

22 BENEFITS OF URBAN STREET TREES

By Dan Burden, Partner and Senior Urban Designer - Glatting Jackson Kercher and Anglin
Co-Founder Walkable Communities, Forestry graduate, University of Montana - November, 2008

U.S. Forest Service facts and figures and new traffic safety studies detail many urban street tree benefits. Once seen as highly problematic for many reasons, street trees are proving to be a great value to people living, working, shopping, socializing, walking and motoring in, around and through urban places.

For a planting cost of \$250-600 (includes first 3 years of maintenance) a single street tree returns over \$90,000 of direct benefits (not including aesthetic, social and natural) in the lifetime of the tree. Street trees (generally planted from 4 feet to 8 feet from curbs) provide many benefits to those streets they occupy. These trees provide so many benefits that they should always be considered as an urban area default street making feature. With new attentions being paid to global warming, the need for energy independence, and more urban living more is becoming known about the many negative environmental impacts of treeless urban streets. We are well on the way to recognizing the need for urban street trees to be the default design, rather than a luxury item to be tolerated by traffic engineering and budget conscious city administrators.

The many identified problems of street trees are overcome with care by designers. Generally street trees are placed each 15-30 feet. These trees are carefully positioned to allow adequate sight triangles at intersections and driveways, to not block illumination of the street from overhead lamps, and not impact lines above or below ground. Street trees of various varieties can be used in all climates, including semi-arid and even arid conditions.

The science of street tree placement and maintenance is well known and observed in a growing number of communities (i.e. Chicago, Illinois; Sacramento, Davis, California; Eugene, Oregon; Seattle, Redmond, Olympia and Issaquah, Washington; Charlotte, N.C.). Although care and

maintenance of trees in urban places is a costly task, the value in returned benefits is so great that a sustainable community cannot be imagined without these important green features.

Properly placed and spaced urban street trees provide these benefits: Increased motorized traffic and pedestrian safety (contrary to popular myths). See below article for details on mode safety enhancements. See especially the compilation of safety benefits detailed in *Safe Streets, Livable Streets*, by Eric Dumbaugh, Journal of the American Planning Association, Vol. 71, No. 3, Summer 2005. One such indication of increased safety with urban street trees is quoted from this document:

"Indeed, there is a growing body of evidence suggesting that the inclusion of trees and other streetscape features in the roadside environment may actually reduce crashes and injuries on urban roadways. Naderi (2003) examined the safety impacts of aesthetic streetscape enhancements placed along the roadside and medians of five arterial roadways in downtown Toronto. Using a quasi-experimental design, the author found that the inclusion of features such as trees and concrete planters along the roadside resulted in statistically significant reductions in the number of mid-block crashes along all five roadways, with the number of crashes decreasing from between 5 and 20% as a result of the streetscape improvements. While the cause for these reductions is not clear, the author suggests that the presence of a well-defined roadside edge may be leading drivers to exercise greater caution."

1 Reduced and more appropriate urban traffic speeds. Urban street trees create vertical walls framing streets, and a defined edge, helping motorists guide their movement and assess their speed (leading to overall speed reductions). Street safety comparisons show a reduction of run-off-

the-road crashes and overall crash severity when street tree sections are compared with equivalent treeless streets. Texas A and M conducted simulation research which found people slow down while driving through a treed scape. These observations are also noted in the real world when following motorists along first a treed portion of a street, and then a non-treed portion. Speed differentials of 3 mph to 15 mph are noted.

- 2 Create safer walking environments,** by forming and framing visual walls and providing distinct edges to sidewalks so that motorists better distinguish between their environment and one shared with people. If a motorist were to significantly err in their urban driving task, street trees can deflect or fully stop a motorist from taking another human life.
- 3 Trees call for planting strips,** which further separate motorists from pedestrians, buildings and other urban fabric.
- 4 Increased security.** Trees create more pleasant walking environments, bringing about increased walking, talking, pride, care of place, association and therefore actual ownership and surveillance of homes, blocks, neighborhoods plazas, businesses and other civic spaces.
- 5 Improved business.** Businesses on treescaped streets show 20% higher income streams, which is often the essential competitive edge needed for main street store success, versus competition from plaza discount store prices.
- 6 Less drainage infrastructure.** Trees absorb the first 30% of most precipitation through their leaf system, allowing evaporation back into the atmosphere. This moisture never hits the ground. Another percentage (up to 30%) of precipitation is absorbed back into the ground and taken in and held onto by the root structure, then absorbed and then transpired back to the air. Some of this water also naturally percolates



into the ground water and aquifer. Storm water runoff and flooding potential to urban properties is therefore reduced.

7 Rain, sun, heat and skin protection.

For light or moderate rains, pedestrians find less need for rain protection. In cities with good tree coverage there is less need for chemical sun blocking agents. Temperature differentials of 5-15 degrees are felt when walking under tree canopied streets.

8 Reduced harm from tailpipe emissions. Automobile and truck exhaust is a major public health concern and contains significant pollutants, including carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), and particulate matter (PM). Tailpipe emissions are adding to asthma, ozone and other health impacts. Impacts are reduced significantly from proximity to trees.

9 Gas transformation efficiency. Trees in street proximity absorb 9 times more pollutants than more distant trees, converting harmful gasses back into oxygen and other useful and natural gasses.

10 Lower urban air temperatures. Asphalt and concrete streets and parking lots are known to increase urban temperatures 3-7 degrees. These temperature increases significantly impact energy costs to homeowners and consumers. A properly shaded neighborhood, mostly from urban street trees, can reduce energy bills for a household from 15-35%.

11 Lower Ozone. Increases in urban street temperatures that hover directly above asphalt where tailpipe emissions occur dramatically increase creation of harmful ozone and other gasses into more noxious substances impacting health of people, animals and surrounding agricultural lands.

12 Convert streets, parking and walls into more aesthetically pleasing environments. There are few streetmaking elements that do as much to soften wide, grey visual wastelands created by wide

streets, parking lots and massive, but sometimes necessary blank walls than trees.

13 Soften and screen necessary street features such as utility poles, light poles and other needed street furniture. Trees are highly effective at screening those other vertical features to roadways that are needed for many safety and functional reasons.

14 Reduced blood pressure, improved overall emotional and psychological health. People are impacted by ugly or attractive environments where they spend time. Kathleen Wolf, Social Science Ph.D. University of Washington, gave a presentation that said "the risk of treed streets was questionable compared to other types of accidents along with the increased benefit of trees on human behavior, health, pavement longevity, etc." She noted that trees have a calming and healing effect on ADHD adults and teens.

15 Time in travel perception. Other research and observations confirm that motorists perceive the time it takes to get through treed versus non-treed environments has a significant differential. A treeless environment trip is perceived to be longer than one that is treed (Walter Kulash, P.E.; speech circa 1994, Glattig Jackson).

16 Reduced road rage. Although this may at first seem a stretch, there is strong, compelling research that motorist road rage is less in green urban versus stark suburban areas. Trees and aesthetics, which are known to reduce blood pressure, may handle some of this calming effect.

17 Improved operations potential. When properly positioned and maintained, the backdrop of street trees allow those features that should be dominant to be better seen, such as vital traffic regulatory signs. The absence of a well developed Green-scape allows the sickly grey mass of strip to dominate the visual world. At the same time, poorly placed signs, signals, or poorly maintained trees reduces this positive gain, and thus proper placement and maintenance must be rigidly adhered to.

18 Added value to adjacent homes, businesses and tax base. Realtor-based estimates of street tree versus non-street tree comparable streets relate a \$15-25,000 increase in home or business value. This often adds to the base tax base and operations budgets of a city allowing for added street maintenance. Future economic analysis may determine that this is a break-even for city maintenance budgets.

19 Provides a lawn for a splash and spray zone, storage of snow, driveway elevation transition and more. Tree lawns are an essential part of the operational side of a street.

20 Filtering and screening agent. Softens and screens utility poles, light poles, on-street and off-street parking and other features creating visual pollution to the street.

21 Longer pavement life. Studies conducted in a variety of California environments show that the shade of urban street trees can add from 40-60% more life to costly asphalt. This factor is based on reduced daily heating and cooling (expansion/contraction) of asphalt. As peak oil pricing increases roadway overlays, this will become a significant cost reduction to maintaining a more affordable roadway system.

22 Connection to nature and the human senses. Urban street trees provide a canopy, root structure and setting for important insect and bacterial life below the surface; at grade for pets and romantic people to pause for what pets and romantic people pause for; they act as essential lofty environments for song birds, seeds, nuts, squirrels and other urban life. Indeed, street trees so well establish natural and comfortable urban life it is unlikely we will ever see any advertisement for any marketed urban product, including cars, to be featured without street trees making the ultimate dominant, bold visual statement about place.

