Introduction to Greenroads ITS Alaska - October 20, 2015



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Overview

- Need for Greenroads
- What is Greenroads?
- Example Projects
- How to Get Involved



Sustainability

"I think of it as living the life you want, with as much Earth-wise efficiency as your time and budget reasonably allow."

-Scott Adams, How I (Almost) Saved the Earth, WSJ, 21 August 2010







Business as Usual

Roadways have substantial impacts on the environment, society and the economy. Research shows a growing interest from roadway owners and stakeholders.

Roads are the majority of transportation spending



Data from U.S. Census Bureau (http://www.census.gov/construction/c30/historical_data.html)

OUR BIG AUDACIOUS GOAL

Fundamentally change the way roads are built on a global scale.

- 1. They can and must be built to be more sustainable.
- 2. We have the technology, skills, and desire to do so now.
- 3. We just need to get beyond "business as usual."





Cheney Sustainable Stormwater Project

City of Tacoma



Who owns Greenroads?

The Greenroads Foundation, an independent non-profit U.S. corporation, manages the review and certification process for sustainable roadway projects.

The Greenroads Foundation.



The Greenroads Story

- Development:
 - Began in 2007 at University of Washington
 - Industry, local and DOT research support
 - 5 years, over 100 people, 120+ test projects







The Greenroads[®] Rating System





U.S. 97: Lava Butte – S. Century Dr.

Oregon Department of Transportation



What is Greenroads?

An independent 3rd party sustainability rating system for transportation design and construction. It awards points for more sustainable practices and can help <u>quantify</u> and <u>communicate</u> the sustainable attributes of a transport project.

It is like LEED[®] for roads.



Camp Garcia Entrance Road, Vieques Island NWR, PR

U.S. Fish and Wildlife Service, FHWA Federal Lands Highway



What can Greenroads do for you?

- ✓ Define sustainable features on your project
- ✓ Benchmark and manage sustainability
- ✓ Communicate sustainability efforts to key stakeholders
- ✓ Stimulate the market for green transportation

It helps improve transportation project sustainability.



14th Street: Market Street to Colfax Avenue

City and County of Denver



Photos from Concrete Works of Colorado, Inc. (prime contractor)

What does Greenroads Address?

Greenroads is a project-oriented system focusing on design and construction, which is a conscious scope choice. Planning/operations/maintenance are megaimportant; this tool is meant to address the design/construction piece.

Greenroads addresses design and construction.





Does Greenroads work for my project?

Greenroads works for all roadway projects and more. It is applicable to a wide range of project sizes and scopes. It works for huge billion dollar mega-projects and for routine pavement overlay projects and everything in between.

Greenroads works for all types and sizes of surface transportation projects.

Greenroads Philosophy

- Easy to use and familiar
- Credible and tested
- Fit policy and funding structures
- Above and beyond
- Reasonable and cost effective
- Minimal bureaucracy

Characteristic	Greenroads®	Infrastructure Tools	Site Tools	Other Transport Tools*
3 rd Party Rating	x	х	х	
Independent Developers	x	**	LEED [®] ND only**	**
Promotes Lifecycle Thinking	x	х	х	х
Continual Evolution	x	х	х	х
Clear Scope of Applicability	x		х	х
Easy to Apply/Use/Specify BMPs	х		х	х
Beyond Compliance BMPs	х		х	
Easy to Understand by Non-Experts	x		х	
Scientifically Supported and Calibrated	x			•
Transparent Weighting	х			



The Greenroads[®] Rating System v2



GREENROADS BY THE NUMBERS (AUGUST 2015)

105 projects worldwide

 28 projects certified worldwide (7+ on deck)

- \$8.1 billion dollars in construction value
- $160\,$ Sustainable Transportation Professionals
 - 1 most-used roadway rating system in the world







Greenroads Categories: Version 2

Category	Description	Points
Project Requirements (!)	12 minimum requirements for a Greenroad	0
Voluntary Credits		
Environment & Water	Habitat, vegetation, soil, water, stormwater	30
A Construction Activities	Construction equipment, processes, quality	20
🛖 Materials & Design	Material processing, transport, design	24
Utilities & Controls	Operational systems, mobility, maintenance	20
Access & Livability	Modal access, culture, aesthetics, safety	21
	Total Voluntary Credit Points	115
Creativity & Effort ★	Local values, integrated teams, write your own	15

Total Points 130



- Project Requirements v2

Project F	Requirements	Pts.	Description
PR-1	Ecological Impact Analysis	Req	Evaluate lifecycle ecological impacts
PR-2	Energy & Carbon Footprint	Req	Compute the project's lifecycle footprint
PR-3	Low Impact Development	Req	Complete a LID feasibility study
PR-4	Social Impact Analysis	Req	Evaluate lifecycle social impacts
PR-5	Community Engagement	Req	Involve the public & stakeholders in decisions
PR-6	Lifecycle Cost Analysis	Req	Compute the project's net present value
PR-7	Quality Control	Req	Have a plan to manage quality on site
PR-8	Pollution Prevention	Req	Have a plan to prevent pollution on site
PR-9	Waste Management	Req	Have a plan to track waste on site
PR-10	Noise & Glare Control	Req	Have a plan to manage noise, light & glare
PR-11	Utility Conflict Analysis	Req	Identify utility conflicts before construction
PR-12	Asset Management	Req	Maintain and preserve capital assets

PR-1 Ecological Impact Analysis

Encourage comprehensive evaluation of the Project's ecological impacts for its whole lifecycle.





Environmental Assessment

Environmental Impact Statement

Supplemental EIS

National Environmental Policy Act (NEPA) documents for SR 520 Bridge Replacement and HOV project, Seattle, WA

PR-3 Low Impact Development

Encourage consideration of low-impact stormwater management practices for the Project.



Filterra stormwater unit (left) in Oak Harbor, WA and pervious concrete sidewalk (right) in Bellingham, WA

PR-7 Quality Control

Encourage systematic quality management practices during Project construction.



Quality control efforts in I-90 in Ellensburg, WA



- Environment & Water v2

Environr	nent & Water	Pts.	Description
EW-1	Preferred Alignment	1-3	Avoid and minimize environmental loss
EW-2	Ecological Connectivity	1-3	Reduce habitat connectivity impacts
EW-3	Habitat Conservation	1-3	Preserve, restore and protect habitat
EW-4	Land Use Enhancements	1-3	Reduce hardscape area
EW-5	Vegetation Quality	1-3	Increase biodiversity
EW-6	Soil Management	1-3	Minimize earthwork and improve soil
EW-7	Water Conservation	1-3	Reduce water resource needs
EW-8	Runoff Flow Control	1-3	Reduce stormwater flow impacts
EW-9	Enhanced Treatment: Metals	1-3	Improve water quality beyond minimums
EW-10	Oil & Contaminant Treatment	1-3	Improve water quality beyond minimums
	Total	30	Max

EW-9 Enhanced Treatment: Metals

Improve water quality of stormwater runoff from the Project beyond basic treatment.





New biofiltration pond and swale at Cheney Stadium, Tacoma, WA



\triangle Construction Activities v2

Construe	ction Activities	Pts.	Description
CA-1	Environmental Excellence	1-3	Go above and beyond compliance
CA-2	Workzone Health & Safety	1-2	Minimize health and safety hazards
CA-3	Quality Process	1-3	Manage and improve quality
CA-4	Equipment Fuel Efficiency	1	Reduce fossil fuel needs in equipment
CA-5	Workzone Air Emissions	1	Reduce air emissions from construction
CA-6	Workzone Water Use	1-3	Track water use on site
CA-7	Accelerated Construction	1-2	Complete work ahead of schedule
CA-8	Procurement Integrity	1	Have an ethics plan and training
CA-9	Communications & Outreach	1	Have a strategic communications plan
CA-10	Fair & Skilled Labor	1-2	Encourage fair labor and skill development
CA-11	Local Economic Development	1	Stimulate local economies
	Total	20	Max

CA-2 Workzone Safety

Improve work-zone safety by using best practice methods to minimize injury risk.



Night paving at NE 45th Street and 7th Avenue NE in Seattle, WA

CA-7 Workzone Water Use

Encourage responsible water resource management during Project construction.





.... Materials & Design v2

Materials & Design

- MD-1 Preservation & Reuse
- MD-2 Recycled & Recovered Content
- MD-3 Environmental Product Declarations
- MD-4 Health Product Declarations
- MD-5 Local Materials
- MD-6 Long Life Design

Pts. Description

Max

- 1-3 Encourage reuse practices
- 1-2 Increase recycled content
- 1-2 Improve supply chain management
- 1-2 Improve supply chain management
- 1-5 Reduce haul and stimulate economies
- 1-5 Improve project durability

Total 24

MD-2 Recycled Content

Reduce or eliminate the Project's needs for the extraction and production of virgin materials.







Utilities & Controls v2

Utilitie	s & Controls	Pts.	Description
UC-1	Utility Upgrades	1-2	Resolve utility conflicts and upgrade
UC-2	Maintenance Access	1	Ensure the project is easy to maintain
UC-3	Electric Vehicle Infrastructure	1-3	Encourage change in vehicle mix
UC-4	Energy Efficiency	1-3	Reduce energy use during operations
UC-5	Alternative Energy	1-3	Change energy resource needs
UC-6	Lighting & Controls	1-3	Improve environmental quality
UC-7	Traffic Emissions Reduction	1-3	Reduce vehicle air emissions
UC-8	Travel Time Reduction	1-2	Improve project mobility
	Total	20	Max

UC-4 Energy Efficiency

Reduce lifetime energy consumption of operational systems on the Project.



Night shot of porous asphalt pavement lit by LED street lights on Clay Huntington Way, Tacoma, WA



-🚴 Access & Livability v2

Access 8	& Livability	Pts.	Description
AL-1	Safety Audit	1-2	Perform a qualitative safety study
AL-2	Safety Enhancements	1-2	Improve safety with quantitative methods
AL-3	Multimodal Connectivity	1-2	Add or improve connections on the project
AL-4	Equity & Accessibility	1-2	Create user friendly projects for all
AL-5	Active Transportation	1-2	Encourage active transport modes
AL-6	Health Impact Analysis	2	Study the health impacts of the project
AL-7	Noise & Glare Reduction	1-3	Reduce impacts from noise and glare
AL-8	Culture & Recreation	1-2	Improve access to culture and recreation
AL-9	Archaeology & History	1-2	Improve access to historical resources
AL-10	Scenery & Aesthetics	1-2	Enhance views and user experience
	Total	21	Max

AL-5 Active Transportation

Improve Project facilities for pedestrian, bicycle and other active modes for healthier communities.





Pedestrian corridor at South Division Street Promenade, Auburn, WA



★ Creativity & Effort

Creat	ivity & Effort	Pts.	Description
CE-1	Sustainable Transportation Professional	1-2	Have a team of credentialed STPs
CE-2	Innovative Ideas	1-5	Submit a new credit
CE-3	Enhanced Performance	1-5	Exceed minimum credit requirements
CE-4	Local Values	1-3	Match practices to local strategic goals
	Total	15	Мах

Certification Levels





40-49 points



SILVER

CERTIFIED

Greenroads



60-79 points



80+ points



Why bother?



Set a higher standard for roads and bridges.

Some examples from LEED:



City of Seattle: Sustainable Building Policy

All City construction projects over 5,000 ft² must meet LEED Silver rating level. LEED Pilot program provides small grants to help.



King County

Highest LEED level achievable based on life-cycle cost analysis and funding. Applies to all new construction and renovation over \$250,000.



Washington State

All State funded projects over 5,000 ft² have a goal of LEED silver.



Make money.

One example from LEED...



From the Turner Construction website: "We believe Green buildings are not only good for the environment, they also provide immediate and long-term economic benefits for developers, building owners and occupants



Greenroads Save Money and Have An ROI.

Credit		Cost & Savings	Source
PR-3	Low-Impact Development	15-80% initial cost savings Lower initial cost	EPA
EW-5	Vegetation Quality	30% premium on initial const. 15% savings per year Payback in 2 years	Santa Monica, CA
AL-1	Safety Audit	\$1,000-\$8,000 initial cost B/C ratio: 3:1 or more Payback in 1 year	NCHRP Synthesis 336
MD-2	Recycled Materials	17% savings for materials 10% savings for HMA in-place Lower initial cost	Kristjansdottir et al. (2007) using 20% RAP
MD-6	Long-Life Pavement	<pre>\$65,000 premium on initial const. \$165,000/lane-mile over 50 yrs Payback in 20 yrs</pre>	Muench et al. (2004) for 2-lane road
CA-2	Workzone Health & Safety	\$6.2 billion lost between 1995-97 alone in workzone crashes Average \$3,678 per crash Priceless: avoid injury and death	Yingfeng (2008)
			Greenroad

Tell people.

Tulacz, G. (2014). The Top 100 Green Contractors, ENR, 11/18 August 2014.

Green Building by Market



\$49.99 billion 2013 revenue (11.9% increase from 2012)
International revenue (\$2.90 billion) up 50.8% from 2012
Over 1/3 of total revenue from green projects



Example Projects (From v1.5)



Who Is Doing Greenroads?

Home > Directories > Project Directory

Project Directory

A list of our certified and registered projects.

Search the current Greenroads project directory.









	Greenroads™ Summary Northshore Drive Road and Drainage Improvements
	Total Score* 29
A STREET AND	Project Requirements 6/11
	Environment & Water 6/21
	Access & Equity 9/30
And the second s	Construction Activities 1/14
	Materials & Resources 10/23
	Pavement Technologies 3/20
	Custom Credits 0/10
PILOT PROJECT Photo: C. Weiland	*Does not include Project Requirements

Owner: City of Bellingham, WA Project Length: 1.0 miles

Contract Price:\$1.6 milFunctional Class:Arterial

42

Potential Score of 52 (Gold) within reach with low effort and cost.

Meador-Kansas-Ellis Trail





Monterey Road

City of San Jose, CA

Greenroads[™] Summary

Same

Monterey Road City of San Jose, CA

Total Score*	35
Project Requirements	11/11
Environment & Water	3/21
Access & Equity	10/30
Construction Activities	3/14
Materials & Resources	12/23
Pavement Technologies	5/20
Custom Credits	2/10

*Does not include Project Requirements



SE Pioneer Way Reconstruction

City of Oak Harbor, WA

Greenroads[™] Summary

SE Pioneer Way Reconstruction City of Oak Harbor, WA

Total Score*	43
Project Requirements	11/11
Environment & Water	5/21
Access & Equity	10/30
Construction Activities	5/14
Materials & Resources	10/23
Pavement Technologies	8/20
Custom Credits	5/10

*Does not include Project Requirements



SILVER CERTIFIED

Presidio Parkway, Phase 1

Greenroads

BRONZE CERTIFIED

Caltrans, San Francisco, CA

Greenroads[®] Summary BRONZE CERTIFIED Presidio Parkway Caltrans, San Francisco, CA

Total Score	35
Project Requirements	11/11
Environment & Water	3/21
Access & Equity	17/30
Construction Activities	1/14
Materials & Resources	2/23
Pavement Technologies	11/20
Custom Credits	1/10

*Does not include Project Requirements

How to Get Involved



How to Get Involved

- Get Experience
 - Screen your project for eligibility for FREE
 - Try out a Practice Project
 - Start early, get Registered
 - Work with us internationally through Pilot Programs
- Get Educated and Participate
 - Free video tutorials on the website
 - Take the STP Exam or practice first
 - Become a 2015 Donor for Greenroads
 - Membership program growing all over world
 - Committee opportunities for members

www.greenroads.org







Thanks for watching!



Spare Slides





Greenroads Categories: Version 1.5

Category	Description	Points
Project Requirements	11 Minimum requirements for a Greenroad	Req.
Voluntary Credits		
Environment & Water	Stormwater, habitat, vegetation	21
Access & Equity	Modal access, culture, aesthetics, safety	30
Construction Activities	Construction equipment, processes, quality	14
Materials & Resources	Material extraction, processing, transport	23
Pavement Technology	Pavement design, material use, function	20
	Total Voluntary Credit Points	108
Custom Credits	Write your own credit for approval	10

Total Points 118

What's Happening: v1.5 to v2 Transition

Greenroads v1.5

- Manual and abridged version released 02/2011
- \$7.1 billion USD registered
- Updated 10/2013, 3/2015
- Retired 06/30/2015 for Certification
- Active projects can continue to use until completed
- Archived for posterity and free to use

Greenroads v2

- Active and accessible now
- Released 07/01/2015
- Applies to all new projects
- Always open for comments
- Abridged version and project demo accessible with subscription
- Paper version out by 8/2015
- Supplemental guidance for purchase by 9/2015



Side by Side – Rating System Elements

Greenroads v1.5

Category Name	Credits	Points
Project Requirements (PR)	11	. 0
Environment & Water (EW)	8	21
Access & Equity (AE)	9	30
Construction Activities (CA)	8	14
Materials & Resources (MR)	6	23
Pavement Technologies (PT)	6	20
Custom Credits	9	10

Total Main Categories	48	108
Total w/ CE	57	118

Certification Award Levels	PRs	Points
Bronze	All 11	32
Silver	All 11	43
Gold	All 11	54
Evergreen	All 11	64

Greenroads v2

Category Name	Credits	Points
Project Requirements (PR)	12	0
Environment & Water (EW)	10	30
Construction Activities (CA)	11	20
Materials & Design (MD)	6	24
Utilities & Controls (UC)	8	20
Access & Livability (AL)	10	21
Creativity & Effort (CE)	4	15

Total Main Categories	57	115
Total w/ CE	61	130

Certification Award Levels	PRs	Points
Bronze	All 12	40
Silver	All 12	50
Gold	All 12	60
Evergreen	All 12	80



Side by Side - Category Weights

Greenroads v1.5 Points



- Environment & Water (EW)
- Access & Equity (AE)
- Construction Activities (CA)
- Materials & Resources (MR)
- Pavement Technologies (PT)

Greenroads v2 Points



- Construction Activities (CA)
- Materials & Design (MD)
- Utilities & Controls (UC)
- Access & Livability (AL)

