



LANDSCAPE PERFORMANCE SERIES

Pompano Beach Streetscape and Dune Restoration Methodology for Landscape Performance Benefits



Figure 1 & 2. Before and after images of *Pompano Beach Streetscape and Dune Restoration*. Courtesy of EDSA, Inc.

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Introduction

This research aims to investigate the environmental, social, and economic performance of *Pompano Beach Streetscape and Dune Restoration* located in Pompano Beach, Florida. It was developed as part of the 2014 Case Study Investigation (CSI) program funded by the Landscape Architecture Foundation. This document is a supplemental worksheet that elaborates on the identified performance benefits of *Pompano Beach Streetscape and Dune Restoration* case study that is listed in the Landscape Architecture Foundation's 2014 CSI database.

Environmental

Performance Benefit 1

Reduces power needed to light the site by 47% or 18,641 kWh per year by using high-performance LED light fixtures, compared to the former high-pressure sodium fixtures.

Methodology

The landscape architect provided a lighting plan schedule and survey from which we extracted the data for light fixture quantities and bulb wattages. The Grounds Manager of the City of Pompano Beach has provided the information on pre-development lighting fixtures (150 W).

According to the Office of Public Works of Pompano Beach, all new lighting use photo cell sensors, which turn on the lights from sun down to sun rise. The average length of daylight hours in Pompano Beach is 12 hours, which gives a total of about 4,380 hours of daylight per year.

Description	Type	Qty	Bulb Wattage	Total Wattage	kWatts	kWh	% of Change
Pre-Development							
Pole Light	High Pressure Sodium	60	150	9000	9	39,420	
Post-Development							
Pole Light	LED	45	60	2700	4.744	20,778.72	-47%
Bollard Light	LED	40	45	1800			
Step Accent Light	LED	10	3	30			
Bump Path Light	LED	28	5	140			
Internal Sign Light	LED	10	2	20			
Internal Sign Light	LED	4	13.5	54			

Table 6. Comparison of pre-development and post-development lighting power.

Limitations of methodology

- High pressure sodium lamps give off an amber glow that can be seen from a distance that is typically associated with light pollution. LED, however, gives off a white light without the glow. The switch to LED not only reduces the amount of power needed but also decreases light pollution on the beach. Unfortunately, quantifying this would require a larger technical study that is beyond our capabilities.

Additional Environmental Information (not a performance benefit)

Reduced water use for irrigation by 73% or 611,477 gallons per month below requirement of a conventional lawn space, through the use of native and drought-tolerant vegetation.

Methodology

WaterSense a program by the EPA, that actively seeks to preserve water through water efficiency methods that include reducing water use, product improvements, and reducing the strain on water resources. WaterSense provides a worksheet that allows one to analyze the site’s water usage and determine whether the irrigation system is efficient and regionally suitable. It compares the site to a conventional lawn space regarded as the baseline. To determine the baseline, which more specifically is the “amount of water required by the site during the peak watering month if watered at 100% of reference evapotranspiration”. The reference evapotranspiration is a factor of the “amount of water lost from a well-maintained expanse of average-height green grass” (EPA, *WaterSense Water Budget Approach*). This results with the landscape water allotment (LWA). This is 70% of the baseline which represents the amount of water needed for a conventional lawn space. The data above is then compared to the landscape water requirement (LWR) which determines the efficiency of the site’s irrigation system. Please refer to the EPA’s *WaterSense Budget Approach* for the explanation of their formulas and references.

Baseline and Landscape Water Allowance	
Required Input	
Landscaped Area	349,929
Average Monthly Reference Evapotranspiration	6.54
Outputs	
Monthly Baseline (gal / month)	1,426,521
Monthly Landscape Water Allowance (gal / month)	998,564

Landscape Water Requirement				
Hydrozone / Landscape Area (SF)	Plant Type	Water Requirement	Irrigation Type	LWR
203,376	Existing Beach Dune Vegetation	Low	Rotor	126,862
48,646	New Beach Dune Vegetation	Low	Rotor	30,344
39,935	New Landscaped Areas	Low	Drip	24,910
57,973	Turfgrass / Lawn	Medium / High	Rotor	204,971
Landscape Requirement for the Site				387,087

Table 8. Water Budget Tool Report.

Landscape Water Allowance: 998,564 gal/month
Landscape Water Requirement: 387,087 gal/month
Potential Peak Watering Savings: 611,477 gal/month

Limitations of methodology

- o Irrigation schedules change with new plant installations and weather conditions. The intent of the landscape architect was to use the drip system to acclimate new plants. When the plants are able to sustain themselves without the need of irrigation, the irrigation is removed (with exception of the minor lawn areas).
- o The calculator does not take into account stormwater management and permeability, which also affect plant growth and watering. For example, the use of artificial turf in the plaza limits the need for irrigation but it is a permeable surface. It could be an arguable decision by some, but it provides some benefit over traditional turf surfaces.

Social

Performance Benefit 3

Increased perceived safety for 100% of the visitors who responded to a survey. Additionally, according to Broward Sheriff’s Office Report there has been a 10% drop in criminal offenses reported in the vicinity since the project’s completion in 2013.

Methodology:

Majority of these survey participants agreed that visibility and increased use were important for them to feel secure.

Within the survey, the following questions were asked about safety:

- Do the landscaped areas feel safe and secure?
 - o Yes
 - o No
 - o Undecided
 - o Don’t want to specify
 - o Other (Please specify)
- If yes, what aspects of it makes you feel safe and secure? Please specify all that apply:
 - o Visibility; it is easy to see around
 - o Landscape lighting; it is well lit at night
 - o Increased use; I feel safe when there are many people around
 - o Wider sidewalk; I can walk, run, bike and skate easier
 - o Narrower roadway; I can cross the street easily
 - o Don’t want to specify
 - o Other (Please comment below)

Response	Frequency
Visibility	25
Lighting	11
Increased Use	25
Wider sidewalk	16
Narrower roadway	9
Don't want to specify	0
Other	0

Performance Benefit 4

Increases opportunities for physical activity for 97% of the survey respondents who reside locally. Of these, 82% visit the site between once per week and every day. 63% of the survey respondents reported that they either bike, walk, jog, or roller skate to the site.

Performance Benefit 5

Improves quality of life for 100% of survey respondent visitors who reside locally. Reasons cited include: reducing mental stress, providing a place to be outdoors, and increasing opportunities for physical activity.

Regarding the report we obtained from the Broward Sheriff's Office:

Below map indicates the boundaries of Zone 1101 (yellow), the area for which crime data was available, and the site (green).



	2012	2013	% of Change
Broward Total Offenses	76652	71791	-6.77
Pompano Beach Total Offenses	6622	5948	-11.33
Zone 1101 Total Offenses	456	413	-10.41

Figure 6. Broward Sheriff's Office Zone 1101. Table 7. Comparison of offenses between Broward County, City of Pompano Beach, and Zone 1101.

Limitations of methodology

- Zone 1101 covers an area that is much broader than our site. The Public Records Office of Broward County only provides data on particular addresses or on established zones.
- Our conversations with police officers on-site suggest that there has been an increase in police presence since the project's completion.
- Many local residents are "snowbirds" who are not in Florida during the summer season when the study was conducted. This may have affected data.

Economic

Performance Benefit 6

Increased property values adjacent to the site by an average of 13% from 2010 to 2013. The City of Pompano Beach overall experienced a 26% decrease in property values during the same period.

Methodology

Data for the values of adjacent properties were obtained from the Office of the Broward County Appraiser.



Figure 3. The site is highlighted in green and the examined properties are highlighted in red.

Properties #16, #1, #2, #3, #5, #6, and #12 are multistory residential condominiums, which have several dwellings on each level. The Office of Broward County Appraiser did not have data for whole condominium buildings. Instead, the appraiser’s office provided us with property values of individual dwellings. To approximate the value of each building we calculated the property values by adding up the values of the dwellings. We repeated this for each year from 2010 to 2013.

Map Ref #	Property Address	Assessed Property Values				% Change
		2010	2011	2012	2013	
1	405 N Ocean Blvd	109,923,585.00	63,631,600.00	116,742,284.00	121,782,459.00	11%
2	328 N Ocean Blvd	55,489,175.00	30,896,370.00	54,239,421.00	55,320,586.00	0%
3	305 N Pompano Beach Blvd	46,999,796.00	26,857,730.00	48,467,320.00	49,797,109.00	6%
4	221 N Pompano Beach Blvd	7,273,700.00	1,619,900.00	7,273,700.00	7,273,700.00	0%
5	133 N Pompano Beach Blvd	57,329,240.00	32,093,990.00	55,167,884.00	53,629,755.00	-6%
6	111 N Pompano Beach Blvd	97,341,911.00	56,209,370.00	104,580,280.00	113,979,216.00	17%
7	110 N Ocean Blvd	6,881,640.00	2,913,190.00	6,622,951.00	6,480,255.00	-6%
8	20 N Ocean Blvd	18,586,155.00	8,775,000.00	18,481,680.00	19,864,243.00	7%
9	1 N Pompano Beach Blvd	6,195,384.00	2,925,000.00	5,819,366.00	6,331,264.00	2%
10	3400 E Atlantic Blvd	4,531,312.00	2,035,890.00	4,524,999.00	4,563,016.00	1%
11	3440 E Atlantic Blvd	1,171,285.00	522,000.00	1,759,026.00	1,744,495.00	49%
12	8 Briney Ave	8,569,500.00	5,661,940.00	10,606,711.00	11,298,529.00	32%
13	499 N Ocean Blvd	983,743.00	464,450.00	992,761.00	1,090,736.00	11%
14	501 N Ocean Blvd	414,003.00	199,780.00	509,125.00	576,302.00	39%
15	505 N Ocean Blvd	405,657.00	186,280.00	438,396.00	451,873.00	11%
16	504 N Ocean Blvd	1,529,229.00	1,038,150.00	1,709,793.00	2,090,313.00	37%
TOTALS		423,625,315.00	236,030,640.00	437,935,697.00	456,273,851.00	13%

Table 1. Assessed values of adjacent properties from 2010 to 2013.

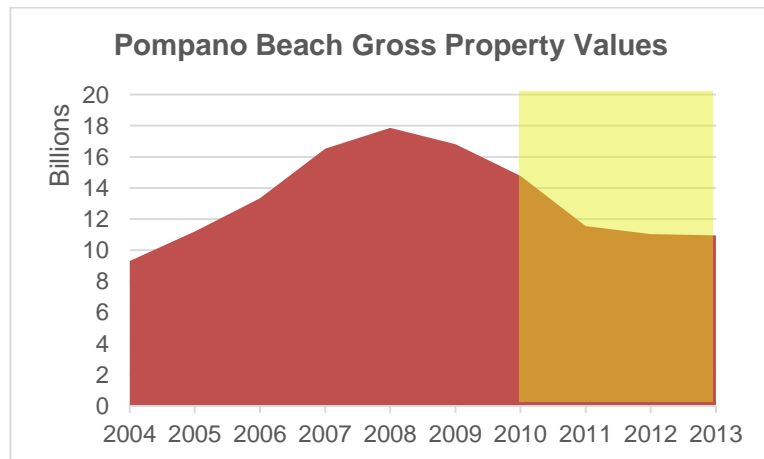


Table 2. Pompano Beach gross taxable property values in billions – 2004 through 2013.

	Assessed Property Values (Dollars)				% Change
	2010	2011	2012	2013	
Total Assessed Values of Pompano Beach	14,787,794,785.00	11,550,171,615.00	11,010,057,195.00	10,954,503,628.00	-26%

Table 3. Pompano Beach gross taxable property values – 2010 through 2013.

** Please see Addenda for the source documents where above listed data was extracted.

Limitations of methodology

Project construction started in May 2011. The streetscape and beach park were officially opened for use in April 2013 (16 months before this research was conducted). Only one year of data after the project's completion is currently available for analysis. Future data may indicate additional significant impact.

Performance Benefit 7

Increased City revenue from the public parking lot adjacent to the site by 45% between February 2013 and February 2014.

Methodology



Figure 4. 2011 Aerial: We counted a total of 783 parking spaces.



Figure 5. 2014 Aerial: We counted a total of 956 parking spaces.
 For Figures 4 & 5: A: A1A/North Pompano Beach Blvd, B: Pier, C: Oceanside Parking lot D was converted to a plaza as part of project's design.

The City of Pompano Beach Finance Department provided the revenues of the parking lots for the months of February 2013 and February 2014. Considering that parking is \$1.25 per hour, the data suggests that there are not only more visitors but they also spend considerably more time at the site.

February 2014 Revenue					February 2013 Revenue				
Date	Pier	Oceanside	A1A/PB Blvd	Total	Date	Pier	Oceanside	A1A/PB Blvd	Total
Saturday, February 1, 2014	\$ 2,302.05	\$ 162.25	\$ 2,611.17	\$ 5,075.47	Friday, February 1, 2013	\$ 313.15	\$ 57.05	\$ 607.55	\$ 977.75
Sunday, February 2, 2014	1,861.00	26.25	2,365.65	4,252.90	Saturday, February 2, 2013	951.25	478.50	1,342.45	2,772.20
Monday, February 3, 2014	830.90	100.75	1,735.05	2,666.70	Sunday, February 3, 2013	1,212.30	60.40	1,443.90	2,716.60
Tuesday, February 4, 2014	998.95	47.15	1,830.15	2,876.25	Monday, February 4, 2013	513.80	51.35	905.75	1,470.90
Wednesday, February 5, 2014	1,344.00	19.90	1,781.35	3,145.25	Tuesday, February 5, 2013	965.35	33.15	1,025.95	2,024.45
Thursday, February 6, 2014	1,272.60	82.15	2,024.70	3,379.45	Wednesday, February 6, 2013	1,239.25	31.50	1,145.30	2,416.05
Friday, February 7, 2014	641.70	132.95	1,870.35	2,645.00	Thursday, February 7, 2013	986.90	213.40	1,324.25	2,524.55
Saturday, February 8, 2014	2,082.00	474.45	2,791.30	5,347.75	Friday, February 8, 2013	1,057.55	75.85	1,432.95	2,566.35
Sunday, February 9, 2014	1,009.45	121.40	2,209.50	3,340.35	Saturday, February 9, 2013	1,433.50	154.20	1,595.80	3,183.50
Monday, February 10, 2014	1,239.05	141.65	1,890.37	3,271.07	Sunday, February 10, 2013	400.95	31.25	628.15	1,060.35
Tuesday, February 11, 2014	1,443.90	50.50	1,908.70	3,403.10	Monday, February 11, 2013	621.80	45.25	940.35	1,607.40
Wednesday, February 12, 2014	1,547.05	43.50	1,761.40	3,351.95	Tuesday, February 12, 2013	1,395.40	46.75	1,204.65	2,646.80
Thursday, February 13, 2014	160.10	20.25	638.80	819.15	Wednesday, February 13, 2013	1,368.15	74.65	1,362.65	2,805.45
Friday, February 14, 2014	951.15	155.85	1,337.35	2,444.35	Thursday, February 14, 2013	247.00	54.90	531.60	833.50
Saturday, February 15, 2014	1,833.95	249.10	2,698.58	4,781.63	Friday, February 15, 2013	70.35	5.75	164.45	240.55
Sunday, February 16, 2014	2,402.80	742.90	2,526.43	5,672.13	Saturday, February 16, 2013	469.85	104.00	868.85	1,442.70
Monday, February 17, 2014	2,143.05	397.60	2,434.45	4,975.10	Sunday, February 17, 2013	230.65	103.00	434.65	768.30
Tuesday, February 18, 2014	1,621.50	141.45	2,092.45	3,855.40	Monday, February 18, 2013	240.40	43.10	449.80	733.30
Wednesday, February 19, 2014	1,554.70	105.90	2,063.65	3,724.25	Tuesday, February 19, 2013	669.10	69.70	1,019.65	1,758.45
Thursday, February 20, 2014	1,445.35	71.00	2,062.35	3,578.70	Wednesday, February 20, 2013	1,343.65	73.30	1,361.20	2,778.15
Friday, February 21, 2014	864.20	144.90	1,993.20	3,002.30	Thursday, February 21, 2013	1,448.40	62.70	1,358.05	2,869.15
Saturday, February 22, 2014	2,472.35	364.45	2,921.85	5,758.65	Friday, February 22, 2013	1,093.05	130.45	1,409.40	2,632.90
Sunday, February 23, 2014	3,138.85	795.90	3,132.50	7,067.25	Saturday, February 23, 2013	1,853.80	143.25	1,733.85	3,730.90
Monday, February 24, 2014	1,389.10	120.15	2,020.60	3,529.85	Sunday, February 24, 2013	2,517.05	314.10	1,984.80	4,815.95
Tuesday, February 25, 2014	1,471.85	78.90	2,079.75	3,630.50	Monday, February 25, 2013	843.85	70.00	1,299.70	2,213.55
Wednesday, February 26, 2014	1,619.95	133.80	2,236.15	3,989.90	Tuesday, February 26, 2013	778.95	17.25	1,100.40	1,896.60
Thursday, February 27, 2014	234.00	47.55	974.45	1,256.00	Wednesday, February 27, 2013	186.80	10.75	467.40	664.95
Friday, February 28, 2014	348.25	89.15	1,183.45	1,620.85	Thursday, February 28, 2013	218.30	11.65	477.52	707.47
Total	\$ 40,223.80	\$ 5,061.75	\$ 57,175.70	\$ 102,461.25	Total	\$24,670.55	\$ 2,567.20	\$ 29,621.02	\$ 56,858.77
Aggregate Hours Spent	16,089.52	2,024.70	22,870.28	40,984.50	Aggregate Hours Spent	19,736.44	2,053.76	23,696.82	22,743.51

Table 4. Parking revenues of February 2014 and February 2013, and aggregate hours spent.

	2013	2014	% of Change
Total	\$ 56,858.77	\$ 102,461.25	45%
Aggregate Hours Spent	22,743.51	40,984.50	

Table 5. Comparison of revenue and hours spent.

Cost Comparison

An efficient LED lighting system reduces the cost of use by \$1,750 or 47% per year compared to the previously existing lighting system of high pressure sodium.

Methodology

The average electric rate in Florida for electricity is 9.39 cents per kilowatt-hour. With this rate, the cost per year is a product of the rate x hours of non-daylight per year.

The chart below shows data on light fixtures and related cost calculations.

Description	Type	Qty	Bulb Wattage	Total Wattage	kWh	Cost Per Year
Pre-Development						
Pole Light	High Pressure Sodium	60	150	9000	39,420	\$3,701.54
Post-Development						
Pole Light	LED	45	60	2700	20,778.72	\$1,951.12
Bollard Light	LED	40	45	1800		
Step Accent Light	LED	10	3	30		
Bump Path Light	LED	28	5	140		
Internal Sign Light	LED	10	2	20		
Internal Sign Light	LED	4	13.5	54		

Limitations of methodology

- Hours of daylights per year were averaged which results in an approximation.