A report into the availability and suitability of the timber resource of Newcastle City Council and an exploration of its possible uses

Commissioned by Newcastle City Council and Northwoods

Researched and Compiled by

By Phil Royal HND CertEd

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GREAT NORTH FOREST

Newcastle City Council

northwoods

1.0.0 Executive Summary

Newcastle City Council produces at least 400T of utilisable hardwood woodchip and timber from its routine tree management operations, and an upper figure as high as 600T per year is possible.

Neighbourhood Services (NS) at present disposes of these arisings at nil or close to nil cost, via a variety of channels, mainly to internal markets, including using woodchip as an horticultural mulch and larger pieces as firewood. Most of the arboricultural arisings are chipped to waste, but a proportion is taken to Parks and Countryside Training (PACT) for disposal there.

It is recommended that the Council builds partnerships with other organisations with the aim of establishing a market for useable wood fuel chips. This potential heating market could be satisfied from arboricultural arisings material if the Neighbourhood Services department invests in some training and development of it's wood utilisation systems. Some suggestions for partnerships are given and it is recognised that there are a number of permutations and ways of dividing responsibility. The Partners involved in this report have offered to import expertise and contribute financial resources.

1.1.0 Conclusions and Recommendations

- Production of a range of products from Newcastle's urban tree resource is possible and economic as long as a demand for the products can be stimulated and, in some cases, created.

- Valuable by-products can be produced with a little extra capital expenditure and management if processing principles are applied carefully and sensibly. Processing operations, such as chipping and drying, add value to the operation of the Grounds Maintenance team and provides spin off opportunities for employment along with other benefits to the community.

- Selling woodchip to an internal market represents the largest financial return per tonne and also the most ethical, efficient and environmentally sound way of using this material

- Arboricultural arisings should be utilised in a number of environmentally sound ways. One of the most desirable ways in today's environmentally aware society would be in the heating of a major public building; substantial reductions in the amount of fossil fuels burned are possible; one tonne of fuelwood chip contains an equivalent amount of energy to 500L of heavy fuel oil. A large public building, such as a school, would utilise around 200Tpa woodchip fuel, which could easily be provided by Newcastle City Council.

- Investment is required in a drying/storage area for the woodfuel along with equipment for handling the product, a specialist member of staff to operate the machinery and training as necessary. A suitable site for this additional building and machinery would be Jesmond Dene with regards to centrality and security.

- It is possible to utilise the larger parts of the tree in the production of sawn planks and beams, a market which needs to be stimulated and explored with trial batches of timber.

- Production of fairly large amounts of environmentally friendly and locally sourced charcoal would be possible from arboricultural arisings if a partnership was developed with a suitably skilled contractor

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2.0.0 Introduction

The City of Newcastle is a dynamic and forward looking local authority with a history in innovation and excellence in the field of environmental management. The Council, in partnership with Northwoods, is exploring the options available for processing and utilising the arboricultural arisings material generated through tree work in the City. The utilisation of arboricultural arisings from landscape maintenance works contributes towards the Eco Management and Audit Scheme (EMAS). As part of EMAS the Council has a policy of continuing improvement and this project is a key part of that improvement process in reducing the level of waste to zero, and thereby eliminating the cost of waste disposal and utilising arisings in the most cost effective way.

Northwoods are a not-for-profit organisation working with forestry, woodland and arboricultural businesses across the region to promote wood products, support business development, encourage the uptake of wood as a fuel and raise standards within the industry.

Within this report the timber resource available to Newcastle City Council is quantified and evaluated in terms of species, size and quality available. To our knowledge, this is the first time a study of this nature has been undertaken in the UK and this document therefore represents considerable innovation on behalf of Northwoods and Newcastle City Council, particularly in light of the likelihood that Government will introduce legislation on the use of woodfuel to heat public and other buildings.

Existing methods of disposal to internal and external markets are evaluated and the size and nature of potential markets is explored.

A series of costings for disposal options is considered, including chipping for woodfuel or general use, timber milling and charcoal production.

3.0.0 Terms of reference

Use has been made of Forestry Commission, Forest Research Technical and Information Notes, which are listed in the Bibliography. Projects exist nationally which seek to utilise rural timber resources and these have been consulted. Approved techniques of timber volume estimation have been applied where possible. Few examples of a City quantifying its timber resources in terms of harvesting and use exist, although the author has expertise in Urban Forestry and timber mensuration.

The Author thanks Neighbourhood Services (NS) for their help and cooperation in compiling this report, particularly Bill Corbett and Paul Findlay who helpfully and enthusiastically committed time and effort in supplying information relevant to the enquiry.

4.0.0 The determination of the available resource

Within the boundaries of Newcastle City there are around 500,000 trees in public ownership and an unmeasured number of private trees and shrubs. 110,000 public trees are mature and are potential removals in the next couple of decades.

City Engineers specify the area of 'plantation' in the City at 1,823,624m^2 or 182 hectares of wooded area. In making this estimation only a few trees qualify an area to become plantation and this should be used only as a guide. For example, the Great North Road, as a tree lined avenue, is classed as a plantation. For our purposes this informs us that there are a significant number of trees in the area. There is always potential for more silvicultural management in urban areas, the City of Newcastle is no exception.

Silviculture is the science of growing trees where they are required for their timber or other products. It involves providing enough light, water, nutrients and air for each tree to fulfil its optimum growth pattern.

Ongoing removal of street trees for road widening and resident parking schemes continue, as do removals of trees for reasons of public safety, planned maintenance and renovation schemes.

Despite being heavily urbanised there are a significant number of wooded parks and semi-natural denes in the City. These denes contain around half of the standing timber in the City. These wooded areas are managed presently for public safety only with little silvicultural consideration. Trees are removed when they show signs of disease or lose limbs, thus endangering pedestrians, houses or traffic beneath. Approximately 3 very large trees of around 20T are removed per year.

4.1.0 Quantity of wood available

An estimate of the quantity of timber removed by NS follows. There are 3 separate ways of determining this; method one is by multiplying up the estimated quantities based on work output per day per team; method 2 is by taking the weighbridge figures from PACT; method three is by examining the quantity of chips disposed of in the winter months.

- NS operates 3 tree teams, 50 weeks of the year. Every week 3 to 3.5T of chips and timber are removed from site by each of these teams. Chipped directly onto a wagon, woodchips are low in density and bulky.

  This equates to 3x50x3.25 = approx 487T chips and timber per year.

  This figure is an estimate based on estimated amounts of arisings produced; it should be used as a rough guide only.

- NS disposes of its chips and timber at PACT, at a minimal cost of around £1500 p.a. The material is processed by trainees there and sold on to various markets.

  The quantity of this material has been accurately measured using a weighbridge and is reliable.

  Material is graded on delivery at PACT into logs or chips; this is noted on the delivery slips by the weighbridge operator.

  According to this weighbridge figure, NS has disposed of 48T of woody material, 31T of which was logs and 17T of wood chippings since April 1 2004.

  This is a period of 4 months, a rate of removal of 12T per month or 143T per year.

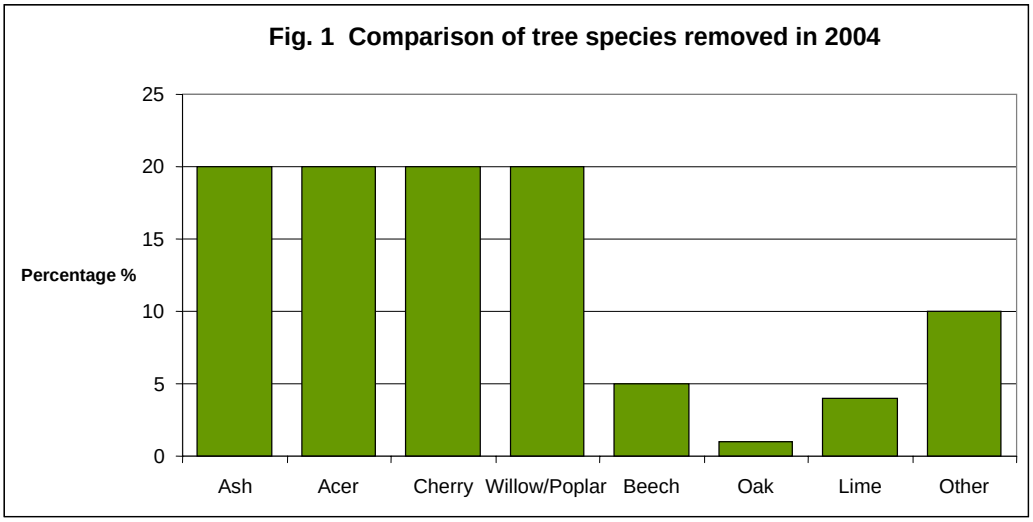
  This figure represents the weight of arisings presently exported from site, at some cost, and disposed of as economically as possible in terms of double handling and distance to disposal site. Travelling time is an issue in Newcastle due to road congestion. The Foremen in charge of operations presently manage each job efficiently and, as each tree team has a chipper, disposes of arisings in the most efficient manner depending on the location of the work. For example, a tree removal in Jesmond Dene offers the opportunity to chip directly into shrub beds whilst a removal in an urban area requires complete removal of all arisings. Quantities weighed in at PACT therefore do not include arisings disposed of in other ways. The difference between the figure or 487T and that of 143T can be explained in this way. It is estimated that the total arisings removed from site is around 400T pa.

- During the 3 winter months, about 20 x 2T vanloads of chips per day are spread onto shrub beds, paths and allotments to suppress weeds and improve muddy access tracks. *This equates to a figure of 12x20x2= 480T of chips* disposed of in this manner in the winter. As these chips have been stockpiled in summer at a NS site we can take this as a guide to the amount of chips available p.a.

4.2.0 Quality and availability of the present resource, from data

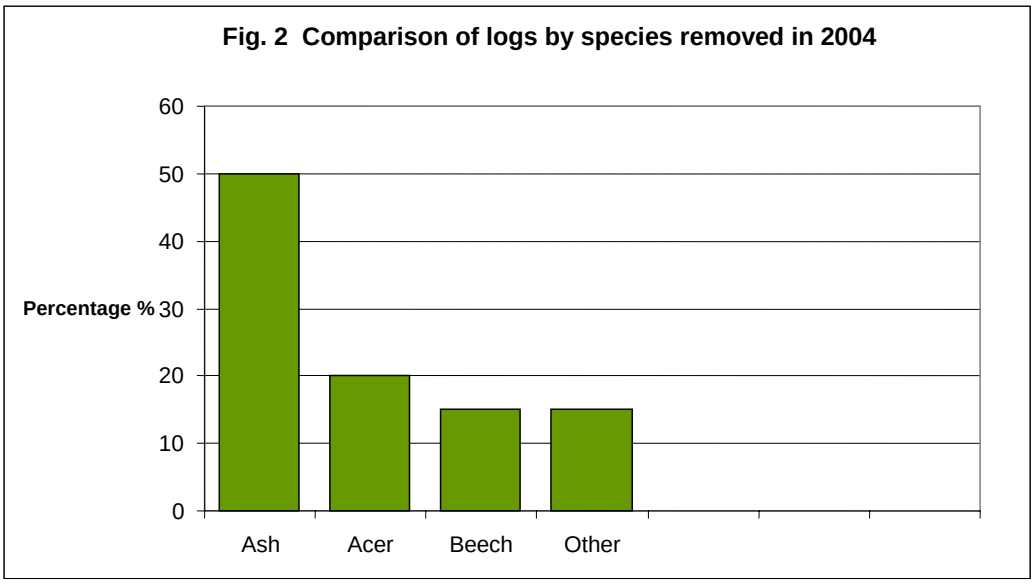
Figures for the availability of wood arboricultural arisings are between 143T and 480Tp.a; I suggest that a working figure for quality chips would be 400Tp.a. My reasons for slightly reducing this figure are based on the different densities of woodchip stacked, shovelled and stored and the diversion of some timber for sawing. Although the weight does not alter, the volume does.

Despite this, there are still some differences in burning quality between wood types and an analysis of the percentages of each timber present in the annual arisings is worthwhile, due to the high quality of the fuel produced.



As can be seen from Fig.1, there is a broad spectrum of species available the Council from its tree stock. Ash, Acer, Cherry, Oak and Beech make excellent firewood and sawn timber for a variety of end users. Small round wood from all types of the tree types here can make valuable charcoal.

Such a wide range of available timber gives a large choice of markets and products, and qualifies the material for use as high grade woodfuel.



As can be seen from Fig.2 there are a limited number of trees which are left in large pieces as logs and not chipped. A value judgement is made by the Foreman and operator on site as to whether or not a piece of wood should be chipped or logged. There is no advantage to the operator in choosing one operation over another as the price for disposal is the same and it only takes a minute to chip a log. Arborists hate arboricultural arisings and adopt the

strategy that what can go as logs, goes as logs. Such decisions help make Newcastle's arboricultural arisings disposal as efficient as it is.

Poorer species such as Rhododendron, Elder and Lilac are chipped. Such chip would have value as a wood fuel.

Some high quality logs are produced and disposed of via PACT.

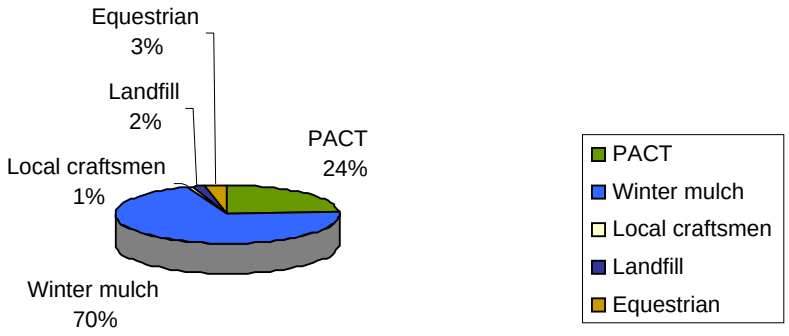
4.3.0 Total number of trees pruned and removed

The City Council has pruned over 3,000 trees since April 2004.

The total number of trees removed this year since April 1st is 1,431.

Fig. 3 shows the destination of the wood arboricultural arisings, it should be used as a guide only as some of the figures are extrapolated.

Fig.3 Destination of Timber and Woodchip 2004 to date



To clarify the terms used above;

Neighbourhood Services work very hard to ensure that arboricultural arisings are recycled as cost-effectively as possible. Because of this, there are already a number of contacts and disposal routes established: PACT has been discussed; winter mulch (see 4.1.0) is spread on flower and shrub beds in winter to suppress weeds, condition the soil and dry out wet access paths.
This material rots down and produces methane, a harmful greenhouse gas much more significant than the products of wood combustion. Local craftsmen; there are a growing number of wood turners and carvers who make beautiful and valuable objects from selected timbers. Rather than allow this portion of their timber to rot, NS has allowed such craftsmen to remove small quantities for free. The very knotty butts of stems are hard to process cost effectively and such pieces are taken to a landfill site. Equestrian arenas utilise woodchip of any grade as a surfacing material, it is comfortable and hygienic for horses to walk on.

4.3.1 Theoretical calculation of quantities available for harvesting

The purpose of this exercise is to calculate the theoretical amount of timber which can be removed from woodland. Forestry calculations allow a maximum of 70% of the yield class be removed each year. The yield class is a figure attached to a group of trees which gives the growth rate of the wood in m3/m/yr.

If an average tree in the City contributes 2.5T (see Cedar Road case study) of wood, then the estimated standing timber resource is in excess of 3 million Tonnes spread over about 180 ha. In a plantation situation this could probably be harvested at a maximum 70% of the yield class which gives a removal rate of 3.5m3 per ha per yr.

Over the entire area there is a potential yield of 630 m3 of timber per year, equivalent to around 630T per year, wet, or about 400T dry weight.

Because of factors peculiar to the urban situation - compaction, vandalism, lack of competition from other trees, etc., this figure is likely to be too high, but is not that far away from the highest estimated figure for actual removals of 487T. In fact if we use this equation;

Amount disposed of as winter mulch + amount taken to PACT = total amount

Then we get: 480 T + 143 T = 623 T pa

It is emphasising that the figure for sustainable removal is based on silvicultural principles and was recorded independently of the evidence collected. The data analysed from the City shows that the amount of timber removed at the present time is sustainable, we can therefore base decisions on the amount of timber available from the resource on this data and avoid the risk of running short of supplies in the future.

This calculation further reinforces the validity and reasoning behind harvesting the urban woodland on a sustainable basis. ie: we are harvesting from our stock of trees at about the right rate to ensure perpetuity of the ‘forest’

After an initial period of operation of the system it may be possible to accept woodchip from third parties. This has the potential to be problematic without the correct management and systems, but with training could be a useful additional, transport cost free, source of woodchips.

Further study into this harvesting limit in an urban environment is required in future.

4.4.0 Case studies relating to timber availability

4.4.1 Cedar Road residents parking scheme

Construction work on Cedar Road

Cedar Road is a busy tree lined avenue through a residential area of Newcastle, the road serves a bus route. The council housing on each side of the road and salt applications have placed constant pressure on the semi mature sycamores lining the edge of the road which are in fair to good health. 15 trees have been removed in this scheme, providing the opportunity to remove some problem trees and provide some residents with off road parking.

The trees removed are all Acer pseudoplatanus, approximately 60 yrs old and 12m high. Their Diameter at Breast Height (DBH) is, on average, 40cm. It is estimated that each tree yields 2.5T of green wood. The stem weight of each will be in the region of 1T, mixed round wood 1T and shredded twigs and small branches 0.5T.

The total weight of wood from the operation is estimated to be 15x2.5T = 38T of mixed arisings.

It is estimated that the stem will yield 0.4m^3 of sawn timber, and up to 1.5T of fuel quality woodchip. Thus from the entire operation about 6m^3 timber and 20T of quality hardwood chip will be produced.

Road altering projects involving the removal of trees such as these are ongoing at the rate of about one per year.

4.4.2 Large Beech tree behind Westgate Community College

This large Fagus sylvatica remains in the yard at the rear of the college building. Recent construction works around the tree have severed and

compacted roots. Little of the soil around the tree remains exposed to the rain and air. The tree is in decline due to these factors and could pose a hazard to the public. It is envisaged that the tree will be removed this year.

It is estimated that the tree will yield up to 2m^3 of sawn timber and up to 10T of quality hardwood chips which are suitable for fuel end uses.

Accurate measurements of the dimensions and weight of the tree will be taken for future calculations of total tree weight.

The tree will be replaced with a more suitable species as per Council policy.

4.4.3 Storage sites and sites for processing operations

Large hardwood logs at Julie Park depot

As can be seen from the map in Appendix 1, NS have access to a number of sites suitable for processing/storage of timber products. One such site is at the **Jesmond Dene depot**. This would be a suitable site for the storage and processing of valuable products, such as sawn timber, and expensive equipment, such as chippers, chainsaws and other handling material. Personnel and facilities are close at hand and the site is secure.

Julie Park is an out of town site with a large area of hard standing suitable for any number of operations, unfortunately it is far from secure and so anything other than chip storage or temporary operations cannot be considered there.

At Julie Park there is also a building which could be used as a store for timber/chips and an estimated 50T of seasoned hardwood timber ready for use as firewood/charcoal/chips. There is, however, a risk from arson to any stored products. Stems of timber could be stored here for short periods of time while awaiting sawing, the sawn timber could then go to Jesmond Dene.

Julie Park has been used for storage of large pieces of timber for years, much of what is there has been picked over by firewood merchants and the remainder is of poor quality. It may be worth sawing up and chipping as although the species are desirable firewood species, the logs are massive and irregularly shaped, and all therefore difficult to process.

5.0.0 Availability and suitability of machinery

5.1.0 Woodfuel production: chips

Some of the woodchip examined on site contained substantial slivers - small branch material causes this when chipped. Therefore, small branch material should be disposed of separately to woodfuel, perhaps chipped to a different end use. Alternatively, a chipper capable of producing the uniform chips required, such as a screw feed chipper, could be purchased.

Different species produce different values of woodchip, with the more desirable species such as Ash and Acer producing more heat and less smoke. However, modern woodchip burning appliances are able to burn virtually any species which is economic and available.

As well as correct processing, there are a number of other important factors to bear in mind when designing a system, including transport, for producing chips.

As woodchips are a low value product, it is desirable to reduce double handling by:

- chipping straight into trailer for transport to the drying site
- chipping straight into a storage place at the heater

Some consideration should therefore be given to the transport of woodchip from the work site to a drying unit, and from there into storage and to the end user. At the minimum this will require two trucks to be loaded. If the drying site was actually at the point of use, then an operation could be avoided. Noise and other factors may prohibit this.

The choice of system depends upon:

- machine availability; the ubiquitous and versatile Transit vans are available and are ideal for transporting raw products to the dryer/storage area. It is unlikely to be economical to use a specialist vehicle for moving woodchips, although the vehicle would be very useful in other circumstances, which may make its purchase cost-effective.
- machine type
- space is available where needed (at roadside, storage area)
- type of material available (see section 4.2)
- whether drying is required, some boiler types require woodfuel to be dried to 35% moisture or less.

Producing chips of the correct quality:

- round wood is better than branch wood for high quality chips
- seasoned material may produce better chip size
- adjust cutters and feed speed for more control over chip size
- keep all cutters sharp
- keep all machinery clean
- monitor availability of grading add-ons for chippers

NS have 3 large 7" Timberwolf disc type chippers which are almost new. These are a good compromise between performance, output and cost. Most chippers are able to produce woodfuel chips if properly maintained and monitored (Forest Research 1998).

The Council is fortunate to have these machines, as they are suitable for the operation of wood chip production as long as anvils, cutting blades and chip size are monitored regularly to avoid slivers. NS have a good relationship with Orange Plant and it is possible that this may result in a rapid development of appropriate machinery.

Slivers (pieces of chip with a length of more than 25mm) are a particular problem with automatic feed hoppers for wood fuel appliances as they can jam up the system (British Biogen 2004). It is therefore important to avoid slivers in the material. Operators need thorough training, not just on operation, but on wood chip production and the need to assure the quality of their product at all times (Forest Research 1998).

There is a standard of classification for chip size developed in Denmark, the Danish Chip Classification. It is recommended that trails are attempted using existing machines to achieve these standards. (Forest Research 1998)

Another standard, called the Biogen Code of Good Practice, should be seen as a guide to woodchip production in the UK. It details the moisture requirements and chip sizes which end users require.

Screw type chippers may be the best for wood chip production as they give a uniform chip size. If the wood fuel route is chosen then it is recommended the

one with a suitable capacity is purchased, although they can be expensive and a little harder to maintain than disc chippers.

5.1.1 Woodfuel production: drying

Moisture content of freshly felled timber can be around 50%, at this level the woodchip produces 2250 Kw/T, if it is first air dried to 25% the energy output goes up to 3800 Kw/T.

Bearing in mind the above fact, it is desirable to air dry the woodchip before use to around 35%. However, it is possible to deliver straight to the place of use where an appliance can first dry and then burn the wood.

Fresh woodchips can have a moisture content as high as 50%. End users require 35% or less in order to make the burning operation efficient. The fuel supplier generally has the responsibility to lower the moisture to this level and costs are offset in the prices charged. Test samples are taken from the chips and are weighed before and after drying to establish moisture content.

A specialised drying rig covering an area of 1600 sqft has been built by Kielder Forest Products Ltd, it consists of a large, perforated, false floor onto which woodchips are piled. Air is forced upwards through the floor and dries the material to 35%. The material is then removed and taken to the end user.

Building costs for this unit are circa £15k and represent a good investment. Operation of the supply chain and machinery would entail a specialist member of staff.

5.1.2 Woodfuel production: pellets

Pellets are made by pushing pulverised wood through die at great pressure. They represent the cleanest and most convenient form of wood fuel. Pellets have a moisture level of <10% because the heat produced at the die evaporates moisture.

Specialist machinery is required to produce pellets which may be invested in at a later date should the market demand arise.

5.1.3 Woodfuel production: grading

Wood chip burning plant requires defined grades of woodchip - stringy material can block feeders and dust can extinguish combustion, so limits have to be set on these elements. The table below defines the parameters of the fuel.

Size	<2mm	2-25mm	25-50mm	50-100mm	100-200mm
Description	*Dust*	*Small*	*Medium*	*Oversize*	*slivers*
Super	<15%	Any	0%	0%	0%
Fine	<15%	Any	10%	2%	0%
Coarse	<15%	Any	Any	<30%	<2%

A maximum of no more than 5% tramp material is desirable. No stones over 25mm. Material over 50mm square is unacceptable for most boiler types

Source; *Wood as Fuel*; BioGen 2004

Some effort should be made to evaluate the form and quality of woodchip produced on site and at the drying stage. Technology is available which would enable the re-grading of fuel during or after chipping.

Prices for woodfuel chip are approximately £45 per Tonne (BioGen 2004).

5.2.0 Milling and sawing timber

Why mill timber?

- To add value to timber for sale
- Convert for City use
- Remove transport costs
- Produce unusual pieces of timber
- Use specific trees for specific products
- Valuable by-products, such as sawdust
- To increase return from felled timber
- Encourages woodland management and enterprise

It is possible to increase value of a £10 tree to £300 if seasoned and planked correctly. It is considered likely that Newcastle City produces trees to which this would apply, if a specialist market can be found for the product. Northwoods are available to assist with this and consider it likely that markets can be found.

Urban trees are considered by many timber merchants as poor quality and uneconomical due to transport costs and small parcel size.

Pre-sale milling of timber maximises returns on small lots of timber, is efficient in terms of road transport costs and utilises most efficiently that which may otherwise go to waste.

An example of one type of mill is the Lucas Board Mill. It is a band-saw, self contained, trailer mounted and towed to site. It is effective for small, medium and large parcels of logs.

Its output varies depending on weather and the availability of hoists. A 2m long 0.5m thick log would take about 1 hr to process into boards, depending

on the size of the product (Forest Research TDB, 2003). This would add value in the region of 300%.
When assessed, the maximum output for small logs was .18m^3/hr. Processing costs per m^3 can be as low as £37.10/m^3.

For medium logs, output is .28/m^3, cost per m^3 can be as low as £28.90/m^3.

For large logs the cost can be as low as £12.2/m^3, although consideration should be given to the additional risk and time in handling large logs.

The mill is uncomplicated, easy to maintain, transportable on a Transit and quick to set up: 20 mins to set up, 10 mins to take down, blade change 10 mins.

A number of contractors are available in the area with similar mobile saw benches, these mills are uncomplicated and easy for trained operators to use.

Value can be added to timber in this way and it should be considered as a form of conversion.

Warning: urban timber may contain foreign bodies such as metal, rocks and nails which can destroy saw blades. Any contractor engaged to do milling work must know the risks in advance and liability decided in advance for this eventuality.

6.0.0 Availability of personnel for additional training in wood chip production and timber processing

All personnel interviewed as part of this study are keen to adopt any system which adds value to their arboricultural arisings. This is a dynamic and forward thinking local authority which places high regard on the importance of the environment. This is reflected in the excellent attitude of all employees in NS.

Additional training may be needed in;

- Production of quality fuel woodchip from various materials
- Quality assurance of the woodchip product
- Valuing and estimating timber weight and potential in standing trees
- Preparing, transporting, storing and seasoning timber
- Dismantling urban trees effectively to maximise their value

I have confidence that the personnel will enjoy and apply such training to the best effect.

No additional staff will be required to undertake any of the recommendations in this report, operations presently carried out with little or no return will be carried out slightly differently with a higher financial and environmental return.

6.1.0 An exploration of potential new markets

A set of examples for opportunities for partnerships are given below, without prejudice, it is a decision for the City as to which are suitable.

- The Council enters a partnership with a private or public body and supplies them direct with fuel woodchip. This would provide a market and eliminate the storage problem for woodchip. The supply of chip can be guaranteed if the system supply requirements are within 400Tpa

- The Council negotiates with timber millers regarding their involvement in the process i.e. will they pick up timber at roadside or at the depot? Will they be present whenever there is timber to be had or will they call every 6 months or so to process the wood so far collected? Levels of involvement determine the cost or surplus.

- The Council negotiates with a charcoal manufacturer. Depending on each parties wishes the result may be short or long term access to selected timber stockpiles and storage depots for processing arboricultural arisings material into charcoal - a valuable product for which there is a large market. It is likely that large DIY stores and petrol stations would sell the product if a regular supply can be guaranteed. Charcoal making is a dirty process which can involve 24 attendance at a kiln under some production systems.

- The Council enters into an arrangement with a merchant who is able to process and sell firewood to the domestic market.

- The Council seeks advice and financial support for innovative, environmentally sound projects through Northwoods.

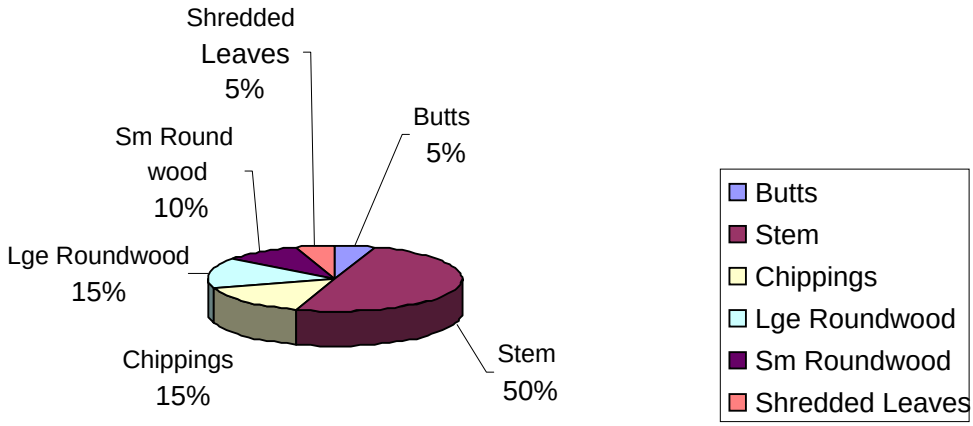
- Local craftsmen are encouraged to utilise specialist and structural timbers of local origin, thus stimulating the local economy.

6.2.0 Markets for the products

Depending on the product mix there are a number of markets for a quality product.

Product Mix 1: Utilise every part of the tree exactly for its ideal market.

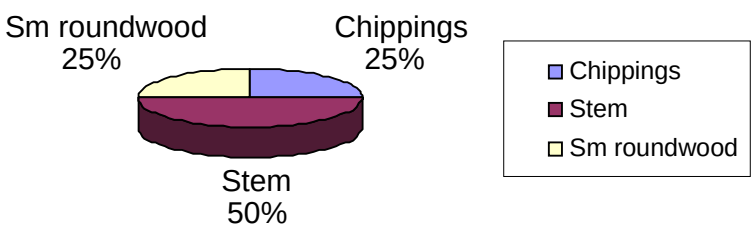
Fig. 4. Product types available from a large ash tree



In this case the tree is dismantled carefully and each piece of wood is measured and used for it's ideal purpose. This is expensive and time consuming and more research is needed. There is the potential for a lot of downtime in this option - foremen and operators making decisions on what is to be done, which is expensive. Small teams equipped with chippers are useful here, but more time is needed to sort out the products into storage or further processing.

Product Mix 2; Realistic and economic processing with no bias

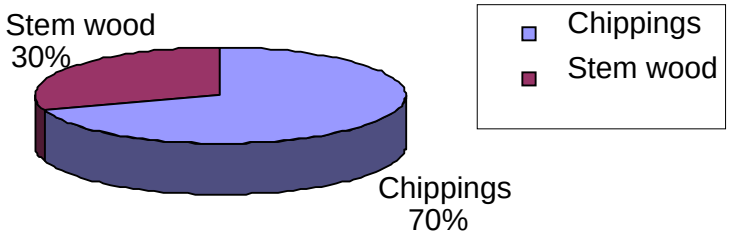
Fig 5 Realistic product range from a large ash tree



If we can restrict the number of products from each tree and focus on producing quality woodchip and quality small roundwood for fuel and charcoal then I believe this may be the best mix. Depending on demand, the amount of small roundwood can be reduced and more chippings produced. A smaller chipper is acceptable as large pieces of wood would be split for logs.

Product Mix 3: Produce as much wood fuel chip as is economically possible

Fig 6. Fuelwood biased product range from an ash tree



In this model 70% of the tree is chipped into high quality woodchip for burning, 30% of the tree is stem in this case and goes to milling or to a firewood processor. This is cost effective as operators are handling only two kinds of product. The problem is where a lot of chain-sawing is required to get the wood into the chipper, a big chipper is therefore required, big chainsaws too.

Woodchip at present demands a price, delivered to SembCorp Wilton, of £35-£45 per Tonne. Woodchip utilised by the City Council could be sold internally at a price agreed to be fair.

One of the most desirable ways of using this fuel would be in the heating of a major public building, substantial reductions in the amount of fossil fuels burned are possible: one tonne of fuelwood chip contains an equivalent amount of energy to 500L of heavy fuel oil. A large public building, such as a school, would utilise around 200Tpa woodchip fuel. Thus the City of Newcastle produces, per year, enough woodchip to heat two large public buildings.

Selling woodchip to an internal market represents the largest financial return per tonne, and also the most ethical, efficient and environmentally sound way of using this material.

8.0.0 Timber prices

Rumours of timber or individual trees being worth ‘a fortune’ are generally just that. Timber merchants make a living and not much more, with prices at a historic low. There are reasons for these low prices; massive imports of timber from managed and unmanaged forests in the Baltic States flood the British market every week. 400T loads of quality Acer from the USA are not uncommon, it is cheaper to buy timber and related products from Asia or Russia than to grow it here. This is at the cost to British jobs and the cost of devaluing our own trees so that they are worthless. Another problem is that we only produce small parcels of timber in the UK, making processing relatively expensive, mainly because of high transport costs.

The question is, ‘should we buy it in, or should we develop and grow internal markets?’ Newcastle City has other consideration other than economic and so can consider the process on other than monetary grounds.

8.3.0 Summary of Timber pricing

Occasional large trees, such as the one behind Westgate Community College, of 2m^3 estimated stem volume will fetch around £110 if taken away by a contractor. Planked on site it may be worth up to £444. This process should be considered on grounds of recycling, even if the processing costs are merely covered in some situations.

By carefully selecting timber, the Foremen can offset some of the processing costs, however, timber is not so valuable that it should overwhelm efficient handling and transport considerations. For example, carrying a log worth perhaps £50 across town on a hired lorry would be nonsense, processing it on site and having the timber removed by an economical means would make more sense.

8.4.0 Further work

Further research is needed into the following;

- Simple methods for calculating the optimum product mix from a standing tree
- Techniques to establish the weight of a standing tree
- Methods of applying values to wood arboricultural arisings
- Methods of quality controlling woodchip in the field

10.0.0 References and appendices

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Appendix 1

Appendix 2 Example costing for a tree dismantling operation

Removal of a large dead Ash tree, in ideal conditions in a park in Newcastle. Utilising a three man team. Timber volume 2m3, chips 10T

Item Detail	**Unit cost** (per day)	**Unit income**	**Remarks**
3 man team Including chipper, Transport and saws	*648*	nil	
Hire of sawyer	220		this tree only*
Processing timber		444	first quality
Woodchip fuel		350	graded on site
Transport of products to markets	100		
Totals	968	794	
Net surplus		174	

* NORMALLY A SAWYER WOULD BE CALLED IN TO DO A WHOLE DAYS SAWING ON A NUMBER OF TREES FOR THIS FEE

The example above shows how a small surplus can be maintained through careful timber processing.

Appendix 3 Additional Sources of Information

Northwooods
1 Walby Hill
Rothbury
Morpeth
Northumberland
NE65 7NT

ADAS
Oxford Spires Business Park
The Boulevard
Kidlington
Oxford
OX5 1NZ

Arb Association
Ampfield House
Ampfield
Hants
SO51 9PA

British Charcoal Group
72 Woodstock Rd
Loxley
Sheffield
S6 6TG

NPTC
National Agric Centre
Stoneleigh
Kenilworth
Warks
CV8 2LG

FCA
Dalfling
Blairdaff
Inverurie
Aderdeenshire
AB51 5LA

English Nature
Northminster House
Peterbrough
PE1 1UA

Forestry Commission
231 Corstophine Rd
Edinburgh
EH12 7AT

HSE
Rose Court
2 Southwark Bridge
London
SE1 9HS

Woodland Trust
Autumn Park
Grantham
Lincolnshire
NG31 6LL

National Small Woodland Association
Perkins Beach Dingle
Stiperstones
Shropshire
SY5 OPF