

City of Alexandria, Virginia

MEMORANDUM

DATE: JUNE 22, 2007

TO: THE HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

FROM: JAMES K. HARTMANN, CITY MANAGER *J*

SUBJECT: CONSIDERATION OF STAFF REPORT ON THE INSTALLATION OF GRATES AND ALTERNATIVE TREATMENTS OF TREE WELLS ALONG KING STREET.

ISSUE: Tree grates and alternative treatments of tree wells along King Street.

RECOMMENDATION: That Council receive this report. If Council wishes to pursue alternative street tree well treatments, authorize an expanded study of King Street for the purpose improving pedestrian access and the quality, longevity and appearance of trees located in the right-of-way.

BACKGROUND: At the Council public hearing on June 16, 2007, Council asked that staff report back on possible alternative treatments to improve and expand tree wells along King Street. Several King Street tree well conditions would influence possible treatments:

Pedestrian Access: The width of the King Street right-of-way between the river and the King Street Metrorail station varies from 66 to 86 feet. Sidewalks along the street vary in width from 13 feet in the 600 and 700 blocks to 21 feet wide in the 400 and 500 blocks, measured from the back of the curb to the right-of-way line, which is usually the face of a building. The majority of the sidewalks along the corridor are 14.5 feet wide. These include the unit block, 100 and 200 blocks, and the 800 block to the Metrorail station. The sidewalk in the 300 block is approximately 16 feet wide. The usable width of the sidewalks is often reduced by stairways, stoops, cellar doors and window wells that encroach into the right-of-way. Public improvements and appurtenances such as light poles, benches, trash receptacles and tree wells also limit the usable width of the sidewalk.

Tree Wells: There are 206 tree wells along King Street, and like the sidewalk areas they also vary in dimension. The tree wells originally installed along the unit block through the 900 block of King Street appear to have been 3 feet wide and 5 feet long. While most of the tree wells are still this dimension, many have been expanded to accommodate the growth of the trees and redevelopment. Tree wells in the 400 and 500 blocks are 5 feet wide by 8 feet long. The remaining blocks have tree wells that range from 4 feet by 5 feet to 5 feet by 8 feet, again apparently driven by redevelopment.

Trees: The trees along King Street are almost exclusively from the red oak family; Scarlet, Northern red and willow oak. The trees vary in age, some having been recently planted and many planted over

30 years ago as part of the urban renewal project conducted in the 1970's. Despite the limited area of the tree wells, many of the trees along lower portion of King Street (unit block to the 1000 block) have grown to over 40 feet tall and more than 20 inches in diameter measured at 4.5 feet above the grade level. Trees planted along the upper end of King Street appear to be younger, being smaller in stature and girth. In many cases the mature trees have out grown the tree wells in which they were planted. The root flare and surface roots have completely filled in the tree well, and in some circumstances have overgrown the curb and disrupted the sidewalk. Where possible, some of the tree wells have been expanded to accommodate the tree growth; however these efforts are hampered by the limited width of the existing sidewalks. Many of the more mature trees are in a state of decline due to the limited growing space and the environmental stresses to which they are subject.

Tree Grates: Tree grates are a decorative method employed to expand the available exposed surface area of a tree well or planting pit, protect the root systems of the trees, and promote public safety by eliminating the hazard of sudden changes in pavement grades at the edges of tree wells. Tree grates are steel or cast iron and are set into frames with a concrete base installed along the edges of the tree well. Typically, tree grates are installed before trees are installed. Retrofitting tree wells with tree grates can only be successful if the existing tree wells meet standard dimensions, and if existing trees are an appropriate size and are positioned correctly to accommodate the tree grates.

Tree grates are available in a variety of sizes, shapes, patterns and grate openings. They may be as small as 30 inches square or as large as five by seven feet in dimension. Round tree grates as well as hexagonal and octagonal shapes are also available. For tree grates located near pedestrian pathways, or in any area that is potentially subject to foot traffic, manufacturers recommend the use of narrow opening tree grate styles having openings no greater than 3/8". Manufacturers do not recommend that pedestrian traffic be directed over the tree grate installations. The grates provide a cut out area for the tree 12" to 18" in diameter. Tree guards are available to protect young trees and direct pedestrian traffic away from the tree cutout. As the trees grow, the tree cutouts can be expanded; however, generally the tree guards are not available as the tree wells are enlarged.

DISCUSSION: The increased demand for sidewalk seating for restaurants along King Street has generated interest in pursuing reasonable methods of expanding available pedestrian access and to provide more space for outdoor seating. It has been suggested that one means of accomplishing this is through the installation of tree grates over existing tree wells; however existing conditions will severely limit their application along King Street. Specifically, these limitations are:

- the grade at which the existing trees are planted;
- the size of the existing trees;
- the dimension of the existing tree wells and the location of existing trees within them; and
- the existing grades along the sidewalks adjacent to the tree wells.

Installation of tree grates requires that trees be planted at a grade level below the finished sidewalk grade to accommodate the installation of the grate frame and the thickness of the grate itself. Existing trees along King Street were planted at a grade level with the sidewalk to prevent an uneven surface adjacent to the sidewalk. The location of existing root flares and roots at grade level make it impossible to excavate the area required for the tree grate installation. In many cases, the caliper of existing trees at ground level is larger than the cutouts in the tree grates. The tree root flares and surface roots substantially fill the tree well, and prevent the installation of the tree grate. If tree wells

are expanded to accommodate the growth of trees, or the installation of tree grates, the trees will no longer be located in the center of the tree well, which is required for proper installation.

In addition to the limitations that existing trees present to their installation, existing grades and contours of the sidewalk further restrict the application of tree grates. Tree grates are not flexible, and therefore must be placed in frames that are level and plum. If the contour of the sidewalk is warped or curved, the tree grate will not sit flat in its frame. Frames that are buckled during installation in uneven pavement, or as a result of tree roots will cause the tree grates to sit askew, creating an uneven and potentially unsafe surface.

As a result of these limitations, the installation of tree grates should be limited to empty tree wells that can be adjusted for a proper fit, and the proper installation of a tree. Efforts to retrofit tree wells with existing trees would require that the trees be removed.

Tree grates will not significantly add to the width of the pedestrian walkway. If an existing 3 by 5 foot tree well were fitted with a 3 by 5 foot tree grate that has a 16 inch cutout for a tree in the center of it, the additional space gained next to the sidewalk would be 10 inches. It is likely that significant portion of this space may be obstructed by the tree itself. As the tree grows, the space available when the tree is young will be reclaimed by the tree and lost to the pedestrian pathway. Furthermore, as the manufacturers suggest, tree grates should not be promoted as part of the pedestrian pathway.

The cost of a 3 foot by 5 foot tree grate is estimated to be \$2,500 to \$3,000; \$1,250 for the tree grate and frame, and \$1,250 and \$1,750 depending upon the alterations to the sidewalk that would be required. Because of the cost and limited benefits that tree grates would provide, staff does not recommend their installation as a short term solution.

If the available space for pedestrian traffic is to be increased with accommodations made for outside dining and trees, other alternatives, broader in scope must be considered. Alternative right-of-way profiles providing wider walkways and tree wells that have larger volumes of soil for trees to grow in, should be a part of these plans. Alternatives that should be considered include expanding sections of the sidewalk area into the parking lanes of King Street to create planting islands for the trees. These planting islands would relocate tree wells from the existing pedestrian walkway; however, other obstructions such as light poles and fire hydrants would remain. Installation of the tree islands would reduce available parking by three or four spaces along each block face, which is a concern. In addition, storm drainage as well as street maintenance including snow removal would have to be carefully considered in the development of these plans.

Another alternative that could be considered is the elimination of parking on one side of King Street, and expanding the width of the sidewalk on both side of the street by approximately 4 to 5 feet. This action would require extensive redevelopment of the right-of-way, including storm drainage, curb and gutter removal and replacement, brick pavement installation, and the relocation of street lights, signs and other public improvements. It is anticipated that 14 parking spaces would be lost as a consequence of this alternative street profile. It would also be difficult to determine which side of the street would be expanded if there are a number of restaurants with outdoor dining on both sides of the street.

New planting technologies, such as tree vaults, continuous trenches, and structural soils should be considered in the design and development of any alternative street profile considered. These planting methods and structures create an improved rooting environment for the trees by increasing the volume of soil in which they grow, and reducing the conflicts between tree roots and surrounding pavement and public improvements. Irrigation, proper drainage, and the provision for electrical connections for the installation of holiday lights or other lighting initiatives will also be included in the design and implementation of these new tree planting profiles. The cost of incorporating these methods however must be carefully considered. Rough cost estimates for their installation range from \$3,000 to \$8,000 per tree depending on the circumstance in which they are prescribed. The Departments of RPCA and T&ES are now preparing to install one of these alternative planting methods at the future maintenance facility. Additional information on costs and effectiveness will become available as this project is implemented.

The development of alternative street profiles will take careful consideration by staff and the public. Therefore, staff recommends that alternatives be prepared during the summer and presented to City Council and the public in September. Such alternative street profiles would likely entail a significant capital cost whose range would be based upon the alternative designs and how much rebuilding of the sidewalk, curb, gutter, tree wells, and street it entailed. Such costs would add to the already large list of capital projects competing for limited funding.

FISCAL IMPACT: This will be determined over the summer.

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