

Transport visioning - Parking spaces to green spaces

December 2021

Reducing private car use in cities is crucial to securing a greener and healthier future. While the move to electric vehicles is positive, [demand reduction is needed](#) to reduce emissions and congestion.

Cities are an ideal environment to lead the transition away from private car use towards walking, cycling and public transport. One [proven](#) way to do so is by controlling the amount of parking space available to them. Turning parking spaces into green spaces is a better use of valuable urban land.

Green Alliance analysis, which takes Birmingham as a case study, shows the benefits to cities could be large. A study for Birmingham City Council recommended removing 10,000 surplus parking bays to improve the city's planning, control, management and operation of parking. Planting a tree in each of these bays would support the council's adaptation to the effects of climate change by removing traffic pollutants, absorbing excess stormwater runoff, and raising the areas' amenity value, totalling a benefit of £287 million between now and 2050. This is equivalent to the cost of the West Midlands Metro Network's extension which will improve connectivity across the region.

As per Birmingham City Council's [study](#), Green Alliance calculates that the 10,000 parking bays could come from free street parking and private non-residential parking, ensuring the council's revenue from controlled parking (Pay & Display) remains. Reducing private non-residential parking could be achieved by implementing a workplace parking levy which would generate revenue for local public transport, as successfully demonstrated in [Nottingham](#).

Managing private car use demand through parking measures underpins the recently announced [Birmingham Transport Plan](#), which aims to reduce the negative environmental impacts of transport in the city. The plan states that 'where development potential exists, land currently occupied by car parking will be put to more productive use' for instance, green public spaces.

Air pollution

The levels of particulate matter (PM2.5) in Birmingham is double that of the WHO's air quality guidelines and is a major concern among residents. The West Midlands Air Quality Improvement Programme at the University of Birmingham has identified that air pollution in the West Midlands affects 2.8 million people and costs £860 million in public spending per year.

Public First [polling](#) for Green Alliance shows that a fifth of Birmingham residents name air quality as one of the worst things about living in the city. Almost three quarters blame the excessive number of cars on the road and 41 per cent would like more trees to be planted to improve air quality. Of common transport pollutants, PM2.5 causes the most damaging health impacts, yet trees are particularly effective at removing it. Planting 10,000 trees will save nearly £9m in pollution and health costs between now and 2050. As the trees mature over time their capacity to remove PM2.5 increases.

Water absorption

Climate change is bringing more frequent heavy downpours to the UK and cities are particularly vulnerable to flash flooding because most of their surfaces are paved over, leading stormwater to drains which can be overwhelmed by sudden large volumes of water. Trees create infiltration space for water to enter the ground and draw water up into their roots and branches, saving the cost of stormwater being processed through sewers. Over 29 years, the trees will save £100,450 in sewerage costs, in addition to avoiding residents and local businesses the inconvenience and expense associated with flood damage.

Amenity value

Trees provide amenity and aesthetic value to the neighbourhoods they are planted in, reducing stress levels and noise, providing habitats for wildlife and supporting local biodiversity. Studies have also found that street trees are correlated with lower crime rates and are more attractive to walkers. Trees are therefore valued as capital assets, with their value increasing as they grow. In its first year after planting, a medium broadleaf tree is worth £2,071 but this grows to £11,582 by its 29th year. Assuming half of the newly planted trees are medium broad leaf species, and half are large broad leaf species, the total cumulative value over 29 years is £314 million.

Methodology for urban tree financial benefit analysis

Summary

Emission and sewerage savings were estimated by assessing the number of surplus parking bays in Birmingham City Centre in relation to demand, assuming one tree would be planted per parking bay and calculating the annual removal of PM2.5 and water absorption. The monetary value is attached to the value of human health benefits from PM2.5 removal, avoided sewerage charges from stormwater runoff and the amenity value of parking bays replaced by trees (such as improving public wellbeing and reducing localised crime levels).

Parking bays

In 2016, a Birmingham City Council [study](#) identified that Birmingham City Centre has a surplus of 10,000 parking bays in relation to the demand for parking, recommending that the council reduce parking availability by 10,000 bays by 2021. Therefore, this research is based on planting one tree in each of the 10,000 surplus parking bays.

Trees

We assume an even split between large and medium species of broadleaf trees are planted (i.e. 5,000 large broadleaf trees, 5,000 medium broadleaf trees) are planted in 2021.

Cost of installation and ongoing maintenance

The total cost of 10,000 trees installation and maintenance over the period of 2012-2050 is £35,400,000 (cost breakdown below).

Costs	Cost per tree	Cost of 10,000 trees	Cost over 2021-2050
Average purchase cost of 3-4m high tree	£65	£650,000	£650,000
Landscaping of parking bay	£250	£2,500,000	£2,500,000
Watering for first three years	£225	£2,250,000	£2,250,000
Annual maintenance	£100	£1,000,000	£29,000,000
		£6,400,000	£35,400,000

Air pollution

The asset value of PM2.5 (£/ha, 2019 prices) represents the PM2.5 concentrations removed by a tree and the subsequent avoided health impacts over the next 100 years (specifically the cases of respiratory and cardiovascular hospital admissions, and life years lost).

The PM2.5 asset value is calculated by the £ per hectare of new planted trees, [using a tool](#) developed by the Centre for Ecology and Hydrology and Eftec. The tool used looks at the data within the context of the local authority's (Birmingham) area of woodland and population size.

Avoided stormwater runoff

Planting 10,000 trees will save the council £1,432 in [sewerage charges](#) in the first year by absorbing 1,463m³ of stormwater runoff. Severn Trent charge £0.9794 per cubic meter of water processed through the sewerage system. With the trees growing over the period 2021-2050, the amount of stormwater runoff avoided increases and the accumulative stormwater avoided runoff costs amounts to £100,450. The volume of stormwater by year of planting is taken from [Forest Research data](#) on ecosystem services provided by urban trees.

Amenity value

The CAVAT method (Capital Asset Value for Amenity Trees) has been applied to calculate the tangible and intangible benefits that trees have on local populations. It views trees as public assets, assessing how they enhance the public's appreciation of a particular area through factors including improving public wellbeing and lowering crime rates. It also covers the importance of local wildlife and biodiversity. CAVAT was designed to support local authority decision making by calculating the appropriate compensation for the loss or damage to a public tree, providing a financial incentive for their protection.

Public First poll

Question 11A: 'You said you thought air pollution was a problem. Which of the following reasons best explains the primary causes of local air pollution, if any? Please select up to three.'
Top result: 72% of participants selected 'too many cars on the roads'.

Question 24A: Thinking Specifically about the issue of air quality, what measures would you most like Birmingham politicians to take to improve air quality in and around the city, aside from the CAZ? Select up to three. Top result 41% of participants selected 'plant more trees'.

Sources:

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