
*May 20, 2021*
*Houston, Texas*

# An Introduction to the Envision Sustainable Infrastructure Framework

*Presented by*

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r.g. miller engineers

ACEC
American Council of Engineering Companies

AMERICAN PUBLIC WORKS ASSOCIATION
APWA
Your Comprehensive Public Works Resource

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Institute for Sustainable Infrastructure

ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

ENVISION

# What is Envision?

*LEED is used by architects*

*to make buildings more sustainable.*

***ENVISION is used by planners and engineers***

***to make public infrastructure more sustainable.***

***sustainableinfrastructure.org***

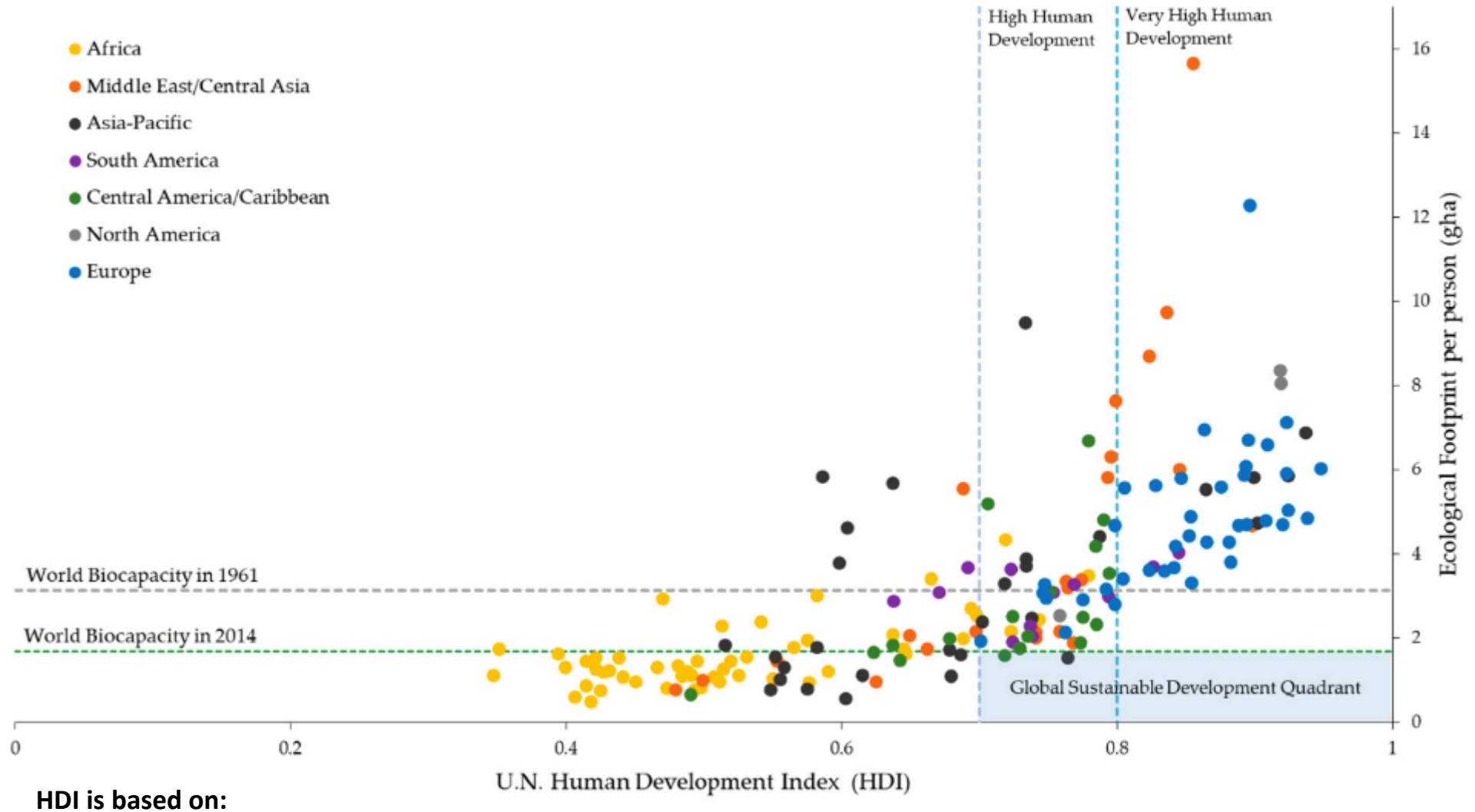
***Sustainable development is…***

***…development that meets the needs of the present without compromising the ability of future generations to meet their own needs.***

***-Brundtland Commission Report 1987***

United Nations. 1987. *Report of the World Commission on Environment and Development*. General Assembly Resolution 42/187, 11 December 1987
http://www.un.org/documents/ga/res/42/ares42-187.htm

# Human Development Index vs. Ecological Footprint




**HDI is based on:**

1. **Life Expectancy**
2. **Years of Education**
3. **Gross National Income per capita**

resources

MDPI

*Article*

# Ecological Footprint Accounting for Countries: Updates and Results of the National Footprint Accounts, 2012–2018

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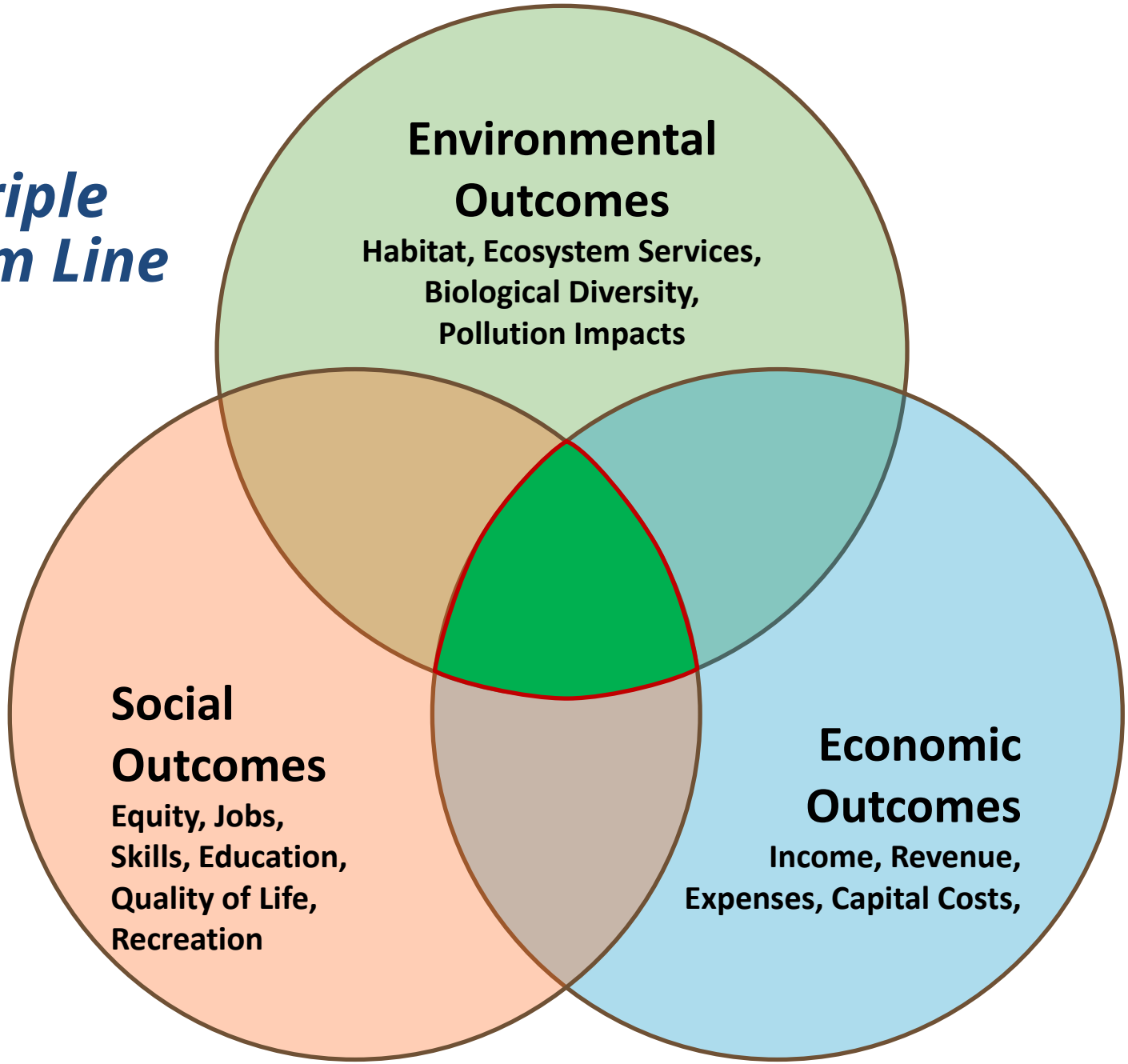
Received: 18 July 2018; Accepted: 12 September 2018; Published: 17 September 2018

# The *Triple Bottom Line*



# Envision Outcomes

## PEOPLE

***are Credentialed…***

**as Envision Sustainability Professionals (ENV SPs)**

## PROJECTS

***are Verified…***

**using the Envision Framework**

# Types of Infrastructure Envision Rates

## ENERGY

Geothermal
Hydroelectric
Nuclear
Coal
Natural Gas
Oil/Refinery
Wind
Solar
Biomass

## WATER

Potable water distribution
Capture/ storage
Water Reuse
Storm Water Management
Flood Control

## WASTE

Solid waste
Recycling
Hazardous Waste
Collection & Transfer

## TRANSPORT

Airports
Roads
Highways
Bikes
Pedestrians
Railways
Public Transit
Ports
Waterways

## LANDSCAPE

Public Realm
Parks
Ecosystem Services
Natural Infrastructure

## INFORMATION

Telecommunications
Internet
Phones
Data Centers
Sensors

# Quality Of Life

14 Credits

## WELLBEING

**QL1.1** Improve Community Quality of Life
**QL1.2** Enhance Public Health & Safety
**QL1.3** Improve Construction Safety
**QL1.4** Minimize Noise & Vibration
**QL1.5** Minimize Light Pollution
**QL1.6** Minimize Construction Impacts

## MOBILITY

**QL2.1** Improve Community Mobility & Access
**QL2.2** Encourage Sustainable Transportation
**QL2.3** Improve Access & Wayfinding

## COMMUNITY

**QL2.1** Advance Equity & Social Justice
**QL2.2** Preserve Historic & Cultural Resources
**QL2.3** Enhance Views & Local Character
**QL2.4** Enhance Public Space & Amenities

**QL0.0** Innovate or Exceed Credit Requirements

# Leadership

12 Credits

## COLLABORATION

**LD1.1** Provide Effective Leadership & Commitment
**LD1.2** Foster Collaboration & Teamwork
**LD1.3** Provide for Stakeholder Involvement
**LD1.4** Pursue Byproduct Synergies

## PLANNING

**LD2.1** Establish a Sustainability Management Plan
**LD2.2** Plan for Sustainable Communities
**LD2.3** Plan for Long-Term Monitoring & Maintenance
**LD2.4** Plan for End-of-Life

## ECONOMY

**LD3.1** Stimulate Economic Prosperity & Development
**LD3.2** Develop Local Skills & Capabilities
**LD3.3** Conduct a Life-Cycle Economic Evaluation

**LD0.0** Innovate or Exceed Credit Requirements

# Resource Allocation

14 Credits

## MATERIALS

**RA1.1** Support Sustainable Procurement Practices

**RA1.2** Use Recycled Materials

**RA1.3** Reduce Operational Waste

**RA1.4** Reduce Construction Waste

**RA1.5** Balance Earthwork On Site

## ENERGY

**RA2.1** Reduce Operational Energy Consumption

**RA2.2** Reduce Construction Energy Consumption

**RA2.3** Use Renewable Energy

**RA2.4** Commission & Monitor Energy Systems

## WATER

**RA3.1** Preserve Water Resources

**RA3.2** Reduce Operational Water Consumption

**RA3.3** Reduce Construction Water Consumption

**RA3.4** Monitor Water Systems

**RA0.0** Innovate or Exceed Credit Requirements

# Natural World

14 Credits

## SITING

**NW1.1** Preserve Sites of High Ecological Value

**NW1.2** Provide Wetland & Surface Water Buffers

**NW1.3** Preserve Prime Farmland

**NW1.4** Preserve Undeveloped Land

## CONSERVATION

**NW2.1** Reclaim Brownfields

**NW2.2** Manage Stormwater

**NW2.3** Reduce Pesticide & Fertilizer Impacts

**NW2.4** Protect Surface & Groundwater Quality

## ECOLOGY

**NW3.1** Enhance Functional Habitats

**NW3.2** Enhance Wetland & Surface Water Functions

**NW3.3** Maintain Floodplain Functions

**NW3.4** Control Invasive Species

**NW3.5** Protect Soil Health

**NW0.0** Innovate or Exceed Credit Requirements

# Climate and Resilience

10 Credits

## EMISSIONS

**CR1.1** Reduce Net Embodied Carbon

**CR1.2** Reduce Greenhouse Gas Emissions

**CR1.3** Reduce Air Pollutant Emissions

## RESILIENCE

**CR2.1** Avoid Unsuitable Development

**CR2.2** Assess Climate Change Vulnerability

**CR2.3** Evaluate Risk & Resilience

**CR2.4** Establish Resilience Goals and Strategies

**CR2.5** Maximize Resilience

**CR2.6** Improve Infrastructure Integration

**CR0.0** Innovate or Exceed Credit Requirements

## Wellbeing

### QL1.1 Improve Community Quality of Life

Project delivers a net positive impact on community needs and values

### QL1.2 Enhance Public Health and Safety

Protect community health and safety

### QL1.3 Improve Construction Safety

Enhance public and worker safety construction

### QL1.4 Minimize Noise and Vibration

Maintain and improve community livability

### QL1.5 Minimize Light Pollution

Reduce backlight, uplight, and glare

### QL1.6 Minimize Construction Impacts

Eliminate temporary inconveniences

# Quality of Life

**14 Credits, 3 Subcategories**

- **Wellbeing**
- **Mobility**
- **Community**

- **METRIC**

- **INTENT**

- **CRITERIA FOR LEVELS OF ACHIEVEMENT**

Planning

### LD2.1 Establish A Sustainability Management Plan

Effective management mechanisms to deliver a successful project

### LD2.2 Plan for Sustainable Communities

Use sustainability principles in project selection

### LD2.3 Plan For Long-Term Monitoring & Maintenance

Resources to ensure that ecological protection measures are incorporated

### LD2.4 Plan for End-of-Life

Planning for deconstruction of a constructed works

# Leadership

**12 Credits, 3 Subcategories**

- **Collaboration**
- **Planning**
- **Economy**

- **METRIC**
- **INTENT**
- **CRITERIA FOR LEVELS OF ACHIEVEMENT**

## Energy

### RA2.1 Reduce Operational Energy Consumption

Reduce the use of energy in operations

### RA2.2 Reduce Construction Energy Consumption

Reduce the use of energy in construction

### RA2.3 Use Renewable Energy

Use renewable energy sources instead of fossil fuels

### RA2.4 Commission & Monitor Energy Systems

Commission and monitor to increase energy efficiency

# Resource Allocation

**14 Credits, 3 Subcategories**

- **Materials**
- **Energy**
- **Water**

- **METRIC**
- **INTENT**
- **CRITERIA FOR LEVELS OF ACHIEVEMENT**

## Conservation

**NW2.1 Reclaim Brownfields**

Remediate brownfields

**NW2.2 Manage Stormwater**

Impact of climate change

Low Impact Development (LID)

**NW2.3 Reduce Pesticide & Fertilizer Impacts**

Reducing the use of toxic pesticides and fertilizers

**NW2.4 Prevent Surface & Groundwater Contamination**

Prevent contamination from equipment and facilities

# Natural World

**14 credits, 3 subcategories**

- **Siting**
- **Conservation**
- **Ecology**

- **METRIC**
- **INTENT**
- **CRITERIA FOR LEVELS OF ACHIEVEMENT**

## Emissions

### CR1.1 Reduce Net Embodied Carbon

Conducting a life-cycle carbon analysis

### CR1.2 Reduce Greenhouse Gas Emissions

Designing the project to reduce GHG emissions

### CR1.3 Reduce Air Pollutant Emissions

Design to reduce air pollution during operations

# Climate and Resilience

**10 credits, 2 subcategories**

- **Emissions**
- **Resilience**

- **METRIC**
- **INTENT**
- **CRITERIA FOR LEVELS OF ACHIEVEMENT**

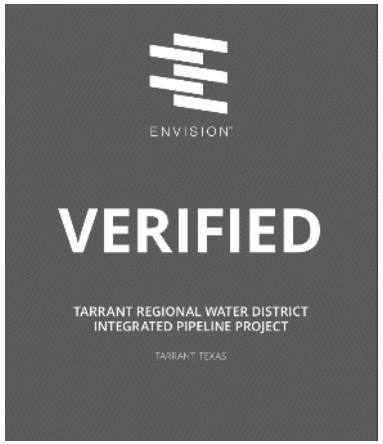
# “Levels of Achievement” for Each Credit

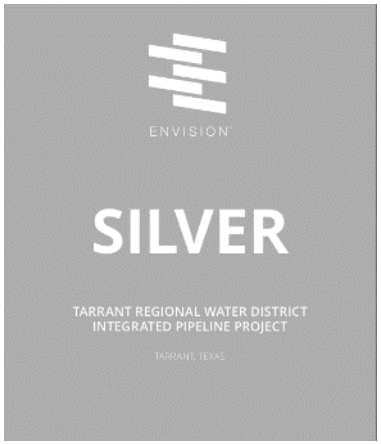
| Improved | Enhanced | Superior | Conserving | Restorative |
|---|---|---|---|---|
| Above conventional | On the right track | Noteworthy but not net-zero | Zero negative impact | Restores systems |

# Envision Verification Awards

$$\text{Fraction Achieved} = \frac{\text{Total Points Achieved}}{\text{Total Applicable Points}}$$

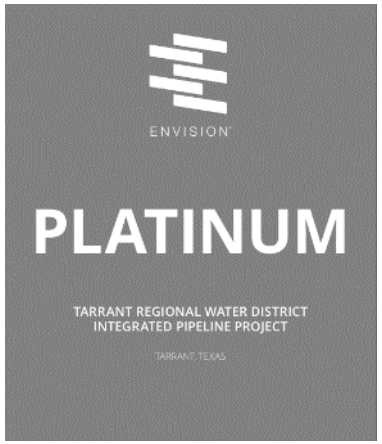
**20%** **30%** **40%** **50%**









# Verification: Roles and Responsibilities

## ENV SP ↔ ISI Staff ↔ Verifier

**Primary project point of contact, liaison between project team and ISI.**

**Provides accurate project details for review.**

**Oversees the verification process for all projects.**

**Provides consistency in reviews and the verification process.**

**Reviews project details and credit submittals.**

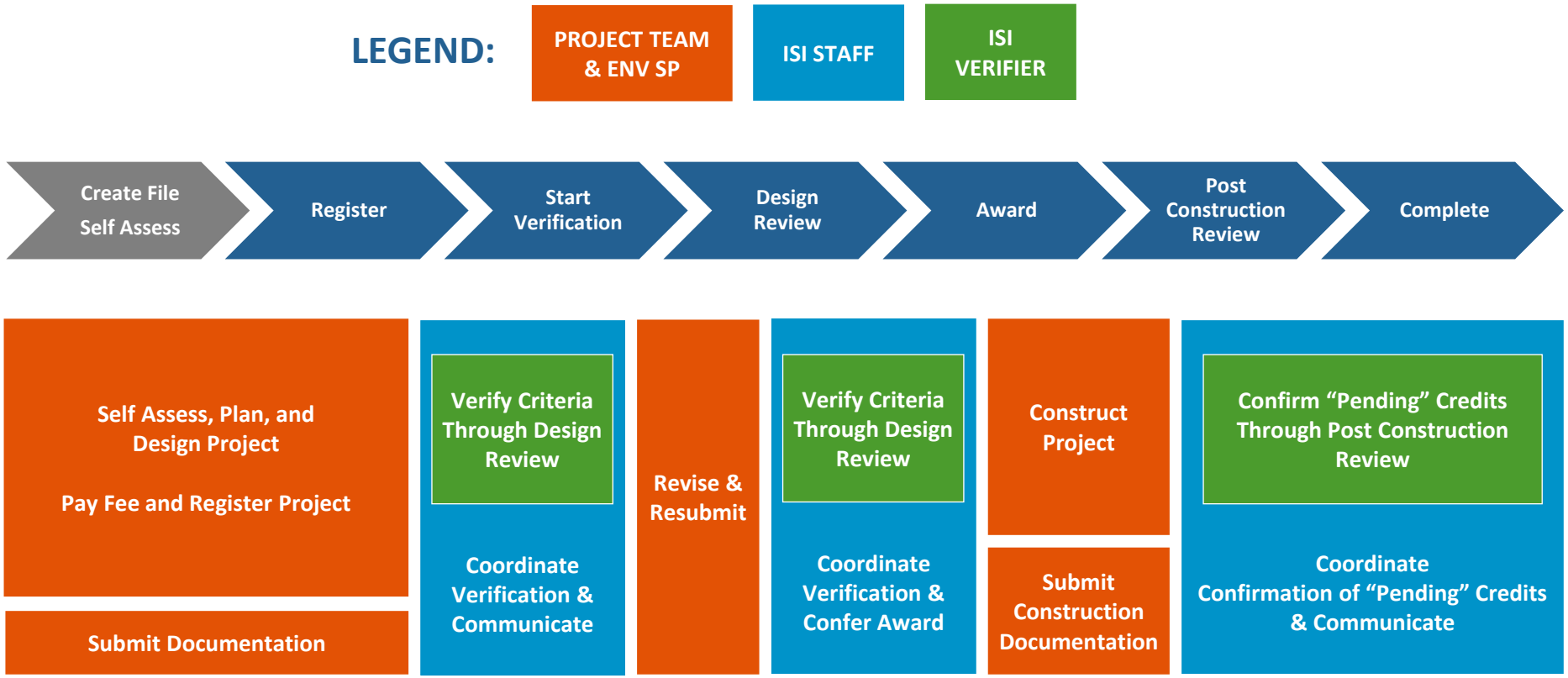
**Confirms or adjusts credit scores.**

# The Verification Process

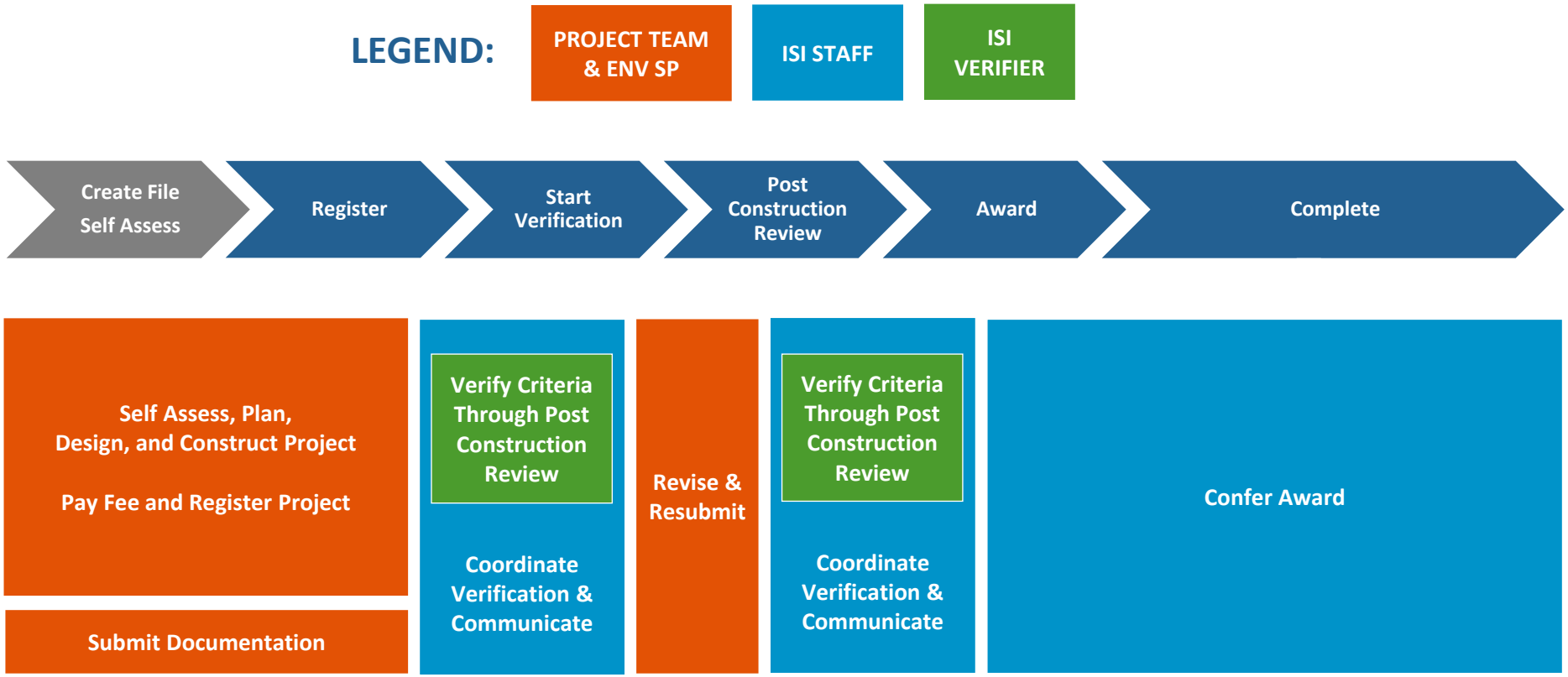
**Pathway A: Design + Post-Construction**


**Pathway B: Post-Construction**

# Verification Process:
# Pathway A: Design and Post-Construction



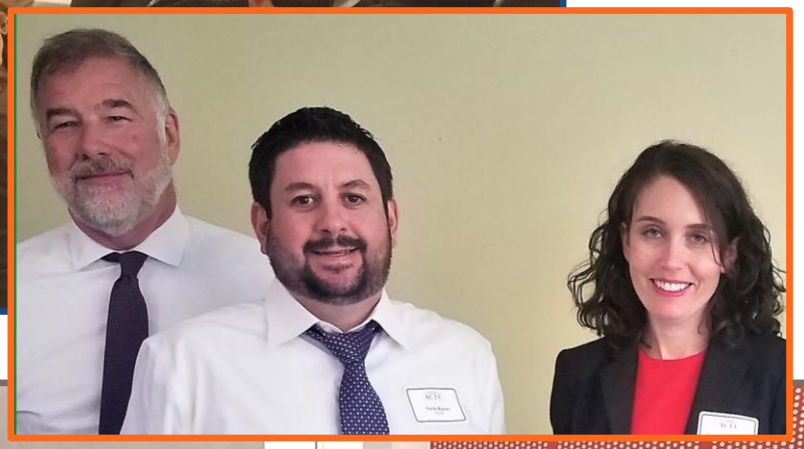
# Verification Process: Pathway B: Post-Construction



# https://sustainableinfrastructure.org/

# Harris County Commissioners Court - January 8, 2019


Source: Harris County Video Capture



# Credentialing Activities (2019 to 2021)

- Total Harris County Trained: 91
- Total City of Houston Trained: 11
- Total Private Sector Trained: 153
- Total Trained: 255
- WHA, ACEC, HC Events

**MEDIA ADVISORY**
September 10, 2019

ADRIAN GARCIA
COMMISSIONER

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**Commissioner Adrian Garcia Initiates Planning and Design of the First Texas Roadway Project to Seek Envision® Verification**

*The Office of Commissioner Garcia and Harris County Engineering Department affirms their commitment to deliver sustainable infrastructure that enhances the economic, social, and environmental conditions in Precinct 2*

HARRIS COUNTY, TX— Commissioner Adrian Garcia is proud to kick off the design of the first roadway project in Harris County and the State of Texas that will seek Envision® Verification. The reconstruction of Kowis Street in East Aldine is intended to enhance the economic, social, and environmental conditions along the corridor between Halls Bayou and Precinct 2's James Driver Park.

HARRIS COUNTY ENGINEERING DEPARTMENT


69
59
Humble
Atascocita
Atascocita Road
960
Huffman
Lake Houston
90
8
Crosby
Beaumont Hwy
Crosby Fwy
Barrett
Sheldon
Sam Houston Pkwy
HARRIS COUNTY
FLOOD
CONTROL
DISTRICT

# Next Steps

- Create an account on the ISI website: https://sustainableinfrastructure.org/
- Download key resources: Envision Manual, Checklist, etc.
- Check out the ENV SP directory
- Check out Envision Qualified Company list
- Check out Envision Support Agencies
- Take the ENV SP Credentialing Class and Pass the Test!
- Use the system on projects

# Questions?

**Michael Bloom, P.E.**
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