

# Who Wants a Green-Certified-Platinum- Triple-Star Bridge? : A Bridge Engineer's Introduction to Current Sustainability Rating Methods

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# Sustainability

- "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." -Bruntland Report for the World Commission on Environment and Development (1987)

# Presentation Goals

- Understand Sustainability Rating Frameworks
  - What do they focus on?
  - How do they work?
  - Where to find more information?
  
- Tools for focusing on sustainable design

# Why we care about Sustainability?

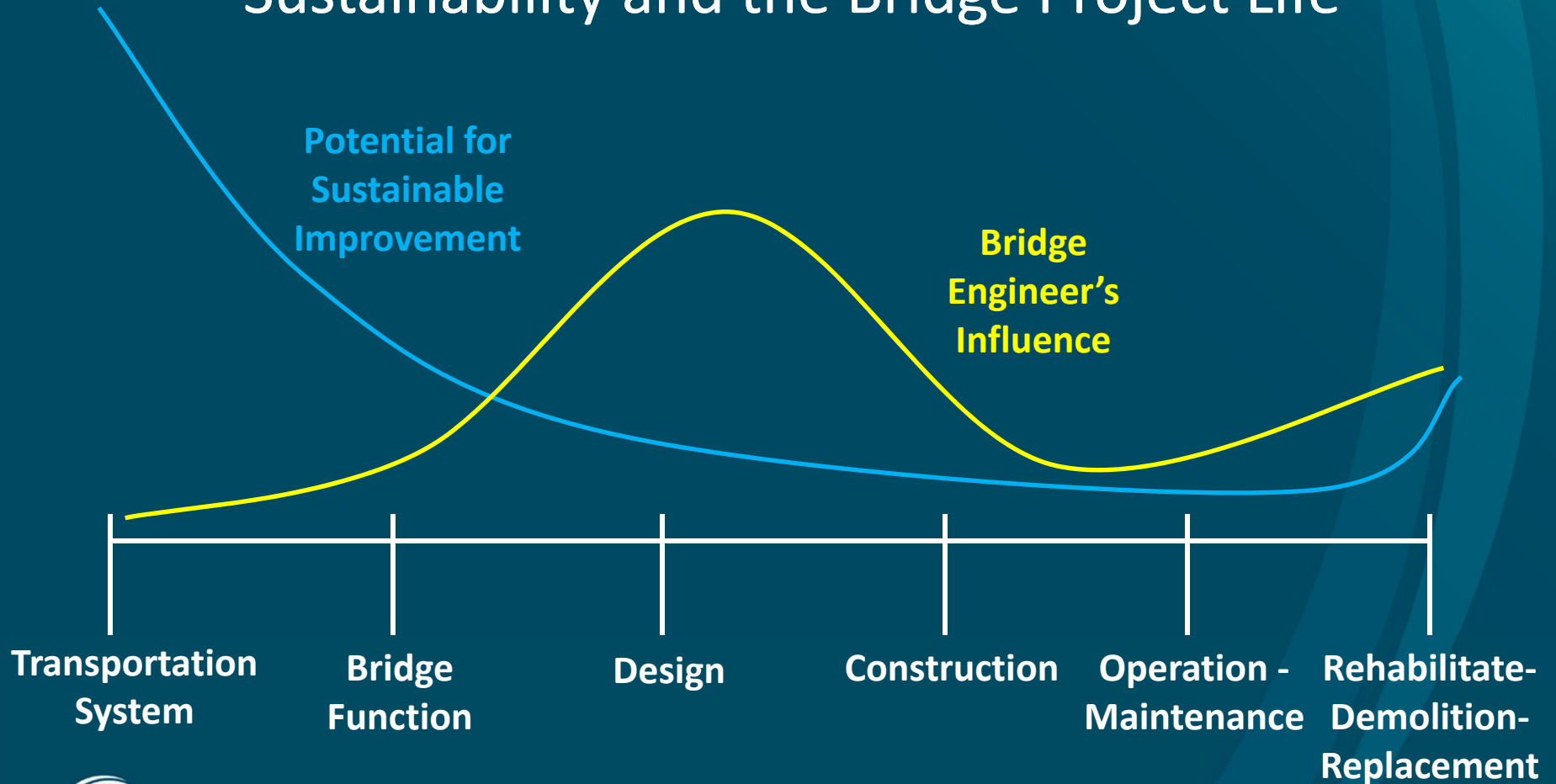


## California AB 32 – Global Warming Solutions Act



# The Bridge Engineer's Role

## Sustainability and the Bridge Project Life



# Rating Systems

○ Primary Ratings Systems relevant to bridges



— ENVISION



# Rating Systems –



# Rating Systems – Greenroads®

- Challenges Project Teams to go above and beyond minimum environmental, social, and economic performance measures and evaluated by an independent, expert, third-party review.

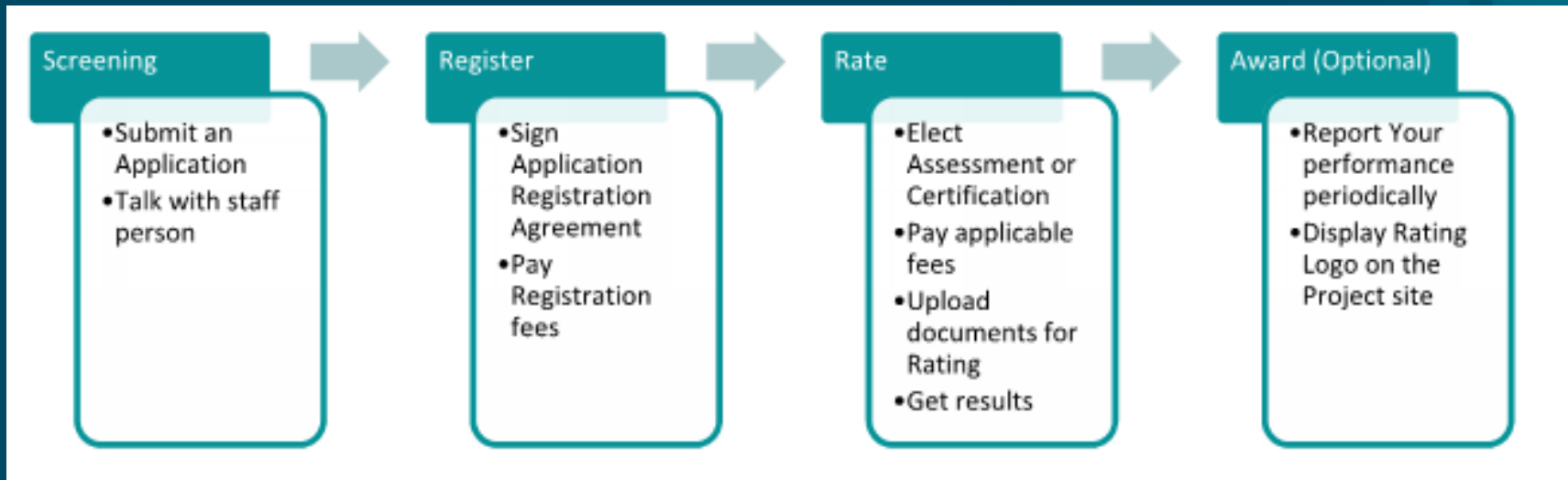


# Rating Systems – Greenroads®

- Who owns it? **Greenroads Foundation -Independent 501(c)(3)**
- Who does the work? **Third-Party Evaluators**
- \$\$ - **Registration + Certification**
  - Registration
    - Plan ahead (3+ yrs to construction NTP) \$500 - \$1500
    - Don't Plan ahead (<1 yr to construction NTP) \$5000 - \$6000
  - Certification
    - \$7,500 for \$10 Million project
    - \$79,500 for \$500 Million project

# Rating Systems – Greenroads®

## ○ How does it work?



## ○ 2 Options: Assessment or Certification

# Rating Systems – Greenroads®

- How does it work?
  - Applies to new and reconstructed roads and bridges
  - Recognizes and quantifies road and bridge sustainable practices
  - Awards points for pre-defined and project specific innovative sustainable practices.

12 Project Requirements

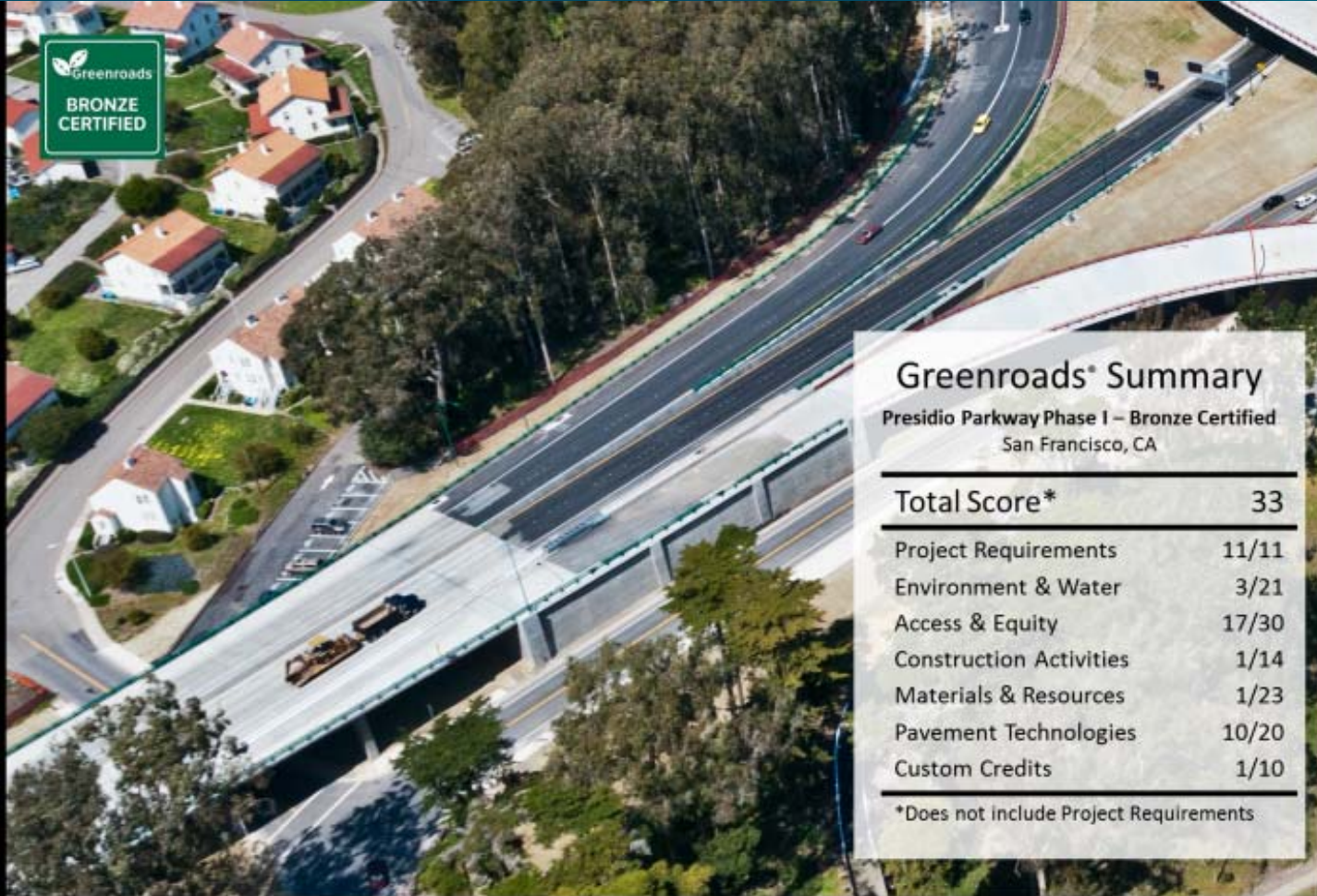
+

Core Credits	
Environment & Water	45 Credits Available
Construction Activities	
Materials & Design	
Utilities & Controls	
Access & Livability	

Credits -> Points

Certification	Points
Bronze	40
Silver	50
Gold	60
Evergreen	80

# Rating Systems – Greenroads®



**Greenroads® Summary**  
Presidio Parkway Phase I – Bronze Certified  
San Francisco, CA

<b>Total Score*</b>	<b>33</b>
Project Requirements	11/11
Environment & Water	3/21
Access & Equity	17/30
Construction Activities	1/14
Materials & Resources	1/23
Pavement Technologies	10/20
Custom Credits	1/10

\*Does not include Project Requirements

**Ruckman Bridge Replacement** **Caltrans/SFCTA – San Francisco, CA**

# Rating Systems – Greenroads®



## Greenroads® Summary

Review Stage: Construction

U.S. 97: Lava Butte - S. Century Drive  
Oregon Department of Transportation

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<b>Total Score*</b>	<b>46</b>
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Project Requirements	8/11
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Environment & Water	6/21
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Access & Equity	17/30
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Construction Activities	1/14
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Materials & Resources	10/23
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Pavement Technologies	5/20
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Custom Credits	7/10
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\*Does not include Project Requirements

# Rating Systems –



## Rating Systems –Envision



- “Envision takes a holistic view of infrastructure development, evaluating projects in terms of their value to communities, effective use of funds, and contributions to conditions of sustainability.
- Envision not only asks ‘Are we doing the project right?’ but also ‘Are we doing the right project?’”

# Rating Systems –Envision



○ Who owns it? **Institute for Sustainable Infrastructure**

- Initiated by ASCE, ACEC, and APWA in 2010



○ Who does the work? **Team professional + 3<sup>rd</sup> Party Verification**

○ \$\$ - **Registration + Verification**

- Registration = \$1000
- Verification = \$9,000 for \$4M project size  
\$21,000 for \$100M project size



# Rating Systems –Envision



## ○ How does it work?

60 Performance Objectives or Credits in 5 Categories



Evaluation



Award

QUALITY OF LIFE	
RESOURCE ALLOCATION	
NATURAL WORLD	
CLIMATE AND RISK	
LEADERSHIP	

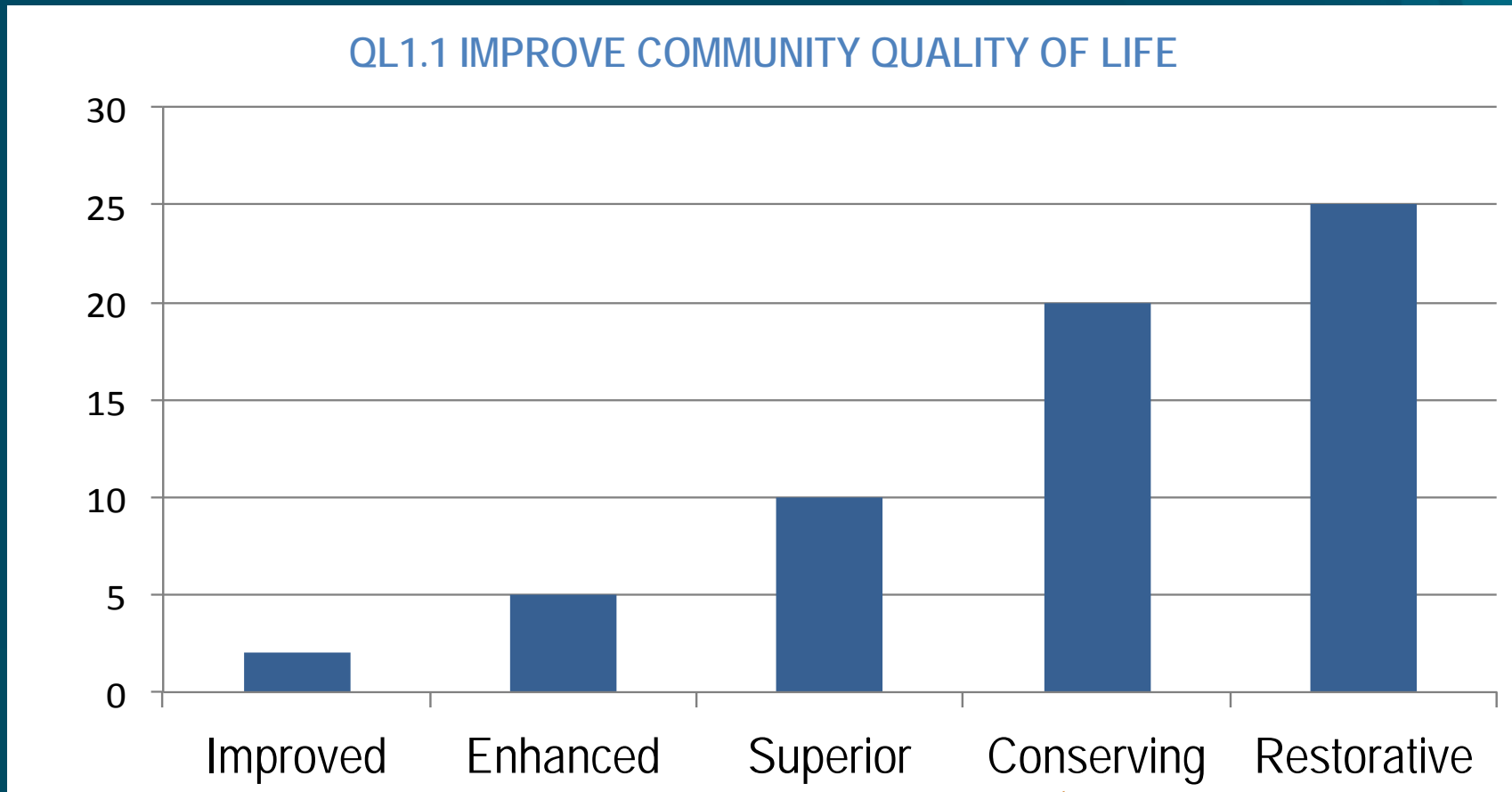
Professional (ENV SP)  
+  
Verifier  
+  
Authenticator

Award Level	% of Available
Bronze	20%
Silver	30%
Gold	40%
Platinum	50%

# Rating Systems –Envision



## ○ Level of Achievement



# Rating Systems –Envision



**QUALITY OF LIFE**  
13 credits

13 credits in progress, 13 credits completed  
Last updated 03/24/2016 by Staff ISI

109 of 165 Possible points – 66%

				I	E	S	C	R
Purpose	<input type="checkbox"/> QL1.1 Improve Community Quality of Life	N/A	0	2	5	10	20	25
	<input type="checkbox"/> QL1.2 Stimulate Sustainable Growth and Development	N/A	0	1	2	5	13	16
	<input type="checkbox"/> QL1.3 Develop Local Skills and Capabilities	N/A	0	1	2	5	12	15
Wellbeing	<input type="checkbox"/> QL2.1 Enhance Public Health and Safety	N/A	0	2	–	–	16	–
	<input type="checkbox"/> QL2.2 Minimize Noise and Vibration	N/A	0	1	–	–	8	11
	<input type="checkbox"/> QL2.3 Minimize Light Pollution	N/A	0	1	2	4	8	11
	<input type="checkbox"/> QL2.4 Improve Community Mobility and Access	N/A	0	1	4	7	14	–
	<input type="checkbox"/> QL2.5 Encourage Alternative Modes of Transportation	N/A	0	1	3	6	12	15
	<input type="checkbox"/> QL2.6 Improve Site Accessibility, Safety and Wayfinding	N/A	0	–	3	6	12	15
Community	<input type="checkbox"/> QL3.1 Preserve Historic and Cultural Resources	N/A	0	1	–	7	13	16
	<input type="checkbox"/> QL3.2 Preserve Views and Local Character	N/A	0	1	3	6	11	14
	<input type="checkbox"/> QL3.3 Enhance Public Space	N/A	0	1	3	6	11	13
Innovate or Exceed	<input type="checkbox"/> QL0.0 Innovate or Exceed Credit Requirements	N/A	Maximum Level of 8					8
		Submitted		109	Verified		93	

## Rating Systems –



- INVEST is a set of best practices intended to identify, recognize, and promote above-and-beyond efforts towards sustainability in transportation programs and projects.



## Rating Systems –



- Who owns it? **FHWA**
- Who does the work? **Self-Assessment**
- \$\$ - **Free**

# Rating Systems –



## ○ How does it work?

**System Planning for States Criteria by Sustainability Principle**

Criterion Number and Title
SPS-01: Integrated Planning: Economic Development and Land Use
SPS-02: Integrated Planning: Natural Environment
SPS-03: Integrated Planning: Social
SPS-04: Integrated Planning: Bonus
SPS-05: Access and Affordability
SPS-06: Safety Planning
SPS-07: Multimodal Transportation and Public Health
SPS-08: Freight and Goods Access & Mobility
SPS-09: Travel Demand Management
SPS-10: Air Quality & Emissions
SPS-11: Energy and Fuels
SPS-12: Financial Sustainability
SPS-13: Analysis Methods
SPS-14: Transportation Systems Management and Operations
SPS-15: Linking Asset Management and Planning
SPS-16: Infrastructure Resiliency
SPS-17: Linking Planning and NEPA

**Criterion Scoring**

**Test 1**

**SPS-01.1a** Has the agency developed goals and objectives for the integration of metropolitan and/or statewide transportation planning with economic development and land use planning above and beyond current requirements?

Yes (1 point)

No

**SPS-01.1b** Are the goals and objectives consistent with applicable economic development and land use plans above and beyond current requirements?

Yes (1 point)

No

**SPS-01.2a** Does the agency regularly engage land use and economic development agencies in its jurisdiction throughout the transportation planning process?

Yes (2 points)

No

**SPS-01.2b** Does the agency utilize institutional mechanisms to facilitate the engagement?

Yes (1 point)

No

# Rating Systems –



○ How does it work?

A screenshot of the INVEST website interface. At the top left is the INVEST logo. To the right, it says "Version 1.2" and has "Login" and "Register" buttons. Below that is a search bar. A horizontal navigation menu contains "About", "Learn", "Criteria", "Score", and "Resources". The main content area features a "Case Studies" banner with a bridge image and the text "New case studies provide examples of how transportation agencies are using INVEST to improve sustainability." Below the banner are four colored buttons: "System Planning for States" (purple), "System Planning for Regions" (blue), "Project Development" (green), and "Operations and Maintenance" (light green). On the right side, there is a "Popular Links" section with buttons for "Case Studies", "INVEST Library", "Getting to Know INVEST", "My Workspace", "FHWA Sustainable Highways Initiative", and "Translate to Version 1.2". At the bottom of the page, it says "Welcome to INVEST Version 1.2!".

## Other Ratings Systems—

- Building Focused
  - LEED + SITES + Parksmart
  - BREEAM
- Product Certifications



# Other Tools

- Life Cycle Cost Analysis

- GHG Calculation

# References/Links/Books/Etc

Greenroads	<a href="http://www.greenroads.org">www.greenroads.org</a>
Envision	<a href="http://Sustainableinfrastructure.org">Sustainableinfrastructure.org</a>
INVEST	<a href="http://Sustainablehighways.org">Sustainablehighways.org</a>
FHWA Lifecycle Cost Tools	<a href="http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm">www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm</a>
WSDOT – Project Level Greenhouse Gas Evaluations under NEPA and SEPA	