



August 4, 2021

Mr. Jeff Chown
Alexandria, VA

Re: Tree survivability reviews for Bricklemaier and Goodman Parks.

Dear Jeff:

Thank you for the opportunity to review the tree survivability scoring you performed using the Tree Matrix software (www.treematrix.com). As you know, I created this website and the underlying algorithm to better assess the likelihood of tree survival following land disturbance.

For too long, the arboricultural industry has relied on determining tree survival based solely on root zone loss percentages. The conventional logic has been that if less than 25% of the critical root zone (CRZ) is lost, then the tree will survive. This logic is misleading and unscientific. The result of using this one parameter has been the slow decline and death of many trees following construction activities. My experience, and frustration, with tree preservation over a 30 year career has lead me to study this area of arboriculture, and to do something to remove the uncertainty.

The formula utilizes five parameters that are equally important to tree preservation including tree tolerance to root loss, percent loss of CRZ, the season of impact, tree condition and the number of 'sides' around a tree that are impacted. The result is a highly accurate depiction of tree survival for at least the 3-5-year period following root loss. Four of the five parameters can be altered to increase the survivability score.

Tree Matrix scoring:

You provided ten images of the analyses of the impacted trees with the Bricklemaier and Goodman parks. My review indicates that you have accurately depicted the limits of disturbance (LOD) for each of these sections, and that you have used the software as designed. Therefore, I conclude that the scores presented are accurate based on the underlying formulas.

Based on my 30 years of experience in this field, the assumption is that trees that receive a score of 70%, or greater, have a high likelihood of survival past the 3-5-year recovery period. In these cases, the program color codes the tree icons as green. If the survival score is 60-69%, then the icon is colored in yellow. Yellow shading of the tree icon indicates that it has a moderate to low likelihood of survival. In these instances, a tree would require pre- and post-construction intervention in the form of chemical treatments and supplemental irrigation.

Scores of 59%, and lower, indicate that the likelihood of tree survival is low. The icons in these cases is highlighted in red. In these cases, it is not worth the effort to preserve the tree. In fact, this is what Tree Matrix is designed to do – reduced the uncertainty in tree preservation. If the user cannot alter the plan in a way that increases the survivability scores to be 60%, or higher, then there is no need to

attempt to save that tree.

TREE IMPACTS:

Trees within the limits of disturbance:

Trees shown to be within the LOD on your plans receive a score of zero. This is because the anticipated impacts of root loss from either soil compaction, or root severing is untenable. In fact, in my own tree preservation work I have not seen a case where trees within an LOD are earmarked for preservation. The impacts of earth work and the movement on large machinery results in far too much root disturbance for most, if not all, trees to survive.

Impacts to supporting roots along the edges of the LOD:

The software plots the anticipated root zones including the zone of supporting roots close to the tree termed the 'structural root zone.' Other terms for this zone include root plate or zone of rapid taper. You may find these terms in reference materials. This area is a darker shade of green around the tree. The Tree Matrix software calculates this zone as being a radial distance of 6" for each inch of trunk diameter. Most reference material, and even state and municipal regulations, identify this area as to be fully protected. Cutting roots in the SRZ can lead to a loss of structural integrity to where the tree can fall over, and an almost certain decline in tree vigor. It is also well understood in our industry that wounds to these roots are avenues for the invasion of wood decay pathogens.

The structural root pattern of a tree may also include 'sinker' roots that grow deeper into the forest soils to provide vertical support. It is difficult to say, however whether these roots exist here because so much depends on the tree and soil types, and wind loading. Because surrounding trees provide so much protection from prevailing winds, trees in a forest setting often don't produce these deeper supporting roots. This explains why many trees fall over when the forest is cleared, and they become 'edge' trees near new areas of forest clearing. I have concerns for many of the edge trees in both parks because of this new clearing. I do believe that many of these edge trees will fail and either crash into the forest, or potentially onto surrounding property including any structures within the fall zone.

Within your studies, I see that many perimeter trees have the LOD bisecting the SRZ of small to large diameter trees. Some SRZ's are ostensibly 'protected' by systems of wood chips overlain with wooden pallets or rubberized matting systems. In other cases, the SRZ's are severed by root pruning equipment. While the impacts of cutting of roots within the SRZ are certain, the impacts from soil compaction are subtle.

Root zone protection:

I understand that your analysis of tree impacts includes an assumption that the present system of wood chips and matting will not adequately protect the underlying roots. I don't disagree with this assumption. Forest soils are very different than those found in suburban landscape situations where roots will grow much deeper, below grass and other plants, to find adequate moisture and dissolved nutrients. In the forest setting, everything the tree needs including water, oxygen and dissolved nutrients is at the surface. Therefore, the potential for adverse impacts from soil compaction are magnified in a setting like this.

As such, I am accepting of your assumptions of root loss as shown on these reports. It is unlikely that all the CRZ will be lost under these matting systems. However, in cases where the survival scores are low to very low (<50%), I concur that these trees are at high risk for death, or at least an irreversible state of decline, within the next 3-5 years.

This concludes my analysis of the survivability scoring for these two riparian systems. Please let me know if you have any other questions.

Sincerely,



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