



# LANDSCAPE PERFORMANCE SERIES

## Port of Los Angeles Wilmington Waterfront Park – Wilmington, CA Methodology for Landscape Performance Benefits

### Environmental

- ***Reduces potential annual landscape water use 40% by using drought tolerant plantings, artificial turf, and drip irrigation, representing approximately \$25,000 in annual savings.***

Calculated estimated water needs by using planting plans and WUCOLS methodology, and made comparison to if all landscaped areas had been planted with high water use plants. Used the estimate provided by phone interview (August 3, 2011) with the Los Angeles DWP Department of Water Conservation that artificial turf saves 80% of potential water-use (some water is required to rinse and cool turf). Cost savings calculated using Los Angeles DWP commercial water rate of \$3.54 per billable unit as of July 2011.

#### Reference:

University of California Cooperative Extension, California Department of Water Resources. 2000. *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California: the Landscape Coefficient Method and WUCOLS III*. Department of Water Resources, Sacramento, CA.

<http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf>

- ***Removes nitrogen oxides from 2.45 million gallons per day of air that passes across a test panel coated with titanium dioxide. Air pollutant removal will increase as more surfaces throughout the park are coated with TiO<sub>2</sub>.***

1 m<sup>2</sup> surface coated with catalyst TiO<sub>2</sub> is capable of removing 200 m<sup>3</sup> NO<sub>x</sub> daily.

$[(500 \text{ ft}^2 \text{ TiO}_2 \text{ panel} \times 0.09290304 \text{ ft}^2/\text{m}^2) \times (200 \text{ m}^3 \text{ NO}_x/1 \text{ m}^2) \times (264.172052 \text{ US gallons}/\text{m}^3)] \approx 2,454,000 \text{ gallons of air cleaned daily}$

#### Reference:

Berdahl, P., and H. Akbari. 2008. *Evaluation of Titanium Dioxide as a Photocatalyst for Removing Air Pollutants*. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-112.

- ***Sequesters 17,500 lbs of carbon and reduces stormwater runoff by 90,300 gallons annually through tree plantings alone.***

Estimates made using the planting plans (species, quantity, and box size) and the National Tree Calculator: <http://www.treebenefits.com/calculator/index.cfm>  
See previous benefit for further explanation.

### Social

- **Reduces noise levels for C Street residents by approximately 10 decibels, which cuts the experienced sound level in half and improves outdoor environment conditions.**

Estimated 10 dB noise reduction was made by Mark Schaffer, acoustical engineer of Schaffer Acoustics Inc during phone interview (July 29, 2011). This is a conservative estimate and does not include noise reduction due to the park altering the street grid, which is expected to decrease truck traffic cutting through the neighborhood. Ambient noise level of C Street prior to construction was measured at 63-67 dBA  $L_{eg(h)}$ , and will be measured again by Port of LA once all area construction is complete. EPA recommends outdoor activity interference and annoyance is minimized for most of the population when outdoor noise is  $L_{dn} \leq 55$  dB.

References:

Environmental Management Division of the Los Angeles Harbor Department & the U.S. Army Corps of Engineers. 2007. *Berths 136-147 [TraPac] Container Terminal Project: Final Environmental Impact Statement/Final Environmental Impact Report (FEIS/FEIR)*. 3G: Chapter 3.9 Noise. Pg. 3.9-4.

[http://www.portoflosangeles.org/EIR/TraPac/FEIR/feir\\_trapac.asp](http://www.portoflosangeles.org/EIR/TraPac/FEIR/feir_trapac.asp)

United States Environmental Protection Agency. 1978. *Protective Noise Levels: Condensed Version of EPA Levels Document*. Office of Noise Abatement & Control, Washington, D.C. EPA 550/9-79-100

Available at: <http://www.epa.gov/nscep/index.html>

## **Economic**

- **Generates \$27,000 in benefits from 653 newly planted trees -- approximately \$22,400 in additional property value and \$4,600 in environmental benefits.**

Estimates made using the planting plans (species, quantity, and box size) and the National Tree Calculator: <http://www.treebenefits.com/calculator/index.cfm>

Example of calculation entered into calculator

Zip code used for calculation: 90744

Tree Species: London plane tree

Average DBH: 2.5"

Land use type: Park or other vacant land

Output from calculator for one London plane tree in this location

Stormwater (gallons of runoff reduced): 87 gallons = \$0.48

Property Value added: \$71.88

Leaf Surface Area: 144 square feet

Energy saved (kilowatt): 18 kwatt = \$3.78

Air Quality: \$0.52

CO<sub>2</sub> sequestered: 28 lbs = \$0.09

**Overall benefit: \$77.00**

These benefits were then multiplied by how many individuals were in each species type and size category. This was done across 12 species/size categories, accounting for all 653 trees. Values were summed to give total tree benefits (stormwater, energy savings, air quality, and carbon were grouped as environmental benefits). Conservative estimate of average diameter as related to box size at planting made for trees based on field observation and following references:

Lesser, L.M. 1996. Street tree diversity and DBH in Southern California. *Journal of Arboriculture* 22(4): July.

Best Management Practices for Successful Urban Tree Plantings (caliper relationship to box size): [http://www.ag.auburn.edu/hort/landscape/hurricane\\_BMPs2.html](http://www.ag.auburn.edu/hort/landscape/hurricane_BMPs2.html)

- **Will represent an additional \$7,600 in energy savings and CO2 reduction annually by using recycled water for landscape once consistent supply is available.**

All landscape irrigation has been piped to use recycled water. A reliable recycled water supply is anticipated to become available for the park in 18 – 24 months (between February-August 2013), as soon as the City of Los Angeles Department of Water and Power is able to resize supply pumps to service landscape needs (Chris Brown, Port of LA, August 9, 2011). A conservative estimate made by the California Sustainability Alliance, is that every gallon of recycled water represents a savings of \$270 in energy and CO<sub>2</sub> reduction.

28.23 acres-feet of water X \$270 per acre-feet ≈ \$7,600 in energy savings and CO<sub>2</sub> reduction

Reference:

California Sustainability Alliance. 2008. *The Role of Recycled Water in Energy Efficiency and Greenhouse Gas Reduction*. Pg. 16.

[http://www.fypower.org/pdf/CSA\\_RecycledH20.pdf](http://www.fypower.org/pdf/CSA_RecycledH20.pdf)

- **Saved \$97,500 in hauling costs by reusing approximately 11,700 cubic yards of crushed cement and asphalt waste as paving base throughout the park.**

Amount of reused material reported by Chris Brown, Port of Los Angeles, Engineering (June 30, 2011). Hauling costs estimated during phone interview with Direct Disposal, a local hauling company (July 29, 2011).

$(11,700 \text{ yds}^3 \times 1 \text{ ton per yds}^3) / 18 \text{ tons per truck load} \approx 650 \text{ loads} \times \$150 \text{ per load} \approx \$97,500$  for hauling of material

- **Created 2,210 one-year full-time equivalent jobs in the Southern California region during construction, and least 5 full-time permanent maintenance positions at the park.**

Reported by Chris Brown, Port of Los Angeles, Engineering (July 14, 2011).