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Subject: 2832 and 2838 Shakespeare St - Exploratory excavation for proposed municipal sidewalk adjacent to municipal Red Horse Chestnut trees

The purpose of this letter is to summarize findings from our exploratory excavations around the municipal Red Horse Chestnut (*Aesculus x carnea*) trees on the south side of Morley Street as requested by City of Victoria Parks' staff. A Tree Preservation Plan (dated November 2, 2018) was completed by our company as part of the project. A municipal sidewalk is proposed 1.2m south from the centre of the trees along the Morley Street flank of 2838 Shakespeare Street.

The City of Victoria engineering department and concerned parties should be aware that if a sidewalk is to be constructed and the trees are to be retained without significant health impacts, the sidewalk and its base material will have to be raised above root systems as specified in our "floating sidewalk" specifications. If these specifications (or a similar approach which avoids significant root loss) is not followed, the trees will require removal if excavation down to bearing soil is required throughout the footprint of the sidewalk.

Multiple surface roots from Red Horse Chestnut NT #4 (municipal tree ID# 23054) were observed within the footprint of the proposed sidewalk. Exposed bedrock was also observed (Photo 1), which could indicate limited soil depth and explain the prevalence of surface roots in the area. Exploratory excavations were not deemed necessary as it is clear that the sidewalk will have to be built above the existing grade. Only limited excavation by hand, air-spade or hydro-excavation can take place if increased depth for sidewalk base is required between roots.

Exploratory digging was conducted between Red Horse Chestnut NT #3 (tree ID 23055) and the existing driveway to determine how steep a sidewalk slope might be necessary to preserve significant roots while maintaining the grade of the existing driveway. The trench was 2.1m in length and 30cm in depth, beginning from the edge of the driveway to just past the trunk of the tree (Photo 3). Roots with the following diameters were observed in the trench: one 15cm, one 14cm and two 2cm roots. No other roots above 1cm were observed. Both the 15cm and 14cm roots were approximately 5cm below the turf surface. The 15cm root was 74cm west of the driveway edge and the 14cm root was 97cm west. Both were approximately 1m south of the trunk of the tree. If the two large roots are to be preserved, the depth of the sidewalk paving material and base

will have to be minimal in the area above the roots and there will likely be a slight slope from the driveway edge to where the roots are located.

Exploratory excavations were not conducted around NT #2 (tree ID 23198) as there does not appear to be a reason why the grade of the sidewalk could not be raised gradually to accommodate roots below, provided the water meter east of the tree could be raised to meet the sidewalk grade.

Exploratory excavations were not conducted adjacent to NT #1 (tree ID 23056) as it is our understanding that the sidewalk will end prior to crossing the trunk of the tree (ending at 2838 Shakespeare's west property line, 2.3m east of the tree).

City of Victoria Parks' staff has also requested that we provide optimal paving surfaces over the root systems of the trees. Concrete or asphalt sidewalks will both result in reduced permeability over their root systems (unless permeable asphalt is used), which will have a negative impact on the roots below the sidewalk. NT #4 could be impacted more than the other trees if there is limited soil volume within its CRZ. However, Red Horse Chestnut trees are known to tolerate pavement over their root systems and these trees are young enough that they will likely adapt over time to the change in hydrology. Permeable pavers would result in more water penetration than concrete or asphalt, but this is unlikely to be a feasible option. A trail made of wood chips would have the least impact of all options as it would be the most permeable, although this is not likely a feasible option as well. Wood chips would have to be maintained if soil compaction is to be avoided.



Photo #1: Multiple surface roots visible adjacent to Red Horse Chestnut NT #4. The tape measure roll is at the edge of the proposed sidewalk. Exposed bed rock was observed (bottom left side of photo) along with multiple surface roots, some of which had bark removed (likely from lawnmower damage).



Photo #2: Close up of surface roots adjacent to Red Horse Chestnut NT #4.



Photo 3: Exploratory excavation adjacent to NT #3.



Photos 4: Exploratory excavation adjacent to NT #3.



Photos #5 and 6: 15cm and 14cm roots were observed 5cm below the surface of the turf.



Photo #7: A water meter is located east of Red Horse Chestnut NT #2. If this water meter opening can be raised to meet the grade of the sidewalk, we are not aware of a reason why the sidewalk could not be raised above the root system.

Please do not hesitate to call us at 250-479-8733 should you have any questions.

Thank you,

A handwritten signature in cursive script that reads "Michael Marcucci".

Michael Marcucci
ISA Certified # ON-1943A
TRAQ – Qualified

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Disclosure Statement

Arborists are professionals who examine trees and use their training, knowledge and experience to recommend techniques and procedures that will improve the health and structure of individual trees or group of trees, or to mitigate associated risks. Trees are living organisms, whose health and structure change, and are influenced by age, continued growth, climate, weather conditions, and insect and disease pathogens. Indicators of structural weakness and disease are often hidden within the tree structure or beneath the ground. It is not possible for an arborist to identify every flaw or condition that could result in failure nor can he/she guarantee that the tree will remain healthy and free of risk. Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.