

LEED v4 RATING SYSTEM REVIEW

LOCATION & TRANSPORTATION

SUSTAINABLE SITES

WATER EFFICIENCY

ENERGY & ATMOSPHERE

MATERIALS & RESOURCES

INDOOR ENVIRONMENTAL QUALITY

LEED FOR BUILDING OPERATIONS AND MAINTENANCE



PRESENTED BY USGBC

MODERATOR



Jenny Carney

LEED AP O+M
Principal, YR&G

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PRESENTED BY USGBC

WHAT

WHY

WHEN

WHO

HOW

WHAT

WHY

WHEN

WHO

HOW

WHAT

WHY

WHEN

WHO

HOW

WHAT

WHY

WHEN

WHO

HOW

WHAT

WHY

WHEN

WHO

HOW



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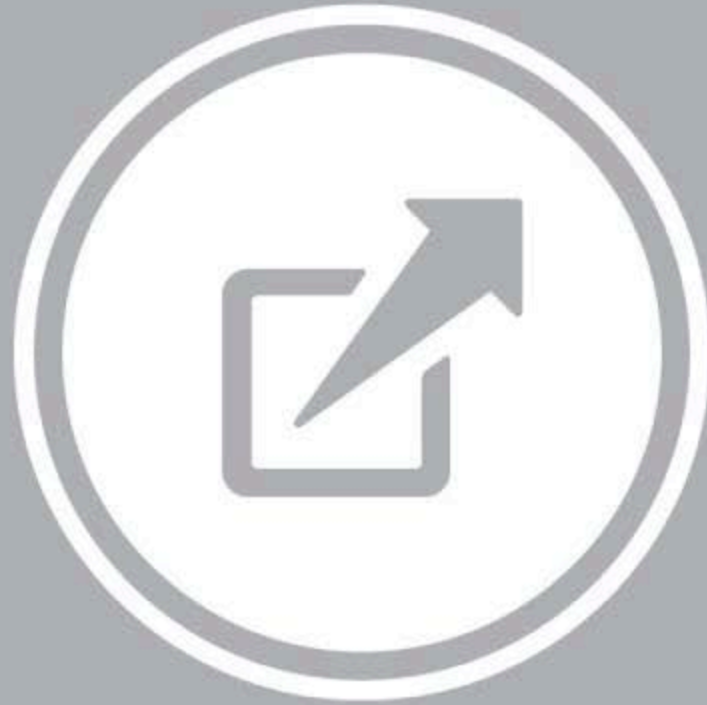




LEED v4 REFERENCE GUIDE

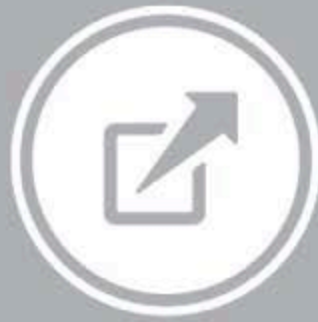
**INNOVATION
CREDITS**

**REGIONAL
PRIORITY CREDITS**



IN Credit Innovation

Innovation, Pilot Credits, Exemplary Performance



IN Credit

Innovation

Innovation, Pilot Credits, Exemplary Performance

OPTION

1

Innovation

1 POINT

and/
or

OPTION

2

Pilot

1 POINT

and/
or

OPTION

3

Additional
strategies

1-3 POINTS

Achieve significant,
measurable,
environmental
performance using a
strategy not in LEED

WHAT

WHY

WHEN

WHO

HOW

Achieve a Pilot Credit

WHAT

WHY

WHEN

WHO

HOW

Meet exemplary
performance
threshold in
a credit

WHAT

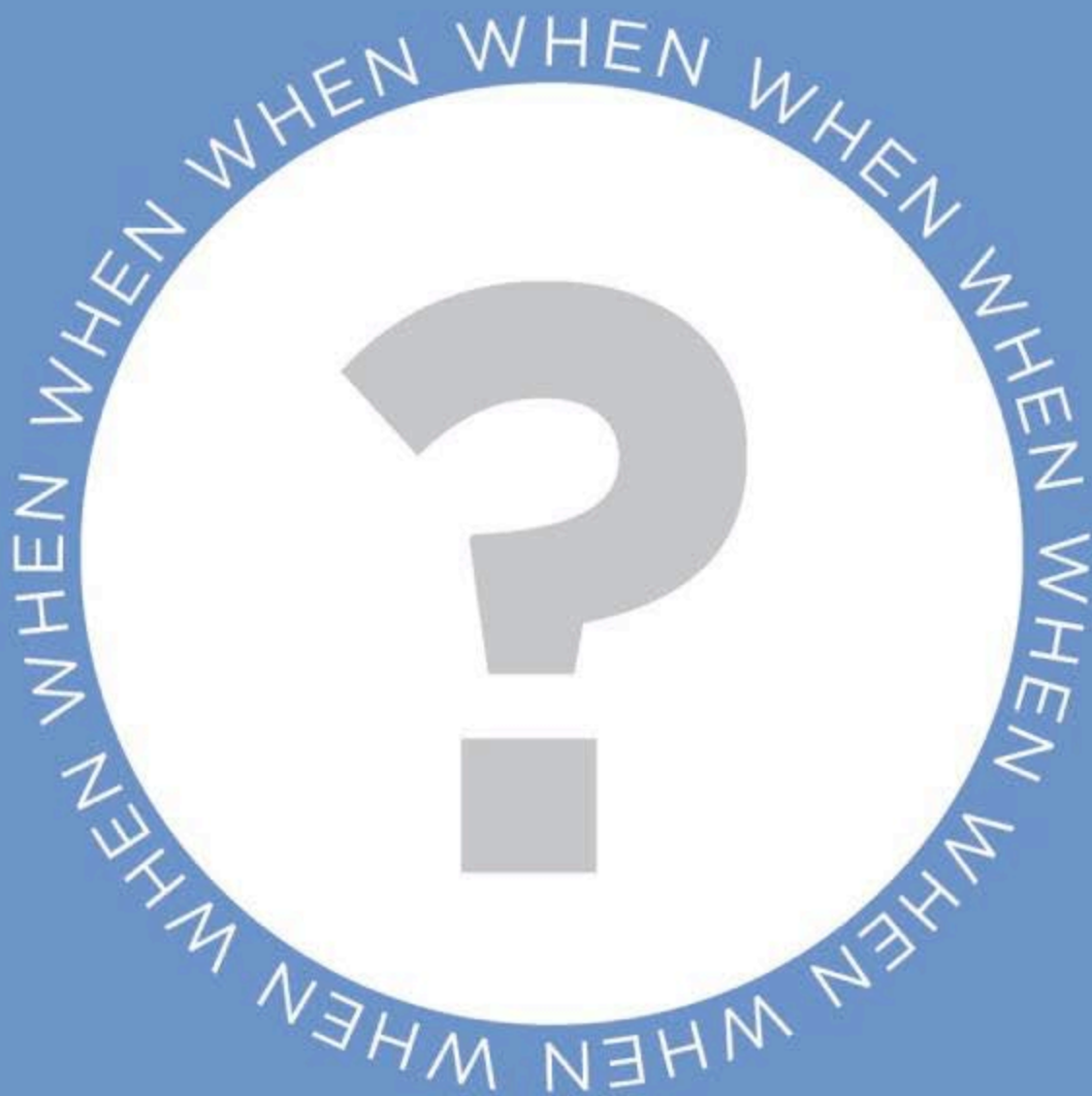
WHY

WHEN

WHO

HOW







Identify innovative strategies

WHAT

WHY

WHEN

WHO

HOW

Consider IN point strategy

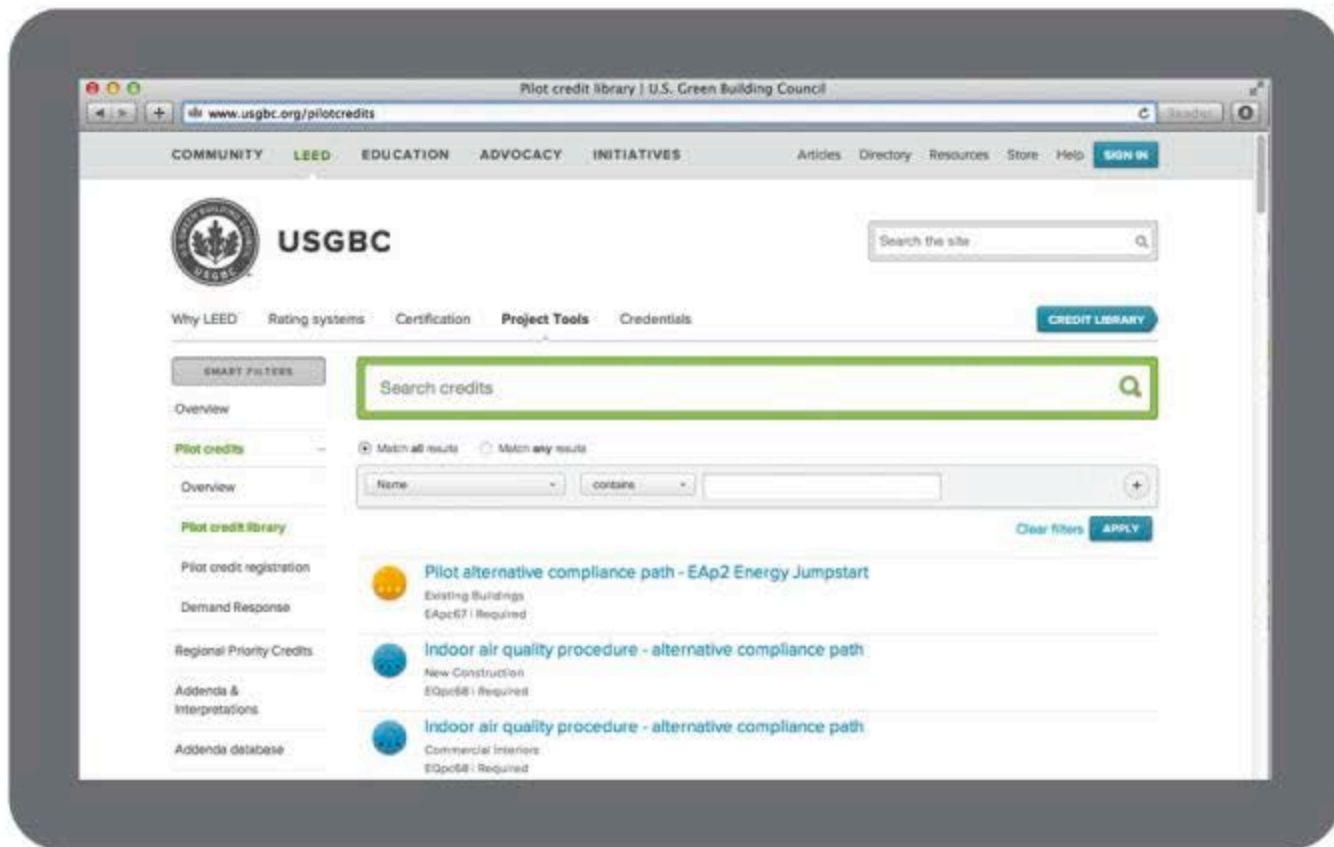
WHAT

WHY

WHEN

WHO

HOW



Check reference guide for exemplary performance thresholds

WHAT

WHY

WHEN

WHO

HOW

Confirm credit
eligibility

Document
credit

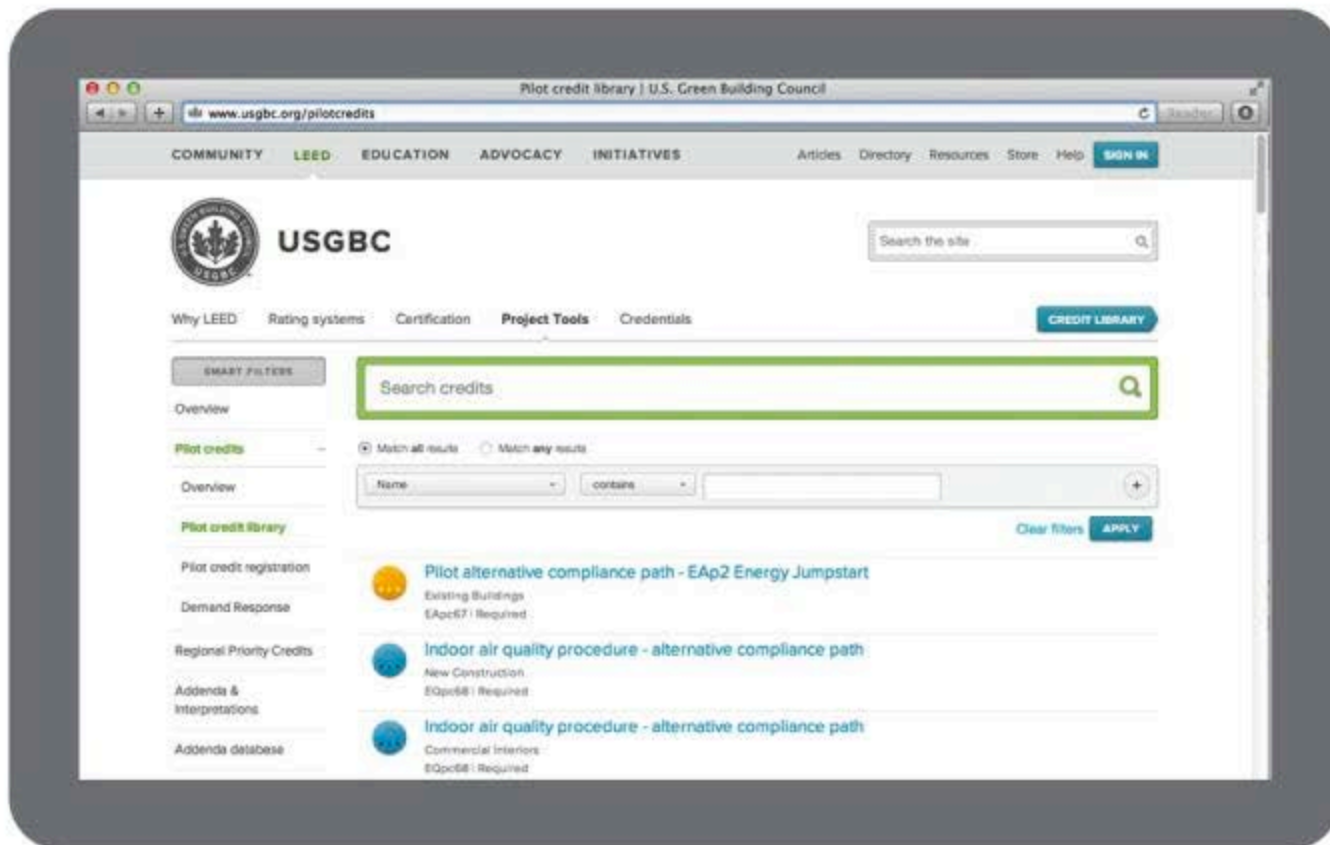
WHAT

WHY

WHEN

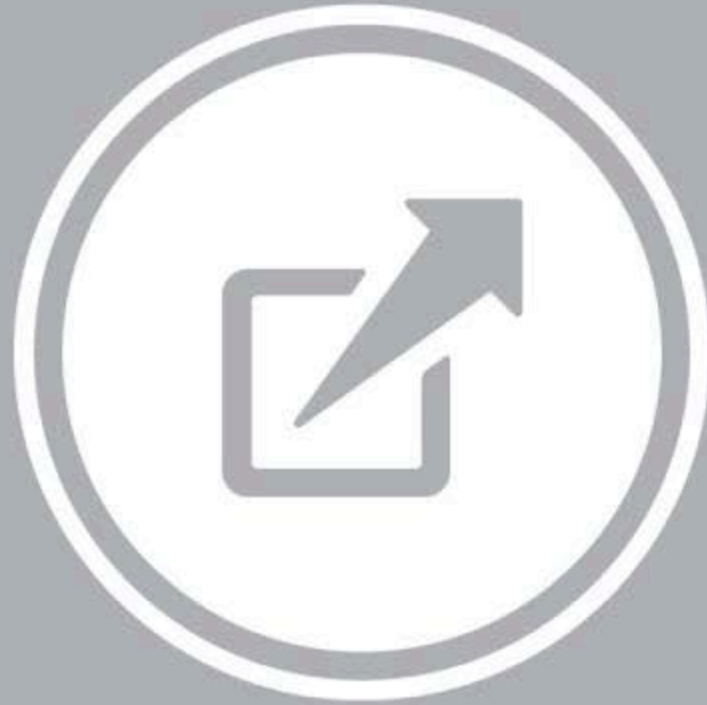
WHO

HOW



EP

exemplary
performance



IN Credit

LEED Accredited Professional

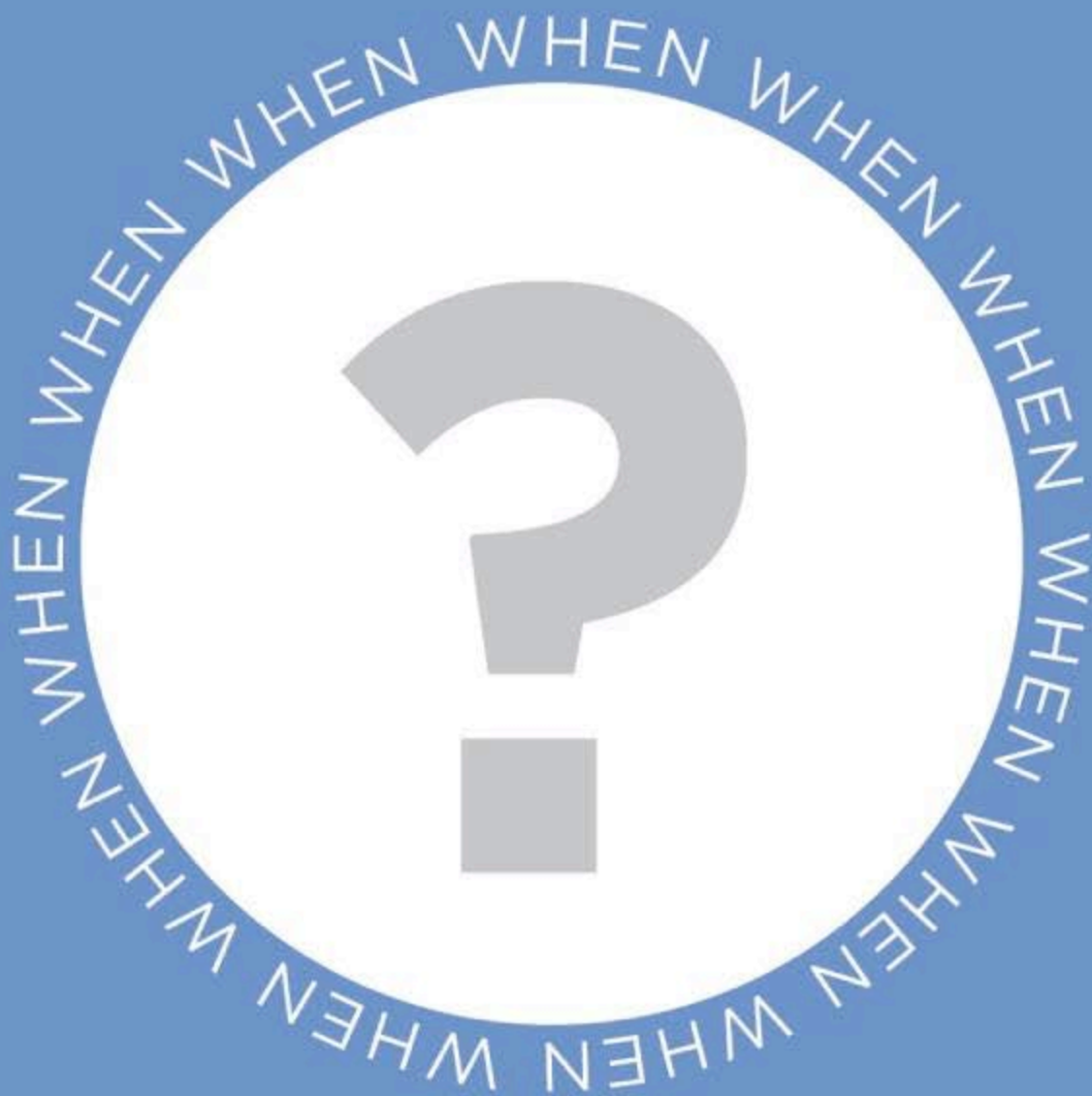
1 Point

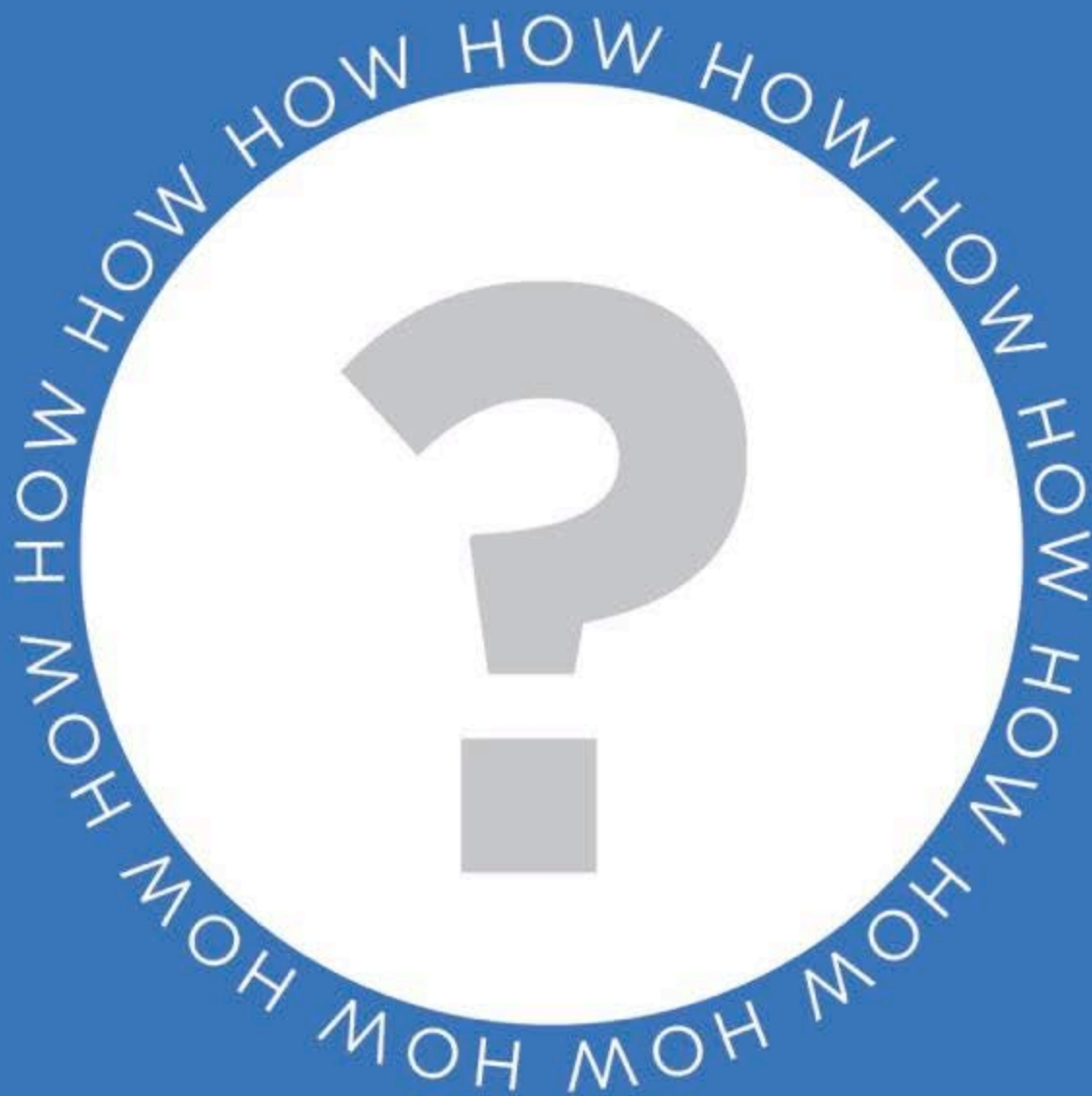


LEED AP

LEED Accredited
Professional









RP Credit
Regional Priority
Up to 4 points



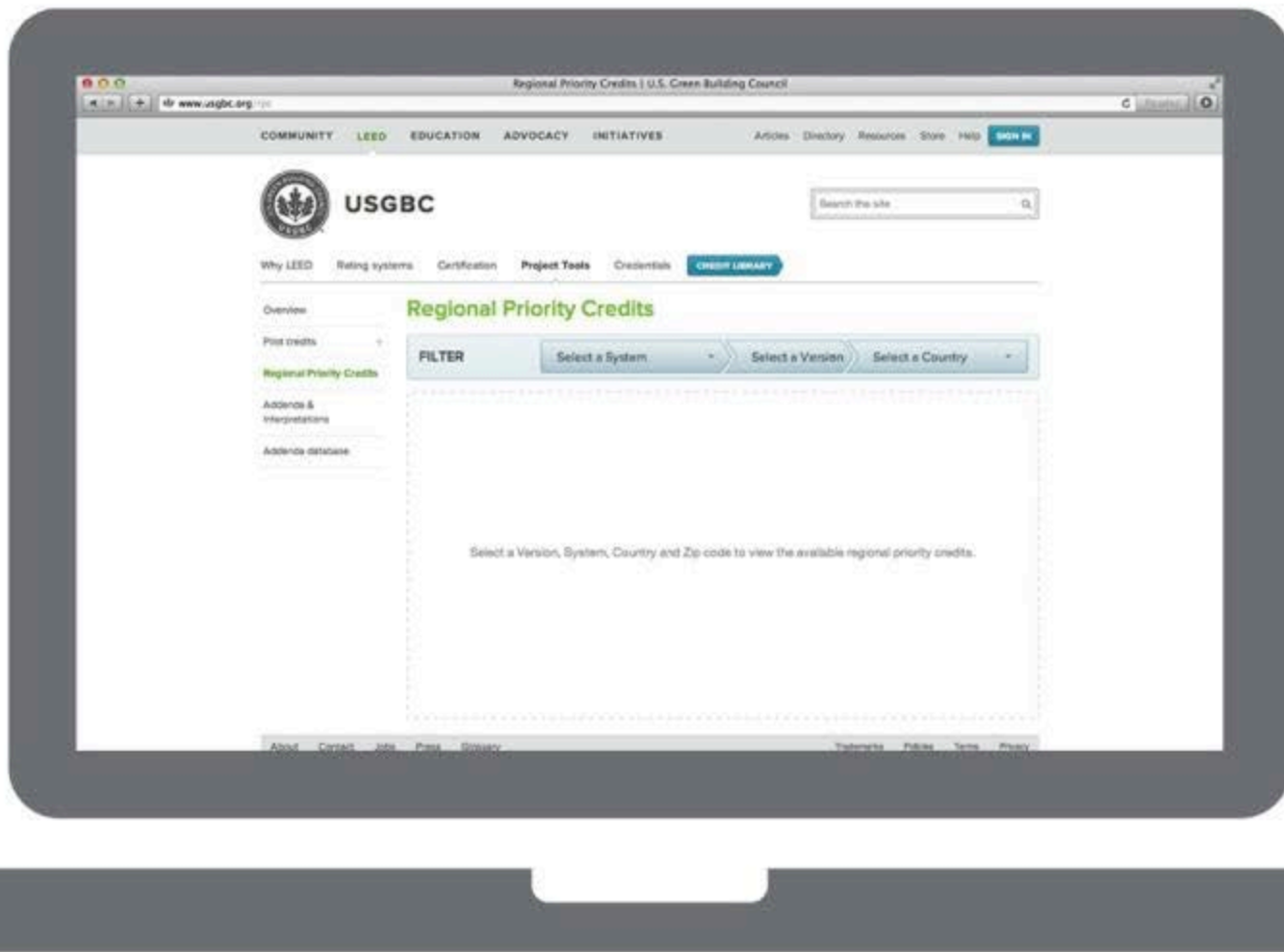
number of

Regional Priority Credits
identified for a given location



maximum number of

bonus points a
team may earn





LOCATION & TRANSPORTATION



LEED FOR BUILDING OPERATIONS AND MAINTENANCE



presented by
USGBC



LT Credit

Alternative Transportation

1

Identify the **intent, requirements,** and **strategies** for success with the LT and SS credits.

2

Recognize how a survey can be used to **determine performance** with respect to transportation and **improve alternate transportation rates.**

3

Identify how the SS credit requirements support a **holistic integration of the site** with local and regional ecosystems.

4

Recognize **synergies** between multiple credits.



LT Credit

Alternative Transportation

OPTION

1

Transportation
survey

1 POINT

or

OPTION

2

Alternative
transportation
rate

3-15 POINTS

or

OPTION

3

Comprehensive
alternative
transportation
program

2 POINTS

alternative transportation

(noun)

anything other than
single occupancy vehicle



photo credit: Grading



GLOBAL LEED

Projects outside of the U.S.
can use a local equivalent
green vehicle listing and can
count ridesharing



LT Credit

Alternative Transportation

OPTION

1

Transportation
survey

1 POINT

or

OPTION

2

Alternative
transportation
rate

3-15 POINTS

or

OPTION

3

Comprehensive
alternative
transportation
program

2 POINTS



Conduct survey
at least every
5 years

WHAT

WHY

WHEN

WHO

HOW

Conduct survey or
participate in local/
regional program

WHAT

WHY

WHEN

WHO

HOW



Consider when
to conduct survey
to get regular
commuting patterns

WHAT

WHY

WHEN

WHO

HOW

Survey regular building occupants and visitors, if peak or daily average is greater than number of regular occupants

WHAT

WHY

WHEN

WHO

HOW

RETAIL, HEALTHCARE, SCHOOLS



ADAPTATION SPECIFIC CREDITS

RETAIL Survey customers

HEALTHCARE Survey patients

HIGHER EDUCATION Survey students

Determine if surveying
all regular occupants
or random sample

WHAT

WHY

WHEN

WHO

HOW

EXAMPLE OF REQUIRED SAMPLE SIZES

REGULAR OR VISITORS	SAMPLE SIZE	REGULAR OR VISITORS	SAMPLE SIZE
100	81	800	267
125	96	900	277
150	110	1000	286
175	122	2000	333
200	134	3000	353
225	144	4000	364
250	154	5000	370
275	163	6000	375
300	172	7000	378
325	180	8000	381
350	187	9000	383
375	194	10000	385
400	201	15000	390
425	207	20000	392
450	212	25000	394
500	222	50000	397

EVALUATION SHEET

DETERMINE SURVEY
DELIVERY: ONLINE,
IN PERSON, OR
ANOTHER METHOD

Good

WHAT

WHY

WHEN

WHO

HOW

Create survey instrument

WHAT

WHY

WHEN

WHO

HOW

LEED-O+M Transportation Survey

Please tell us about your week

Declined to Respond _____

	Monday	Tuesday	Wednesday	Thursday	Friday
Subway					
Bus					
Walk					
Bicycle					
Carpool / Vanpool					
Drive Alone					
Taxi					
Telecommute					
Compressed Workweek					
Out of Office					

If you drove alone, what is your vehicle's:

Make _____

Model _____

Year _____

If you carpooled, how many people were in your carpool each day:

LEED-O+M Transportation Survey

Please tell us about your week

Declined to Respond _____

	Monday	Tuesday	Wednesday	Thursday	Friday
Subway					
Bus					
Walk					

Schedule survey and finalize logistics

WHAT

WHY

WHEN

WHO

HOW



**TRANSPORTATION
RELATED INCENTIVES**

Conduct survey

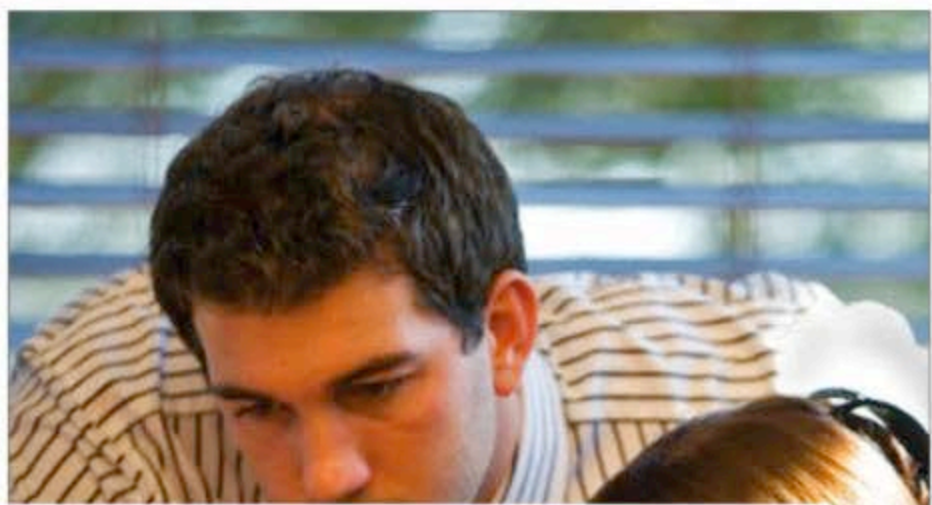
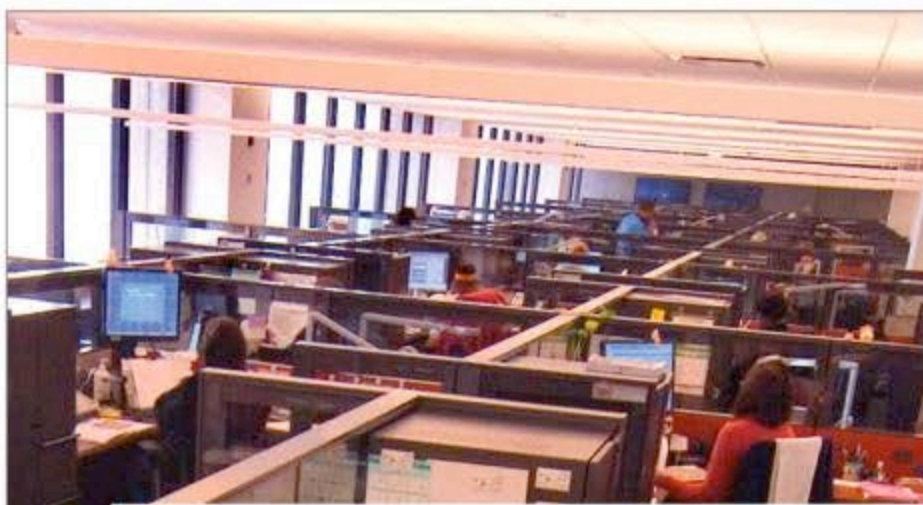
WHAT

WHY

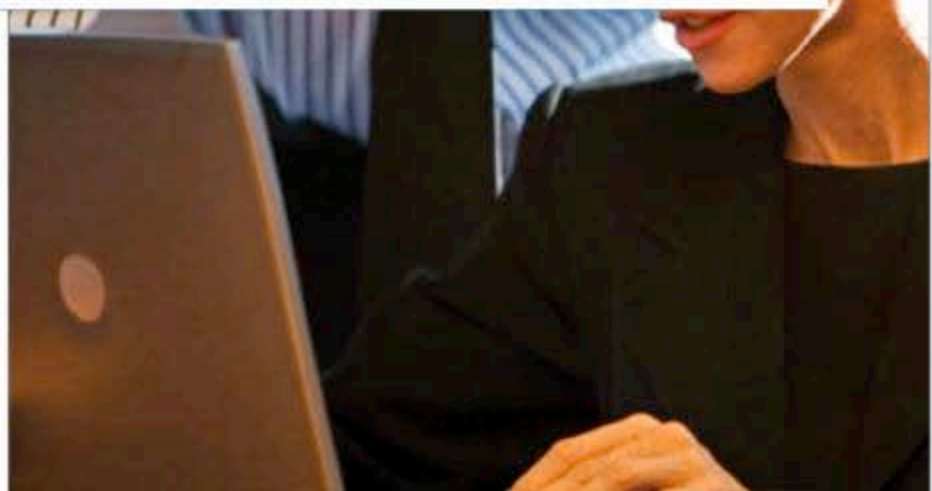
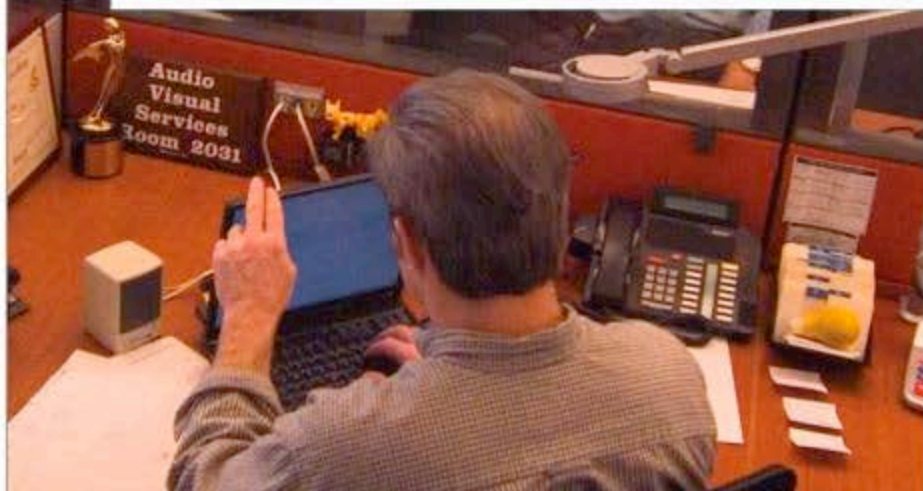
WHEN

WHO

HOW



DISTRIBUTE SURVEY



WHAT

WHY

WHEN

WHO

HOW



5%

minimum
response rate



30%

minimum
to extrapolate results

EXTRAPOLATION FACTORS

SURVEY RESPONSE RATES	EXTRAPOLATION FACTOR
60% - 100%	1.00
50% - 59%	0.80
40% - 49%	0.60
30% - 39%	0.40
< 30%	0.00



Use USGBC calculator
to compute number
of alternative
transportation trips



ALTERNATIVE TRANSPORTATION RATE

raw alternative
transportation
rate



extrapolation
factor

SURVEY VISITORS IF

typical peak
or daily
average
visitor counts



regular
occupants

WHAT

WHY

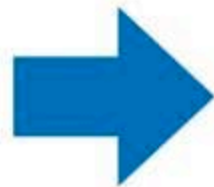
WHEN

WHO

HOW

SURVEY VISITORS FOR ONE TYPICAL DAY OF OPERATION

if visitors
work in
building



exclude
results

WHAT

WHY

WHEN

WHO

HOW



VISITOR ALTERNATIVE TRANSPORTATION RATE

raw alternative
transportation
rate, visitors



of alternative transportation
trips from survey results



of total trips recorded in
the survey results



OVERALL ALTERNATIVE TRANSPORTATION RATE OF REGULAR BUILDING OCCUPANTS AND VISITORS

regular occupant
share of total building
population

X

overall alternative
transportation rate,
regular occupants

+

visitor share of
total building
population

X

raw alternative
transportation rate,
visitors

OPTION 2. ALTERNATIVE TRANSPORTATION RATE

ALTERNATIVE TRANSPORTATION RATE	POINTS
10%	3
15%	4
20%	5
25%	6
30%	7
35%	8
40%	9
45%	10
50%	11
55%	12
60%	13
65%	14
70%	15

Ongoing alternative transportation program

Incentives to respond to survey

Quick and easy surveys

Build interest

OPTION 3.

Comprehensive Alternative Transportation Program

OPTION 1 survey

+

IMPLEMENT ALTERNATIVE
TRANSPORTATION PROGRAM:

Education strategies

Basic support strategies

Direct strategies



EDUCATION STRATEGIES

Teach building occupants
about options available

WHAT

WHY

WHEN

WHO

HOW

The background image shows a parking garage with a concrete wall and a black car parked at an electric vehicle charging station. A charging cable is plugged into the car. A blue sign is visible on the wall, and a red sign with the number '101' is in the background.

BASIC SUPPORT STRATEGIES

Provide basic transportation support to occupants

WHAT

WHY

WHEN

WHO

HOW

photo credit: Ana Ka'ahanui



DIRECT STRATEGIES

Encourage alternate transportation

WHAT

WHY

WHEN

WHO

HOW

Track strategy implementation

WHAT

WHY

WHEN

WHO

HOW







**BUILDING
DESIGN
AND CONSTRUCTION**



**BUILDING
OPERATIONS
AND MAINTENANCE**



SUSTAINABLE SITES



LEED FOR EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE



presented by
USGBC

SPEAKERS



R. Alfred Vick

LEED AP BD+C

Georgia Power Professor in
Environmental Ethics
University of Georgia



Steve Benz, PE

LEED Fellow, Hon ASLA

Partner/Director of Green Infrastructure
OLIN, Philadelphia PA

QUESTION and ANSWER

QUESTION

What do project teams need to understand in order to grasp the intent of the SS credits and be most successful with them?





THE SUSTAINABLE SITES INITIATIVE™





SS Prerequisite

Site Management Policy

Use of low emissions maintenance equipment

Snow and ice removal

Cleaning of building exterior and outside
impervious surfaces

Erosion and sedimentation control

Organic waste management

Invasive and exotic plant species management

Fertilizer use

Irrigation management

Storage of materials and equipment



SS Credit

Site Management

1 Point



SS Credit

Site Management

Perform site management activities
AND

OPTION

1

Limited
turf area

or

OPTION

2

All manual or
electric powered
equipment

or

OPTION

3

Reduction in
emissions from
site management
equipment

EXAMPLE SITE MANAGEMENT ACTIVITIES

OPERATIONAL ELEMENT	EXAMPLE SITE MAINTENANCE ACTIVITIES
Irrigation management	<ul style="list-style-type: none">• Test operation of system components regularly during operating season• Install pressure sensors that respond to water pressure surges by closing mainline
Organic waste management	<ul style="list-style-type: none">• Divert all plant material waste generated by on-site landscaping activities through on-site composting or mulching, or composting at an off-site facility• Plant material diverted to a waste-to-energy facility counts towards diversion quantities• All plant waste must be diverted from landfills to earn this credit



ESTABLISHMENT

Create and implement site
management policy

PERFORMANCE

Implement site
management plan criteria

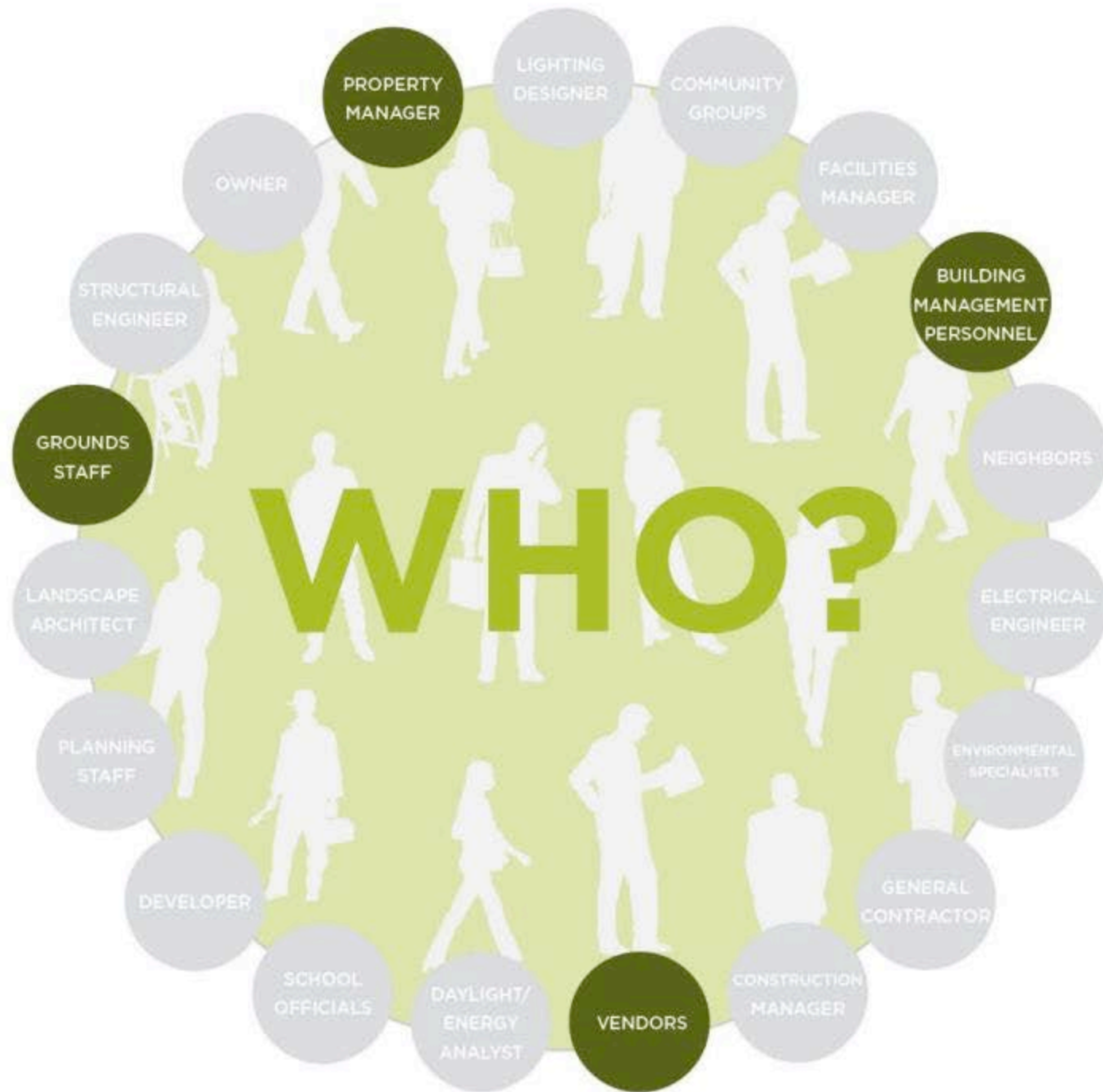
WHAT

WHY

WHEN

WHO

HOW



Research and review best management practices

Gather current
site practices

WHAT

WHY

WHEN

WHO

HOW

Use of low emissions maintenance equipment

Snow and ice removal

Cleaning of building exterior and outside
impervious surfaces

Erosion and sedimentation control

Organic waste management

Invasive and exotic plant species management

Fertilizer use

Irrigation management


Storage of materials and equipment

SCHOOLS



ADAPTATION SPECIFIC CREDITS

Include athletic or playing fields
within LEED project boundary



USE LOW OR ZERO-EMISSION MAINTENANCE EQUIPMENT

WHAT

WHY

WHEN

WHO

HOW

photo credit: Hedwig Storch / Creative Commons



DETERMINE TREATED AND UNTREATED AREAS FOR SNOW AND ICE

photo credit: Hedwig Storch, Creative commons

WHAT

WHY

WHEN

WHO

HOW

A photograph of a white snowplow clearing a snowy street. In the background, there is a multi-story brick building with snow-covered trees. A green rectangular box with white text is overlaid on the center of the image.

CONSIDER SALT-FREE OR ENVIRONMENTALLY- PREFERRED DEICERS

photo credit: Hedwig Storch, Creative commons

WHAT

WHY

WHEN

WHO

HOW



USE GREEN CLEANING PRODUCTS FOR BUILDING EXTERIOR OR MANUAL STRATEGIES WHERE POSSIBLE

photo credit: By U.S. Navy photo by Mass Communication
Specialist 3rd Class Jason R. W

WHAT

WHY

WHEN

WHO

HOW



SPECIFY ON-GOING MAINTENANCE OF STORMWATER INFRASTRUCTURE

photo credit: UC Davis

WHAT

WHY

WHEN

WHO

HOW

The background image shows a construction site with a large pile of reddish-brown soil on the left. A black erosion control blanket is partially visible, secured with wooden stakes. In the background, there are green trees and utility poles with power lines. A semi-transparent green rectangle with a white border is centered over the image, containing the main title text.

DEVELOP CONSTRUCTION ACTIVITY PLAN FOR EROSION AND SEDIMENTATION CONTROL

WHAT

WHY

WHEN

WHO

HOW



RETURN ORGANIC WASTE TO SITE OR DIVERT FROM LANDFILL

photo credit: Bruce McAdam

WHAT

WHY

WHEN

WHO

HOW

A person with dreadlocks is standing in a greenhouse, surrounded by tall green plants. The person is wearing a green shirt and brown pants. The greenhouse structure is visible in the background.

CONSIDER ENVIRONMENTALLY PREFERABLE FERTILIZERS AND APPLICATION METHODS

photo credit: Jonathan Burgess

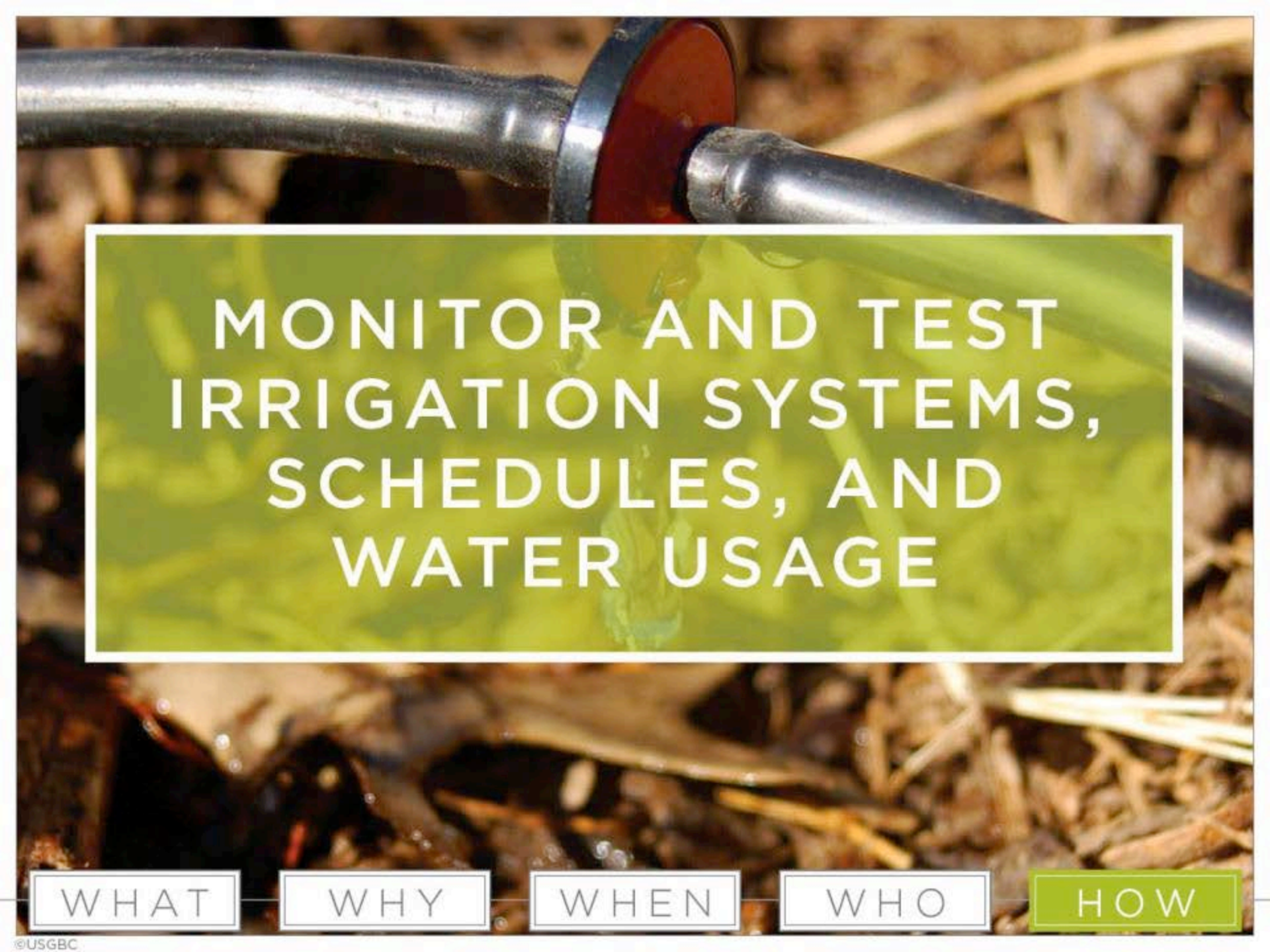
WHAT

WHY

WHEN

WHO

HOW



MONITOR AND TEST IRRIGATION SYSTEMS, SCHEDULES, AND WATER USAGE


WHAT

WHY

WHEN

WHO

HOW



STORE MATERIALS AND EQUIPMENT TO PREVENT AIR AND SITE CONTAMINATION

WHAT

WHY

WHEN

WHO

HOW

Identify site management goals and objectives

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Site Management

Align goals in site management policy
with minimum thresholds

Implement policy and track activities

WHAT

WHY

WHEN

WHO

HOW

EXAMPLE PERFORMANCE METRICS

OPERATIONAL ELEMENT	METRIC CAN INCLUDE
Snow and ice removal	<p>Percentage of environmentally preferred deicer used, by cost or quantity (units of weight or volume)</p> <p>OR</p> <p>Percentage reduction in area treated with calcium chloride or sodium chloride deicers, from baseline application area</p>

Scope and goals

Roles and responsibilities

Standard operating procedures

Implementation strategies

Performance measurement and
schedule for reassessment

Quality assurance plan

Roll out site management policy

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Site Management

Perform site management activities
AND

OPTION

1

Limited
turf area

or

OPTION

2

All manual or
electric powered
equipment

or

OPTION

3

Reduction in
emissions from
site management
equipment



SS Credit

Site Management

Perform site management activities
AND

OPTION

1

Limited turf area:
Limit turf area on site
to no more than 25% of
total vegetated area

or

OPTION

2

All manual or electric
powered equipment

or

OPTION

3

Reduction in
emissions from
site management
equipment

WHAT

WHY

WHEN

WHO

HOW



PERCENT OF VEGETATED AREA COVERED BY TURF

amount of vegetated
area that is turf

total site area that is vegetated
(including turf)

X 100



SS Credit

Site Management

Perform site management activities
AND

OPTION

1

Limited turf area:
Limit turf area on site
to no more than 25% of
total vegetated area

or

OPTION

2

All manual or electric
powered equipment:
No gas or propane
powered equipment

or

OPTION

3

Reduction in
emissions from
site management
equipment

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Site Management

Perform site management activities
AND

OPTION

1

Limited turf area:
Limit turf area on site
to no more than 25% of
total vegetated area

or

OPTION

2

All manual or electric
powered equipment:
No gas or propane
powered equipment

or

OPTION

3

Reduction in emissions
from site management
equipment: Determine
baseline emissions and
percent reduction

WHAT

WHY

WHEN

WHO

HOW

CHANGE USAGE PATTERNS AND RECALCULATE EMISSIONS

50%

reduction

of HC and NO_x emissions

75%

reduction

of CO

WHAT

WHY

WHEN

WHO

HOW

Document
and verify
activities during
performance
period

WHAT

WHY

WHEN

WHO

HOW



SS Prerequisite and Credit

Measure and improve the maintenance of the site

PREREQUISITE

Site management policy

CREDIT

Site management plan



SS Credit

Site Development –
Protect or Restore Habitat



SS Credit

Site Development -
Protect or Restore Habitat

OPTION

1

On-site restoration

2 POINTS

or

OPTION

2

Financial support

1 POINT



ESTABLISHMENT

PERFORMANCE

OPTION 1.

Include
on-site restoration

or

OPTION 2.

Provide financial
support

OPTION 2.

Continue financial
support annually

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Site Development -
Protect or Restore Habitat

OPTION

1

On-site restoration

2 POINTS

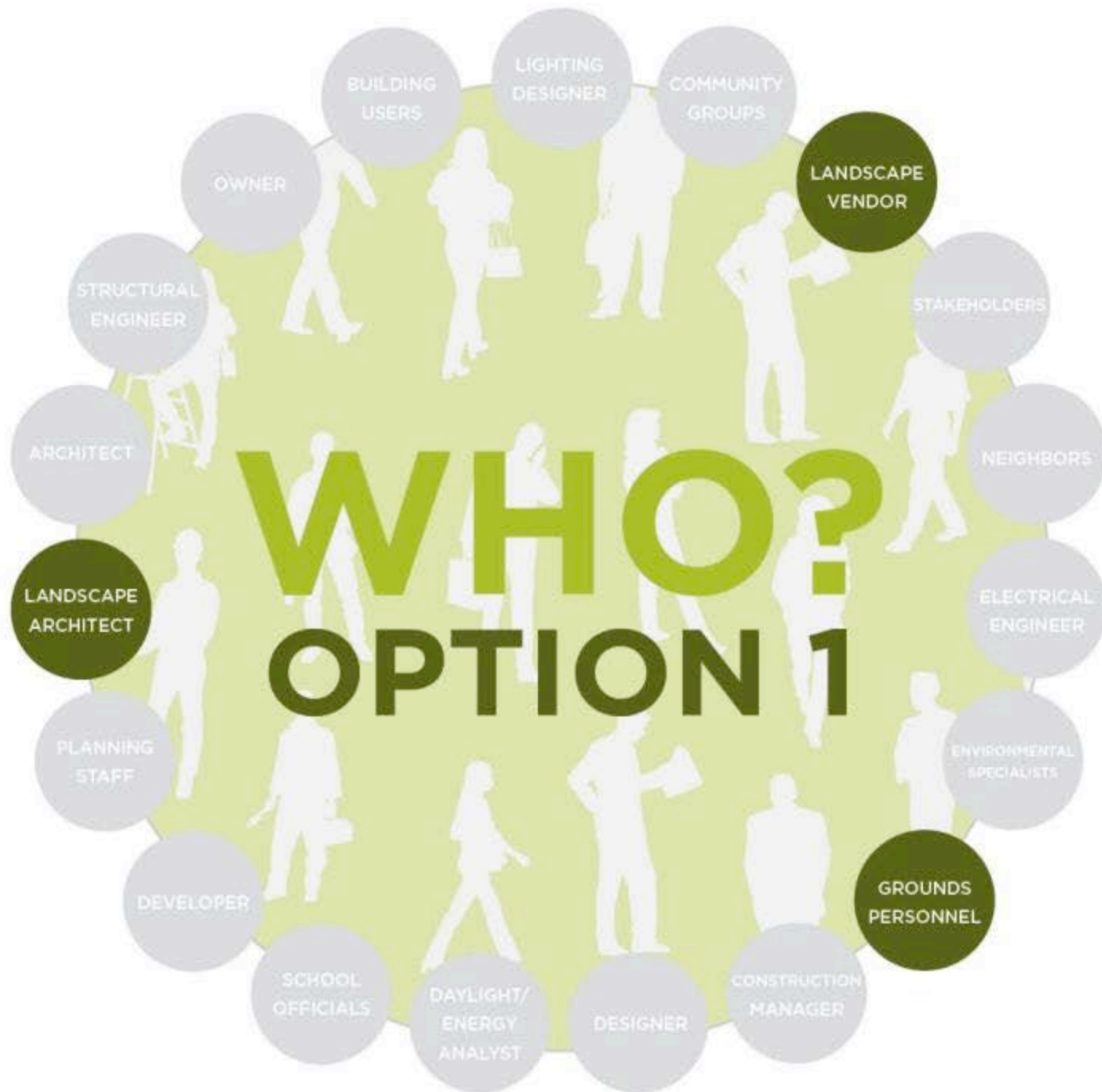
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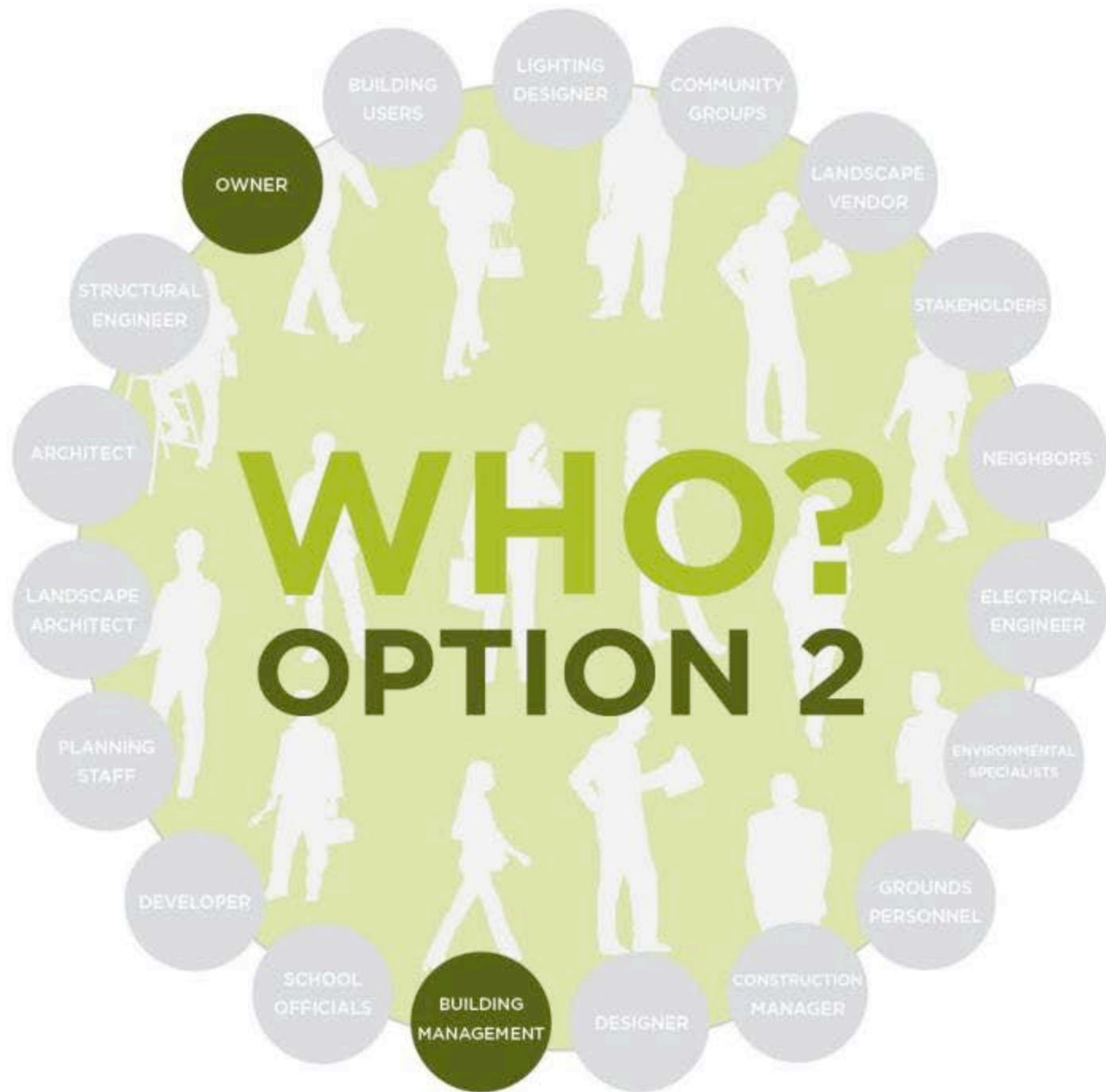
OPTION

2

Financial support

1 POINT







OPTION 1. ON-SITE RESTORATION

Include native or adaptive
vegetation on 20% of total site area

Minimum of 5,000 square feet
(465 square meters)

WHAT

WHY

WHEN

WHO

HOW

native vegetation

(noun)

indigenous species that occurs in a particular region, ecosystem, and habitat without direct or indirect human actions

adapted plants

(noun)

plants that reliably grow
well in given habitat with
minimal maintenance



CALCULATE REQUIRED SITE AREA

required area for
native or adapted
vegetation



total site area
(including building
footprint) x 0.20

WHAT

WHY

WHEN

WHO

HOW

Determine
restoration
strategies,
if needed

WHAT

WHY

WHEN

WHO

HOW



Avoid storage of equipment and materials in protected habitat

Identify boundary of protected habitat on site plans

Monitor for and removal of invasive species

Perform site assessment

Keep records of the origins
of the plant material used

Use local ecotypes



CALCULATE AMOUNT OF ANNUAL FINANCIAL SUPPORT

total site area

X

\$0.05/sq ft

or

\$0.50/sq m



WORK WITH ACCREDITED LAND TRUST OR CONSERVATION ORGANIZATION

WHAT

WHY

WHEN

WHO

HOW



GLOBAL LEED

Ensure conservation
organization is within 100 miles
(160 km) of project site



SS Credit

Site Development –
Protect or Restore Habitat



SS Credit

Rainwater Management

3 Points;
Schools 2 Points



25

percent
of impervious
surfaces



95th

percentile
of storm events

WHAT

WHY

WHEN

WHO

HOW

Establish,
implement and
document annual
inspection
programs

WHAT

WHY

WHEN

WHO

HOW



ESTABLISHMENT

Capture and
treatment of
rainwater

PERFORMANCE

Conduct annual
inspections and
maintenance

Develop annual
inspection
program

WHAT

WHY

WHEN

WHO

HOW



Obtain rainfall
data and
determine
95th percentile

WHAT

WHY

WHEN

WHO

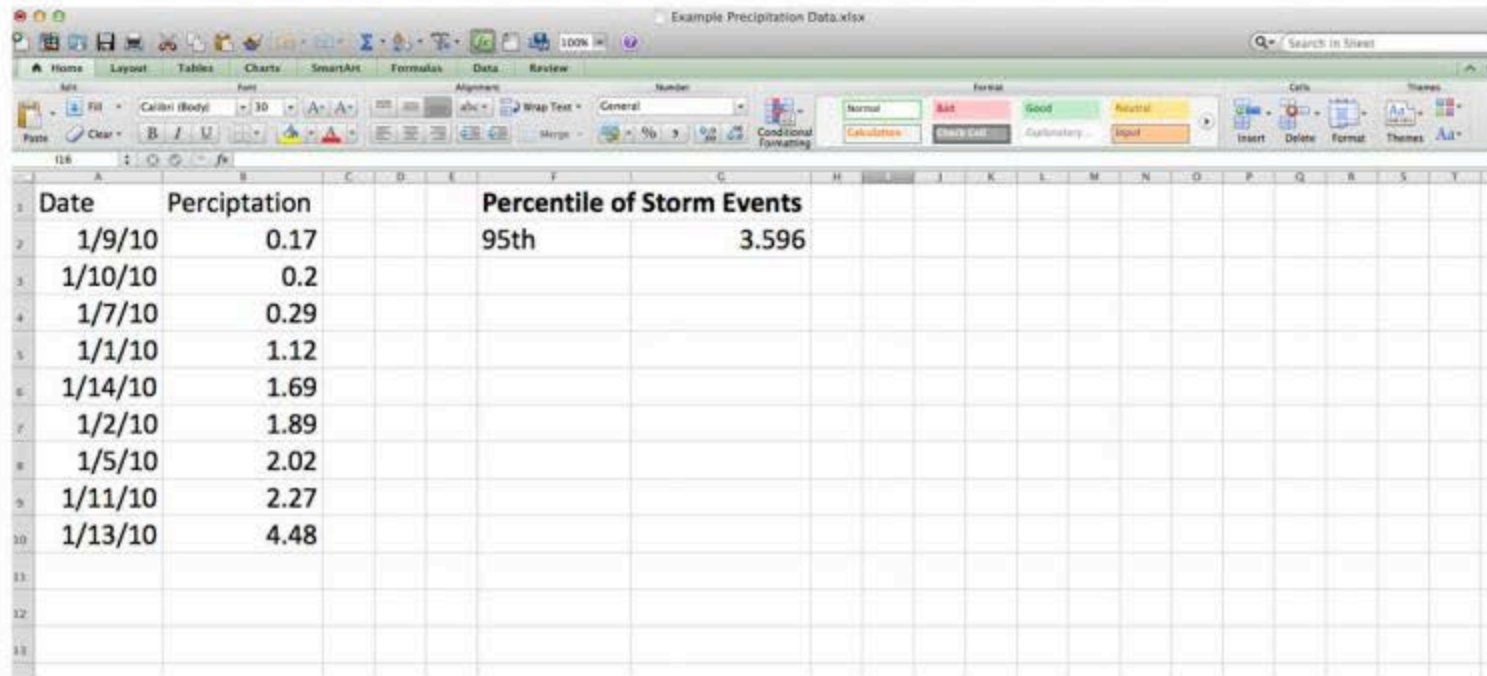
HOW



REFERENCED STANDARD

EPA's Technical Guidance
Section 438 of the Energy
Independence and Security Act

SAMPLE SPREADSHEET CALCULATION



Date	Perciptation	Percentile of Storm Events	
1/9/10	0.17	95th	3.596
1/10/10	0.2		
1/7/10	0.29		
1/1/10	1.12		
1/14/10	1.69		
1/2/10	1.89		
1/5/10	2.02		
1/11/10	2.27		
1/13/10	4.48		


95TH PERCENTILE = 3.596 IN

EPA STORMWATER CALCULATOR


National Stormwater Calculator

Overview Location Soil Type Soil Drainage Topography Precipitation Evaporation Land Cover LID Controls Runoff

Site Name (Optional)

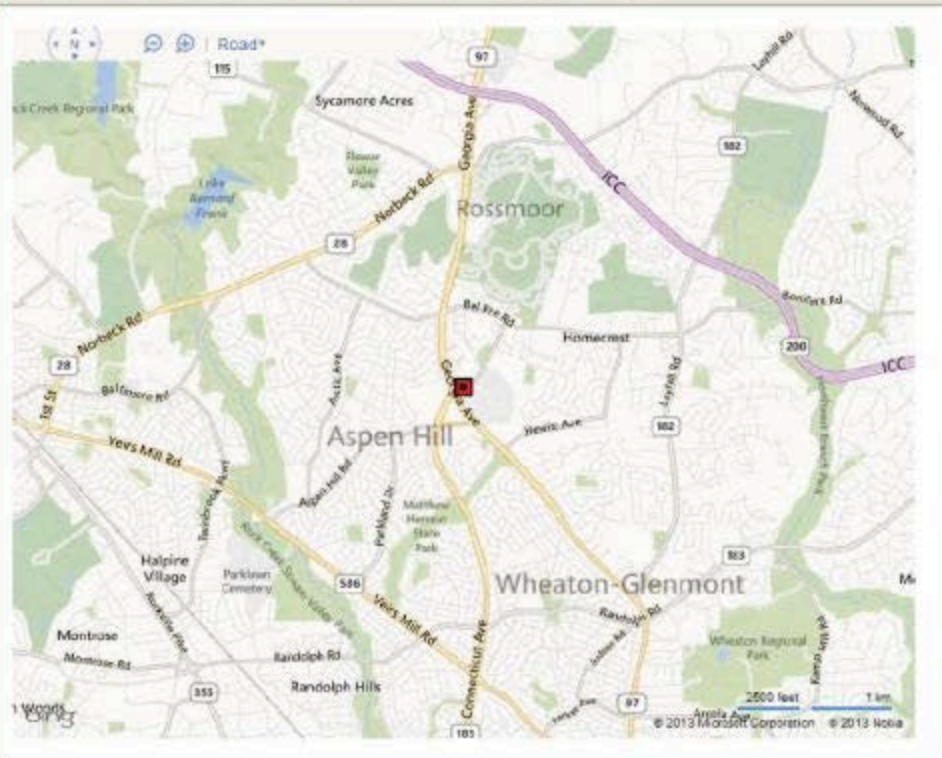
Search for an address or zip code:
 

Site Location (Latitude, Longitude)

Site Area (acres - Optional)
 

[Open a previously saved site](#)

Bring your site into view on the map and then mark its exact location by clicking the mouse pointer over it.



Locate the site on the map

[Analyze a New Site](#) [Save Current Site](#) [Exit](#)

www.epa.gov/research/gems/stormwater.htm



25%

minimum impervious area

from which the runoff volume must be managed

WHAT

WHY

WHEN

WHO

HOW

Work with experts
to assess current
site conditions

WHAT

WHY

WHEN

WHO

HOW

GI

green
infrastructure

LID

low impact
development

Vegetated roofs

Bioretention areas

Porous paving

Rain gardens

Rainwater harvesting

Pervious decking

Hardscape reduction

Restored natural landscape

Modify site to incorporate strategies

WHAT

WHY

WHEN

WHO

HOW



REMOVE IMPERVIOUS AREAS AND REPLACE WITH GI/LID MEASURES

WHAT

WHY

WHEN

WHO

HOW

photo credit: Jason Johnson, Creative Commons

PERFORMANCE

Develop and
implement annual
inspection program

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Rainwater Management

3 Points;
Schools 2 Points



SS Credit

Heat Island Reduction



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

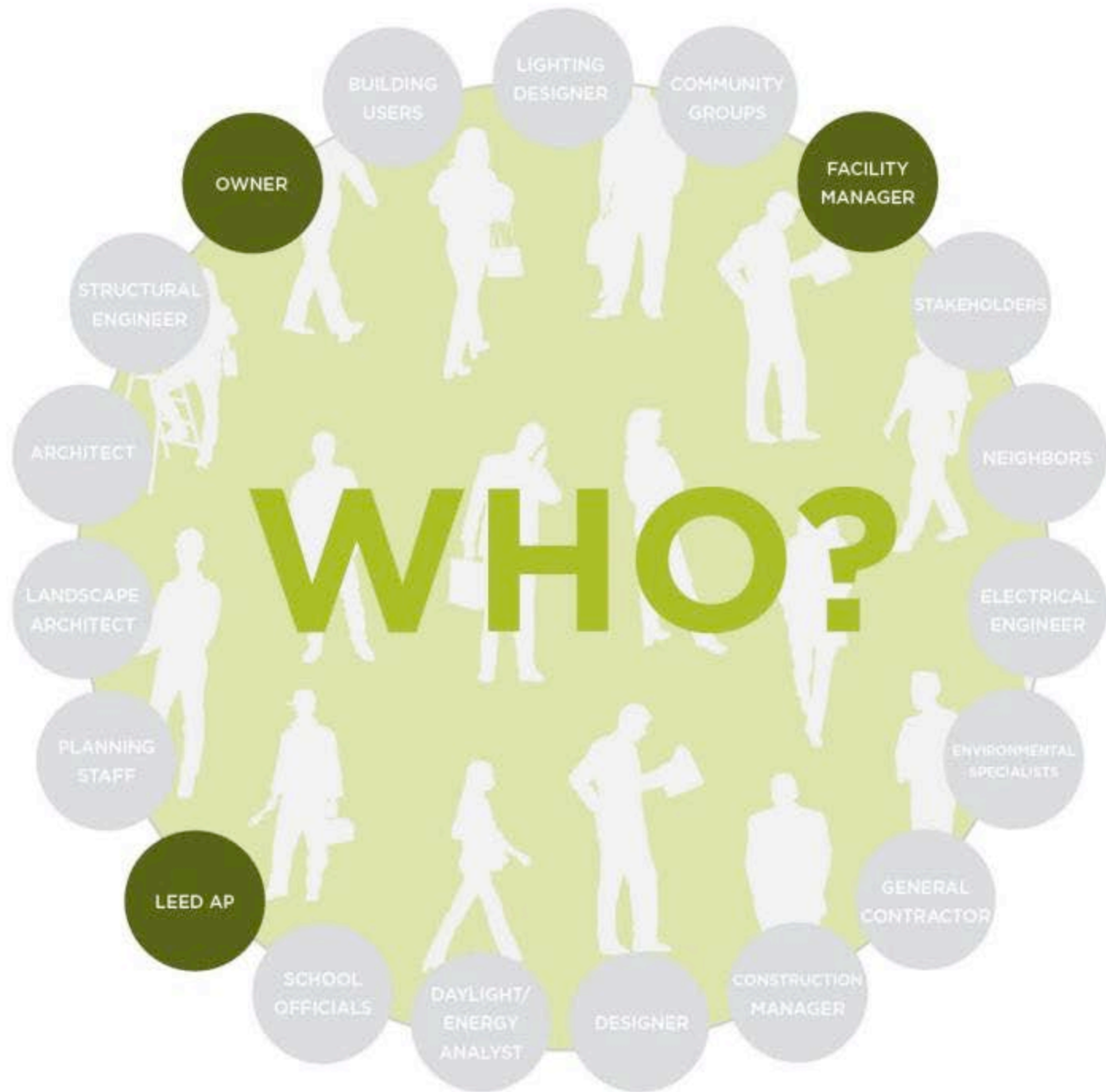
1 POINT



heat island

(noun)

thermal gradient differences
between developed and
undeveloped areas



ESTABLISHMENT

Incorporate
strategies for
each option

PERFORMANCE

Implement
maintenance
program

WHAT

WHY

WHEN

WHO

HOW

OPTION 1. NONROOF

Use given strategies
for minimum of
50% of site's paving

WHAT

WHY

WHEN

WHO

HOW

Vegetated planters
provide shade

Energy generation
systems provide shade

Architectural structures
provide shade

Open grid-pavement
system

OPTION 2. ROOF

50% = vegetated roof

and/or

75% = roofing material
with minimum SRI



AREA OF COMPLIANT ROOF

area of high-
reflectance
roof

0.75



area of
vegetated
roof

0.5



total
roof
area



OPTION 3. NONROOF AND ROOF

$$\frac{\text{area of nonroof measures}}{0.50} + \frac{\text{area of high-reflectance roof}}{0.75} + \frac{\text{area of vegetated roof}}{0.50} \geq \text{total site paving area} + \text{total roof area}$$

OPTION 4.

PARKING UNDER COVER

Place at least 50% of parking spaces under cover that meets SRI requirements, is vegetated, or covered by an energy system

WHAT

WHY

WHEN

WHO

HOW



IDENTIFY PARKING, HARDSCAPE, AND ROOF AREA

WHAT

WHY

WHEN

WHO

HOW

High-reflectance roofing

Vegetated roofing systems

Planters

Hardscape that meet shading, permeability or reflectance requirements

Under cover parking

ESTABLISHMENT

Incorporate
strategies for
each option

PERFORMANCE

Implement
maintenance
program

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

1 POINT



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

1 POINT



50%

portion of hardscape
must be addressed by assessment

WHAT

WHY

WHEN

WHO

HOW

OPTION 1 STEPS

1

Incorporate additional strategies as needed and recalculate

2

Include performance requirements in specifications

3

Collect vendor documentation

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

1 POINT



75%

of roof
uses high
reflectance materials



50%

of roof
is a vegetated
system

OPTION 2 STEPS

1

Incorporate additional strategies as needed and recalculate

2

Include performance requirements in specifications

3

Collect vendor documentation

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

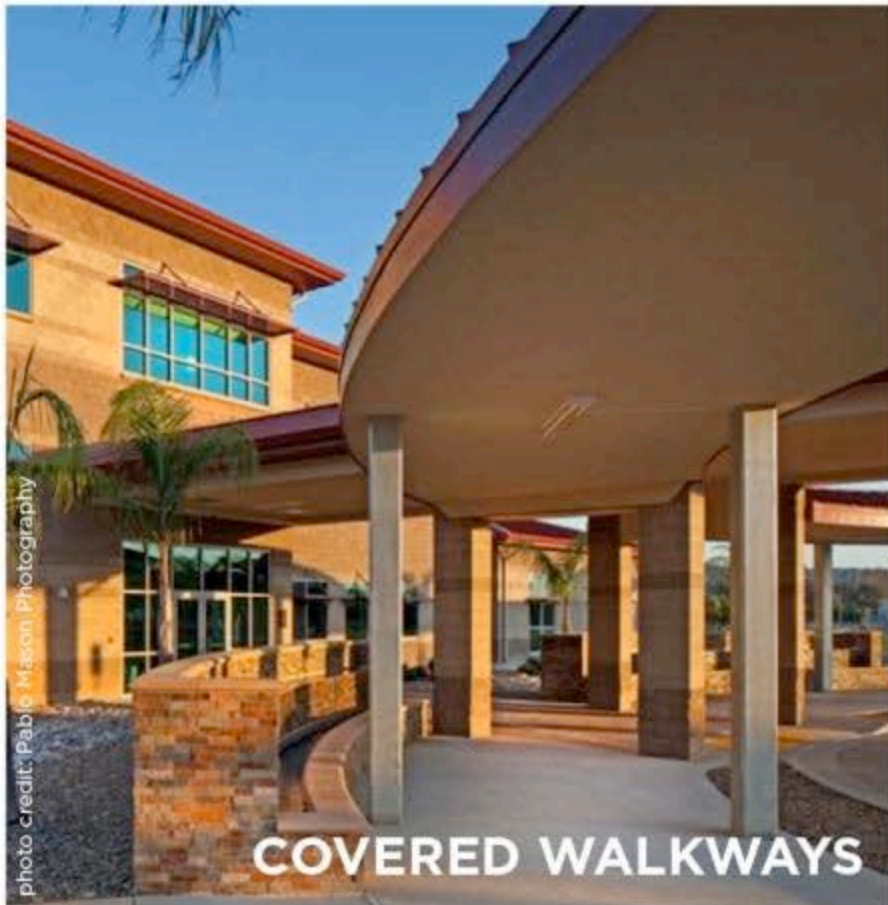
1 POINT



VEGETATED ROOF



HIGH REFLECTANCE ROOF



COVERED WALKWAYS



SHADE TREES

photo credit: Pablo Mason Photography



SS Credit

Heat Island Reduction

OPTION

1

Nonroof

1 POINT

or

OPTION

2

Roof

1 POINT

or

OPTION

3

Nonroof
and roof

2 POINTS

or

OPTION

4

Parking
under cover

1 POINT

PERFORMANCE REQUIREMENT

Ensure surfaces are
cleaned and maintained

Maintain vegetated roof: plant
health and structural condition

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Light Pollution Reduction



SS Credit

Light Pollution Reduction

OPTION

1

Fixture shielding
Exterior lights don't emit
light vertically above
90 degrees from lamp

1 POINT

or

OPTION

2

Perimeter measurements
Illumination levels do not
exceed 20% of ambient level

1 POINT



WHEN WHEN WHEN WHEN WHEN WHEN WHEN

ESTABLISHMENT

PERFORMANCE

WHEN WHEN WHEN WHEN WHEN WHEN WHEN



SELECT AN OPTION

OPTION 1.

Fixture shielding

or

OPTION 2.

Perimeter measurements

WHAT

WHY

WHEN

WHO

HOW

OPTION 1.

FIXTURE SHIELDING

Identify existing luminaires
where sum of mean lamp
lumens > 2,500

WHAT

WHY

WHEN


WHO

HOW

mean lamp lumens

(noun)

average quantity
of light output
over life of lamp

A nighttime photograph of a city skyline with several skyscrapers. A bright light source, possibly the sun or moon, is visible in the upper right, creating a lens flare. A semi-transparent green rectangular box is overlaid in the center of the image, containing the main title text.

ASSESS IF EXISTING LUMINAIRES MEET SHIELDING REQUIREMENTS

photo credit: Thomas Pinteric

WHAT

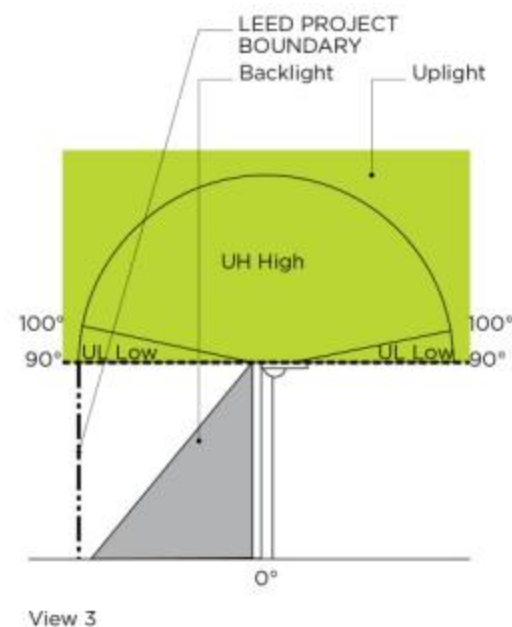
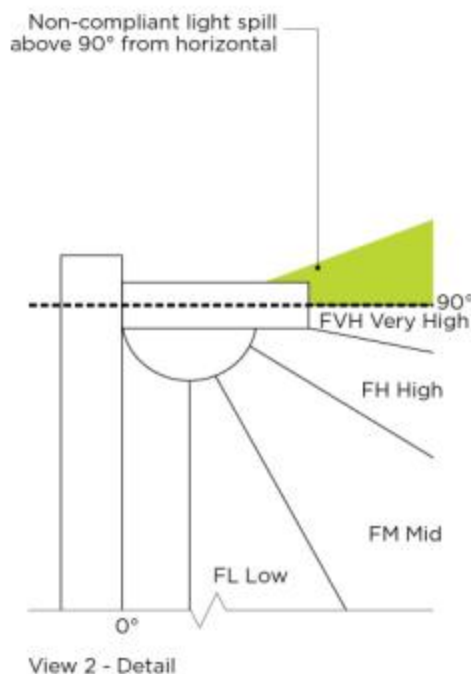
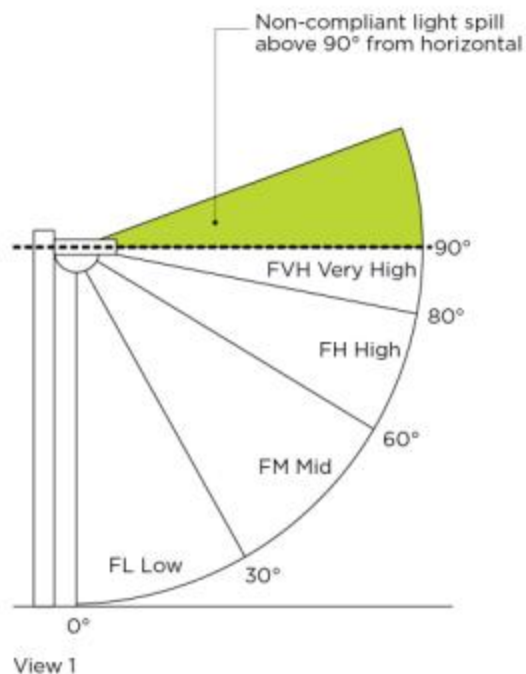
WHY

WHEN

WHO

HOW

NO DIRECTLY EMITTED LIGHT AT VERTICAL ANGLE MORE THAN 90 DEGREES FROM STRAIGHT DOWN



- Non-compliant light
- Backlight

Replace lamps
to have mean
lamp lumens at
or below 2,500

WHAT

WHY

WHEN

WHO

HOW

OPTION 2.

PERIMETER MEASUREMENTS

Measure and assess
illumination levels along
project boundary

WHAT

WHY

WHEN

WHO

HOW



8

minimum measure
points along boundary



100

ft (30 m)

maximum distance
between points

WHAT

WHY

WHEN

WHO

HOW



TAKE ILLUMINATION MEASUREMENTS AT EACH POINT WITH LIGHTS OFF AND ON

photo credit: Charles Davis Smith

WHAT

WHY

WHEN

WHO

HOW

Ensure illumination
level with lights is no
more than 20% above
level with lights off

WHAT

WHY

WHEN

WHO

HOW

QUESTION and ANSWER

QUESTION

How has the light
pollution reduction
credit improved in
LEED v4?



SS Credit

Site Improvement Plan
1 Point

ESTABLISHMENT

Develop a
five-year site
improvement plan

PERFORMANCE

Show 5% is
vegetated

Implement no- and
low-cost measures

Develop new plan
and implement
measures every
five years

WHAT

WHY

WHEN

WHO

HOW







Assemble site property team and professionals

WHAT

WHY

WHEN

WHO

HOW



DETERMINE CURRENT PERCENTAGE OF VEGETATION

$$\begin{array}{ccccc} & & \text{total} & & \\ & & \text{vegetated area} & & \\ \% & = & \frac{\quad}{\quad} & \times & 100 \\ \text{vegetated} & & & & \\ \text{area} & & \text{total site area} & & \end{array}$$

WHAT

WHY

WHEN

WHO

HOW

If site already
meets 5%
threshold



include
protection
of those areas
in plan

If site does
not meet
threshold



include
requirement
to increase
vegetated area
in plan

WHAT

WHY

WHEN

WHO

HOW

Documentation of existing site conditions

Site improvement objectives

Performance standards to evaluate ongoing progress

Monitoring protocols

Hydrology, vegetation, soils



FIRST

perform site inventory
on existing conditions



THEN

identify metrics
& establish objectives

WHAT

WHY

WHEN

WHO

HOW

EXAMPLES

Maintenance activities

Watershed quality

Soil quality improvements

Community congregation areas

Plant types and vegetation palette

Exterior design strategies

Identify measures,
performance
standards, and
monitoring protocols

WHAT

WHY

WHEN

WHO

HOW

Implementation costs

Operational savings

Maintenance cost savings

Occupant/user effects

Teams must include all
measures in the plan
and implement no- and
low-cost measures

WHAT

WHY

WHEN

WHO

HOW

Work with
contractors
to identify
improvements

WHAT

WHY

WHEN

WHO

HOW

Review and update site plan every



years



SS Credit

Site Improvement Plan
1 Point

SCHOOLS



ADAPTATION SPECIFIC CREDITS



SS Credit

Joint Use of Facilities

1

POINT

Share space with the community



SS Credit

Joint Use of Facilities

OPTION

1

Make building
space open to the
general public

or

OPTION

2

Contract
with specific
organizations to
share building space

or

OPTION

3

Use shared space
owned by other
organizations

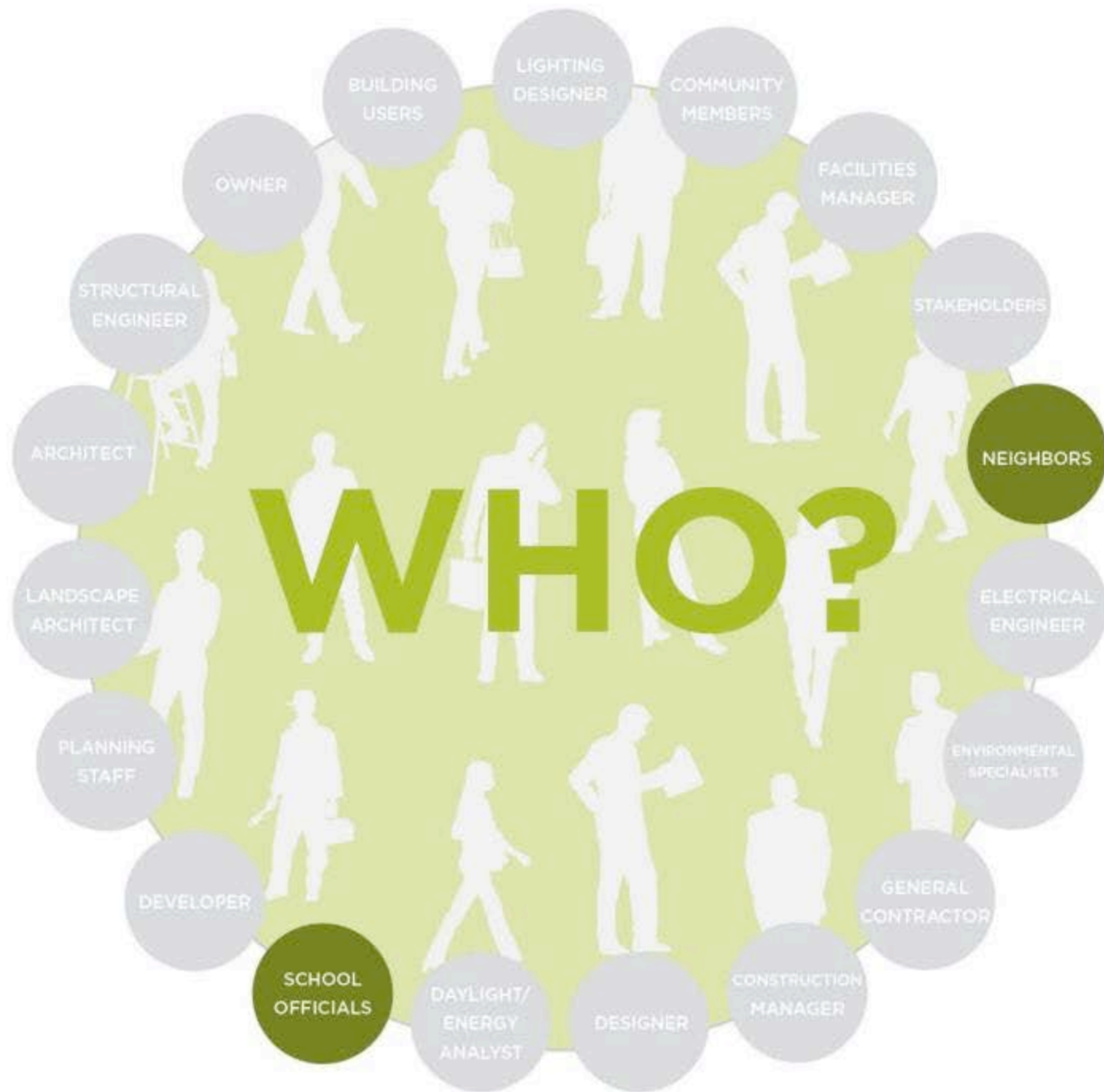


WHEN WHEN WHEN WHEN WHEN WHEN WHEN

ESTABLISHMENT

PERFORMANCE

WHEN WHEN WHEN WHEN WHEN WHEN WHEN



School expansion limits

Parking capacity limits

Resource availability

Pros and cons of shared spaces

Community needs

WHAT

WHY

WHEN

WHO

HOW



SS Credit

Joint Use of Facilities

OPTION

1

Make building
space open to the
general public

or

OPTION

2

Contract
with specific
organizations to
share building space

or

OPTION

3

Use shared space
owned by other
organizations

The image shows a classroom with a green rectangular overlay in the center. The overlay contains the text 'IDENTIFY AND ALLOCATE SHARED SPACES ESTABLISH TERMS AND CONDITIONS' in white, bold, sans-serif capital letters. The background of the image is a classroom with a drop ceiling, a large window on the left, and several rows of black chairs and wooden tables. In the foreground, a table is set up with water bottles, pens, and a small orange sign that says 'Liera'.

IDENTIFY AND ALLOCATE SHARED SPACES ESTABLISH TERMS AND CONDITIONS

photo credit: Gary Wilson



IDENTIFY ELIGIBLE
FACILITIES OWNED
BY OTHERS

ESTABLISH TERMS
AND CONDITIONS

WHAT

WHY

WHEN

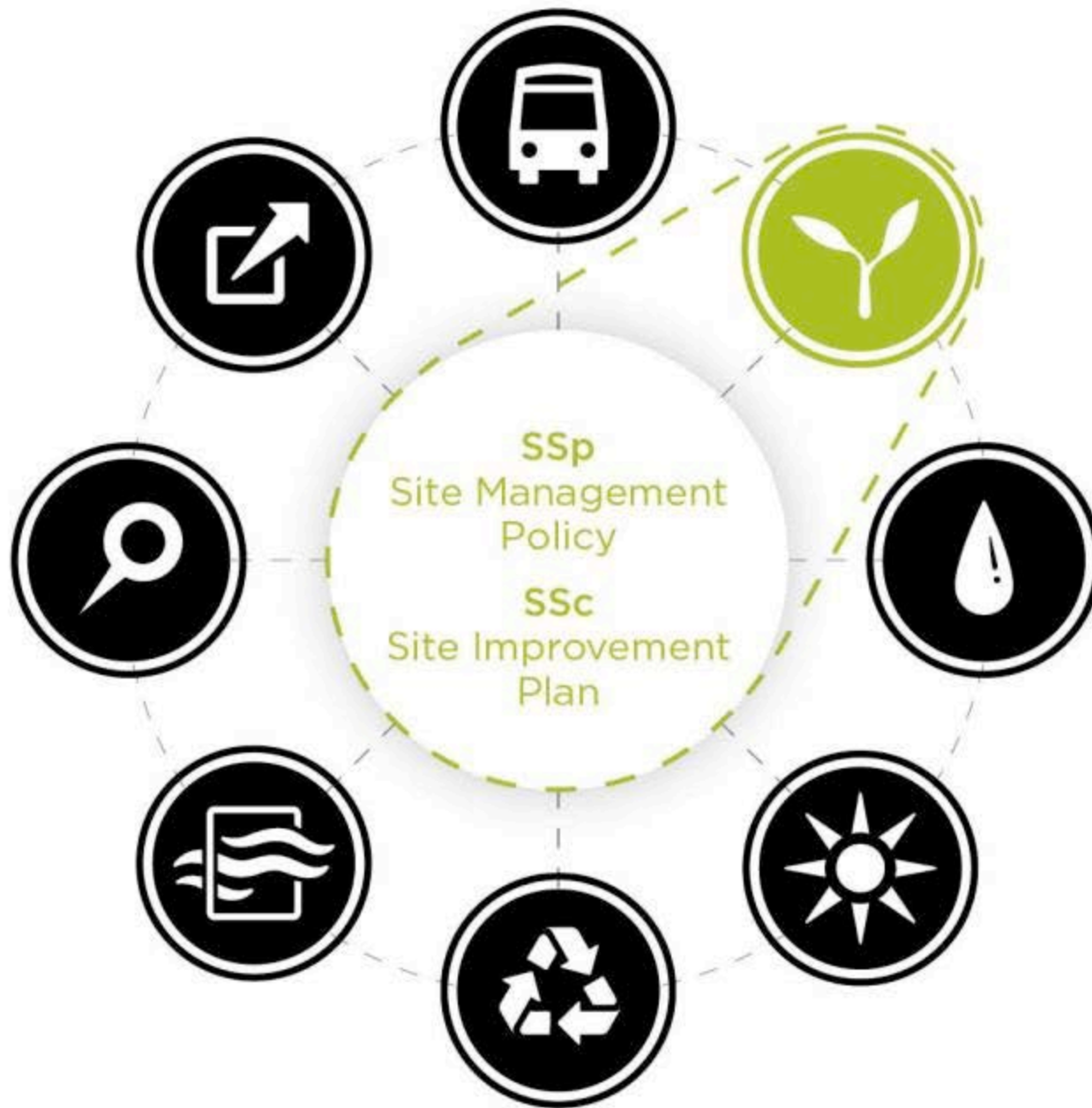
WHO

HOW









QUESTION and ANSWER



SUSTAINABLE SITES



LEED FOR EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE



presented by
USGBC

LEED v4 RATING SYSTEM REVIEW

LOCATION & TRANSPORTATION

SUSTAINABLE SITES

WATER EFFICIENCY

ENERGY & ATMOSPHERE

MATERIALS & RESOURCES

INDOOR ENVIRONMENTAL QUALITY

LEED FOR BUILDING
OPERATIONS AND MAINTENANCE