

Retford Town Centre Neighbourhood Plan
Ecology Study Report

By Nanette Wraith
September 2022

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Terminology quick reference:

- Annual plant: a plant that completes its lifecycle within one year
- Bedding plants: a plant set into a garden bed or container when it is about to bloom, typically an annual used for display and discarded at the end of the season
- Perennial plant: a plant that lives for more than 2 years
- Shrub: a woody plant which is smaller than a tree and has several main stems arising at or near the ground

Notes for the reader:

This report is in direct response to the EOI. All findings relate to the defined 'Neighbourhood Area' on page 5 of that document and the 5 scope criteria a-e.

Much diligence was taken during the cataloguing process however, the numbers contained within this report are best estimates and should be considered as conservative.

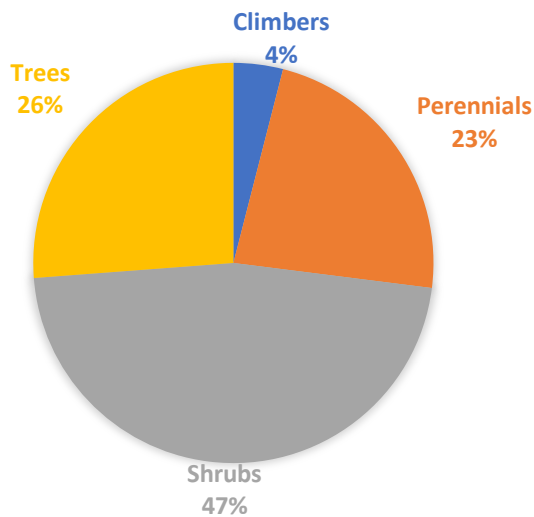
Common plant names have been used for the benefit of the reader however, Latin nomenclature can be provided upon request. Please email n_wraith@yahoo.com.

The author of this report is a professional horticulturalist with over 15 years practical experience in the industry.

Scope a

To catalogue the types of plants and trees in the town centre to:

- Provide a critical analysis of the suitability of plants and trees in the town centre
- Recommend alternative species with pros/cons of each from the perspective of ecological value and the amenity for Town Centre users



This chart depicts the percentage breakdown of all plants, except annuals, within the study area (September 2022).

	Number	Percentage
Climbers	5	4
Perennials	29	23
Shrubs	59	46.8
Trees	33	26.2
Total	126	100

'Number' refers to the number of different species of each type of plant e.g. *Acer pseudoplatanus* (Sycamore) is one species, *Acer saccharinum* (Silver Maple) is another species of tree. Each species is counted individually.

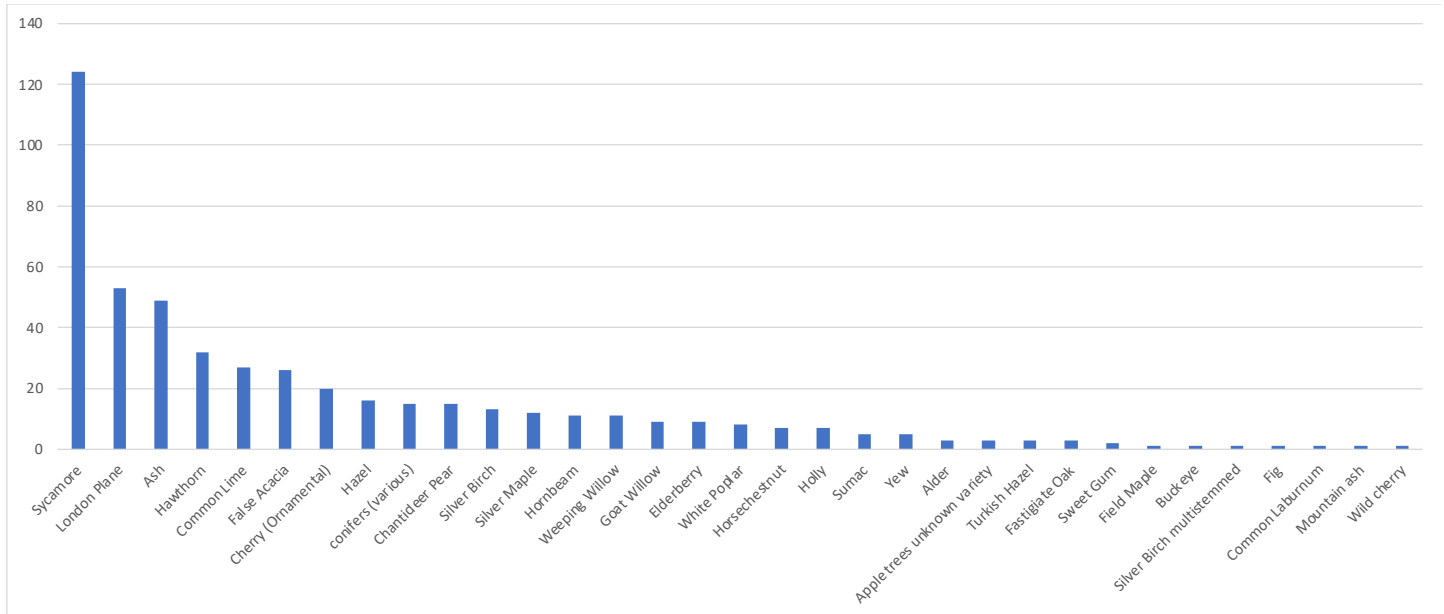
Where trees and shrubs were growing as individual specimens they were counted as such:

TREES 495

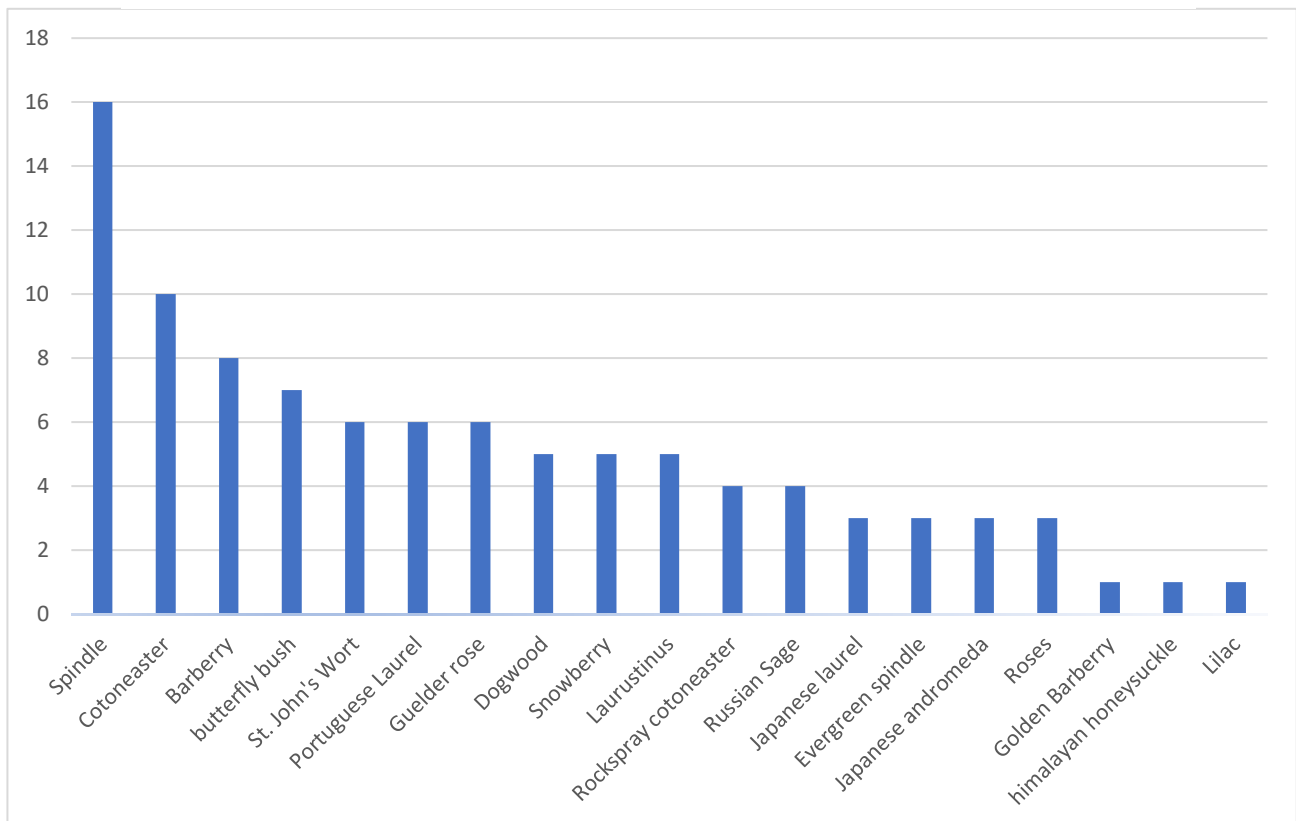
SHRUBS 97

These are likely to be conservative numbers as some areas were overgrown and access was difficult.

A chart depicting the total number of trees within each species



A chart depicting the total number of specimen shrubs within each species



Of the 59 species of shrub identified in the survey only 19 species are growing as specimen plants. The remaining species are all found within hedging.

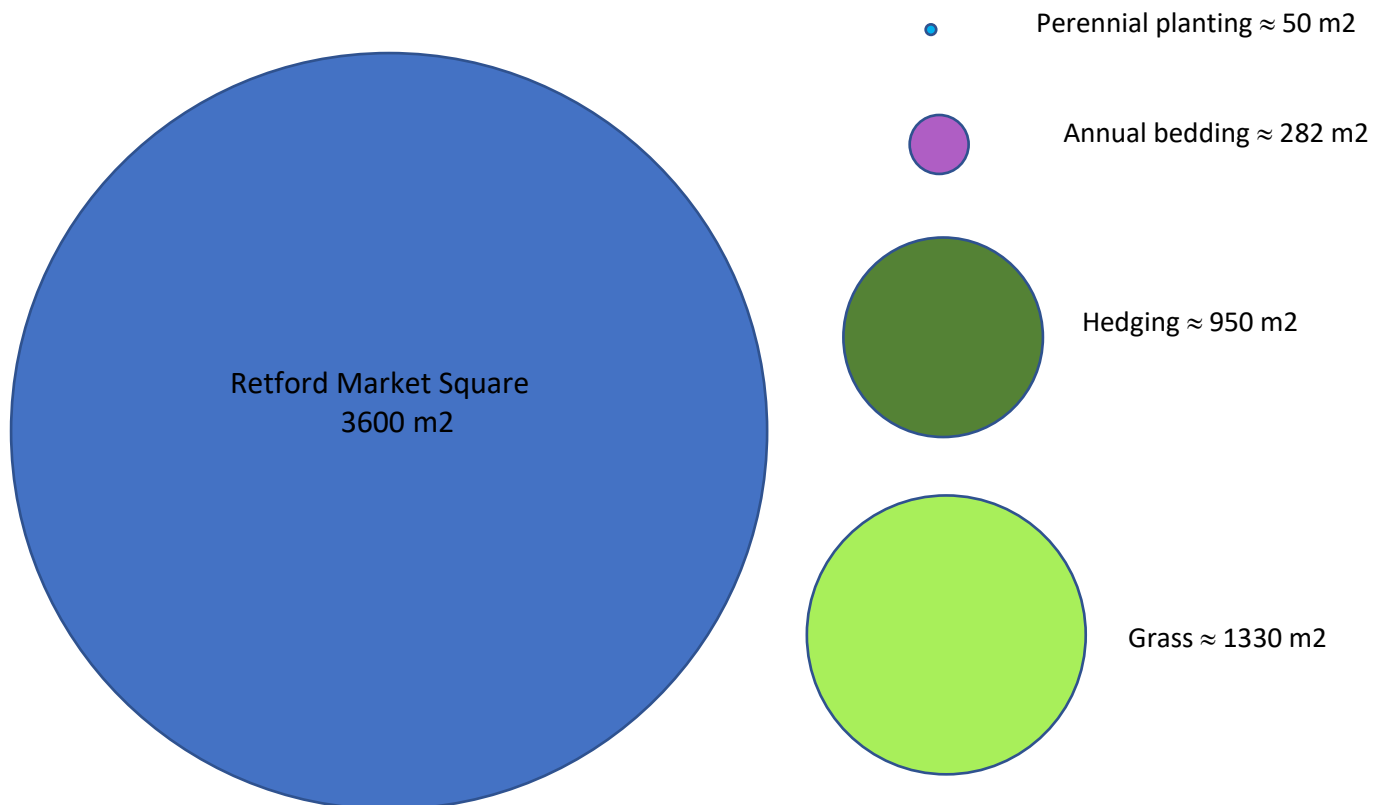
In this instance the area of the hedge was calculated in square metres. The same was done for borders of ornamental perennials, annual bedding displays and areas of grass (verges and mown lawn).

HEDGING $\approx 950 \text{ m}^2$

ANNUAL BEDDING $\approx 282 \text{ m}^2$

GRASS $\approx 1330 \text{ m}^2$

PERENNIALS $\approx 50 \text{ m}^2$



To give an idea of scale, the circles proportionally represent the amount of area dedicated to annual bedding, hedging, perennial planting and grass (verges and mown lawn) in relation to the area of Retford Market Square.

Perennials were classed as 'ornamental' or 'weeds'. For the purpose of this study the term 'weeds' implies that the plants have self-sown, were not cultivated in a nursery and were not part of the original planting design. This does not mean that weeds have no ecological value, as quite the opposite is true. The distinction was made to highlight the discrepancy between the amount of annual bedding used and the relatively small amount of perennial planting.



This word cloud illustrates the varieties of ornamental perennials surveyed. The larger the word the more prevalent the plant.

'Weeds' surveyed include:

Mugwort	Goose grass	Common clover
Bindweed	Common mallow	Nettle
Hedge bindweed	Broadleaf Plantain	Burdock
Thistle	Brambles	Cow parsley
Horsetail	Dandelions	English ivy

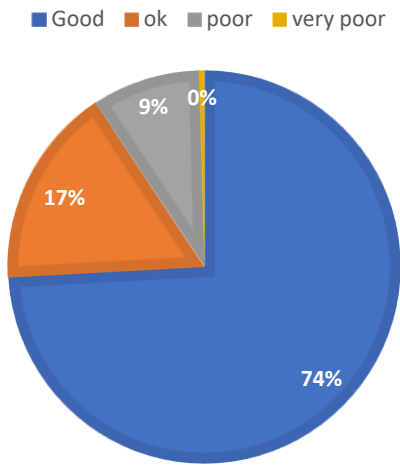
These were mostly found on the canal toe path verges, scrambling through hedges and within borders of perennials and shrubs.

Plant Health

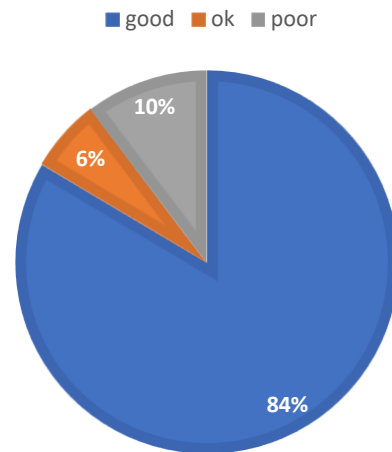
A simple visual assessment was made of each plant. It was then assigned one of the following labels:

- **GOOD** the plant had no visible signs of deterioration or stress and was in optimum condition
- **OK** the plant was showing some minor signs of stress or disease
- **POOR** the plant was visibly weakened and showing clear signs of stress, disease and overall decline
- **VERY POOR** the plant was very weak with over 75% of the leaves absent/canopy loss
- **DEAD**

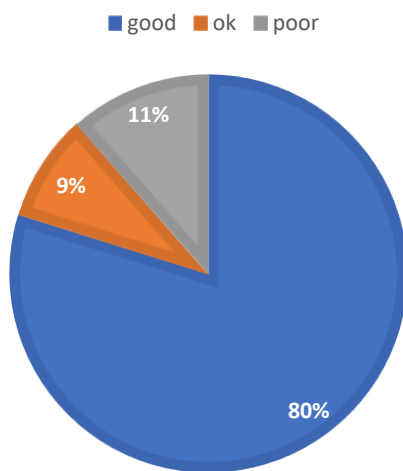
The following charts depict the health of the various categories of plants.



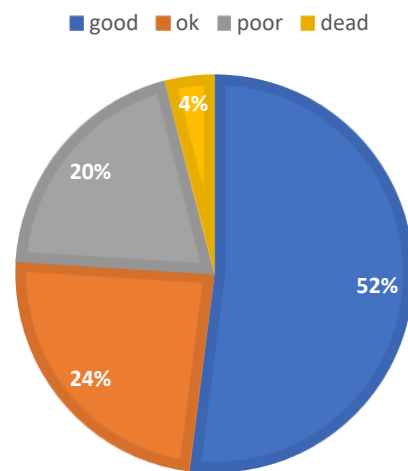
Trees



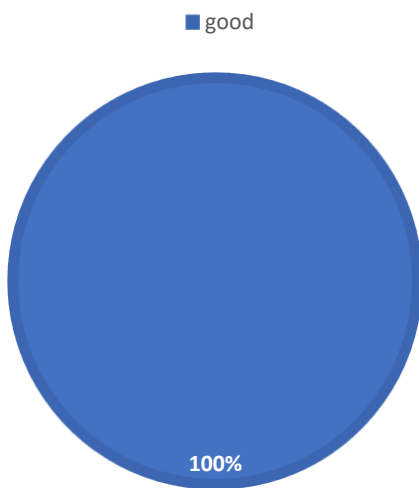
Specimen shrubs



Hedges

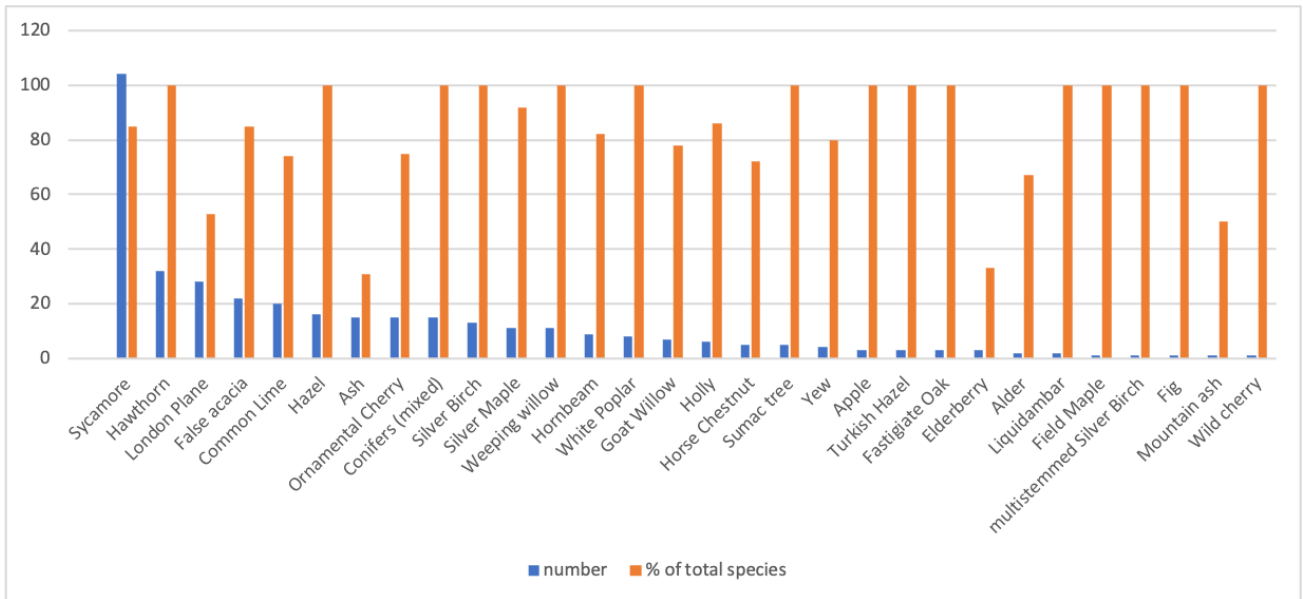


Ornamental perennials



Annual bedding

- The data shows that the vast majority of the plants are in good health.
- The drought conditions of 2022 will have negatively impacted the health of some plants, especially those already struggling.
- Annual bedding has been watered throughout the season and coupled with the high levels of both sunlight and heat is thriving.
- Ornamental perennials experience the lowest percentage of 'good' health as they tend to be planted in raised beds which have higher drainage levels than open ground. They also have not been irrigated like the annuals.
- Not included are the 3 m2 of 'missing' annuals from Carolgate planters.

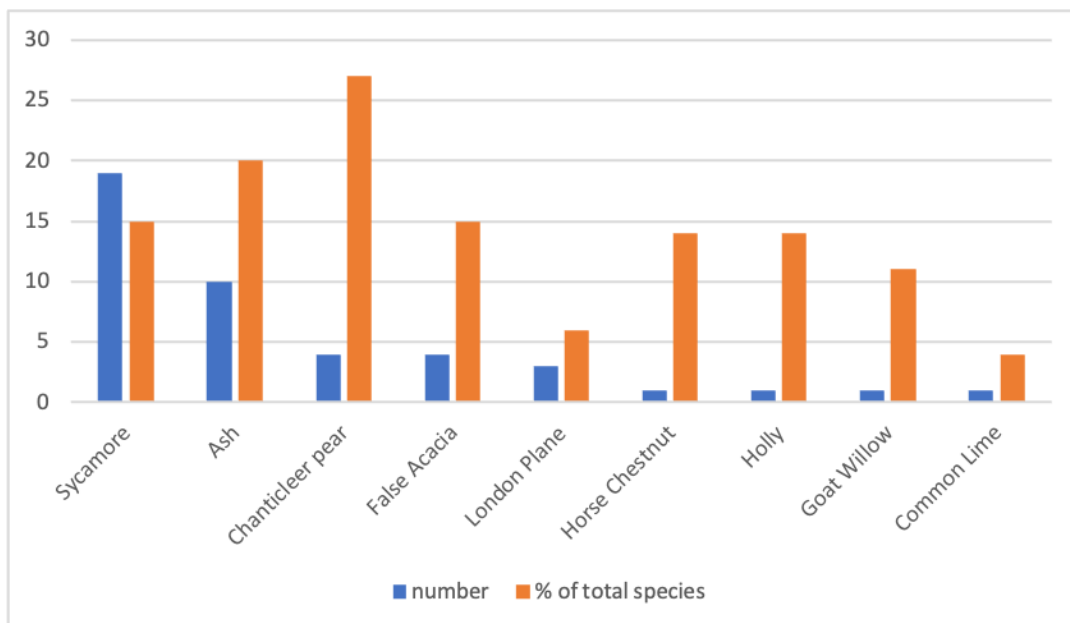


The chart above shows the number of each tree species categorised as being in 'good' health (blue). The orange bar shows how many of each species are in good health as a percentage.

The data highlights the tree species that are struggling:

- London Plane (53%)
- Ash (31%)
- Elderberry (33%)
- Mountain Ash (50%)

About 50% or less of these 4 species are in good health.



The blue bars in the chart above show the number of each tree species categorised as being in 'poor' health. The orange bar shows how many of each species are in poor health as a percentage.

With over 25% of Chanticleer pears and 20% of Ash trees being in poor health these are 2 species of concern

Suitability of current planting and alternatives

- **Annual bedding** One of the first things to note is the relatively high proportion of annual planting in comparison to perennial.



The amount and quality of planting in the Town Centre is undeniably positive. It is however, predominantly comprised of annuals, an unsustainable choice for a progressive and climate conscious Council. A more sustainable option and a relatively easy swap to make would be perennial planting.

Annual Bedding	Pros	Cons
	Large choice of varieties, colours and styles	Large carbon footprint both in nursery growing (compost and energy) and transportation
	Different display every year	High water consumption
	Good for pollinators	High labour costs with bi-annual planting out and changeover of displays
		Provide poor habitats for wildlife

Perennial plants	Pros	Cons
	Display can last several years before needing to be changed/divided	Subtle changes to the display rather than completely different each year
	Lower carbon footprint than annuals	Potentially more expensive initial outlay if buying plants (not seed)
	Can be sown directly from seed into final planting area	Knowledgeable staff required to maintain the borders
	Lower/zero water consumption post plant establishment	Winter stems and seed heads can be viewed as untidy
	Plants can be left overwinter to provide good habitats for wildlife, cut down in spring	

A good example of a successful perennial display is on Arlington Way at the end of Chapelgate (below).



This large raised bed sees a diverse mix of ornamental grasses for year-round interest alongside specimen shrubs for evergreen winter structure and a staggered flowering season. Most plants were healthy and coping well in the drought.

In terms of ecological value there is scope to increase the amount of flower and fruit/seeds within this border but it does a great job of greening up a very grey and traffic-heavy part of Retford.

- **Shelter belts and hedging** The main roads have good hedging and shelter belts comprised of mixed trees and shrubs. These established hedges are a good habitat for birds and small mammals and provide shelter and food. The mix of species also enables a variety of species to live which in turn contributes to a healthier town ecosystem. (e.g. Within the boundary hedge of Churchgate Car Park/Amcott Way there is a minimum of 13 species).
- **Inappropriate planting** An example of such are the fastigate oaks and hornbeam trees along Carolgate and Spa Road. The fastigate oaks have the potential to reach 20m in height and the hornbeams can grow to 10m x 6m wide. Both seem a little out of proportion and somewhat dominant for the relatively narrow area in question.
- **Balancing low maintenance with ecological merit** Much of the shrubs and planting used can be classified as 'low maintenance' with little in the way in terms of ecological benefits. This is clearly an important factor when trying to beautify an urban area with limited finances and resources but maybe ecological value can now be added to the selection criteria for new plantings.

There are a number of contributing factors to the 'poor' health of plants within that category:

- **Density of planting.** Some trees are planted too closely and are struggling for water and nutrients.



These London Plane trees (pictured left) in the Market Square and the Sycamore trees (below) in New Street Car Park are a good example of trees planted too closely. Too much competition leads to poor growth, even more so in urban environments when growing conditions are not optimal. Die back in the canopy of the trees photographed, along with the shedding of dead branches, is a sign of stress within the tree.



- **Planting under trees.** Similar issues are evident with perennials and hedging planted under established trees. The competition for light, water and nutrients is lost by underplanting and the trees struggle too

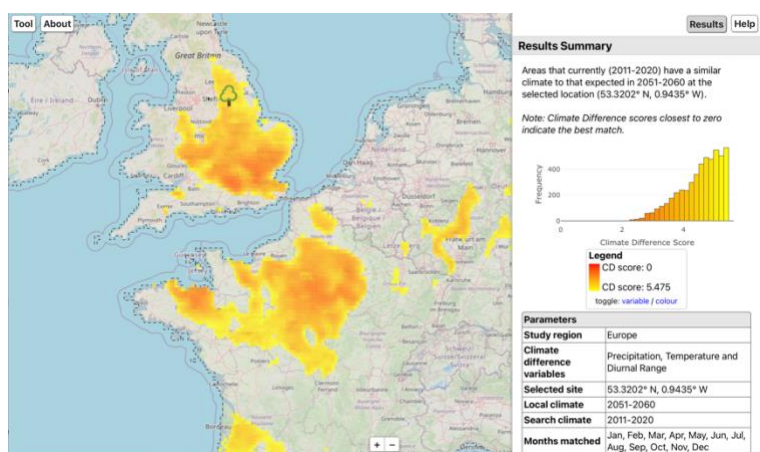


Underplanting has died leaving bare earth. Establishing plants under trees is difficult in urban areas.

- **Lack of water.** Prolonged water stress can stunt plants and trees, cause defoliation and die back. It can weaken a plants immune system leaving it vulnerable to infection and cause roots to desiccate and die. The roots can then rot when the ground is wet in winter. Progressively drier conditions during the growing season, when the plant needs water the most, are the cause of some of the poor plant health witnessed.
- **Age.** Some trees are naturally short lived. Callery pears for example have a life expectancy of about 25 years which may explain the declining health of the majority of the population (especially on Grove Street). They are reaching the end of their life. Also, the additional stress experienced by urban trees (heat, less water, pollution, poorer soils) means their life expectancy will be shorter.
- **Pests and disease.** The rapid increase in pests and diseases affecting plants is by far the largest threat to our national plant population. The sudden rise in new pests and diseases is exacerbated by climate change. Like a 2-pronged attack the milder winters make for a more hospitable environment for pests and diseases that would previously have been killed by frosts and prolonged cold. Alongside that plants that are already stressed by the changing and unpredictable nature of the British climate are more susceptible to pest and disease attack. Ash Die Back is a good example. Only 31% of the Ash trees are in good health with 20% already in poor health. The majority were suffering Ash Die Back with water stress affecting the rest. There is no cure or prevention for Ash Die Back and it is estimated that 80% of all UK Ash trees will be lost.
- **Climate change.** Our climate is changing and with it the landscapes as we know them. It is inevitable that some of the trees and plants within Retford Town Centre will be able to adapt but some will not. For the purposes of this study and the Town Plan which aims to 'Transform the town into a nationally significant area which enhances ecology' I feel more thorough research is needed into how to take the Town Centre planting forward. This not only includes what species should be planted but also how they should be planted i.e. does soil amelioration need to take place? It is not as simple as just choosing 'drought tolerant' plants. We must be more strategic and responsible in our plant choices.

Salient points going forward

- It is important to understand how our climate is changing and what a 2-4°C increase in temperature by 2050 will actually look like. The Climate Matching Tool (see references) predicts by 2051-2060 Retford will have the climate that is currently experienced by parts of London and Northern/central France. The areas in darker orange on the map indicate a closer climate match. This is based on science that predicts the climate of every city in the Northern hemisphere to be moving south towards the equator at a rate of 20km per annum.



- The key to encouraging biodiversity is increasing the overall diversity of the urban plant palette. The biodiversity audit undertaken by Great Dixter Garden showed that the gardens were the most biodiverse area on the estate, more so than the meadows and ancient woodlands mainly because the gardens have such a rich and diverse mix of plants that flower at different times of the year.
- Trees are only part of an ecologically rich Town Centre. We should also be focussed on introducing a wide variety of plants with a range of flowering periods, a mix of deciduous and evergreen and planting designs that maximum soil coverage. Bare soil should be avoided. It is easily eroded by people, wind and rain and starts to release carbon back into the atmosphere.
- To ensure new planting is climate resilient we need to be looking further afield than just native plants. Strategic plant choices should be encouraged.

Scope b

To comment on the feasibility of creating an eco-bridge/corridor across the Town Centre.

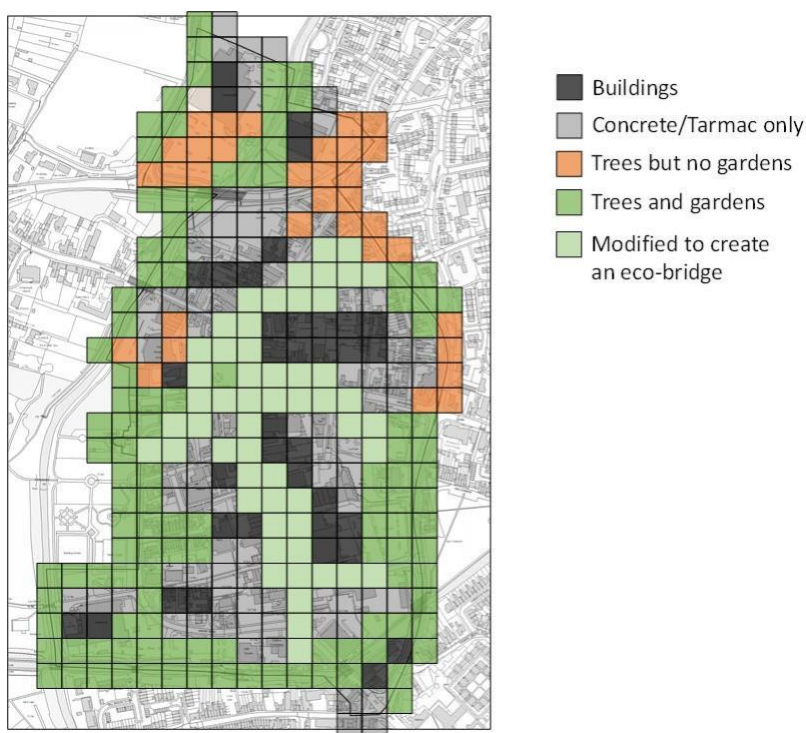


Figure 4: A concept design for an eco-corridor across the town centre

This is an exciting proposition and stands to be highly beneficial for both humans and nature. The aesthetic benefits alone for the users of the Town Centre would be huge, enhancing the already handsome historic architecture. There would also be multiple additional benefits in the form of:

- the cooling effects that larger scale planting has through transpiration
- managing urban rainfall run off

- carbon sequestration by the plants and soil
- increase nectar and pollen sources for bees and insects
- human physical and psychological well-being

Commenting from purely a plant perspective an eco-corridor can definitely be achieved to link up with surrounding parks, the canal toe paths and areas of green space. I would highly recommend the group take a trip to Sheffield where hugely successful urban planting can be seen in their 'Grey to Green' schemes. Year round, climate resilient, biodiverse planting that has transformed grey urban areas into wonderful biodiverse nature havens that have reinvigorated corporate and public appeal. See references.

It is possible to tailor the palette of plants along the eco corridor to seamlessly blend with the outlying existing green spaces e.g. more trees at the junction of the green corridor and Kings Park.

Sheffield Grey to Green



Photo by uk.greencities.eu



Photo by Nigel Dunnett



Photo by Nigel Dunnett



Photo by Sheffield Tribune

A professional Landscape Architect would need to be employed to undertake the design of a green corridor. They can instruct and advise on the process of converting hard landscaping into areas to support planting. They will also be able to incorporate flood control measures into the designs to mitigate for sudden heavy downpours to safe guard businesses and infrastructure. They can pre-empt the best positioning of seating

and other street furniture to maximise the space and benefits for local eateries. They are also able to incorporate vehicle access, charging points, water points and lighting.

A green corridor to link green spaces across Retford would also be a great asset to the town and its inhabitants. The 3-30-300 rule is a new evidence-based principle designed to help guide Landscape Architecture and Town Planning. It states that everybody should be able to see at least 3 trees from their home; there should be at least 30% tree canopy cover in each neighbourhood and that a person should be able to easily access a high-quality green space within 300m.

Another prime example of an urban area being successfully converted into a 'green corridor' is the New York High Line (see references). A derelict elevated trainline has been transformed into a public park spanning 1.5 miles in length. The regeneration of this area has seen a 35.3% increase in the value of homes closest to the High Line (See references: Black & Richards) and is a major tourist attraction, with an estimated 8 million annual visitors.

New York High Line



Photo by loving-newyork



Photo (left) by N. Wraith.
Integrated seating in the shade



Photo (above) by metalocus.es

Scope c

To assess the suitability of planting a tree on the Town Centre roundabout (adjacent to the Market Square)



Photo by N. Wraith

The roundabout in question (pictured left) is a prime candidate for improvement. The raised roundabout with sparse planting of annuals and a tiered arrangement of planters, also filled with annuals, is somewhat underwhelming. It is hard to distinguish it in the photo.

An analysis of the soil within the roundabout should be undertaken to ascertain the depth, quality and ultimately, it's suitability for sustaining a tree.

A small-medium tree could work well in this space and provide a link in the urban tree canopy from Market Place out towards the river on Bridgegate and St. Swithun's church on Chapelgate, that has some magnificent trees within its grounds.

Potential trees to suit this location (depending on the outcome of soil tests) include all the trees already growing in the Town Centre and classified as being in good health (refer to page 8). Additional suggestions:

Suggested tree	Pros	Cons
Acer pensylvanicum (Snake-bark maple)	Architectural bark and habit	No fruit for birds or mammals
	Low maintenance	Can reach 10m in 20-50 years
	Yellow autumn colour	Susceptible to leaf miner
	Yellow flowers in spring	
	Moderate drought and waterlogging tolerance	
Celtis australis (European hackberry)	Leaves like a sycamore (familiar)	
	Good wildlife tree	Inconspicuous spring flowers
	Yellow autumn colour	Can get large (20m in 20-50 years)
	Drought tolerant	
Crataegus laevigata (Midland hawthorn)	Low maintenance	
	Great ecological value with flowers and fruit	Lacks architectural merit
	Tolerant of variety of growing conditions	Fruit can cause mild stomach upset to humans if ingested

	Good autumn colour	
	Not to tall at 8m	
	Low maintenance	
<i>Crataegus x lavalleei</i> 'Carrierei' (Hybrid cockspur)	Red autumn colour late in the season	Informal appearance
	White flowers and large orange berries	Prone to caterpillars
	Tolerant of exposed site and growing conditions	
<i>Tilia mongolica</i> (Mongolian Lime)	Good habit	Can reach 15m. in 20-50 years
	Yellow autumn colour	Winter maintenance – removal of suckers
	Low ecological value	Can be affected by caterpillars and honey fungus disease
	Slow growing	
	Fragrant white flowers in summer	



Trees top row left to right:
Acer pensylvanicum (Snakebark maple)
Celtis australis (European hackberry)
Crataegus laevigata (Midland hawthorn)

Bottom row left to right:
Crataegus x lavalleei 'Carrierei' (Hybrid cockspur)
Tilia mongolica (Mongolian Lime)

Scope d

Identify ecological success stories in the town centre

The criteria used to assess 'ecological success' are:

- Healthy, thriving plants/trees

These were to be found in most areas surveyed but particularly along the canal toe path where hedges are slightly wilder, grass verges are left longer and there is a mix of species to accommodate a wider variety of wildlife and birds. Water is also vital for a healthy ecosystem.

- Appropriate plants and trees to encourage wildlife and insects

The ecological merit of plants and trees was mostly lacking. Or more precisely the scale of planting was too small for significant ecological benefits to be seen. Larger and more complex plant communities need to be created via thoughtful design and plant selection.

- Good levels of insects and birds present (or more than any other area)

No area in particular stood out as being more abundant in birds, insects and wildlife. The summer drought may have been a contributing factor to this.

- Aesthetically pleasing and sustainable design

The bed on the corner of Carolgate and Albert Road has potential with the architectural structure of a multi-stemmed silver birch underplanted with shrubs and perennials. It looks to be relatively newly planted and as it matures it could provide a well-balanced bed with year-round interest and habitats.

- Spaces that feel comfortable to be in and linger in i.e. overgrown land can be a great wildlife haven but hinder human access and use



The trees in Carolgate have a wonderful softening effect, taking the edge off the harshness of the hard landscaping. They make the space less intimidating by filling some of the open space with softness and non-threatening volume.



The raised planters with picnic benches inside have the same effect of breaking up the large open space and creating smaller, more inviting 'rooms' that encourage you to sit, eat, socialise and spend time in the space. Ideally these planters will be replaced by permanent beds planted with a rich tapestry of self-seeding annuals, shrubs, herbaceous perennials and the odd tree, all with ecological value.

Scope e

To assess the quality of the various miniparks identified in the Town Centre:

- Provide a concept design to improve one of the parks
- Comment on the suitability of sites identified in the appendix for other parks

The mini parks include:

- car park planting
- raised beds with planting
- specimen trees set within hard landscaping
- annual bedding in beds and containers

Unanimously, all the mini parks beautify and enhance their surroundings merely by containing plants and bringing natural elements into the urban environment. They all add interest, seasonality, the annual bedding adds colour as well as the strong message that Retford Town Centre is cared for and is a place locals can take pride in. The mini parks are well located and spread across the Town Centre and there was a distinct lack of litter, dog faeces and vandalism.

Some of the mini parks however, are clearly planted up for ease of maintenance and year-round interest i.e. evergreen shrubs, rather than with the specific purpose of being a 'mini park'.

The planting in some of the mini parks was also looking tired.



Top left: End of West Street and Wharf Road. Overgrown with weeds and poorly maintained.

Bottom left and right: Spa Road by the bus station. Dead lavender and large patches of bare earth where other plants have died.

When these mini parks were being assessed no-one was observed utilising the spaces for recreation. They seem to be very transient spaces. Places people walk through rather than intentionally spend time. There was also a lack of wildlife. A few pigeons were seen but no other obvious wildlife.

This is all down to design. The desired purpose of each mini park should be decided upon prior to design. This will then form the design brief. In order to encourage people and nature into these spaces both need to be considered and catered for in the design and layout.

The word 'park' (in relation to outdoor spaces) conjures up images of:

- recreation and leisure
- children playing
- skate parks
- outdoor sports/fitness
- outdoor performances/events
- picnics
- ponds/water features
- benches
- grass/lawn
- flowers
- ice cream
- dog walkers
- birds, squirrels and wildlife
- rubbish bins/recycling
- paths
- trees

Concept design to improve Beardsall's Row
(Roughly 90 sq metres of raised lawn surrounded by a low brick wall.
3 square planters sit on the lawn.)

The planters add very little to this space in terms of colour, interest or benefits to wildlife. They would be removed. The brick wall would also be removed and the soil level dropped to pavement level.



At the southern end of the mini park a wild flower grass seed mix would be sown and allowed to grow long. A simple path mown through it would instantly add texture and interest. Meadow areas are beneficial for insects and small mammals. Bulbs and perennials could be planted into the grass to add interest and colour and prolong the season.

Seating is important to define a space as somewhere people can spend time, relax, eat, rest and socialise. The reclining bench pictured above is very popular (in Freudenstadt, Germany). So much so a second bench was commissioned. There would be 2 seating areas in this mini park, one in the meadow and one in the planted area at the Northern end.



At the Northern end of the park simple beds would be created and planted up with a mix of shrubs, herbaceous perennials, ornamental grasses and bulbs. The design would ensure there was interest, structure and colour all year round as well as a long flowering period for beneficial insects. The borders would be left standing over winter and cut down before growth starts in later winter/early spring.

Access onto and through the site needs to be level and inviting. A softly meandering hard-landscaped path would link the planted beds with the grass meadow. It would also make the most of the length of this mini park and optimise planting and seating areas.



A sculptural piece that also doubles up as a bug hotel would sit well in this space.

References:

Forest Research. Climate Matching Tool

<https://www.forestresearch.gov.uk/tools-and-resources/fthr/climate-matching-tool/>

Forest Research. The Right Trees for Changing Climate Database.

<http://www.richtrees4cc.org.uk/default.aspx>

Great Dixter Biodiversity Audit

<https://www.greatdixter.co.uk/great-dixter-biodiversity-audit>

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Sheffield Grey to Green Scheme

<https://www.greytogreen.org.uk/>

The High Line

<https://www.thehighline.org>