Guiding Principles and Sustainable Best Practices

Version 2b
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INTRODUCTION

STATEMENT OF PURPOSE

ecoPRO Sustainable Landscape Professional Certification is an advanced certification for professionals working in the landscape industry in Washington. It is administered by the Washington State Nursery & Landscape Association (WSNLA) and the Washington Association of Landscape Professionals (WALP) to ensure a unified standard for sustainable practices within the horticultural industry that also enhances marketing, networking, and educational opportunities.

- Certified landscape professionals will have demonstrated knowledge of, and voluntarily practice, the sustainable best landscape practices presented in this document.
- Certified landscape professionals will be able to offer knowledgeable, enthusiastic, profitable, and environmentally sound landscape design, installation, and maintenance services. Participants' work will strive to have a positive impact on the environment and on their local Washington State community.
- The Program provides science-based information that promotes, guides, and informs ecological, sustainable landscape management.

ecoPRO sustainable best practices align as much as possible with existing business and site certifications. There are several sustainable certifications applicable to landscape businesses and sites in Washington State. Some of these include: EnviroStars—a certification for businesses that reduce their use and input of toxics in the environment; Sustainable Sites Initiative (SITES)—a national certification for landscapes designed, installed, and including a maintenance plan for sustainable practices; Salmon Safe—a land management certification for sites that protect water quality and preserve and restore habitat; the regional BuiltGreen, national LEED, and Living Building Challenge--green building certifications that include site development best practices; Greenroads—for road construction; Envision—for infrastructure projects; and Oregon Tilth's Organic Land Care accreditation program, which applies USDA National Organic Program agricultural standards and policies to landscapes.

BACKGROUND AND ACKNOWLEDGEMENTS

Program standards and requirements were developed by a nine-person volunteer Advisory Committee in 2011-2012 with additional input by outside reviewers. The standards and requirements were updated in 2013. The Initial Advisory Committee, convened by WSNLA, WALP, and Cascadia Consulting Group in 2011, was comprised of landscape professional leaders in the private and public sectors: designers, builders, maintenance professionals, horticulture educators, and growers. The Initial Advisory Committee members, as well as subsequent committee members, are associated with other relevant initiatives and professional organizations, including the regional EnviroStars certification program and national Sustainable

Sites Initiative (SITES), Association of Professional Landscape Designers (APLD), Washington Chapter of the Society of Landscape Architects (WASLA), International Society of Arboriculture (ISA), Coalition of Organic Landscape Professionals (COOL), Washington Native Plant Society, Sports Turf Management Association (STMA), and Building Owner and Management Association (BOMA).

The Initial Advisory Committee had the overarching goals of developing a program that:

- Serves landscape professionals in Washington state;
- Addresses Washington state habitat, water quality, conservation, and toxics reduction issues;
- Holistically addresses the landscape; and
- Builds on existing programs.

The Initial Advisory Committee first reviewed existing organic and sustainable landscape certification programs in California, Oregon, British Columbia, Connecticut, and nationwide, with the goal of adopting and adapting policies, standards, and material. The committee chose to develop a menu of Sustainable Best Practices that encourage professionals to consider the whole landscape, from design to installation to maintenance over time. They designed the program as a second tier certification that builds on and does not duplicate existing basic horticultural education and certification opportunities. The program is geared to professionals who already have basic landscape horticultural knowledge, experience, and certification, and who serve a wide range of clients – from public to residential to commercial.

We want to acknowledge the following individuals and entities instrumental in the initial development of this program for Washington State:

Initial Advisory Committee

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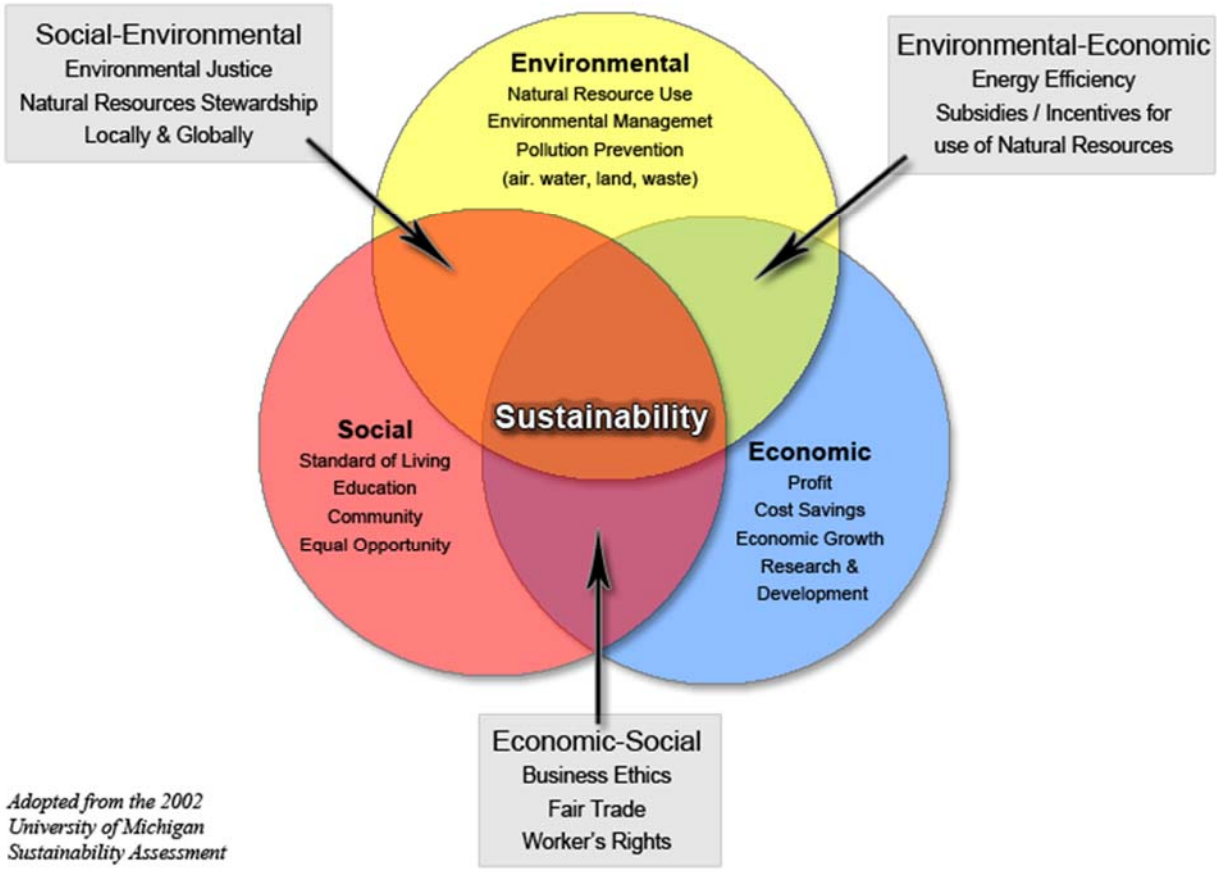
Seattle Public Utilities
Washington Department of Ecology
Washington State Department of Agriculture
WSNLA Scholarship & Research Charitable Fund

GUIDING PRINCIPLES

United States Environmental protection Agency (from US EPA):
www.epa.gov/sustainability):
Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations.

Brundtland Commission of the United Nations 1987:
Sustainability is defined as design, construction, operations, and maintenance practices that meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

The Three Spheres of Sustainability



Adopted from the 2002 University of Michigan Sustainability Assessment

Sustainable Landscaping is the work of designing, constructing, and maintaining landscapes to conserve and regenerate water, air, soil, plant, and wildlife resources, and protect and enhance human health and well-being. Sustainable practices focus on the environment of an ecoregion[1] while striving to be socially equitable and economically feasible.

Sustainable Landscape Practice is the use of ecologically sound principles to work in concert with natural ecoregional systems. It encourages working within closed systems with regard to organic matter and nutrient cycling. It aims to be pesticide-free. The goal of sustainable landscape practice is to design, construct, and maintain landscapes that will continue to be aesthetically pleasing, ecologically resilient, and enduring in the ecoregion in which they are located.

ecoPRO Certified Sustainable Landscape Professionals have passed an exam that tests their knowledge of sustainable landscaping principles and best practices. They abide by the ecoPRO Code of Conduct to design, construct, and manage landscapes using the most current, ecologically sound principles and practices. Where possible, ecoPRO certified professionals collaborate across the disciplines of design, construction, and maintenance.

[1] An "ecoregion" is an area that reflects broad ecological patterns occurring on the landscape. In general, each ecoregion has a distinctive composition and pattern of plant and animal species distribution. Abiotic factors, such as climate, landform, soil, and hydrology are important in the development of ecosystems, and thus help define ecoregions. Within an individual ecoregion, the ecological relationships between species and their physical environment are essentially similar. Washington State is generally considered to encompass nine ecoregions. http://www.landscope.org/washington/natural_geography/ecoregions/

SUSTAINABLE BEST PRACTICES

This section outlines Sustainable Best Practices for landscape design, construction, and maintenance. The best practices are organized around **eight key principles**:

- Protect and Conserve Soils
- Conserve Water
- Protect Water and Air Quality
- Protect and Create Wildlife Habitat
- Conserve Energy
- Sustain Healthy Plants
- Use Sustainable Methods and Materials
- Protect and Enhance Human Health and Well-being

The tables of best practices on the following pages present choices for sustainable landscaping that a professional may apply to each site, as appropriate. The understanding is that every site and situation is unique.

Best practices designated with a *diamond (♦)* indicate a "core" best practice that ecoPRO certified professionals should employ on all sites, where applicable. Since many practices conform to multiple principles, the right-hand columns cross-link the practices to the applicable principles. There is some duplication of best practices. Underlined terms are defined in the Glossary.

PROTECT AND CONSERVE SOIL

Key concepts: soil protection zones, soil management plans, amending soils, mulching, mulch-mowing, composting, managing stormwater runoff and erosion, minimize soil disturbance, closed system management

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Protect & Conserve Soil

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
DESIGN									
1.	**Identify and map soil characteristics of landscape site**								
☐	♦Perform a soil test and analysis to inform design and management decisions	X	X				X		
☐	♦Designate soil protection, disturbance, and other construction management areas on a Soil Management Plan	X					X		
☐	Test soil drainage in several locations	X	X				X		
☐	Define the location and boundaries of all vegetation and soil protection zones	X					X		
☐	Design the landscape with designated onsite recycling areas	X				X		X	X
2.	**Review site grading specifications for accuracy**								
☐	♦Limit overall cut and fill through efficient design and layout	X			X	X		X	X
☐	♦Limit vegetation clearing to avoid soil erosion and compaction	X			X		X		
☐	Retain natural topographic features that slow and store stormwater flows and limit steep, continuous slopes	X		X					
CONSTRUCTION									
1.	**Use the least invasive construction methods and tools and site sensitive construction methods**								
☐	♦Protect soil from compaction, wherever possible	X		X			X		X
☐	♦Minimize major grading, soil disturbance, and compaction	X					X	X	
☐	♦Avoid creating soil interfaces when preparing soils for planting	X					X		
☐	♦Prevent loss of onsite and stockpiled soils from stormwater runoff and wind erosion	X						X	
☐	♦Restore disturbed/compacted soil with compost amendment	X						X	
☐	Perform grading operations during the low rainfall seasons	X		X					X
☐	Avoid handling and installing saturated soils, especially during wet weather	X					X		
☐	Use heavy equipment fitted with flotation tires or wide tracks that distribute heavy loads	X		X			X		X

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Protect & Conserve Soil

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
☐	Avoid disposing of concrete waste and materials washout onto adjacent properties and waterways	X		X				X	X
2.	**Protect tree root zones**								
☐	♦Fence off the tree root protection zone, or if access is necessary cover zone with 4-6 inches of coarse wood chips, crushed rock, or with metal plates (See International Society of Arboriculture (ISA) Standards at http://pnwisa.org)	X	X				X	X	
3.	**Reduce import and export of earth materials**								
☐	♦Remove and stockpile existing topsoil before grading, for reuse onsite	X						X	
☐	♦Improve existing soil as an alternative to importing topsoil	X				X	X	X	X
☐	♦Inspect imported topsoils and soil amendments to verify specifications are met	X						X	
☐	Identify an area to store topsoil during construction	X						X	
☐	Reuse organic debris onsite, or recycle at a composting facility	X				X		X	X
4.	**Prepare or amend soil to maximize water holding capacity and drainage**								
☐	♦Amend soils over entire planting area with 2-4 inches of compost tilled to a depth of 8-12”	X	X	X			X	X	X
☐	♦Install topsoils properly by ripping in the first lift (layer) to mix into existing native soil	X	X	X			X	X	X

MAINTENANCE

1.	**Build healthy soils**								
☐	♦Perform a soil test and analysis when analyzing problems or when renovating landscapes	X					X	X	
☐	♦Maintain 2-4 inches of large particle size organic mulch over the surface of soil	X	X	X			X	X	X
☐	♦Apply organic mulches a few inches from the base of trees and plants and extending at least to the dripline	X	X	X			X	X	X
☐	♦Use compost to establish beneficial soil organisms and release nutrients over the long term	X	X	X			X	X	X
☐	♦Use organic recycled materials onsite by mulching, mulch-mowing, and composting	X				X	X	X	X
☐	Sow nitrogen fixing or deeply rooted cover crops to improve soils and limit erosion, then till these in before seed set.	X	X	X			X	X	X
☐	Allow fallen leaves to remain as mulch in landscaped beds and natural areas	X				X	X	X	X
☐	Apply compost twice per year to landscaped beds	X	X	X			X	X	X
☐	Feed the soil around shrubs and trees with compost tea	X					X	X	
☐	Avoid practices that degrade soil fertility and biodiversity	X	X	X			X		X
☐	Avoid synthetic barriers or mulches that prevent or inhibit natural biodegradation of organic matter	X		X		X	X	X	X

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Protect & Conserve Soil

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect/Enhance Human Health/Well-being
2.	**Address problem drainage areas with appropriate drainage solutions**								
☐	Keep debris and leaves away from storm drains	X		X					X
☐	Replant with plants adapted to wet conditions	X		X			X	X	
☐	Mechanically aerate and top dress turf soils at least once per year	X		X			X		X
☐	Use power augers, water jets, or air spades to create holes in compacted tree and shrub root zones and fill with compost	X		X			X	X	X
3.	**Create a sustainable plant nutrient management program**								
☐	♦Base nutrient management programs for turf, trees, and shrubs on soil tests, tissue analysis, and clear indication of need	X		X	X	X	X		X
☐	♦Base any application of phosphorus on soil test indicating plant need	X		X			X	X	X
☐	♦Use naturally derived fertilizers from organic sources such as blood or bone meal, alfalfa, fishmeal, kelp, and natural minerals that slowly release nutrients over a 1-to-4 month timeframe	X		X	X	X	X	X	X
☐	Schedule fertilization for site conditions, plant needs, and dry weather	X		X			X		X
☐	Select fertilizers that contain 30% or more of the nitrogen in slow release form	X		X		X	X	X	X
☐	Follow fertilizer label rates and schedule recommendations	X					X		
☐	Apply mycorrhizal inoculants, as appropriate	X	X				X		

CONSERVE WATER

Key concepts: irrigation water conservation, irrigation system/design/maintenance efficiency, certified designers, sustainable irrigation materials, water budget, conservation/weather-based irrigation management, water use monitoring and auditing

Conserve Water	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN								
1. Map and assess site hydrology								
♦Map hydrozones, existing plantings, and soil types	X	X	X			X		X
♦Map topography and drainage		X	X			X		X
2. Design high-efficiency irrigation systems								
♦Design watering systems with zones to match plant water needs		X	X			X		X
♦Specify smart controllers that are weather-based and seasonally-adjustable to environmental conditions		X	X			X	X	X
♦Include irrigation system controller and maintenance instructions in a Landscape Management Plan		X				X	X	X
Specify rain shut-off sensors		X	X			X	X	X
Specify system monitoring features such as flow meters		X				X	X	X
Specify that irrigation designs be prepared or reviewed by an Irrigation Association certified irrigation designer		X					X	X
Specify non-PVC pipe such as PEX for irrigation systems		X	X		X		X	X
3. Maximize use of onsite water conservation options								
♦Specify water supply systems for the period of planting establishment		X				X		
♦Design with drought tolerant and low water use plants that require no or minimal irrigation		X				X	X	
Collect rainwater for onsite graywater use - check with local regulatory agencies		X	X				X	X
Design recycling water features		X						
Design drip irrigation systems for maximum efficiency		X	X			X	X	X
CONSTRUCTION								
1. Install automatic irrigation systems as designed								
♦Follow industry best practices for installation		X					X	
♦Audit system at installation to ensure uniform coverage and verify application rates		X	X			X		X

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
Conserve Water									
☐	Pressure test lines and test controllers		X					X	
MAINTENANCE									
1.	**Develop a <u>water budget</u> and multi-year watering plan to guide irrigation scheduling**								
☐	♦Plan to adjust watering after plant establishment period (1-3 years)		X				X	X	
☐	♦Test and repair irrigation systems at start of each season and by draining at end of season		X					X	
☐	♦Set and adjust irrigation schedules as needed to minimize evaporation and overwatering		X	X			X		X
☐	♦Set and adjust irrigation schedules for seasonal weather conditions, site characteristics, edible crops and vegetation water needs		X	X			X		X
2.	**Monitor and maintain systems for best performance and efficiency**								
☐	♦Monitor irrigation regularly for broken heads, leaks, runoff, and uniform distribution, and repair irrigation problems promptly		X	X			X	X	
☐	Maintain and analyze irrigation water consumption records to find leaks and to maximize opportunities for efficiencies		X	X			X	X	
3.	**Improve system efficiency with conservation features**								
☐	Add <u>smart controllers</u>		X				X	X	
☐	Add <u>rain shut-off sensors</u>		X				X	X	
☐	Add flow meters		X				X	X	
4.	**Manage plantings with irrigation**								
☐	♦Manage water use for plant health and best root development		X				X		
☐	♦Group plants into <u>hydrozones</u> by water needs and drought tolerance		X				X		
☐	♦Apply organic <u>mulches</u> a few inches from the base of trees and plants and extending at least to the dripline	X	X				X	X	
☐	Irrigate turf to deeper depths while watering less frequently		X	X			X	X	X
☐	Maintain low-traffic turf areas for no/minimal irrigation, allowing them to go dormant in summer		X	X		X	X		X
☐	Reduce turf area where possible, to reduce water, fertilizer, and maintenance inputs	X	X	X				X	X
☐	Utilize soaker hoses under mulches, where appropriate		X	X			X	X	
5.	**Manage irrigation for edible crops**								
☐	Exercise caution with using unfiltered, harvested rainwater for irrigating edible food crops		X					X	X

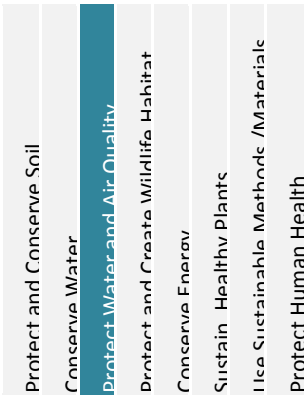
PROTECT WATER AND AIR QUALITY

Key concepts: Green Stormwater Infrastructure (GSI), Low Impact Development (LID), onsite water infiltration/dispersion, prevent erosion, air movement, sound absorption, carbon cycle

Protect Water and Air Quality	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN								
1. Minimize water runoff								
♦Design Green Stormwater Infrastructure (GSI) features that direct runoff into compost-amended soil/vegetated areas, swales, rain gardens and bioretention cells, pervious paving, cisterns, rain barrels, and vegetated roofs – check with regulatory agencies	X	X	X					X
♦Minimize impervious surface area	X		X			X		X
Avoid materials specifications for roofs and other impervious surfaces that contain toxins or release pollutants, including treated wood, copper, or zinc anti-moss strips	X		X	X			X	X
Specify bio-engineering and other "soft" methods to manage stream bank and slope erosion	X		X	X	X		X	X
Avoid use of concrete bulkheads or other hardscape solutions to manage erosion	X		X	X			X	X
2. Improve air quality and sound absorption and reduce fuel use								
♦Specify paints, sealants, and coatings that emit low levels of volatile organic compounds (VOCs)	X		X	X	X		X	X
♦Source local materials to reduce transportation			X		X		X	X
Design with consideration for existing and desirable air flow patterns			X	X		X		X
Select and locate plants and hardscape features to encourage air flow and sound absorption			X	X		X		X
Specify existing site materials to reduce transportation			X		X		X	X
Design for minimal power tool use in construction and maintenance			X		X		X	X
CONSTRUCTION								
1. Prevent erosion before and during construction								
♦Avoid draining, disturbing, or filling wetlands	X	X	X	X		X		X
♦Cover bare soils with tarps, wood chip mulch, compost blankets, and compost filter socks	X	X	X				X	X
Maintain all soil covers during construction	X	X	X				X	X
2. Maximize on-site water infiltration and detention capacity								
♦Prepare and/or amend soil to maximize water-holding capacity and drainage	X	X	X			X		
♦Install Low Impact Development (LID) and Green Stormwater Infrastructure (GSI) features	X	X	X		X		X	X

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
	Protect Water and Air Quality								
☐	♦Ensure final grades direct rainfall runoff to spread and disperse into soil, swales, and other Green Stormwater Infrastructure (GSI)			X					
☐	Avoid creating drainage to neighboring properties	X	X	X	X		X		X
3.	**Reduce fuel use and noise pollution**								
☐	♦Use energy-efficient equipment and power tools	X		X		X		X	X
☐	♦Maintain all equipment and tools in optimal working condition	X		X		X		X	X
☐	Use hand tools as appropriate	X		X		X		X	X
☐	Reduce the need for landscape supplies and materials that require factory processing and transportation	X		X		X		X	X
	MAINTENANCE								
1.	**Use closed system management**								
☐	♦Recycle and compost organic waste and reuse landscape materials on site			X		X	X	X	X
☐	♦Maintain all onsite stormwater infiltration, Low Impact Development (LID), and other Green Stormwater Infrastructure (GSI) to WA Dept of Ecology standards www.psp.wa.gov/LID_manual.php	X		X	X		X	X	X
☐	Maintain pervious paving by keeping it free of debris and vacuuming at least once per year			X	X			X	X
☐	Improve/enhance a plant's ability to process CO2 and pollutants on site	X		X			X	X	X
2.	**Minimize point source pollution into stormwater**								
☐	♦Base nutrient management inputs for turf trees, and shrubs on soil tests, tissue analysis, and clear indication of need			X			X	X	X
☐	♦Minimize or eliminate use of chemical pesticides	X		X	X	X	X	X	X
☐	♦Minimize use of synthetic fertilizers	X		X	X	X	X	X	X
☐	Avoid contaminating water with soluble landscape chemicals, oil, cleaners, etc.			X	X			X	X
3.	**Minimize air and noise pollution**								
☐	♦Maintain vehicles, equipment and power tools in optimal working condition to prevent fuel, hydraulic fluids and oil drips, leaks, and spills	X		X	X	X		X	X
☐	♦Use energy-efficient equipment and power tools	X		X		X		X	X
☐	Use 4-cycle power gasoline powered equipment	X		X		X		X	X
☐	Avoid use of 2-cycle gasoline-powered equipment	X		X	X	X		X	X
☐	Use electric, propane, or natural gas powered equipment	X		X		X		X	X
☐	Choose cultural maintenance strategies and hand tools	X	X	X	X	X	X	X	X
☐	Avoid burning piles of organic waste material	X		X	X			X	X

Protect Water and Air Quality



☐ Maintain appropriate air movement and circulation in the landscape			X			X		X
☐ Prune to optimize air flow for plant and human health			X			X		X
☐ Implement management practices based on an understanding of the carbon cycle	X	X	X			X		X

PROTECT AND CREATE WILDLIFE HABITAT

Key concepts: protect/conserve/build/enhance biodiversity and wildlife habitats

Protect and Create Wildlife Habitat	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	**Protect and Create Wildlife Habitat**	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN								
1. Prioritize designs that improve or create healthy habitats for native wildlife								
☐ ♦Survey, conserve, and protect existing native wildlife and their habitats	X		X	X		X		X
☐ ♦Design landscape to provide food, water, and shelter for native wildlife				X				
☐ Minimize high-maintenance landscapes with less habitat for native wildlife	X	X	X	X	X	X	X	X
☐ Preserve existing mature trees and other vegetation that provides functional wildlife habitat	X		X	X		X		X
☐ Retain wetlands and existing natural areas	X		X	X		X		X
2. Use local native <u>plant communities</u> as models to support biodiversity								
☐ Plan for natural evolution of the landscape and habitat changes				X				
☐ Plan for adaptive management in response to wildlife impacts and modification of landscapes				X				
CONSTRUCTION								
1. Protect onsite wildlife habitat								
☐ ♦Protect existing habitat including wetland areas and landscape features	X	X	X	X		X		X
☐ ♦Minimize impacts to existing desirable vegetation during construction activities				X		X		
☐ Create and manage refuge areas for wildlife during construction				X				
2. Construct wildlife habitat								
☐ Create shelter sources, such as brush and rock piles from landscape waste				X	X		X	
☐ Create water sources				X				
☐ Plant vegetation food sources for specific native wildlife				X				
MAINTENANCE								
1. Maintain and enhance sources of food, water, and shelter for native wildlife								
☐ ♦Survey, conserve, and protect existing habitat for native wildlife				X				
☐ ♦Schedule maintenance tasks to avoid disturbing native wildlife and their habitats				X				
☐ ♦Preserve and plant native vegetation to enhance native wildlife diversity	X		X	X		X		
☐ Avoid cultivation of landscaped areas to retain soil organisms and soil habitat				X				
☐ Avoid disturbing wildlife habitat during critical times in the wildlife cycle (e.g. nesting seasons)				X				

Protect and Create Wildlife Habitat

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
☐	Minimize pruning to enhance habitat				X				
☐	Create brush and rock piles from landscape waste				X	X		X	
☐	Maintain water sources				X				
☐	Maintain shelter sources, such as brush and rock piles				X				
☐	Avoid premature removal of flowers, stems, and seed heads that provide a food source or habitat for wildlife				X				
2.	**Look for opportunities to create habitat**								
☐	♦Allow decomposition of organic matter on the surface of garden beds as natural mulch to protect and build habitats for amphibians, insects and arachnids		X	X	X		X	X	
☐	♦Maintain habitat for <u>pollinators</u> and biological predators				X		X	X	X
☐	Convert dead or declining trees to habitat snags for cavity-nesting birds and other wildlife				X	X			
3.	**Practice <u>Integrate Pest Management (IPM)</u> and <u>Plant Health Care (PHC)</u>**								
☐	♦Eliminate or reduce the use of pesticides harmful to wildlife	X	X	X	X	X	X	X	X
☐	♦Create diversity in landscapes to encourage natural, biological pest control processes				X	X	X		X

CONSERVE ENERGY

Key concepts: embodied-energy, low energy use materials/features, fuel efficient equipment/power tools, vehicle fuel reduction, manual tools and methods

Conserve Energy

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN									
1.	**Design low-energy use landscapes**								
☐	♦Select site-appropriate turf and plants to minimize power tool use for mowing, shearing and pruning maintenance	X	X	X	X	X	X	X	X
☐	♦Design with plants and hardscape materials that minimize adjacent buildings energy consumption (heating, cooling, natural lighting)					X		X	X
☐	♦Consider the sustainability of manufacturing and transportation when specifying plants and hardscape materials		X		X	X		X	X
☐	♦Specify efficient lighting systems by using solar, low-voltage and LED fixtures, photo cells, and timers					X		X	X
☐	Purchase plants and landscape materials from manufacturers whose practices increase energy efficiency					X		X	X
☐	Specify features designed to mitigate the Heat Island Effect in urban areas		X		X	X		X	X
☐	Specify low embodied-energy materials				X	X		X	X
☐	Design for minimal use of energy in landscape construction					X		X	X
CONSTRUCTION									
1.	**Use energy-efficient vehicles, power tools, and heavy equipment**								
☐	♦Maintain all vehicles and equipment in optimum working condition	X		X		X		X	X
☐	Select battery-powered, electric, propane, or other alternative energy power tools	X		X		X		X	X
2.	**Use hand tools**								
☐	Choose hand tools when practical for construction tasks	X		X		X		X	X
MAINTENANCE									
1.	**Allow minimal use of equipment and power tools**								
☐	♦Select plants that need minimal pruning and shaping					X	X	X	
☐	Choose and use hand and mechanical tools	X		X		X		X	X

Conserve Energy

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
2.	**Minimize energy and fuel use and optimize fuel efficiency**								
☐	♦Optimize landscape contribution to adjacent building energy conservation (heating, cooling, natural lighting)					X		X	
☐	♦Schedule landscape maintenance and related activities to minimize miles driven	X		X		X		X	X
☐	Purchase plants and landscape materials from manufacturers whose practices increase energy efficiency	X		X		X		X	X
☐	Choose low-emissions equipment, such as electric, propane, or natural gas	X		X		X		X	X
☐	Choose and use four-cycle gasoline-powered equipment	X		X		X		X	X
☐	Choose vehicles and equipment that prevent air pollution	X		X		X		X	X
☐	Avoid use of two-cycle gasoline-powered equipment	X		X		X		X	X

SUSTAIN HEALTHY PLANTS

Key concepts: Right plant/right place, low input landscapes, no pesticide use, Integrated Pest Management, Plant Health Care, Human health issues

Sustain Healthy Plants

	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN								
1. Use sustainable selection and purchasing practices								
♦Specify locally produced, propagated, and sourced plant material and seed					X	X	X	X
♦Purchase plants/seed when possible from sources that certify sustainable production and business practices	X	X	X	X	X	X	X	X
Specify organic seed and plant stock when possible	X	X	X	X	X	X	X	X
2. Design landscape plantings appropriate for the site, climate, and ecoregion								
♦Incorporate and protect existing thriving plants and trees where possible and desirable	X	X	X	X		X		X
♦Design plantings to encourage maximum soil coverage	X	X				X		
♦Specify plants needing minimum inputs for water, fertilizer, pruning, and other maintenance needs	X	X	X	X	X	X	X	X
♦Specify native, climate-adapted, or other low water use plants that require no or minimal irrigation		X		X		X	X	X
Use natural communities as a guide to group plants by cultural needs		X		X		X		
Select turf varieties adapted to the geographic area, local macro- and microclimates		X	X			X		X
Reduce turf area where possible, to reduce water, fertilizer, and maintenance inputs	X	X	X				X	X
3. Design landscape plantings appropriate for the site and climate								
♦Place plants in the proper location to prevent poor performance		X				X		
♦Regularly consult the local Noxious Weed List for plants to avoid in the landscape design	X	X	X	X	X	X	X	X
♦Specify disease and pest-resistant plants	X		X		X	X	X	X
Avoid use of non-native plants in natural areas or areas directly adjacent to high quality natural areas				X		X		
Specify weed-free nursery stock	X		X	X		X	X	X
Specify locally produced, propagated, and sourced plant material and seed					X	X	X	X
4. Develop a Landscape Management Plan, including Plant Health Care (PHC) and Integrated Pest Management (IPM), to guide annual and future maintenance								
♦Develop a Landscape Management Plan to guide maintenance activities	X	X	X	X	X	X	X	X

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
	Sustain Healthy Plants								
☐	♦Design and plan for plant growth, species longevity, and succession during the life of the landscape	X	X	X	X	X	X	X	X
☐	Encourage plant biodiversity, especially plants native to an ecoregion, and use plants that attract beneficials and biological pest predators				X		X		
☐	Survey for known pests, noxious weeds, and invasive species on site	X		X	X		X		X
	CONSTRUCTION								
	1. Protect existing trees and vegetation								
☐	♦Follow best management practices to protect existing trees and other plants during construction (see Tree Protection Handbook at http://pnwisa.org)	X	X	X	X		X		X
	2. Select and install healthy plants								
☐	♦Inspect all vegetation for health, pests, and diseases				X		X		
☐	♦Install plants properly						X		
☐	♦Use local, reputable nurseries as sources for plants			X		X	X		X
☐	♦Monitor, water and protect plant material until installation					X	X		X
☐	♦Make planting adjustments in the field based on actual site conditions		X				X		
☐	♦Remove and replace non-site-adapted, pest-susceptible plants and noxious weeds	X	X	X	X	X	X	X	X
☐	Inspect plants that are field grown and container grown for proper root mass and development appropriate to the size of the plant						X		
☐	Use the most appropriate materials to create ideal habitat for chosen trees and plants						X	X	
☐	Avoid placing edible plants in contact with known toxic materials, such as treated wood						X		X
☐	Avoid using non-organic seeds and plants if organic choices are available			X		X	X		X
	MAINTENANCE								
	1. Maintain and update a Landscape Management Plan to guide annual and future maintenance practices								
☐	♦Maintain and update a Landscape Management Plan to guide annual and future maintenance practices	X	X	X	X	X	X	X	X
	2. Manage all landscapes to be healthy and functioning ecosystems that maximize plant health and diversity								
☐	♦Practice Plant Health Care (PHC)	X	X	X	X	X	X	X	X
☐	♦Avoid use of synthetic fertilizers	X	X	X	X	X	X	X	X
☐	♦Encourage plant establishment and continuing health by appropriate watering and mulching	X	X		X		X	X	X
☐	♦Remove and replace diseased or failing plants with resilient or more site-appropriate selections		X	X		X	X	X	X

Sustain Healthy Plants

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
☐	♦Avoid use of combination pesticide and fertilizer products	X	X	X	X	X	X	X	X
☐	♦Avoid use of synthetic mulches, such as rubber	X	X	X	X	X	X	X	X
☐	♦Prune properly to maintain the natural form of the plant				X				
☐	♦Apply organic mulches a few inches from the base of trees and plants and extending at least to the dripline	X	X		X		X	X	
☐	Manage water use for plant health and deepest root development	X	X	X			X		X
☐	Minimize disturbance of naturally occurring beneficials, such as biological predators and other natural control mechanisms				X		X		
☐	Fertilize plants with natural, organic products for healthy growth and flower/fruit production	X	X	X	X	X	X	X	X
☐	Thin or transplant overplanted material as needed to allow room for growth and air circulation						X		
☐	Avoid shearing plants	X	X	X	X	X	X	X	X
☐	Avoid off-target impacts to plants, animals, birds, fish and humans while applying pesticides	X	X	X	X	X	X	X	X
3.	**Use sustainable lawn care practices**								
☐	♦Use mowing practices, fertilization, aeration, topdressing, and over seeding to control weeds and sustain dense turf	X	X	X	X	X	X	X	X
☐	♦Promote nutrient cycling and deep rooting by mulch mowing at 2-4 inches or as appropriate for grass species		X	X	X	X	X		X
4.	**Practice Integrated Pest Management (IPM)**								
☐	♦Maintain healthy plants						X		
☐	♦Choose plants that are pest- and disease-resistant						X		
☐	♦Monitor for, remove/contain/control, and properly dispose of invasive plants found on the local Noxious Weed List for the local county area	X	X	X	X	X	X	X	X
☐	♦Monitor the worksite often to detect and identify potentially damaging pests and diseases				X		X		
☐	♦Identify all pest insects, weeds, and diseases and understand their lifecycle				X		X		
☐	♦Tolerate a few insects, weeds and diseases						X		
☐	♦Replace plants that attract damaging pests and diseases				X		X		
☐	♦Establish action thresholds for actively managing pests						X		
☐	♦Manage pests and diseases most susceptible lifecycle stage, when management is easier, less costly, and more likely to succeed						X		
☐	♦Utilize IPM strategies and methods that do not rely on chemical pesticides	X	X	X	X	X	X	X	X
☐	♦Minimize or eliminate the use of chemical pesticides	X	X	X	X	X	X	X	X
☐	♦Use 2-4 inches of organic mulches to suppress weeds, such as cardboard, arborist wood chips, and bark	X		X			X	X	X

Sustain Healthy Plants

	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
♦Use ground covers to shade soil for weed control	X		X		X	X	X	X
♦Evaluate how IPM strategies work, modify and adapt new strategies						X		
♦Recognize and protect common beneficials	X		X	X		X		X

USE SUSTAINABLE METHODS AND MATERIALS

Key concepts: sustainable materials, salvage landscape plants and materials, recycled content, composting, closed system management

Use Sustainable Methods and Materials

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
DESIGN									
1.	**Design with existing and local materials from sustainable businesses**								
☐	♦Specify renewable, biodegradable, and recycled materials	X	X	X		X		X	X
☐	♦Specify new materials with recycled content		X	X		X		X	X
☐	♦Specify locally sourced materials			X		X		X	X
☐	Design with sustainable materials that can be later re-purposed, reused and recycled		X	X		X		X	X
☐	Specify Forest Stewardship Council (FSC) certified wood products	X		X	X	X	X	X	X
☐	Specify recycled compost and mulch	X		X		X	X	X	X
☐	Reuse on-site structures, hardscapes, and landscape amenities			X		X		X	X
☐	Avoid use of polyvinyl chloride (PVC) and non-biodegradable materials as weed barriers	X	X	X	X	X	X	X	X
☐	Purchase materials from manufacturers whose process reduce resource consumption and waste		X	X		X		X	X
2.	**Avoid specifying toxic products or materials**								
☐	♦Specify paints, sealants, and coatings that emit low levels of volatile organic compounds (VOCs)	X	X	X	X	X		X	X
3.	**Consider human health issues in plant selection**								
☐	Use edible plants in planting design							X	X
☐	Avoid use of noxious weeds or genetically modified organisms (GMOs)	X		X	X	X	X	X	X
☐	Avoid specifying known allergenic plants or materials			X				X	X
☐	Avoid specifying poisonous plants, especially for clients with children							X	X
4.	**Design to maximize use of water and energy conservation options**								
☐	♦Design to maximize water and energy conservation options		X			X		X	X
CONSTRUCTION									
1.	**Use closed system management**								
☐	♦Salvage, reuse, compost and recycle materials from site, demolition, and construction	X	X	X	X	X		X	X
☐	♦Dispose of waste material in the most environmentally sound manner available	X	X	X		X		X	X
☐	♦Use landscape materials that are salvaged or have recycled content	X	X	X	X	X		X	X

	Use Sustainable Methods and Materials	Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
☐	Salvage existing plants for reuse					X	X	X	X
☐	Reuse plants salvaged from an alternate, local site					X	X	X	X
☐	Recycle used plant containers		X	X		X		X	X
2.	**Manage stormwater onsite**								
☐	♦Manage erosion through Temporary Erosion and Sediment Control (TESC) practices	X		X	X			X	
☐	♦Install low impact development (LID) and green stormwater infrastructure (GSI) features	X		X	X		X	X	X
	MAINTENANCE								
1.	**Minimize fuel use, air and noise pollution**								
☐	♦Use energy-efficient vehicles, equipment and power tools			X		X		X	X
☐	♦Maintain vehicles, equipment and power tools in optimal working condition to prevent fuel, hydraulic fluids and oil drips, leaks, and spills	X		X	X	X	X	X	X
2.	**Use closed system management**								
☐	♦Recycle or reuse organic matter generated during site operations and maintenance	X	X	X	X	X	X	X	X
☐	♦Provide plant nutrition from renewable materials such as compost and mulches	X	X	X	X	X	X	X	X
☐	♦Reuse salvaged materials on site					X		X	X
☐	Apply organic mulches a few inches from the base of trees and plants and extending at least to the dripline	X	X		X		X	X	
☐	Compost organic waste and materials on site			X		X		X	X
☐	Reduce the need for offsite sources of landscape materials and supplies	X	X	X	X	X		X	X
3.	**Support sustainable business practices**								
☐	♦Send organic debris and materials that cannot be used onsite to an offsite composting or recycling facility	X		X	X	X		X	X
☐	Provide plant nutrition from renewable materials that are sustainably harvested	X	X	X	X	X	X	X	X
☐	Purchase materials from manufacturers whose process reduce resource consumption and waste	X	X	X	X	X		X	X
4.	**Practice Plant Health Care(PHC)**								
☐	♦Know your plants	X	X	X	X	X	X	X	X
☐	♦Determine key problems: biotic and abiotic	X	X	X	X	X	X	X	X
☐	♦Optimize plant health	X	X	X	X	X	X	X	X
☐	♦Study the landscape ecosystem	X	X	X	X	X	X	X	X
☐	♦Employ Integrated Pest Management (IPM) strategies	X	X	X	X	X	X	X	X

Use Sustainable Methods and Materials

		Protect and Conserve Soil	Conserve Water	Protect Water and Air Quality	Protect and Create Wildlife Habitat	Conserve Energy	Sustain Healthy Plants	Use Sustainable Methods /Materials	Protect Human Health
5.	**Practice Integrated Pest Management (IPM)**								
☐	♦Create an IPM plan to produce a long-term, sustainable suppression and prevention of pests and diseases	X	X	X	X	X	X	X	X
☐	♦Avoid using toxic products or materials	X	X	X	X	X	X	X	X
☐	♦Establish action thresholds for actively managing pests							X	
☐	♦Use cultural, mechanical and biological IPM strategies	X		X	X		X	X	X
☐	♦Create diversity in landscapes to encourage natural, biological pest control processes	X		X	X	X	X	X	X
☐	♦If pesticides are necessary, choose the least toxic products	X		X	X	X	X	X	X
☐	Choose manual pest management methods such as hand pulling weeds	X		X		X		X	X
☐	Remove non-site-adapted, pest-susceptible plants and noxious weeds	X	X	X	X		X	X	X
6.	**Be aware of human health and safety issues in landscapes**								
☐	Avoid using toxic landscape products or materials	X		X	X		X	X	X
☐	Exercise caution with using unfiltered, harvested rainwater for irrigating edible food crops							X	X
7.	**Provide regular training for staff**								
☐	♦Train staff in green stormwater infrastructure (GSI) feature function, repair, and maintenance							X	
☐	♦Train staff to use and maintain irrigation systems for maximum efficiency and plant health							X	
☐	♦Train staff in wildlife identification, biology, and habitat design management							X	
☐	♦Train staff in proper pruning practices							X	
☐	♦Train staff in PHC practices. strategies and methods							X	
☐	♦Train staff in IPM practices, strategies and methods							X	

GLOSSARY

Beneficials

Include insects, nematodes, microorganisms, animals, and plants that support or are vital to the health, growth, and fruitfulness of plants.

Carbon Cycle

In the carbon cycle, plants absorb carbon dioxide from the atmosphere and use it, combined with water they get from the soil, to make the substances they need for growth. The process of photosynthesis incorporates the carbon atoms from carbon dioxide into sugars. Animals eat the plants and use the carbon to build their own tissues. Animals return carbon dioxide into the air when they breathe and when they die, since the carbon is returned to the soil during decomposition. The carbon atoms in soil may then be used in a new plant or small microorganisms. The same atoms can be recycled for millennia. Best landscape practices tend to increase soil carbon content in living and dead organic matter.

Chemical Pesticides

Chemically and industrially manufactured products that kill pests or inhibit the growth of pest populations including plants, insects, fungi, algae, and mammalian species. An umbrella term for insecticides, herbicides, fungicides, mollusk killers, rodent controllers, etc.

Closed System Management

Self-sustaining processes and practices within a defined area.

Compost

Organic materials combined under controlled aerobic conditions that create humus from the raw ingredients. Composts from Washington State-permitted facilities meet additional process and contaminant standards. (See http://www.ecy.wa.gov/programs/swfa/organics/soil.html)

Compost Blanket

Medium coarse compost applied at depth of1-3 inches to prevent erosion primarily on slopes. (See specifications at http://www.buildingsoil.org/tools/Erosion_Control.pdf)

Compost Filter Sock

A type of contained compost filter berm; a mesh tube filled with composted material that is placed perpendicular to sheet-flow runoff to control erosion and retain sediment in disturbed areas.

Compost Tea

A liquid extract of compost that contains plant growth compounds and beneficial microorganisms.

Design

The underlying plan or conception that affects and controls the function and development of the landscape.

Drip Irrigation

Irrigation devices that discharge water directly to (or under) the soil surface at a controlled rate through “emitters” that are installed on or molded into flexible tubing (usually polyethylene), or attached to hard pipe (PVC). Drip irrigation can meet the needs of plants using 50% less water than sprinkler irrigation because it can apply water very uniformly, avoid overspray to non-target surfaces (pavement, unplanted areas) and minimizes evaporation from foliage, soil surfaces, and misting. Drip irrigation can also be used for precise applications of fertilizers.

Ecoregion

Ecoregions are areas that reflect broad ecological patterns occurring on the landscape. In general, each ecoregion has a distinctive composition and pattern of plant and animal species distribution. Abiotic factors, such as climate, landform, soil, and hydrology are important in the development of ecosystems, and thus help define ecoregions. Within an individual ecoregion, the ecological relationships between species and their physical environment are essentially similar. Washington State is generally considered to encompass nine ecoregions. http://www.landscope.org/washington/natural_geography/ecoregions/

Embodied-energy

Measure of the total energy consumed by the product through its whole life--creation, use, and disposal.

Fertilizer

A substance containing one or more of the 16 recognized plant nutrients that is used to promote plant health and growth.

Forest Stewardship Council (FSC) Certified Wood Products

Wood products are certified by the Forestry Stewardship Council (FSC), a group of 12 global certifiers that evaluate both forest management activities (forest certification) and tracking of forest products (chain-of-custody certification).

Genetically Modified Organisms (GMOs)

An organism whose genetic material has been altered through the use of genetic engineering techniques. These techniques, generally known as recombinant DNA technology, use DNA molecules from different sources, which are combined into one molecule to create a new set of genes. This DNA is then transferred into an organism, giving it modified or novel genes.

Graywater

Waste water that has been used in the home for washing, bathing, cooking and other uses—excluding water from toilets, or sinks that may be highly contaminated with food wastes or high soap concentrations. In many locales, codes allow graywater to be used for landscape irrigation,

though use is often restricted to sub-surface applications (not sprinklers) on ornamental plants or tree crops—not on herbaceous food crops.

Green Stormwater Infrastructure (GSI)

Using green solutions to help reduce overflows by allowing stormwater to infiltrate slowly into the ground and cutting the volume of stormwater entering the system.

Heat Island Effect

As urban areas develop, changes occur in their landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist become impermeable and dry. These changes cause urban regions to become warmer than their rural surroundings, forming an "island" of higher temperatures in the landscape. Mitigation strategies include: 1) increasing tree and vegetative cover; 2) installing green roofs (also called "rooftop gardens" or "eco-roofs"); 3) installing cool—mainly reflective—roofs; and 4) using cool pavements.

Hydrology

The study of the movement, distribution, and quality of water – the water cycle.

Hydrozone

A landscape area comprised of plants with similar water needs. Landscape designs that cluster plants with similar water needs and create irrigation zones including only groups of similar plants in similar exposures, make efficient irrigation possible. Mixed hydrozones that include (for example) annuals and drought tolerant shrubs, cannot be irrigated without either overwatering the shrubs or underwatering the annuals.

Integrated Pest Management (IPM)

Integrated pest management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices, including pest monitoring, setting thresholds of acceptable damage, and using cultural and pest control methods with the least non-target impact. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage cost-effectively, with the least possible hazard to people, property, and the environment.

International Society of Arboriculture (ISA)

The International Society of Arboriculture certifies arborists and publishes information about tree care. (http://pnwisa.org)

Irrigation Association (IA)

A membership organization of irrigation industry professionals, manufacturers, researchers and water utility representatives; that promotes efficient irrigation policies, practices and products. IA offers professional trainings and certification programs, educational materials, and tests and

certifies conservation products through the Smart Water Application Technologies (SWAT) program. (http://www.irrigation.org/)

Landscape Management Plan

A written plan outlining the utilitarian, ecological, and aesthetic objectives for a specific landscape. The plan describes the specific practices and products that will be used to implement the landscape management plan, along with a schedule of annual maintenance practices. (See www.seattle.gov/util/proipm - "Landscape Management Plans")

Low Impact Development

LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

Material Safety Data Sheet (MSDS)

An MSDS contains information on safe working procedures when handling chemical products, provides hazard evaluations on the use, storage, handling, and emergency procedures for specific materials within a product formulation and the potential health and environmental impacts of exposure to chemicals or other dangerous substances in that formulation. An MSDS is prepared by the manufacturers of chemical products, and is required to be made available to workers who handle these substances. MSDS information is available from the manufacturer and also through online resources.

Mulch

A layer of material applied to the surface of an area of soil to conserve moisture, improve the fertility and health of the soil, reduce weed growth, and/or enhance the visual appeal of the area. A mulch is usually, but not exclusively organic in nature. It may be permanent (e.g. bark chips) or temporary (e.g. plastic sheeting). It may be applied to bare soil, or around existing plants. Mulches of manure or compost will be incorporated naturally into the soil by the activity of worms and other organisms. The process is used both in commercial crop production and in gardening, and when applied correctly can dramatically improve soil productivity.

Mulch Mowing

Mowing with equipment that disperses cut grass clippings over the mowed area during the mowing process in order to decompose and return to the soil naturally.

Mycorrhiza

The symbiotic association of the mycelium of a fungus with the roots of a seed plant.

Native Plant

A native plant is one that occurs naturally in a particular region, ecosystem, or habitat without direct or indirect human intervention. We consider the flora present at the time Europeans arrived in Washington State as native. Native plants include all kinds of plants from mosses and ferns to wildflowers, shrubs, and trees. Definition derived from: http://www.usna.usda.gov/Gardens/faqs/nativefaq2.html

Naturally Derived Fertilizers

Plant nutrients derived from naturally occurring plant, animal, microbial, or mineral sources.

Natural Lawn Care

Soil and turf installation and maintenance practices that create healthy, deep-rooted turf that resists damage from pests, weeds, traffic and drought, with minimal chemical and water inputs and waste outputs. Key practices include appropriate site and species selection, soil preparation with compost, mulch-mowing at proper heights, moderate fertilization with organic sources based on plant needs, watering deeply but less frequently, integrated pest and weed management, and renovation practices including aeration, compost topdressing, and over-seeding to restore dense turf. (See Ecologically Sound Lawn Care for the Pacific Northwest)

Noxious Weed List

Washington State Noxious Weed Control Board updates a statewide list by area annually. (See http://www.nwcb.wa.gov)

Onsite Infiltration

Stormwater retention and treatment encouraged for Low Impact Development (LID). Includes compost-amended soils, trees, rain gardens and bioretention areas, vegetated swales, pocket wetlands and stormwater wetlands, vegetated landscaping, and vegetated buffers.

Organic Matter

Matter composed of organic compounds that has come from the remains of once-living organisms such as plants and animals and their waste products in the environment.

Pest

The term “plant pest” has a very specific definition in terms of the International Plant Protection Convention and phytosanitary measures worldwide. A pest is any species, strain, or biotype of plant, animal, or pathogenic agent injurious to plants or plant products (FAO, 1990; revised FAO, 1995; IPPC, 1997).

PEX Pipe

Cross-linked polyethylene pipe, durable for extreme temperatures. Creep deformation in PEX is caused by long-term exposure to stress and chemical attack from acids or alkalis. PEX degrades when exposed to sunlight and is not recyclable.

Plant Available Water Storage

The portion of water stored in soil that is readily available for plants to use. Plant available water storage varies with soil texture, depth and organic matter content.

Plant Communities

Groups of plants that tend to occur together in particular local environments. See http://public.wsu.edu/~wsherb/edpages/raingrass/raingrass.html

Plant Health Care (PHC)

An emphasis of plant health over pest management. PHC takes an ecosystem approach that emphasizes working with nature instead of fighting nature, and it sees proper culture as the foundation of a healthy landscape. PHC has evolved from IPM: It still incorporates all IPM principles, but goes beyond it.

Pollinators

Animals such as birds, bees, bats, butterflies, moths, beetles, or other animals, that move pollen within flowers or carry pollen from flower to flower. Plants can also be pollinated by abiotic factors such as wind and water.

Rain Shut-off Sensors

Sensors that prevent an automatic irrigation controller from starting valves when a set amount of rainfall occurs. Rain sensors can be used with any irrigation controller that runs solenoid valves.

Smart Irrigation Controllers

Irrigation timers that automatically adjust watering schedules based on calculations using current weather data from on-site sensors or sent from regional weather stations, and/or historic data. Smart controllers have been demonstrated to maintain healthy landscapes with 20% less water than standard controllers. They must be accurately set using information about plants, soil, exposure and irrigation rates in each zone; if they are not, it is likely that the site's water use will be higher, rather than lower.

Soil Interfaces

Layers of the soil profile that are composed of very different soil texture and density that interfere with movement of water, nutrients, and roots.

Soil Management Plan

Site plan (drawing) showing both (1) vegetation and soil protection zones (to be fenced and protected from disturbance during construction and (2) areas that will be disturbed during construction and then restored, typically by de-compacting and amending soil with compost or

bringing in compost-amended topsoil. Soil management plans should also include a worksheet showing how much compost, topsoil, and/or mulch will be used in each soil restoration area. They should be communicated to all construction personnel to ensure that protection zones are maintained during construction and that all disturbed areas are restored at the end of construction. (See Building Soil manual at http://www.soilsforsalmon.org/pdf/Soil_BMP_Manual.pdf)

Soil Moisture Shut-off Sensors

Sensors that prevent an automatic irrigation controller from starting valves when soil is moist. Many soil sensors require the addition of a proprietary control module between the sensor and a controller.

Soil Water Holding Capacity

The specific ability of a particular type of soil to store water, after it is allowed to fully drain. Clay soil stores more than three times as much water per foot of depth than sandy soil; silty and loamy soils store an intermediate amount. However much of the water stored in clay is held too tightly for plants to access, so they must be watered just as frequently—in small amounts. Loamy soils are able to store the most Plant Available Water.

Synthetic Fertilizers

Plant nutrients manufactured by chemical and industrial processes. These include products not found in nature or products synthetically compounded or simulated from natural sources.

Volatile Organic Compound (VOC)

Organic chemicals that have a high vapor pressure at ordinary room temperature. VOCs include both human-made and naturally occurring chemical compounds. Most scents or odors are of VOCs. Some VOCs are dangerous to human health or cause harm to the environment. Anthropogenic VOCs are regulated by law, especially indoors, where concentrations are the highest. Harmful VOCs typically are not acutely toxic, but have compounding long-term health effects.

Water Budget

A calculation of the irrigation use expected for a site based on the square footage of landscaping, plant types, and measured efficiency of the irrigation system (or an efficiency goal). Water Budgets based on efficient irrigation assumptions can be compared to the existing water use on a site to gauge the efficiency of irrigation equipment and management. They are also used by municipalities to establish limits on planting of high water use plants at new developments, and by some water purveyors to establish maximum allowable water use for a property.

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