Three partners, one vision
The National Trust, Redrow Homes and Bryant Homes - developing relationships that work

In volume we trust
A journey of faith

Case studies
Key lessons learnt from the development
Fast Facts

Location
Altrincham, Cheshire

Part of the Dunham Massey Estate bequeathed to The National Trust in 1976 by the 10th Earl of Stamford

Landowner
The National Trust

Developers
Redrow Homes (North West) Ltd.
Bryant Homes

Vision
A sustainable and imaginative development of new homes in a new landscape, which integrates with the surrounding environment, and aims to be a safe, healthy and inspiring place in which to live, work and to have as a neighbour. A place and community that will evolve, mature and rejuvenate, and serve as an exemplar of sustainable development over many decades.

Key Aims
- Approximately 750 masonry dwellings reflecting local vernacular
- Highly insulated buildings free from serious thermal bridging
- Heating and ventilation systems that minimise carbon dioxide emissions
- Restoration of Sinderland Brook river corridor
- Sustainable Urban Drainage system
- Green infrastructure network incorporating footpaths and cycleways
- Network of residential streets and mews parking
- Prospective local centre comprising retail and community facilities

Phase 1
273 units (complete)

Phase 2
188 units (under construction; completion summer 2008)

Phase 3+5
174 units (combined)

Phase 4
Circa 100 units (subject to planning)
The current Government has been bold and ambitious in setting a target for zero-carbon homes by 2016. But let us be clear, setting a policy target and timetable for regulatory change is one thing; understanding and addressing the practical implications is another challenge altogether.

If we are to have any chance of genuinely delivering low and zero-carbon housing over the next decade, and demonstrating to the rest of the world what can be achieved through leadership and innovation, Government and the house building industry must work together at the national and local level to turn the zero-carbon vision into a reality.

The immediate challenge is not to prove the possible through isolated flagship schemes – important though they are – but to identify and respond to the systemic and cultural limitations of an industry which has such a massive role to play in tackling climate change and delivering a sustainable future.

That is why the lessons learnt from Stamford Brook are so important, and why the development partners – The National Trust, Redrow Homes and Bryant Homes – should be commended for their refreshingly honest and constructive reflection of a journey in learning which provides key lessons for the wider industry.

I visited Stamford Brook in early 2005, as Minister for the Environment and Climate Change, and I was struck then by the positive approach being taken to fuse environmental and social excellence with the traditional housing product that the market continues to demand.

It is clear from this account that it has been no easy ride. Unexpected challenges have arisen. Mistakes have been made. It is from mistakes though, that we often learn our most important lessons. Understanding what has worked well, as well as what hasn’t, is critical to realising positive change.

Above all, it is clear that pursuit of a shared vision has been central to the achievements of Stamford Brook. It is now down to Government through the consistent and robust enforcement of regulatory change, and house builders across the country through innovation and business excellence, to grasp the nettle and make truly sustainable homes a collective vision for the future.
passing the baton

Our shared experience at Stamford Brook has demonstrated to us the scale of the challenge that the house building industry faces as it strives to deliver zero-carbon homes within the next decade. But it has also given us hope - hope founded on the knowledge that the industry, with the support of Government and local communities, is capable of delivering the zero-carbon vision.

But if that vision is to be realised, many things need to change. The journey in learning for us at Stamford Brook has highlighted a range of systemic and cultural limitations within the house building industry that must be overcome. It has also amplified the need for substantial changes in Government’s approach to policy and regulatory enforcement.

This unique document articulates our journey at Stamford Brook. It addresses a diverse and extensive range of policy and practical lessons and gives rise to the following headline recommendations:

• Government must be consistent and coherent in its approach to regulating the house building industry. Higher standards are clearly needed, but in practice they will only be delivered through robust enforcement underpinned by post-construction performance measurement as standard.

• Greater transparency and accountability is needed at the point of regulatory control. The current disconnect between policy and regulatory practice undermines Government objectives and disenfranchises its key stakeholders.

• The need to address skills deficits and supply chain limitations within the construction sector is highlighted by the substantial gap between the predicted thermal performance of buildings at design stage and that achieved following construction.

• The industry needs to re-think the whole design and construction process by adopting an integrated systems approach, all of which must be underpinned by a culture of continuous improvement.

• The value of effective community engagement should never be underestimated and should be a pre-requisite of planning permission on all substantial development projects.

Over the next ten years we have the chance to significantly improve the social and environmental performance of homes across the UK, spearheaded by the drive towards zero-carbon new dwellings by 2016. With leadership, talent and commitment, together we can dramatically reduce domestic carbon emissions, provide well designed and accessible green spaces that provide multiple benefits for communities and enhance quality of life, and capture the once in a generation market opportunity to innovate across the construction sector.

Our job is not yet done, but now is the time to hand over our learning from Stamford Brook and urge Government and the wider housing industry to rise boldly to the challenge. It is now or never.
	hree partners. one vision

Leading players from the Stamford Brook development partnership talk about their relationship and its influence on the quality of the scheme.

Mark Mainwaring
Director and General Manager
Bryant Homes

Rob Jarman
Head of Sustainability
The National Trust

John Grime
Development Director
Redrow Homes

Stamford Brook is built on the foundations of an unlikely alliance. The National Trust, an independent conservation charity of 3.5 million members, joined forces with Bryant Homes and Redrow Homes to counter the myth that traditional volume house building approaches cannot be used whilst simultaneously improving energy efficiency to reduce carbon emissions.

You only need to spend a few moments with the three of them to appreciate their mutual understanding.
three partners, one vision

It is often said that life’s experiences are defined by those with whom they are shared. Stamford Brook appears to be no exception. The journey in learning for the development partners has been defined by their unique three-way relationship. Stakeholders and project consultants have been equally impressed by the partnership dynamic and the effect that this combination of interests and cultures has had on the masterplanning, detailed design and construction of the scheme.

It has been the thread of rigour, stimulated by the partnership ethos, which has tied the Stamford Brook experience together.

It would be ridiculous to suggest however, that the three partners have always seen eye to eye. At times, there have been fundamental differences in opinion that have paralysed progress. But these breakdowns have only ever been temporary. Commitment to a unifying vision has invariably provided the glue by which the partnership has stuck; during the good times as well as the bad. Perhaps most importantly, that shared vision has resulted in shared responsibility for the problems, as well as the achievements.

Flying the flags for the three development partners have been Rob Jarman, Mark Mainwaring and John Grime.

You only need to spend a few moments with the three of them to appreciate their mutual understanding, something which all of them would admit has taken time to develop. “It’s fair to say,” comments Grime, “that we felt slightly sceptical at the beginning. Traditionally, the stereotype is that developers and conservation campaigners sit at loggerheads on opposing sides of the table, so the opportunity to work together has been an insightful process for all of us.”

Reflecting on the way in which that stereotype has been turned on its head at Stamford Brook, Jarman holds the view that the acceptance of each partner to look at options in depth and objectively has been a key ingredient. “We’ve all had to come into this with a degree of open-mindedness whilst holding true to our individual objectives for the scheme. To justify the development on the Dunham Massey estate in the first place, the Trust had key outcomes to deliver from which it has not been prepared to deviate. The same is true of the house builders, but we’ve all accepted each others’ bottom-line requirements and worked constructively to meld them together into a coherent development strategy.”

Seven years on from its inception, the partnership now has something tangible against which to measure its success. Despite the fact that construction is still underway, there is already a coherence within the established phases of Stamford Brook which is often lacking on modern housing estates.

“Our partnership with The National Trust has forced us to look at things in a lot more detail than we normally would do” reflects Mainwaring. “This is an industry which is driven by unit completions and sales figures so it’s been a challenge for us culturally, but it means that Stamford Brook is the antithesis of an ‘off-the-peg’ housing solution. It is this collaborative approach that has led to the results we are now seeing on the ground – not just in terms of energy efficient units, but also in terms of site-wide sustainability and the emergence of a new community.”

“I also think the partnership approach has led to stronger relationships with local residents and stakeholders than we would normally see in our business” continues Grime. This is a view that Jarman evidently supports. “There has been significant investment in the employment of long-term project officers on Stamford Brook, by the developers and the Trust. That has been a massive success because we’ve been able to work together to develop strong relationships locally. There are elements of this scheme that we thought would be very controversial, but the fact that people understand our shared vision has meant that they are able to appreciate the importance of those individual elements within the wider context.”

... I am certain that we are better for it now as developers.

It is abundantly clear to the Trust and the developers that the strength of partnership has enhanced the quality of Stamford Brook. But for all the reflective back-scratching, there is also a notable honesty about some of the more difficult experiences that they have shared. At one point, tensions reached a level which prompted the partners to convene an independently chaired workshop - away from the normal boardroom meeting setting - to look introspectively at the partnership and its progress on the scheme.

It was a turning point for the project, and Grime is convinced that those difficulties have been central to the realisation of a commercially viable sustainable development at Stamford Brook. “It’s true that there have been times when the process has been frustrating for us, and I have no doubt that the same is true for the Trust. It is perhaps inevitable that you encounter some disagreements along the way, but those disagreements have prompted rigorous interrogation of the possibilities and the perceptions, supported in no small part by our teams of professional experts. I am certain that we are better for it now as developers - not just at Stamford Brook, but because we’re taking that learning forward from here into other schemes too.”

Jarman doesn’t disagree. “I think it has been a valuable learning experience for the developers, but it would be naïve to suggest that that hasn’t been the case for the Trust too. Understanding the commercial realities of development will prove to be invaluable to us as we seek to work with others in the private sector in pursuit of our goals.”

Interestingly, serious questions remain about the marketability of environmental credentials in the residential market. Mainwaring sums it up simply. “I think it’s fair to say that we expected the sustainability credentials of the scheme to be a significant factor in the choice of purchasers, but that has turned out not to be the case. However, we know the way that Building Regulations are heading, and we’re grateful that we now have that clarity from Government. It’s true that we have invested more time and money in this project than we do typically, but you can bet your bottom dollar that our experience of working with the Trust here will put us in a stronger position than most when higher regulatory standards do kick in. At the end of the day, this has all been good business sense.”

The journey at Stamford Brook continues and there are bound to be further challenges for the partnership along the way. The partners have come so far together though, that it’s very hard to imagine those challenges getting in the way of success.
60 second interview with

Simon Castle
Chief Planning Officer, Trafford Council

So Simon, how long have you been involved personally with Stamford Brook.

For over 4 years.

Presumably you don’t come across many joint planning applications from house builders and conservation charities.

No, I do think this is a first!

Do you think that combination of interests has had any particular effect on your relationship with the applicants?

Yes, in my view it has. What has happened here has been a three-way agreement over development proposals, between the National Trust, the developers and the Authority. As those proposals have been developed, the developers have had to work to two masters. That has made it a much more rigorous process for them than perhaps it normally would be. This coming together of three parties has meant a lot more discussions and a lot more negotiation.

And do you think that has had implications for the development itself?

I think it definitely has. I think the National Trust has managed to imprint its ethos on the whole scheme through its relationship with the house builders.
So what stands out for you in particular about Stamford Brook compared to other residential schemes that you are familiar with in Trafford?

First of all the character of the design ethos you can see right through the development. We don’t often deal with new housing estates of over 700 units in Trafford, but you can see the design principles underpinning the layout being reflected right across the scheme. And then, of course, the quality of the external environment comes across extremely strongly with the river restoration, the sustainable drainage system and the way that the open space is integrated throughout the scheme.

Are you starting to see similar approaches coming through elsewhere? There have not been many opportunities for other schemes of this size and with this potential locally. We tend to deal with far smaller sites in the built-up area so I think we have not actually had much of an opportunity to deal with this kind of approach elsewhere.

As far as you are aware has there been any particular sort of tensions along the way that has been resolved from the outset. I am sure it has been a difficulty for the house builder. I think also there has been some disagreements with the Council about shared surfaces for cyclists and pedestrians. It would have been helpful if that had been resolved from the outset.

With the highway adoption issue in particular, do you see that as an example of a disconnect between policy objectives and the practical realities of technical guidance and standards? What it reveals to me is perhaps those kind of issues not being raised far earlier in the design process. The issue of geometry and adoptability should have been discussed more fully at the time that draft layouts were agreed between the applicants and the Authority, so that the implications were known from the outset rather than being raised some years into the project.

Do you think it has had a negative impact on the final development layout? As you say, some adjustments have been made in terms of layout overall to accommodate those issues. I would have to say that the jury is still out on that because we have not had a chance to see the outcome in those parts of the development that have been particularly affected by these changes and get a feel as to whether that has been for the good, for the bad, or whether it has been fairly neutral.

Do you feel that the community consultation that the Trust and the developers have instigated, together with liaison with ward councillors, has helped to deliver the vision for the development and get a wider sense of community support? I think it has. That’s another outstanding feature of this scheme; the extent to which - and I am sure it was led by The National Trust - the community has been brought along with this scheme and had an opportunity to look at and debate principles and details from the outset. Providing the opportunity for the community to look at the proposals for the scheme in advance of the planning application stage has been a very helpful process, and I think it is interesting the way that the community have continued to retain a deep interest in Stamford Brook, even at this stage when you are well into construction. The level of interest is still extremely high and that’s a reflection of the amount of work that has been put into that consultation process over years.

So a lesson perhaps for other developers? Yes. As always there have been some objections to some aspects of the scheme but I think the objections have been very limited because The National Trust and the house builders have been able to explain their proposals from the outset. People have seen the way the thinking has developed and resulted in particular aspects of the design.
The successes of Stamford Brook have resulted from collaborative working and commitment to a central vision, but the journey in learning for the development partners and their team has been punctuated by important mistakes and provides valuable lessons for policy makers and the wider house building industry.

A journey of faith

Despite the absence of prominent environmental gestures such as wind turbines and solar panels, Stamford Brook has developed a reputation as an exemplar residential development demonstrating how a traditional volume housing product can deliver high environmental standards through passive design and construction techniques. Certainly, the efforts of development partners The National Trust, Redrow Homes and Bryant Homes, have been well rewarded by positive publicity and commendations from those in the highest levels of Government. Today, the scheme is at an advanced stage of construction and occupation and continues to draw accolades for its holistic approach to sustainable development.

Surprisingly though, for all the sense of achievement, one is struck by a persistent air of frustration amongst those most closely involved with the project. The reason for this weathered outlook becomes clear when the journey through which the project team has travelled is recounted.

“We have always had a strong sense of vision and a commitment to underlying design principles”, says Catherine Prasad, Project Manager for the Trust, “but maintaining the focus on that vision has required persistence in the face of sometimes protracted bureaucracy.” Whilst lessons have clearly been learnt by the Stamford Brook team across all features of the development, there are three particular issues which seem to evoke the most impassioned of opinions:

• the apparent disconnect between policy and practice;
• the ability of the house building industry, in its current form, to deliver sustainable homes; and
• the need to make regulation more robust and drive ever higher standards across the residential sector.

Turning policy into practice

Strong emphasis on sustainability through planning policy is nothing new. The former Planning Policy Guidance Note on Development and Flood Risk (PPG25), for example, was clear in its advocacy of sustainable drainage principles for new developments. This has been reinforced further by its successor Planning Policy Statement, PPS25.

There was an expectation from the project team, therefore, that their commitment to sustainable urban drainage systems (SUDS) would be readily welcomed by those with regulatory responsibility. However, the reality of getting approval and support on the ground from key partners has proved a challenge.
In this respect, Stamford Brook has demonstrated how far the regulatory system, and the culture surrounding it, is divorced from strategic policy objectives. “There have been a number of difficulties throughout the design and approval process in making sure that people understand the hydrological concepts that we were proposing. This problem was exacerbated by changes in personnel during the design and approval process, meaning that any progress we made was vulnerable to being undone” reflects Nick Haycock, who advised The National Trust on the river restoration and surface water attenuation elements of the scheme.

According to Prasad, there were also unexpected hurdles to cross in securing approval from United Utilities for connections to the drainage network. “We ended up in a situation where we had to invest considerable time in convincing United Utilities that The National Trust had the same longevity as a local authority and could therefore assume liability for the SUDS in order for the mains outlet to be adopted. Without this, we would have been unable to discharge surface run-off into Sinderland Brook.”

Haycock continues: “Clearly the solution reached at Stamford Brook will not be transferable to other commercial development schemes in the region, despite the national policy context and the more progressive approaches being made successfully by utility companies in other regions. One has to question how quickly progress on sustainable drainage can be made, and that’s a real worry when the fragility of existing infrastructure in the UK has been highlighted so dramatically by recent major flooding events.”

Stamford Brook demonstrates that it takes leadership, vision and perseverance to implement key features that are recommended in most national and regional policies. Despite the strength of policy nationally there is little sign that positive change is being realised on the ground. The question of accountability is therefore pertinent. It will be interesting to see what stance Government takes in light of these evident contradictions between policy and practice.

Delivering low carbon housing standards

The Government has recognised the imperative for low carbon housing and has set a target for all new houses to be zero carbon by 2016. Stamford Brook demonstrates the size of the challenge in meeting this target when relying on the current volume house building system but there are also encouraging signs that it is possible to meet this target through leadership and innovation.

On the positive side, the project has demonstrated how performance standards for new housing can be developed through partnership between Government, academia and industry. Stamford Brook played a significant part in the 2006 revision of Part L of the Building Regulations by demonstrating that the energy performance standards that Government was proposing to implement were achievable in mass, site-built housing. This is a powerful model for future regulatory development.

Ask either of the house builders about the challenges of delivery and both will agree that Stamford Brook has delivered some important lessons but that many challenges remain for developers and the industry at large. Paul Brickles, Project Manager for Redrow Homes points out that “to achieve the vision at Stamford Brook, we have had to invest heavily in developing the skills of our contractors, working closely with academics from Leeds Metropolitan University. Even so, in some cases the cost of securing important expertise has proved prohibitive. Because many of the skills we need are not readily available within the industry, those that do offer them are able to command a premium on their costs.”

Mark Mainwaring from Bryant Homes adds, “We are fortunate in this instance that we have worked with contractors that have been motivated by our vision for Stamford Brook, but we have really struggled to get that same dedication elsewhere. Within the industry, it is not so much the lack of skilled labour that is the problem; it is the total lack of labour supply that really limits what we are able to achieve. It means that the power of the procurer to demand certain standards of workmanship is limited, because contractors can simply walk away and readily gain employment on other sites.”

Much of the learning at Stamford Brook has been a collaborative endeavour involving, not only the developers and The National Trust, but a range of professional consultants, and in particular Leeds Metropolitan University. The academic team was involved heavily in the project from day one, in the development of the environmental performance specifications and the resulting design of the scheme, in shaping the construction practices and through the implementation of the performance monitoring. This is its unique collaborative approach that has enabled lessons to be extracted as deeply as they have.

For the academics involved in the project the difficulties of labour and skills are symptomatic of wider challenges for the industry. As Malcolm Bell remarks,
"the whole industry needs to change. It needs to rethink the way it produces its product, from site procurement, through design, construction and testing to occupation and use. Stamford Brook is pointing the way to making the changes that are necessary but it will be for the industry, Government, the supply chain and educators to recognise the need and take action."

Regulation, regulation, regulation
At a time when Government is mapping out its vision for zero carbon new homes by 2016, surely it must play its full part in the development of regulatory standards that are not only clear and robust, but actually achieved and enforced where it matters - on the ground. It is acknowledged within the team that it would be very difficult for a single developer, no matter how large, to go-it-alone on this and that regulation must drive the whole industry towards a sustainable future. Mainwaring is convinced that outcome related standards need to become paramount in order to drive higher standards through improved production practices supported by well integrated supply chains. "There are currently very few consequences for contractors when they default on performance, but in truth that is a function of the fact that independent enforcement of regulatory standards on completed developments is geared more towards aesthetic quality rather than performance. Inherently, previous increases in standards within the industry have been driven by regulation, so any further incremental changes in energy performance would also need to be properly regulated."

David Houston, Project Director for the National Trust, sympathises with the developers’ predicament. “It’s simply naive to expect all developers across the industry to deliver high standards when there is virtually no enforcement. At a time when demand is outstripping supply so heavily, it tends to be the case that the lowest common denominator rules. There is a serious risk that all of the investment made by our development partners at Stamford Brook will be undermined when they attempt to replicate these standards on other schemes."

All of those involved closely with Stamford Brook agree that better regulation is needed to drive standards. It is ironic, therefore, that Government is investing so much time and energy in reducing the regulatory burden, yet those closest to the construction sector are crying out for a level-playing field, almost irrespective of the height at which the standards bar is set. Mainwaring concludes, “If, for example, the industry was told that mandatory energy performance testing was going to be applied to all completed units at an additional capital cost of say £1 per square metre, the market would respond through adjustments in build cost and hence land values. Provided house builders are involved at the outset of discussions to regulate future changes to building performance, there should be little concern within the industry about higher standards. House builders who recognise the urgency of tackling climate change appreciate the need for greater accountability of their products”.

Measurement of actual performance compared to theoretical design predictions has been a very important aspect of the project. Bell is quite clear that "without the measurement of real performance or the unprecedented participation of our partners in trying to understand why performance is often less than predicted, many valuable lessons would have been lost. Most residential developments are assessed using standardised theoretical modelling called ‘SAP’. We have demonstrated not only that predictions are often wide of the mark but, more importantly, why that is the case and what can be done about it." The Code for Sustainable Homes now provides a roadmap for regulatory change over the next decade, leading to zero carbon homes by 2016. Those who recognise the role of the house builders in delivering sustainable development have warmly welcomed the Government’s approach. It must be hoped that the Government and the wider industry will learn from the experiences of The National Trust, Redrow Homes and Bryant Homes at Stamford Brook, and ensure that future regulatory change is backed by robust enforcement.

Perhaps the key success of Stamford Brook is the open acknowledgement by the development partners of the challenges for the volume house builder and the lessons it has provided for the actual delivery of low carbon housing. It is its legacy for learning as well as the bricks and mortar that make the achievements here on the fringes of the Dunham Massey estate all the more impressive.
60 second interview with

Peter Crowe
Local resident at Stamford Brook

How long have you lived at Stamford Brook?
Just coming up for 2 years.

What was it that made you choose a home there in the first place?
Well, Manchester is 20 minutes away, Altrincham 10 minutes, and the countryside is 2 minutes.

So it’s location, location, location?
Yes it is.

But what is it like as a place to live?
It’s still very new – but it’s pleasant and improving.

In what way is it improving?
Well it’s developing as a community. Its eco-credentials and the wider development of the site make it interesting – there is always something happening!

Has it lived up to your expectations then?
To a large extent yes, but I expect there is still time for it to reach those expectations fully.

Any particular things that you have got in mind to see how they develop further?
I think the community. Whilst it’s developing, the sense of community is yet to reach its full potential. But I have to say, in my local area it is off to a really good start.

So how long do you see yourself living there... not that I wish to pry into your private affairs!!
We see ourselves here for quite a few years and really it will only be a job move or if we suddenly come into a lot more money that we might want to move!

Are there any particular aspects of your home, or Stamford Brook as a wider development, which you are particularly fond of?
In terms of my house, I love the 12ft high landing window! It’s such a good feature. I’m also very fond of the fact that we are so close to Dunham Massey.

On the flip side, have you encountered any problems or disappointments at all?
Attention to detail could have been better on the house. Site noise is an issue, but I guess that’s unavoidable when you’re living on an active development site. Oh, and street lighting!

Oh really, in what sense?
It doesn’t work!

And when you talk about attention to detail, can you give any particular examples?
Well, we weren’t able to turn the taps in one bathroom because they were positioned too close to the tiling, and that shouldn’t happen.

No, absolutely. Have you found that living at Stamford Brook has had an impact on your lifestyle away from the home?
Have you become more of a conscious consumer for example.
I’ve always been keen on the eco friendly side of things, but it has meant that at work when people know that I have bought a more eco friendly house they expect me to lead on to eco friendliness in the workplace, so that’s quite amusing!

Do you get a sense that your neighbours at Stamford Brook have bought into the vision of the scheme?
Mostly.

What do you think about the wider development setting?
Very appealing. We walk along the restored brook regularly and it’s fantastic to have. I don’t think we would have seen it on any other development.
This aspect of the project was led by a research team at Leeds Metropolitan University, with financial support from Government, the Trust, the developers and other partners. The research team used an action research approach in which they simultaneously participated in and observed all stages of the project from design, through construction to performance evaluation.

Through robust survey and post completion testing Stamford Brook has challenged established views of energy performance of site-built masonry dwellings by demonstrating that such dwellings can perform as well as other types of buildings, in particular in terms of airtightness.

Key lessons learnt include:

• The participatory action research approach allowed energy performance innovations to emerge from and to be evaluated in practice. Key contributions to the final low energy design were made by all partners.

• The involvement of Government as a partner in the project ensured that lessons for policy were quickly and effectively communicated. Stamford Brook played a significant part in the 2006 revision of Part L of the Building Regulations by demonstrating the energy performance standards that Government was proposing to implement were achievable in mass, site-built housing. Stamford Brook represents a powerful model for future regulatory development.

• In the case of air-tightness, the levels achieved at Stamford Brook represent a considerable improvement on existing UK practice and demonstrate the capacity of masonry construction to achieve the sort of levels that will be required in the production of low and zero carbon housing.

• Stamford Brook provides some confidence that energy performance levels likely to be required by the 2010 review of Part L could be achievable by the UK housing industry now, using existing technologies and relatively standard construction techniques. However, this assumes that actions are taken to tackle the issues that have been highlighted in this project such as thermal bypassing, heating system design and typical construction faults, and also to address underlying system and process failures.

• There can be significant and quantifiable discrepancies between designed energy performance and that realised in occupational use or when tested under experimental conditions. A series of system failures in the design and construction processes at Stamford Brook highlight the fundamental importance of design, construction, and performance measurement in achieving predicted performance.

• Stamford Brook can act as a template for Level 3 compliant dwellings under the Code for Sustainable Homes. However, a step-change in designed performance over that achieved at Stamford Brook would be required to reach Level 4, in the absence of abundant low-carbon energy generation.

• Performance feedback through a formal production testing regime is vital to improve detailed design and the construction process.

• The research has demonstrated the significant extent to which heat is lost via party cavity walls in attached dwellings. Through relatively simple measures, this loss can be partially mitigated. If the measures developed at Stamford Brook were applied to new and existing dwellings with party wall cavities, CO2 savings to the tune of 850,000 tonnes per annum could be realised in the UK.

• Improved heating system design and installation, especially in respect of long lengths of uninsulated pipework, together with improved user advice and control, could ensure that heating systems in occupied units achieve their full potential.

• The discrepancy between space heating consumption in use compared with modelling predictions could be accounted for by allowing for the various measured system inefficiencies, user behaviour patterns, real weather data and construction defects. Ultimately, it has been concluded that the volume house building industry will struggle to meet enhanced energy performance standards for reasons that are deeply embedded in the culture, processes and practice at all levels in the industry.
Key recommendations arising from the research to overcome these challenges include:

• It is imperative that the UK housing industry rethinks the whole construction process, embracing modern process improvement tools and systems thinking methodologies. This must go beyond the search for a silver bullet such as off-site construction methodologies, which in isolation will not address the extent of performance enhancements required.

• A significant extension of post-completion performance testing of dwellings built to the 2006 Building Regulations is needed to generate the necessary feedback data required for an effective review of Part L in 2010.

• A culture of continuous improvement is needed within the industry, underpinned by robust design, production planning and systematic feedback on realised energy performance, with particular attention paid to the practicalities of construction and development sequencing. This will require true integration between the design and construction processes.

• Much improved sequencing of construction tasks, commitment to resolve faults as they occur, robust procedures for controlling product and material substitution and effectively communicated quality control are all necessary to improve energy performance.

• Improved integration between house builders and their suppliers is required, starting at the whole dwelling level and through to individual components required to achieve the desired performance.

• A greater level of thermal design expertise is required across the industry, particularly within large house building companies. This has implications for professional and trade bodies through appropriately focused CPD, as well as academic institutions who are training the next generations of designers.

• Flawed assumptions exist in energy models and design tools. In particular, SAP 2005 should be updated to account for heat loss through party walls and other similar thermal bypass factors.

• The use of smart technology and occupant information could be powerful tools in improving efficient use of energy systems during occupation.

• A concerted ten-year programme of national research is required to advance progress towards Government’s target for zero-carbon homes by 2016 including design process studies, construction studies, post-completion studies, detailed interrogation of disaggregated energy streams, and extensive energy in-use studies to generate more robust performance benchmarks for building types.

The ‘green’ and ‘blue’ infrastructure at Stamford Brook is a defining feature of the development which goes far beyond the function of aesthetics. Breaking away from the conventional mould of unit-driven housing layouts, the holistic approach to masterplanning, which included a whole site approach to the management of water, has ensured that a strong spatial framework of landscape and open spaces has determined the layout and structure of the scheme as a whole. Central to this network of open spaces is a sustainable urban drainage system which attenuates and manages surface water across the site, and which includes a uniquely restored 1.8km stretch of river, Sinderland Brook, at the northern boundary of the development.

Sinderland Brook was canalised in the 1970s by the local water authority. In the late 1990s a proposal to restore the brook and its floodplain was prepared by The National Trust, the implementation of which became a condition of the Development Agreement between the developers and the Trust. The aim of the project was to transform the canalised watercourse, which was previously restricted to a floodplain offering only limited protection to the development site and established residential properties to the north, to a dynamic meandering river allowed to adjust within its own semi-natural floodplain.

Using the Environment Agency’s data, it was possible to model the area required to contain the flow of a 1 in 100 year rainfall event. The National Trust then added 20% to the flow to account for climate change scenarios, and calculated the increased flood water level. Taking account of the topography of the wider site area, engineers instructed by the developers added 600mm to this level to ensure that drainage of all utilities within the development could be drained by gravity away from property without the need for any pumping equipment.

Key features and benefits of the landscape and water environment at Stamford Brook include:

- A restored and dynamic river environment, based on an interpretation of historic mapping and photographic records, which contributes significantly to local environmental quality and which significantly enhances flood protection for the site and an established residential community to the north. The initial 1.3km of the restoration scheme was funded by The National Trust and the developers, with the Environment Agency contributing to the final phase of around 500 metres.
- A semi-natural sustainable urban drainage system comprising swales and storage basins which enhance ecology and ensure that surface water run-off into Sinderland Brook does not exceed the greenfield rate for the site as a whole.
- A series of well connected greenways and wildlife corridors planted with species that are native locally and which facilitate movement by wildlife and people.
- A hierarchy of formal and informal open spaces designed with strong reference to local landscape character and which provide recreational opportunity, visual amenity and adaptive capacity in the context of a changing climate.
- Carefully designed boundary treatments and private gardens which maximise the use of native hedgerow and tree planting to further enhance ecological and landscape value within the heart of the built environment.
Landscape and hydrology are undoubted highlights of Stamford Brook, reflected by the positive perceptions of these aspects of the scheme. 85% of respondents to a recent stakeholder survey, which includes local residents, agree that the landscaping of the development and the river restoration have improved the local area – a significant achievement when it is considered that the development is located on a greenfield site to which many people attached an intrinsic value. In fact, a good number of respondents think that these have been the most significant success at Stamford Brook. Nevertheless, there have been some challenging impediments along the way, some beyond the control of the development partners, but others which could have been mitigated by robust planning and management.

- Despite the significant improvements in flood risk and environmental quality offered by river restoration proposals, securing approval from the Environment Agency was a lengthy process. A stronger connection is needed between national policy on flood risk management and the function of regulatory authority and administration on individual schemes.

- Notwithstanding the ultimate breakthrough at Stamford Brook, the adoption requirements of the local utility provider is an obstacle and disincentive to the implementation of sustainable urban drainage systems which makes their widespread inclusion on residential developments elsewhere in the region highly unlikely.

- The initial use of native species, particularly in plot landscaping and prominent gateway locations, has in some cases led to a trade-off between the long-term vision for Stamford Brook and the requirement for instant visual impact to evoke an image of desirability to attract potential purchasers. Specifying a native mix for plants has also been a problem for the contractors, used to planting a more generic mix which gives the instant visual effect that house builders normally seek to achieve.

- The long-term management of landscape and public realm will be secured through a management company funded and directed by residents and The National Trust. However, transfer to the management company can only occur viably once a degree of critical mass has been generated by development progress and unit occupations. In the short term, this has resulted in inconsistent management approaches across the site arising from fragmented responsibilities.

Lessons Learnt:
Product supply chains

A critical factor in the sustainability of construction projects is the capacity of suppliers to provide products of the right specification in the right quantity at the right time. Acknowledging that there would undoubtedly be procurement cost implications arising from the need to secure products which exceed the typical specifications of the volume house building industry, a jointly funded ‘pot’ was established to cover anticipated abnormal costs arising from agreed Environmental Performance Standards (EPS) for various aspects of the scheme, tied into the Development Agreement between The National Trust and the house builders.

Experiences at Stamford Brook have highlighted the relative infancy of sustainable specifications within product supply chains. In some cases this has led to environmental standards being weakened on later phases of the scheme, but in other notable instances the demand for particular specifications generated by the scheme has stimulated innovation and reactive product development by suppliers.

Three particular examples at Stamford Brook characterise the key issues which house builders are likely to face as they strive to meet the rising standards required of them by regulation and public expectation:

- Timber-frame, double glazed windows – timber window units meeting the stringent thermal bridging standards required for the scheme had to be imported from Scandinavia for the first phase of the scheme (273 dwellings) because no UK supplier could provide
Lessons Learnt: Community Engagement

The development of Stamford Brook, although allocated for housing in the Unitary Development Plan, was always going to be controversial. Despite the clarity of the late Earl of Stamford’s bequeathing wishes for the site to ultimately be sold on to secure funds for the long-term management of the wider Dunham Massey estate, opposition to the sell-off was strong amongst some parts of the community who saw it as conflicting with the charitable objectives of The National Trust. The fact that the development site is surrounded on three sides by established residential communities, further complicated the bid to win hearts and minds locally. Although there were no features of particular landscape merit, the site was valued as an important recreational resource which many felt enhanced the environmental quality of the area.

The need for a concerted and transparent public engagement exercise was therefore essential in securing the support of local residents, as well as wider stakeholders, for the scheme. This has comprised a number of elements, many of which go well beyond the typical approach seen on volume housing schemes:

• The employment by The National Trust of a dedicated community engagement officer in the early planning and design stages of the scheme, ensuring that local residents were kept well informed of, and consulted upon, emergent development proposals.

• The appointment of a project manager by the Trust and separately by Redrow Homes, both of whom have shared dedicated responsibility for community engagement over the lifetime of the scheme.

• A series of community consultation events held locally, including open meetings and exhibitions and regular meetings with local councillors.

• Regular meetings held with local interest groups, such as Broadheath Community

sufficient volume to satisfy building rates at Stamford Brook on a supply-only basis. However, these represented by far the most significant additional cost subsidised by the EPS pot on the first phase of the development to such an extent that their use on subsequent phases of the development proved prohibitive. uPVC frames, which run against the grain of the environmental vision for the scheme, are now being used at Stamford Brook until a more cost effective UK based supplier can be sourced.

• Low VOC* emulsion - (paint with low VOC content) was specified for internal fit-out and external timber treatment on all dwellings. Application revealed that the drying time was substantially longer than that which would normally be expected from paint with a typical VOC content. This gives rise to concerns that higher environmental standards may compromise product quality in some cases. A further nuance in this instance was that, in order to complete internal fit-out works to keep pace with the required programme of unit completions, it was necessary to bring mechanical drying equipment to site until such time that a more suitable produce could be sourced, increasing energy consumption associated with the construction process. There was also a strong link between the perception potential buyers had with the finish of doors, architraves and skirting boards towards overall quality. A high gloss finish is the expected norm in new build developments, and the low VOC paints did not meet expectations.

• Low flush toilets – the agreed Environmental Performance Standard stipulated the use of 4.5 litre flush toilets in all dwellings, which in the first instance were unavailable from suppliers with which the house builders had established procurement agreements. However, engagement by the development partners with their suppliers resulted in accelerated product development in response to the market demand generated by Stamford Brook. Ideal Standard was already planning to develop a 4.5 litre product in anticipation of future regulatory change to reduce domestic water consumption, but brought its programme forward specifically to meet the Stamford Brook specification. The house builders are now also using this product on all of their other current developments.

* VOC = Volatile Organic Compounds are organic (carbon based) chemical compounds that evaporate easily in the atmosphere, and are known to be a major contributor to global climate change.
Lessons Learnt: Masterplanning and Design

It is commonly said, rightly so, that delivering sustainable development is dependent on principles embedded from the beginning of the design process. With this in mind, a key objective for Stamford Brook has been to emphasise the purpose of passive environmental performance, which in practice necessitates a holistic approach to masterplanning and detailed design through which all elements of the scheme are considered collectively.

Bringing together the multi-disciplinary project team on a regular basis was, therefore, crucial to the realisation of the following guiding principles for the scheme:

- Take all practicable steps to minimise the impact of the development on the environment at all levels.
- Take all practicable steps to create a development which enhances the local environment for the existing and future community.
- Take all practicable steps to enhance the visual impact of the development and encourage local distinctiveness.
- Create a healthy environment providing a high quality of life by addressing issues of noise, odour, air quality and light pollution, designing out encroachment from neighbours, designing out encroachment on personal space, and encouraging community safety.

Given Government’s aspirations for community engagement in the planning process and the value of the approach taken at Stamford Brook for the relatively smooth running of the planning and construction process, it seems appropriate that Local Authorities should determine minimum requirements for community engagement through pre-application discussions and Planning Conditions relative to the scale and sensitivity of individual projects.

Case studies

Association and the Friends of Woodheys Park, ensuring that proposals for the scheme took account of community aspirations.

- The creation of a dedicated website for Stamford Brook, although in practice this was not maintained during the project, undermining its potential value as an information resource for project partners, stakeholders and residents.
- The distribution of quarterly ‘Stamford Brook’ newsletters to residents in neighbouring communities and to new occupants of Stamford Brook, providing information on project progress and key site issues as the development has progressed over time.

Despite some early reticence and disharmony, the overwhelming majority of the local community have become, if not exclusively supportive, at least understanding and sympathetic of the need for the development. There is also positive recognition for the lengths that the development partners have gone to in keeping local people informed of progress, problems and key project milestones. This is reflected in responses to the recent stakeholder and residents’ survey, which also highlights appreciation of efforts to reflect local character and the needs of existing residents in the scheme.

Notwithstanding, a handful of persistently fractious relationships with individual members of the community, the approach to community engagement at Stamford Brook has genuinely demonstrated the value of investing time and resources in building understanding and support locally. Notably, the house builders are now employing similar techniques on other schemes.

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This has led to a number of notable features of best practice at Stamford Brook. In particular:

- A demonstration of how holistic water management, through a strategic approach to green infrastructure planning and hydrological design, can be incorporated into a development scheme to ameliorate flood risk and improve environmental quality.

- Careful attention to building layouts to maximise solar gain through dwelling orientation and the minimisation of overshadowing between units through analysis of building heights and spacing.

- An integrated network of footpaths and cycleways together with a strong hierarchy of open spaces ensuring connectivity with neighbouring communities, convenient movement through the site and an emerging strength of character which is enhanced by the retention of mature vegetation wherever possible.

- A hierarchy of routes which aids legibility and reduces the visual dominance of vehicles.

Nevertheless, the masterplanning and design process has been one of the most challenging aspects of the Stamford Brook project, and there have been important lessons for the design team. Specifically, the following issues have been highlighted:

- The need to ensure that compatible software is used for the production of site constraints plans, geotechnical information and scheme designs by engineers and architects, thereby avoiding the risk of significant inconsistencies and inaccuracies when drawing information is ultimately assimilated.

- The need to ensure that Quantity Surveyors are involved in the preparation of proposals from an early stage to ensure that commercial viability is a consistent frame of reference for non-standard design features.

- The need to ensure, through accurate and detailed recording of decisions, that each partnership organisation and design team member share consistent interpretations of emergent design proposals and principles.

- The need to ensure that local authority highways officers are fully engaged in the production of scheme designs and planning drawings to avoid the need for later amendments and variant submissions to account for restrictive adoption standards.

- The need to communicate and explain these aspirations to potential householders and any management company put into place to maintain the open spaces.
60 second interview with

Phil Jones
Loftus Construction
Subcontractors

How long have you been in the construction game Phil?
I have been in the construction game all my life - 34 years. I started when I was about 8 with my father.

And how has working on Stamford Brook been different to working on other housing developments?
Well, it is a totally different construction idea with the introduction of environmental issues. You’re looking at 150mm cavities, new materials and new techniques. It is definitely different to the old types that we used to work on!

What has it been like working with the Leeds Metropolitan University team?
It was a real pleasure. They’ve come up with different ideas about materials and working methods to meet environmental requirements and we’ve worked together to make it successful on site.

Is the environment or performance of the houses important to you?
Yes it is very important, because it is helping the environment but it also reduces the cost for people when it comes to heating their houses.

But how do you ensure that your teams deliver the workmanship required, because clearly quality is important in achieving the energy efficiency standards required on each house.
On Stamford Brook we have kept the same teams all the way through, so the guys that we trained up from the start, including even myself, have continued to work together.

How have you been able to do that?
Have you not had any turnover in staff?
Yes we have had some turnover, because it’s all based on demand - the more houses you want at the end of day the more lads we have to get on site. But it goes back down to the regular intake of lads – I have got to keep them together as much as I can, and they can then bring the new ones up to speed when they arrive.

So presumably those with experience on the site can deliver the training required for new starters?
Yes, and we’re still getting the results that we need, so that proves it!

Has working on Stamford Brook opened your eyes at all to what can be achieved in house construction from an environmental perspective and will you take some of the lessons from this job on to future developments that you work on?
Yes, definitely. You know, I would never have believed how much air tightness can be improved. It’s quite outstanding what you can achieve without reducing the quality or appeal of the house itself.

Have you come across any particular challenges during the construction process, things that you maybe didn’t anticipate?
Well again, the main thing is the air tightness, it has to be thoroughly checked on each unit. It’s not just a case of putting on the last tile and then moving on to the next house – we’ve been very careful to make sure that we achieve good results.

The guys from Leeds Metropolitan University have done tests both before units are plastered, and another one once the house is completed.
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Key recommendations from Stamford Brook:

- Government should work with Building Control and NHBC to develop comprehensive post-construction testing to deliver the standards needed for zero carbon homes by 2016
- Local Authorities should be more ambitious in requiring sustainable approaches to housing and landscape design in Local Plans and Development Briefs
- The Environment Agency and utility companies should accelerate the adoption of sustainable infrastructure by putting their policies into practice
- Government and partners should encourage homebuyers to demand improved environmental, water and energy efficiency standards for new homes