

# Monetizing the Value of AIB

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2018 AMERICA IN BLOOM SYMPOSIUM

# Economic contributions of tourism

Total travel related output was more than \$2.1 trillion in 2014.

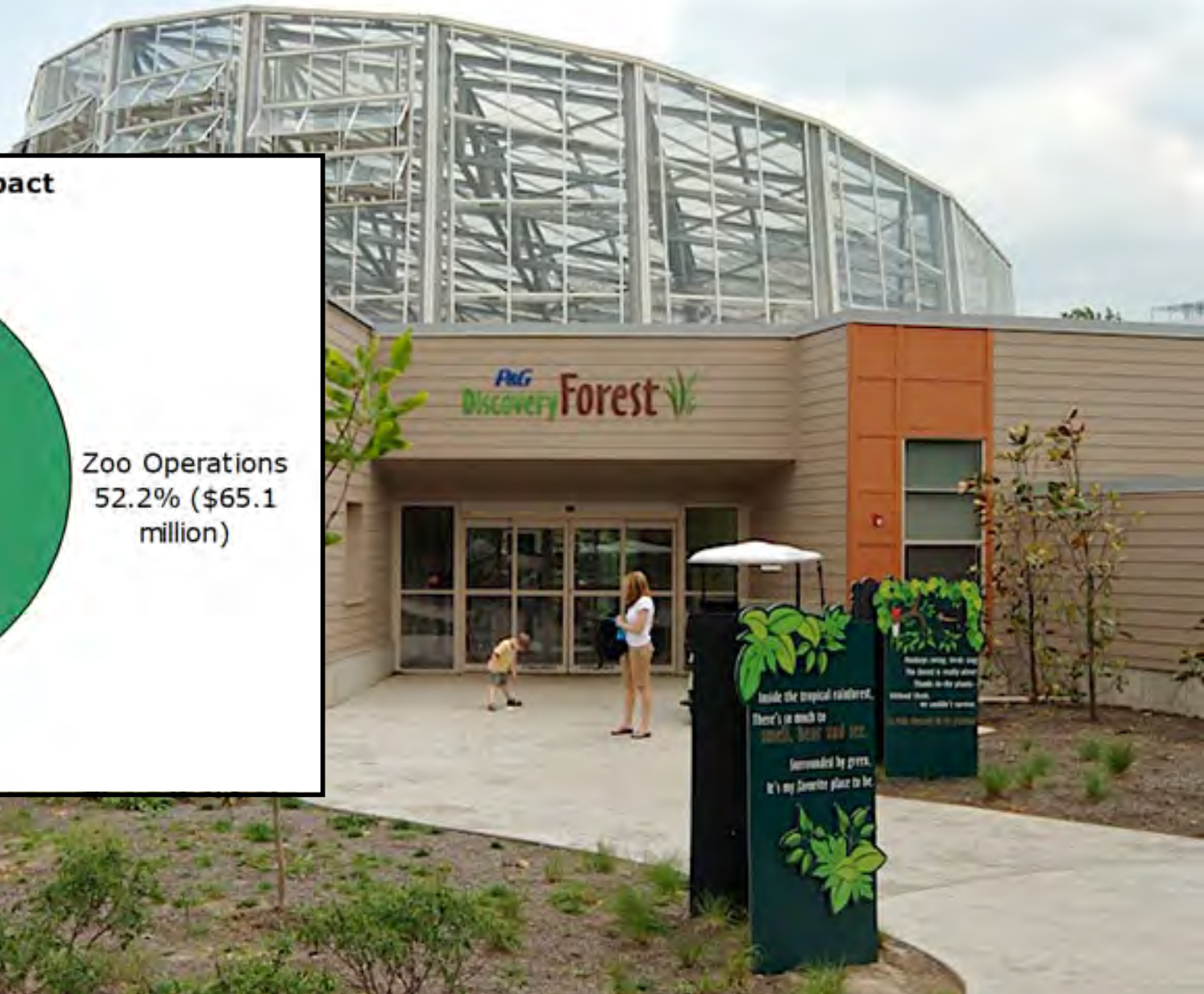
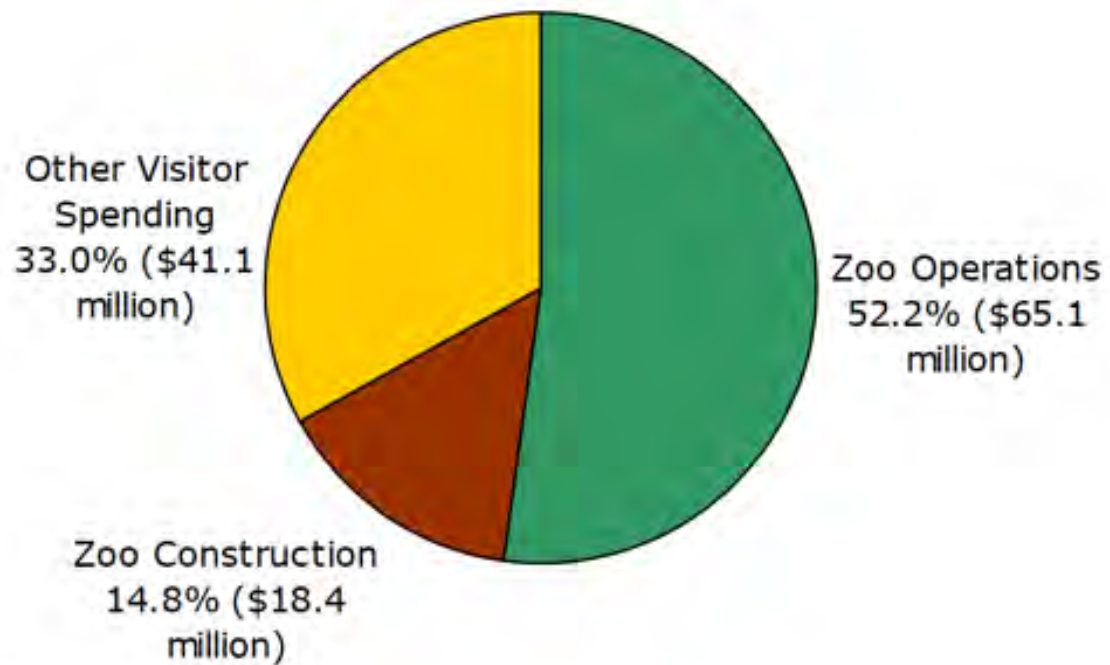


In 2014, a total of 15 million American jobs was directly and indirectly supported by travel and tourism.





### Sources of Economic Impact







Total economic impacts of the Florida Botanical Gardens are \$113.9 million, adding an additional 1,584 jobs.





Chihuly in the garden – Desert Botanic Garden, Phoenix (630,000 annual attendance = \$22M)





Shoppers spend 9 to 12% more.



Shoppers' WTP = +17% more.





7% higher rental rates + higher occupancy rates



2 million jobs in the U.S.








Office plants decrease sick time by 14%.

\$2,200 reduction in average annual health care costs per adult.



The results of an eight-year study showed that women living in areas with more vegetation had a **12% lower mortality rate** than women living in areas with the least vegetation.



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- \$1.09 per \$1.00 invested
  - Adjacent to parks +8 to 20%
  - Trees = +3 to 15%







# Benefit measurement & evaluation: WATER

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Green roofs

Tree planting

Bioretention & infiltration

Permeable pavement

Water harvesting



Reduced water treatment needs

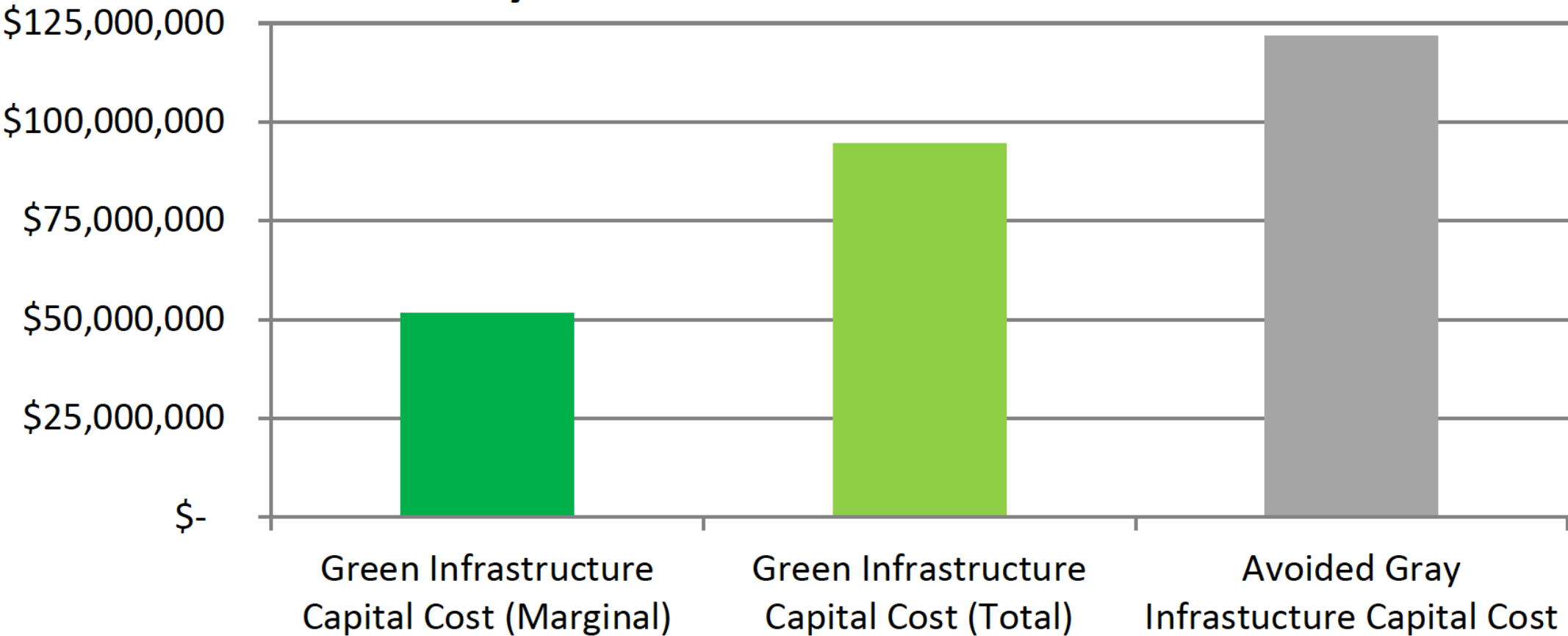
Reduced gray infrastructure needs

Improved water quality

Reduced flooding



# Green vs. Gray Infrastructure Costs within Lancaster's CSS Area

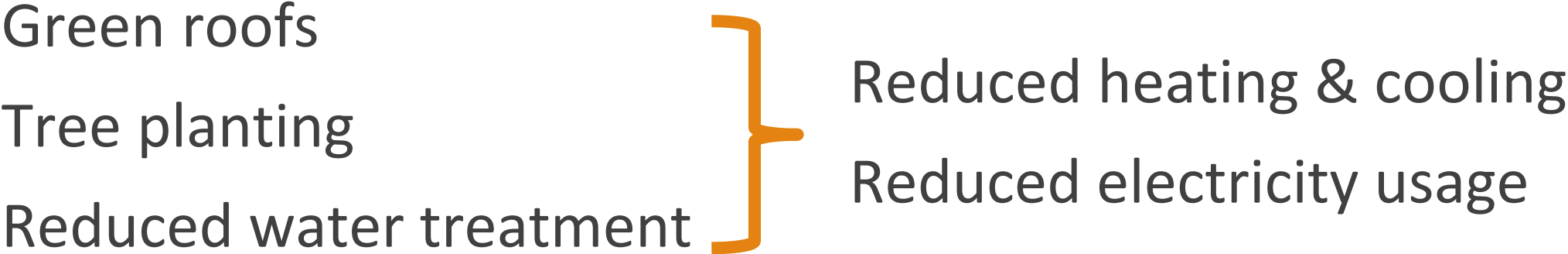


## Estimated Value of Avoided Costs for Wastewater Treatment & Storage at 25-Year Implementation\*

Reduced Pumping and Treatment Costs (per year)	\$661,000
Reduced Gray Infrastructure Capital Costs	\$120,000,000



# Benefit measurement & evaluation: Energy



Estimated Value of Reduced Energy Use at 25-Year Implementation	
Reduced Electricity Use (kWh)	\$592,000
Reduced Natural Gas Use (Btu)	\$1,776,000
<b>TOTAL (per year)</b>	<b>\$2,368,000</b>

# Benefit measurement & evaluation: Air Quality

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Green roofs

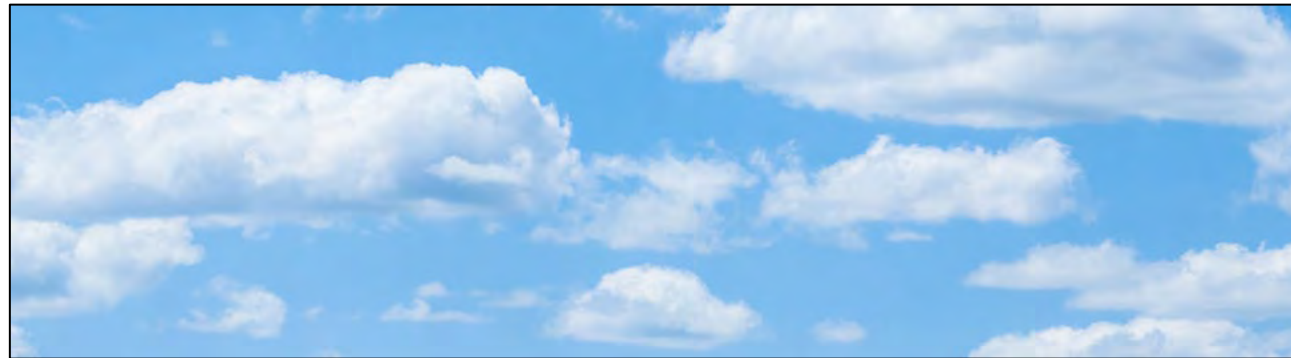
Tree planting

Bioretention & infiltration



Reduced criteria pollutants

Climate change benefits





Estimated Value of Reduced Air Pollutants at 25-Year Implementation	
Reduced NO <sub>2</sub>	\$285,000
Reduced O <sub>3</sub>	\$171,000
Reduced SO <sub>2</sub>	\$238,000
Reduced PM-10	\$329,000
<b>TOTAL (per year)</b>	<b>\$1,023,000</b>

Total Calculated Benefits (at Long-Term 25-Year Implementation)	
Estimated Value from Water Benefits	
Reduced CSS Gray Infrastructure Capital Costs (one-time)	\$120,000,000
Reduced Pumping and Treatment Costs (per year)	\$661,000
Estimated Value from Energy Benefits (per year)	\$2,368,000
Estimated Value from Air Quality Benefits (per year)	\$1,023,000
Estimated Value from Climate Change Benefits (per year)	\$786,000
Estimated Value from other Qualitative Benefits	Not calculated
<b>TOTAL</b>	
<b>Avoided Capital Costs</b>	<b>\$120,000,000</b>
<b>Annual Benefits</b>	<b>\$4,838,000</b>



## THE BENEFITS OF GREEN STORMWATER INFRASTRUCTURE ON PRIVATE COMMERCIAL PROPERTY

### GREEN ROOFTOPS

Apartment buildings with green roofs received a 16% rental premium, according to one study.

Green roofs typically last twice as long as conventional roofs, saving hundreds of thousand of dollars in roof repair/replacement costs.

The green roof on the Target Center Arena in Minneapolis has decreased annual energy costs by \$300,000.



### LANDSCAPING WITH RAIN GARDENS AND BIOSWALES

Well-designed landscaping boosts average rental rates for office buildings by approximately 7 percent

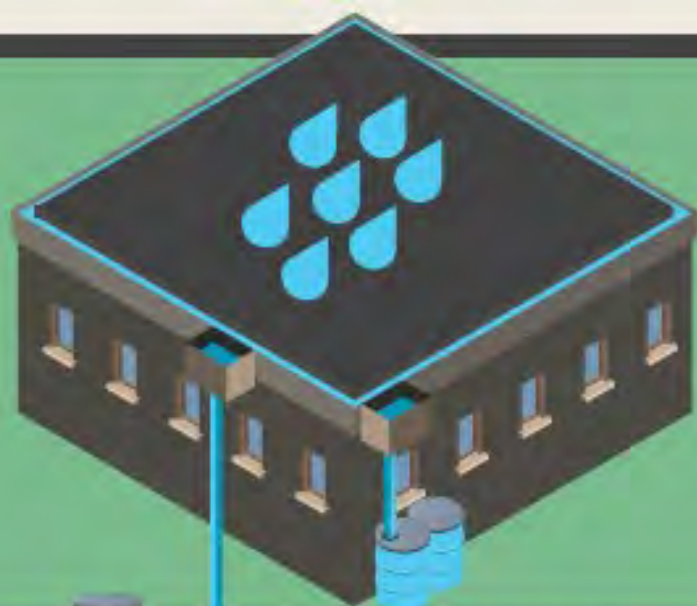


**SITES  
CERTIFIED**  
LEED APES - B2000000000

### ECO-LABELS

LEED, Sustainable Sites Initiative or other certifications can increase property values, rents, and occupancy rates in commercial office buildings.





## TREE COVER

Trees can reduce building energy demand for heating and cooling by providing shade in summer and blocking wind in winter. Multiple trees on a site can save hundreds of dollars in annual energy costs.

Retail customers are willing to pay **8% to 12% more** for products in shopping centers with mature tree canopy.



## RAIN BARRELS AND CISTERNS

Capturing rainwater for reuse can help save on water bills for landscape irrigation and other non-potable water uses.



## PERMEABLE PAVEMENT

Permeable asphalt, concrete, or paver blocks allow water to seep into gravel and soil below. These systems can have significantly lower maintenance costs than traditional pavement, resulting in lower overall life-cycle costs.

# RETAIL CENTER

The figures below present the key assumptions, proposed green infrastructure property improvements, and the resulting benefits for a midsize retail center.



## GREEN INFRASTRUCTURE IMPROVEMENTS

40,000-sq.-ft. **green roof**, installed at the end of the life of the existing conventional roof, with green covering 90 percent of surface, or 36,000 sq. ft.

50 strategically planted **medium-size trees**, 25 opposite west-facing walls and 25 opposite south-facing walls

**Bioswales** and **rain gardens** that manage 1 inch of runoff from 2,000 sq. ft. of adjacent impervious area

72,000-sq.-ft. **permeable-pavement** parking lot

**Cisterns** to capture runoff from 5,000 sq. ft. of roof area and use for irrigation

## BUILDING ASSUMPTIONS (BEFORE IMPROVEMENTS)

SIZE	40,000 sq. ft.
STORIES	1
ROOF SIZE	40,000 sq. ft.
LOT AREA	128,000 sq. ft.
PERMEABLE AREA (COVERED IN TURF)	4,000 sq. ft.
NUMBER OF STORES	15
ANNUAL RENT	\$17 per sq. ft.
ANNUAL RETAIL SALES	\$2,182,000 per store



## POTENTIAL BENEFITS

Energy savings due to reduced demand for heating and cooling	<b>\$3,560</b> Annually
Avoided costs for conventional roof replacement	<b>\$607,750</b> net present value over 40-year analysis period
Tax credit	<b>\$100,000</b> one-time credit in year of installation
Increased retail sales	<b>\$1.2 MILLION</b> per year
Stormwater fee reduction	<b>\$14,020</b> Annually (projected to increase 6% per year)
Total present value benefits (over 40-year analysis period)	<b>\$24,202,000 +</b> (including \$22,963,800 in increased retail sales, which accrue to the tenants)

## NON-QUANTIFIED BENEFITS

Water conservation	+
Increased property value	++
Reduced infrastructure costs due to use of permeable pavement system	+ / U
Reduced crime	+ / U
Improved health and employee satisfaction	+ (for tenants and employees)
Reduced costs associated with flooding	U

- + would likely increase net benefits;
- ++ would increase net benefits significantly;
- U direction of net change is uncertain.

Present value benefits over 40-year period were estimated on the basis of a 6 percent discount rate, projected CPI, projected increase in electricity and natural gas prices in relation to CPI (based on historical relationship), and 6 percent annual increase in stormwater fees. Improvements assumed to be implemented in 2015. Avoided conventional roof replacement costs were added to net present value of other benefits. Tax credit and stormwater fee reductions are based on available credits and fee structure in Philadelphia; many other localities have similar incentives.

# APARTMENT BUILDING

The figures below present the key multifamily building assumptions, the proposed green infrastructure property improvements, and the resulting benefits.

## GREEN INFRASTRUCTURE IMPROVEMENTS

8,435 sq. ft. **green roof**, installed at the end of the life of the existing conventional roof, with green covering 90 percent of the surface, about 7,600 sq. ft.

12 strategically planted **large trees**, 6 opposite a west-facing wall and 6 opposite an east-facing wall

**Bioswales** and **rain gardens** that manage 1 inch of runoff from 2,635 sq. ft. of adjacent impervious area





## POTENTIAL BENEFITS

Energy savings due to reduced demand for heating and cooling	<b>\$1,780</b> Annually
Avoided costs for conventional roof replacement	<b>\$128,160</b> present value over 40-year analysis period
Tax credit	<b>\$52,720</b> one-time credit in year of installation
Increased rental income	<b>\$77,720</b> Annually (assuming no vacancies)
Increased property value	<b>\$37,500</b> one-time benefit to property owner at time of sale
Stormwater fee reduction	<b>\$1,230</b> Annually (projected to increase 6% per year)
Total present value benefits (over 40-year analysis period)	<b>\$1,740,000 +</b>

Present value benefits over 40-year period were estimated on the basis of a 6 percent discount rate, projected CPI, projected increase in electricity and natural gas prices in relation to CPI (based on historical relationship), and 6 percent annual increase in stormwater fees. Improvements assumed to be implemented in 2015. Avoided conventional roof replacement costs were added to net present value of other benefits. Tax credit and stormwater fee reductions are based on available credits and fee structure in Philadelphia; many other localities have similar incentives.

## NON-QUANTIFIED BENEFITS

Reduced crime	+ / U
Reduced costs associated with flooding	U
+ would likely increase net benefits; U direction of net change is uncertain.	

## BUILDING ASSUMPTIONS (BEFORE IMPROVEMENTS)

SIZE	33,740 sq. ft.
STORIES	4
ROOF SIZE	8,435 sq. ft.
LOT AREA	12,435 sq. ft.
PERMEABLE AREA (COVERED IN TURF)	1,000 sq. ft.
NUMBER OF UNITS	32
MONTHLY RENT	\$1,265 per unit

# MEDIUM-SIZE OFFICE BUILDING

The figures below present the key office building assumptions, the proposed green infrastructure property improvements, and the resulting benefits.

## GREEN INFRASTRUCTURE IMPROVEMENTS

17,900-sq.-ft. **green roof**, installed at the end of life of the existing conventional roof, with green covering 80 percent of the surface, or 14,300 sq. ft. (Remainder of roof is impervious area.)

20 strategically **planted trees**, 10 opposite a west-facing wall and 10 opposite an east-facing wall

10,000-sq.-ft. **permeable pavement** parking lot, installed at the end of life of the existing parking lot

**Bioswales** and **rain gardens** that manage 1 inch of runoff from 4,700 sq. ft. of adjacent impervious area





## POTENTIAL BENEFITS

Energy savings due to reduced demand for heating and cooling	<b>\$1,630</b> Annually
Avoided costs for conventional roof replacement	<b>\$271,970</b> present value over 40-year analysis period
Tax credit	<b>\$67,130</b> one-time credit in year of installation
Increased rental income	<b>\$72,150</b> annually (assuming no vacancies)
Stormwater fee reduction	<b>\$3,490</b> Annually (projected to increase 6% per year)
Total present value benefits (over 40-year analysis period)	<b>\$1,863,000 +</b>

Present value benefits over 40-year period were estimated on the basis of a 6 percent discount rate, projected CPI, projected increase in electricity and natural gas prices in relation to CPI (based on historical relationship), and 6 percent annual increase in stormwater fees. Improvements assumed to be implemented in 2015. Avoided conventional roof replacement costs were added to net present value of other benefits. Tax credit and stormwater fee reductions are based on available credits and fee structure in Philadelphia; many other localities have similar incentives.

## NON-QUANTIFIED BENEFITS

Increased property values	++
Reduced infrastructure costs due to use of permeable pavement system	+
Reduced crime	+ / U
Improved health and employee satisfaction	+ (for tenants and employees)
Reduced costs associated with flooding	U

- + would likely increase net benefits;
- + + would increase net benefits significantly;
- U direction of net change is uncertain.

## BUILDING ASSUMPTIONS (BEFORE IMPROVEMENTS)

SIZE	53,600 sq. ft.
STORIES	3
ROOF SIZE	17,900 sq. ft.
LOT AREA	32,000 sq. ft.
PERMEABLE AREA (COVERED IN TURF)	1,000
ANNUAL RENT	\$19.23 per sq. ft.

# LANDSCAPE PERFORMANCE SERIES

by the  
Landscape Architecture Foundation

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**Doc Cavalliere Park**



**Teardrop Park**

[org/case-study-briefs/renaissance-park](https://www.landscapeperformance.org/case-study-briefs/renaissance-park)



# Economic benefits by category

Increase in property value for adjacent or nearby properties

## (1) Property Value

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Increases in sales price for adjacent or nearby properties

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Increases in rents for adjacent residential or commercial properties

# Economic benefits by category

Reduction in heating and cooling costs

(2) Operations and Maintenance Savings

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Reduction in irrigation or potable water costs

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Reduction in maintenance costs, mowing, fertilizer and others

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Value of volunteer hours



# Economic benefits by category

## (3) Construction Cost Savings

Reduced hauling and/or  
dumping costs

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Reduced material purchasing costs

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Reduced installation costs

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Reduced earthworks costs

# Economic benefits by category

## (4) Job Creation

Number of permanent jobs created directly for the operation of the site

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Number of permanent jobs created for surrounding, related development

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Number of temporary jobs created for the construction of the site, seasonal operations, or other temporary needs



# Economic benefits by category

(5) Visitor Spending	Revenue generated by entry fees
	Revenue generated through direct sales
	General visitor spending in nearby or adjacent areas

# Economic benefits by category

(6) Increased Tax  
Base/Revenue

Increase in office, commercial,  
or residential space or units

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Actual increase in tax revenue

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Projected increase in tax revenue



# Economic benefits by category

## (7) Economic Development

Increase in retail sales

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Increase in commercial  
establishments

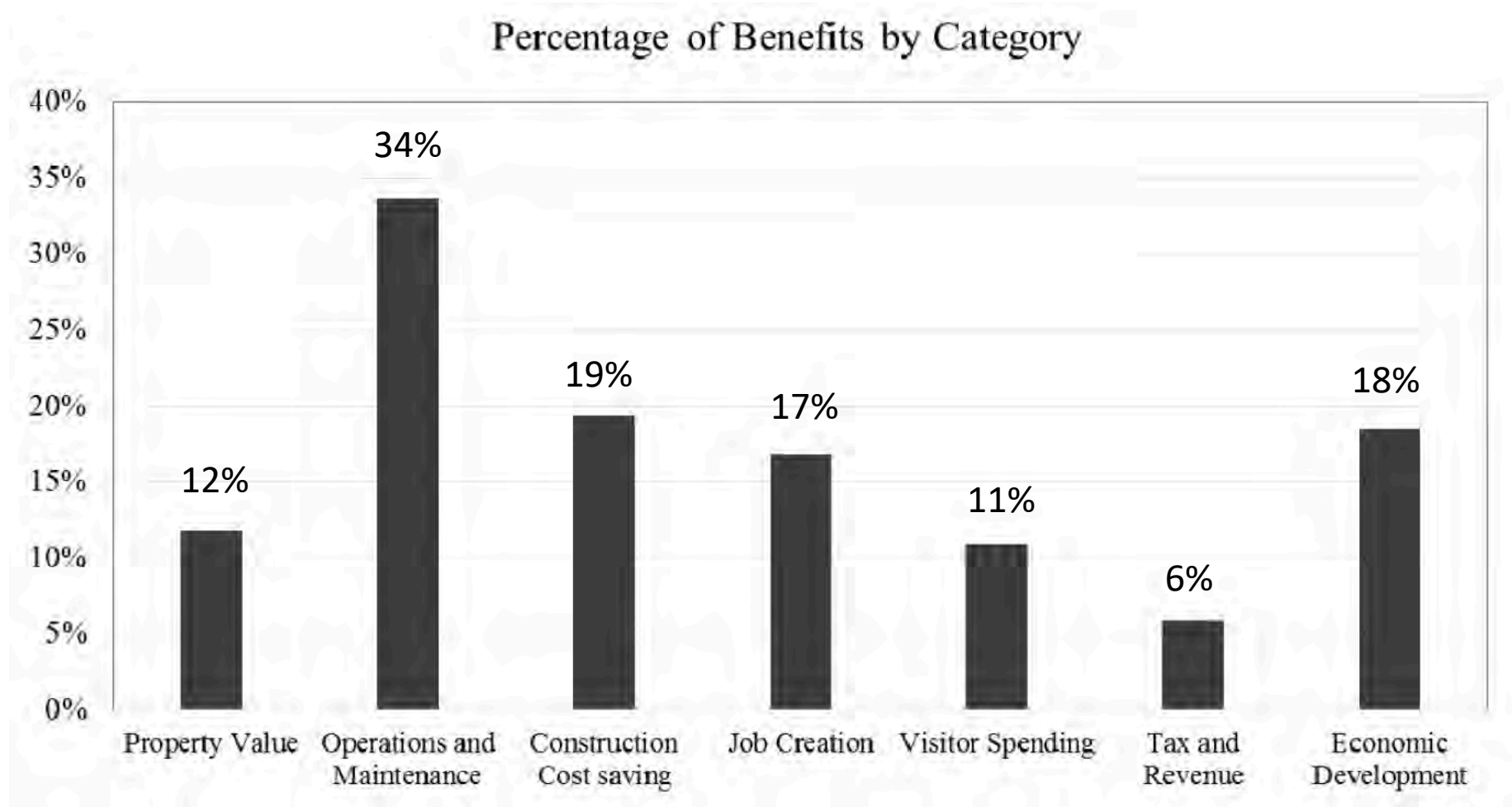
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Decrease in retail vacancies  
and/or increase in occupancy

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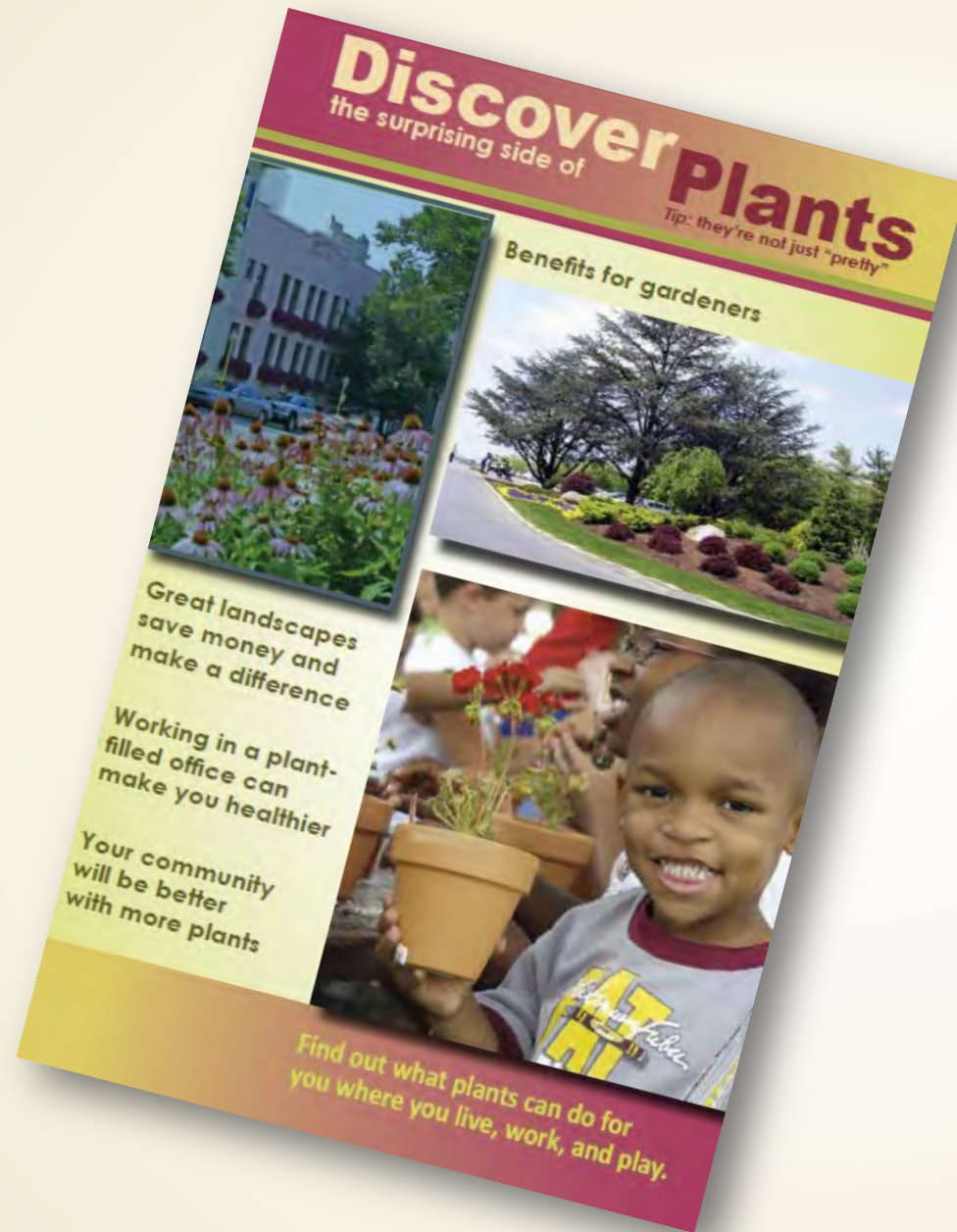
Revenue generated through  
project-related events

# Percentage of economic benefits by category



Landscape Architecture Foundation's Landscape Performance Series.





- ✓ Plants offer numerous benefits for communities.
- ✓ Great landscapes save money.
- ✓ Plants can make you healthier.
- ✓ Your community will be safer.
- ✓ Discover what plants can do for you where you live, work, and play.

## #PlantsDoThat

Horticulture: The Art, Science, & Business of Plants

Horticulture contributes \$196 billion to the US economy across a diverse array of businesses. But the story doesn't end there. Horticulture benefits the wealth and health of every citizen and every community in the US.

Produced by  
National Initiative for  
Consumer Horticulture

ConsumerHort.org



### Where We LIVE

- A 25-foot tree reduces annual heating and cooling costs for typical homes by 8-12%.
- Our homes represent 25% of our personal wealth. Well-landscaped homes are more valuable.
- Improvements to your landscape pays off! The return on investment for landscape upgrades is 109%.
- 1/4 of American homes grow berries, veggies, or fruit trees.



### Where We WORK

- Green roofs provide beauty and moderate rooftop temperatures, reducing heat loads and lowering energy costs.
- Office plants reduce employee sick time by 14% and improve work productivity and speed.
- Upkeep and preservation of urban green habitats creates new jobs, boosts local economies, and adds to community prosperity.



Horticulture creates 2 million jobs across a diverse array of businesses.



### Where We SHOP

Stores with landscaped areas have expanded sales resulting from longer shopping occasions and can charge more due to higher perceived quality.



- There are 4 million miles of US roadways. Street trees preserve paved surfaces. Shaded roads save up to 60% of repaving costs. Trees also improve driver safety and result in fewer traffic accidents.

Trails and greenways increase property values and make adjacent homes sell faster.



### Where We PLAY

America's public gardens are key tourist destinations and contribute \$2.3 billion in community tourism spending.

Parks provide cities and citizens significant value. In Philadelphia, parks generate \$23 million in city revenue, \$16 million in municipal cost savings, and \$1.1 billion in cost savings for citizens.





