers and maintenance personnel developed by and offered through Northwest Energy Efficiency Council. BOC training can help existing staff learn new skills to help further their own professional career in building management and keep buildings they manage at peak performance. BOC training is for all building trades' professionals, building managers, systems, and custodial staff.

Brownfields – Real property that is abandoned or underused where the expansion, redevelopment, or reuse of the property may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Building exterior – A structure's primary and secondary weatherproofing system, including waterproofing membranes and air- and water-resistant barrier materials, and all building elements outside that system.

Building interior – Everything inside a structure's weatherproofing membrane.

CSI – Construction Specifications Institute.

CHPS – Collaborative for High Performance Schools.

Chain of custody (CoC) – A procedure that tracks a product from the point of harvest or extraction to its end use, including all successive stages of processing, transformation, manufacturing, and distribution.

Charrette – An intensive, multiparty workshop that brings people from different disciplines and backgrounds together to explore, generate, and collaboratively produce design targets, goals, and options.

CFC - Chlorofluorocarbon-based refrigerant – A fluid containing hydrocarbons that absorbs heat from a reservoir at low temperatures and rejects heat at higher temperatures. When emitted into the atmosphere, CFCs cause depletion of the stratospheric ozone layer.

Commissioning (Cx) – A systematic process of ensuring that building systems perform separately and interactively according to the manufacturers specifications, the contract documents, the design intent, and the schools' operational needs. Commissioning involves three phases: pre-design, construction, and warranty.

Commissioning authority (CxA) – Individual or company designated to organize, lead, and review the completion of commissioning activities. The CxA coordinates and facilitates the work between the owner, designer, and contractor to ensure that complex systems are installed and function in accordance with the design and owners' requirements.

Commissioning plan – A plan that includes a list of all equipment to be commissioned, delineation of roles for each of the primary commissioning participants, and details on the scope, timeline, and deliverables throughout the commissioning process.

Cool roof – A roof that reflects more of the sun's energy instead of absorbing it into the interior spaces below. Cool roofs can be made of highly reflective paint, sheet covering, or highly reflective tiles or shingles.

Daylighting – The practice of placing windows and reflective surfaces so the natural light of day provides effective internal illumination. Optimize the daylighting design to minimize glare and eliminate direct-beam light in the classroom and use daylighting controls designed to dim or turn off electric lights when sufficient daylight is available.

dBA – A measure of the level of sound expressed in units of "decibels." The application of the "A-weighted filter" de-emphasizes low-frequency and very high-frequency sound in a manner similar to human hearing.

Design-build – A construction-project delivery process with a single entity that assumes the obligation of furnishing the design, supervision, and construction services required to complete a project.

Development footprint – The total land area of a project site covered by buildings, streets, parking areas, and other typically impermeable surfaces constructed as part of the project.

Direct sunlight – An interior horizontal measurement of 1,000 lux or more of direct beam sunlight that accounts for window transmittance and angular effects, and excludes the effect of any operable blinds, with no contribution from reflected light (i.e., a zero-bounce analysis) and no

contribution from the diffuse sky component (Adapted from IES).

Energy Star Portfolio Manager - is an online interactive program developed by the EPA especially for managers of commercial and institutional type facilities. This detailed tool enables users to track and evaluate energy and water usage, as well as track waste, in the properties they manage.

Energy Use Intensity (EUI) – EUI expresses a building's energy use as a function of its size or other characteristics. The site EUI is calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building. EUI is calculated and expressed as either site EUI or source EUI. Source EUI considers the energy required to deliver the consumed energy on site.

Enhanced Commissioning (E-Cx) – Additional activities by the commissioning authority to ensure building systems are designed, constructed, and operating in accordance with the owners' project requirements (OPR) and basis for design (BOD). Activities include reviewing building system design, contractor submittals, delivery of systems manuals, operator and occupant training, seasonal testing.

Environmental Product Declaration (EPD) – A statement that the item meets the environmental requirements of ISO 14021–1999, ISO 14025–2006 and EN 15804, or ISO 21930–200. An Environmentally Preferable Product (EPP) that is declared, is defined in accordance with ASTM as a material, component, system, or service that has measurable and statistically significant, positive, or reduced negative environmental impacts when compared with other material(s), component(s), and system or service(s) that serve similar purpose(s).

Environmentally sensitive area – A designation of a piece of land that needs special protection because of its landscape, wildlife, or historic value.

Furniture, fixtures, and equipment (FF&E) – The stand-alone items purchased for the project, including individual and group seating; open-plan and private-office workstations; desks and tables; storage units, credenzas, bookshelves, filing cabinets, and other case goods; computers, printers, network servers and initial software purchases; gymnasium instructional equipment, communications and security equipment, window coverings, commercial kitchen equipment, library books, wall-mounted visual-display products (e.g., marker boards and tack boards, excluding electronic displays); and miscellaneous items, such as easels, mobile carts, freestanding screens, installed fabrics, and movable partitions, desks, and moveable task lighting. Office accessories, such as desktop blotters, trays, tape dispensers, waste baskets are excluded.

Gray water system – Untreated wastewater that has not come into contact with toilet waste. Gray water may include used water from bathtubs, showers, bathroom washbasins, and water from clothes-washers and laundry tubs. It may include wastewater from kitchen sinks or dishwashers. Project teams should comply with the gray water definition established by the authority having jurisdiction in the project area.

Greenfields – Parcels of land not previously developed, graded, or disturbed and could support open space, habitat, or natural hydrology.

Hardscape – The inanimate elements of the building landscaping. It includes pavement, roadways, stonewalls, wood and synthetic decking, concrete paths and sidewalks, and concrete, brick, and tile patios.

Heat island – An effect caused when exterior hardscape surfaces, such as dark, non-reflective pavement and buildings, absorb the sun's energy and heat the air near the ground. Other contributing factors may include vehicle exhaust, air conditioners, and street equipment.

HEPA filters – High Efficiency Particulate Air filters

Impervious surface – An area of ground that development and building have modified in such a way that precipitation cannot infiltrate downward through the soil. Examples of impervious surfaces include roofs, paved roads and parking areas, sidewalks.

Integrated pest management (IPM) – A sustainable approach to managing pests that minimizes economic, health, and environmental risks.

Integrated design – The consideration and design of all building systems and components. It brings together the various disciplines involved in designing a building and reviews their recommendations as a whole. It also recognizes that each discipline's recommendation has an impact on other aspects of the building project.

Land-clearing debris and soil – Materials that are natural (e.g., rock, soil, stone, vegetation) that have naturally occurred on the site or have been placed or planted. Materials that are man-made (e.g., concrete, brick, cement) are considered construction waste if they were on site and needed to be removed for the project to proceed.

Life cycle cost analysis (LCCA) – A tool to determine the most cost-effective option among different competing alternatives to purchase, own, operate, maintain, and dispose of a building or building system when each is equally appropriate to be implemented on quality, function, lifespan, and technical grounds.

Light pollution – Waste light from building sites that produces glare, is directed upward to the sky, or is directed off the site. Waste light does not increase nighttime safety, utility, or security and needlessly consumes energy.

Light trespass – Obtrusive illumination that is unwanted because of quantitative, directional, or spectral attributes. Light trespass can cause annoyance, discomfort, distraction, or loss of visibility.

Low-impact development (LID) – An approach to managing rainwater runoff that emphasizes on-site natural features to protect water quality, by replicating the natural land cover hydrologic regime of watersheds and addressing runoff close to its source. Examples include better site design principles (e.g., minimizing land disturbance, preserving vegetation, minimizing impervious cover), and design practices (e.g., rain gardens, vegetated swales and buffers, permeable pavement, rainwater harvesting, soil amendments). These are engineered practices that may require

specialized design assistance.

Minimum Efficiency Reporting Value (MERV) – MERV is a rating system for HVAC system air filters. ASHRAE standards use the MERV. The higher the rating (higher the number) indicates the smaller the particles can be captured.

Native vegetation – An indigenous species that occurs in a particular region, ecosystem, and habitat without direct or indirect human actions. Native species have evolved to the geography, hydrology, and climate of that region. They also occur in communities; that is, they have evolved together with other species. As a result, these communities provide habitat for a variety of other native wildlife species. Species native to North America are generally recognized as those occurring on the continent prior to European settlement. Also known as native plants.

Nonpotable – Water that does not meet drinking water standards.

Occupant control – A system or switch that a person in the space can directly access and use. Examples include a task light, an open switch, and blinds. A temperature sensor, photo sensor, or centrally controlled system is not occupant controlled.

On-site Renewable Energy – Energy derived from solar radiation, wind, waves, tides, landfill gas, biomass, or internal heat of the earth. The energy system providing on-site renewable energy shall be located on the project site. For a new building on an existing school campus, or a new school contiguous to an existing school, the on-site renewable energy source may be shared as long as the source is owned by the school district.

Operations and maintenance (O&M) plan – A plan that specifies major system operating parameters and limits, maintenance procedures and schedules, and documentation methods necessary to demonstrate proper operation and maintenance of an approved emissions control device or system.

Operations and maintenance manual – Provides detailed operations and maintenance information for all equipment and products used in the school.

Operations and maintenance training – Provides a short introduction on operations and maintenance of equipment and products for all school staff and then features hands-on workshops for facility personnel.

Owner's project requirements (OPR) – A written document that details the ideas, concepts, and criteria determined by the owner to be important to the success of the project.

Permeable pavement – A paved surface that allows water runoff to infiltrate into the ground.

Post-consumer – Waste generated by households or commercial, industrial, and institutional facilities in their role as end users of a product that can no longer be used for its intended purpose. Examples include a soda-pop can or a cardboard box that are discarded after use.

Potable water – Water that meets or exceeds U.S. Environmental Protection Agency drinking water quality standards (or a local equivalent outside the U.S.) and is approved for human consumption by the state or local authorities having jurisdiction; it may be supplied from wells or municipal water systems.

Pre-consumer – Waste generated by industrial or manufacturing. Examples include planer shavings, sawdust, walnut shells, culls, trimmed materials. The designation excludes rework, regrind, or scrap materials capable of being reclaimed within the same process that generated them (ISO 14021). Formerly known as post-industrial.

Rainwater harvesting – The capture, diversion, and storage of rain for future beneficial use. Typically, a rain barrel or cistern stores the water; other components include the catchment surface and conveyance system. The harvested rainwater can be used for irrigation.

Rapidly renewable materials – Materials that substantially replenish themselves faster than traditional extraction demand (e.g., planted and harvested in less than a 10-year cycle), do not result in significant biodiversity loss or increased erosion, positively impact air quality, and can be sustainably managed. Products in this category include, but are not limited to, bamboo products, wheat grass cabinetry, oriented strand board, and other wood products made from fast-growing pine trees.

Recycled content – Materials that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer). Defined in accordance with the International Organization of Standards document ISO 14021.

Refurbished material – An item that has completed its life cycle and is prepared for reuse without substantial alteration of its form and use. Refurbishing involves renovating, repairing, restoring, or generally improving the appearance, performance, quality, functionality, or value of a product.

Renewable energy – Energy sources that are not depleted by use. Examples include energy from the sun, wind, and small (low impact) hydropower, plus geothermal energy and wave and tidal systems.

Renewable energy credit (REC) – A tradable commodity representing proof that a unit of electricity was generated from a renewable resource. RECs are sold separately from electricity itself and thus allow the purchase of green power by a user of conventionally generated electricity.

Reuse – The reemployment of materials in the same or a related capacity as their original application, thus extending the lifetime of materials that would otherwise be discarded. Reuse includes the recovery and reemployment of materials recovered from existing building or construction sites. Also known as salvage.

Responsibly produced – Materials that are extracted, harvested, or manufactured in an environmentally friendly manner (includes certified wood products).

Reverberation time – The time in seconds it takes for the sound level to decrease by 60 decibels after the source of the sound has been abruptly interrupted.

Salvaged material – Materials that are recovered and reused for a similar purpose rather than processed or remanufactured for different use. Common salvaged materials include structural beams and posts, flooring, doors, cabinetry, brick, and decorative items.

Solar reflectance index (SRI) – A measure of the constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation. It is defined such that a standard black surface (initial solar reflectance 0.05, initial thermal emittance 0.90) has an initial SRI of 0, and a standard white surface (initial solar reflectance 0.80, initial thermal emittance 0.90) has an initial SRI of 100. To calculate the SRI for a given material, obtain its solar reflectance and thermal emittance via the Cool Roof Rating Council Standard (CRRC-1). SRI is calculated according to ASTM E 1980. Calculation of the aged SRI is based on the aged, tested values of solar reflectance and thermal emittance.

Source reduction – A decrease in the amount of unnecessary material brought into a building in order to produce less waste. For example, purchasing products with less packaging is a source reduction strategy.

Thermal comfort – A condition of mind that expresses satisfaction with the surrounding environment. It is determined by taking into account environmental factors (such as humidity, A/C, heat) and personal factors (what an occupant is wearing).

Total Cost of Construction –The total cost of construction is the contractors' price to the owner of all materials, labor, and all contractor fees (overhead, profit, insurance, bonds) when applying the 35% default value as opposed to actual value for determining MR credits.

VOC – Volatile Organic Compounds are organic chemicals that are emitted as gases from certain solids or liquids. VOCs are emitted from paints, glue, cleaning supplies, pesticides, furnishings, copiers and printers, craft and graphic materials, and adhesives to name a few. Many scents and odors found in a building are from VOC's. VOCs are regulated by law, especially for indoor materials that are dangerous to human health and cause harm to the environment.

Waste diversion – A management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

Wetlands – Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support vegetation adapted for life in saturated soil. Wetlands generally include swamps, marshes, bogs, and other similar areas.

Xeriscaping – Landscaping that does not require routine irrigation.

Zero Net Energy (ZNE) – A building that uses no more energy in the course of the year than they produce from on-site renewable sources.

LEGAL NOTICE

ESTD
1889

All students prepared for post-secondary pathways, careers, and civic engagement.

Washington Office of Superintendent of
PUBLIC INSTRUCTION

Chris Reykdal | State Superintendent
Office of Superintendent of Public Instruction
Old Capitol Building | P.O. Box 47200
Olympia, WA 98504-7200