

06. LILAC tree plan



a tree planting scheme for LILAC

Background

The original planting plan by LILAC's architect, White Design (right) details 50 new tree locations and a list of indicative species. However, it does not specify quantities of each species or which trees should go where: it is this level of detail that the design seeks to achieve.

At a community landscape design workshop on 18th September 2011, consensus was built around a landscape vision for LILAC that set key goals for the design.

Various other factors influence the choice of species for each location, including:

- proximity to underground services, retaining walls & foundations,
- the need to avoid shading out solar panels,
- appropriate seasonal shading of the homes to further improve buildings' thermal performance.

Other factors influencing the design include a number of planning conditions that we are obliged to meet, and the need to meet certain landscape recommendations in order to achieve Code for Sustainable Homes level 4.



Survey

LILAC's shared landscape vision: LILAC, 18/09/2011

Client interview: LILAC's landscape vision

"What do we want from LILAC's Landscaping?"

- **Educational:** promote sustainable living; to learn from making it
- **Aesthetics:** Shade in summer and looks good in winter; beauty, diversity & variety; year round interest; looks good with the buildings; pleasing to our senses; beautiful and welcoming; lots of greenery
- **Medicinal:** medicinal herbs & aromatics
- **Play:** Places to play and hang out; wooden play park for all ages; all age play; play space; playful – children & adults; play – treehouses, swings, climbing; nooks, dens, tree houses?
- **Promotes Biodiversity:** wildlife habitat; a colourful biodiverse jungle
- **Food:** edible plants; grow food for us all; grow variety of fruit and veg; food – fruits nuts veg herbs; edible; edible colourful plants; useful plants (food etc)
- **Community:** Good sightlines; Social neighbourliness; promote community
- **Sanctuary:** Easy to meander around; relaxing; calm, quiet, private
- **Outside cooking & Eating:** areas to cook and eat outside; clay oven using subsoil
- **Others:** CO2 capture; Variety of Spaces (play, picnic, hiding, relaxing); Incremental & evolving

WHAT DO WE WANT FROM LILAC'S LANDSCAPING?

AESTHETICS

INTEREST

SHADE IN SUMMER + LOOKS GOOD IN WINTER

BEAUTY

LOOK GOOD WITH THE BUILDINGS

DIVERSITY + VARIETY

pleasing to our senses

A COLOURFUL PROMOTES DIVERSE BIODIVERSITY JUNGLE

BEAUTIFUL

WELCOMING

PLACES TO PLAY AND HANG OUT

ALL A PLAY

PLAY!

WOODEN PLAY PARK FOR ALL AGES

Play climbing

NOOKS DENS

PLAYFUL Children + Adult

Play &

CO2 capture

Medicinal - herbs

MEDICINAL

VARIETY OF

INCREMENTAL

LIVING

Survey



Planning Services
Leonardo Building
2 Rossington Street
Leeds LS2 8HD

Planning conditions relating to LILAC's soft landscaping

"6. No Development shall take place until full details of both hard and soft landscaping works have been submitted to and approved in writing by the Local Planning Authority... Soft Landscape Works shall include: (h) planting plans, (i) written specifications (including cultivation and other operations associated with plant and grass establishment), (j) schedules of plants noting species, planting sizes and proposed numbers/densities, (k) implementation programme.

7. Hard and soft landscaping works shall be carried out in accordance with the approved details.... The soft landscaping works shall be completed by no later than the end of the planting season following substantial completion of the development. The landscape works shall be implemented to a reasonable standard in accordance with the relevant provisions of appropriate British Standards or other recognised codes of good practice.

8. No development shall take place until a plan, schedule and specification for landscape management has been submitted to, and approved in writing by, the Local Planning Authority. This shall include reference to planting and hard landscaped areas including paving, fencing and other features. The schedule shall identify the frequency of operations for each type of landscape asset and reflect the enhanced maintenance requirement of planted areas during the establishment period. It shall provide for an annual inspection during late summer for any areas of failed tree or shrub planting, and the identification of the replacements required in the autumn planting season.

13. The trees identified on the Tree Constraints Plan are to be retained for the lifetime of the development, unless otherwise agreed with the Local Planning Authority

14. The soft landscaping areas shown on the approved plans, are to be retained for the lifetime of the development."

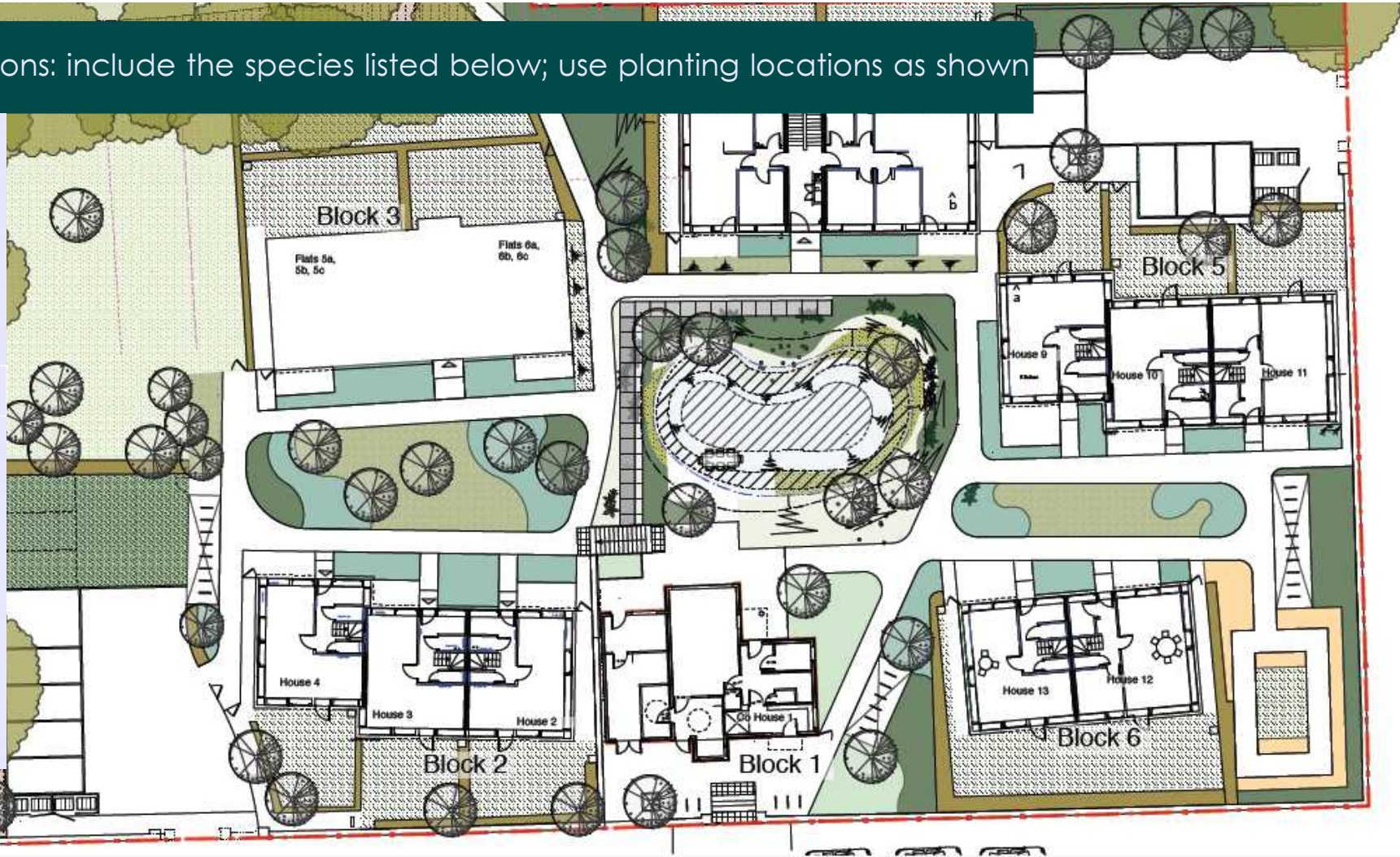
- taken from the Report of the Chief Planning Officer.

Survey

revised planting plan (detail) – White Design – 28/2/2013

Planning obligations: include the species listed below; use planting locations as shown

- Acer campestre*
- Alnus glutinosa*
- Betula pendula*
- Betula pubescens*
- Carpinus betulus*
- Fraxinus excelsior*
- Prunus avium*
- Quercus robur*
- Salix caprea*
- Sorbus aria*
- Sorbus aucuparia*
- Sorbus torminalis*
- Tilia cordata*



Latin name	Common name	Mature height (m)	Mature spread (m)	Primary uses
<i>Quercus robur</i>	Pedunculate Oak	30	30	Various; wildlife
<i>Fraxinus excelsior</i>	Ash	30	20	wood; fuel
<i>Juglans nigra</i>	Black Walnut	30	20	Edible nuts; wood
<i>Tilia cordata</i>	Lime	30	12	Edible leaves; medicinal; wood for carving
<i>Carpinus betulus</i>	Hornbeam	25	20	wood
<i>Alnus glutinosa</i>	Alder	25	10	N fixer; various medicinal & practical uses
<i>Betula ermanii</i>	Gold Birch	25	5	ornamental
<i>Betula pendula</i>	Silver Birch	20	10	various edible, medicinal & practical uses
<i>Betula pubescens</i>	White Birch	20	10	as above
<i>Sorbus torminalis</i>	Wild Service Tree	20	8	Edible fruit; wood (turning)
<i>Prunus avium</i>	Wild Cherry	18	7	Fruit; wood
<i>Acer campestre</i>	Field Maple	15	8	Fuel wood; charcoal; wildlife
<i>Sorbus Aucuparia</i>	Rowan	15	7	Edible fruit; medicinal; wood (turning)
<i>Sorbus aria</i>	Whitebeam	12	8	Edible fruit; medicinal; wood (structural)
<i>Morus nigra</i>	Black Mulberry	10	15	Fruit
<i>Salix caprea</i>	Goat Willow	10	8	medicinal; various practical uses (basketry etc)
<i>Malus domestica</i>	Apple	9	9	Fruit
<i>Prunus domestica</i>	Plum	8	8	Fruit
<i>Prunus domestica subsp. Italica</i>	Gage	8	8	Fruit
<i>Prunus domestica subsp. insititia</i>	Damson	8	8	Fruit
<i>Ficus carica</i>	Fig	6	6	Fruit
<i>Cydonia oblonga</i>	Quince	7	7	Fruit
<i>Prunus dulcis</i>	Almond	6	6	Fruit
<i>Mespilus germanica</i>	Medlar	6	6	Fruit
<i>Pyrus communis sativa</i>	Pear	5	5	Fruit

list of species approved by planners plus additional edible species to help meet LILAC's vision. Ordered by mature height.



Brief

LILAC's shared landscape vision: LILAC, 18/09/2011

I developed the following brief from the aspirations of the client group (LILAC community) and other key factors:

"Create a detailed tree layout plan for LILAC that:

- *Contributes to LILAC's landscape vision*
- *Meets our planning obligations*
- *Supports achievement of our CfSH objectives*
- *Minimises risk of damage to underground services, foundations and retaining walls,*
- *Avoids shading out solar panels,*
- *Contributes positively to the thermal performance of LILAC's buildings, if possible"*

using slab soil

SANCTUARY

QUIET,
PRIVATE

MAXING

USEFUL PLANTS
(FOOD ETC)

EDIB

FOOD

fruit
nuts
veg
herbs

PROMOTE
COMMUNITY

SOCIAL
NEIGH

COMMUNITY

GOOD

SIGHTLINES

GROW VARIETY
OF FRUIT + VEG

GROW FOOD
FOR US ALL

EDIBLE
PLANTS

Analysis

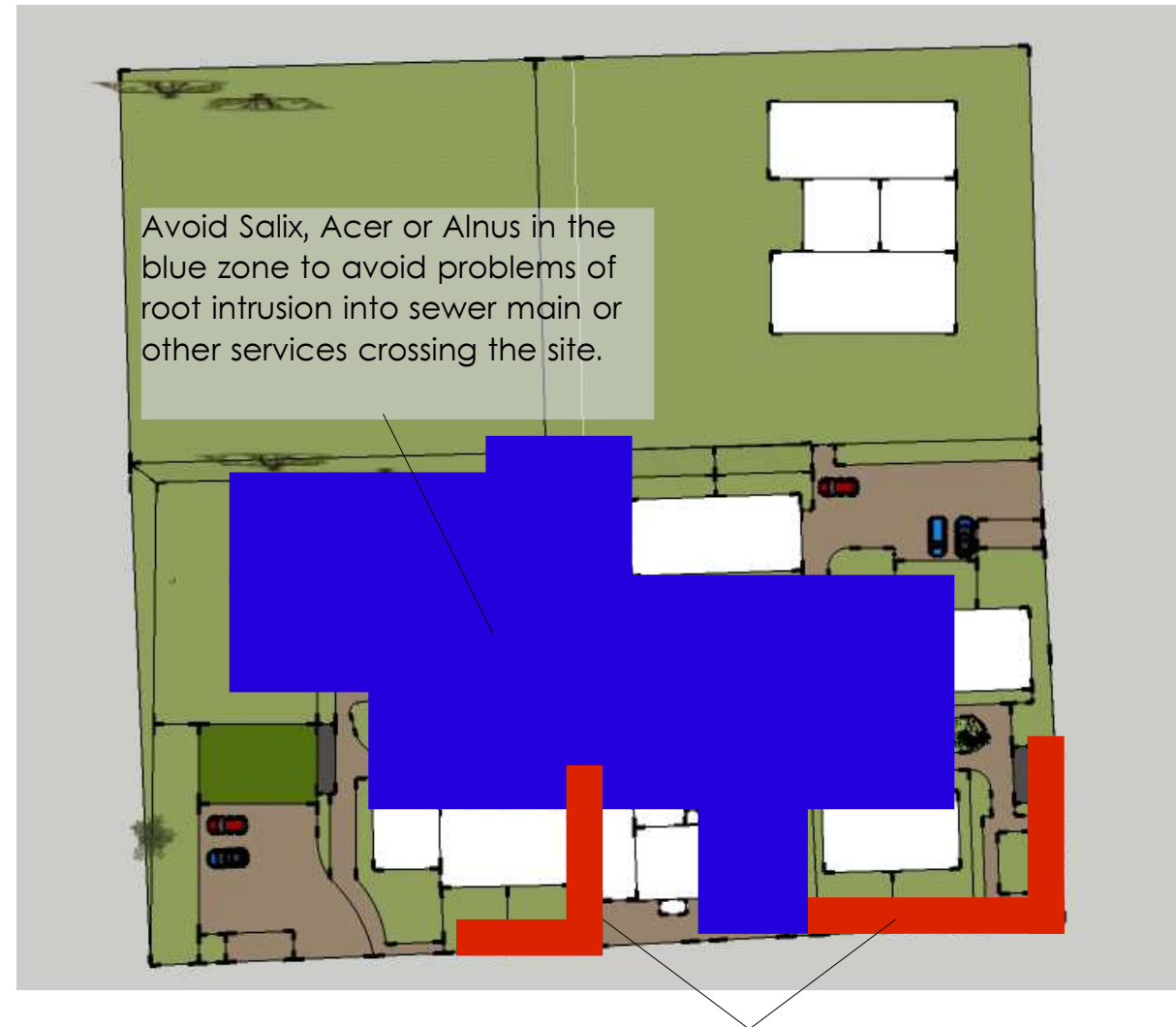
Using McHarg's exclusion method to minimize potential damage to services & vulnerable walls by tree species with a high incidence of root intrusion.

1 Identification of root samples from drains as a percentage of all recorded cases of root intrusion into drains. (After Cutler and Richardson, 1989.)

Species	Percentage
<i>Populus</i> spp.	24.0
Willow	18.5
Horse chestnut	11.0
<i>Acer</i> spp.	9.6
Plane	7.5
Birch	5.5
<i>Prunus</i> spp.	4.5
Ash	4.5
Oak	3.5
Cypresses	2.5
Apple/pear	2.0
Hawthorn	1.6
Lime	1.0
Beech, elm, <i>Sorbus</i> , <i>Robinia</i>	each <1

Source:

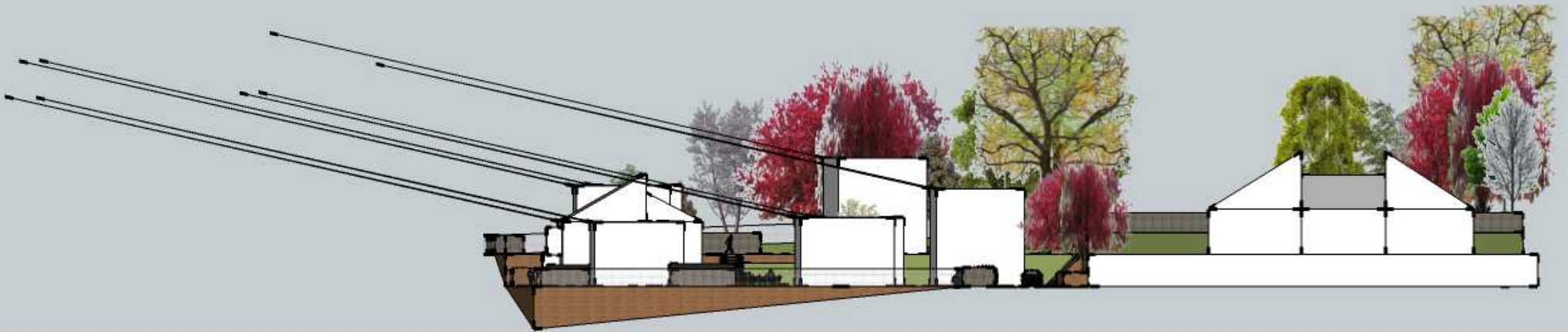
Roberts, Jackson, Smith (2006), "Tree Roots in the Built Environment"
<http://books.google.co.uk/books?id=afiZn2h8QJEC>



No trees to be planted in the red zones to avoid compromising vulnerable retaining walls

Analysis

existing trees & midwinter solar altitude – JA 2/3/13



Avoiding shading solar panels

Eastern elevation showing solar altitude of midwinter sun projected from the roofs of all the buildings at LILAC.

Trees that break the plane formed by the lines will cause some shading of the solar panels. Even deciduous trees should not extend too far above this plane as even the relatively small amount of shade from bare branches can have a significant impact on overall PV array performance.

Impact on solar gain/thermal performance in the homes

Because the new trees are deciduous, they will be in leaf during the warmer months, and will provide a small amount of beneficial shading, helping to avoid some of the homes overheating in summer. However, the higher angle of the sun will limit this effect.

Analysis

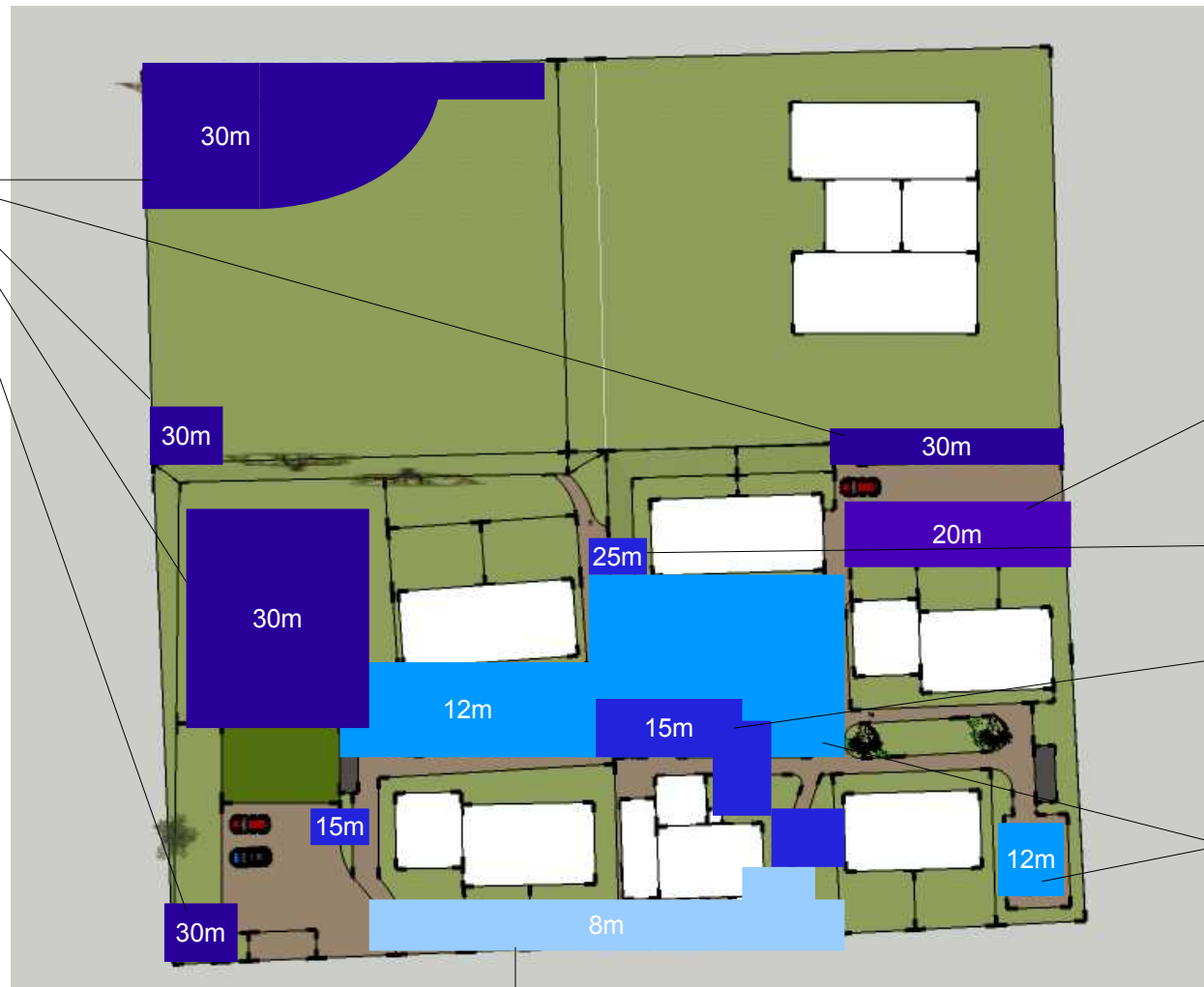
Species grouped into areas by maximum permissible height

Quercus robur
Fraxinus excelsior
Juglans nigra
Tilia cordata
Carpinus betulus
Alnus glutinosa

I performed a detailed shading analysis. This enabled me to map areas of maximum permissible tree heights.

This then allowed me to group tree species into areas by their expected mature height.

This approach was an adaptation of McHarg's exclusion method.



Betula pendula
Betula pubescens
Sorbus torminalis

Betula ermanii

Acer campestre;
Sorbus aucuparia

Salix caprea
Malus domestica
Prunus cerasus austera
Sorbus aria

Prunus domestica (& subsp.); *Ficus carica*; *Prunus dulcis*; *Pyrus communis sativa*; *Cydonia oblonga*; *Mespilus germanica*; *Malus domestica* on dwarf/semi-dwarf rootstock

Design

proposed planting plan: northern section – JA 4/3/2013

Notes

Some planting locations have changed from the original plan, as the tree locations:

- were in members' allotments plots, or
- may cause significant shading of plots or – in the southern section – solar panels, or
- may pose a higher risk of root intrusion or damage to services, walls or footings.

Planting locations in both the public park and play area (see next sheet) have been moved to both avoid the above issues and to provide more consolidated woodland habitat areas.

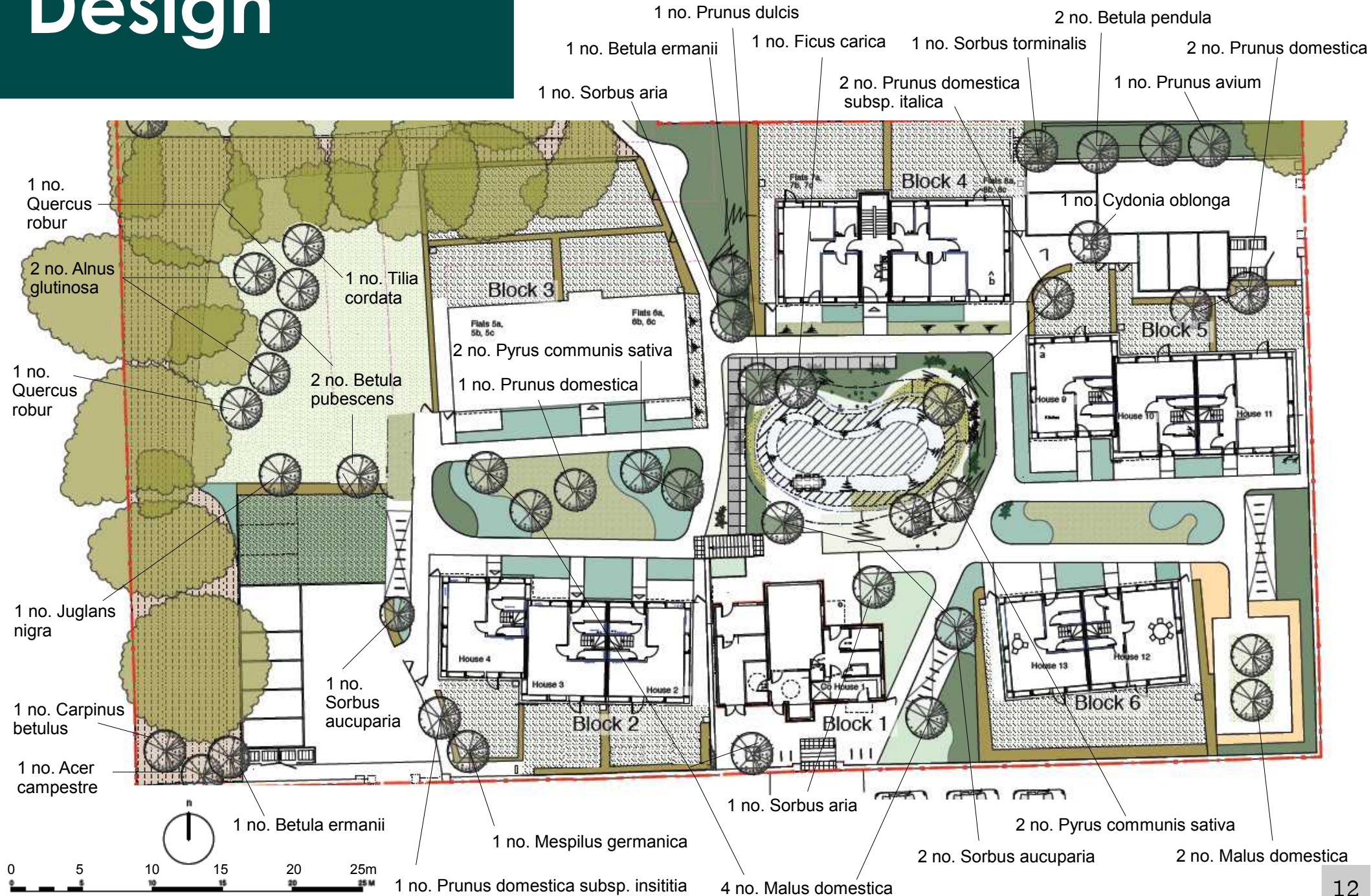
Salix caprea is typically a riparian species; consideration was given to whether it would be appropriate to plant next to the pond. However, there was concern that it's roots may damage the pond liner and other services. The *Salix* located in the northern section is intended for coppicing, to inhibit root growth & consequent intrusion into nearby allotment plots or services running under the nearby highway.

Fraxinus excelsior was omitted as there were several existing on site and to avoid the risk of loss due to *chalara fraxinea* (ash dieback).



Design

proposed planting plan: southern section – JA 4/3/2013



Design

existing tree layout viewed from South East



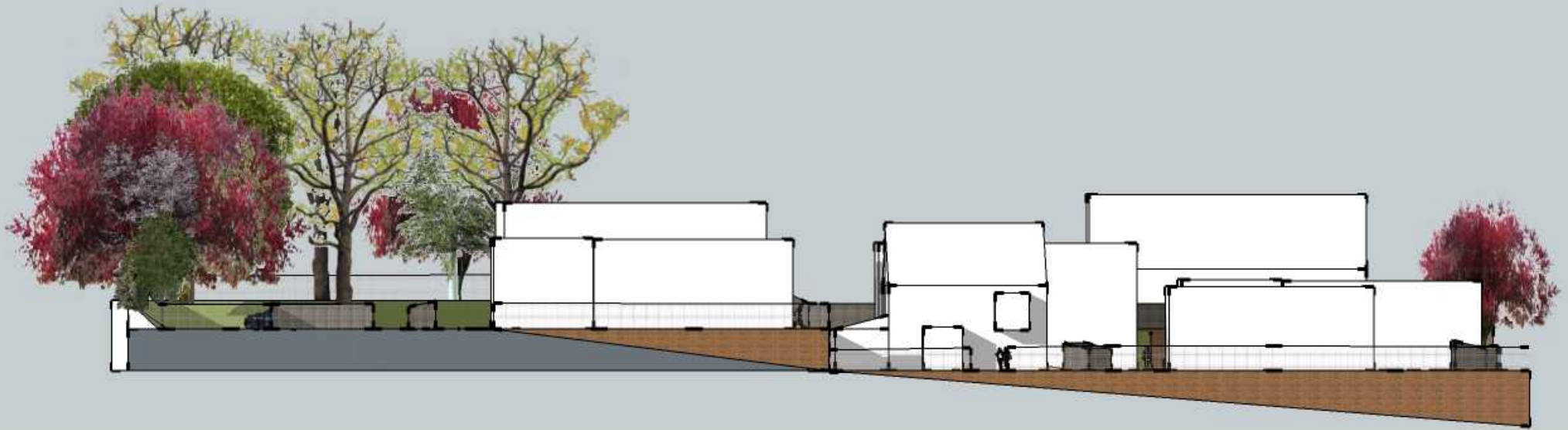
Design

proposed tree layout viewed from South East



Design

existing tree layout: south elevation



Design

proposed tree layout: south elevation



Implementation

Quantities

Several of the trees are to be provided by members, or from stock that was removed from site prior to the commencement of works.

The remaining trees are to be sourced from commercial nurseries, and paid for from the landscape budget.

Budget

I secured £1,000 from the overall landscape budget for trees and sundries (stakes, tree ties, etc). This would enable some relatively mature specimen trees to be purchased.

However, I aimed to spend as little of this as possible to keep some of the budget in reserve for failures and future developments.

Species	Total required	Member pledges	to buy
<i>Acer campestre</i>	1	0	1
<i>Alnus glutinosa</i>	4	0	4
<i>Betula ermenii</i>	2	0	3
<i>betula pendula</i>	3	1	2
<i>Betula pubescens</i>	3	0	3
<i>Carpinus betulus</i>	1	0	1
<i>Cydonia oblonga</i>	1	0	1
<i>Ficus carica</i>	1	1	0
<i>Juglans nigra</i>	1	1	0
<i>Malus domestica</i>	6	6	0
<i>Mespilus Germanica</i>	1	0	1
<i>Morus nigra</i>	1	0	1
<i>Prunus domestica</i>	3	1	2
<i>Prunus domestica subsp. Insitativa</i>	1	0	1
<i>Prunus domestica subsp. Italica</i>	2	0	2
<i>Prunus dulcis</i>	1	1	0
<i>Pyrus communis sativa</i>	4	1	3
<i>Quercus robur</i>	3	1	2
<i>Salix caprea</i>	1	0	1
<i>Sorbus aria</i>	3	0	3
<i>Sorbus aucuparia</i>	3	1	2
<i>Sorbus torminalis</i>	2	0	2
<i>Tilia cordata</i>	2	1	1
TOTAL	50		36

Implementation

Phasing & resourcing operations

The original design specified that the trees would mainly be planted in the winter of 2012/2013, and any failures replaced during the winter of 2013/2014 (see maintenance section, below)

However, the construction of LILAC overran significantly, so we only gained access to the majority of the site in late March – early May 2013.

Fortunately April 2013 was exceptionally cold, so we were able to plant some bare-root trees in the areas of the site that had been handed over in March.

We also bought several fruit trees and containerised them until we gained access to the remaining areas of the site where they were to be planted. This strategy met with mixed success.

There were still a significant number of trees to be planted in winter 2013/2014, along with replacements for the few failures that we had experienced.



Kevin Macleod & housing minister Mark Prisk plant our first tree, a *Sorbus aucuparia*; members planted the remaining trees during landscape work days

Maintenance

Excerpt from LILAC site management plan (see design 03) detailing tree establishment & maintenance schedule

Habitat Feature/ Landscape Asset	Legislation/ policy	License requirements/ other constraints	Notes on management/ timing of operations	Work Programme	
				2012	2013 & Subsequent years
Typical Tree Selection	Wildlife & Countryside Act, 1981.	It is an offence to intentionally destroy the nest of any wild bird while it is in use or being built, for example by knowingly removing tree branches containing a bird's nest.	<p>Tree inspection to take place in late summer, to allow time to order bare-root replacements for winter planting.</p> <p>Pruning should be preformed in winter when deciduous species are dormant & evergreens are less active.</p> <p>Application of mulch & compost in spring.</p> <p>Manual weeding throughout the main growing season on a monthly basis or as necessary.</p>	<p>Plant trees in accordance with White Design specifications.</p> <p>See drawing 6188 D 7301, Note 2.3 for details.</p> <p>Perform additional watering during hot & dry weather</p>	<p>Inspect trees & order replacements for failures.</p> <p>Plant replacements.</p> <p>Perform formative & maintenance pruning as required.</p> <p>Water, apply a general purpose organic fertilizer and spot mulch.</p> <p>Manually Weed around base if necessary.</p> <p>Perform additional watering during hot & dry weather</p>

Evaluation

Application of permaculture ethics

People Care

- Free healthy food (fruit)
- Providing pleasant and attractive landscape for residents to enjoy
- Opportunities for residents to learn skills such as grafting, pruning, harvesting, preserving...

Earth Care

- Planting native broadleaf species to promote biodiversity
- Integrated edible perennials: help to reduce food miles.
- Planting to avoid compromising solar resource supports project's wider design goals of reducing carbon emissions

Setting Limits to Consumption & Redistributing Surplus

- Fruit produced on communal trees will be shared among the community and in future, if yields are sufficient, with the wider community.

Evaluation

Application of permaculture principles

Observe & Interact	Observations of shading, .
Catch & Store Energy	Fruit trees; Avoiding shading solar panels!
Obtain a Yield	Fruit trees
Apply Self-regulation & Accept Feedback	Accept the feedback that people have varying views on e.g. placement of specific elements: as designer it's challenging to anticipate all options & outcomes.
Use & Value Renewable Resources & Services	-
Produce no Waste	-
Design from Patterns to Details	Started with just tree locations; worked with patterns of tree growth (i.e. Mature heights) to
Integrate Rather than Segregate	-
Use Small & Slow Solutions	
Use & Value Diversity	Increased the diversity of new species on site beyond Landscape Architect's scheme
Use Edges & Value the Marginal	-
Creatively Use & Respond to Change	-

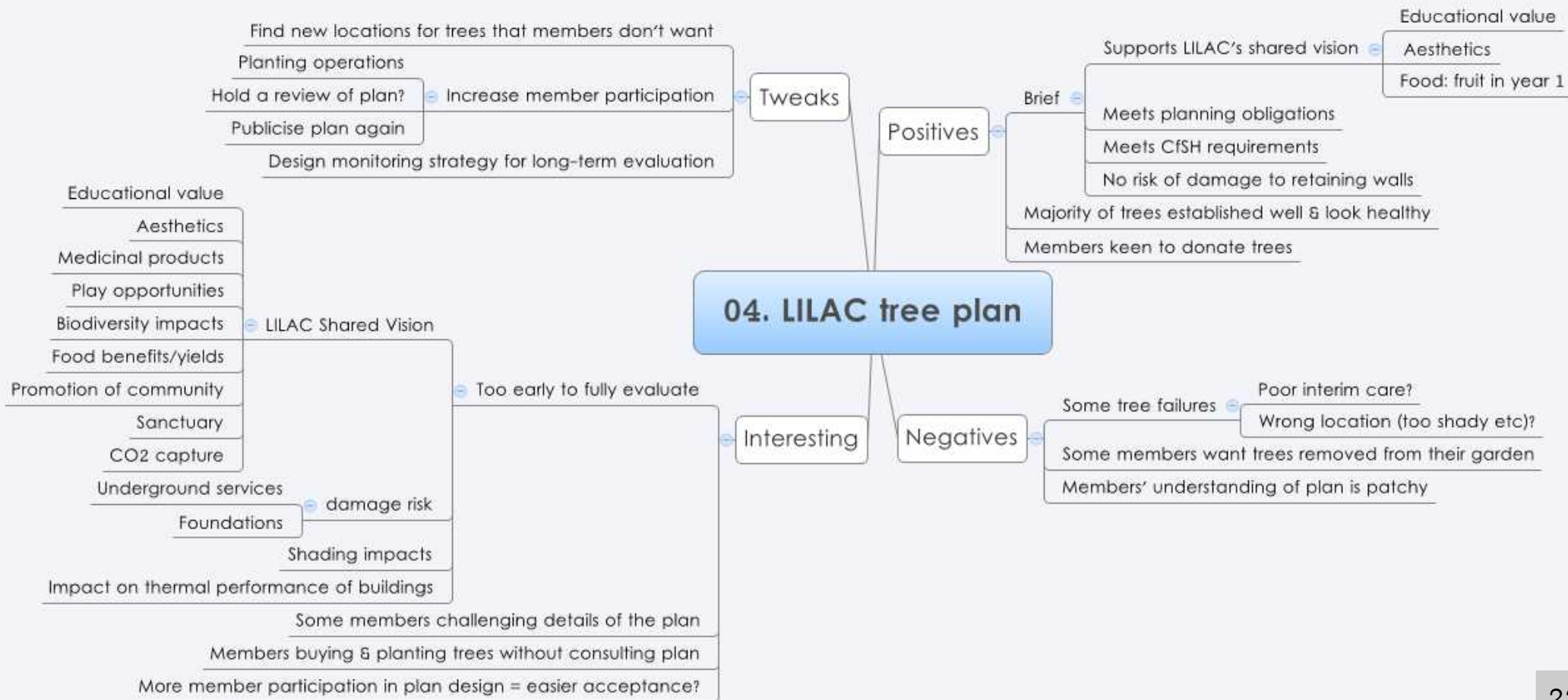
Evaluation

Long term design

It is too early to perform a meaningful evaluation of many aspects of this design's performance, as it will take years for the trees to mature, and their impacts to become fully apparent. It is possible, however, to perform an interim assessment.

"PNIT"

I have used a variation of the PMI (plus, minus interesting) evaluation tool. Most significantly, I've added another category – Tweaks – to capture the actions (design tweaks in this case) that arise while performing the evaluation.



Reflection

What went well?

- I felt that I made appropriate use of some tools (e.g. McHarg's exclusion method).
- Adapting tools to make them more useful to the situation: gaining confidence with the design cycle & tools
- I had to submit the revised plan to the local planning authority via LILAC's project manager; his feedback, and that of other members of our professional team was extremely complimentary.

What was challenging?

- I had to work to a very tight timescale because the design had to be submitted to the planning authority. This meant that the scope for consulting LILAC's members was limited. Consequently, people have challenged aspects of the design after they'd been implemented, rather than during the consultation phase: "I don't like that tree there, can we move it?".
 - Do differently: put more time & focus on consultation with people who will ultimately be affected by it.
 - Lesson learned: time in consultation with the client is rarely wasted.
- LILAC members seemingly not having much grasp of the detail of the plan or rationale behind it.
 - Do differently: put more effort into communicating the plan to others.
 - Lesson learned: don't assume that people know something because you do: communicate more.
- Members buying trees that weren't on the species list and asking where to plant them.
 - Do differently: circulate the shopping list of trees earlier so that people know what to buy
 - Lesson learned: communicate more!

Long term visions & goals

- 50 healthy trees giving us a diverse range of yields & providing wildlife habitat.
- Experiment with more design tools and further develop use of visualization software

Next achievable steps

- Put a copy of the tree plan on LILAC's common house noticeboard.
- Implement tweaks identified during design evaluation