STONEHOUSE
TOWN COUNCIL

THE STONEHOUSE COMMUNITY ARBORETUM MANAGEMENT PLAN

A tree and woodland strategy for Stonehouse

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A tree walk as part of the 2019 Stonehouse Walking Festival

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> "A STRUCTURED, RESPONSIBLE AND REALISTIC FRAMEWORK FOR TREE MANAGEMENT"

1.1 Background and purpose

Trees deliver a wide range of environmental, social and economic benefits to communities, but they require proper care and attention if they are to flourish and fulfil their potential. Within the boundaries of Stonehouse there are many different tree owners and managers but there has never been an overarching strategy which regards the urban forest collectively and coordinates its management in line with best practice and the wants and needs of the community. The aim of this management plan is to do just that – to provide relevant information about trees to the people of Stonehouse and to create a structured, responsible and realistic framework for the management and care of the urban forest of Stonehouse to ensure that everyone in our community, of present and future generations, benefits equally from the Stonehouse Community Arboretum.

1.2 Stonehouse

Stonehouse is a community of approximately 8500 people located in the Stroud District, Gloucestershire, in the United Kingdom. Part of Stonehouse falls within the Cotswolds Area of Outstanding Natural Beauty (AONB) and the Cotswold escarpment is a key landscape feature from much of the town. Within the boundary of Stonehouse is Doverow Hill, on top of which is Doverow Wood. The Cotswold Way passes through the outskirts of the town and the Stroudwater canal runs alongside the southern boundary. Stonehouse is mentioned in the Domesday Book of 1086 and became a thriving community from the 17th Century thanks to the wool industry and local brickworks, assisted by strong transport connections to the River Severn and nearby Stroud, Gloucester and Bristol. It is hoped that the Stonehouse Community Arboretum will serve to give the town a unique identity as it moves into the future.

Stonehouse has a proud history of the community defending access to its public green spaces. In the mid-late 19th Century people from all walks of life worked together in different ways – from political lobbying, letter writing and direct action – to fight against plans to close Doverow Wood, thereby ensuring that it would remain open as "a place of resort and pleasure ground for the public" to this day. Another example was when, in 1898, some trees were offered to the Parish Council to be planted on the village greens, but the Lord of the Manor objected. The community instructed the Parish Council to "assert its rights to the control of the village greens and roadside wastes" (Anderson, 1984). In both of these stories, the key points are the same. That it is necessary to appreciate, and sometimes fight for, access to public open green space. And that when the people of Stonehouse today enjoy the pleasures of Doverow Wood, or relax on their village greens, that their rights to do so were achieved by the actions of their ancestors.

1.3 The Stonehouse Community Arboretum

An arboretum can be defined as a collection of trees intended for people to enjoy, and to be studied for scientific purposes. Most arboreta are clearly-defined areas, often surrounded by fences and accessible only with a ticket. The Stonehouse Community Arboretum is rather different. Its boundaries are the boundaries of Stonehouse, and it is free to visit. It includes all of the trees on public and private land (although Stonehouse Town Council only have management responsibilities for relatively few trees, and private trees will of course remain the responsibility of the landowner), in the urban and rural parts of Stonehouse. Ultimately its intention is to create a

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diverse collection of trees, responsibly and sustainably planted and cared for, which will deliver a wide range of benefits to the Stonehouse community and encourage people to visit the town. It is there for everyone – for current and future generations, regardless of gender, race or socioeconomic factors. It is a long-term project, not a quick fix, and those involved in implementing the policies presented in this management plan will do so knowing that they will never see it completed in full.

1.4 Climate emergency

In March 2019 Stonehouse joined many towns and cities across the world in declaring a climate emergency, stating "Stonehouse Town Council acknowledges the urgent need for global society to reduce carbon emissions, and recognises the part which we have to play and commit to taking an active role in achieving this."

Trees sequester carbon, can improve air quality and help mitigate extreme weather events by intercepting rainfall and creating shade. Trees are the lungs and the air conditioners of the urban environment, and help mitigate the biodiversity crisis by offering essential shelter and food for animals, birds, fungi and insects. Trees are long-lived organisms and those we plant today may need to cope with the conditions we will face in decades and centuries to come; tree selection and maintenance will therefore be influenced, among other factors, by the likely future climate of the area. This strategy will contribute to the town's climate ambitions, although it is important to note that trees are just one part of the solution to the climate and ecological crises.

1.5 Legal and policy context

The Arboricultural Association has produced a simplified list of legislation relating to trees in their publication *Guide to trees and the law* (Arboricultural Association, 2015). The definitive publication relating to trees and the law is *The law of trees, forests and hedgerows* (Mynors, 2002). In summary, all tree owners have a duty of care to ensure that their trees are maintained in such a way that does not lead to an unreasonable level of risk for those who might be affected by them. This obligation applies to public and private landowners. In terms of policy, there is a wide range of international, national, regional and local policy considerations which have been taken into account in the production of this strategy.

On a local level it has been written in accordance with the principles of the Stonehouse Neighbourhood Development Plan (2017). The aims of the Stonehouse Community Arboretum can also contribute to all five of the themes identified in the Stonehouse Neighbourhood Development Plan: Amenities and facilities, travel and transport, housing, employment and environment.

1.6 This document

Tree care and management – arboriculture – is complex, and it is not possible within this strategy to include a detailed account of all of the important aspects. This strategy is a living document which is expected to change over time. The document will be under constant review, as well as being formally reviewed every five years. It has been written for Stonehouse Town Council (STC) by John Parker, Chief Executive Officer at the Arboricultural Association, Trustee of the Doverow Hill Trust and a Stonehouse resident. Prior to publication it was reviewed by STC and industry experts from around the world and was subject to public consultation in May-June 2021. It was formally adopted by the Full Town Council on September 13th, 2021.

> "TREES ARE THE LUNGS AND THE AIR CONDITIONERS OF THE URBAN ENVIRONMENT."

Sycamore at the entrance of Doverow Wood

Amelanchier in Old Chapel Gardens

2 The urban forest of Stonehouse

> "STONEHOUSE IS HOME TO MANY IMPORTANT TREES, FROM SAPLINGS TO ANCIENT SPECIMENS."

2.1 The urban forest

The urban forest of Stonehouse can be defined as all trees, under public and private ownership, within the town boundary, covering urban and rural areas. This includes trees on the streets, in parks and school grounds, in private gardens, in the churchyards, alongside the canal and railways, in farmland and those that make up Doverow Wood. The trees of Stonehouse are an important part of the town's character, delivering a wealth of benefits to the community and contributing to the green corridors which connect the urban environment to the rural fringe and wider countryside. Trees are also an important part of our town's history, and its future. One of the key aims of this document is to redefine the urban forest of Stonehouse and establish it as the Stonehouse Community Arboretum.

Planting a tulip tree at the 2019 Community Climate Event

2.2 Significant Stonehouse trees

Stonehouse is home to many important trees, from saplings to ancient specimens, and everything in between. Some key examples include the Globe Willow, located on the Village Greens in the centre of the town, a tree which celebrated its 100th birthday in 2021, and the Elm Road Planes, a row of three venerable London planes which have offered shade and shelter beneath which generations of Stonehouse children have played since the mid-1800s. The Park Oak, at the junction of Midland Road and Severn Road, was planted in 1604 and is the last survivor of a lost avenue which once extended for 1km, from Stonehouse Court Hotel to the Oldends Lane playing field. We are also fortunate to have a number of ancient, open-grown oak trees in the fields around the town, as well as an ancient sycamore and many more specimen trees. In time it is planned for all of these trees of particular interest to be added to maps for people to visit and explore.

2.3 Doverow Wood

At the summit of Doverow Hill in Stonehouse is Doverow Wood, approximately 9 acres of woodland comprised predominantly of sycamore, ash, oak, beech and hornbeam. Doverow Wood is owned by the town and managed by STC through the Doverow Hill Trust, with the express purpose of maintaining it as a place of recreation for the public. The woodland management objectives are to keep the public footpaths running through the site useable and to encourage biodiversity and habitat. A separate Doverow Wood Management Plan will be published to specify the strategic and operational objectives of the site. It will ultimately be incorporated into a future version of the Stonehouse Community Arboretum Management Plan.

2.4 Measuring the urban forest

There are different metrics available to measure the size and extent of the urban forest. Two of the most common are tree numbers and canopy coverage. These are useful but are quantitative rather than qualitative and their limitations should be understood – for example, neither tree numbers nor canopy cover tell us anything about size, species, age, or condition. However, they are a useful starting point and give a snapshot in time which can be used to assess progress. This strategy will include the adoption of a canopy cover target against which to measure performance.

The urban forest of Stonehouse

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As of March 2021 there are 101 individual trees (larger than 75mm stem diameter) of 38 different species in Stonehouse under the management of STC, as well as approximately nine acres of woodland at Doverow. Of those 101 trees, 22 were planted between autumn 2019 and spring 2021. The tree canopy cover of Stonehouse was estimated as 18.8% in a 2018 assessment using iTree Canopy software. Tree canopy cover is expressed as a percentage of a given boundary which is covered by tree canopy when looking down from above. Comparisons to other towns and cities can be seen in Table 1. A key element of the Stonehouse Community Arboretum will be recording and mapping the whole variety of trees in the town, starting with those maintained by STC.

2.5 Ownership

Responsibility for, and ownership of, trees in Stonehouse is divided amongst a wide range of stakeholders. The main public bodies with responsibility for trees include STC, Stroud District Council (SDC), Gloucestershire County Council (GCC) and Network Rail (NR). There are also many trees alongside the canal (managed by the Stroud Valleys Canal Company) and in the churchyards and schools. Much of the urban forest is located on private land – in individual gardens and on land occupied by larger organisations such as Stonehouse Court Hotel and Wycliffe College.

Mixed ownership and responsibility means there has never been a holistic overview to managing the urban forest of Stonehouse to maximise benefits for the community. A key aim of this document is to provide a framework within which public and private landowners, renters and community groups can operate to make Stonehouse an exemplary example of collaborative tree management.

> "...NEITHER TREE NUMBERS NOR CANOPY COVER TELL US ANYTHING ABOUT SIZE, SPECIES, AGE, OR CONDITION"

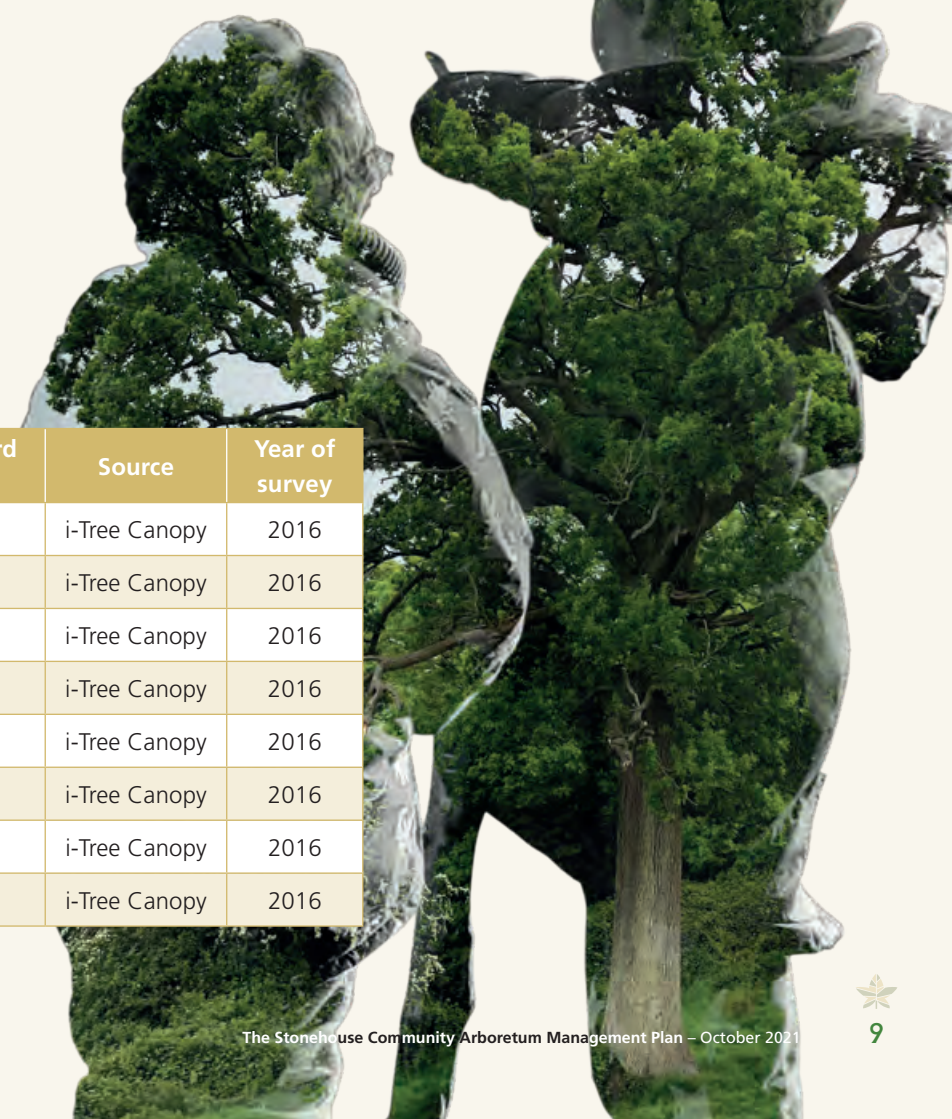

Table 1:

Tree canopy cover in selected UK towns and cities.

Town	% Tree cover	(± Standard Error)	Source	Year of survey
Bath	20%	(± 1.79)	i-Tree Canopy	2016
Bristol	19%	(± 1.52)	i-Tree Canopy	2016
Cardiff	21%	(± 1.44)	i-Tree Canopy	2016
Cheltenham	12.80%	(± 1.49)	i-Tree Canopy	2016
Exeter	18.80%	(± 1.75)	i-Tree Canopy	2016
Gloucester	13.60%	(± 1.53)	i-Tree Canopy	2016
Stroud	28.60%	(± 2.02)	i-Tree Canopy	2016
Torquay	15.80%	(± 1.63)	i-Tree Canopy	2016

Data from Doick *et al*, 2017.

3 The Stonehouse Tree Charter

1 Trees will be regarded as an asset, not a liability.

2 Existing trees will be cared for and managed appropriately.

3 New trees will be established responsibly and sustainably.

4 The urban forest of Stonehouse is a Community Arboretum, for everybody.

5 Collaboration will be at the heart of urban forest management.

3.1 Policy commitments

At the heart of this strategy is a set of five policy commitments which describe STC's approach to managing the Stonehouse Community Arboretum and which can collectively be described as the Stonehouse Tree Charter. All other organisations managing trees in Stonehouse and all private landowners, large and small, and those renting property, are invited to subscribe to these commitments, which are outlined here, to the left.

As a first step towards meeting these policy commitments, the Stonehouse Community Arboretum Management Plan contains fifteen actions. These state that STC will:

ACTION 1	**Actively promote** trees as an asset, not a liability.
ACTION 2	**Protect and retain** trees wherever possible to do so.
ACTION 3	**Increase tree canopy cover** in Stonehouse to 30% by 2040.
ACTION 4	**Inspect all** Town Council-owned trees annually and keep records of inspections.
ACTION 5	Only engage **competent**, **qualified arboricultural professionals** to undertake tree work.
ACTION 6	Produce a **woodland management plan** to protect and enhance Doverow Wood.
ACTION 7	**Plant and establish** a diverse range of trees, responsibly and sustainably.
ACTION 8	**Only plant trees** which are **UK-grown** or, if imported, have gone through an appropriate period of quarantine.
ACTION 9	Work to ensure that **at least 95%** of all newly-planted trees are still alive three years after planting.
ACTION 10	Seek to **invest resources** in tree planting, establishment, and care equally across Stonehouse.
ACTION 11	Work actively with **local schools** to promote the importance of trees and nature.
ACTION 12	Actively engage **landowners and renters** to sign up to the principles of the Stonehouse Community Arboretum Management Plan.
ACTION 13	Create an **online map** of all Town Council trees and encourage others to participate.
ACTION 14	Help set up a **Stonehouse Tree Group** to support the delivery of this strategy.
ACTION 15	**Respond to any questions**, complaints, or concerns about trees openly and honestly.

Trees will be regarded as an asset, not a liability

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4.1 Summary

Trees are good. It is now widely acknowledged that trees bring considerable benefits to those who live, work and play in urban environments. These benefits are commonly divided into environmental, social and economic benefits and are sometimes collectively referred to as ecosystem services. It is important to remember that trees are multi-functional infrastructure, doing many things at the same time. It is unhelpful to focus exclusively on one benefit at the expense of others. A more detailed explanation of the benefits of trees can be found in Appendix A.

4.2 The benefits of trees (summary)

A non-exhaustive list of the benefits of trees includes:

4.3 Positive correlation to canopy size

There is a positive correlation between the amount of benefits delivered and the size of trees, with the effects of the benefits increasing with canopy size. Large-canopy trees and increased canopy cover has been shown to increase the benefits associated with air quality, carbon sequestration, shade, urban cooling and water management (Armour *et al*, 2012). Large trees have been demonstrated as more effective than small or medium-sized trees in delivering benefits related to commercial spending, health and perception of health. Some sources suggest that most, if not all, benefits associated with trees are positively correlated to canopy size, and research shows that ecosystem services

Shade created by the street trees on Regent Street

4 Trees will be regarded as an asset, not a liability

Horse chestnut on Gloucester Road

delivered by large trees are 44% greater than medium-sized trees and 92% greater than small trees (Armour *et al*, 2012).

4.4 Canopy cover as a metric

Recognising the fact that the benefits of trees are positively correlated to increased canopy coverage, STC is committing in this strategy to increasing canopy cover in the town from the existing 18.8% to 30% by 2040. This is an ambitious target which will not be met purely through tree planting – existing trees must be protected and cared for. Crucially, it is not a target that can be achieved by STC alone. It will require the support of other public and private landowners in the town. Canopy cover studies will be undertaken at least every five years and reported online to monitor progress.

4.5 Quantifying the benefits

It is increasingly common practice for towns and cities to use tools such as iTree Eco in order to quantify and value the benefits delivered by trees. Whilst these attempts to place a monetary value on trees can undoubtedly have useful practical applications, there is also a risk that the true value of trees is significantly underestimated. Aside from the fact that these valuation tools do not take into account many of the benefits of urban trees, there are also benefits which simply cannot be quantified and given a 'value' in pounds and pence. This includes many of the social, cultural and heritage benefits, which should be considered no less important simply because a price cannot be put on them.

4.6 Disbenefits of trees

It must be acknowledged that urban trees can also bring perceived disbenefits. Like any other living thing they can go into decline and die, and in the case of trees this can sometimes bring increased risk to persons and property. However, through a responsible and appropriate inspection regime and proactive maintenance work, this risk can be reduced to acceptable levels. The mere presence of a tree, no matter how large it is, should not be regarded as a danger which needs to be dealt with. Blocked light can be a real frustration for those who suffer from it, although it is important to understand that there is no 'right to light' in English law (although there can be exceptions to this under the rules around 'easement'). There are also other potential irritations, usually minor, which can be considered non-actionable nuisances. This includes phenomena such as falling leaves or fruit, blocked television reception or attracting insects and birds. However, the benefits trees deliver far outweigh any of these perceived disbenefits, although understandably these can create a difficult situation for those directly affected.

There are some common misconceptions around tree roots and the risk they pose. Tree roots can indeed cause damage to other infrastructure, whether directly (for example, lifting paving slabs or cracking asphalt) or indirectly (such as subsidence – although this can only happen on clay or peat soils). When planting new trees this risk can be mitigated through careful pit design and species selection. For existing trees, footway maintenance or even root pruning might be required. Roots tend to follow the path of least resistance, and will not 'undermine' foundations, as is sometimes feared. The impact of roots on drains is also frequently exaggerated – tree roots lack the ability to actively break drains open and instead merely exploit existing weaknesses, usually cracks caused by natural ground movement over time, or a lack of drain maintenance. This is less of a problem with modern infrastructure.

Stonehouse Town Council will:

1. **Actively promote trees as an asset, not a liability.**
2. **Protect and retain trees wherever possible to do so.**
3. **Increase tree canopy cover in Stonehouse to 30% by 2040.**

Existing trees will be cared for and managed appropriately

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5.1 Summary

If we are to ensure that newly-planted trees grow into maturity and that the urban forest of Stonehouse continues to thrive and deliver benefits for future generations of Stonehouse residents, then they must be properly looked after and maintained. Whilst the Community Arboretum is something for everyone to be involved in, it must be remembered that arboriculture is a specialist discipline and professional arboriculturists play a critical role in urban tree management. Money spent on tree care must be regarded as an investment, not a cost.

5.2 Pruning

Tree maintenance shall only be undertaken by suitably competent, qualified and insured arboriculturists. Arboriculture is an unregulated industry, and anyone can purchase a chainsaw and call themselves an arborist. Engaging appropriate professionals is likely to be more expensive than having the work done by someone without the relevant qualifications and competencies, but this is a worthwhile investment. Tree pruning operations should only be undertaken after instruction by a suitably competent arboriculturist who is independent from the company engaged to carry out the recommended works. All tree pruning must be undertaken in accordance with British Standard 3998: *Tree work – Recommendations* and with due regard for legislation including the Wildlife & Countryside Act 1981 and the Town & Country Planning Act 1990. Pruning should not be regarded purely as a way to mitigate risk or problems, but as a tool to maximise the benefits of trees in the urban environment.

Tree pruning is an essential part of responsible tree maintenance, and all requests made to STC from members of the public to prune or remove STC-owned trees will be considered. However, there are some reasons for which trees will typically not be pruned or removed. These include:

- Non-actionable nuisances such as blocked light, views or television/radio reception.
- Falling fruit, leaves or twigs.
- Perceived problems with birds, insects or animals (such as squirrels).
- Obstruction of views.
- Obstruction of private surveillance cameras.

Reasons trees might be pruned or removed include:

- Health and safety considerations.
- Clearance over roads or footpaths.
- Actionable nuisances (as defined in law).
- To facilitate developments with full planning permission.
- Cyclical pruning programmes, such as pollarding or coppicing.
- Trees making contact with structures or above-ground infrastructure.
- Legal requirements such as those associated with pest and disease notifications.

It should be noted that these lists are non-exhaustive and requests to prune or remove trees will be considered on a case-by-case basis.

5.3 Tree removal

On occasion it is necessary to remove a tree, particularly in the interests of public safety. However, as a general rule the presumption will be to retain healthy trees wherever possible. Requests from third parties to remove STC-owned trees will be considered on a case-by-case basis, with a presumption towards retention. The community will be notified of planned tree removals through a notice being affixed to the tree explaining the reason for removal. This should be regarded as a notification

> "TREE PRUNING IS AN ESSENTIAL PART OF RESPONSIBLE TREE MAINTENANCE"

Pollarding the Elm Road Planes

5 Existing trees will be cared for and managed appropriately

> “.....IT MIGHT TAKE AS MANY AS 100 SAPLINGS TO REPLACE THE CANOPY LOST FROM REMOVING A SINGLE MATURE TREE.”

Hornbeam planted in the Oldends Lane playground

rather than a consultation, although feedback will be welcomed. Under some circumstances, such as emergency removals, this communication will not be possible. However, regardless of the circumstances STC will always be prepared to fully justify tree removals to residents and no tree will be removed without good reason. It should be noted in the context of Doverow Wood that reasonable and proportionate tree removal is part of good woodland management.

5.4 Mitigation for removal

Where STC-owned trees are proposed to be removed for development they will be valued through the CAVAT (Capital Asset Valuation of Amenity Trees) system, and appropriate mitigation will be agreed prior to removal. This might take the form of replacement tree planting, a financial contribution to be invested in trees and green spaces in the town, or a combination of both. All applications to remove trees will be assessed with input from a suitably qualified arboriculturist. Where trees owned by STC are removed without permission (including vandalism and accident), appropriate compensation for the town will be calculated using CAVAT. In some circumstances it might be appropriate for STC to pursue the perpetrators of the damage through legal means.

Blanket rules, such a one-for-one or two-for-one tree replacement strategy, are rarely nuanced enough to be useful. Consideration should be given to the canopy coverage which has been lost, as well as tree numbers. Sometimes it might be entirely appropriate to replace a removed tree on a one-for-one basis; in other cases, it might take as many as 100 saplings to replace the lost canopy. Often, particularly when considering ancient trees, it is not possible to mitigate their loss at all.

5.5 Reuse of material

Where possible, attempts will be made to reuse the material produced by tree removal. This might be donations to local schools for use in outdoor areas, construction of habitat piles or the provision of firewood for the community. Where appropriate, some material will be composted and used for organic bark mulch. Deadwood – particularly standing deadwood – is a valuable habitat and will be retained where it is safe and practicable to do so, including monoliths in woodland areas. Where trees have been removed due to specific pests and diseases it may not be appropriate to reuse the material and there may be restrictions on transportation.

5.6 Tree inspections

All trees under the management of STC will be inspected on an annual basis by appropriately-qualified individuals. Tree work will be largely driven by the inspection programme. In the absence of a bespoke tree database, records relating to tree inspections will be held by STC in an appropriate format, such as an Excel spreadsheet. Information to be recorded about each tree includes a unique tree number, common name, botanical name, age class, height, stem diameter, defects, work recommendations, timescale for work and last date of inspection. A risk register should be kept of those trees which may be of concern, but which do not warrant removal, so that they can be reinspected after severe weather events such as storms, to ensure that their condition has not deteriorated.

5.7 Planning and development

New housing and developments are critical infrastructure for people and society, but so are trees, and we must strive to find space for both in our

Existing trees will be cared for and managed appropriately

5

community. The presumption against the removal of healthy trees extends to developments, which should be planned in such a way that minimises the need to prune or remove trees or hedgerows before, during and after construction. Planning applications which might have an impact on existing trees must go through the relevant processes, including a British Standard 5837:*2012 – Trees in relation to design, demolition and construction – Recommendations* arboricultural survey and report. This includes when there will be an impact on trees which are not within the development boundary, but adjacent to it, and the potential impact of construction traffic on the root protection areas of nearby trees must also be taken into account.

Proposed tree planting in new developments should be considered in the context of the principles of the Stonehouse Community Arboretum Management Plan and should be properly planned. This includes considerations such as species selection, provenance, biosecurity, planting, staking/securing, aftercare, the timing of the planting and replacement in the event of failure. It is no longer enough to simply tick an environmental box by selecting a poor-quality tree, planting it in the front garden of a new development and leaving it to die.

5.8 Legally protected trees

Some trees are protected under law. The most common methods of legal protection are contained within the Town & Country Planning Act 1990; these are Conservation Areas and Tree Protection Orders (TPOs). In Conservation Areas, all trees larger than 75mm stem diameter are automatically protected and the Local Planning Authority must be contacted prior to any tree work being undertaken. The area around the canal is included within the Stroud Industrial Heritage Conservation Area. TPOs are a mechanism by which the Local Planning Authority can ensure that important amenity trees, groups of trees and woodlands are protected from unauthorised pruning or felling. Permission must be sought from the Local Planning Authority prior to any tree work being undertaken, unless an exemption applies as specified by the Town & Country Planning (Tree Preservation (England)) Regulations 2012, for example the removal of dead, fractured or hanging branches from a protected tree. More information about Conservation Areas and TPOs can be found on the Stroud District Council website. It is good practice to always check if there is a TPO on your tree before undertaking work. If there is a tree which you believe should be protected, then contact Stroud District Council.

Some of Stonehouse lies within the Cotswolds Area of Outstanding Natural Beauty (AONB) but this does not bring any additional tree protection beyond Conservation Areas and TPOs. One additional piece of legislation which might be relevant to tree protection and removal is the Forestry Act 1967, which specifies that a felling license is required if you are felling more than 5m³ in one calendar quarter, or more than 2m³ if the timber is to be sold.

5.9 Practical tree protection

Trees can be damaged in a variety of ways, for example during developments or improvement works, such as highway maintenance projects. Above the ground this damage can be caused in the crown of the tree through inappropriate pruning or by direct damage from vehicles. Materials laid up against the stem of a tree can cause direct damage to the bark which might also lead to future pest and disease problems. Changes to ground levels changes around the base of the tree can lead to long-term damage. Below

> "..ALWAYS CHECK IF THERE IS A TPO ON YOUR TREE BEFORE UNDERTAKING WORK"

The Verney Oak

5 Existing trees will be cared for and managed appropriately

Stonehouse Town Council will:

4. **Inspect all Town Council-owned trees annually and keep records of inspections.**
5. **Only engage competent, qualified arboricultural professionals to undertake tree work.**
6. **Produce a woodland management plan to protect and enhance Doverow Wood.**

the ground, tree roots can easily be severed through excavation, or be invisibly damaged by soil compaction. Materials – including fuel, salt or equipment – stored beneath a tree can cause compaction or direct damage.

The root system of a tree extends further than is often thought. The Root Protection Area (RPA) can be shown as a circle around the tree which has a radius 12 times the diameter of the stem. For a tree with a one metre diameter stem the RPA therefore extends 12 metres away from the tree in each direction. The RPA must be considered whenever working around a tree. The risk of root damage can be mitigated through careful planning and protection measures such as fencing, bespoke boxes, signage, careful pruning or temporary cellular systems to avoid compaction. It should be noted that increased protection areas should be applied to ancient and veteran trees, including ancient woodland. Another useful document to consult with regard to tree protection is the National Joint Utilities Guidelines 4 (NJUG 4, 2013).

Street trees on Stonehouse High Street

New trees will be established responsibly and sustainably

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6.1 Summary

Tree planting is an investment in the future of our town. Trees are the only public realm assets we have that increase in value from the day of planting for the rest of their lifetime. Whilst the act of planting a tree in the ground is obviously an important part of the process, it is just one element of a complex story. To ensure a healthy urban forest for Stonehouse our new trees must thrive – this means focusing as much on establishment as planting. The approach to tree planting in Stonehouse will not be based on targets or ever-escalating numbers, rather it will be informed by quality over quantity, sourcing high-quality trees in a biosecure fashion, and only in numbers that can be properly maintained.

6.2 Tree planting targets

In recent years tree planting targets have become increasingly popular, typically expressing planting ambition in terms of numbers. For example, in 2020 the Gloucestershire Tree Strategy committed to planting 30,000,000 trees in the county by 2030. The Stonehouse Community Arboretum Management Plan does not provide any tree planting targets of this nature, which all too often lead to nothing more than the mass tree planting of whips (young seedlings, typically less than 1m in height). Whilst appropriate in some situations, these typically have little to offer the urban environment. When commitments are made to plant millions of trees, the far smaller numbers involved in urban projects are completely overlooked, despite being disproportionately important.

STC will plant only what there is room for, what can be afforded, and what can be responsibly sourced and properly looked after. Trees will be planted with quality rather than quantity in mind, with diversity as a key influencing factor. Tree planting numbers will be reported, but whips will not be included (unless specified) in order to avoid distorting the figures. Rather than seeking to hit arbitrary tree planting targets, STC will aspire to tree establishment targets, with the intention of ensuring that 95% of newly-planted trees are still alive three years after planting. Progress will be carefully monitored, reasons for failure recorded and figures reported on the STC website.

6.3 Species selection and diversity

New trees will be selected on the basis of identifying the correct tree for the given situation, with particular attention paid to the importance of aftercare. We need a diverse urban forest with many different species represented, not only for the increased level of interest and broad range of ecosystem service delivery, but in order to future-proof our trees against climate change and the risk of pests and diseases. Where possible, trees will be selected which will have a large canopy at maturity. However, tree species selection will be made on a case-by-case basis. Where possible and

> “TREE ESTABLISHMENT IS AS IMPORTANT AS TREE PLANTING.”

Tree planting at Park Junior School

6 New trees will be established responsibly and sustainably

> "IN URBAN AREAS, THE DISTINCTION BETWEEN 'NATIVE' AND 'NON-NATIVE' TREES IS NOT IMPORTANT."

appropriate, input from local residents will be sought as part of the decision-making process. One key factor in selecting a species is what one is hoping to achieve through the planting.

One factor of selection often given disproportionate attention is whether or not a species is 'native' to the UK. In urban areas, the distinction between 'native' and 'non-native' trees is not important. The UK has around 30 'native' trees, usually defined as species which colonised the British Isles between the end of the last ice age, around 10,000 years ago, and the formation of the English Channel. Of these, only a handful are large-canopy species, many of which suffer from pest and disease problems. Whilst in some circumstances – such as hedgerow planting or woodland creation – it may be entirely appropriate to prioritise native species, in general terms this is not the case when planting urban and amenity trees. Furthermore, just because a tree is native to the UK does not mean it is native to all regions of the UK. One common argument in favour of prioritising native species is that importation of species increases the chances of importing pests and diseases. This overlooks the fact that most native trees planted in the UK are probably not grown in the UK; they are still imported. The Stonehouse Community Arboretum will be appropriately diverse, featuring native and non-native trees.

6.4 Tree size

In addition to species, there are other considerations to take into account when selecting a new tree. Trees come in many sizes at the time of planting. 'Standards' (including regular standards, heavy standards and extra-heavy standards) are specified in terms of stem circumference, for example 10-12cm or 18-20cm. Whips are much smaller trees, typically only a year or two of age. There are advantages and disadvantages to planting different sizes of tree. Standards have a more immediate impact on the landscape, are less prone to vandalism and often allow for a wider variety of species. However, they can be heavier to move around, more expensive and can require substantial pits. Whips are very cheap and easy to handle, but often come in a limited range of species and have limited impact value at the time of planting. The overall approach of STC is to use standards wherever possible, opting for whips only in limited circumstances such as the gapping up of existing, or creation of new, hedgerows.

6.5 Root specification

Different root types are often available when purchasing new trees, each with their own advantages and disadvantages. Bare root trees come, as it sounds, with no soil around them. These can be cheaper and easy to handle but must be planted very soon after delivery and can be available in a limited range of species. Rootballed trees come with a bag of soil around them which preserves much of the fine rooting material. These can be more expensive than bare root trees and more difficult to handle, but there is a slightly longer window in which to plant them, and they tend to have good success rates. A third option is container-grown trees, where the tree is delivered in a bag or container, along with a developed root system. These trees are usually the most expensive and often require substantial holes to be excavated but have high success rates and in theory can be planted throughout the year, although best practice is still to plant only within the planting season. More information about specifying young trees can be found in British Standard 8545:2014 *Trees: From nursery to independence in the landscape – Recommendations*.

6.6 Biosecurity

Trees to be planted in Stonehouse will be sourced from nurseries which supply

New trees will be established responsibly and sustainably

6

UK-grown stock or, if imported, have appropriate biosecurity and quarantine measures in place. Biosecurity is a critical issue which must be considered in all tree planting and maintenance operations – importing trees from other countries without using reputable nurseries or ensuring appropriate quarantine regimes will risk bringing new pests and diseases into the country or moving pests and diseases from one part of the UK to another. Alternatives to planting, such as natural regeneration, will be considered as and when appropriate.

6.7 Tree pits

New trees will be planted in tree pits to a specification appropriate to the site. In soft landscapes this might consist of a simple hole in the ground; in hard landscapes more highly-engineered solutions may be required. Methods such as planting trees into buried concrete rings to inhibit root growth are not appropriate and should not be considered. Planting specifications may vary from one location to another but as standard it can be expected that new trees will be container-grown, between 12-20cm stem circumference and secured using two timber stakes and rubber ties. The preferred surface treatment for newly-planted trees is organic mulch, preferably sourced from material generated through previous tree removal and pruning, although an alternative material may be required in certain circumstances, such as where pedestrian footfall is particularly heavy. Efforts should be made to create the best possible rooting environment for trees, with large tree pits containing uncompacted soil (where necessary using engineered tree pit systems) and, if at all possible, establishing underground soil connections between tree pits in hard landscapes.

6.8 Young tree maintenance

Young tree maintenance is essential if newly-planted trees are to survive and become established in the landscape. For the first three years after planting, a new tree will be visited annually so that any necessary maintenance can be undertaken; this might include re-mulching, straightening of stake and ties or clearance of watering pipes. Formative pruning may also be necessary, but this is only to be undertaken by a suitably competent person acting under instruction by the tree owner, following current best practice guidance. After three years a decision will be made as to whether or not the tree is ready for young tree maintenance to come to a conclusion; if so, then the stake and ties will be removed, the surface treatment may be changed, and the tree will be removed from the watering programme. If not, then it may be appropriate for young tree maintenance to continue for an additional period of time. Young tree maintenance will be undertaken by a combination of professionals and competent volunteers through local community groups, and records will be kept.

6.9 Watering

Adequate watering is essential for newly-planted trees. As a general rule of thumb each tree should receive 50 litres of water, once a week, between March and September. Additional watering might be required during periods of drought to ensure establishment. Water should be added to the surface of the tree pit unless there is a watering pipe, in which case half should go down the pipe and half on the tree pit. If watering bags are in place, then they should be used as specified. Sustainable sources of water should be used where possible, with stored rainwater the preferred option. Usage of drinking (potable) water to irrigate trees will often be necessary but should be minimised through sustainable alternatives where possible. Residents should be engaged to water trees using captured rainwater, bath water or

“AS A GENERAL RULE OF THUMB EACH TREE SHOULD RECEIVE 50 LITRES OF WATER, ONCE A WEEK, BETWEEN MARCH AND SEPTEMBER.”

Arboricultural Association tree watering sign on a recently planted wedding cake tree at Stonehouse station

6 New trees will be established responsibly and sustainably

Stonehouse Town Council will:

7. **Plant and establish a diverse range of trees responsibly and sustainably.**
8. **Only plant trees which are UK-grown or, if imported, have gone through an appropriate period of quarantine.**
9. **Work to ensure that at least 95% of all newly-planted trees are still alive three years after planting.**

washing up water where appropriate, particularly during prolonged periods of dry weather. Engaging community groups and using watering tags to encourage participation from residents is encouraged.

6.10 Funding and sponsorship

Processes will be developed to allow residents and businesses to request and/or fund the planting of new trees. Requests to plant trees in specific locations will be assessed by STC and decided on a case-by-case basis. This includes memorial trees; guidelines relating to memorial signs and plaques etc. are covered by the STC Memorials Policy. Residents and businesses wishing to sponsor the planting of trees more generally rather than in specific locations are invited to do so and can contact STC for further information. Grant funding may also be available for some projects.

6.11 Private landowners

The Stonehouse Community Arboretum is intended to include not only trees on public land, but those on private land which are visible from public areas. To this end, residents and businesses are encouraged to consider planting trees on their own property and are able to contact STC for any additional information or support they might require in responsibility and sustainably purchasing, planting and establishing trees. In time it is hoped that grants will be made available from STC to offer financial support to those hoping to plant trees on private land which will benefit the wider community.

6.12 Annual programme

Tree planting is a seasonal activity and one which is led by natural processes. The ideal time to plant new trees is before they come into leaf, and the standard planting season is between October and March. Each year the intention of STC will be to have submitted a tree order by the end of September and to have planted all of the trees by the end of March in the following year. Residents wishing to make a request for a new tree should be aware that, depending on the timing of the request, it might not be possible to plant the tree in the forthcoming season. All newly-planted trees will be recorded by STC for inclusion in the inspection and maintenance regime.

6.13 New trees – Site considerations

When assessing a site for potential tree planting, considerations will include:

- Above and below-ground utilities.
- Sightlines.
- Proximity to infrastructure.
- Proximity to existing vegetation.
- Local heritage.
- Access for maintenance.
- The short, medium and long-term implications of planting.

6.14 New trees – Species considerations

When selecting a species for planting in a given situation, consid-erations will include:

- Overall diversity of the urban forest.
- Ultimate dimensions.
- Species characteristics.
- Soil type.
- Water demands.
- Local vegetation.
- Local heritage.
- Existing and future pest and disease considerations.
- Existing and likely future climate.
- Community preferences.

The Stonehouse Community Arboretum is for everyone

7

7.1 Summary

It is well acknowledged and understood that urban trees bring benefits, but those benefits are not always equally distributed throughout communities. In some towns and cities there is more investment in tree planting and maintenance in wealthier areas, which are typically already more heavily treed than less well-off areas. The main indicator of health is wealth, but there is also a correlation between increased tree canopy and improved human physical health and mental wellbeing. Urban trees have the potential to bring a wide range of benefits to people at all stages of their life, and it is the responsibility of all public bodies to ensure that these benefits are enjoyed equally across society.

7.2 Green equity

This concept can be defined as "fair access to, and governance of, urban forests regardless of differentiating factors such as socioeconomic status, racialization, cultural background or age" (Nesbitt *et al*, 2018). This does not mean that the problem of green inequity can be solved simply by planting trees in less well-off areas, although this might be part of the solution and a balanced public investment across all areas of Stonehouse is to be encouraged. However, it also means that the governance decisions relating to the management of the urban forest should involve all parts of the community.

7.3 The 3-30-300 rule

In 2021 a policy approach to urban forestry was proposed by Professor Cecil Konijnendijk at the University of British Colombia, Canada. The 3-30-300 concept calls for every resident of an urban area to be able to see a minimum of three trees from their house, to live in a ward with a minimum of 30% canopy cover, and to live a minimum of 300m away from the nearest public green space. The 3-30-300 approach has influenced this strategy and it is agreed that these are good aspirational aims to have, but a lack of existing data relating specifically to Stonehouse (other than with respect of canopy cover) means that they have not been adopted as formal policies. However, this should not be ruled out as an option for the future and the importance of visibility of trees from private dwellings, canopy coverage and proximity to public green space is fully acknowledged.

7.4 Rights for future generations

A well-known ancient Greek proverb tells us that the mark of a great society is one in which the older generations plant trees, in the shade of which they know they will not sit. Tree care is not simply a pastime of the present, it is a promise to the future. We must all think in tree time. Aside from being good general life advice (credit to Ted Green), this means that we must understand

> "THE MARK OF A GREAT SOCIETY IS ONE IN WHICH THE OLDER GENERATIONS PLANT TREES, IN THE SHADE OF WHICH THEY KNOW THEY WILL NOT SIT"

A mature pedunculate oak on Laburnum Field

7 The Stonehouse Community Arboretum is for everyone

The Park Oak, Stonehouse's oldest resident

Stonehouse Town Council will:

10. **Seek to invest resources in tree planting, establishment and care equally across Stonehouse.**
11. **Work actively with local schools to promote the importance of trees and nature.**
12. **Actively engage landowners and renters to sign up to the principles of the Stonehouse Community Arboretum Management Plan.**

and acknowledge that trees exist on timescales which it can be hard for us to conceptualise. The oldest living thing in Stonehouse, the Park Oak, was likely an acorn in 1600, during the reign of James I. If looked after and protected properly, it could be a fixture in our town for another 500 years or more. When we consider tree management, we must therefore consider the rights not only of the Stonehouse residents of today, but of those who will live in Stonehouse 10, 100 or 500 years from now. The trees we plant today are the ancient trees of the future.

7.5 Land ownership

Proximity to green space is incredibly important, but it is access to that green space which really matters. Open spaces behind fences might look attractive, but to fully benefit from them, people need to be able to get there. As has been established, trees are good for our community – but this extends to those trees on private land as well as public. Tree owners are encouraged to see themselves as tree custodians; temporary owners of the land on which the tree might have been growing for centuries. One of the key aspects of the Stonehouse Community Arboretum is that it includes all trees in our town, including those on public and private land. Examples of this are trees in front gardens, which – whilst legally possessed by the landowner – will be delivering benefits to the people who live and work nearby. Another example is farmers, because it is on farmland that we find many of our oldest and most important trees. Tree time transcends land ownership, as well as human lifespans.

7.6 Promoting Stonehouse

The Stonehouse Community Arboretum is also intended to promote Stonehouse as a town, with the hope that this unique selling point will attract visitors and investment into the area. It is important that these indirect benefits, as well as the direct benefits delivered by trees, are equally distributed through the community. Promoting the Stonehouse Community Arboretum regionally, nationally and internationally will involve sharing best practice, actively seeking to learn from others, adopting those ideas and practices which might be beneficial to the town and establishing Stonehouse as a world leader in arboriculture and tree care.

Community engagement is critical to the success of the urban forest

8

8.1 Summary

The trees maintained by STC and other public bodies are not owned by them – they are owned by the people of Stonehouse and are being held in trust and managed on their behalf. Urban forestry is primarily a social endeavour (credit to Rob Northrop). For the Stonehouse Community Arboretum to be a true community project, the people of Stonehouse must be encouraged to engage with the trees and woodland in our town throughout every stage of the process. This is not to deny the fact that arboriculture is a specialist discipline and that decisions do need to be taken based on professional advice, particularly relating to risk management and pests and diseases. However, community engagement is still possible. This section outlines some key ways in which the community can be engaged with their trees. Some of these ideas are already happening, some are ambitions for the future. Additional ideas are always welcome.

8.2 Stonehouse Tree Group

If the objectives of the Stonehouse Community Arboretum Management Plan are to be achieved, then participation from all parts of the community is essential. An ambitious programme of tree planting, establishment and care cannot be undertaken by individuals or the Town Council alone. Responsibility must be shared. To this end, a Stonehouse

A Spaeth's alder in the Stonehouse Methodist Church Eco-Garden

8 Community engagement is critical to the success of the urban forest

> “IF THE STONEHOUSE COMMUNITY ARBORETUM IS TO SUCCEED, THEN IT IS ESSENTIAL FOR THE YOUNGEST GENERATION TO GET INVOLVED AND FEEL OWNERSHIP.”

Love heart graffiti on the Elm Road Planes

Tree Group should be formed which can work with STC, local residents, community groups and arboricultural professionals to ensure that the objectives of this management plan are successfully implemented and monitored. This group should be representative of the community it is there to work with.

8.3 Telling stories through trees

An important part of the Stonehouse Community Arboretum is to tell the stories of some of the trees we have in the town, and how they relate to the community. For example, in Stonehouse we have the Bishop’s plane, a cutting from one of the oldest London plane trees in the country, the magnificent specimen in the gardens of King’s Ely school. Only a handful of cuttings were taken, which were planted in locations such as Kew Gardens and Sandringham – and, of course, Stonehouse. And growing in a secret location in the town are some seedings of a Hiroshima ginkgo, one of the trees which survived the atomic bomb in 1945. These trees will be planted out when they are just a little bit bigger. In Stonehouse Park Infant School is an oak tree grown from one of the acorns collected by Prince Phillip, Duke of Edinburgh, who sent them out across the country from oaks in Windsor Great Park which fell in the great storm of 1987. There are many more stories such as this, right on your doorstep, and STC will actively seek to plant more of these special trees in the town and share their stories.

8.4 Tree walks and maps

As part of the 2019 and 2021 Stonehouse Walking Festivals, tree walks were offered – free walking tours, led by a local arboriculturist, to showcase some of the most important specimens in Stonehouse and to tell their stories. It is intended that tree walks will be available every year. As well as guided walks, the best examples of trees in Stonehouse will be added to online and printed maps so that residents and visitors can enjoy their own walks around the town to visit some of the best trees in the area. It is hoped that technology such as QR codes will be used to allow people to learn more about the trees through their smartphones.

8.5 Trees and education

If the Stonehouse Community Arboretum is to succeed, then it is essential for the youngest generation to get involved and feel ownership. STC will work with local schools and youth groups to educate and entertain children and young people with trees, whether in the classroom or out in the field, planting and maintaining them. One common concern around tree planting is that the new trees will be the victim of vandalism, often blamed on young people. This risk can be mitigated against through involving and engaging young people in the process of growing, planting and caring for trees – by making this something they are a part of, rather than something that is being done to them.

8.6 Open-source data and mapping

Some Local Authorities hold their tree data and survey information online, accompanied by maps of tree locations and notable trees, so that it can be accessed and reviewed by the public. This is an aspiration for Stonehouse but can involve costly databases and will require the buy-in of all public bodies who maintain trees in the town. However, it is acknowledged that open-source data can assist with management and help communities feel that they are engaged with, and have ownership of, the urban forest. Until such a time that data is available in this format, STC commits to being entirely transparent with regard to all matters relating to trees and will answer all enquiries as fully as possible.

Community engagement is critical to the success of the urban forest

8

8.7 Communication

STC will seek to communicate with local people when taking significant decisions relating to tree management. Wherever possible, felling notices will be affixed to those trees which are intended for removal in order to notify residents. However, under some circumstances – such as emergency works – it will not be practical to notify residents in this way. Where appropriate to do so, STC will consult with local residents when planting trees immediately adjacent to properties and will be open to discussion about suitable species. Communication with local residents will be carried out in a variety of ways including social media, the STC website and using printed material where required. Progress on the targets set out in this management plan will be reported on using the STC website.

8.8 Tree planting requests

Residents and businesses are encouraged to make requests for new trees. Where the requests relate to land maintained by STC the request will be considered, and an answer given as soon as is reasonably practicable. Where the land concerned is not under the jurisdiction of STC, it will be raised with the appropriate public body or landowner. It should be remembered that there are many restrictions to tree planting, as described elsewhere in this strategy. In many cases it will not be suitable to plant a tree in a given location, sometimes due to above-ground considerations but often due to below-ground restrictions such as utilities. These problems are not always obvious when assessing a potential tree planting site for suitability.

8.9 Community engagement in management

Whilst many tree-related activities such tree work operations or detailed inspections and reports should only be undertaken by appropriate professionals, there are many opportunities for the local community to get involved in caring for the Stonehouse Community Arboretum. This might include tree watering, young tree maintenance activities such as mulching, basic tree inspections, logging and recording instances of pests and diseases and many more. These activities can be coordinated by a combination of STC and the Stonehouse Tree Group. It is important to remember that over-reliance on specific individuals should be avoided, and responsibility for undertaking these key tasks should be split amongst different members of the community, each feeling a sense of ownership for their trees. Local and regionally-based businesses and organisations are encouraged to take an active role in the Stonehouse Community Arboretum. This might include financial contributions, sponsorship or encouraging staff members to volunteer their time for tree care.

8.10 Professional input

As has been explained previously, arboriculture is a specialist profession, and it is essential that qualified arboricultural professionals are fully engaged in the management of the Stonehouse Community Arboretum. This might be in relation to tree inspections or reports, pest and disease concerns, or in tree species selection for new tree planting. The role of the Local Authority tree officer is a very important one. Tree officers are the custodians of urban trees and are vital sources of information, advice and contacts. If the Stonehouse Community Arboretum is to succeed, then it must be through close collaboration between the community and the arboricultural profession.

Street trees being used for tree inspection training

Stonehouse Town Council will:

13. **Create an online map of all Town Council trees and encourage others to participate.**
14. **Help set up a Stonehouse Tree Group to support the delivery of this strategy.**
15. **Respond to any questions, complaints, or concerns about trees openly and honestly.**

9 Miscellaneous

> "A TREE DOES NOT EXIST IN ISOLATION.. ALL TREES ARE PART OF A WIDER ECOSYSTEM IN WHICH MANY ORGANISMS ARE DEPENDENT ON EACH OTHER."

Ancient sycamore on Maiden Hill

9.1 Surface materials around trees

A healthy tree requires a root system which has access to air and water. Where trees are located in soft landscape areas the surrounding surface material might be grass or other vegetation. In grass areas it might be necessary to introduce a layer of organic bark mulch around the base of the tree in order to protect the tree from strimmer damage and to supress the growth of vegetation and weeds. Soil compaction can be an issue around trees in grass areas, where pedestrian or vehicular impact damage can compact the soil and prevent the roots from accessing air and water. In such circumstances it might be necessary and appropriate to ensure the long-term health of the tree through soil decompaction, the addition of organic material or by fencing off particular trees to discourage footfall beneath the canopy. Soil management should often be regarded as being just as important as tree management in order to ensure tree health.

Conditions can be particularly difficult for trees in hard landscaped areas, such as in pavements or car parks, where access to water and air might be limited. Surface materials around these trees should be permeable to air and water as far as is reasonably practicable; appropriate materials for this purpose might be bound rubber crumb, self-binding gravel, organic or inorganic mulch, or resin-bound gravel. Asphalt should rarely be considered and appropriate surface material around a tree and should not be laid up to the base of a tree. Where asphalt is currently in place, an alternative should be sought. More information about materials can be found in the London Tree Officers Association guidance document *Surface materials around trees in hard landscapes* (London Tree Officers Association, 2015).

9.2 Ancient and veteran trees

An ancient tree can be defined as one "that has passed beyond maturity and is old, or aged, in comparison with other trees of the same species" (Ancient Tree Forum, 2015). A veteran tree is not necessarily defined by its ages, but can be understood as "a tree that has survived various rigours of life and thereby shows signs of ancientness, irrespective of its age" (Lonsdale, 2013). Stonehouse has many such ancient and veteran trees, delivering all of the usual benefits of trees but particularly adding to the biodiversity, habitat and cultural value of our town. Some of these ancient trees are open-grown specimens, often found in fields and farmland. It is hoped that STC can work with landowners and other organisations such as the Ancient Tree Forum and Arboricultural Association to ensure that these trees are properly protected and given the space and care they need to survive into the future.

9.3 Hedgerows

Hedgerows, and trees in hedgerows, deliver a particular range of benefits which must not be overlooked. Aside from being key landscape features, hedgerows create green corridors offering connectivity to a range of species, and can perform functions such as improving air quality, mitigating against noise and offering habitat and biodiversity. Hedgerows must be managed in a responsible and sustainable fashion, and require protection. Gaps in hedgerows should be planted using appropriate species and they should be retained and actively managed wherever possible.

9.4 Soil and fungi

A tree should not be regarded as existing in isolation – all trees, even those in urban areas – are part of a wider

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ecosystem in which many organisms depend on one another. One of the key components of this are fungi (Boddy, 2021), particularly the mycorrhiza in the soil with which trees develop mutually-beneficial relationships, creating a greatly-increased rooting area and enabling access to minerals and essential resources which they would not otherwise be able to access. The rooting zone, fungal associations and – crucially – the soil must not be forgotten about when considering tree care. Trees hosting fungi may feature visible fungal fruiting bodies; these should not necessarily be regarded as a problem or a defect and in many cases should be appreciated as part of the wider biodiversity of Stonehouse. Greater consideration should be given to how we treat soil, whether with regard to the application of pesticides and fertilizers, compaction or ploughing.

9.5 Pests and diseases

There are a number of tree pests and diseases of particular concern to urban forests in the UK. Some of these are present in Gloucestershire, others are in the UK but not necessarily in this region, and some are not known to be in the UK at all but are of considerable concern. Significant tree diseases known to be in Gloucestershire include ash dieback (*Hymenoscyphus fraxineus*), Dutch elm disease (*Ophiostoma novo-ulmi*) sudden oak death (*Phytophthora ramorum*) and massaria disease of plane (*Splanchnonema platani*). Pathogens present in the UK but not known to be in Gloucestershire include oak processionary moth (*Thaumetopoea processionea*). Pests and diseases which are not thought to be in the UK at the current time, but are of concern for the future, include Xylella (*Xylella fastidiosa*), emerald ash borer (*Agrilus planipennis*), Asian longhorn beetle (*Anoplophora glabripennis*) and canker stain of plane (*Ceratocystis platani*). A comprehensive list of pests and diseases of concern and useful resources can be found on the Observatree website at observatree.org.uk. In the fight to prevent new pests and diseases reaching the region or the wider UK, robust biosecurity practices are critical in all elements of arboriculture, particularly when sourcing and planting new trees.

9.6 Lights and signs on trees

Requests to install lights in trees, whether permanent or temporary/ festive, will be considered on a case-by-case basis. Any installations must be non-invasive, with suitable strapping used to secure the lights and cables in place rather than screws or nails. Care must be taken not to affect rooting systems during any excavations which might be necessary. Lighting systems should be removed from trees in their entirety every three years as a minimum, in order to allow any necessary tree pruning operations to be undertaken and to reattach the lighting in a safe and appropriate way. No tree work should be undertaken whilst lighting is still installed in the tree. Signage must only be attached to trees in a non-invasive manner, without using screws or nails which can damage the tree and create the conditions under which pests and diseases can flourish.

9.7 Trees in planters

Planting trees in restricted rooting environments should only be considered where it is impractical to plant directly into the ground. Careful consideration should be taken when specifying and installing planters, including pedestrian and vehicular traffic, sightline obstruction, drainage, and the potential for the planter to be used to drop litter in. Species selection is particularly important, and it must be remembered that trees with restricted rooting environments will not develop to their maximum dimensions and are unlikely

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to have long lifespans. Trees in planters will require watering for the lifetime of the tree rather than just for the usual young tree establishment period.

9.8 Innovations and trials

Arboriculture is a relatively young industry, and technological advances offer many opportunities for improving best practice in tree care. These might include the use of smart technology to monitor soil moisture levels or tree health, drones or aerial surveys to assist with inspections, or equipment such as watering bags and engineered tree pits to facilitate establishment and maintenance. It is to be hoped that we can move away from using plastic products for tree planting and establishment (such as watering pipes and tree ties) where appropriate alternatives exist. If Stonehouse is to become a world leader in arboriculture and tree care, then we must embrace these developments and be prepared to trial new systems and methods of working. STC will actively seek out such opportunities in order to become fully involved with, and benefit from, research and development in arboriculture.

Silver birch near Meadow Road Field

9.9 Training, development and careers

It is hoped that the Stonehouse Community Arboretum and associated reputation of the town as being a world leader in arboriculture will create opportunities for the people of Stonehouse to develop themselves though training and volunteering. As well as working with local schools to establish trees as part of the essential curriculum and forest school delivery, the approach towards tree care in Stonehouse should benefit people throughout life. Since 2020 the Arboricultural Association has worked with STC to use trees in the town for training purposes, meaning that there is high-quality arboricultural education already going on in the town. The intention is for this to deliver direct benefits for the people of Stonehouse and for the young people of the town to consider arboriculture a viable career for them, and to be helped in this aspiration by living within the Stonehouse Community Arboretum.

9.10 National and international collaboration

The success of the Stonehouse Community Arboretum is dependent to some extent on sharing ideas and experiences with others, whether in the UK or around the world. Many of the principles of arboriculture, urban forestry and tree care apply around the world, regardless of which country they are taking place in. Tree pests and diseases, for example, do not recognize often arbitrary national borders. STC will actively seek out opportunities for collaboration and engagement to ensure that the best ideas and practices from around the globe are considered and, where appropriate, adopted in Stonehouse. In turn, the work being done in Stonehouse will be promoted and shared with others.

Appendix A
The benefits of trees

Trees deliver many benefits to people (Davies *et al*, 2017). These benefits are sometimes referred to as ecosystem services, and can be divided into three broad areas – environmental, social and economic. Some of these benefits are quantifiable and can be measured and valued in monetary terms (Hand and Doick, 2018), although it is important to remember that many important benefits – including some relating to culture and heritage – cannot be quantified in this way. However, this does not mean that they are any less significant. A selection of quantifiable ecosystem services is described and referenced below, but must not be regarded as an exhaustive list. This summary has been divided up into categories for convenience, but many benefits could be included in more than one category.

Environmental benefits

Air quality

Each year in the UK around 40,000 deaths are attributed to the effects of poor air quality, with a cost burden exceeding £20 billion per annum (Royal College of Physicians, 2016). In London in 2010 air pollution was responsible for 141,000 life years lost, equivalent to around 9400 deaths at a cost of £3.7 billion (Laybourn-Langton, 2016). Trees improve air quality by removing gaseous air pollution through their leaves and stomata and via the interception of airborne particles (Nowak *et al*, 2006; Hiemstra *et al*, 2008). Due to a large leaf area and branch/crown structures which encourage air turbulence, trees are considered to be the most effective type of green infrastructure to improve air quality (Freer-Smith *et al*, 2005).

Water management

Trees play an important role in the urban water cycle (London Tree Officers Association, 2013), intercepting rainwater through their canopy and slowing or preventing much of that water from reaching the ground. Estimates of interception levels vary, but one study in Mexico involving figs (Ficus benjamina) in urban environments found that up to 60% of rainfall could be intercepted by the canopy of the tree (Guevara-Escobar *et al*, 2007). Canopies can direct water, channelling it down the stem and into the pit as opposed to the surrounding area (Xiao *et al*, 2000). Trees and tree pits can reduce surface water runoff from asphalt by as much as 62% (Armson *et al*, 2013) and can significantly reduce costs associated with stormwater management (Mullaney *et al*, 2015). In recognition of these attributes trees are increasingly being incorporated into sustainable drainage systems (SuDS) (CIRIA, 2015).

Biodiversity and habitat

Street trees can be significant contributors to biodiversity in the urban landscape and are an important element of the green grid, helping to create wildlife corridors (Kelly, 2011). Bees and other pollinators use trees as a food source as well as to shelter and nest (Defra, 2014). Trees provide habitat for insects, with 423 phytophagous insect and mite species associated with oak trees in the UK (Barsoum *et al*, 2014). Bats use trees for food and roosting and often use avenues of trees and other linear features as commuting routes (Forestry Commission, 2008). As well as using trees for nesting, perching and feeding, some bird species use urban trees as important stopover points on their migrations (Matthews and Rodewold, 2010). Studies have demonstrated that a greater diversity of bird species can be found where existing street trees have been retained rather than where they have to exclusively rely on newly-planted trees (Barth *et al*, 2015).

Urban cooling

Evapotranspiration from leaves can moderate urban temperatures and mitigate the heat island effect (Qui *et al*, 2013), and temperatures are typically lower beneath the canopy of trees due to the interception of solar radiation and associated shading (Gillner *et al*, 2015). Different sizes and species of trees can have a different effect on this process, but in general terms a greater crown density results in greater interception and lower sub-canopy temperatures (Shashua-Bar *et al*, 2010). Lower temperatures in urban areas assist with improving human thermal comfort (Nasir *et al*, 2015) although this is also affected by factors such as air humidity, wind speed and solar radiation, all of which can be modified by urban trees (Takacs *et al*, 2016).

Carbon sequestration

Carbon sequestration is the process in which carbon dioxide is removed from the atmosphere and held in another form, in this case by, and within, trees (Nowak *et al*, 2013). During photosynthesis trees fix carbon dioxide from the air and store it as biomass, such as in stems and branches (McPherson, 1998). Different tree species sequester varying amounts of carbon depending on their life stage, but in simple terms it can be understood that larger, healthy trees typically sequester and store more carbon, and that long-lived trees will have a greater positive impact on carbon dioxide levels over their lifetimes than short-lived species.

Appendix A

A The benefits of trees

Social benefits

Health and wellbeing

High levels of air pollution, particularly PM_{10}, are a significant problem for human health (Zanobetti *et al*, 2003). The benefits of green infrastructure to health can be seen to extend throughout life. Proximity of pregnant women to green space has been found to have a positive effect on birth weight (Dadvand *et al*, 2012). Increased canopy cover can be positively associated with asthma and allergic sensitisation in children (Lovasi *et al*, 2013) and research has indicated that green infrastructure can combat inflammation-associated illnesses in some urban environments (Rook, 2013). The probability of senior citizens living an additional five years was increased with the proximity of their residence to street trees and other green spaces (Takano *et al*, 2002). Street trees improve the liveability of cities and streets and generally help to improve quality of life for residents and visitors (Wolf, 2010).

Tree canopy is also associated with an increased perception of health; ten additional trees on a city block (approximately 200,000m²) on average improves health perception to the same extent as would an annual salary increase of around £7000 or being seven years younger (Kardan *et al*, 2015). Mental health can also be improved by the presence of trees. Green spaces assist with recovery from stress (Hansmann *et al*, 2007; Natural England, 2009) and hospital patients recover quicker when they have a view of trees (Ulrich, 1984). London boroughs with a higher density of street trees tend to have lower prescription rates for antidepressants (Taylor *et al*, 2015). The COVID-19 pandemic of 2020-2021 highlighted the importance of trees and green space to the mental health of those whose movements were restricted, and brought into focus the importance of accessibility to green space (Berdejo-Espinola *et al*; Ribeiro *et al*, 2021).

Children and education

Trees and tree canopy cover have a positive effect on people of all ages, but the impact on children and their development is particularly interesting. Research has shown that increased

One of the Village Greens

Appendix A
The benefits of trees

tree canopy cover (as distinct from other kinds of green infrastructure) is a significant predictor of student performance in primary schools. In this study, the improvement was most pronounced in those schools which had the highest level of external challenges (Sivarajah *et al*, 2018). Including trees in education through initiatives such as Forest Schools can improve the behaviour of the children involved, as well as encouraging those children to share what they have learned with others in a positive ripple effect (O'Brien and Murray, 2006). A study in London showed that higher daily exposure to woodland was associated with higher scores for cognitive development and a lower risk of emotional behavioural problems for adolescents (Maes *et a*l, 2021).

Amenity

General amenity is arguably the benefit traditionally most associated with urban trees, although research in recent decades have helped to prove that they provide many more tangible benefits (Kirkpatrick *et al*, 2013; Mullaney *et al*, 2015). The amenity value of trees is recognised in law and through the planning process and is one of the key elements of the Tree Preservation Order (TPO) system in the UK (Town and Country Planning (Tree Preservation) (England) Regulations, 2012). Amenity is also taken into account in the quality categorisation process featured in British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations (British Standards Institution, 2012), and the contribution of trees to wider heritage sites is acknowledged by the principal organisations responsible for managing those sites (English Heritage, 2014). Urban trees are often perceived as cultural assets, giving a wider sense of place and providing communities with a link between past and present (Chen, 2015). Quantifying amenity value can be difficult but methods such as the Helliwell System or CAVAT (Capital Asset Value of Amenity Trees) exist which can assist with this process (Helliwell, 2014).

Crime and traffic speeds

Well-maintained green spaces, particularly those containing large-canopy trees, are associated with increased usage of the space and a decrease in crime (Wilson and Kelling, 1982; Kuo and Sullivan, 2001). A 10% increase in canopy cover can lead to a 12% reduction in certain crimes such as robbery, burglary and theft; public street trees are more effective in achieving this than private trees or other types of vegetation (Troy *et al*, 2012; Wolfe and Mennis, 2012). Street trees have been shown to have a positive effect on driver behaviour; soft landscaping adjacent to roads has been proven to increase driver safety (Dumbaugh, 2005; Mok *et al*, 2003). Avenues of street trees in suburban areas can significantly reduce cruising speeds and accidents associated with speed (Naderi *et al*, 2008).

Economic benefits

Buildings and energy use

By creating shade and providing an alternative to the reflective hard surfaces characteristic of the urban landscape, trees reduce the heat island effect and break the cycle in which higher air temperatures lead to the increased usage of air conditioning and higher electricity requirements (Akbari *et al*, 2001). When properly positioned in relation to a building, trees reduce summertime electricity use and the carbon footprint associated with the structure (Donovan and Butry, 2009; Balogun *et al*, 2014). Much of the research into trees and energy use has been undertaken in the USA, where air conditioning usage is more common than in the UK. However, with UK temperatures predicted to rise (Defra, 2009) it is anticipated that air conditioning usage will increase accordingly, along with the associated increase in energy consumption (Caeiro *et al*, 2005).

Property prices and commercial activities

Trees in commercial and retail environments can improve perception of visual quality for visitors and influence consumer behaviour, encouraging them to spend more time and money than they would in a less satisfactory environment (Wolf, 2007; 2004). Commercial activities and increased urban greening should be regarded as compatible, mutually reinforcing practices rather than being in opposition to each other (Joye *et al*, 2010). Research demonstrates that the highest consumer ratings of retail environments were associated with large-canopy trees (Wolf, 2007). Property value can be affected by the presence of street trees, which have been shown to add significant value to nearby properties and reduce the amount of time that they are on the market (Donovan and Butry, 2010; Pandit *et al*, 2013). This might be considered a benefit or a disbenefit of trees, depending on your perspective, but it can be an effective way of making developers understand the value of trees.

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Appendix B

References

Further reading

Below is a list of publications which readers might find of interest with regard to trees and arboriculture. These were not referenced directly in the Stonehouse Community Arboretum Management Plan, but many of them influenced its production.

ARBORICULTURAL ASSOCIATION (2013). *An arborists' field guide: Tree pests and diseases*. Arboricultural Association, Stonehouse.

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Useful online resources

There are many websites which contain useful information about trees, tree care and Stonehouse. Below is an alphabetical list of some which the author feels are particularly valuable (please note that this is not an exhaustive list).

- Ancient Tree Forum: https://www.ancienttreeforum.org.uk/
- Ancient Tree Inventory: https://ati.woodlandtrust.org.uk/
- Arboricultural Association: https://www.trees.org.uk/
- Capital Asset Valuation of Amenity Trees (CAVAT): https://www.ltoa.org.uk/resources/cavat
- European and Mediterranean Plant Protection Organisation: https://www.eppo.int/
- Forest Research (pests and disease resources): https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/
- Green cities, good health: http://depts.washington.edu/hhwb/
- Hedgelink: https://hedgelink.org.uk/
- Know Your Place: http://www.kypwest.org.uk/
- London Tree Officers Association: https://www.ltoa.org.uk/
- Observatree: https://www.observatree.org.uk/resources/
- Stonehouse History Group: https://stonehousehistorygroup.org.uk/
- Stonehouse Town Council: https://www.stonehousetowncouncil.gov.uk/
- Sustainable Soils Alliance: https://sustainablesoils.org/
- Tree Care Supporters: https://treecare.org.uk/
- Trees and Design Action Group Tree Species Selection: https://www.tdag.org.uk/tree-species-selection-for-green-infrastructure.html

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