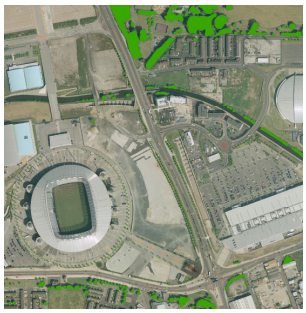
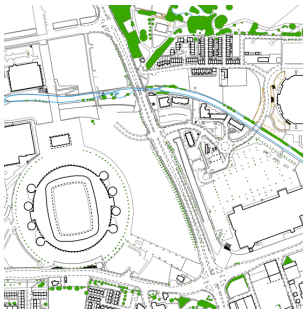
Valuing Manchester's Trees: An Audit of Tree Data and Tree Cover in the City

March 2008





MANCHESTER CITY COUNCIL

redroseforest

executive summary

BACKGROUND

ES1. This study is an outcome of an ongoing process to improve the management of trees in the City of Manchester.

ES2. In September 2007 Manchester City Council commissioned Red Rose Forest to undertake a Tree Audit for the City. The work had two strands:

- Compiling and assessing existing tree and woodland datasets (both those produced by external organisations and those produced by the City Council) to identify ways in which the management and use of tree data could be improved
- Conducting a pilot tree canopy survey of North and East Manchester, using aerial photography

ES3. The Manchester Tree Audit has proved to be a groundbreaking piece of work which has generated considerable interest both locally and regionally. As a result of this work Salford City Council are considering commissioning a similar Audit, and The Red Rose Forest Partnership have requested the Red Rose Forest Team to investigate the possibility of a Forest-wide or Greater Manchester-wide canopy survey.

KEY FINDINGS

Compiling and assessing existing tree and woodland datasets

ES4. Although there are many datasets produced by external organisations which give useful information on aspects of trees and woodlands, they are generally **too specific or limited to be of use** in a holistic and strategic approach to the management of Manchester's trees and woodlands.

ES5. Internal datasets produced and maintained by departments are generally of a **very high standard**, and are most useful when they are complete – the main example is the Street Tree dataset. However, there are several departments which have **little or no systematic recording** of the trees in their management.

ES6. A major information gap is in relation to trees now managed by **Housing Trusts**.

Conducting a pilot tree canopy cover

ES7. The total tree and woodland canopy cover for North and East Manchester was found to be 652 hectares, which given a total project area of 4,236 ha gives a figure of **15.39%.** This is **significantly higher than the national average** for canopy cover in towns of 8.2% and the regional average for the North West of 7.9% (source: *Trees In Towns 2)*.

KEY RECOMMENDATIONS

ES8. To help implement the Manchester Tree and Woodland Strategy and meet Green City Target 5, it is recommended that a **Central Tree Database** is created and maintained by a **Tree Data Group** of Officers from key departments, including Corporate GIS. This will require an on-going commitment from Departments to ensure the long-term sustainability of records.

ES9 The Tree Data Group should **agree standards for access to data** to ensure maximum benefit is gained from tree-related data while recognising the investment departments have made in gathering the data.

ES10. The quality and detail of the pilot tree canopy survey indicate that there would be many uses for a City-wide survey, not only in terms of better management of the City's tree and woodland stock, but also in terms of many 'green infrastructure' benefits of trees, including Climate Change mitigation/adaptation; Air Quality Improvement; Physical and Mental Health; and Flood Risk alleviation. It is therefore recommended to **extend the Tree Cover Survey to cover the remaining wards of the City.**

ES11. Specific recommendations are made in the report for

- Environmental Services
- Housing
- Housing Trusts
- Manchester Leisure
- Environmental Campaigns and Green City Teams
- Education
- Health and Social Care
- Landscape Practice
- Planning
- Regeneration Teams
- River Valley Projects
- Community Network for Manchester
- Red Rose Forest

Commitments to implement the recommendations are sought from these departments and agencies.

ES12. The report includes an **Action Plan** setting out all its recommendations, and makes proposals for **Future Study/Research.**

ES13. An accompanying CD contains relevant maps of tree data and details of the pilot tree canopy survey.

contents

This report has been produced for Manchester City Council by Red Rose Forest. Every effort has been made to gain accurate information. While these sources have not presented problems in the past, it is advisable that figures are double checked before critical and financial decisions are based on them.

introduction

Background to the project

1.1 This study is an outcome of an ongoing process to improve the management of trees in the City of Manchester.

1.2 In March 2005, Manchester City Council adopted its Green City Policy, which included amongst its targets:

> *Target 5: Complete a city wide tree audit, assemble a management and development strategy and require a nett increase of 10% on all new developments.*

1.3 A key milestone in the development of the strategy was the conference *Valuing Manchester's Trees,* held on 16th September 2005 at the Manchester Museum. This involved a wide range of stakeholders in identifying priorities and actions needed for the future of Manchester's trees and woodlands.

1.4 After extensive consultation and partner involvement, the Manchester Tree and Woodland Strategy was approved by the City's Executive Committee in July 2006. It sets out four objectives:

- To Involve Creatively
- To Manage Sustainably
- To Plant Appropriately
- To Protect Strongly

Under the Objective 'To Manage Sustainably', the strategy Action Plan includes the development of a Citywide Tree Audit.

1.5 In September 2007, the City Council commissioned the Red Rose Forest Team to carry out the first phase of the Audit. The original project aim was:

"To rationalise all existing tree data and provide new information in order to provide:

- *an MCC GIS compatible database and map populated with:*
  - *1. a detailed estimate of leaf cover and tree resource in the North and East of the City to 10 m^2 grids;*
  - *2. all existing available tree data for the whole city converted into a compatible format and appropriate typology.*
- *A suggested Management system and process for expanding the detailed datasets to the remaining areas of the city, and of maintaining the records and keeping them up to date. "*

methodology

TREE AUDIT CASE STUDIES

2.1 Approaches to tree audits were explored through a desktop study using existing knowledge within the Red Rose Forest Team, web-based research and discussion with Red Rose Forest partners.

ASSESSMENT OF EXISTING DATASETS

External datasets

2.2 As the Community Forest for western Greater Manchester, the Red Rose Forest Team has considerable experience of collecting and mapping data, and several of the relevant datasets were already held by Red Rose Forest. Others were readily obtainable though internet sites, especially the MAGIC website (www.magic.gov.uk). Datasets were brought into the Red Rose Forest GIS and examined in terms of coverage, consistency, currency and relevance.

Internal datasets

2.3 Between July and October 2007, meetings were held between the Environmental Engagement Manager, Red Rose Forest Operations Manager and representatives of key departments. The purpose of these meetings was to introduce the project to the departments and establish working relationships with the Red Rose Forest Team. Following on from these meetings, departments either provided the datasets directly or provided information on the format of the datasets, with Red Rose Forest then using various tools to convert the data into ArcView shapefiles.

Data Storage

2.4 Because of the overall volume of data obtained and the need to be able to collect large amounts of data quickly and easily from various departments, a portable 400Gb hard drive was used to collect and store data.

TREE COVER SURVEY OF NORTH AND EAST MANCHESTER

2.5 Part of the original brief envisaged a city-wide tree audit using aerial photography to produce detailed information on individual trees, species, size and condition. However, it became apparent that this level of detail is currently impossible to collect from aerial photography alone, and resources were insufficient to carry out a canopy survey of the whole City. It was therefore agreed to undertake a pilot survey in north and east Manchester.

2.6 In Autumn 2007 research was carried out to identify potential consultants and a Brief was issued inviting submissions through a competitive quotation procedure. The successful consultancy was *ecoscape*, led by Chris Senior who has significant experience in aerial photography interpretation (API) and GIS, including the Wakefield Tree Strategy, a good practice example noted in the Manchester Tree and Woodland Strategy.

2.7 The detailed API methodology is set out in *MCC Tree Canopy Cover - North and East Manchester Final Report* (see enclosed data CD). As a result of this methodology, and the high quality of the aerial photography, it proved possible to map tree canopies down to around 2m spreads.

2.8 During the course of the Canopy Survey issues which had to be addressed included:

- Copyright Issues Both Red Rose Forest and the API contractor had to complete Ordnance Survey Schedule 7 *End-user licence for local authority data derived from Ordnance Survey material* in order to use the City Council data.
- Cost of aerial photography access Although the City Council had the right to use the aerial photography data, to provide the data to a third-party contractor an additional licence was required, at a cost of £2,000 plus VAT. This cost was met by the Planning Department, enabling the project to proceed.

2.9 The report and mapping from the pilot survey were received in December 2007.

3.1 There is no standard methodology for conducting Tree Audits, and so an important first stage of the project was to research approaches adopted elsewhere to establish examples of best practice. A number of these examples are listed below.

Overseas - USA

3.2 Some interesting modelling has recently been developed in the USA which provides not only the opportunity to assess city tree populations but to assign values to the benefits these trees provide. i-Tree has been developed by the US Forest Service and others. By inputting complete or sample street tree inventory data, figures can be derived for energy conservation, air quality improvement, carbon dioxide reduction, storm water runoff reduction and uplift in property values. This is a powerful model that could provide useful and tangible figures for the benefits derived from trees that are currently lacking. However, this complex software includes many assumptions based on US situations, and the developers of the software acknowledge the difficulties and potential expense of adapting it for other countries – indeed the models do not even work accurately for all areas of the US at present.

UK wide - Forestry Commission

3.3 Since 1924 the Forestry Commission has carried out a Great Britain-wide survey of trees and woodlands, the *National Inventory of Trees and Woodlands*, every 15-20 years. This is the UK's most comprehensive time series and sampling procedures have become more refined over time. The Inventory consists of two separate surveys - a main woodland survey covering woodland over 2 hectares and another covering smaller woods, groups of trees, linear features and individual trees. The survey is now GIS-based, using aerial photography to derive woodland areas. From this, ground sampling is carried out on approximately 1% of woodland in various size classes. This is therefore using a sample survey to derive information on species, age, management type, etc.

UK wide - Trees in Towns

3.4 The original *Trees in Towns* survey was undertaken for the Department of the Environment in 1992/93 by Land Use Consultants and included 66 cities, towns and villages across eight Government regions (London was not included). The study identified sample areas within towns based on breaking the settlements down into Urban Morphology Types (UMTs), using five primary categories broken down further into subsidiary categories. The research revealed many interesting aspects of the distribution, species composition, size, cover, condition and management of urban trees.

3.5 In February 2008 DCLG published *Trees in Towns II: A new survey of urban trees in England and their condition and management.* This new research, completed in 2005, was designed to provide up-to-date information on the national urban tree stock and urban tree management by local authorities. The project was structured into three distinct but interrelated tasks:

- Strand 1: National tree survey
- Strand 2: Survey of local authorities
- Integration of Strands 1 and 2.

3.6 Strand 1, the national survey of urban trees in England, included a greater number of towns and cities than the 1992 survey, with increased replication. London was included for the first time. Some land classes that were poorly represented in the original survey were omitted, e.g. woodlands.

3.7 The Strand 1 survey was stratified at three levels: Region, Town size and Land use. A total of 147 towns and cities were surveyed, including 10 London boroughs. Within each selected town, up to four 4 ha plots (200 x200 m) were selected from each land use type sufficiently represented there. Plots were randomly selected using on-screen analysis of aerial photos and digital maps. A total of 590 plots (2,360 ha) were surveyed on the ground during June to August 2004, one plot per land use type per town. However, not all of the six land use types were present in sufficiently large and uniform areas within every town to permit even one survey plot to be identified. Consequently, replication was unequal for some land classes, particularly in the small towns – where high density residential, town centre and open space plots were often under-represented. Data were collected using hand-held dataloggers and every tree or group of trees was geo-referenced using a GPS.

3.8 Variables recorded were very similar to the 1992 survey:

- tree status
- species and variety/form
- height, stem diameter and crown spread
- age
- maturity
- condition
- management history
- contribution to the urban environment.

3.9 In addition, aerial photographs for a total of 1,783 plots were analysed to measure the extent of tree canopy cover.

3.10 Strand 2 was a questionnaire survey of Local Authority officers with tree responsibilities.

3.11 Under Strand 3 the report identified 10 targets for 'Raising national standards in LA tree management' – these are listed in Appendix 2.

English City - London

3.12 In 1993 Cobham Resource Consultants carried out the London Tree Survey. It used aerial photography to split the city into either areas of uniform or non-uniform tree distribution. It then attempted to carry out ground based surveys on 3% of the city's area using 1ha sample plots. The information collected at the time was very comprehensive but financial constraints may prevent a similar exercise being undertaken again. The survey concluded that the mean tree and hedge density in Greater London was 28/ha although this varied from 8-43 trees/ha. This translates to a tree population of over 4 million.

Public Participation - Woodland Trust Ancient Tree Hunt

3.13 This project, part funded by the Heritage Lottery Fund, allows members of the public to map and record basic information about ancient trees, veteran and notable trees. It uses a web-based mapping system which then goes through a degree of third party verification. This type of system could provide useful additional information on trees valued by Manchester people. It also gives a glimpse at the possibility of an online system for viewing maps linked to data. Negotiations have begun on making the technology available through a Manchester portal.

ASSESSMENT OF EXISTING DATASETS

4.1 External Datasets (see also enclosed data CD).

Dataset and access details	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Information for Manchester
Ancient Woodland Inventory Available from Natural England	The Nature Conservancy Council (one of Natural England's predecessors) undertook a 1998 survey of Ancient Woodland - woodlands over 2ha in size that had been in existence since 1600AD, usually of high nature conservation value. This dataset was considered provisional and there was the ability to add to this list via special submission, including areas under 2ha in size. In practice very little has been added to this original list.	✓			✓	Only four areas of ancient woodland were identified in Manchester - parts of Boggart Hole Clough and Baileys Wood in the North of the City, and Cotteril Clough and Sunbank Wood in the South – totalling 52.9ha.
Woodland Habitat Types Available from Natural England	Natural England has some data for woodland habitat sites based on the broad habitat classifications used for Biodiversity Action Plans. The relevant wooded habitats are Lowland Beech and Yew Woodland, Lowland Mixed Deciduous Woodland, Upland Mixed Ashwoods, Upland Oakwoods, Undetermined Woodland and Wet Woodland. The data gives a patchy and incomplete picture.	✓			✓	In Manchester 24.3ha of wet woodland and 32.5ha of undetermined woodland are identified. The other woodland habitats are not represented.
SSSIs Available from Natural England	Sites of Special Scientific Interest (SSSIs) are nationally-important sites for biodiversity. They are designated by Natural England, are often in private ownership and are afforded some degree of protection. They cover all types of habitats.		✓	✓	✓	Manchester has 2 SSSIs, of which one is Cotteril Clough, a 7.1ha woodland.
Sites of Biological Importance (SBIs)	SBIs are non-statutory sites of importance for nature conservation. The Site of Biological Importance (SBI) system in Greater Manchester was established in the early 1980s and was based primarily on the Ratcliffe criteria (1977). The Greater Manchester Ecology Unit (GMEU) operates the SBI Register for the 10 Districts of Greater Manchester, and sites are graded as of GM importance (A), District importance (B) or local importance (C). There are currently 524 SBIs in Greater Manchester		✓	✓	✓	There are currently 34 sites on the SBI Register for Manchester, 24 of which correspond with the Forestry Commission's National Inventory data (see below) and cover 91.8ha.

Dataset and access details	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Information for Manchester
Woodland Grant Schemes	Any woodland which receives finance from the Forestry Commission under the Woodland Grant Schemes (areas over 0.25ha) is plotted digitally and these boundaries are available to download via MAGIC. This information is updated twice a year	✓			✓	At September 2007 45 woodland scheme boundaries are identified, the majority of which are Manchester City Council holdings submitted via Red Rose Forest. The precise area is difficult to calculate as some boundaries overlap, but the dataset does provide a good comparative time series that is easy to access.
National Inventory of Trees and Woodlands From MAGIC website.	Approximately every 15-20 years since 1924 the Forestry Commission has carried out a GB-wide survey on trees and woodlands. The last survey was published in 2002 using 1991-2000 air photo data. The main survey covers woodlands over 2ha and defines them to some extent on type and management. Further details on species composition has been extrapolated and backed up with ground-truthing. There is also some survey data for small woodlands and trees (0.1ha - 2ha) based on sample plots. This is a very interesting dataset as it provides a good time series.	✓		✓		The 2002 data for Manchester identifies 132 woods totally 382.2ha.
Red Rose Forest Woodland Resource Study	In 2000 Red Rose Forest commissioned Eamonn Wall to carry out a Woodland Resource Survey. This surveyed distinct areas of woodland over 0.25ha in size, with a canopy cover of over 50% and an average canopy height of over 10 metres. The woods were initially identified from OS maps and data on ownership, timber quality and basic ecological data collected. Woodlands were plotted using MapInfo and the data linked to a Microsoft Access database.					For Manchester 99 woods were identified totalling 309.4ha.

Dataset and access details	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Information for Manchester
Urban Morphology Types (UMTs)	UMTs in Greater Manchester were first developed in 2000 by the University Of Manchester for a study on behalf of Red Rose Forest into the Urban Timber Resource – for this reason countryside areas were not included. This study identified 9 different UMTs from aerial photography interpretation and then looked at average tree densities within each type, using a mix of air photo interpretation backed up with ground-truthing. In 2004, the UMTs were revised by the Centre for Urban and Regional Ecology (CURE) as part of the ASCCUE Climate Change study. Using the Cities Revealed 1997 aerial photography, 28 UMTs were identified linked to the categories in the National Land Use Database classification. Coverage was for the whole of Greater Manchester. Surface cover was then sampled at 400 points to give average figures for each UMT.				✓	From the Urban Timber resource study, it was estimated there were over 344,000 trees in Manchester. The 2004 study identified over 600 individual polygons in the City, with around 135ha in the Woodland UMT. Using the average surface cover for each UMT, this would indicate an overall tree cover in the City Council area of around 1500ha – 13% of the City.

4.2 Internal datasets (see also enclosed data CD).

Dataset	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Action Recommended
Manchester City Council, Street and Highway trees	Manchester's Street Trees are managed by the Green Spaces Team within Environmental Services, and information is recorded on Lotus Approach, a database like Microsoft Access. Records are held for all the City's street and highway trees, with the dataset containing 23,289 records. However analysis undertaken reveals that some records contain multiple trees where they are close together so the actual number of trees is 26,818. The dataset has a map reference which is uploaded into Environmental Services' GIS package FastMap.	✓	✓	✓	✓	ES1: Environmental Services to consider obtaining ArcView licence to enable easier spatial mapping of surveyed trees and easier exchange of information. ES2: Environmental Services to assess potential for introducing Ezy-treev or compatible system
Manchester City Council, Cemetery trees	These are also managed by the Green Spaces Team and recorded in the same way as the street and housing trees. Southern Cemetery is stored in a different dataset. The information is geocoded and plottable. The Cemetery trees inventory is incomplete	✓	✓	✓	✓	ES3: Environmental Services to seek additional resources to enable systematic assessment of Cemetery trees
Manchester City Council, Housing trees in communal areas	These are also managed by the Green Spaces Team and recorded in the same way as the street and highway trees but stored in a different dataset. The information is geocoded and plottable.	✓	✓	✓	✓	HSG1: Housing to consider starting process of systematic recording of tree stock (could use canopy survey data to assist).
Manchester City Council, Housing trees in tenancies	The Green Spaces Team hold data on Housing Trees within a tenancy envelope but these are only registered if dealt with as part of a request/complaint. This information is not geocoded.	✓	✓			As above
Housing Trusts (RSLs)	There are 47 RSLs operating in Manchester. While there are a considerable number of trees under their control, recording of information appears to be highly variable, and the are no systems in place to standardise or share information					HT1: Housing Trusts to develop their systems for assessing their tree stock (could use canopy survey data to assist), introducing systematic/ cyclical maintenance and protecting trees of note.

Dataset	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Action Recommended
Manchester City Council, Poplar Survey	Following the outbreak of poplar scab in 2000, there was an immediate need to assess the location and condition of Manchester Poplars in City Council ownership. This survey was initiated by Manchester Leisure. In order to assist in this task, Ezy Treev was purchased and the software installed on two HP iPAQ PDAs which then sync to PCs back at Alexandra Park. With a base map preloaded, tree locations are manually plotted on the PDA along with information on their condition. 2319 Manchester poplars were identified and plotted. Ezy Treev is a stand-alone system but the data can be imported into MapInfo and ArcView	✓	✓		✓	ML1: Manchester Leisure to assess impacts of poplar removal and replacement programme, including ensuring replacement trees are mapped
Manchester City Council, Park Trees	After the Manchester Poplar survey was completed mapping of all trees in individual parks was initiated concentrating on those where Green Flag Status was being sought. Only 13 parks/green spaces have had a full survey to date and other are only being surveyed when time allows. This work has been carried out by the Arboricultural Special Projects Officer within Leisure – this has been shown to be both more cost-effective and with better quality than external consultancy. Manchester Leisure would ideally like to add a Risk Assessment module onto the Ezy Treev system. Some information has already been uploaded onto the Corporate GIS system. Leisure's Park tree inventory is incomplete	✓	✓	✓	✓	ML2: Manchester Leisure should continue to invest staff time in expanding its database of surveyed parks trees, with the aim of completing the audit of Leisure trees.
Manchester Leisure Open Space database	As part of the Manchester Greenspace Management Project, consultants TEP produced a database of all its parks and open spaces (157 sites) dated May 2003. This database includes information on Landscape Elements (Woodland or Trees in Grass) and woodland management (management plan, status of compartments etc) but it has not been maintained or developed.					ML3: Manchester Leisure should review the Open Space database to assess whether there is still value in maintaining the system or whether to move to another form of database, perhaps linked to the Corporate GIS system

Dataset	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Action Recommended
Environmental Campaigns	Environmental Campaigns carry out a wide range of projects including treeplanting. At present there is no systematic system for recording this work					EC1: Environmental Campaigns to start process of systematic recording of tree planting
Phase 1 Habitat Data	A Phase 1 Habitat Survey of Manchester was undertaken in 2000 by Lancashire Wildlife Trust and the paper maps produced were digitised. This dataset has not yet been fully assessed but while it does not identify individual tree, it does identify woodlands and through 'target notes' indicates where these were considered to be of biodiversity value. As such it can provide useful data on sites falling below SBI status but still of biodiversity value.				✓	GCT1: Green City Team to fully assess the Phase 1 dataset, esp.to identify how the tree canopy survey can be combined with it for future biodiversity planning
Manchester City Council Education Department	Education own a considerable number of trees, but do not maintain systematic records. Under Local Management of Schools individuals schools contact Environmental Services or a private consultant if they need work undertaking. Site reports for the Building Schools for the Future programme will typically have an ecological report drawn up, with a tree survey in table format and existing/proposed tree locations mapped as AutoCAD files					ED1: Education to start process of systematic recording of tree stock (could use canopy survey data to assist) ED2: BSF to provide data in compatible format.
Health and Social Care	Health and Social Care own a significant number of trees spread over their but do not maintain systematic records. They will contact Environmental Services to undertake discrete pieces of work. They realise that there are good managerial and safety reasons why a tree asset and survey/works registered should be produced but currently this is not prioritised work.					HSC1: Health and Social Care to start process of systematic recording of tree stock (could use canopy survey data to assist)
Landscape Practice Drawings	MCC's Landscape Practice produce design plans for environmental improvement schemes throughout the City. Many of these schemes involve tree planting and the design drawings are produced in AutoCAD. Currently there is no specific capture of this tree information; it just forms part of the overall drawing. While it is not possible to currently give a precise figure of the trees planted over a given timescale, it may be possible to separate the tree data in future and this should be easy to convert to ArcView.				✓	LSP1: Landscape Practice to provide all arboricultural surveys and planting schemes in a format that will enable the locations to be submitted to the Central Tree Database

Dataset	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Action Recommended
Planning Tree Preservation Areas	Planning operate a system for recording data called UNI-Form. This is a system built on an Oracle platform that is also used for the Gazetteer and imminently Valuation and Property. There is a geocoded reference in the data which is then linked to MapObjects, a GIS system produced by ESRI who produce ArcView. It uses .shp files and opens up easily in ArcView. There are currently 306 TPOs issued in Manchester consisting of 298 individual orders and 8 group orders. The mapped TPO data is in a polygon format, showing the location for groups of trees but for individual orders the polygon is mapped for the property the tree is located on, not the precise location of the tree, allowing room for confusion.	✓	✓		✓	PLN1: Planning to assess the feasibility of undertaking a review of Tree Preservation Orders, including loading onto Uniform as actual tree locations, and setting up system to ensure every TPO is reviewed on a specified cycle.
Conservation Areas	There are 35 Conservation Areas in Manchester. They are mapped as polygons but there is some concern about their accuracy. The owners of trees in these areas need to notify the Planning Department of intent to carry out works on all trees. Trees in conservation areas are not specifically protected or individually recorded. The measure is there to flag up whether a tree may need specific protection from a TPO. While the tree may be visited by Planning, Environmental Services and sometimes Landscape Practice, information is only taken in a written format.		✓		✓	PLN2: Planning to consider developing a systematic approach to recording significant trees in Conservation Areas
Planning Applications	In addition many planning applications are now submitted in an electronic format. They will often include arboricultural surveys of existing trees and new planting planned under any landscaping conditions. There are currently technical and resource constraints to transferring this specific data to a GIS format.		✓		✓	PLN3: Planning to investigate the feasibility of requesting that all arboricultural surveys and planting schemes are submitted in a format that will enable the locations to submitted to the Central Tree Database
Regeneration Teams	Regeneration teams work (NDC, NEM, HMR etc commission work that includes tree surveys and treeplanting. At present this information is not provided in a format compatible with a Central Tree Database					RGN1: Regeneration Teams that commission work to investigate the feasibility of stipulating that any arboricultural surveys and planting schemes are submitted in a format that will enable the locations to be submitted to the Central Tree Database

Dataset	Details	Mostly tree data	Statutory function	Regularly updated	High accuracy	Action Recommended
Medlock Valley Woodland Management Plans	In 2007 New East Manchester commissioned the Red Rose Forest Team to carry out a comprehensive survey and woodland management planning exercise based on Forestry Commission management plans. All woodlands in the Medlock Valley have been surveyed and plotted in ArcView with data on individual woodland compartments and species composition.	✓			✓	MDV1: Medlock Valley to ensure that all development of the woodland/tree resource is submitted to the Central Tree Database
Irk Valley	Irk Valley are beginning the process of developing their GIS.					IVP1: Irk Valley to ensure their developing GIS is submitted to Central Tree Database
Mersey Valley	Mersey Valley have not yet obtained a GIS, but are working towards setting up a system.					MSV1: Mersey Valley to seek resources to obtain GIS and ensure their developing GIS is submitted to Central Tree Database
Community Groups	Several community groups operating under the umbrella of the Community Network for Manchester (CN4M) have carried out, or have expressed interest in carrying out, community tree surveys. This ties with an Objective 2 Target of the Tree and Woodland Strategy. To date there has been no system for linking or comparing these surveys, and there is considerable untapped potential for community engagement and the collection of valuable data.					CNW1: CN4M to co-ordinate and link community tree surveys, to a standard compatible with the Central Tree Database.
Red Rose Forest, Green Streets Street Trees	Red Rose Forest's Green Streets project plants several hundred street trees each year in Manchester. Eventually responsibilities for these are taken on by Environmental Services. At the end of each year, the Green Streets team submits an Excel spreadsheet outlining the tree location, species and size to Environmental Services who then transfer this information onto their system. Red Rose Forest does have ArcView and could record the information in this format.	✓			✓	RRF1: Red Rose Forest Team to submit all tree data in a format compatible with the Central Tree Database

Pilot Tree Canopy Survey

4.3 The total tree and woodland canopy cover for North and East Manchester was found to be 652 hectares, which given a total project area of 4,236 ha gives a figure of 15.39%. The consultant compares this with Wakefield MDC which was surveyed at 10.16%, though he points out that Wakefield is a very different borough both in size (337 km2) and urban/rural mix.

4.4 This estimate of tree cover is very high in comparison to the Forestry Commission National Inventory 2002 which gave woodland figures of London 3.9%, Merseyside 3.8% and Greater Manchester 3.7%. However, this study only looked at woodlands over 0.1ha in size and so does not include individual trees or small groups. Of greater relevance is *Trees In Towns 2* which found a national average for canopy cover in towns of 8.2% and a regional average for the North West of 7.9%.

4.5 The proportion of tree cover varies widely between wards as shown below

Ward	%age cover
Ancoats and Clayton	12.65
Bradford	8.47
Charlestown	14.39
Cheetham	10.70
City Centre	3.96
Crumpsall	17.79
Harpurhey	12.26
Higher Blackley	24.57
Miles Platting and Newton Heath	15.64
Moston	15.31

4.6 North and East Manchester clearly has a particularly high level of tree cover. This is of interest as this part of the City is usually seen as less 'green' than the South of the City. The consultant has used an analysis of tree cover by UMTs to produce an estimate of tree cover in the whole of the City of 11.85% of the total area.

4.7 Initial visual assessment suggests that a very large part of the overall figure is contributed by woodlands in Council ownership, especially Heaton Park and Blackley Forest in Higher Blackley; Boggart Hole Clough and Baileys Wood in Charlestown; Broadhurst Park in Moston; and Clayton Vale in Ancoats and Clayton/ Miles Platting and Newton Heath.

conclusions and recommendations

Conclusions on Usefulness of Datasets

5.1 All the datasets assessed provide some useful information that could be used to aid the management of Manchester's Trees and Woodlands. However, most of the external datasets provide either only a limited amount of tree data or detailed information at a fixed point in time and will not be repeated. The most useful external datasets are those that can provide continual comparative data and particularly those that help in assisting statutory functions.

5.2 The key datasets for the City will be its internal datasets, several of which are complete or extensive, containing large amounts of detailed information to a high degree of accuracy.

Recommendations

5.3 In addition to the Departmental Recommendations listed in the Internal Dataset Assessment table above, a number of City-wide recommendations have been identified as set out below.

Creating and Maintaining a Central Tree Database

5.4 While separate departmental databases are best suited to meeting the specific needs of departments, creation of a Central Tree Database (CTD) would contribute to a number of benefits, including:

- Meeting the Tree and Woodland Strategy Target of establishing a "single system approach to data recording"
- Acting as the definitive data source for monitoring changes in tree cover across the City.
- Acting as an appropriate location for tree data not required by existing departmental systems (e.g. community tree surveys)

The most appropriate way of hosting the database would be as an Arcview shapefile on the Citrex system, receiving periodic updates from departmental systems.

Recommendation CTD1: Create a Central Tree Database, hosted by Corporate GIS, updated every 6 months from departmental systems.

5.5 To co-ordinate the development and maintenance of the CTD, it is recommended that a Tree Data Group (TDG) be set up, meeting 6-monthly but communicating more frequently through an email distribution list. Suggested membership of the TDG is:

- Environmental Campaigns
- Environmental Services
- Manchester Leisure
- Planning
- Corporate GIS
- Red Rose Forest

Recommendation CTD2: Establish a Tree Data Group to co-ordinate the development of the Central Tree Database.

5.6 One of the first tasks of the TDG should be to develop an agreed list of critical fields which will be common to all departmental systems and will form the Central Tree Database. These could include:

- Location 1 (general)
- Location 2 (geocoded for GIS – easting and northing in metres)
- Species
- Height
- Diameter at Breast Height (DBH)
- Crown cover
- Age/planting date
- Ownership/ departmental responsibility
- Condition
- Recorder
- Date of assessments

Recommendation CTD3: TDG to develop an agreed list of critical fields for the CTD

5.7 Once the CTD is established, it could be used by Environment On Call to identify trees which are the subject of public enquiries. This would enable any calls coming in regarding trees to have the departmental responsibility for the trees identified, some basic information to be provided to the caller, and the report passed through to the correct Officer.

Recommendation CTD4: The CTD should be made available to Environment On Call and staff trained in its use.

5.8 Although current systems are to a greater or lesser extent compatible, there would be clear benefits for ease of transfer in having departments using common systems wherever possible. The most obvious approach would be for departments to use the corporate standard of ArcView.

Recommendation CTD5: All departments should investigate the feasibility of moving to ArcView, with relevant staff appropriately trained in its use.

5.9 Once data has been uploaded to the CTD, an assessment can be made of its implications for the Tree and Woodland Strategy, and the results reported, in particular to the Tree and Woodland Forum. Red Rose Forest would be an appropriate body to collate and present the report, as a member of the Tree Data Group with a sub-regional perspective.

Recommendation CTD6: Provide 6-monthly reports on Central Tree Database to Tree and Woodland Forum

Access to Data

5.10 Given the considerable financial investment that the City Council has made in the Audit, and in particular in the Tree Canopy Survey, the issue of access to the data generated by the Council needs to be considered. Options include:

- Departments retain all rights on the data they generate, with Environmental Campaigns holding the Tree Canopy data. Access to the data in GIS format is restricted via licence agreement and fees are charged to other departments, academic institutions, private companies and individuals.
- Data is made available via licence agreement and fees charged to private companies and individuals but with no charge for other departments or academic institutions.
- Data is made available via licence agreement with no fee or nominal fee charged.
- Data is free to download without licence agreement.

This is a complex issue which will require further exploration, most appropriately by the Tree Data group to ensure a level of consistency across the Council.

Recommendation CTD7: Tree Data Group to agree standards for access to data

Pilot Tree Canopy Survey

5.11 The quality and detail of the pilot survey indicate that there would be many uses for a City-wide survey, not only in terms of better management of the City's tree and woodland stock, but also in terms of many 'green infrastructure' benefits of trees, including Climate Change mitigation/adaptation; Air Quality Improvement; Physical and Mental Health; and Flood Risk alleviation. Some of the potential uses of a City-wide tree canopy survey are set in Section 7.

Recommendation CAN1: Extend the Tree Cover Survey to cover the remaining wards of the City.

action plan

EC=Environmental Campaigns; ES= Environmental Services; GST= Green Spaces Team; ML=Manchester Leisure; GCT= Green Cities Team; PLN= Planning; RRF= Red Rose Forest

Action	Priority	Action by: Lead	Others	2008 - 2009	2009 - 2010	2010 - 2011
CREATING AND MAINTAINING A CENTRAL TREE DATABASE						
CTD1 Create a Central Tree Database, hosted by Corporate GIS, updated every 6 months from departmental systems.	1	EC	Tree Data Group	●		
CTD2: Establish a Tree Data Group to co-ordinate the development of the Central Tree Database.	1	EC	Tree Data Group	●		
CTD3: TDG to develop an agreed list of critical fields for the CTD	1	EC	Tree Data Group	●		
CTD4: The CTD should be made available to Environment On Call and staff trained in its use.	2	ES		●	●	●
CTD5: All departments should investigate the feasibility of moving to the corporate standard of ArcView, with relevant staff appropriately trained in its use	2	All		●	●	●
CTD6: Provide 6-monthly reports on Central Tree Database to Tree and Woodland Forum	2	RRF	Tree Data Group	●	●	●
CTD7: Tree Data Group to agree standards for access to data	1	EC	Tree Data Group	●		
TREE CANOPY SURVEY						
CAN1: Extend the Tree Cover Survey to cover the remaining wards of the City.	1	EC	Other Depts, RRF	●		

Action	Priority	Action by: Lead	Others	2008 - 2009	2009 - 2010	2010 - 2011
IMPROVING DEPARTMENTAL SYSTEMS						
ES1: Environmental Services to consider obtaining ArcView licence to enable easier spatial mapping of surveyed trees and easier exchange of information.	2	ES		●		
ES2: Environmental Services to assess potential for introducing Ezy-treev or compatible system	2	ES		●	●	
ES3: Environmental Services to seek additional resources to enable systematic assessment of Cemetery trees	1	ES		●	●	●
HSG1: Housing to consider starting process of systematic recording of tree stock (could use canopy survey data to assist).	1	Housing	ES	●	●	●
HT1: Housing Trusts to develop their systems for assessing their tree stock (could use canopy survey data to assist), introducing systematic/ cyclical maintenance and protecting trees of note.	1	Housing Trusts	EC, RRF	●	●	●
ML1: Manchester Leisure to assess impacts of poplar removal and replacement programme, including ensuring replacement trees are mapped	2	ML	RRF	●	●	●
ML2: Manchester Leisure should continue to invest staff time in expanding its database of surveyed parks trees, with the aim of completing the audit of Leisure trees.	1	ML	Park Managers/ Friends Groups	●	●	●
ML3: Manchester Leisure should review the Open Space database to assess whether there is still value in maintaining the system or whether to move to another form of database, perhaps linked to the Corporate GIS system	2	ML		●		
EC1: Environmental Campaigns to start process of systematic recording of tree planting	1	EC		●	●	●
GCT1: Green City Team to fully assess the Phase 1 dataset, esp.to identify how the tree canopy survey can be combined with it for future biodiversity planning	2	GCT		●		
ED1: Education to start process of systematic recording of tree stock (could use canopy survey data to assist)	1	Education		●	●	●
ED2: BSF to provide data in compatible format.	1	Education		●	●	●
HSC1: Health and Social Care to start process of systematic recording of tree stock (could use canopy survey data to assist)	1	HSC		●	●	●
LSP1: Landscape Practice to provide all arboricultural surveys and planting schemes in a format that will enable the locations to be submitted to the Central	1	LP		●	●	●

Action	Priority	Action by: Lead	Others	2008 - 2009	2009 - 2010	2010 - 2011
Tree Database						
PLN1: Planning to assess the feasibility of undertaking a review of Tree Preservation Orders, including loading onto Uniform as actual tree locations, and setting up system to ensure every TPO is reviewed on a specified cycle.	1	PLN		●	●	●
PLN2: Planning to consider developing a systematic approach to recording significant trees in Conservation Areas	2	PLN		●	●	●
PLN3: Planning to investigate the feasibility of requesting that all arboricultural surveys and planting schemes are submitted in a format that will enable the locations to submitted to the Central Tree Database	2	PLN		●	●	●
RGN1: Regeneration Teams that commission work to investigate the feasibility of stipulating that any arboricultural surveys and planting schemes are submitted in a format that will enable the locations to be submitted to the Central Tree Database	2	Regen teams		●	●	●
MDV1: Medlock Valley to ensure that all development of the woodland/tree resource is submitted to the Central Tree Database	1	Groundwork		●	●	●
IVP1: Irk Valley to ensure their developing GIS is submitted to Central Tree Database	1	Groundwork		●	●	●
MSV1: Mersey Valley to seek resources to obtain GIS and ensure their developing GIS is submitted to Central Tree Database	1	Mersey Valley		●	●	●
CNW1: CN4M to co-ordinate and link community tree surveys, to a standard compatible with the Central Tree Database.	1	CN4M		●	●	●
RRF1: Red Rose Forest Team to submit all tree data in a format compatible with the Central Tree Database	1	RRF		●	●	●

FUTURE STUDY/ RESEARCH

6.1 The data assembled by the Audit, in particular the Tree Canopy Survey, will allow further work to be carried out in relation to wide range of issues. Many of these will relate to the 'green infrastructure' benefits of trees including:

- Climate Change mitigation/adaptation
- Air Quality Improvement
- Physical health
- Mental Health
- Flood Risk alleviation

6.2 A list of potential future projects is given below, together with very approximate indicative costs.

Project	Indicative cost
Analysing tree cover Initial processing of tree canopy survey to separate out into MCC-controlled (by department) and private ownership. Will entail liaison with Valuation and Property. Will also provide Parks trees data layer for ML, useful for providing info on non-priority sites or where Green Flag work not yet done	£3k
Ward Tree Cover Improvement Plans **Phase 1** – desktop study in 1 ward with below-average tree cover, analysing potential for increasing tree cover (e.g. in parks, schools, Housing land, street trees, commercial sites and private gardens) **Phase 2** – if sufficient potential identified, working desktop study into a Ward Tree Cover Improvement Plan through on-site assessments, identifying and negotiating with landowners	£1k £2k
Canopy Change Monitoring Yearly/2-yearly assessment of changes in tree canopy change (with ground truthing) in sample UMTs. May need to ensure that UMT boundaries are kept updated.	£2k
Tree cover and Health City-wide analysis of tree canopy cover at Medium-level Super Output Area level, assessing Air Quality status, incidence of physical and mental illnesses, IMD, etc. Pilot delivery project – Phase 1: Work with PCTs and other agencies to identify highest-priority area for intervention and work up a funded delivery project Phase 2 – Work with PCTs and other agencies to deliver increased tree cover in identified area, using project as communications tool for healthy living, monitor impacts over 3-year period	£3k £2k £100k

Project	Indicative cost
Trees and Housing Trusts Pilot project Phase 1 – Work with a selected Housing Trust to work up project addressing Tree management systems, Pilot project Phase 2 – Deliver project, auditing tree stock in Trust area, producing action list, drawing up new Tenancy agreement	£2k £10k
Trees and Climate Change Review the ASCCUE study maximum summer temperature modelling to assess how actual tree cover would alter the model, with a view to identifying areas for tree cover conservation/ enhancement	£2k
Using canopy survey for strategic planning Pilot showing how Audit can be used to guide strategic planning, based on Wythenshawe, inc. Wythenshawe Woodlands	£1k
Strategic road and rail corridors Analysing tree cover along Strategic road and rail corridors and identifying priorities for action in relation to Image, Air Quality, Quality Bus Routes, Walking and Cycling routes (links to LTP2 and *Green Infrastructure in Greater Manchester Phase 1 Report* 3.7.3)	£1k
Strategic recreational routes Analysing tree cover along Strategic Recreational Routes and identifying priorities for action in relation to Image, Air Quality, Walking and Cycling routes (links to LTP2 and *Green Infrastructure in Greater Manchester Phase 1 Report* recommendation 3.4.3.1)	£1k
Strategic approach to planting in Parks Pilot project across one Parks Management Area, identifying locations for replacement of lost trees, locations for 'successors' (for important trees coming to end of life), new uses for redundant areas of parks, planting for shelter/shade	£2k
Poplar removal impacts GIS-based analysis of the impact of poplar removal and replacement on local tree canopy cover, e.g. by ward or park	£2k
Tree mapping for Ward Tree Wardens Training events to allow Tree Wardens to start mapping trees in their patch not covered by other surveys. Capturing Tree Warden surveys into GIS. Also potential for students/schools to get involved	£1k

appendices

Appendix 1: List of supporting documents

England's Trees Woodlands and Forests Forestry Commission, 2007

Greater Manchester Local Transport Plan 2 Greater Manchester Passenger Transport Authority, March 2006

Green Infrastructure in Greater Manchester Phase 1 Report Draft Report by Red Rose Forest for AGMA/Natural England, November 2007

Manchester Tree Conference: Valuing Manchester's Trees, Report on conference 16th September 2005, Manchester City Council

Manchester Tree and Woodland Strategy 2006-2010, Manchester City Council, 2006

MCC Tree Canopy Cover - North and East Manchester Final Report. Ecoscape, Decmber 2007

The Agenda for Growth - The Regional Forestry Framework for England's Northwest , Northwest Regional Forestry Framework Partnership, 2005

Trees in Towns. A Survey of Trees in 66 Towns and Villages in England. Research for Amenity Trees No. 1. Prepared for the Department of the Environment by Land Use Consultants. DoE, 1993.

Trees in Towns II: A new survey of urban trees in England and their condition and management Chris Britt & Mark Johnston for DCLG, February 2008

Appendix 2: *Raising national standards in LA tree management*
– DCLG's 10 Targets from *Trees In Towns 2*

TARGET	MANCHESTER'S POSITION
1. To have at least one specialist tree officer.	Manchester has 6 specialist tree officers (5 in Environmental Services, 1 in Manchester Leisure)
2. To obtain at least £15,000 in external funding for the LA tree programme over the next five years.	Through its own work and through its partners Manchester is currently bringing well in excess of this amount (actual amount varies considerably year-on-year)
3. To develop and implement a comprehensive tree strategy.	Manchester has a comprehensive Tree and Woodland Strategy
4. To undertake a Best Value Review of the LA's tree programme.	This recommendation may no longer be relevant due to changes with the Best Value approach
5. To install a computerised tree management system.	This issue is addressed in the report
6. To ensure that at least 40% of the LA's tree maintenance work is done on a systematic, regularly scheduled cycle.	While all street trees and many parks trees are in a systematic, regularly scheduled cycle, without better data on other Council-owned trees it is not possible to estimate what proportion of the total falls in this category.
7. To ensure that at least 90% of all the LA's newly planted trees, excluding woodland plantings, receive systematic post-planting maintenance until they are established.	This is an area that is being addressed though schemes such as Green Streets but there is no systematic monitoring of post-planting maintenance
8. To establish a programme, within the next five years, that will ensure every TPO is reviewed on a specified cycle.	This is a recommendation of this report.
9. Every LA that has a planning function to have a comprehensive Supplementary Planning Guidance document relating to trees and development.	The G*uide to Development in Manchester* Supplementary Planning Document and Planning Guidance (Adopted April 2007) includes a number of sections relating to trees.
10. Every consent to work on protected trees to be monitored regularly and enforcement action take where necessary.	Currently undertaken by Planning.

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