



Project Development Document (PDD)

for

Land Use, Land Use Change & Forestry (LULUCF) project

at

Apley, Lincolnshire, UK,

developed to

The Climate, Community & Biodiversity Alliance Standards.

Project Climate Apley PDD 1.4

November 2007

Project terminated and CCB Standards validation withdrawn, Oct 28th 2009

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Project Climate Apley PDD 1.4

Introduction

Project Climate (PC) has been established by Land & Capital Group, to develop voluntary carbon offsetting projects in the UK in line with high standards achieved by international certified emissions reductions projects.

The International community developed the Kyoto Protocol in 1997. It established legally binding greenhouse gas (GHG) emissions targets for industrialised (Annex 1) countries. The UK and other countries that have ratified the Protocol are committed to meeting these targets. Savings are primarily made through key industries such as chemicals, energy and oil & gas.

GHG emissions reductions targets can be achieved through reducing domestic emissions and/or by purchasing credits through the Emissions Trading Scheme (ETS). Under the ETS, Certified Emissions Reductions (CER's), either from overachieving member states or qualifying Clean Development Mechanism (CDM) projects, can be traded towards the legally binding Kyoto targets. This has created an international market for the trade of such credits as a commodity. Now entering phase two (2008-2012) of the Kyoto Protocol, the value of such credits is set to steeply increase in response to tighter targets and thus greater demand.

Alongside the ETS a "voluntary" market has developed and grown. Public, shareholder and environmental pressure has led to industries and organisations outside the scope of the Kyoto Protocol volunteering to offset their GHG emissions by supporting carbon reduction projects.

The UK Government has been an active supporter of both markets and has taken a range of initiatives to raise awareness of global warming and ways of tackling GHG emissions.

- It funds the Carbon Trust (an independent company formed in 2001). The Carbon Trust published a "Three Stage Approach to Developing a Robust Offsetting Strategy" in November 2006
- The Department of the Environment, Farming and Rural Affairs (DEFRA) published an updated report on the "UK Climate Change Programme – Final Regulatory Assessment" in March 2006
- DEFRA published a discussion document in January 2007 on a proposed "Voluntary Code of Best Practice for Provision of Carbon Offsets to UK Customers"

These various documents state that:

- The Climate, Community and Biodiversity Alliance (CCB) standards are recommended for forestry climate change mitigation projects
- Emissions reductions projects must address questions of Additionality, Verification, Permanence and Leakages to comply with best practice. A robust third party standard provides assurance to customers that these matters have been addressed
- Agriculture is responsible for 7% of all UK GHG emissions. An agricultural market-trading scheme is under active consideration and is preferred to a "command and control" approach. There are questions involving methodology and mechanisms that need further study. Any eventual scheme needs to be compatible with current legislation, grant and environmental stewardship schemes (Woodland Grant Scheme, Higher Level Scheme, Entry Level Scheme, Single Farm Payment etc.)

- Most offsets are currently non-certified voluntary emissions reductions. The UK Government supports the trail blazing efforts made by the voluntary offset market to raise public awareness and demand for offsets. It is considering establishing a code and "kite-mark" that provides a robust framework to give assurance to customers that the offsets are genuine. It considers that regulation or legislation will not provide the most effective way to provide this framework. A voluntary market based approach allows flexibility for innovation and new business models
- Most offset projects are located outside the UK but as GHG's have a long lifespan and mix thoroughly in the atmosphere, the location of the emissions and the location of offsetting projects, have no impact on effectiveness.

Most projects are located outside the developed world (the UK in particular). This is because of lower costs or the requirements of CDM that qualifying projects be outside Annex 1 countries. A second certified scheme, JI (Joint Implementation) allows certified projects within Annex 1 countries as long as credits are not claimed by the host state. In response to CDM projects, JI has dampened concerns of spurious projects in the developing world as they take place in countries which themselves have an emission reduction requirement.

As noted above, the location of a project has no bearing on the effectiveness of the GHG saved. There has been an increasing degree of negative publicity recently surrounding overseas projects, particularly in the developing world:

- Are the reductions permanent, given uncertain local political conditions?
- If circumstances change, can the offset provider enforce change on the ground? (Project developers rarely own the land and have entered into an agreement with local inhabitants)
- Are the interests and livelihood of the local community being subordinated to the wishes of industrialised countries to "replant the rainforest"?
- Are Annex 1 countries imposing their projects on unsuspecting third world communities in a process that amounts to "Carbon Colonialism"

Project Climate's Apley project is based in the UK. Project Climate (PC) believes that basing projects in the UK avoids all the above disadvantages. UK customers will find a native project more attractive because of:

- Increased transparency and integrity. (They can physically visit the project and it is developed under the scrutiny of UK legislation)
- The benefits to local UK amenities, community, biodiversity and landscape
- Costs of measures to reduce UK GHG emissions being borne by UK consumers, in the UK, so avoiding Carbon Colonialism

It is hoped that these factors will provide the Apley project with a competitive marketing advantage that mitigates the higher cost of operating in the UK. PC will establish additional projects in the UK if this business model proves effective. PC plans to adhere to any and all UK Government guidelines that are subsequently adopted.

Since the Government has not concluded its deliberations on such matters, PC has designed the Apley project to achieve the international respected **CCB standard**.

Selling estimated GHG emissions up front is a recognised weakness of projects which generate carbon credits for the voluntary market, though necessary to their funding and the issue of "Additionality". Therefore, actual carbon savings will be verified at the end of each accounting period using the International Panel on Climate Change Good Practise Guide (IPCC GPG).

General Information

G1. Original Conditions at Project Site

The Project is based on a 12.12 hectare site, 8 miles east of the city of Lincoln, Lincolnshire, England (Attachment A).

The local area is predominantly arable agricultural land, interspersed with pockets of semi-ancient broadleaved woodland and small conurbations. The geography is gently rolling lowland. Most land is listed as "Grade 3" agricultural land at the lower reaches of suitability for cropping, with strong clay content. Climate is "temperate moist", in keeping with most latitudes of the United Kingdom.

- 2.67 hectares of the project site has been planted with trees that are the subject of a grant under the UK Woodland Grants Scheme. The plantation was established in 2003 and comprises native species of tree and woody shrub. A density of 1,100 trees/shrubs per hectare has been established and natural regeneration encouraged.
- 9.45 hectares of bare agricultural land has been left fallow. It has not been ploughed, sowed or otherwise prepared for a 2007 harvest. Recent cropping rotation has been:

2003	barley
2004	oil seed rape
2005	oil seed rape
2006	wheat

The 2.67 hectares of woodland planted in 2003 are excluded from all project activity and calculations of GHG savings. This is because of "Additionality". DEFRA published a document in March 2006 "Updated UK Climate Change Programme – Final Regulatory Impact Assessment" which lists the Forestry Commission's Woodland Grant Scheme as a Government measure designed to save 0.2 MtC in 2010. Although methodologies are under review, it is thought that the UK may claim ownership of any GHG savings arising from these hectares against its Kyoto target. Project Climate (PC) will continue to support and maintain this woodland during its growing phase.

The 9.45 hectares of land in agricultural production until 2006 are the source of all Project GHG savings

Environmental and other searches have been performed at the Project site. No environmental, planning or other concerns were disclosed that might affect the Project (Attachment B). The Land Use Policies and Allocations section of the survey report (Attachment C) identifies open land, adopted heritage environment, nature conservatory, ancient woodland and Sites of Special Scientific Interest within the area (Hardy Gang Wood - Attachment A). There is a public footpath skirting the northwest boundary (Attachment D) and an Internal Drainage Board maintained watercourse to the southern boundary of the Site (Attachment D).

Hardy Gang Wood is one of a series of ancient woodlands in the neighbourhood (Attachments E and F) that are collectively referred to as the Bardney Limewoods (Attachment G) or the Lincolnshire Limewoods (Attachment H). Some of these woods date back to prehistoric times. Bardney was once an island in marshy ground around the river Witham. It was named after a Saxon chief called Bearda (Attachment I).

Ecology Consultancy Ltd has conducted a comprehensive biodiversity study for PC, assessing the project against CCB biodiversity criteria (Attachment J). The overall findings support a positive affect on biodiversity with the project. No IUCN Red List threatened species were found within the project site boundary. The nearby ancient woodland covers a wide range of soil and drainage conditions resulting in varied ground flora and range of tree and shrub

communities. They are very important for wildlife as they contain a wider range of plants and animals than modern woodlands. Upon purchase and thus commencement of the project, the 9.45 hectare Project site is ploughed and bare agricultural land with virtually no flora or fauna apart from organisms in the soil. The nearby ancient woodlands with their rich biodiversity will facilitate growth of biodiversity once woodlands are established in the Project site.

Basic socio-economic data about the communities in the neighbourhood is contained in Attachment E. The neighbourhood is basically rural and supported by an agricultural economy. A number of residents commute into Lincoln. The freehold of the 12.12 hectare Project site was bought with vacant possession in 2007 by L&CL.

Current Carbon Stocks (see Attachment L)

As the CCBA's preferred methodology, PC has applied the International Panel on Climate Change Good Practise Guide (IPCC GPG) to calculate current and future carbon stocks.

Attachment K details chapter 3.2 of the IPCC GPG. Attachment L details its application to calculate the baseline carbon stock:

$$C(\text{baseline}) = 143 \text{ tC/ha}$$

G2. Baseline Projections (see Attachment L)

The "without Project" scenario is that the 9.45 hectare project area would continue to be intensively farmed arable land.

The CCBA criteria G2.2 requires that "If there is evidence that non-CO2 greenhouse gas (GHG) emissions such as CH4 or N2O are more than 15% of the baseline GHG fluxes at the project site (in terms of CO2 equivalents), they must be *estimated*."

Attachment L details the calculation of carbon emissions in the "without project" scenario applying the "HGCA Bioethanol GHG calculator" (Attachment M).

The scenario would contribute 6.143 tCO2 per hectare per annum. Across the timescale of the project (100 years):

$$C(\text{Farming}) = 1583\text{tC}$$

The "Without Project" scenario has little economic impact on local communities. The 9.45 hectare Project site is too small for anyone apart from the farmer who originally sold the land, or a neighbour, to farm the land economically. There was little interest from the neighbours when the land was purchased by PC so the "without project" scenario involves the land being contract farmed. The contractor would earn some additional revenue, which may have a marginal impact on his wealth and therefore his spending in the local community. Because of its small size the "without project" scenario has no effect on employment in the community. This project's small size is a strength in terms of project planning and impact on the community. Any possible initial negative economic impact will by definition be insignificant.

The Project land is not irrigated so the "without project" scenario has no impact on water usage. Nitrogen fertiliser would continue to be applied to the Project land every year in the "without project" scenario, so there would continue to be a certain amount of run off and contamination of the watercourse that borders the Project Site. The soil would remain broadly unchanged in this scenario. Dead organic matter would be limited to and straw or stubble ploughed back in. Cereal and oil seed crops would continue to utilise whatever nutrients are naturally present and those added by fertilisers.

The 9.45 hectare Project site is currently bare agricultural land with little biodiversity. With single species cropping and the use of herbicides & pesticides, this would continue in the "without project" scenario.

G3. Project Design and Goals

The primary purpose of the project is to develop carbon credits for UK businesses and individuals who wish to "voluntarily" offset their GHG emissions. "Voluntary" is defined as those who are not legally bound to do so under the Kyoto or associated national legislation.

This project is to be used as a pilot for future projects throughout the UK.

The project is designed to realise the following objectives:

1. Reduce GHG emissions and capture carbon to help mitigate the effects CO2 on climate change.
2. Develop community benefits through creating amenable forest in an area of historical and conservational significance.
3. Create and increase the biodiversity of indigenous and semi-indigenous species within an area of historic biodiversity, in an increasingly urbanised, developed country.

Within the project site, the 2.67 acres of woodland will continue to be administered in accordance with the conditions agreed under the Woodlands Grant Scheme. This land is outside the scope of the Project.

The 9.45 hectare project Site will be planted with a variety of two year old native species of trees in the autumn/winter of 2007/8 (dependant on voluntary offset sales). A detailed Operational Plan has been created by Ecology Consultancy Ltd (Attachment O).

The GHG Carbon Dioxide (CO2) is internationally recognised as the most important ingredient of man made global warming. During the 1990's the atmospheric concentration of CO2 increased by 1.5 parts per million (ppm) per year, continuing an upwards trend which has seen a pre-industrial concentration of 280ppm increase to its current level of approximately 370ppm.

The rate at which GHG's are being released into the atmosphere has increased mainly due to the burning of fossil fuels for both domestic and industrial purposes. This releases carbon that has been accumulated in sinks over millions of years.

Land clearance and deforestation also leads to more atmospheric CO2. Fewer plants means less photosynthesis, the process by which flora takes carbon from the atmosphere and stores it in its structure. The premature burning of trees returns the carbon stored to the atmosphere.

Plants and particularly trees (because of their large biomass per unit area of land) make an important contribution to the global carbon cycle. It has been published that there was a net worldwide increase of 3.2 giga tonnes (3,200 million tonnes) per year of carbon into the atmosphere in the 1990's:

Activity	Source	Sink
Burning fossil fuels	6.3	
Land use change (mainly deforestation)	1.6	
Enhanced vegetation growth		3
Ocean / atmosphere exchange		1.7
Totals	7.9	4.7
BALANCE	3.2	

The visible structure of trees (and plants) is not the only store of carbon a forest or plantation. The IPCC GPG details five "pools" of carbon:

- Above ground biomass
- Below ground biomass
- Dead organic matter (dead wood)
- Dead organic matter (litter)
- Soil carbon

Like all flora, trees assimilate CO₂ from the atmosphere through the process of photosynthesis. Much of this CO₂ is released again through respiration with the remaining carbon used to grow biomass. This can be above the ground in leaf, wood and seed biomass, or below the ground as root biomass. Approximately 50% of dry organic matter is carbon dependant on species.

The rate of carbon accumulation by trees in the initial years while they become established is low. This is followed by a full vigour phase where carbon uptake is rapid and finally by a mature phase when the trees reach their full size. Ultimately a forest reaches an old growth phase during which it is broadly in equilibrium, with tree mortality offset by new growth.

Large amount of litter and dead wood cover forest floors. This represents a store of carbon in itself. However much of this will transfer to the soil. This is demonstrated by a study into carbon accumulation in soil in a field in Rotherhamsted, Hertfordshire. The field was originally managed for arable agriculture but was "set aside" in 1875 to create a wilderness. Soil carbon concentrations more than doubled in the next century. Forest soils can contain more carbon than the trees.

Forestry related measures that make a significant contribution to the mitigation of climate change include:

- halting deforestation
- conserving and managing existing forests and woodland
- afforestation or reforestation
- recycling of wood and wood products
- substitution of wood as a fuel for fossil fuels

The projects location is detailed in Attachment A. As specified in the Planting Plan (Attachment O) the use of native and locally occurring broadleaved species is key to projects community and biodiversity benefits. Unlike popular coniferous species, the growth rate of deciduous trees is slower but may result in greater final biomass and thus carbon stocks.

The growth cycle of the key species being used (*Quercus Robur* and *Fraxinus Excelsior*) thus dictates a 100 year project lifecycle. This will be echoed the accounting model for measuring actual carbon stocks.

Risks to climate, community and biodiversity benefits are addressed in their respective sections. The greatest risks are from physical damage, fire or disease. The former two would most likely be caused by human intervention. The later would be controlled by appropriate preventative and curative measures, under expert advice.

The Project plan is to limit public access to the woodland during its initial establishment phase and into its full vigour phase. Forest litter will be encouraged to promote accumulation of carbon in the soil. Any thinned, trees or branches will be used for bio energy. Public access will be granted to the newly established woodland at an appropriate point in the full vigour phase proved that this access does not damage the viability of the woodland or its biodiversity. This would involve restricting public access to certain areas of the woodland that contained Red List threatened species or sensitive habitats. Public access is granted to

the neighbouring ancient limewoods and visitor numbers are approximately 20,000pa. Public access could be granted to the Project site for a variety of leisure activities (walking, bird watching, picnicking etc). Commercial exploitation opportunities (paint balling, barbecuing, camping etc) will also be considered. Plans will need to be finalised at the time based on commercial, legal and health & safety considerations.

Public access will continue into the woodland's mature phase. Accumulation of forest litter will continue, natural habitats and biodiversity will be encouraged, thinned biomass will be used for bio energy and any harvested lumber will be sold for bio energy or for construction or wood products. New saplings will be planted as required to replace any tree felled for lumber and to maintain the biodiversity, natural habitats and amenity value of the land.

As discussed later in this document, the project site has no indigenous population.

Local stakeholders will be defined as those with a social, political or conservation interest in the projects activities and resultant woodland. As the project will only be possible through the initial sales of voluntary offsets, local stakeholders may also be defined as those who a financial interest. However, their interests will be represented by PC unless otherwise agreed.

The Bardney Limewoods area, including the project site and adjacent Hardy Gang Wood, is already subject to a number of stakeholders:

- The Forestry Commission (government funded body) manage a number of local woodlands (including Hardy Gang Wood) and provide grants for local land owners to plant woodland and hedgerow. The 2.67 hectares of project site planted in 2003, whilst outside the scope of the project, remains funded by the Forestry commission.
- The Woodland Trust (a national registered charity) own, promote and expand a number of pockets of local woodland within the Bardney Limewoods area.
- Natural England (government body) manages 384 hectares of Bardney Ancient Limewoods as a national Nature Reserve.
- Lincolnshire Wildlife Trust (charitable body) promotes increase in biodiversity throughout the county of Lincolnshire.

It is hoped that the younger local community (Schools, Colleges, Youth Groups, Scouts etc) can also be embraced as stakeholders (discussed later in this document).

The interests of local stakeholders will be defended through consultation and involvement in the project where feasible.

All project documentation will be publicly available. This Product Development Document will be available through the CCBA's and Project Climate websites. Onsite signage will further guide visitors to these resources.

G4. Management Capacity

Land and Capital Limited (L&CL) is a small holding company owned by the Townsend family. Christopher Townsend is majority shareholder and Managing Director. The following trading companies are in the L&CL group:

- Feedmark Limited: business established in 1989 selling herbs and supplements for horses and dogs
- Langley Abbey Estates Limited: 600 acre arable farm in Norfolk, UK, accepted into the HLS in 2006. Major HLS tree planting capital works project completed in 2007.
- Oxborough Lodge Farm Limited: 300 acre arable farm in Norfolk, UK.
- Land & Capital (Forestry) Limited: Owns the 12.12 hectare Apley land and will purchase land for other future LULUCF projects and manage the woodland.

- Project Climate (Limited by Guarantee): “not-for-profit” organisation which designed and developed the Apley, and future, LULUCF projects. Markets and sells the resultant voluntary and certified carbon reductions.

Key members of the Group’s management team are:

- Christopher Townsend (Managing Director)
- James West (Project Climate Project Director). Extensive sales, marketing and project management experience in various business sectors.
- John Stroud F.C.A. (Company Secretary). Responsible for all L&CL group financial, legal and administrative matters
- Carl Warren (Farm Manager). Extensive agricultural and arboreal knowledge.

In relation to this small pilot project, the L&CL group’s land management experience is evident from its significant farming interests. The group has access to various external consultants and advisors:

- Barry Nicholson (Consultant Ecologist). Employed by Ecology Consultancy Ltd.
- Joe Magrath (Consultant Agronomist). Employed by Frontier AG
- Richard Macmullen (FWAG – Farming & Wildlife Advisory Group)
- Baker Tilly (Accountants and Tax Advisors)
- Sprake & Kingsley (Solicitors)

The L&CL group therefore has the necessary farming, technical, ecological, scientific, commercial, legal and financial expertise to manage this Project. Any additional expertise or advice will be sought from the commercial market or academic organisations.

The Project Climate and L&C (Forestry) Limited businesses will be based at separate premises in Norwich. Application has been made to the Norwich Bio Incubator (part of the Norwich Research Park adjacent to the campus of the University of East Anglia) which seeks to rent office space to new technology enterprises that can use links to the University to grow their businesses. The Incubator currently has no available space, but they confirmed that we met all five of the Incubator’s selection criteria and that they would give us first refusal as soon as space became available.

Preliminary discussions been held with two soil scientists at the University of East Anglia (Dr Reid and Dr Simon Gerrard) to determine whether the UEA could provide technical support in the longer term, or whether the Apley Project could form the basis of a post graduate thesis.

The project’s development is funded from capitalisation within the group until such time as this is recouped through the sale of offsets. As is UK law, all annual accounts will be filed with Companies House and be publicly available.

G5. Land Tenure

The Apley Project site freehold is owned by the L&CL group. The purchase was financed by a combination of L&CL group funds and bank finance provided by Barclays Bank PLC. The loan has been granted over a three year period only. Lenders are unwilling to offer longer terms as new Forestry is unlikely to generate any cash flow to meet the loan or interest until the trees are established. In regard to the Apley project, this highlights the financial necessity to sell the carbon offsets in the voluntary market, at the projects outset. As described in section G2, this economic barrier further enhances the additionality of the project.

Most LULUCF projects are located overseas and lease their project site, which limits the project manager’s ability to make long term commitments or to react to changing circumstances that were not envisaged when the lease was originally signed. Permanence

can be a problem for projects structured in this manner. However, permanence is a significant strength of the Apley project.

The freehold of the Apley Project land is owned by the L&CL group so the project is able to make long-term commitments concerning future land use. The small size of the project land and the fact that PC intends to establish a series of new projects throughout the UK spreads the risk by making it less susceptible to fire etc. This helps ensure Permanence.

PC guarantees that:

- the project will not encroach uninvited on neighbouring property
- subject to any future UK legislation to the contrary, the project woodland will be maintained in accordance with the Project Design and Goals for at least the 100-year life of the project and as long thereafter as is considered necessary to mitigate global warming. This includes replanting the site in the event of a fire.

The current land use of the project site is agricultural so it has no human inhabitants. The Project does not involve the relocation or inward migration of any people.

G6. Legal Status

As noted above, the freehold of the Project land is owned by the L&CL group and the current use is agricultural. PC has been advised that it is not necessary to apply for planning approval to reforest this land, as it will still be officially designated as agricultural. While PC has no reason to believe that any neighbour or local authority would object to this reforestation plan, as it is compatible with neighbouring ancient woodlands and will add to local amenities, PC commits to complying with the law and filing any required planning applications to support this Project plan. Reforestation and mitigation of the effects of climate change is UK Government policy so PC has every reason to believe that any such planning challenge would find in its favour. In the event that any legal or planning challenge to this reforestation project is successful, PC commits to acquiring an alternative site to meet its commitments to sequester carbon that are contained in this project document.

Because UK farming is extensively regulated there is a possibility that in the future the UK Government could mandate that the Project site should revert to growing crops. PC considers that this would only occur in the event of a national emergency that created a food shortage, but that it must be recognised that global warming could disrupt current farming practices worldwide and create such a crisis. PC will need to adhere to UK law.

Though not a legal requirement, The Forestry Commission (government funded agency) recommend the completion of an Environmental Impact Assessment (EIM) including a 14 days public consultation period on their website. PC is adhering with this.

G7. Adaptive Management for Sustainability

The PC business plan envisages that many UK residents will more readily contribute and appreciate a carbon offset project based in the UK. It is hoped they will value its transparency, closer regulation and the local amenity and aesthetics provided by the resulting woodland.

The Apley project is intended to be a pilot for a series of further projects around the UK. PC intends to initially market each project to businesses and individuals with a vested local interest who will value and benefit directly from the amenity value of the woodland. PC is therefore establishing procedures that will enable it to learn from the Apley project and incorporate any improvements into subsequent projects. Key features of the management plan are:

- The Apley freehold is owned by group company L&C(F)L. All project activity is owned by PC. Annual director's report and accounts for each company will be filed with Companies House. Project status will therefore be a matter of public record. The Directors' report comments on trading and business activity and will include a review of progress in complying with the Project Plan and attaining the Project Goals.
- The Project site will be inspected and photographed annually by our consultant ecologist or other appropriately qualified individual. The results of this annual survey will be documented and discussed by the management team in one of their monthly management meetings. Where applicable photographs will be displayed on the Project Climate website
- The initial 100-year project term will be divided into a series of accounting periods. The first such period is the five years ending 2012. In addition to the normal annual survey, assessments will be made of resident fauna, flora and soil conditions. These results will be compared with the baseline site conditions and corrective actions will be initiated as required. The first accounting date was chosen because the current Kyoto emissions reduction target is for the period 2008/12. The UK Government is planning various initiatives to mitigate the impact of climate change and the Project plan may need to be adapted to reflect a changing legislative environment. The Project will be audited at the end of this initial five-year accounting period to calculate physical carbon stocks. It is planned that subsequent accounting periods will continue at 5 years intervals. However, this may vary if required to by the forthcoming DEFRA "voluntary code of best practice for carbon offsetting" or other emerging regulation or best practise.

G8. Knowledge Dissemination

As noted above, progress of all projects will be monitored and reported in the annual accounts filed with Companies House. PC is establishing a website that will be used to disseminate knowledge as well as being a marketing tool for PC projects. Information contained on the website will include, but may not be limited to:

- Flora, fauna and soil surveys
- Matters of general interest (scientific, endangered species etc) arising from the assessments and audits conducted at the end of each accounting period
- Photographs and status of all PC projects

Signage will be erected on the Project site informing the public that the reforestation is part of a GHG emissions reduction project. The certifying authority etc. will be acknowledged on this signage as a way of promoting public awareness.

Should any matter of major scientific interest arises from project activities (significant variations in the amount of carbon sequestered from the accepted baseline etc) that have a general application to project design consideration will be given to publishing a paper in the scientific literature.

In addition to the voluntary code of best practice for the provision of carbon offsetting to UK customers, the UK Government is developing an agricultural market trading scheme for reducing emissions (DEFRA paper RCCF 06/09) so it is likely that some form of official reporting will be established to ensure appropriate dissemination of knowledge. PC commits to complying with any voluntary code of best practice established by DEFRA or the UK Government in this respect.

As discussed below it is hoped to involve local schools in the site monitoring by establishing the monitoring programme as a school science project. This will help teach the children about climate change and will help the local community take ownership of the Project.

As noted above, discussions have also occurred with Dr Brian Reid (UEA Senior Lecturer) about using this project as the basis of a postgraduate thesis.

Climate Section

CL1. Net Positive Climate Impact (see Attachment L)

The CCBA standard recommends the use of IPCC GPG to estimate future carbon stocks. It stipulates:

"This estimate must be based on defined and defensible assumptions about how project activities will alter carbon stocks and non-CO2 GHG emissions."

"The net change is equal to carbon stock changes with the project, minus carbon stock changes without the project"

"Factor in the non-CO2 gases CH4 and N2O to the net change calculations if they are likely to account for more than 15% (in terms of CO2 equivalents) of the project's overall GHG impact"

As detailed in section G1 and Attachment L, baseline carbon stocks are limited to soil carbon at 143 tC/ha

As detailed in section G2 and Attachment L, the cessation of intensive agriculture will mitigate 167 tC/ha over the project lifecycle. N2O therefore accounts for more than 15% of the projects overall GHG impact.

The project will count carbon from four of the five pools identified in the IPCC GPG:

Pool	Counted
Above Ground Biomass	Yes
Below Ground Biomass	Yes
Dead Organic Matter (Dead Wood)	No
Dead Organic Matter (Litter)	Yes
Soil Carbon	Yes

Due to the difficulty in accurately measuring "Dead Organic Matter (Dead Wood)" and its relatively low carbon stock, it will be omitted. As per the IPCC GPG, all thinnings are measured within Above Ground Biomass.

Attachment L details the methodology, defensible assumptions and data used to estimate the net climate benefit.

The net climate benefit over the project lifecycle will be:

$$\Delta C_{(\text{Project})} = 23,058 \text{ tCO}_2\text{e}$$

This compares to a "without project" scenario of 5805 tCO2e emitted.

CL2. Offsite Climate Impacts ("Leakages")

The Project is a self-contained private initiative and will not cause a corresponding reduction in tree planting elsewhere. The UK Government has established the Woodland Grant Scheme to promote new woodlands. The Project would be entitled to claim a grant under this scheme but it has not done so to ensure that this project is Additional. If it had claimed a grant it could have resulted in less woodland subsequently being planted elsewhere in the UK.

As previously noted, withdrawing 9.45 hectares of agricultural land from production will not result in additional production elsewhere in the UK. All agricultural land is registered and its

use is controlled and monitored by DEFRA and linked to the SFP. UK regulations therefore ensure Additionality and that no leakage through subsequent agricultural will occur.

Some 39,690 saplings will be planted on the project site. It is intended that these will be sourced locally to minimise leakage due to transport. Labour will be supplied by neighbouring farms or the help of local stakeholders such as conservation groups or schools. Site preparation will be limited to ploughing with no fertilisers, herbicides or pesticides being applied. Within the scale of the project it is believed that leakages due to operation activity will be minimal. It is not feasible to measure or predict these leakages. However, they are factored into the conservative estimate of future carbon stocks and the retention of 10% of calculated carbon stocks (CL5).

It is recognised that UK Customers who buy carbon offsets may wish to visit "their trees". This will not be discouraged, but it will be noted on the PC website that that this could result in additional GHG emissions because of additional travel, unless the customer was already intending to visit the neighbouring ancient woodlands or is in the area. The website will contain pictures of the Project (updated annually) and will also give the Project site co-ordinates so that customers can view the site using Google Earth.

The Project plan is to restrict public access to the site until the woodland is in its "full vigour" phase. In this initial phase there will be an annual inspection and audit at the end of each (5 year) accounting period. These activities will generate a certain amount of emissions from vehicle exhausts etc but will not be significant. Again it is not possible to accurately predict these leakages and they have been factored into the conservative estimates made. These emissions may also not be Additional as, if the Project land was contract farmed on behalf of L&CL, a number of inspection visits would occur each year by the L&CL farm manager.

Once public access is granted there may be some additional emissions leakages from visitors. As noted, Bardney Limewoods attract approximately 20,000 visitors per year at present. The Project business plan envisages that some of these people will also visit the Project site. However, it is anticipated this will be an extension or deviation from a journey which may have occurred without the project. It is unlikely to result in significant or measurable increase in GHG emissions.

The Project plan involves re-evaluating actual emissions savings each accounting period. If public access for activities such as paint-balling does result in additional emissions, this will be taken into account and withdrawn in the following accounting period.

CL3: Climate Impact Monitoring

It is noted that the CCB Standard envisages that though an initial monitoring plan will be established, it is accepted that developing a full carbon-monitoring plan can be costly and may not be fully defined at the design stage. It highlights that this may be especially true for small projects, such as the Apley.

The Project site will be visually inspected and photographed annually. This will include inspection of boundaries, footpaths, pond and stream etc. The general health and wellbeing of trees will be inspected. Any dead trees may be replaced and any diseased plants treated or removed, as recommended.

In accordance with the Operational Plan, trees will be thinned at the intervals specified. The figures quoted are projections of that required to achieve a final optimal biomass. Growth, maturity and density will be taken into account at each thinning and adjustments made as such. Any resultant dead biomass will be used as bio fuel or timber.

It is envisaged that the accounting period will be every 5 years, beginning in 2012. Each of the four pools used in the project estimate will be assessed.

Measurements will include, but not be limited to:

- Sampling tree species, density and numbers
- Sampling tree height and d.b.h. (diameter at breast height)
- Sampling of Dead Organic Matter (Litter)
- Sampling of Soil Carbon

The scale of sampling will be determined at the time of accounting, with relation to the growth stage of the project, IPCC GPG, best practise and gaining acceptable accuracy.

It will not be possible to assess non-CO2 GHG savings as they have resulted from the cessation of agricultural activity. However, this is an area of significant scientific research. Should the estimates, methodology or farming practise change, PC will seek to update and modify its projections as applicable.

CL4. Adapting to Climate Change and Climate Variability

Climate change studies suggest that an increase in global warming of more than 4°C may result in the death of forests that are unable to adapt to higher temperatures or changing rainfall patterns. Other studies suggest that global warming could affect ocean currents. The UK is warmer than normal for its latitude because of the Gulf Stream. If the Gulf Stream is diverted or weakened global warming could actually result in lower UK temperatures.

The species of trees to be planted at the Project site are not currently close to their limits of viability in this location. Theoretically they can therefore survive moderate amounts of climate change. The Project plan involves replacing dead trees as required to achieve optimal density once the woodland is mature. This may include replacing any trees that die because of climate change with a different species that is adapted to the changed conditions.

Changing global climate could create a food shortage that necessitates major changes to the worldwide pattern of agriculture. It is possible that the UK may need to be farmed more intensively than present in response to such changes. A worldwide food shortage could result in significantly higher food prices, which would make it economically advantageous to return the project site to agriculture. PC undertakes that it would not return the Project site to agriculture voluntarily unless it purchases an equivalent number of carbon credits to cancel those sold.

If international measures to limit climate change fail and rising temperatures melt the polar ice caps, rising sea levels could flood much of Lincolnshire. Given the extremity of this event, PC is unable to establish a contingency plan as circumstances are too uncertain and the UK Government would probably dictate counter measures.

CL5. Carbon Benefits Withheld from Regulatory Markets

The concept of withholding some carbon benefits from the regulatory markets is because this requires additional mitigation action to be taken elsewhere, therefore resulting in greater climate change mitigation. Projects that do not sell all their carbon benefits in regulated regimes have the opportunity to experiment with climate change mitigation activities other than those eligible. Such experimentation may generate valuable new knowledge.

For these reasons the CCB standard recommends (not a mandatory requirement) that at least 10% of total carbon benefits generated by a project are not sold into regulated GHG markets.

The Apley plan is to sell all estimated carbon benefits in the unregulated voluntary market to generate sufficient cash flow to fund the project. As demonstrated, PC has applied

methodology and defensible assumptions in such a way that a cautious underestimate was achieved.

Both the certified and voluntary markets are undergoing significant evolution, the pace of which is predicted to increase sharply. To save guard its supporters and in anticipation of any regulatory changes, PC is adopting accounting periods of five years to calculate physical carbon stocks achieved. Should it be possible in future to sell such credits in a regulated voluntary or expanded certified market, 10% will be withheld.

Project terminated and CCB Standards validation withdrawn, Oct 28th 2009

Community Section

CM1. Net Positive Community Impacts

The UK is a small, congested country that is intensively farmed with comparatively little forest or wilderness. Most common land was enclosed in medieval times and appropriated by the ruling classes. By the 19th century forests had been decimated for shipbuilding or construction.

The establishment of National Parks in the 20th century was a belated attempt to preserve the little remaining wilderness and forest for the nation. The National Trust has purchased large stretches of coast to preserve it from developers and grant public access. It is UK Government policy to increase public access to the countryside. "Right to Roam" legislation has been passed within the last few years that has granted increased access by the public to privately owned farmland, but even relatively modest proposals (walkers must remain on established footpaths) were regarded as very controversial and were resisted by many farmers and landowners.

Initial access to the project site will be limited to protect the young trees and thus the interests of financial stakeholders who invest in the project and its net climate benefits. In the "Without Project" scenario the project remains intensely farmed arable land with no direct community benefits. Therefore, during this period of limited access the community benefit remains neutral. However, access along the northwest and northeast perimeters of the site by public footpath will of course remain, with enhanced biodiversity and physical aesthetics from the project site.

Once established, granting public access to the project site will provide a significant social amenity to the local community. In this context "local community" refers to anyone who may wish to visit the woodland for a walk, nature visit, picnic or day trip. The city of Lincoln is within 8 miles and there are over one million people within a 30 mile radius can derive social benefit from this project.

No one lives on the Project site and it is relatively very small. Therefore, there is no discernible negative social impact of the project on local communities. As there are no dwellings within close proximity of the project the physical presence of the resultant woodland will have no negative impact on properties etc.

As noted in section G3, the project site is in an area of significant activity by conservational & forestry organisations & charities. PC is keen to engage such bodies as stakeholders in the project. The Forestry Commission (FC) has provided verbal help and advice with the planting plan. They are to conduct an Environmental Impact Assessment and 14 day public consultation through their website. The Woodland Trust and Lincolnshire Wildlife Trust have also been approached but do not wish to use their resources on a privately financed project at this time. In their absence PC has employed the services of Ecology Consultancy Ltd for biodiversity advice and best practise.

Because the project site is private property owned by L&CL, the decision to initiate the Project has no financial impact on the local community.

As noted, planning permission is not required for the reforestation of the Project site. PC may erect signage at the Project site advising the public of its plans and providing contact details and the website address so that interested parties can obtain further information. A written record will kept of any comments or complaints by neighbours (phone calls, emails and letters). PC will respond to all such contacts received and keep neighbours and the community advised of future developments. These responses will be summarised and reviewed by PC management and the Project Plan revised if considered appropriate.

CM2. Offsite Community Impacts

The Project site is bounded by a public road (Attachment A), public footpath and watercourse (Attachment D). The Project plan is based on granting public access (walking, bird watching) and possibly establishing commercial activities such as camping, barbecue facilities or paint balling in part of the Project site. The Project therefore has the social benefit of adding to local amenities and will attract visitors or customers in due course. Granting public access may create employment opportunities (grounds men, security, events organisers etc) and any commercial exploitation will create additional employment, depending upon the nature of the business. Additional visitors will have an economic benefit to the community, as they will spend money outside the project boundaries at local shops, restaurants, pubs etc. There is therefore a net positive impact on social amenities in the neighbourhood.

The baseline agricultural scenario has no employment implications. Stopping farming may have a marginal negative impact on the wealth of the local farming community as they have lost the opportunity of generating additional income from contract farming and this could translate into lower discretionary spending in local community. Any such reduction in economic activity would be temporary (lasting for 15 to 20 years while public access is restricted) and is relatively insignificant given the small size of the Project site and the fact that it is relatively unproductive grade 3 land.

Any economic change would be voluntary by the local community as the Project site was put on the market by its previous owner (a farmer) and the sale was not initiated by any unsolicited offer from L&CL. The farmer has received payment for the land and may use this money for discretionary spending. Therefore the change in use could increase economic activity in the local community.

In summary it is possible that there could be a slight negative economic impact initially (but even this is uncertain). This is greatly outweighed by additional employment opportunities and increased downstream economic activity after the initial phase of the Project.

CM3. Community Impact Monitoring

The CCB standard requires the development of an initial monitoring plan to quantify and document changes in social and economic wellbeing resulting from Project activities. It notes that developing a full-scale community-monitoring plan can be costly, it is accepted that some plan details may not be fully defined at the project design stage. This will especially be true for small-scale projects.

Because of the nature of the Project (micro project based on private property) it is considered that the only community monitoring that is required is to confirm additional employment and economic activity once the Project site is opened for public access. Records will be maintained of:

- Direct employees or employees of concessionaires at the Project site
- Visitor numbers

CM4. Capacity Building

The Project's business model can be replicated across the UK using small plots of the most unproductive agricultural land. If this pilot Project at Apley is commercially successful, this is what PC intends. Spreading projects across the UK will provide general access to woodland for a variety of leisure activities. The UK public will gain the benefits of investing in measures that improve their local communities as well mitigating the effects of climate change.

Once public access is granted, training will be provided to on site Project employees to preserve sensitive habitats and restrict public access where necessary.

Consideration will be given to involving local schools in the various monitoring programmes. The initial Project plan involves annual site surveys and more detailed analysis of soil samples etc in 2012 and at the end of every subsequent accounting period. It may be possible to build an ongoing school science project around this monitoring and delegate responsibility for some of this monitoring. The school could be granted access to a separate section of the Project Climate website to tabulate and record survey results. PC would pay for any required laboratory analysis. The monitoring programme required by the CCB standard could be expanded to include more regular site inspections covering the four seasons. While these additional inspections may not be scientifically necessary, they may benefit the school children in learning about the natural world and climate change.

Unlike most CDM or CCB standard projects, PC is developed in a country where the equal rights of women are heavily protected and culturally accepted. Within the scale of this project it is not possible to positively discriminate. However, particularly when engaging school or colleges, females will be equally engaged, encouraged and supported.

CM5. Best Practices in Community Involvement

Due to the nature of CDM projects, most are delivered in developing or third world countries, with expertise and finance from outside the indigenous culture. Developers attempt to assimilate and accommodate local politics, ethics and customs. As UK natives, the PC management team is developing a project within its own culture. Therefore our ethical, moral and business practises match that of the community affected by the project.

The project will create employment opportunities through the physical plantation of trees and any future use of the site once access is granted. The former will be sub-contracted to a local farmer or gardener. Due to the small size of the project, it will not result in direct employment but will create work and wages within the local community and economy. Any employment from the latter will be sourced from the local community and those in easy commuting distance of the project site.

The UK (particularly as part of the European Union) protects its workers and their rights to a high degree. Any one employed as a result of the project by association receives these protections.

Likewise health and safety at work legislation in the UK is amongst the most stringent and comprehensive in Europe. This will cover any employee on the project site whether in a high or low risk activity or occupation.

Biodiversity Section

B1. Net Positive Biodiversity Impacts

Baseline and anticipated "with-project" biodiversity has been analysed and predicted using appropriate methodologies in Attachment J. The study was conducted by Ecology Consultancy Ltd. Please refer to this throughout.

The Project site is agricultural land that has been intensively farmed for almost two centuries. The baseline condition of the site is bare land with now vegetation, following cropping in 2006.

Historically, herbicides and pesticides have been applied to eliminate flora and insect biodiversity, to the extent possible or desired. Fertilisers have been applied to promote growth and totality of the selected crop. A 10-metre strip was left around the field to reduce accidental contamination. There are no IUCN Red List species on the Project site.

The baseline biodiversity of the site is therefore very low.

The Project plan is based on reforesting the area using native species of broad leaved trees and providing an environment for fauna and flora to flourish. No invasive species or GM modified trees or other organisms will be planted initially.

There will still be far more open farmland than woodland in the surrounding countryside once the project is initiated. Therefore, it will not adversely affect species (hares etc) that prefer an open habitat. It is clearly apparent that there are huge net positive biodiversity impacts arising from this Project without conducting any form of monitoring. The adjacent ancient woodlands (Hardy Gang Wood) provide an existing wildlife haven. Flora and fauna will migrate naturally onto the Project site.

The CCB standard notes that the question of using GM modified plants is currently unresolved. PC would only use GM modified plants if this action were to be recommended by the UK authorities or CCB at some future date. As noted above it is conceivable that in the event of severe global warming native trees might start to die off and may need to be replaced with non-native or GM modified species.

B2. Offsite Biodiversity Impacts

The only possible negative impact on offsite biodiversity is if wildlife that currently resides in neighbouring Hardy Gang Wood migrates into the Project site. This is at worst neutral if both areas are taken into account. The additional habitat provided by the Project site will enable species to expand and establish new territories if they have outgrown the space afforded by Hardy Gang Wood.

It is unlikely that non-native species would have an adverse effect on biodiversity as at baseline it is almost zero. However, the use of non-native species could limit the benefits to future biodiversity.

In the initial planting plan no non-native or recently introduced species will be used.

The surrounding woodlands, as their collective names suggests, are famed for their small leaved Lime (*Tilia Cordata*). The exact variation of the species is particular to each wood. Their genealogy is under scientific study. Therefore, to avoid contamination of species, the Forestry Commission have recommended that no small leaved Lime be planted. PC will adhere to this.

B3. Biodiversity Impact Monitoring

The CCB standard notes that an initial monitoring plan must be established to quantify and document changes in biodiversity (within and outside the project boundary). It is noted that developing a full scale biodiversity monitoring plan can be costly. It is accepted that some of the plan details may not be fully developed at design stage and that this will especially be true for small projects.

As noted above it is clearly apparent that biodiversity will greatly increase because of the nature of the project. Monitoring will be minimal unless circumstances change and it becomes apparent that a specific aspect of Project activity has an unforeseen negative impact on biodiversity in general, or a specific species in particular. The initial monitoring plan is to conduct an annual visit to survey biodiversity. The survey will be conducted on approximately the same day each year to ensure comparability. Time will be spent observing birds and other wildlife. Notes will be taken flora species, droppings, game trails etc. Photographs will be taken and the whole Project site inspected. Biodiversity trends will become apparent by comparing annual data, as will any changes arising from global warming. Confirmation will be made that all neighbouring fields are being farmed, noting the crop. It should not be necessary to independently monitor Hardy Gang Wood, as separate monitoring should exist that can be accessed for comparison purposes. If no monitoring is taking place in Hardy Gang Wood the annual site visit should include an hour making similar observations. Any trends that indicate declining biodiversity in Hardy Gang Wood need to be reviewed to ensure that the Project has not caused the change

B4. Native Species Use

The Project plan will plant native species only. The species selected have been based upon the recommendations of the Forestry commission and UK best practise. This has been balanced against the need to optimise biomass and thus carbon stocks.

The key species will be:

- Oak (*Quercus Robur*) 57%
- Ash (*Fraxinus Excelsior*) 38%

Smaller native tree species and woody shrubs (5%) will be used around the perimeter and rides to encourage biodiversity. This is detailed in the Planting Plan (Attachment O).

B5. Water and Soil Resource Enhancement

Intensive agriculture and the application of fertilisers (baseline scenario) invariably creates run off of nitrates into surrounding watercourses. The project site is adjacent to a watercourse (Attachment D) and flowing stream. The latter includes a range of biodiversity including fish.

Cessation of intensive farming (Project scenario) will inevitably halt nitrate contamination and thus improve water quality.

Following decades of intensive farming the project sites soil is devoid of organic matter and natural nutrients. The carbon cycle of deciduous trees will enhance the organic levels within the soil through dead organic matter (dead wood & litter) permeating from the surface and dead root matter. This will enhance fertility. The mature trees root structure will also enhance the grounds integrity and structure.