



Arboricultural Assessment & Report: Avendon Estate, Glen Waverley Cypress Windrows Management Plan

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Avendon Estate, Glen Waverley Cypress Windrows Management Plan

Executive Summary:

The Avendon Estate, Glen Waverley was originally a Country Roads Board depot site until its subdivision and sale as a residential housing development. The windrows are located around the boundary of the Avendon Estate and are sited along a narrow right-of-way adjacent to the eastern and sections of the western boundaries and within part of the road reserve for the southern boundary and a section of the western boundary.

Previous reports have been done on these trees in 2000 and 2006 with the main issues being requirements for deadwooding, minor limb removal and monitoring. There have been at least 6 trees removed in the past since the 2006 inspections.

There are currently 81 trees within the eastern windrow, 20 trees within the southern windrow and 113 trees within the western windrow. Trees are typically planted at 4.0-4.5 metre centres and this has forced very upright and non-natural form. The trees in the row have developed tree form, and branch attachments that are leading to their ongoing failure. Many trees through the rows exhibit this habit, where there is an ongoing evidence of branch failure. The other major issue is that these windrows have developed as complete stands and must be managed as such.

Key Strategic Recommendations:

- It is recommended that when the trees decline to the point where they require removal and replacement (ULE approximately 15-20 years), that this is done in manageable sections.
- A strategy for future removal of the trees and opportunities for their replacement should be prepared in consultation with the community and internal stakeholders within 12 months.
- A regular monitoring program (6 monthly and after major wind and storm events) by a qualified Arborist and any subsequent arboriculture work be implemented in the interim.

Risk Recommendations:

- There does not appear to be any sign that individual trees should be open to wind-throw or total collapse in the future, however ongoing monitoring is strongly recommended.
- The main risk issue is the ongoing limb collapse due to storm events.

Pruning Recommendations:

- Prune to remove all existing hanging and broken limbs. *This should be done within 1-2 months and inspected again within 6 months and directly after any major wind and storm events.*
- There should be no significant canopy reduction or remedial pruning to any individual tree or tree row.

Removal Recommendations:

- It is not recommended that individual tree removals are undertaken. The only proviso to this is if an individual tree becomes unsafe and poses a significant risk to persons or property.

Arboricultural Assessment & Report

Avendon Estate, Glen Waverley

Cypress Windrows Management Plan

Introduction:

The Avendon Estate, Glen Waverley was originally a Country Roads Board depot site until its subdivision and sale as a residential housing development. These windrows are listed on the City of Monash - Heritage Study (1999) and have been inspected several times as part of inspections and updates of the Tree Logic survey of trees on these heritage sites (2000 and 2006).

Objectives:

The project brief for this Tree Management Plan covers the following items:

- Undertake a basic individual assessment of these trees, including: general health, structure and useful life expectancies.
- Provide a comprehensive report outlining the condition of the trees and recommending a management solution for the future of the trees and the site.
- Prepare a list of general Arboricultural works with priorities for the trees.
- Discuss management programs including possible removal strategies and make recommendations.

Observations:

The windrows are located around the boundary of the Avendon Estate, Glen Waverley and are sited along a narrow right-of-way adjacent to the eastern and sections of the western boundaries and within part of the road reserve for the southern boundary and a section of the western boundary.

There is a section of some forty-five (45) trees located alongside an open drainage channel along a section of the western boundary and while these trees are immediately adjacent to this channel, it does not appear to have caused issues with either the structure or the health of these trees.

All three windrow sections appear to have trees planted at approximately 4.0-4.5 metre centers and this has seen all of the windrow trees grow with a very upright and non-natural form. It is this non-natural upright form that is leading to many of the issues now facing these trees.

There are currently 81 trees within the eastern windrow, 20 trees within the southern windrow and 113 trees within the western windrow.

All trees range in height from 18.0 – 20.0 metres with approximate trunk diameters of 600mm - 1000mm and many trees have been pruned back off the adjacent properties in all windrows.

In June 2000, Tree Logic were engaged by the City of Monash to undertake a survey of trees associated with heritage site throughout the City. The Avendon Cypress windrows were inspected at this time and the following information was provided regarding these trees.

“Overview:

This site consists of those Monterey Cypress situated along a significant proportion of the boundary fence line of the Estate. These trees border the eastern and western fence lines with a smaller section of the southern boundary fence line. There are approximately 240 individual trees being in two complete (no gaps or missing trees) windrows. In general the trees exhibit reasonable health with the typical upright form associated with such a planting of this species.

Recommendations:

Future work will basically involve regular monitoring and some minor deadwooding as required. The rows should be managed as complete stands and no individual tree removal should be done unless it is for a severe unmanageable hazard.”



These 2 images from 2000 show the trees prior to completion of all construction within the Avendon Estate.

The 2006 update of the heritage Sites Trees stated that there was:

“No significant change to tree health.

Overview:

This site consists of those Monterey Cypress situated along a significant proportion of the boundary fence line of the Estate. These trees border the eastern and western fence lines with a smaller section of the southern boundary fence line. There are approximately 220 individual trees being in two complete (no gaps or missing trees) windrows. In general the trees exhibit reasonable health with the typical upright form associated with such a planting of this species.

Recommendations:

Future work should include regular (12 monthly) monitoring and some minor Arboricultural works (deadwooding, limb removal, etc.) as required. The rows should be managed as complete stands and no individual tree removal should be done unless for a severe unmanageable hazard.

Threats:

Future construction of adjacent properties will need to be considered carefully so that disturbance to the tree’s root zones is kept to a minimum.”

The current inspection for these trees found that there was one recently removed tree along the eastern boundary windrow and it would appear that there were at least 6 trees removed in the past since the 2000 and 2006 inspections.

Discussion:

The structure of all the Avendon Estate Cypress' has been rated as fair-poor or poor due to the growth characteristics of these tree growing in close proximity to each other and forming a very upright form with acute angled leader, limb and branch attachments. There is now nothing arboriculturally that can be done to improve this structure and it is this structural issue that is causing the majority of the issue with the windrows.

Monterey Cypress (*Cupressus macrocarpa*) is a species that originates on low cliffs at Cypress Point and Point Lobos, near Monterey, California. It's natural habitat develops a tree form a lot smaller than when grown as a specimen or windrow tree in Australia. On its native ocean cliffs its size is stunted, as in that of a windswept tree. Branches developed in its natural habitat are 45° from horizontal. As a contrast older specimen trees are hugely spreading, flat topped, with long, often level, horizontal branches.

The trees are considered quick growers, particularly while young and fast growing trees are usually weak wooded. The trees in this case are mature specimens and have generally reached the end of their dynamic growth period. Older trees are less able to adapt to unfavourable conditions and are more subject to decay.

When grown as a specimen or windrow tree, this species attains a large size. While young, the tree has a conical shape, generally with a central leader. As this species attains larger size the central leader loses its epinasty (control exerted by the leader over the lower lateral branches), this leads to the development of a number of large heavily branched leaders. Often these leaders are attached at one area on the trunk and are many-boled.

Codominant stems are frequent causes of tree failure. Several relatively large branches arising near the same level on the trunk are even more vulnerable to failure. Also the weight and leverage of such limbs are great in relation to the strength of their attachments. This type of structure is in evidence throughout these windrows. Trees develop shape in a dynamic process which can minimise all avoidable external loading. Stresses are highest where bending (wind loads) and growth stresses are involved. Tree failure starts as internal stresses take on critical values as a result of external loads.

As stated above, Monterey Cypress is grown as a specimen and windrow tree in Australia. The trees develop multiple leaders with acute angled branch attachments and it is this type of growth that creates internal stresses that are exacerbated by external loads, which can lead to critical values being reached and the result is branch shear. This is happening in many sections of the trees in question with many limb-shed sites in evidence.

The trees in the row have developed tree form, and branch attachments that are leading to their ongoing failure. Many trees through the rows exhibit this habit, where there is a great deal of evidence of branch failure.

The other major factor for consideration here is the fact that these windrows have developed as a complete stand and must be managed as such. Therefore it is not recommended that any single trees be removed or severely pruned along this row as this has the potential to have significant detrimental effects on the adjacent trees.

The problems for any remaining trees after individual tree removal is that they are likely to be opened up to differing and greater wind stresses and this could cause the potential failure of branches, major parts of the canopy and possibly complete trees.

Hitchmough (1994) argues that aesthetic returns generally increase as trees age until a plateau is reached. After this point, returns fall away as trees enter over-maturity or decline stages. As trees age past this point they require increased arboricultural input to maintain them in a safe and aesthetic condition.

With this in mind it is vital to prepare a tree management strategy which focuses on controlled management rather than just action on perceived 'threats'. However, this becomes increasingly difficult given windrows with over 200 individual trees to manage.

Root Damage Issues:

It is not only possible but likely that the Monterey Cypress would have root systems extending into the properties along Kinnoull Grove. However, tree roots interact with properties and building across urban Melbourne and only in isolated cases does significant damage occur.

The fact that tree roots are likely to be present from the cypresses should not be cause for undue alarm. However, it is possible that there could be individual sites where damage occurs. These should be assessed on an individual basis and there should not be assumptions made regarding the whole windrow in terms of damage potential.

In terms of options for mitigation should a claim for damage be made, the first action should be a complete assessment of the claim and the possible damage. With many claims for tree root related damage, there are often other mitigating or contributing factors (apart from tree roots) that are involved and all of the issues with individual site must be understood before any action regarding tree roots is carried out.

Should a claim be proven there are still several options for management from that point.

Given that the trees in question are listed on the City of Monash - Heritage Planning Policy Register and are an important landmark in the local area, it should be a clear recommendation (at this stage) that the trees need to be retained and that removal of even individual trees is not likely to be approved.

This leaves root control measures as the only options for individual problem sites. This can be done in several ways; from the pruning of roots at individual properties to the installation of tree root barriers.

Any pruning of roots is likely to occur on Council property between the trees and the boundary fence. Any discussion regarding the pruning of roots in such areas close to the trunk of large trees should take into consideration of the critical root zone and its implications for tree stability.

However, as stated above, individual claims of tree root damage will need to be thoroughly assessed and solutions should not just be knee-jerk reactions based on fear of liability but be founded on complete knowledge of all the site information.

- Tree removal should not be considered for damage claim mitigation (except under extreme circumstances and should not be done on an individual basis).
- Tree root pruning or tree root barrier installation could be an option for individual cases but should only be carried out after a complete assessment of the individual circumstances.
- Any tree root pruning or tree root barrier installation should be followed up with a remedial soil improvement programme.

Risk Issues:

I have stated above that, the trees in the row have developed tree form, and branch attachments that are leading to their ongoing failure. Many trees through the rows exhibit this habit, where there is ongoing evidence of branch failure.

While this ongoing limb failure is a concern, there does not appear to be any sign that individual trees or tree groups are likely to be open to wind-throw or total collapse.

The main risk issue is the limb failure due to tree form and there is little that can be done to mitigate this risk. The best form of prevention of damage is to instigate a regular monitoring of the rows around the estate.

Tree Management Plan:

A Management Plan for the Avendon Cypress windrows will cover all existing trees and will cover issues such as pruning and removal issues.

Pruning:

Given the upright form of all of the existing trees and the fact that there have been many limb collapse issues in the past, pruning has been the main maintenance activity that has been carried out to the trees in the windrows.

An inspection of the individual trees shows that there are still many sites of poor structure (being mainly acute angled attachments) within almost every tree. It would be almost impossible and unreasonable to completely remove every site of poor structure from within the windrows.

There are also many hanging limbs on trees throughout the windrows and this will be the main maintenance activity recommended as part of this management plan. However, this issue will be an ongoing problem due to the inherent structure of the trees. The only way to cope with this will be to undertake regular inspections and pruning.

I certainly do not believe that there is any benefit in reducing the height of the trees in any row. In fact I would suggest that this would cost a significant amount and would possibly worsen the problems with the ongoing limb collapse.

Removal:

As stated many times in this report, the removal of individual trees is not recommended unless there is a significant safety issue with any one tree.

These windrows have developed as complete stands and should be managed as such. The removal of individual trees or the severe pruning or reducing of canopies along these rows has the potential to have significant detrimental effects on the adjacent trees.

The problems for any remaining trees after individual tree removal is that they are likely to be opened up to differing and greater wind stresses and this could cause the potential failure of branches, major parts of the canopy and possibly complete trees.

This can clearly be seen where trees have been cut back over adjacent properties for property clearance and this is now leading to ongoing limb failures in that area. It would appear that there are more limb collapse events occurring in the area where trees have been pruned than in areas where trees have more complete canopies.

Long-term Management:

The trees in all windrows can now be considered to be mature and no longer under-going a growth phase. Given the medium to high density residential development that has gone on around the trees, many trees have suffered root loss associated with this development and are now facing decline.

It is anticipated that the majority of the trees in the windrows have a useful life expectancy of between 15-20 years.

There are fewer options to extend the life of the windrows when the trees are reaching the end of their mature life and moving towards senescence.

As trees age their ability to adapt to dramatic changes to growing conditions is diminished and with cumulative pressures they become increasingly susceptible to disease, decay and ultimately a spiral of decline.

Management plans must be prepared in advance to plan for the eventual time when removal of an avenue becomes unavoidable. Given the longevity and familiarity of these landscape features there is likely to be an emotional response to wholesale removal of these features if the community are not educated and notified beforehand about the problems associated with sustaining ageing avenues of trees, especially if it is directly associated with their home or neighborhood.

Options for renewal may include;

Replacing trees only when they die or fail.

There is a likelihood that eventually this strategy will fragment the avenue until it is no longer recognisable due to various age and size classes. It may also lead the public to query what management strategy is in place to extend the life and quality of the avenue.

Remove and replant the trees as an entire group.

This will result in a dramatic change in the established landscape which may be unacceptable to the public. However, this option does permit the re-establishment of a new tree population of uniform species, age and size as well as allowing for spacings that will allow better form and lesser ongoing issues.

Removal and replanting of every second or third tree.

This strategy diminishes the uniform quality of the avenue and if spacing is inadequate could reduce the success of the new plantings due to competition for resources of available soil water, nutrients and light. This approach does not allow for large scale redesign of the landscape.

Planting a new row of trees adjacent to the existing stands.

With available land being increasingly at a premium it is unlikely that this option would be available in most urban settings. Problems associated with competition for resources could also limit successful re-establishment. Landscape upgrade and renewal may also be difficult to achieve under this option.

Remove and Replant in smaller manageable sections over a specified timeframe.

This option permits elements of the avenue to remain intact while providing an opportunity to successfully re-establish a new avenue of uniform age, size and species. Based on scheduled visual tree assessment methodology, specific groups of trees can be identified based on deficiencies identified in health, safety, useful life expectancy or the need to upgrade infrastructure.

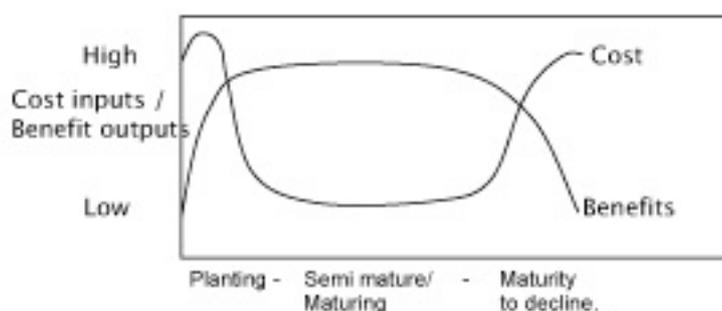
The keys to successful re-establishment of avenue plantings will be dependent on;

- 1 appropriate species selection for the site with consideration to exposure and orientation to prevailing weather and topography,
- 2 provision of adequate spacing for future growth requirements with minimal competition from adjacent established trees,

- 3 good planting site preparation with consideration of future constraints / opportunities
- 4 a scheduled establishment maintenance program that includes watering and formative pruning with scheduled re-inspections for the life of the trees.

One of the key problems for the relevant authorities charged with managing these aging avenues into the future is allocation of resources within budgetary constraints. It is not practical to keep expending resources on retaining trees if there is not a high probability of the tree remaining viable in the medium to long term, especially when the costs associated with maintenance of aging trees grows exponentially the older they become whilst the perceived amenity value of the tree is on the decline.

i.e. Trees that are reaching the mature stage require more intensive tree management which becomes more costly and less effective the longer they are retained.



Relationship between time since planting and the aesthetic returns and management costs generated by a hypothetical tree. (extract from Hitchmough J. 1994.)

When there are large numbers of trees within the windrow then the cost of management is generally much higher than the typical street tree management program where uniformity is not an integral part of the management program.

Tree Management Plan Recommendations:

I do not believe that there is any great benefit in trying to undertake a remedial pruning program or to reduce the height of the trees within the windrows. This would entail a very significant cost and there is much evidence that suggests that such pruning programs can actually increase the risk of limb failure. I would suggest that the tree should be pruned to remove any existing hanging or broken limbs and any sites of major deadwood. This would need to be an ongoing maintenance issue as the broken and hanging limbs will only continue to occur after major wind and storm events.

- Prune to remove all existing hanging and broken limbs. There are currently at least eight sites in the various rows where there are such limbs but the complete windrows should be walked and inspected prior to any pruning as it is possible that further collapses could have occurred. ***This should be done within 1-2 months and inspected again within 6 months and directly after any major wind and storm events.***

The discussion regarding the removal and replacement of any trees in these windrows would suggest that there are several options for future management of these windrows. However, there are several options that would be unworkable and exceedingly expensive.

- It is not recommended that individual tree removals are undertaken. The only proviso to this is if an individual tree becomes unsafe and poses a significant risk to persons or property.

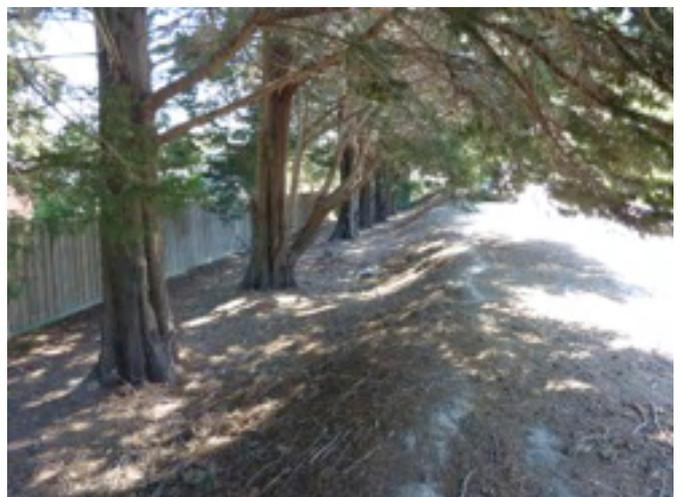
While the removal and replacement of the complete windrows is the best option for new planting uniformity and future success, it would also be the hardest to educate the residents and the public to accept. It would also require a significant financial input in the order of \$1,000,000 to remove and replace the complete windrows.

- It is recommended that when the trees decline to the point where they require removal and replacement (ULE approximately 15-20 years), that this is done in manageable sections.
- Root pruning or tree root barrier installation should only be considered as an option for individual case management but should only be carried out after a complete assessment of the individual circumstances.

Glenn Waters

Director/Consulting Arborist

Site Photographs:





Timber Ln

Timber Ln

Timber Ln

Timber Ln

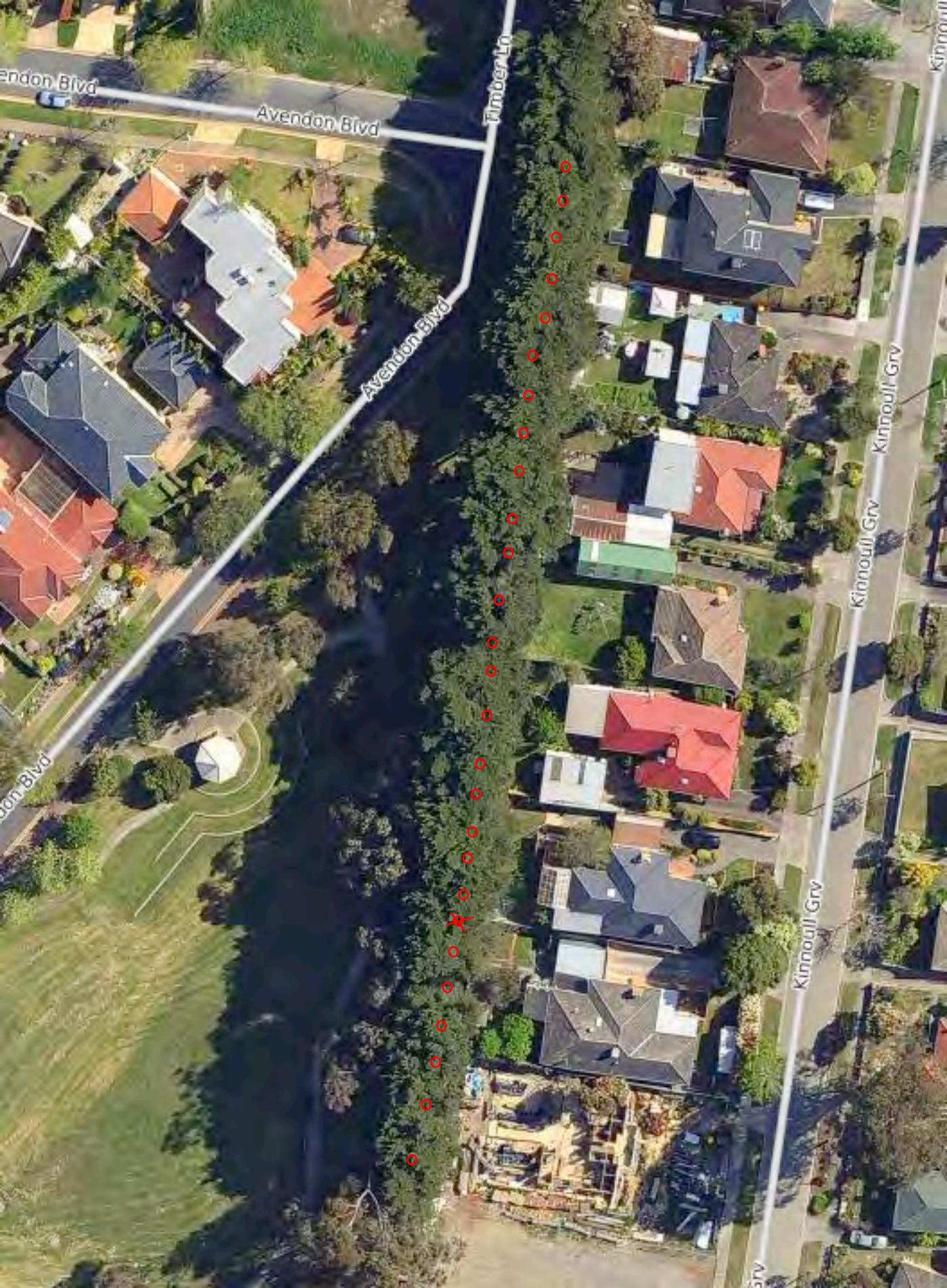
Timber Ln

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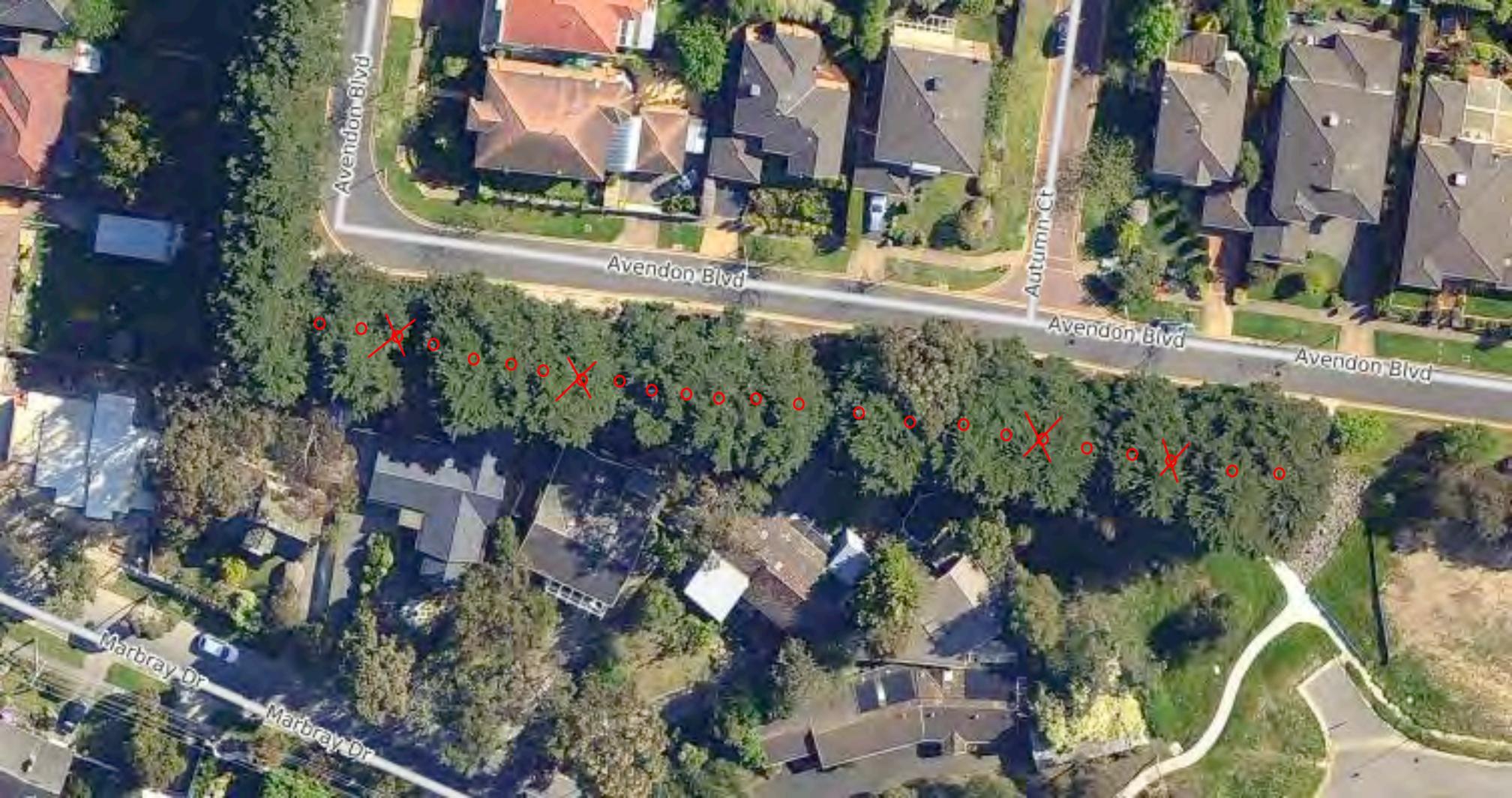
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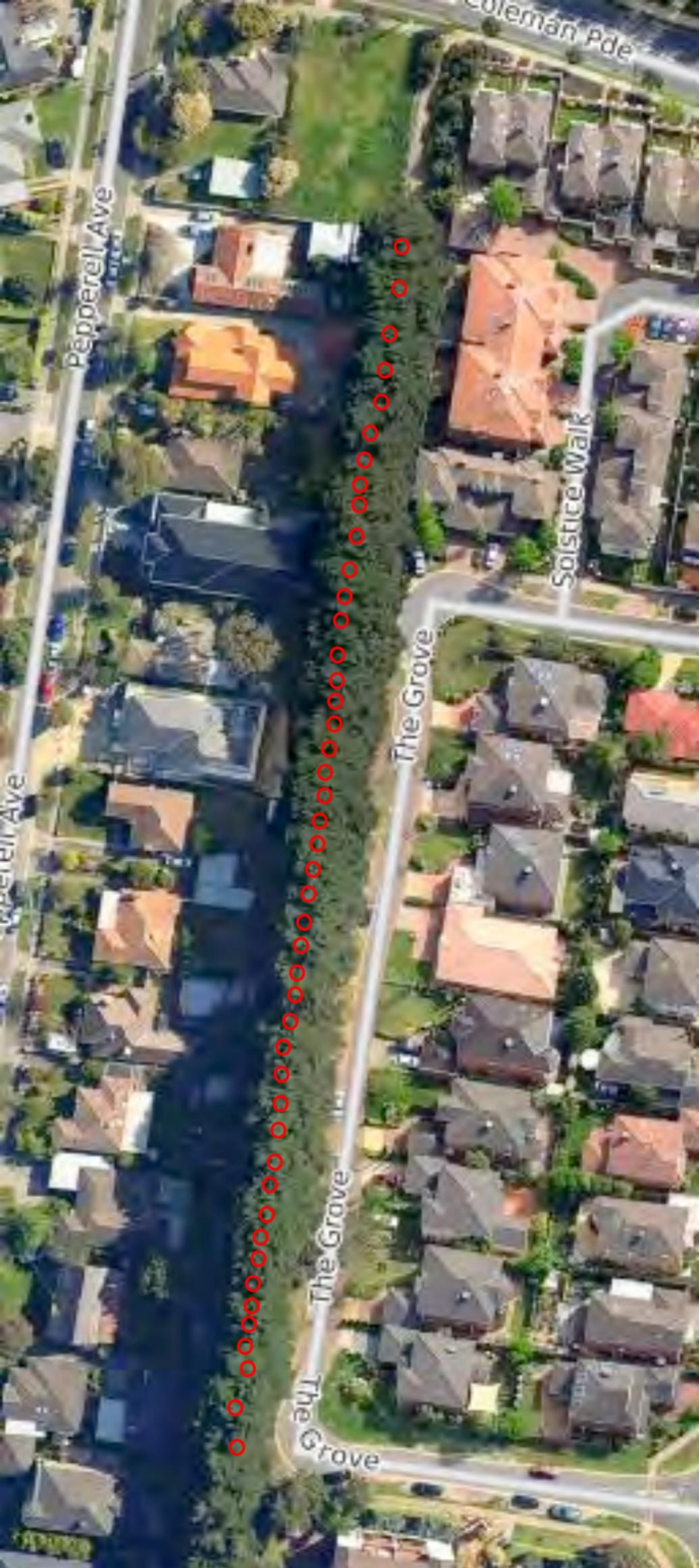
Autumn Ct

Avendon Blvd

Avendon Blvd

Marbray Dr

Marbray Dr



Pepperell Ave

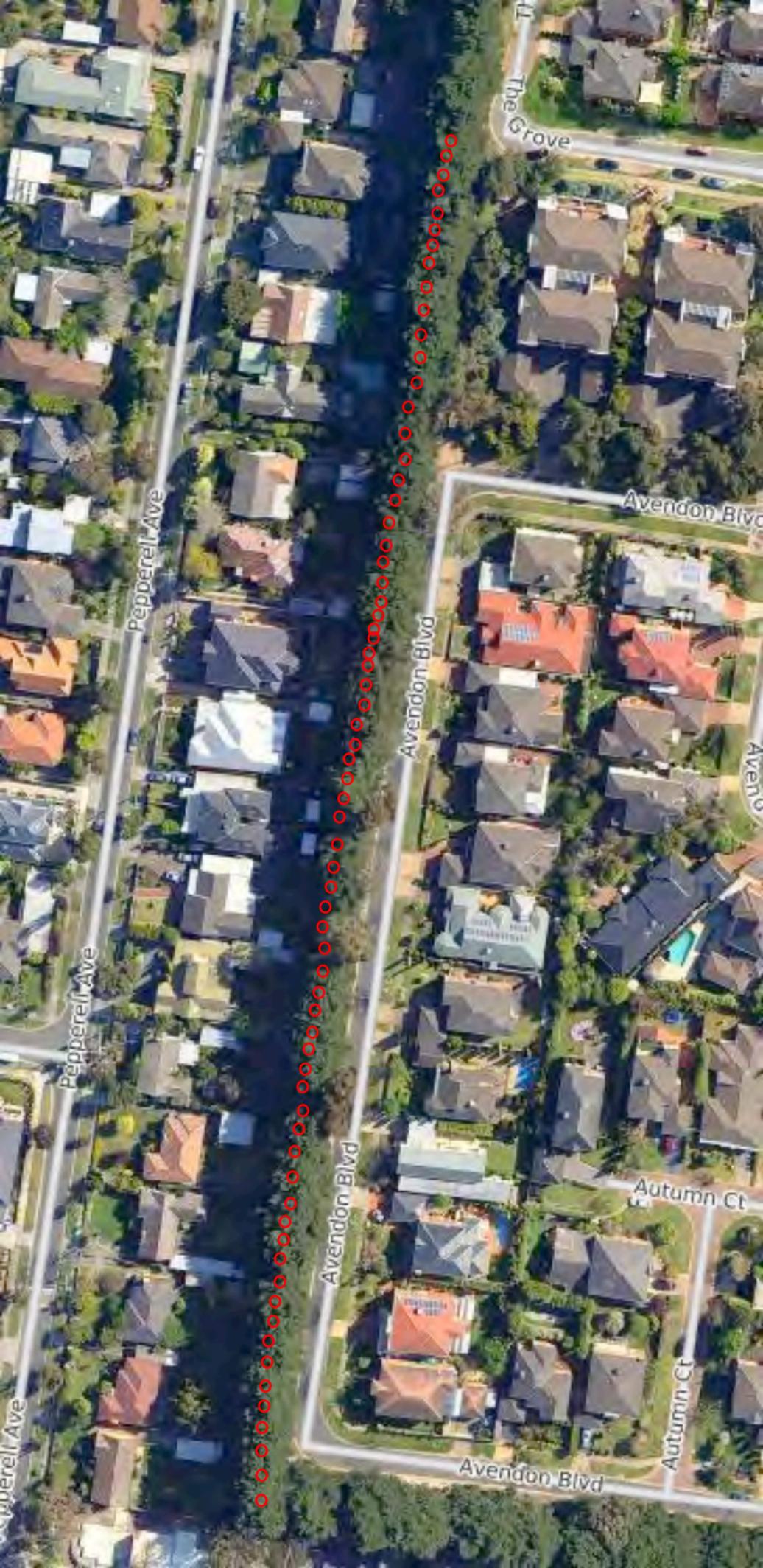
Coleman Pde

Spistice Walk

The Grove

The Grove

The Grove



The Grove

Pepperell Ave

Pepperell Ave

Pepperell Ave

Avendon Blvd

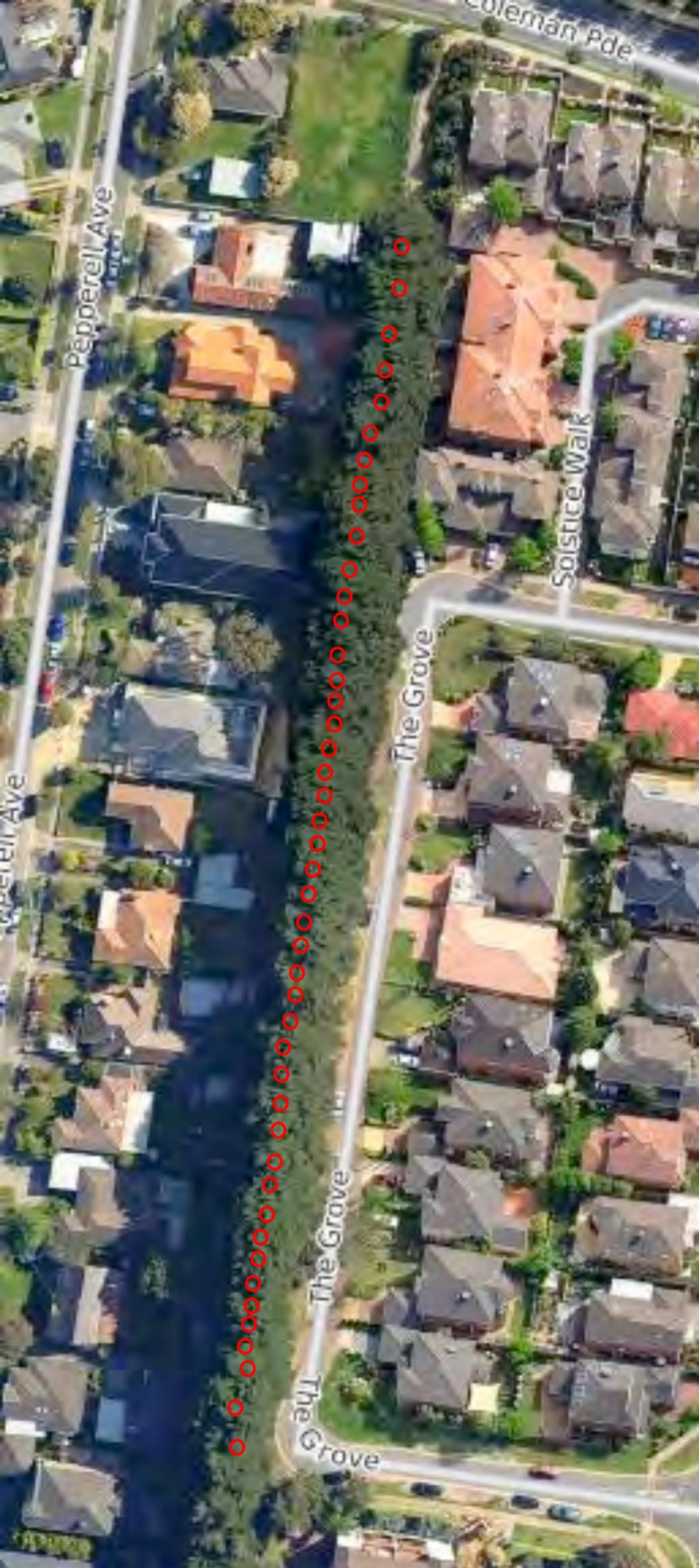
Avendon Blvd

Avendon Blvd

Autumn Ct

Autumn Ct

Avendon Blvd



Pepperell Ave

Coleman Pde

Spistice Walk

The Grove

The Grove

The Grove

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