2010 Transportation Research Board
Environment and Energy Research Conference

Incorporating GreenLITES Program Concepts in Colorado DOT's Transportation Design

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TerraLogic-Boulder, Colorado
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Governor Ritter Greening Government

Executive Directives D0011 07 and D0012 07 (2007)

By 2012

- 20% reduction in energy consumption
- 25% reduction in petroleum consumption
- 10% reduction in water consumption
- Zero goal for solid waste generation
- Fuel efficient vehicles
- New buildings LEED Silver
- Reductions based upon FY 2005 baseline

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CDOT Sustainability Programs

- CDOT Green Council
  - Address Governor Ritter's Executive Orders
  - Funded Materials Recycling and Reuse- Finding Opportunities in Colorado Highways (2007- EPA Grant)
  - Greening Government Research and Implementation Project (2007)
  - Green Maintenance Program
  - Green Construction Program (future)
  - GreenLITES Pilot Study

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CDOT Sustainability Program

- Sustainability Council
  - Sustainability Principles and definition
  - Performance measures
  - Statewide Implementation
- Transportation Environmental Resource Council
  - Common sustainability vision with all state agencies and federal partners

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NYDOT GreenLITES Overview

- Green (Leadership In Transportation and Environmental Sustainability)
- Internal Self Certification Program
- Goals
  - Protect and enhance the environment
  - Conserve energy
  - Preserve-enhance historic/scenic/aesthetics
  - Encourage public involvement in planning
  - Support Smart Growth
  - Encourage innovation in sustainable design

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CDOT GreenLITES Pilot Project Overview

- CDOT Long Term Goals
  - Implement sustainable practices within CDOT
  - Initiate a program that encourages development and implementation of sustainable principles
- Project Goals
  - Evaluate GreenLITES scoring process on CDOT projects (baseline/test case)
  - Provide recommendations for scoring improvements
  - Evaluate other DOT sustainability programs and provide recommendations for potential CDOT program implementation

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CDOT GreenLITES Pilot Study Approach

- 2 Interchanges on I-70 Selected
  - Edwards Interchange (Baseline)
  - Eagle Interchange (Test Case)
- Select Scoring Teams
  - Project Manager
  - Design Team
  - Regional Environmental Manager
- Revise Scoring Criteria Wording
- Project Overview and Training

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CDOT GreenLITES Pilot Study Approach

- Edwards Interchange-Baseline Scoring
- Eagle Interchange Scoping-Goal Setting Scoring
- Eagle Interchange-Interim Scoring/Goal Evaluation/Modifications
- Eagle Interchange –Final Design Scoring
- Final Report
  - Recommendations
  - Key Criteria (cost effective)

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DOT Checklist Project Environmental Sustainability Rating System Scorecard v2.0.1

				POINTS Available	POINTS Scored	Project: PIN: Type: Contact Name: Ph #: Element Specific?	
	CATEGORY	ID	DESCRIPTION			INSTRUCTIONS	EXPLANATION OR COMMENTS *(optional)*
Materials & Resources (M)		M-1m	Reuse (i.e., remove and reset versus remove and replace) of granite curbing.	1		<= Please enter 0 or 1	
		M-1n	Reuse of elements of the previous structure (stone veneer, decorative railing, etc.).	1		<= Please enter 0 or 1	
		M-1o	Designing an on-site location for chipped wood waste disposal from clearing and grubbing operations.	1		<= Please enter 0 or 1	
		M-1p	Specifying the recycling of chipped untreated wood waste for use as mulch and/or ground cover. (Pressure/preservative-treated or painted/coated wood cannot be used as mulch and must be disposed properly).	1		<= Please enter 0 or 1	
		M-1q	Project documents make scrap metals available for reuse or recycling.	1		<= Please enter 0 or 1	
		M-1r	Identify approved, environmentally acceptable and permitted sites in the contract documents for the disposal of surplus excavated material.	1		<= Please enter 0 or 1	
		M-1t	Specify the salvage/moving of houses rather than demo for disposal in landfills.	1		<= Please enter 0 or 1	
		M-1u	Reuse of major structural elements such as bridge piers, bridge structure, etc. if warranted and appropriate and does not compromise the feature life cycle.	2		<= Please enter 0 or 2	
	M-2 *Recycled Content*	M-2a	Use tire shreds in embankments.	2		<= Please enter 0 or 2	
		M-2b	Use recycled plastic extruded lumber or recycled tire rubber (e.g. for noise barriers).	2		<= Please enter 0 or 2	
		M-2c	Specify hot-in-place or cold-in-place recycling of hot mix asphalt pavements.	2		<= Please enter 0 or 2	
		M-2d	Specify the use of recycled glass in pavements and embankments, as drainage material or filter media where adequate local sources can be obtained.	2		<= Please enter 0 or 2	
		M-2e	Specify asphalt pavement mixes containing Recycled Asphalt Pavement (RAP).	2		<= Please enter 0 or 2	
		M-2f	Specify PCC pavement mixes containing Recycled Concrete Aggregate (RCA).	2		<= Please enter 0 or 2	
		M-2g	Use crumb rubber or recycled plastic for noise barrier material.	2		<= Please enter 0 or 2	
		M-2h	Use of porous pavement systems in light duty situations (e.g. sidewalks, truck turnarounds, rest stops, parking lots, police turnarounds).	2		<= Please enter 0 or 2	
	M-3 *Local Materials*	M-3a	Specify locally available natural light weight fill. Contact Geotechnical staff to help in locating these materials.	2		<= Please enter 0 or 2	
		M-3b	Specify local seed stock and plants.	2		<= Please enter 0 or 2	
	M-4 *Bio-engineering Techniques*	M-4a	Project designs that utilize soil bioengineering treatments (the reliance on plant material for slope protection, rebuilding, stabilization, and erosion control) along water bodies/wetlands.	2		<= Please enter 0 or 2	
		M-4b	Project designs utilizing soil biotechnical engineering treatments (combination of plant materials and structural elements to achieve slope protection, rebuilding, stabilization, and erosion control) along water bodies/wetlands. Examples are: vegetated crib wall, vegetated gabion, and vegetated mats.	2		<= Please enter 0 or 2	
		M-4c	Projects using targeted biological control methods to reduce invasive species.	2		<= Please enter 0 or 2	
		M-4d	Project designs utilizing soil biotechnical engineering treatments (combination of plant materials and structural elements to achieve slope protection, rebuilding, stabilization, and erosion control) NOT along water bodies or wetlands. Examples include vegetated: crib walls, gabions, Geosynthetic Reinforced Earth Systems (GRES), geocells, and mats.	1		<= Please enter 0 or 1	
		M-4e	Project designs that utilize soil bioengineering treatments or soil biotechnical engineering treatments in upland areas.	1		<= Please enter 0 or 1	
	M-5 *Hazardous Material Minimization*	M-5a	Project design substantially minimizes the need to use hazardous materials to maintain the bridge or highway, or increases the interval before reconstruction must be performed using hazardous or toxic materials. The project design improves durability of components that contain hazardous substances.	2		<= Please enter 0 or 2	
		M-5b	Project design specifies less hazardous materials or avoids generating contaminated wastes by reducing the volatile organic compounds (VOCs) or hazardous air pollutants (HAPs) emitted during project construction (e.g., use of non-solvent traffic or bridge paints, lower VOC/nonhazardous air pollutant bridge deck sealers) and by eliminating or reducing toxic metals/components.	2		<= Please enter 0 or 2	
		M-5c	Removing and disposing of contaminated soils beyond what is necessary for project construction.	2		<= Please enter 0 or 2	
		M-5d	Removing and disposing of contaminated soils, lead based paints, asbestos, tanks containing hazardous contents as necessary for project construction.	1		<= Please enter 0 or 1	
Energy & Atmosphere (E)	E-1 *Improved Traffic Flow*	E-1a	Special use lane (HOV/Reversible/Bus Express).	3		<= Please enter 0 or 3	
		E-1b	Innovative interchange design and/or elimination of freeway bottlenecks (diverging diamond, single point urban).	3		<= Please enter 0 or 3	
		E-1c	Specify new roundabout(s).	3		<= Please enter 0 or 3	
		E-1d	Implementation of a robust Traffic Demand Management/ Traveler Information System operation (e.g., TDM, CCTV, VMS freeway detection, ramp metering, road weather info system and/or weigh in motion devices, travel time signs).	3		<= Please enter 0 or 3	
		E-1e	Installation of a closed-loop coordinated signal system.	2		<= Please enter 0 or 2	
		E-1f	Installation of a transit express system (queue jumper, pre-emptive signals, etc)	2		<= Please enter 0 or 2	
		E-1g	Expansion of a Traffic Demand Management/Traveler Information System operation; for example increasing system coverage significantly (installation of new CCTV, VMS freeway detection, ramp metering, road weather information system and/or weigh in motion devices, travel time signs, etc.).	2		<= Please enter 0 or 2	
		E-1h	Implementation of a corridor-wide access management plan.	2		<= Please enter 0 or 2	
		E-1i	Limiting/consolidating access points along highway.	1		<= Please enter 0 or 1	
		E-1j	Improving a coordinated signal system and other signal timing and detection systems.	1		<= Please enter 0 or 1	
		E-1k	Adding bus turnouts.	1		<= Please enter 0 or 1	
		E-1l	Installing higher capacity controllers with features to improve flow and reduce delay at intersections.	1		<= Please enter 0 or 1	
		E-1m	Infill and/or preparation for Traffic Management/Traveler Information System operation (installation of VMS, CCTV, etc.) with existing system coverage to increase or improve density of devices, installation of conduit in anticipation of future Traffic Management/Traveler Information System need, etc.	1		<= Please enter 0 or 1	

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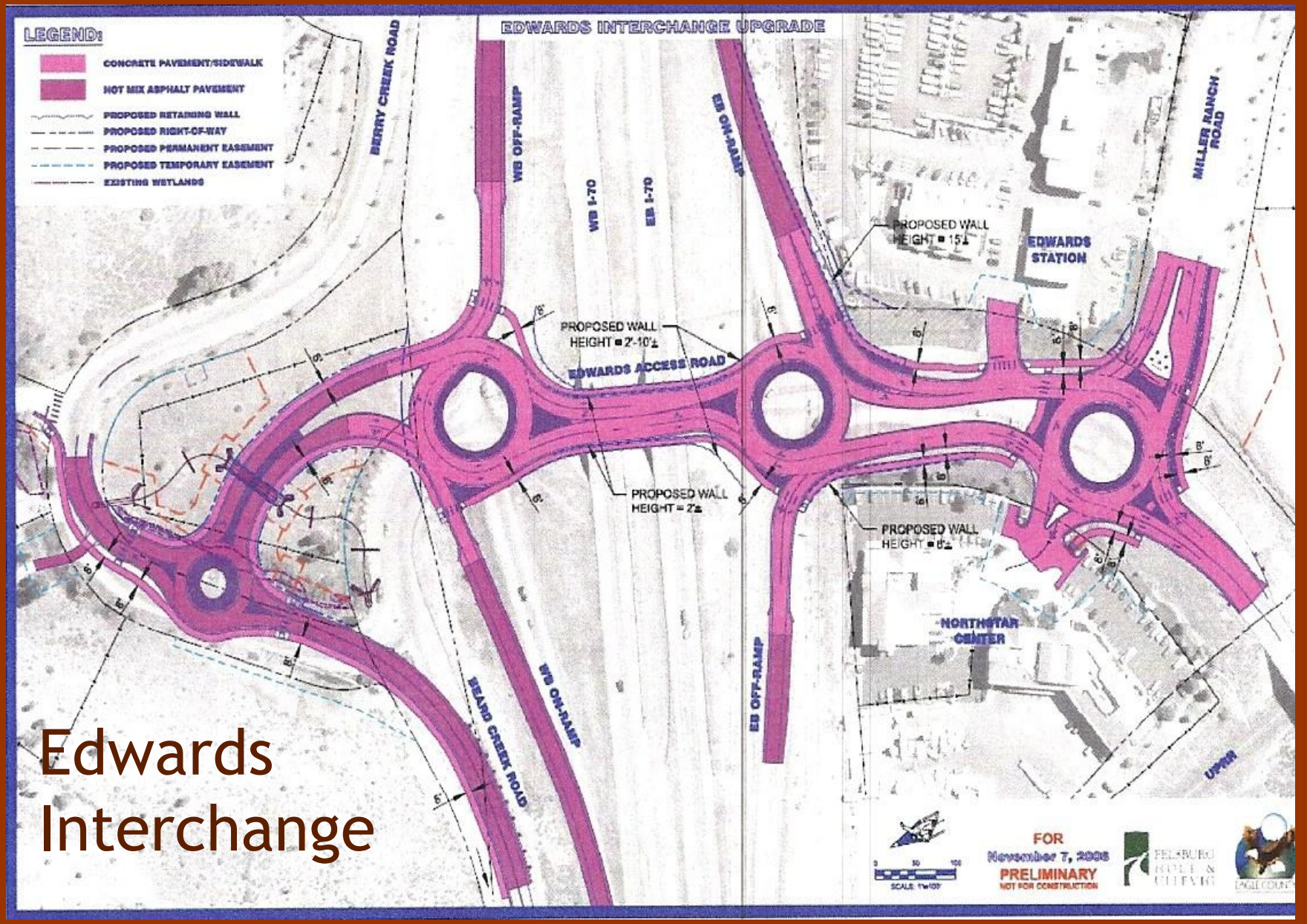

Edwards Interchange

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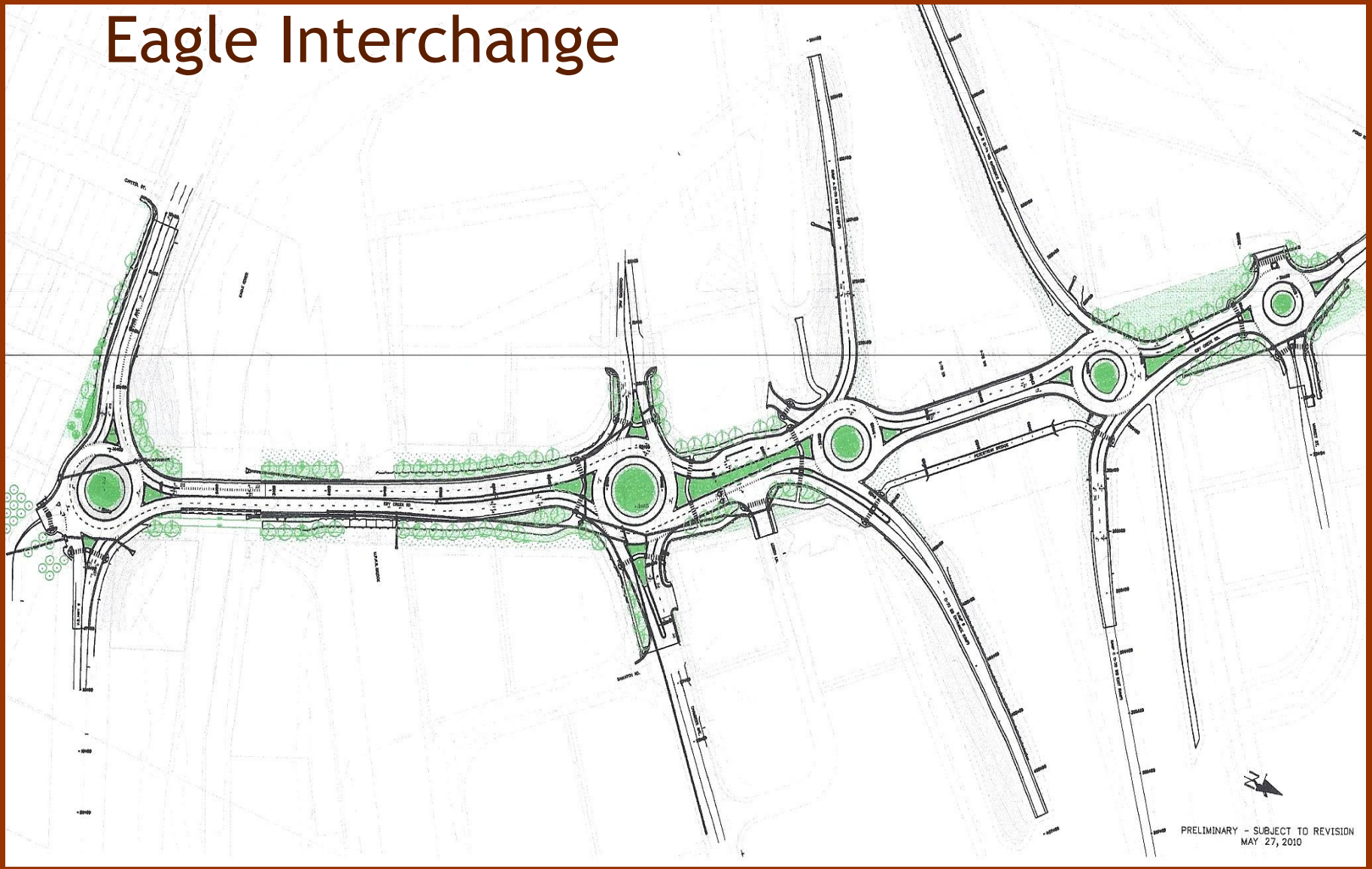
Eagle Interchange



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NYDOT-CDOT GreenLITES Scoring Criteria

1. Sustainable Sites- Focus on the setting of the project; measures which can protect and enhance the landscapes ability to regulate climate, provide cleaner air and water and improve quality of life
   - Alignment Selection
   - Context Sensitive
   - Land Use/Community Planning
   - Protect, Enhance, Restore Wildlife
   - Protect and Mitigate Tree and Plant Impacts

   # Criteria=56

   Maximum Points=82

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NYDOT-CDOT GreenLITES Scoring Criteria

2. Water Quality-protect the State's water bodies by improving water quality and reducing stormwater runoff; achieved by using BMPs and designs that treat stormwater quality and quantity.
   - Stormwater management (volume/quality)
   - Reduce runoff and pollutants using BMPs

   # Criteria=13

   Maximum Points=21

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NYDOT-CDOT GreenLITES Scoring Criteria

3. Material Resources-encourages reducing waste by reusing and recycling materials in beneficial ways. Local materials would be used to the greatest extent possible to minimize haul distances.
   - Reuse of Materials
   - Recycling Content
   - Locally Provided Materials
   - Bioengineering Techniques
   - Waste Material Minimization

   # Criteria=39

   Maximum Points=66

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NYDOT-CDOT GreenLITES Scoring Criteria

4. Energy and Atmosphere-reduce the climate change by increasing energy conservation and efficiency, promotes air quality improvements, encourages car pooling, mass transit and non-motorized transportation
   - Improved traffic flow
   - Reduce electrical and petroleum consumption
   - Improve bicycle/pedestrian facilities
   - Noise abatement
   - Stray light reduction

   # Criteria=68

   Maximum Points=102

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NYDOT-CDOT GreenLITES Scoring Criteria

4. Innovation-credits that significantly build upon GreenLITES categories and objectives or incorporate significant innovations not previously been utilized on projects

   Maximum Points=6

   Total # Criteria=176

   Total Possible Points=271

Scoring Comparison

- Sustainable Sites
  - Baseline-33/82 points (40%)
  - Scoping- 44/82 points (54%)
- Water Quality
  - Baseline- 6/21 points (29%)
  - Scoping- 16/21 points (76%)
- Energy and Atmosphere
  - Baseline-27/102 points (26%)
  - Scoping-56/102 points (55%)

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Scoring Comparison

- Materials and Resources
  - Baseline-5/66 points (8%)
  - Scoping-33/66 points (50%)
- Total Points
  - Baseline- 71/271 points (26%)
  - Scoping- 148/271 points (55%)

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NYDOT-CDOT GreenLITES Certification Levels

- Certified (15-29 points)
- Silver (30-44 points)
- Gold (45-59 points)
- Evergreen (60 points and beyond)
  - Baseline 71 points
  - Scoping 148 points

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Initial Lessons Learned

- Collaborative scoring using projector
- Baseline scored at Evergreen Level
- Some criteria does not fit Colorado
- Many criteria not applicable for interchanges and other types of projects
- Hard to get reviewers to review scoring criteria before meetings
- 3-3.5 hours for scoring

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Lessons Learned

- Need support from engineering management and design team
- Project Manager needs to be the driving force behind the GreenLITES scoring and design integration
- Concern about the cost of sustainability implementation (which ones are the most cost effective?)
- Definition of terms and criteria needed for consistent evaluation and understanding
- Scoring criteria could include other sustainability elements such as electrical energy conservation, petroleum conservation, and water reduction requirements

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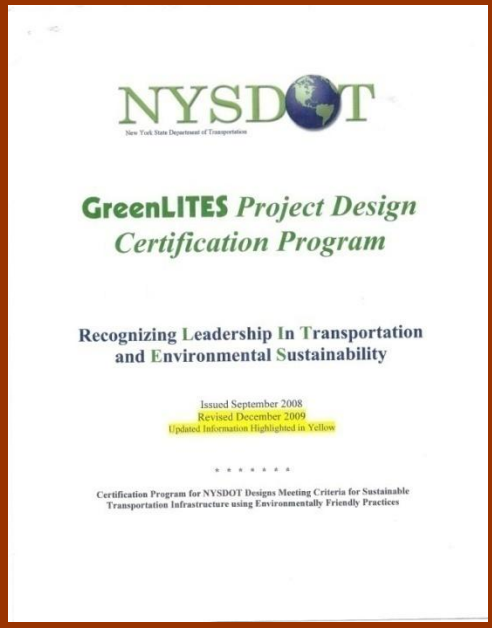
NYSDOT
New York State Department of Transportation

GreenLITES Project Design Certification Program

Recognizing Leadership In Transportation and Environmental Sustainability

Issued September 2008
Revised December 2009
Updated Information Highlighted in Yellow

Certification Program for NYSDOT Designs Meeting Criteria for Sustainable Transportation Infrastructure using Environmentally Friendly Practices