

# The People's Plan: Cressingham Gardens Estate

*“warm and informal... one of the nicest small schemes in England”<sup>1</sup>*

## Cover

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This document has been produced by the residents of Cressingham Gardens Estate (CGE) with technical support from a team of local expert architects, viability consultants and surveyors, as well as industry professionals from further afield. Where relevant, specific expertise has been credited within the text. We would like to thank every contribution to this intensely collaborative document, no matter how small.



*70+ people attended The People's Plan launch event 23rd Feb 2016*

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<sup>1</sup> Quote from Lord Esher, past president of the Royal Institute of British Architects (RIBA), after its completion in 1981.

## Summary

The People's Plan (TPP) places existing residents at the heart of the regeneration of CGE, and can provide **33+ additional homes at council rent level**, helping reduce the London Borough of Lambeth's (LBL) housing waiting list. TPP proposes a full refurbishment and build programme that can be funded by a range of options from fully council to fully external. This proposal:

- Minimises negative environmental and social impact.
- Costs vastly less than the proposed **£111m** for Council Option 5.
- Has a positive NPV (£6.6m) over just 30 years compared to a negative NPV (-£19.4m) for Option 5 over 60 years.
- Has strong support from CGE residents, wider Lambeth residents and other groups such as homeowners at Parkview Court & homes on Trinity Rise which are also at risk of demolition.

Most importantly, TPP improves the condition and keeps people in the homes that they love, while supporting both the longevity of the **current thriving community** and existing housing stock.

We are already in conversation with a number of funding organisations who are in the position to finance a community-owned structure, as was stated in the executive summary of TPP submitted February 19th 2016. In response to Lambeth officers stating that “no proof of additional funding had been provided” at the subsequent February 25th 2016 exhibition, we are willing to disclose the proof of these commercially sensitive discussions via an independent and neutral third party.

Similarly, we would like to point out that no proof of additional funding has been provided for any of the Council's options. Secondly, in an attempt to make Option 5 financially viable Council officers have proposed that £7.5m is loaned by LBL that has erroneously been accounted for as income in order to make the NPV calculation positive<sup>2</sup>, see “Funding sources” section for more information. In order that TPP and all Council Options are assessed under the same criteria, this fund should also be available to all TPP options under the same terms. Though even without this fund TPP is still financially viable.

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<sup>2</sup> Lambeth's financial datasheets published online 16th February 2016; paper copies provided to residents at Viability workshop 18th February 2016

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# 1. Introduction

The People's Plan (TPP) is a strategy which offers Lambeth Council a viable alternative to demolition of Cressingham Gardens Estate (CGE) for consideration as part of its consultation. Residents have created TPP with help from local architects, quantity surveyors and finance experts. It places residents at the centre of the regeneration programme and assists the council in fulfilling its stated 'programme level' regeneration aims of building 1,000 extra homes at council rent levels and enhancing the quality of existing homes. It does so in a way which takes on board the economic reality of local housing finances. TPP provides an evidence-based opportunity for the council and the community to fulfil these shared aims and meet the council's own criteria for assessment. The Plan also fulfils additional aims that have been defined as a priority for: CGE residents, local community groups and central government. These additional aims can be summarised as:

- Prevent unnecessary demolition - to minimise negative impacts on social well-being and the environment
- Keep people in their homes
- Preserve the community support network developed over many years
- Conserve the original vision for the estate (integration with park setting, mix of generations and backgrounds, convivial layout enhancing life quality from social and family point of view)
- Significantly improve the quality of repairs and maintenance
- Further improve wellbeing and add value via a range of community and innovation opportunities
- Improve the carbon footprint of the estate
- No or minimal impact on Brockwell Park's environs and views, including the section of CGE which is already part of the Brockwell park conservation area.

TPP takes full account of the inherent value of the estate, which residents have a deep desire to protect and maintain for future generations. It addresses the need for extra genuinely affordable housing, along with a key issue underpinning the launch of the whole regeneration programme – severe deficiencies with maintenance and repair of Lambeth housing stock. The Plan explores a combination of management and funding opportunities for achieving the People's Plan. It only offers viable options that have been evaluated against the council's financial and wider criteria, in addition to the further aims specified by CGE residents and wider community groups.

TPP is a proposal to enable all residents to remain in their current homes on CGE regardless of tenure. It is a powerful ethical, environmental and financially viable alternative to the council's proposed redevelopment options, which are not the preference of a clear majority of residents<sup>3</sup>. The People's Plan can demonstrably meet the criteria as set out by council officers' 17th February 2016<sup>4</sup>, comparing extremely favourably with all of the council's options and exceeding them in respect of meeting the criteria.

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<sup>3</sup> A survey of residents between 5th-13th July, with a household response rate of 72%, showed that 86% of residents wanted refurbishment and only 4% wanted demolition. The report by Social Life commissioned by Lambeth council also found overwhelming support for refurbishment. The vast majority of residents walked out of a packed TRA AGM at the Rotunda as a protest against regeneration proposals presented by regeneration manager Julian Hart. Lambeth's democratic services informed CGE residents they had received more requests to speak than at any other meeting for the July 2015 Cabinet decision. Within the Judicial Review, Mrs Justice Elisabeth Laing DBE took the view that based on Social Life's exit data, there was clear cross-tenure support for refurbishment.

<sup>4</sup> The latest criteria presented to residents was contained in a letter issued 17th Feb 2016. Details were presented within a Q&A document under the following heading "On what basis will the Cabinet make a decision about the future of Cressingham Gardens"

**NOTE:** The recently published criteria for assessing the options differ significantly from those that were published during that part of the consultation carried out in 2014/15 and no longer appears to prioritise council rent housing. There has been a marked change in emphasis from providing council rent housing, in favour of simple densification. This being a 'resumed consultation', as confirmed by the Lambeth council regeneration team, residents would expect the aims to be the same as before. As a result of this discrepancy, residents are unclear as to how respond to the council's aims in this respect. There is an apparent subtext which suggests that the enterprise is motivated by financial liquidity rather than the stated, albeit regularly morphing, aims.

For these purposes, TPP operates on the assumption that Lambeth council retains the motives of overall financial affordability/viability of the chosen option and where possible extra homes at council rent, as per the terms of a resumed consultation.

## 2. The People's Plan vs Council's Option 5 (Full Demolition)

Checklist	The People's Plan	Option 5
Additional homes for council rent	33	0-23 [1]
Additional homes for high value market sale	3 [2]	135-18 [2]
LBL target strategy of 60% affordable homes	Yes (90%+)	No (62%) <sup>5</sup>
Financial viability	+£6.6m NPV	£0.8m or -£20m
Council subsidy	£0m	£7.5m [3]
Change in existing Tenants rents	-4% [4]	+10-25% [4]
Homeowner value gap	None [5]	£188-£350k [5]
Housing density targets	Yes	Achieved
Minimises environmental and social impact	Yes	No
Meets transport planning guidelines	Yes	No [6]
Houses existing community	Yes	No [7]
Preserves Brockwell Park conservation area	Yes	No [8]
Meets targets for homeowner buyback	Yes	No [9]

- Multiple documents provided by council officers state different figures.
- High value homes are unaffordable by the average Lambeth income of £28,764 (ONS 2014). This indicates that for Option 5 the majority of sales will not be to existing Lambeth residents.
- Option 5 requires £7.5m upfront subsidy from LBL. This has been marked as a loan, though no payback is specified and access to information regarding payback terms has been refused. See funding options section for more detail.
- Under Option 5 it is proposed that (over a period of 5 years) council rents will rise between 10-25% depending on property size. While central government has specified a 4% reduction of council rents over 5 years. To put it another way, 73% of current council tenants will experience a 24% rent increase.
- The value gap is the difference homeowners would have to pay in order to buy a new home under Option 5 this is £150k-£350k higher, ie up to 70% more than existing properties on average<sup>6</sup>.
- Option 5 housing densities exceed the Public Transport Accessibility Level (PTAL) guidelines for this site.
- Option 5 proposes that 28 four bed houses are replaced by just 4 four bed houses. And over 70 residents have indicated they would like to leave in response to the 2015 demolition decision - an early indication of community disruption and high upfront buyout costs.
- Option 5 densities build on Brockwell Park conservation area and require compulsory purchase of adjacent private homes on Tulse Hill and Trinity Rise.
- Lambeth's own Airey Miller financial viability report (footnote 5) indicates capacity for buyback of 20% of homeowner properties. Yet already, over 20% of homeowners have indicated they will leave.

### 2.1 Policy & Legal Risk

There are currently massive changes occurring and uncertainty at the government policy and legislative level in connection with housing. For example, less than three years after the system of HRA self-financing was introduced, the new Conservative government announced in the Welfare Reform and Work Bill (now an Act of Parliament), the introduction of legislation that will change the basis of that debt settlement by compelling councils to reduce rents by 1% per year

<sup>5</sup> Figures from Draft Viability report report, 12th February 2016, p.15. Aire Miller, Reference: 14/124 Version 11.

<sup>6</sup> Latest financial data provided by Lambeth 17th February.



over the next four years. With the proposed new Housing Bill, even further considerable changes are expected.

One of the key questions is whether TPP or Lambeth's Option 5: Full Demolition provides greater protection for social and genuinely affordable housing and the level of risk associated with both. The level of protection and risk is associated with the proposed ownership & funding structures.

Lambeth council officers and councillors have explained to residents that the use of a Special Purpose Vehicle (SPV) "Homes for Lambeth" (a private company) is required for Option 5 in order to remove certain secure tenants' rights - in particular the Right to Buy - and to be able to borrow further funds not subject to the HRA debt cap.

TPP can be delivered under different funding structures including remaining under Lambeth ownership through to full community ownership (see further discussion later in this document) and consequently has flexibility to adapt. In particular, a full community ownership structure would ensure that the social housing could be protected by the community itself and not be subject to the changing policies at central and local government levels.

The Option 5 SPV is the highest risk structure because the central government already has made statements in March 2015 that it will not tolerate SPVs set up in order to avoid the HRA or to remove the Right-to-Buy:<sup>7</sup>

*"The government is aware that some authorities may be using their general power of competence under the Localism Act 2011 to develop new social or affordable housing and accounting for that stock in its General Fund. Accounting for stock in this way is not in line with government policy and if councils continue to develop social or affordable stock which they fail to account for within the Housing Revenue Account the Secretary of State will consider issuing a direction under section 74 of the Local Government and Housing Act 1989 to bring that stock into the Housing Revenue Account."*

## **2.2 Tenants' Rights**

Under TPP, council tenants are protected as they either retain their secure tenancies in most funding scenarios or are granted 'protected' rights with an assured tenancy under a community ownership structure (subject to a ballot of tenants). TPP offers an ballot and preserves more tenant rights than those offered under Option 5.

As already mentioned Central government made statements in March 2015 indicating that removal of tenants rights would not be accepted (footnote 6):

*"It is important that new council tenants should have access to the Right to Buy, and that new homes should not be built by councils which are excluded from the Right to Buy. In order to be eligible, local authority tenants need to have a secure tenancy. All forms of secure council tenancies are subject to the Right to Buy, including new flexible tenancies, regardless of whether they are accounted for in the local authority's Housing Revenue Account or the General Fund."*

Finally, under the Option 5 SPV, tenants lose the right to a ballot if there is a change in landlord and consequently, they will have no control or even influence over any potential sale of the SPV, which as a private company can be sold off by the council at any stage.

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<sup>7</sup> <https://www.gov.uk/government/speeches/housing-update-march-2015>

## 2.3 Financial Impact on Tenants

The TPP does not affect existing tenants' rents. They would still get the 1% pa rent reduction over the next four years followed by any future annual increases in line with all council rents.

In comparison Option 5 dramatically increases council rents resulting in a up to 25% rent hike over and above if their homes were simply refurbished (even after taking into account any incorporated 1% rent reductions and stepped increases). In the financial datasheets, Lambeth has disclosed the following impacts:

	Households # <sup>[1]</sup>	Current Rent	Proposed Rent	Increase
0/1 bedrooms	125	£94.62	£117.00	24%
2 bedrooms	30	£108.12	£135.00	25%
3 bedrooms	29	£124.43	£144.00	16%
4 bedrooms	28	£143.69	£158.00	10%

<sup>[1]</sup> Lambeth has put the wrong mix of households into the refurbishment data sheets and hence we use our own more accurate numbers here, e.g. instead of 28 x 4 bedroom homes for council tenants, Lambeth has only accounted for 4 x 4 bedroom homes.

Consequently, Lambeth is proposing that 73% of the current council tenant households will experience a ~24% rent increase, subject to any of the households down-/upsizing.

Furthermore, experience on Myatts Field North has shown that the council tax band will be higher for the new properties and that residents will be required to pay up to £500 more year for council tax. (Cressingham Gardens properties are currently only Band B for council tax). Plus, consideration must be made for the fact that households will be placed on water metres, which will put even further financial burdens on families and vulnerable residents.

Lambeth officers have argued that the increase in costs will be offset by a reduction in utility bills. Feedback from residents is showing that their gas and electricity bills are approximately in the range of £50-£110 per month (Sturgis). Even if these bills were reduced by 50%, it would not offset the increase in council rent and council tax.

In summary, TPP has no financial impact on council tenants, whereas the council's proposed Option 5 will see tenants pushed further into poverty with increased housing costs.

## 2.4. Financial Impact on Homeowners

Under TPP, none of the current homeowners would be forced to sell their properties. They would have to contribute to any refurbishment in accordance with their leasehold/freehold agreements. If the TPP is supported by the council, then leaseholders will have the same policy of protection accorded to all Lambeth leaseholders with regards to financial support in cases of financial hardship and if they can't get a mortgage to pay for the works. Depending on the level of works, we estimate that leaseholders would receive s20 bills in the range of £5k-£15k for Lambeth Housing Standard works, which is very similar to elsewhere in Lambeth.

Under the council's Option 5, homeowners would be subjected to a greater financial impact than the TPP:

1. **Market Value Gap** Lambeth council proposes new homes are valued £150k-£350k higher i.e. up to 70% more than existing properties. Lambeth proposed current valuations for new private homes:<sup>8</sup>

1 bed flat £436k

2 bed flat £610k

3 bed flat £750k

4 bed flat £863k

This level of market value gap will mean that many homeowners will also not be eligible for Lambeth's Shared Equity option, and be forced into more expensive Shared Ownership or Private Rental.

2. **No Mortgage Protection.** If an existing homeowner cannot port their mortgage or is no longer eligible for mortgage under the new financial guidelines, then their only option to return to the estate is "unaffordable" market rent from the council (e.g. £39k pa for a 4 bedroom flat is the market rent proposed by Lambeth council, compared to the median household income in the area of only £29k pa before tax)
3. **Increased Service Charges.** Cressingham Gardens leaseholders benefit from some of the lowest service charges in Lambeth due to the design of the estate. It is highly likely that service charges will increase under Option 5 because of the necessary design required to increase density. We have requested data on the expected maintenance costs to understand the likely impact on leaseholder service charges, but the request has been refused by Lambeth officers. Furthermore, under Shared Equity leaseholders will be required to pay 100% of service charges and all internal works although they don't own 100% of the property. Lambeth, as part owner under Shared Equity will nevertheless benefit from the improvements paid fully by leaseholders when they take their % of any subsequent sale.

### Homeowner scenario

Consider a homeowner currently paying around £1,000 a month for a £200k mortgage on a two-bed home. The council is proposing to only offer £300k for the existing home, plus 10% homeloss compensation (£30k). The new homes are currently being forecasted in the latest set of financial datasheets to be worth £610k. This leaves the homeowner a market value gap of £280k, and even with the homeloss compensation, they only have equity equivalent to 54% of the new property. They would not qualify for Shared Equity unless they can substantially extend their mortgage. Consequently, they will be forced into a Shared Ownership scheme assuming that they can either port their existing mortgage or qualify for a new mortgage.

Under Shared Ownership, the homeowner now has to pay rent on the portion that they don't own in addition to their mortgage (£1,000/mth). The rent proposed is 2.75% pa of the value owned by the SPV. In this scenario, this equates to an additional £642 per month. So instead of their original £1,000 per month, the homeowner would need to find £1,642 per month to stay on Cressingham Gardens, a 64% increase in housing costs. If the homeowner is not able to afford the increase to £1,642/mth, Lambeth has provided the additional option of returning to the estate paying market rent. However, the proposed market rent for the new build is £454/wk or £1,967/mth, even more costly than Shared Ownership and hence is not a viable option. Thus, in this scenario the only option actually open to the homeowner is to leave the estate and most likely the area completely.

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<sup>8</sup> Latest financial data provided by Lambeth 17th February to residents assumes a sales price of £810/ft<sup>2</sup> compared to a buy-out price of only £466/ft<sup>2</sup>

In summary, the council's Option 5 is highly detrimental to the existing homeowners who make up around 1/3 of the community (and many of which are only marginal homeowners), and has major implications for the financial viability of the whole scheme if the council's assumption that 80% of homeowners proves to be wrong. Whereas in comparison the TPP would allow these residents to actually stay within the community with a dramatically lower financial impact.

## 2.5 Target Tenancy Strategy

Lambeth's target strategy for the regeneration programme is for the net gain houses that 60% of homes should be 'affordable', of which 100% should be at council rent levels, and 40% market levels (either sale or rent).

Under the TPP the level of new housing at council rent level is 90% of new homes, far exceeding the target strategy of 60% council rent levels.

In comparison, the council's Option 5: Full Demolition will be achieving maximum 15% of new net gain homes at council rent levels, and in the latest communications to residents, any mention of net gain homes at council rent levels appears to have disappeared.

Furthermore, it should be noted that under Lambeth's Local Plan, it is written that the "affordable housing element of residential developments should reflect the preferred borough-wide housing mix for social/affordable rented and intermediate housing set out below:

1-bedroom units	Not more than 20%
2-bedroom units	20-50%
3-bedroom+ units	40%

Under Option 5, Lambeth is failing to meet its own planning requirements that it only signed off on in September 2015:

	Net Gain Homes	Total Homes
1 bedroom units	21%	24%
2 bedroom units	46%	48%
3-bedroom+ units	33%	28%

*"5.23 In the case of estate regeneration schemes, replacement / new affordable housing should reflect the particular housing needs of existing and future tenants. Schemes should make provision to re-house existing residents, after which the mix of all additional units should reflect the wider housing needs of the borough in all but exceptional cases where a variation can be robustly justified."*

Both overall and just considering the Net Gain, Lambeth's Option 5 fails to deliver sufficient family-sized homes. For there to be a variation it must be an exceptional case and must be robustly justified. Lambeth council has not provided any "robust" justification for failing to meet its own Local Plan requirements agreed only in September 2015.

In summary, TPP exceeds the council's target strategy in terms of homes at council rent levels, whereas Option 5 misses this target and is in contravention of the Lambeth Local Plan.

## 2.6. New Home Affordability

In the latest financial datasheets released to residents only on 16th February 2016, Lambeth provides some insights as to the affordability of the proposed new homes on Cressingham Gardens under Option 5: Full Demolition. Note: Lambeth's numbers presented here are the values in today's money, which are then inflated in the model by formulas to account for any future inflation.

### Council Rent

	Current Rent	Proposed Rent	Increase
1 bedroom	£94.62	£117.00	24%
2 bedrooms	£108.12	£135.00	25%
3 bedrooms	£124.43	£144.00	16%
4 bedrooms	£143.69	£158.00	10%

Note: the extra 1 and 2 bedroom homes to be built as part of the 'net gain' will not be offered at council rent levels, but rather at the **LAHA (Local Area Housing Allowance)** levels. This means that for new social tenants, a 1 bed flat will be £204/wk (or £11k pa) and a 2 bed flat £265/wk (or £14k pa)

### Market Value - Private Sales

1 bed flat:	£436k
2 bed flat:	£610k
3 bed flat:	£750k
4 bed flat:	£863k

### Market Rent to be charged by Lambeth

1 bed flat:	£345/wk, or £18k pa
2 bed flat:	£454/wk, or £24k pa
3 bed flat:	£606/wk, or £32k pa
4 bed flat:	£757/wk, or £39k pa

To put these numbers into context, the median household income in the area is only £29k pa before tax<sup>9</sup>. Consequently, a family could not even afford to rent a 1 bed flat from the council at market rent levels. These rents are comparable to Knightsbridge and Pimlico. They would even struggle to rent a 2-bedroom flat from the council at LAHA levels if they were eligible.

Under TPP, the new homes will be much more affordable (see the detailed discussion on financial viability of TPP later in this document).

In summary, TPP provides more new extra homes at genuinely affordable levels than the council's Option 5, the majority of which will be completely unaffordable to the local community.

<sup>9</sup> "State of the Borough, 2014", Lambeth

[http://www.lambeth.gov.uk/sites/default/files/ec-lambeth-council-state-of-the-borough-2014\\_0.pdf](http://www.lambeth.gov.uk/sites/default/files/ec-lambeth-council-state-of-the-borough-2014_0.pdf)

## 2.7 Comparison of Financial Viability

On 16th February 2016, Lambeth council published online financial datasheets purportedly from the Airey Miller financial model for Option 5: Full Demolition that calculated a NPV of only £0.8m over 60 years. No full financial cash flow model has been provided by Lambeth council for review, plus most of the costs have been redacted in the financial datasheets. Consequently, we have re-created a 60 year financial model for Option 5 using the council's datasheet assumptions, and where necessary due to either errors or redactions provided assumptions. (Copy of full model provided in appendix) This was so that we could compare the viability of TPP vs Option 5. This exercise also highlighted some major issues in the financial model being used by the council to support an Option 5 recommendation to the cabinet.

### 2.7.1 NPV Comparison

In the Airey Miller report, Lambeth officers are claiming that Option 5: Full Demolition has only a marginally positive NPV after 60 years of £0.8m compared to the TPP NPV of £6.6m after just 30 years. Given that the proposed cost of the Option 5 development is somewhere in the realm of over £100m, even just a 5% increase in costs will cause the project under the council's assumptions to be loss making and not financially viable even after 60 years.

	Option 5 Airey Miller 60 years	Option 5 Re-created 60 years	Option 5 Re-created 30 years	TPP 30 years
NPV	£0.8m	-£19.4m	-£30.8m	£6.6m

When we re-created Lambeth's Option 5 financial models using the assumptions provided by the council, it would appear that the real NPV for Option 5 is probably closer to a negative -£20m over 60 years, increasing to a -£30m over 30 years. This appears to be a result of excluded assumptions (e.g. no maintenance) and errors (e.g. recognising the £7.5m loan from Lambeth to its SPV as income).

### 2.7.2 Missing Assumptions

It appears that Lambeth has not included any of the following cost items in its financial model:

- Ongoing repairs & maintenance (it could be argued that there will be minimal repairs in the early years of a new build, but there still will be grounds maintenance and cleaning, and it cannot be argued that no repairs & maintenance would be required for 60 years)
- Building a new community hall to replace the Rotunda
- Car parking provision
- Waste management
- External and drainage works
- Dealing with the 40" water main that passes through Cressingham Garden that is older than the estate itself
- Dealing with the invasive weed that is present across the entire estate (For the same invasive weed to be removed from the Olympic Park Stadium development site, approx the same size as Cressingham Gardens, it cost reportedly £70m)

- No compensation payable to non-returning homeowners to cover the stamp duty and legal costs for replacement homes

In the financial viability assessment of TPP, we have aimed to include all costs. However, it would appear that many millions of costs for already foreseeable items have not been accounted for in Lambeth's Option 5 financial assessment.

### 2.7.3 Lambeth's £7.5m "Loan"

Lambeth has included as income in its financial datasheets a £7.5m "grant" from the Single Capital Pot that is supposedly to be repaid via the finances, but on unknown terms and on an unknown timeline. This "grant" is in substance either a loan or an equity contribution to the SPV, it cannot be classed as income. As such it should not be included in the NPV calculation, as it is a funding source. Consequently, Lambeth's calculated NPV for Option 5 would not be positive without it having recognised the £7.5m, its own capital money, as income.

TPP requires no such subsidy from Lambeth in order to achieve a positive NPV.

### 2.7.4 Homeowner Retention Assumption

In Lambeth's datasheets for Option 5, it assumes that 80% of homeowners will be returning to Cressingham Gardens after regeneration. No explanation has been provided as to why 80% is being assumed as reasonable, particularly as Neil Vokes is minuted as explaining to AMCAP that this is optimistic given that 80% was only achieved on Myatts Field North with a much better offer to homeowners, than will ever be offered to homeowners on the regeneration estates. Furthermore, in Lambeth's own Test of Opinion survey conducted in 2015 only 60% of homeowners indicated that they wanted to return to a question that did not specify any specific option. Also in the same survey, only 20% of homeowners indicated that they wanted to live in a new build if finances were not an issue.

We have not seen any sensitivity analysis undertaken by council officers to test how changes in this assumption could affect the overall financial viability of Option 5. Using our re-created models, we have been able to undertake such a sensitivity analysis:

Retention Rate	80%	60%	40%	20%	0%
NPV	-£19m	-£26m	-£33m	-£40m	-£48m

From this analysis, if only 60% of homeowners return then the council would need to find an additional £7m in funding and the overall project would not be financially viable. If only 20% of homeowners returned to live in the new homes, as indicated as possible from the results of the Test of Opinion, then Lambeth would need to find an additional £21m in funding and the project would not be financially viable over 60 years without serious levels of subsidies.

Under TPP, this is not an issue as no homeowners will need to be bought out.

### 3. The People's Plan Proposal

TPP can provide up to 38 additional homes of which 33 can be at council rent levels. More than is proposed under Council Option 5 (Full Demolition). TPP offers LBL a viable alternative to demolition and proposes a holistic strategy and resident led vision created with support from industry expertise. Key elements of the plan include:

- **Baseline – Lambeth Housing Standard (LHS) Refurbishment**  
Brings all existing property up to the LHS.
- **Additional Housing**  
Utilises existing undercover Car Park space. Void properties on Crosby walk to be developed. This additional Housing is designed to meet local demographic need.
- **Green Retrofit & Renewable Technologies**  
Phased green retrofit programme. Solar energy installations. Zero Net Energy “Energiesprong” / Enerphit Passivhaus approach to refurbishment. No unnecessary demolition, retained community and architectural heritage, significantly improved repairs and maintenance.
- **Housing Allocation & Mutual Swap Programme**  
Mutual swap program in order to allow flexibility in housing allocation, as originally envisioned by the design of the estate.
- **Additional Community-Led Initiatives**  
Resident led surveys have identified additional opportunities for the community to explore.

TPP is financially viable with at least £6.6m positive NPV over 30 years, plus an estimated £23m pa in social well-being impact. In comparison, Lambeth is only claiming £0.8m NPV over 60 years for Option 5: Full Demolition, and has an estimated negative -£22m pa social wellbeing impact. It should be noted that we have re-created Lambeth's financials for Option 5: Full Demolition (see appendix) using the assumptions provided by Lambeth in their latest data sheets and where numbers have been redacted, we have made reasonable assumptions based on a variety of sources including the earlier Ian Sayer models.

Many of TPP priorities are highlighted in the London Assembly's Housing Committee Report *Knock it Down or Do it Up?*, published in February 2015. In particular, George Clarke, the Government's advisor on empty homes, recommends a preference for refurbishment over demolition and exhausting “all forms of market testing and options for refurbishment” before considering demolition.



### **3.1 Baseline – Lambeth Housing Standard (LHS) Refurbishment**

The Tall Survey along with quantity surveyor costed reports, detail how the Lambeth Housing standard is technically achievable and the financial viability section of this document outlines the funding opportunities to make this a reality. Through LHS, it would be possible to bring Cressingham Gardens back to its original standard.



*When Cressingham Gardens shortly after construction*

### **3.2 Additional Housing - Undercover Car Park Conversion**

By repurposing the undercover car parking space, 23 additional homes can be created, in a manner similar to what London Borough of Islington's Labour council have successfully undertaken. Islington's project was completed to the satisfaction of both residents and the council<sup>10</sup> on Parkhurst Road and Vulcan Way resulting in 18 and 17 new homes respectively. All of the new homes located within the CGE car park space can be offered at council rent levels due to the lower cost of delivery than new build (approx ⅓ of the cost). This alone would be sufficient to compete with the council's proposals for 23 new homes at council rent levels even after total demolition and redevelopment of the estate.

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<sup>10</sup> London Borough of Islington development:

<http://www.bff-architects.com/news/2013/06/mayor-of-islington-officially-opens-new.html>  
<http://www.bff-architects.com/news/2013/05/residential-scheme-in-islington-gains.html>



Parkhurst Road - Front facade before



Parkhurst Road - Front facade after



Parkhurst Road - Rear facade before



Parkhurst Road - Rear facade after



Parkhurst Road - garage space interior pre development

50% of the current car parking spaces are allocated to lock up garages rented to predominantly to off-site renters. The remaining car parking sees a typical occupation of about 50%. The proposed housing in the car parks would be designed as low costs modular inserts. The units

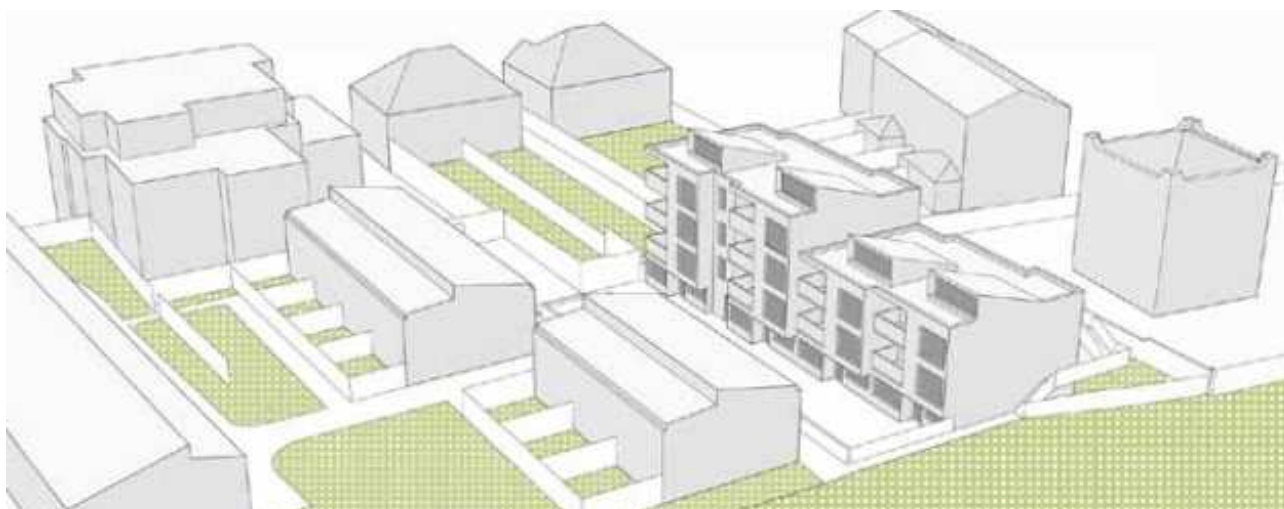
would be single aspect and by pushing the unit out to the meet the line of the balconies the units get the additional advantage of top light from their roofs.



*Architect's drawing of additional housing on CGE within the car parking spaces*

### **3.3 Additional Housing – Crosby Voids**

A second site of 14 (possibly up to 17) 2-bedroom homes could be provided on Crosby Walk. These would replace the row of 12 x 1-bedroom flats located on the northern edge of the estate, six of which have been left 'void' for more than 15 years, and of the six occupiable properties, currently only five are tenanted. The majority of this second site can be offered at council rent levels (11, up to 12 homes), potentially bringing the total extra homes at council rent to 33 and possibly as high as 38. Only three of the new homes on Crosby would need to be sold for this site to be breakeven, and sales above this number could provide funds towards refurbishment across the estate. This provides a sensitive alternative to the majority of private sales and market rentals envisioned by the council in Option 5.



*Architect's drawing of re-developed Crosby Walk site*

The proposed block to replace the void units would be similar in character to the existing estate. The block would be deck access Picking up on the sloping pitches and the inbound balconies of the existing blocks. Hollamby's original masterplan was designed around a tall perimeter with low lying houses in the enclosure they created. The proposed block would respond to this strategy and respond to the scale of the surrounding blocks.

### **3.4 Additional Housing - Meeting Demographic Need**

It is misleading to think purely in terms of additional or new homes as it is important to consider the number of bedrooms and to understand how specific local needs for housing is met. In order

to add breathing room in the housing mix and support the proposed Mutual Swaps programme discussed later in this document, the greatest need on Cressingham Gardens is for two-bedroom homes. The People’s Plan directly deals with that need, with all of the additional homes currently being proposed as two-bedrooms. The following table summarises the number of homes and number of bedrooms being proposed for the two sites:

	Homes in Car Park	Homes on Crosby Walk	Total Homes	Total Homes @ Council Rent	Total Bedrooms @ Council Rent
1 bed	-	-5	-5	-5	-5
2 bed	23	14	37	34	68
<b>Net Total</b>	<b>23</b>	<b>9</b>	<b>32</b>	<b>29</b>	<b>63</b>
<i>Possible further uplift (2 beds)</i>	3	3	6	4	8
<b>Net Total including uplift</b>	<b>26</b>	<b>12</b>	<b>38</b>	<b>33</b>	<b>71</b>

It should be noted that under the People’s Plan, there will be no reduction in the number of family-sized homes. This compares very favourably to the Council’s Option 5 (Full Demolition) where the number of four-bedroom homes is being significantly reduced, with only four of the existing 28 four-bedroom homes being replaced. The council has said previously that it wanted to address overcrowding on the estate and our data shows that there are significantly more than four families who need homes with four bedrooms.

### **3.5 Green Retrofit & Renewable Technologies Programme**

A sustainable refurbishment model is proposed for existing homes which would bring existing homes up to the Lambeth Housing Standard and then further improved through a phased green retrofit programme. A further programme of work is proposed to improve accessibility where it makes sense based on the immediate needs of the residents. TPP has the flexibility of ‘add-ons’ which allows for a programme that can be phased to minimise disruption and harness funding as cash-flows allow. The phasing can be shifted to allow for changes in the financing schedule.

It should be noted, that the proposed new homes in the car park spaces will have additional insulating benefits to existing homes in the same blocks and thus having the same effect as some of the proposed green retrofit measures.

#### **3.5.1 Refurbishment vs Demolition**

As explored in detail in UCL’s Engineering’s series of reports entitled “Demolition or Refurbishment of Social Housing”<sup>11</sup> there are clear financial and social benefits to refurbishment

<sup>11</sup><http://www.engineering.ucl.ac.uk/engineering-exchange/demolition-refurbishment-social-housing/>

over demolition due to improvements in social wellbeing, energy efficiency, environmental and health indicators and improved living standards for residents.

Refurbishment is more efficient than a new build when lifetime costs are taken into account, together with the embodied energy, carbon and operational energy. It would take many years for an efficient new build to catch up with a good refurbishment in this respect. Furthermore, the period of disruption to residents will be minimised through a carefully managed, phased retrofit programme.

Sweetnam and Croxford (2011)<sup>12</sup> undertook a lifecycle assessment and whole life costing two buildings on the Clapham Park regeneration - one refurbishment and one new build. They found that the combined measure of monetary and carbon investment cost with lifetime savings allowing showed that it was preferable to refurbish over demolish/rebuild.



The refurbishment programme for the buildings on Cressingham Gardens can achieve similar levels of energy performance to new build and will avoid the greenhouse gas (GHG) emissions that come with demolition and construction of new buildings. Therefore the net effect will be a reduction in both embodied energy and operational energy.

When considering energy, buildings GHG emissions through two processes: the occupants' use of a building (operational energy); and the extraction, manufacture and transportation of materials for a building's construction and demolition (embodied energy). The retrofit programme will reduce energy consumption and therefore operational energy, along with a reduction in fuel bills and increased thermal comfort.

In addition to improving energy usage performance through improvements to the building fabric, reduction in energy consumption will be achieved through the installation of more efficient

<sup>12</sup> Sweetname and Croxford (2011) "A carbon, energy and cost assessment of whether to refurbish or rebuild aging UK residential blocks", CIBSE

appliances and controls, improving occupant understanding of how energy is used in the home, and a partial switch to renewable fuel sources through on-site power generation. This will be achieved through the creation of a neighborhood energy supply of solar panels and potentially a low carbon heat network for the estate.

Finally, the minimisation of demolition waste will reduce costs, carbon emissions and social and environmental impacts associated with transportation, landfill, recycling and the manufacturing of new materials for a rebuild programme. The construction industry is responsible for some 120 million tonnes of construction, demolition and excavation waste every year – around a third of all waste arising in the UK<sup>13</sup> which accounts for 22% of all construction embodied energy and 19% of embodied carbon<sup>14</sup>. The potential impact on energy efficiency is hence significant.

### 3.5.2 Phase 1: Basic Green Retrofit

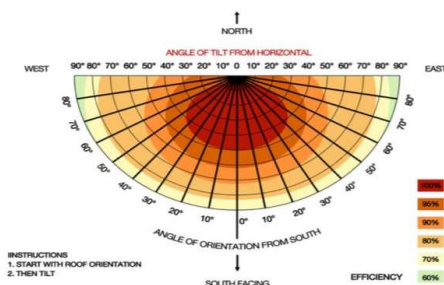
Under Phase 1 of the proposed green retrofit is a series of quick wins in addition to the LHS that have already been tested on an existing home in CGE:

- Filling the gaps around the windows
- Internal floor and ceiling insulation
- Upgrading kitchen and bathroom ventilation fans to building regulation standards

This programme of works would take homes past the LHS and would provide substantial improvements to the quality of people's homes.

### 3.5.3 Photovoltaics/Solar Panels

Residents were awarded a UCEF grant to engage Sturgis Carbon Profiling to investigate the initial feasibility and viability of renewable technologies for Cressingham Gardens. Photovoltaics/ solar panels were found to be very suitable given the layout of CGE.



PV panel orientation efficiency diagram

For example, the majority of roof aspects across the estate are perfectly aligned for solar panels - both in terms of orientation and the angle of the roofs (shallow sloping at 15° from the horizontal)

Overshading	% of sky blocked by obstacles.	Overshading factor
Heavy	> 80%	0.5
Significant	> 60% - 80%	0.65
Modest	20% - 60%	0.8
None or very little	< 20%	1.0

Note: Overshading must be assessed separately for solar panels, taking account of the tilt of the collector. Usually there is less overshading of a solar collector compared to overshading of windows for solar gain (Table 6d).  
Table A: Overshading factor, assume 1 for Cressingham Gardens roofs

The installation of PVs would have a number of benefits, including:

- Energy generation for communal use, and hence reduction in communal energy bills

Tilt of collector	Orientation of collector				
	South	SE/SW	E/W	NE/NW	North
Horizontal			961		
30°	1073	1027	913	785	730
45°	1054	997	854	686	640
60°	989	927	776	597	500
Vertical	746	705	582	440	371

Table B: Annual solar radiation, assume 961 kWh/m<sup>2</sup> for typical shallow sloping roof

<sup>13</sup> Davis Langdon LLP (2009). Designing out waste: a design team guide for buildings. Oxon: WRAP

<sup>14</sup> Jones, C.I. & Hammond, G.P. (2008). Embodied energy and carbon in construction materials. Proceedings of the ICE - Energy, 161(2), 87-98

- Income generation from feed-in-tariffs
- Potential reduction in residents' energy bills

Furthermore, it would be possible to install PVs regardless of the regeneration option chosen, as even under a demolition scenario the PVs could be moved and re-installed. Ideally, the installation of any PVs would occur in coordination with the roof renewals under the baseline LHS refurbishment in order to reduce installation costs (e.g. scaffolding, etc).

### 3.5.4 Zero Net Energy “Energiesprong” / Enerphit Passivhaus

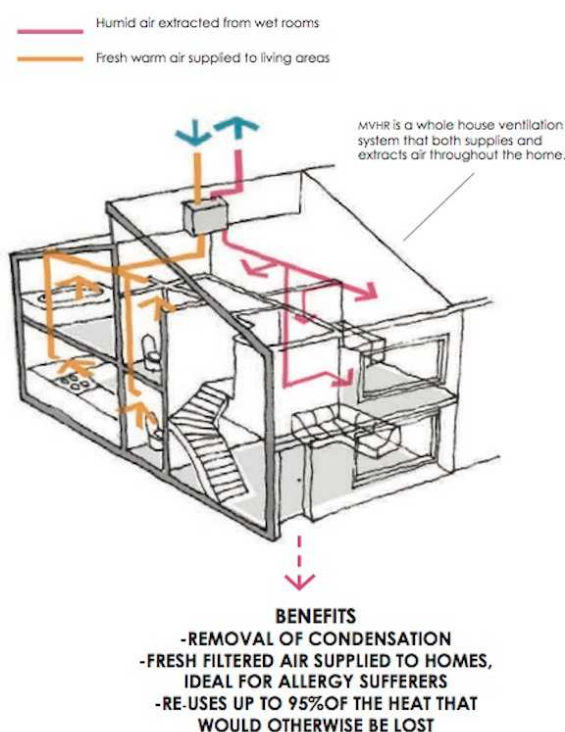
Extensive work was done with Sturgis Carbon Profiling to look at the different mechanisms by which an Enerphit Passivhaus standard could be achieved. Their recommendation was for a carefully planned step-by-step deep retrofit that would deliver the benefits over time. The full report is provided in the appendix, including detail drawings on the different measures possible.

There are numerous benefits to the community of this “higher than LHS” standard of refurbishment:

- Heat retention - Passivhaus homes are designed to stay warm, with such houses losing only 1°C overnight. Thus, heating would only be required for half an hour a day in winter to keep the house at 20°C.
- No cold surfaces - This means that there is no temperature gradient in the room and no draught
- Fresh air - Passivhaus homes incorporate Mechanical Ventilation with Heat Recovery (MVHR) systems that ensure clean fresh filtered air supply to all rooms. This is particularly beneficial for the residents with certain medical conditions.
- No noise - Although Cressingham Gardens is fairly quiet, the extra insulation and triple-glazing provide further sound insulation.
- Low maintenance - Passivhaus produces no condensation, which increases longevity of internal finishes, structure and windows, and reduces the maintenance cycle.

Residents are quite attracted to the Enerphit Passivhaus standard as it has the added benefit of requiring full testing of the work before a certificate is issued, ensuring that quality work is delivered. That is, Enerphit Passivhaus is an effective mechanism by which to achieve a step change in the quality of repairs & maintenance on Cressingham Gardens.

ZNE (Zero Net Energy) is slightly different and has been looked at independently by residents. This is already being rolled out in social housing in the Netherlands as part of the EU-supported “Energiesprong” initiative. It aims to achieve zero net energy use through a mix of measures similar to



Passivhaus together with renewable technologies. The contractual and funding side of the arrangement is particularly innovative and is discussed further in the Funding Structures and Sources sections of this document.

### **3.5.5 Further Green Initiatives**

#### **3.5.5.1 Green space strategy**

The refurbishment programme is also proposing a green space strategy, which will include sustainable drainage systems (SUDS) along with additional green infrastructure, and this will reduce the amount of water flowing into the sewers. This addresses any justification for demolition as a solution to solve drainage problems and also reduce the level of flooding risk in lower lying areas elsewhere in the borough.

#### **3.5.5.2 Water management**

Water is a vital and often overlooked issue in construction in terms of how sewage and stormwater are dealt with. When considering the differences between refurbishment and new build programme there are considerable reductions in water use that will be achieved by not rebuilding and just refurbishing bathrooms and kitchens.

### **3.5.6 Improved Accessibility**

Access on Cressingham Gardens is particularly good with pathways/routes around and to most parts of the estate without having to walk up steps. Nevertheless, access could be further improved with the sensitive introduction of ramps and stairlifts to key areas and renovation of existing poorly maintained stairways and walks. CGE was a flagship scheme for the council, designed and built to the highest standards available at the time, though subsequent poor quality repairs undertaken by Lambeth, most notably to stairs, mean they no longer comply with current standards. The innovative features of Cressingham Gardens are standard in modern architectural vocabulary and we believe the technical issues identified can be easily resolved through a holistic design-led strategy rather than the piecemeal approach taken to date.

## ***3.2 Housing Allocation & Mutual Swap Programme***

TPP proposes a well organised mutual swaps strategy. CGE was designed for a whole community and includes housing for every stage in life: studio flats through to 4 bedroom homes, a high number of accessible properties including one block specifically designed for residents with medical / accessibility requirements. However, Lambeth's housing allocation policy and lack of support for mutual swaps has resulted in inflexibility contrary to the original vision and design. While "Mutual Swaps" are currently only a right accorded to council tenants, data shows that leaseholders are also overcrowded, particularly as they cannot afford the extra 1 or 2 bedrooms that they require as their families grow.

### **3.2.1 Examples**

CGE has elderly residents living in 3/4 bedroom homes wanting to downsize. There are families who wish to move into larger homes, and disabled residents who need better access to their homes. Preliminary research carried out by residents suggests that any imbalance between overcrowding, under-occupation (net 1% overcrowding) and accessibility could be addressed with a well-organised mutual swaps strategy without residents having to leave the community and forgo the valuable social connections.



*“Upgrove Manor Way is great for accessibility to the house and onto the main street via Trinity Rise or into Brockwell Park without encountering too many obstacles, this is quite rare and very beneficial enabling me to get out of the house without limitations, the pavement is in need of repair but the design is fantastic and makes life livable due the accessibility.”*

*“I am disabled; I can not make the stairs!”* Disabled resident under occupying a three bedroom home on the upper level, who has not been able to move despite requests.

### **3.4 Additional Community Initiatives**

In addition to new extra housing, residents have identified and proposed further alternative and additional uses for the unused car parks and other identified spaces across Cressingham Gardens. These ideas originated through an estate wide survey undertaken Jan-Feb 2016. Further ideas have focused on wellbeing improvement and on creating employment opportunities. All of these ideas have arisen through the community discussion around the People’s Plan.

#### **3.4.1 Health & Wellbeing**

Cressingham Gardens is a diverse community with a large number of vulnerable and elderly residents. Two ideas that have already bubbled to the top through the community discussion include:

- GP surgery
- Day centre for Elderly

So far, from the community discussion, 37% of respondents have expressed support for a GP surgery as part of a possible conversion of the under car parks (ie within the top 5 most popular ideas to date).

We are currently further researching this idea, but the early raised issues in the local area are around the capacity of and the transport access to the local GP services, which are important for the Cressingham Gardens community that has a high proportion of households with a medical condition or disability, as well as the higher-need age bands - young children and over 65s. Also unknown the GP services required, ie whether a full service GP surgery would be desirable or simply an outreach/limited service GP. However, these issues need to be confirmed and tested. The GPs locally are:

<b>GP Surgery</b>	<b>Patients</b>	<b>Transport</b>	<b>NHS Patient Rating</b>
The Tulse Hill Practice	7,400	15 min walk 6 min bus	3 stars
Palace Road Surgery	7,100	18 min walk 8 min bus	4 stars
Brockwell Park Surgery	7,600	18 min walk 9 min bus	5 stars

Brixton Hill Group Practice	10,700	21 min walk multi-bus trip only via Brixton	3.5 stars
Water Lane Surgery	6,100	20 min walk 6 min bus	3 stars

This idea potentially would have both positive social wellbeing and economic impacts. Social benefits in terms of better health care and access for our residents, and economic benefits in terms of potential employment opportunities and the rental income<sup>15</sup> that the GP surgery could generate for the estate.

A Day Centre for Elderly has also proved to be very popular amongst residents, with 42% of respondents indicating support for the idea. Currently the closest 'senior citizen' day centre is on Lambert Road, off Brixton Hill, which requires using private transport or dial-a-ride (community transport), plus residents need to be able to go up stairs as the lift is (sometimes) not operational.

	Wellbeing impact		
	Social	Environmental	Economic
<b>GP Surgery</b>	Better health and access to services	n/a	Employment opportunities Rental income for estate
<b>Day Centre for Elderly</b>	Increase in social interaction and better health	n/a	Employment opportunities

### 3.4.2 Community Assets

A number of ideas have been proposed that can be broadly categorised as prospective community assets. The idea of a gym has been one of the top 5 most supported ideas by respondents (35%). Initial research shows that the closest gyms to Cressingham Gardens are:

- Brockwell Lido
  - Distance: 14 min walk, 20 min public transport
  - Price level: single exercise class £6.50 (concession) - £9.15 (adult), or £55/mth (single adult) - £126/mth (family)
- Brixton Rec
  - Distance: 25 min walk, 14 min public transport
  - Price level: £30/mth (senior) - £56/mth (adult)
- West Norwood Health & Leisure Centre

<sup>15</sup> Rosendale Surgery GP Practice business case (2015) showed annual rents payable between £128/m<sup>2</sup> and £225/m<sup>2</sup>

- Distance: 25 min walk, 15 min public transport
- Price level: £30/mth (senior) - £56/mth (adult)

At this pricing level and given the demographics, these gyms are not highly feasible for the community. Consequently, there is an opportunity to provide basic gym equipment, either outdoor or indoor, free to use and which is appropriate to the age demographics (ie suitable for younger and/or older residents).

A communal laundry was frequently mentioned by residents in discussion, with 32% of respondents indicating support. The original design of the estate incorporated public laundries but which were subsequently converted into either housing or space for the estate management staff.

The challenge of a number of households is how to dry laundry during winter months. A launderette is available at High Trees shops, but paid-for drying is costly in comparison to simply having space to hang up larger items. Provision of this space alongside launderette-scale driers at cost price, would help reduce condensation issues caused by drying within the home.

Outdoor picnic/BBQ areas have also been added to the list of ideas by residents, as outdoor family gatherings are very popular in the warmer months of the year.

### **3.4.3 Children & Youth**

Through the community discussion it was often noted that Lambeth's regeneration consultation and proposals showed a glaring absence of any consideration or even strategy for the children and youth of the estate. Cressingham Gardens has an above average number of young residents under the age of 16.<sup>16</sup> The impact of demolition and disruption to their education has not been evaluated or considered to our knowledge by the council. A fuller discussion of this impact on our younger residents is addressed in the Wellbeing Assessment section. However, in the People's Plan we are proposing to positively impact on this large section of our community.

On the estate, currently Childspace operates a co-operative nursery for children aged 14mths to 3 years, three days a week from the Rotunda (which was originally designed for use by a playgroup). Sadly, the Childspace service is restricted to only 7 children, has limited opening hours and currently no children from Cressingham Gardens attend (although in the past a few Cressingham Gardens children have had the benefit of attending). Further work is required to better understand what type of offering would be best suited for the young children and families on the estate, however, there is a demand for an affordable service.

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<sup>16</sup> According to ONS gathered by Social Life.



Youth facilities are currently limited on the estate to the single Ping Pong table outside the Rotunda, ad-hoc organised youth activities held within the Rotunda, the limited opening play equipment attached to Rotunda and the informal green play areas. Residents are also in the process of establishing a communal toy box with various pieces of equipment and toys that children and families can borrow. However, some of the ideas that raised by the children on the estate, their families and other residents include:

- Basketball area (maybe on the small green patch on Upgrove Manor Way where residents have already set up an informal basketball ring)
- Football equipment for the area behind Hardel Walk where the children currently play football amongst the trees
- Further Ping Pong tables - between Bodley Manor Way and Upgrove Manor Way, and between Crosby Walk and Scarlett Manor Way.
- Ground level slides placed into the mounds of the Teletubby area, and possible playful paving there as well.
- Mini-cinema where children/youth can go during the school holidays

Children have been particularly creative coming up with even more ideas of flying foxes, Wendy Houses, tree houses, climbing walls ...



### 3.4.4 Community Opportunities

A number of ideas being generated by the community also look to increase the opportunities available to residents and the wider community, as well as have a positive impact on lives:

- Café
- Urban Market
- Horticulture Apprenticeship program

Last year, the Trew Era Cafe was opened on the New Era estate and is run as a social enterprise. It has 7 staff and daily specials are made by the residents of the New Era estate, who come to the café after hours to cook their own recipes to be served the next day. Such a community cafe would provide numerous benefits including:

- Economic opportunities for residents (particularly residents involved in catering, as well as training and apprenticeships for residents new to the catering)
- Healthy affordable meals for residents that may not be getting balanced nutrition
- Income generation for the estate

A further idea is an urban market, which similarly has multiple benefits:

- Economic opportunities for residents running small home-based businesses
- Promote edible gardens and sell any fresh fruit & vegetables grown on the estate
- Social gathering

Through the lack of streets, Cressingham Gardens has numerous green areas between blocks where residents have been planting edible gardens and trees cultivated/harvested (elderflowers, bay leaves, etc). All homes also benefit from small private areas where they can grow plants. Taking this one step further is to create a horticultural education and apprenticeship training program.

### 3.4.5 Connectivity

One idea generated through the community discussion has been to improve the connectivity on the estate - both in terms of the internet connectivity and mobile coverage.

In the UK, 14% of households on average do not have internet access. Though, it is particularly noteworthy that there is no internet access in 50% of households consisting of only 1 adult aged 65+ and 20% of households consisting of only 1 adult aged 16-54. The top reasons given for not having internet access are:

- 53% Don't need internet (not useful, not interesting, etc)
- 31% Lack of skills
- 14% Equipment costs too high
- 12% Access costs too high (telephone, broadband subscription)

We believe the lack of connectivity to be higher than the national average. To improve the overall level of connectivity an idea has arisen to implement a self funding, community run estate-wide wifi project. This would have the benefit of reducing overall cost of connectivity, foster local IT skills and can provide a number of households with a better service than they can afford currently. Better connectivity can facilitate and support improved community services such as health/home adaptations, repairs, and reduce isolation for those who are housebound.

## 4. Preserving the Value of Cressingham Gardens

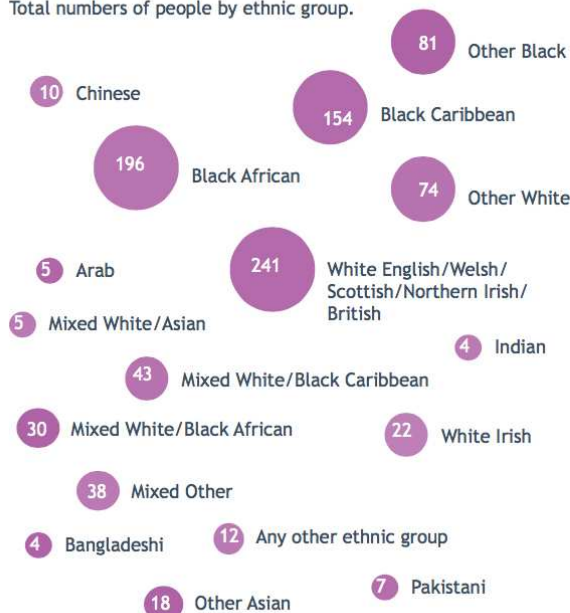
### 4.1 The Community

Cressingham Gardens is home to a role model community that has taken decades to create. A strong and caring community has evolved on CGE. It is a community highly valued by its residents, evidenced by very high retention rates. This is largely due to the architecture and layout of the estate, along with relatively affordable living costs, which has set the foundation for successful community formation. For example 22% of residents have been resident for over 20 years, 19% for 10-14 years (19%) and 18% for 5-9 years.<sup>17</sup>

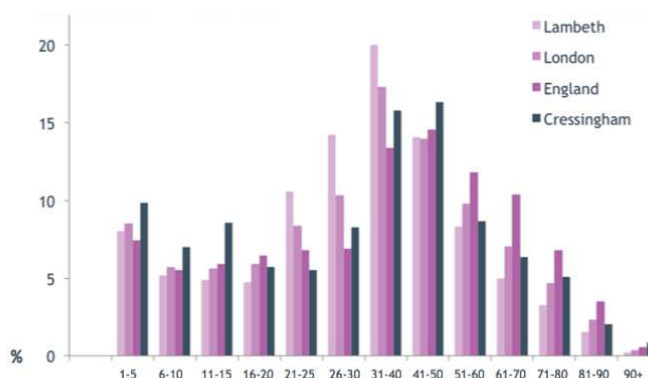
When surveyed by the Social Life<sup>18</sup> residents described a number of deep attachments to the place and its people which imbues the estate with a value extending far beyond the bricks and mortar. The report identified key social features which include 'strong levels of neighbourliness and belonging'; 'low levels of actual reported crime, and of fear of crime and anti-social behaviour'; 'positive impact of the design of the estate, the light, well-designed homes that feel spacious and comfortable'; and the 'mix of people from different backgrounds, ages, ethnicities and tenures'. Social Life's wider research also shows the setting continues to be home to a mixed community, with many of the residents that moved onto the estate in the 1970s still living there.

#### Ethnic origin

Total numbers of people by ethnic group.



#### Age



All these statistics come from the Office of National Statistics and are for 2011. They cover the Cressingham Gardens estate and a small area on the other side of Tulse Hill.



#### Neighbourliness

There are a large number of people considered 'vulnerable' on the estate, including those with; disabilities, long-term physical and/or mental health issues. A significant 47% of residents reported that they or a member of their household have a disability or medical condition that affects the size, location or design of the home they live in.<sup>19</sup> This makes maintaining the particular support and community conditions all the more desirable. Furthermore, in light of the

<sup>17</sup> Lambeth's 'Acuity' Housing Needs Survey 2015

<sup>18</sup> Social Life's 2015 council-commissioned report entitled 'Understanding well being on Cressingham Gardens'.

<sup>19</sup> Lambeth's 'Acuity' Housing Needs Survey 2015

austerity cuts, Lambeth cannot afford to replace the adult social care that is currently being provided by the community on Cressingham Gardens.

One example is Liz, a grandmother who brought up her own children on the estate. She is one of a network of neighbours who helped dementia-sufferer Meryl continue to live independently in her own home after her diagnosis, by collecting her medicine from the pharmacy and checking on her regularly. This continued until just a few months ago, when aged in her 90's, Meryl took the decision to move into a care home. Herself in late middle age suffering from asthma and arthritis, Liz is in turn supported by a number of fellow residents. Her ground floor front door means that despite her own physical limitations, she is able to maintain daily contact with neighbours who chat to her across the Way as she rests in her doorway. Her lynchpin status is owing to her character, her time investment, and the particular qualities of the estate environment and layout.

Another example is mother-of-two Amy, who brings her elderly neighbour Julie her groceries because a medical condition means she often can't get to the shops. In return, Julie helps Amy by providing meals for Amy's two school-age boys when she has to work late. These, along with a wealth of practical favours from school-run swaps, to pet-sitting and help with lifting heavy items, are ongoing examples of crucial connections which provide social, health and emotional support services, free of charge, to residents and at no cost to the local authority and NHS. Amy's contribution to Julie's life will be impossible post redevelopment and she would almost certainly have to leave London.

It is important to note that in the daily life on CGE, the legal tenure of one's neighbours is irrelevant and until Lambeth announced regeneration, many residents were not aware of or simply didn't care about tenure, except when it became a factor in reporting repair issues.

## **4.2 Low Crime**

Cressingham Gardens has a reputation as a low crime community, and this is supported by the statistics. Neighbourhood policeman PC Matthew Joyner has said: "My opinion is that crime is low across Cressingham as well as the ward as a whole. I have been the local officer for Tulse Hill since early 2011." This assertion is backed by Metropolitan Police Service figures which show that non-adjusted crime rates<sup>20</sup> (per thousand residents) for the sub-ward E01003172 (includes CGE) are lower than for the ward area, which are in turn significantly lower than for the borough of Lambeth. This is consistent across the last three years for which the MPS provide comparative data (Data from maps.met.police.uk).

## **4.3 Architectural Heritage**

The estate was built as a high density (256 habitable rooms per hectare, rising to 297 with the People's Plan uplift) low rise development of London stock brick, facing the South Western edge of Brockwell Park. It currently meets the target planning densities required today by the London Plan for a PTAL rating 2/3. When the Lambeth Housing Committee approved the development of Cressingham Gardens in January 1969, it was unusually noted in the minutes "*congratulations were conveyed to the officers on a bold and imaginative scheme*" and was the only new estate that was accorded its own press release (copy of which still exists in the V&A museum). Soon

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<sup>20</sup> Adjustment to allow for the location of a probation hostel in the sub-ward lowers the local crime rate significantly.



after its completion in 1981, Lord Esher, past president of RIBA (Royal Institute of British Architects), described Cressingham Gardens as *“warm and informal... one of the nicest small schemes in England.”* Cressingham Gardens is one of the most successful examples of social housing built under Ted Hollamby in an era when Lambeth was recognised as one of the leading boroughs for social housing and architecture:

*“He [Ted Hollamby] came to Lambeth and turned a backwater into a pioneering department.”<sup>21</sup>*

*“Hollamby is the acknowledged leader in high density housing with low buildings.”<sup>22</sup>*

*“[Hollamby] a champion of modern low-rise estates responsive to topography and local conditions”<sup>23</sup>*



*CGE immediately after build*

#### **4.4 Integration with Brockwell Park and Environment**

The original master plan is structured in a manner that affords a universality of connection to the park and was to also conserve all the existing trees.<sup>24</sup> Both English Heritage and SAVE Britain's Heritage<sup>25</sup> strongly recommend that the Brockwell Park Conservation Area boundary be

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<sup>21</sup> Ken Livingstone *You can't say that: Memoirs* Faber & Faber, 2011

<sup>22</sup> Jill Craigie *“People versus Planners,”* The Times, 14 Sep 1968

<sup>23</sup> *“Edward Hollamby,”* The Guardian, 24 January 2000

<sup>24</sup> All the mature trees were retained during the construction of Cressingham Gardens, except for one sick poplar tree. This was one of the reasons why Cressingham Gardens has a slightly more informal layout than Blenheim Gardens, which was designed in parallel.

<sup>25</sup> 10th July, 2015, Save Britain's Heritage, *Cressingham Gardens: Report Number:41/15* “a very strong objection is the failure to designate a conservation area, and indeed to carry out an initial assessment for a conservation area. Historic England has supported the designation of a conservation area. This, combined with

extended to include the entirety of the estate in order to preserve the particular features of the setting. The Brockwell Park Conservation Area already incorporates the central green square on Cressingham Gardens (known colloquially as “Teletubby land”). This approach is also supported by the Twentieth Century Society, Friends of Brockwell Park and the Brixton Society. The proposals within the People’s Plan take this into account and seek only to activate the underused spaces on the ground plane.

Social Life reported proximity to the park as being a key contributor to wellbeing on Cressingham Gardens. A replacement development would of course continue to border the park, but such an assertion does not appropriately account for the widely celebrated way in which the current estate integrates with the park setting, bringing with it the significant psychological benefits of a 'village in a city' environment, as highlighted by heritage organisations such as the Twentieth Century Society, English Heritage (now Historic England), and SAVE Britain's Heritage.

SAVE's 2015 report 'A Proposal for the Re-Assessment of the Brockwell Park Conservation Area and a Recommendation for the Extension of the Boundary to Incorporate the Cressingham Gardens Housing Estate', describes how the '*original site plan shows (fig.12), the estate incorporated the established trees and planting already on the site and this was a key element of the design ethos, as was the exploitation of the site's topography and proximity to Brockwell Park.*' It continues: '*The original design brochure succinctly describes the rationale for the low-rise design, and evidences the importance assigned to the development's assimilation with its natural environment and more specifically, the park.*'

Design Brochure (see appendix): *“It is proposed to provide all the accommodation needed in low rise dwellings. This will avoid any visual obstruction on the views from Brockwell Park and will ensure that all dwellings will have a close contact with the site. Part of the plateau has been kept clear of buildings to extend the landscape of the Park into the site. The buildings are arranged around this in such a way that the lower buildings are adjacent to it with the height increasing to a maximum of four storeys around the perimeter of the site away from the park.”*



*Contemporary view of CGE from Brockwell Park*

## **4.5 Estate Layout**

Neighbourliness is also afforded a greater opportunity to flourish because of the way in which the front doors face each other and back garden gates open onto the public areas. A common sight in the summer months is gates left open so that children can mingle in each-others' gardens, in tandem with the officially communal spaces that buffer the blocks - all easily watched over by their parents. In Ted Hollamby's own words:

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current government policy, should lead your council to reverse its policy for the site and invest in a scheme of refurbishment and improvement”

*"We are building a community. We don't look at this in terms of so many houses. Rather we think of things in terms of the functions of a community."*<sup>26</sup>

## **4.6 Design of Homes**

All homes on Cressingham Gardens were designed to Parker Morris standards, a report considered a benchmark for housing space standards in Britain. It was Ted Hollamby's desire to build council homes that set the benchmark for all homes, *"He passionately believed that council housing should be as good as if not better than private housing, and some of his estates are still the most sought-after in the borough"*<sup>27</sup>.

Internally, the homes have a significant positive effect on comfort and state of mind in that the design optimises natural daylight via multi-aspect, split level arrangements. These architectural features are rarely seen in contemporary new-builds through pressure of cost, though where architects are fortunate to have the creative and financial scope, they continue to incorporate these qualities in their buildings today.

*"The buildings have shallow double-pitched roofs, the pitches off-set, with ridge-level clerestory windows. The split-level houses have a continuous skylight strip which runs along the front of the roof, giving light to the entrance halls and kitchens of each house beneath. All units have one range of floor-to-ceiling windows, either opening out onto balconies, patio gardens, or, in the case of the maisonettes, looking out over the tops of the other units, and into the surrounding trees."*<sup>28</sup>.

Note that homes that still use the warm air system of heating as per the original design, do not suffer from condensation, damp and mould, compared with some of the properties where this has been replaced with radiator-based central heating and which are not properly ventilated. Sturgis has reported that the original ducts would enable a relatively uncomplicated transition to a heat-recovery system.

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<sup>26</sup> "Edward Hollamby talks to Peter Rawstone", RIBA July 1965, pp350-357

<sup>27</sup> Ken Livingstone You can't say that: Memoirs Faber & Faber, 2011

<sup>28</sup> See appendix item "Save Britain's Heritage, Cressingham Gardens;Report Number:41/15"

## 5. Estate Management Options

Cressingham Gardens Residents set up a steering group to look into the government's Tenant Empowerment Programme to look at various options open to it. The group had initial discussions with Department for Communities and Local Government (DCLG) and decided to appoint Open Communities, an independent training and advice agency, to carry out an 'Exploring the Options' project under the government initiative training for the steering group and public events where the wider community can decide on the way forward. Options open to the community are to play a part in the council's existing tenant participation options as well as look at some legal rights available to secure tenants of local authorities – namely the Right to Manage and the Right to Transfer.

This project is currently taking its course – and has involved extensive consultation across the estate. Once this consultation is complete the steering group will put a proposal to the community to test opinion on its chosen way forward.

### 5.1 Management of the Estate

The steering group decided early in the Exploring the Options' process that it would not be worth exploring current participation options available from the council. Rather, the steering group is examining in detail the possibility of exercising its Right to Manage or Right to Transfer.

A test of opinion will be held amongst tenants to determine which option they are in favour of. This could lead to a feasibility study to look in more depth at the implications of both the Right to Manage or the Right to Transfer – depending on the option chosen by the steering group and supported by the wider community.

Neither of these options will happen overnight and both involve a high level of commitment from the community. Neither can be fully realised without a full, independent and confidential ballot of secure tenants across the estate.

### 5.2 Why support alternative management?

Lambeth Council has not looked after or invested in homes to a high enough standard on CGE. Structural surveys state that the main problems are non-structural due to the council failing to carry out regular maintenance and to keep homes and public spaces in a good state of repair<sup>29</sup>. Residents have discovered that Lambeth and contractors have repeatedly:

- Over estimated the costs of major works<sup>30</sup>.
- Charged twice, made up, or not completed jobs<sup>31</sup>.
- Failed to claim for repairs on insurance<sup>32</sup>.

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<sup>29</sup> At the request of the TRA, Lambeth commissioned a survey of 10% of properties. This was completed by Tall Consulting Structural Engineers in November 2013. The report stated that "The structural condition of the estate was generally acceptable" and "extensive problems had been caused by trees and lack of maintenance" [p.7]. This contradicted earlier statements, made by the council, that there were major structural problems with the Estate.

<sup>30</sup> The July 2015 Cabinet report highlights that an original £16 million estimate for refurbishment was revised down to £9 million after costs were reviewed by a volunteer quantity surveyor who calculated costs to be £7 million.

<sup>31</sup> In Jan 2016 leaseholders contested £45,000 worth of repairs to the Estate. Out of 87 contested items the first 10 reviewed by Lambeth's Brixton/Clapham head surveyor have now been discounted reducing the service charge bill by over £4,000. The remaining 77 items have still to be reviewed.

<sup>32</sup> In 2002-2004 UPV windows were installed across the estate. These were poorly installed causing extensive damage which was never claimed for under warranty. ([https://www.whatdotheyknow.com/request/windows\\_warranty\\_action\\_since\\_ja#incoming-599990](https://www.whatdotheyknow.com/request/windows_warranty_action_since_ja#incoming-599990)). Also, in

- Stopped repairing Cressingham Gardens as a result of the regeneration discussion<sup>33</sup>.
- Not supplied financial and other information relating to management of CGE<sup>34</sup>.

The failure to repair and maintain has increased repairs costs and damaged people's homes, causing damp, mould and cracks to walls. This poor state of repair was the reason given for placing Cressingham Gardens within a regeneration scheme in 2012 which could ultimately result in the demolition of people's homes.

Subsequently, a manifesto pledge by Lambeth Labour Party to build 1000 additional council rented homes provided another reason for Cressingham Gardens to be placed within the regeneration scheme. To fund these new homes Lambeth are proposing that high value properties are built for sale and/or market rent. These new homes are fully expected, by Lambeth's own estimation, to raise rents and living costs in the area<sup>35</sup> which would not be beneficial to current and future low, middle, and even moderately high-income residents. Furthermore, rebuilding the estate would not solve the problems around poor quality repairs and maintenance as Lambeth proposes that the SPV contracts Lambeth housing management to manage the estate.

### **5.3 Right to Manage**

RTM is legislation that allows tenants and leaseholders to take on responsibility for managing their homes and community. Residents can setup a Tenant Management Organisation (TMO) and use money provided by Lambeth to employ its own staff to undertake repairs, maintenance and major works.

Each TMO has its own legal Management Agreement with the council. This agreement outlines services the TMO wishes to take on board and which services it would leave with the council. A TMO can choose how much or how little responsibility it takes over from the council. Services managed by TMOs might include:

- Day to day repairs and maintenance
- Tenancy management
- Rent collection
- Cleaning
- Grounds maintenance

The more services the TMO takes on, the more money it would receive from the council. Under RTM, the TMO effectively becomes the managing agent of the council. This means that no changes would be made to any tenant or homeowner agreement. There are currently 10 TMOs within Lambeth and around 250 across England.

#### **RTM Pros:**

- Residents could hire their own estate staff like an on-site manager who could work closely with residents to ensure jobs are properly completed.

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October 2014 a car crashed into railings causing £3024 worth of damage. Lambeth attempted to charge residents for this damage (service charge reference 1494416/1). This item is now being claimed on insurance and not being charged to residents.

<sup>33</sup> In 2011 Lambeth's regeneration team instructed surveyors to halt all structural works to Cressingham until a decision about the regeneration had been made. Residents later reported difficulties in logging repairs. [https://www.whatdotheyknow.com/request/why\\_were\\_structural\\_works\\_to\\_cre](https://www.whatdotheyknow.com/request/why_were_structural_works_to_cre)

<sup>34</sup> Since 2012 over 200 freedom of information requests have been submitted in relation Cressingham Gardens Estate in order to gain information about the regeneration proposals and how Lambeth manages the Estate. <https://www.whatdotheyknow.com/search/cressingham/all?query=cressingham>

<sup>35</sup> (July 2015 Cabinet report, para 7.3 in viability analysis). "potential living cost increases arising from the regeneration, such as rent increases and service charge changes"

- Opportunity to fine-tune contractor's' knowledge of the estate design, increasing likelihood of respect for the buildings and outcomes desired by residents
- TMOs have a track record of delivering better and lower cost resident services than councils.
- Any money saved through effective service delivery can be spent on additional services to the community.

#### **RTM Cons:**

- RTM requires lengthy negotiations and sustained commitment from residents.

### **5.4 Right to Transfer**

This option is where the community can vote to transfer ownership of the Estate to a new 'stand alone' community owned and controlled organisation (Cressingham Housing trust –CHT- for example) which would entirely own and manage Cressingham Gardens. Residents can choose exactly how this organisation is structured and decide what its priorities should be for the community. Transfer could also be to an existing social housing provider.

RTT would mean a change to tenancy agreements - from the current "secure tenancy" to a "Lifetime Assured tenancy". This is because only tenants of local authorities can receive secure tenancies. However, under transfer of ownership, those tenants in the properties at point of transfer would change to an "Assured" tenancy with protected rights. This ensures that no secure tenant living in a home at the point of transfer would lose key rights as a result of transfer. The status of freeholders would remain the same as their properties are not owned by the council. Some of the changes that could take place as a result of transfer are:

- Gain rights of succession, where a new right of succession would be granted so that tenants could pass their tenancy on to a family member.
- Gain the right to refuse changes to your Tenancy Agreement without your consent (except for rent and service charges).
- Lose the right to manage.

The rights tenants have within the assured tenancy do not have the same protection as secure tenants. However the tenancy agreement offered after transfer – if this is the route the community takes - would be written after respectful consultation with existing tenants, to protect the rights tenants would otherwise lose. This includes the right to buy.

#### **Pros:**

- The organisation would have access to all financial information regarding the estate.
- This can safeguard and protect the estate for the community and gives residents more control over their quality of life and living costs.
- The community can develop new homes and services if it desires.
- Tenants gain some rights.
- The assured tenancy has protected rights and hence provides more tenant rights than the current offer from Lambeth.
- Lambeth HRA account benefits from any transfer deal.

#### **Cons:**

- This is a new initiative which is currently being tested by three projects: Bushbury Hill (Wolverhampton), Bloomsbury (Birmingham), PACCA (Lambeth).
- Tenants lose their secure tenancy.

### **5.5 Do Nothing**

This would mean the estate would continue to be managed by Lambeth. However, if the estate was demolished, ownership would be transferred into a for-profit private company set up by

Lambeth Council called "Homes For Lambeth". This company, known as a Special Purpose Vehicle (SPV), is designed to provide access to alternative types of funding that operate outside of normal council rules and financial strictures.

**Pros:**

- Takes no effort on the part of residents.

**Cons:**

- Lambeth's proposed SPV is very complex and difficult to understand.
- No residents would be included on the management board.
- The council can decide to demolish people's homes.
- The same 'problem' contractors and sub-contractors will maintain and repair the new homes.
- Residents have limited or no say over how the SPV or the Estate is run.
- Residents have limited access to financial information.
- Tenants could lose many of the rights held within their secure tenancy, more than with RTT.

### ***5.6 Summary of Estate Management Options***

A vote for RTM (Right to Manage) may be viable in tandem with a funding model for refurbishment, however Lambeth officers have made it clear they prefer to demolish CGE. A vote for RTT (Right to Transfer) would have the best chance of all the options of improving estate repairs and maintenance in the short and long term. A strong case would need to be made to the council for it to relinquish control of the estate's ownership and finances (see financial viability). A vote to 'do nothing' will result in the council continuing with its unpopular demolition programme.

## 6. Financial Viability

Financial analysis shows that the People’s Plan can achieve at least a £7m positive NPV over 30 years and potentially as high as over £13m NPV depending upon the new housing mix. This level of financial viability exceeds the council’s Option 5, which according to Lambeth’s own numbers, achieves only a maximum £824k positive NPV, and hence provides more confidence that the viability will not be eroded over time into a loss making scenario for the council (ie negative NPV). For example, it would only require less than 75% of homeowners to return (ie only 5 fewer homeowners than currently being assumed), before the council’s redevelopment proposals turn into negative NPV territory (ie loss making).

The People’s Plan NPV consists of:

- £6.6m NPV generated through refurbishment to the Lambeth Housing Standard plus reinstatement of the six voids
- £300k NPV if all new homes but 3 at council rent, up to £6.7m NPV if 40% social rent/60% private sale (and still better than Lambeth’s Tenancy Strategy - 40% ‘affordable’/60% market)
- £50k NPV from green initiatives

There is further additional upside not yet factored into the total NPV for the other resident ideas being developed as part of the People’s Plan.

Initial calculations based on the latest numbers provided - at the last minute - by the council during their consultation would indicate that Option 5 (full demolition) would in fact have a negative NPV in the range of -£13m to -£40m over a 60-year period, i.e. not be financially viable even over a 60-year period.

Unless stated otherwise, the discount rate used is 4%. Although housing associations have been able to raise long-term finance below 3% (fixed rate), we have decided to conservatively estimate the weighted average cost of capital (WACC) for funding the People’s Plan at 4% to provide ‘buffer’ in the numbers and to run a sensitivity analysis on the discount rate.

### 6.1 Baseline – LHS Refurbishment

The baseline LHS refurbishment component considers Cressingham Gardens as a stand-alone accounting entity. It has a NPV of £6.6m, which means that Cressingham Gardens can finance its own refurbishment and ongoing repairs & maintenance over a 30-year period, as well as generate a surplus that can be reinvested into the community

	Discount Rate			
	3%	4%	5%	6%
NPV	£8.1m	£6.6m	£5.3m	£4.2m



Assumptions:

- 1% pa council rent reductions for the next 4 years, thereafter rent increases return to a medium term average CPI of 3%
- Additional major works assumed on a 5 year, 10 year and 30 year cyclical basis
- Additional full window replacement of current windows at end of life (25 years, currently approx. 12 years old)
- S.Morrow refurbishment estimate using Lambeth pricing schedules
- Excludes weather-tight repairs as they are currently being undertaken
- Management costs of 20% of total income (council rents + service charges)

## 6.2 Additional Housing – Undercover Car Park Conversion

In the undercover car parks an extra 23 two-bedroom homes can be created. This is an extremely cost effective mode of delivering new homes: build cost of only £52k per 2-bedroom home (compared to a new build cost of £145k per home) . As a consequence, all 23 extra homes could be at council rent (ie 100% social) and still generate a positive NPV.

A mere 4 homes would need to be privately sold before the conversion would be entirely self-financing, ie no long-term debt required.

If the tenure mix were set at the council's aspiration target of 60% council rent / 40% private, then there is a £2m - £4m positive NPV subject to the market value of the private sale homes. And thereby generating funds for the community, including for refurbishment.

If the tenure mix were set at the council's proposed target for the net gain of homes on Cressingham Gardens, ie 40% council rent / 60% private, then there is a £4m-£7m positive NPV subject to the market value of the private sale homes. This net profit generated would be equivalent to 60%-100% of the entire refurbishment cost.

In the latest set of financial Airey Miller datasheets, Lambeth council is assuming the following current market values for new build:

1 bedroom flat: £435k          2 bedroom flat: £610k

3 bedroom flat: £750k          4 bedroom flat: £863k

Consequently, we have included the sensitivity scenario of £610k for a 2 bed flat. However, we do consider this to be at unaffordable levels and against the community ethos of providing the most affordable housing possible.

Tenure Mix		NPV if Market Value of 2 bed flat...			
Council rent	Private Sale	£400k	£470k	£540k	£610k
23	-	£0.13m	£0.13m	£0.13m	£0.13m
20	3	£0.97m	£1.17m	£1.37m	£1.57m

15	8	£2.36m	£2.89m	£3.43m	£3.97m
9	14	£4.02m	£4.97m	£5.91m	£6.85m

Further Assumptions:

- Same council rent levels as existing council tenants, including 1% pa rent reductions
- Includes professional fees, contingency, on-costs, promotion/marketing and legal fees
- Includes ongoing annual maintenance & management costs, plus 5-year, 10-year and 30-year cyclical major works

### 6.3 New & Additional Housing – Crosby Voids

At the northern end of the estate, a block of 12 x 1 bedroom contains 6 flats that have been void and empty for over 16 years (“the voids”). Lambeth council has already decanted one family from this block such that only 5 homes are currently tenanted. Various options have been looked at whether new homes can be created on this site, including refurbishing the voids with some infill through to rebuilding the voids at higher density through to rebuilding the entire block.

Demolishing and building new homes is a more costly exercise than refurbishment and more costly than converting the undercover car parks into new homes (ie £145k build cost for a new build 2-bedroom home vs only £52k per home for the carpark conversion). Consequently, it was critical to understand whether a new build scenario (either only of the 6 voids or of the entire block of 12 flats) would be financially viable. For illustrative purposes, we present here the modelled scenario of replacing the 12 x 1 bedroom flats with 14 x 2 bedroom flats.

Tenure Mix		NPV if Market Value of 2 bed flat...			
Council rent	Private Sale	£400k	£470k	£540k	£610k
14	-	-£0.82m	-£0.82m	-£0.82m	-£0.82m
11	3	-£0.08m	£0.12m	£0.32m	£0.52m
8	6	£0.66m	£1.10m	£1.46m	£1.87m
6	8	£1.15m	£1.68m	£2.22m	£2.76m

Under a new build scenario, it is not possible to provide 100% of the homes at council rent and have a positive NPV (in contrast to the car park conversion where 100% of the homes could be

at council rent). If 3 of the homes (20%) were sold and 11 kept at council rent (80%) it is possible to achieve a positive NPV, subject to the market valuation of the homes being sold.

If the tenure mix were set at the council's aspiration target of 60% council rent / 40% private, then there is a £0.6m - £2m positive NPV subject to the market value of the private sale homes. And thereby generating funds for the community, including for refurbishment.

If the tenure mix were set at the council's proposed target for the net gain of homes on Cressingham Gardens ie 40% council rent / 60% private, then there is a £1m-£3m positive NPV subject to the market value of the private sale homes. (As noted above in the section on the Undercover Car Park Conversion, we don't believe the market valuations of new homes used by Lambeth council in their models are actually affordable)

Note: In accordance with the community ethos of the People's Plan, the current residents in the block would have to be in favour before this illustrative scenario could go ahead.

Further Assumptions:

- Council rent levels based on new build rent levels provided for in Lambeth models, but we have added 1% pa rent reductions in accordance with current central government requirements
- Includes professional fees, contingency, oncosts, promotion/marketing and legal fees
- Includes ongoing annual maintenance & management costs, plus 5-year, 10-year and 30-year cyclical major works

## **6.4 Green Retrofit & Renewable Technologies**

Proposed in the People's Plan is a phased green retrofit and renewables program. Under the green retrofit & renewable technologies component, residents have looked at a number of models, each of which have different potential income streams and costs associated.

### **6.4.1 Phase 1 Basic Green Retrofit**

Under Phase 1, quick wins are achieved through three techniques, that have already been tested on an existing home on the estate:

- Filling the gaps around the windows
- Internal floor and ceiling insulation
- Upgrading kitchen and bathroom ventilation fans to building regulation standards

Item (i) has already been included in the basic refurb cost estimate. To achieve (ii) and (iii), S. Morrow has provided a detailed cost estimate that equates to an additional £3.2k per home (including professional fees and contingency costs) above the basic LHS refurbishment. This is equivalent to a negative NPV of -£609k. However, this extra cost could comfortably be covered through incorporation with the Basic Refurbishment that produces a positive NPV of £6.6m, resulting in a combined positive NPV of £6.0m. However, further grants and other funding sources would be sought in order to further reduce this cost (see discussion below on funding sources).

## 6.4.2 Photovoltaics/Solar Panels

Given the recent series of changes in the proposed Feed-In-Tariff rates and programme, it has been somewhat harder to forecast the future viability of PVs. Nevertheless, despite the dramatic reduction in FiTs recently announced, the installation of solar panels across the estate generates an overall positive NPV for the community.

	NPV if price of solar panels reduce by ...			
	0%	5%	10%	15%
NPV	£540k	£579k	£619k	£658k

Further Assumptions:

- Income sources include FiT-Generation Income and FiT-Export Income at latest reduced rates
- Energy savings achieved by households (50%) and for estate communal electricity (100%)

## 6.4.3 Zero Net Energy “Energiesprong” / Enerphit Passivhaus

Based on information obtained from Energiesprong (see EU grants section) on their experience in the Netherlands we were able to run an incremental analysis to see whether the extra costs associated with delivering full ZNE could be covered by converting residents’ current energy bills into an energy plan. Initial analysis shows that the solution would be breakeven (positive NPV of £0.97m), ie delivering a better quality refurbishment at no net cost. Nevertheless, further work is required to including more in depth analysis of residents’ energy bills and to investigate the legal logistics.

## 7. Five funding Structures & their Implication

This section describes five funding structures available to deliver TPP. Each structure can access different sources of funding which are listed within each structure and expanded on within the “Funding Sources” section of this document. These structures include:

**Structure 1:** Lambeth

**Structure 2:** TMO/Lambeth

**Structure 3:** Sale & Leaseback with Community Entity

**Structure 4:** Full Community Ownership

**Structure 5:** Energiesprong

### 7.1 Structure 1: Lambeth

There are a number of sources of funding open to Lambeth if they were to support the People's Plan. These can be used in combination, or individually:

- Housing Revenue Account (HRA) debt
- Forfeiting/ factoring
- Grant funding

#### 7.1.1 Housing Revenue Account (HRA) debt

To be noted upfront, we have requested the latest version of the HRA 30-year Business Plan, but to date residents have been refused access by Lambeth officers. Consequently, the analysis has had to proceed using the HRA 30 year Business Plan shared with residents in December 2014. However, we have run a scenario with the 1% rent reduction (assuming that no cost efficiencies are achieved). Note also, that this version of the HRA Business Plan does not appear to take into account of the extra £23m backlog funding grant awarded in November 2014 to Lambeth by the GLA/DCLGA. This funding would release an extra £23m in HRA debt headroom that could be used to finance the TPP on Cressingham Gardens.

In summary, Lambeth could afford to finance TPP if it so wished. The full analysis has been made available in the appendices.

#### 7.1.2 Forfeiting / factoring

Lambeth is able to sell the future rental income from Cressingham Gardens in exchange for an upfront discounted amount that could be directly applied to the refurbishment. Our understanding is that this would not be classified as HRA debt as there are no future obligations to pay as rent collection would be undertaken by a different party. Furthermore:

- No write-off of the value of the existing homes directly against the HRA, which will be required from 2017 onwards. The write-off will threaten Lambeth's ability to deliver its services in the years of the write-offs as it is not allowed to make an accounting loss in the HRA.
- No removal of Cressingham Gardens' rents from the HRA except those subject to the factoring arrangement.

- No buy-out costs being booked against the HRA, and again threatening Lambeth’s ability to deliver services elsewhere in the borough due to the requirement not to make a loss.

Importantly for council tenants, they would retain their secure tenancies under the 1985 Housing Act.

### 7.1.3 Grant funding

There are sources of grant funding available to the council that would allow it to partially fund the People’s Plan. For example, ECO funding is still available and we understand Lambeth is already using ECO funding on other estates in the borough. Given the architectural merit of the estate, there are often grants available particularly for the refurbishment of the Rotunda, which is a listed asset of community value:

- **ECO Funding**  
The Energy Company Obligation (ECO) is a government scheme to obligate larger suppliers to deliver energy efficient measures to domestic premises in the UK.<sup>36</sup> The scheme has been further extended beyond 2015 and is now known as ECO2 (currently running until 31 March 2017).
- **£7.5m Single Capital Pot “Grant”**  
Through its financial data sheets provided to residents, Lambeth has noted that it has a £7.5m loan available for the regeneration of Cressingham Gardens from the Single Capital Pot. This would be more than sufficient to cover the build costs and fees for all of the proposed new homes under the People’s Plan (£4m), and achieve more homes at council rent than under Option 5: Full Demolition.

## 7.2 Structure 2: TMO/Lambeth

Lambeth can work with residents to establish a Tenants Management Organisation (TMO). TMOs often manage housing more effectively than their landlord. Independent government sponsored research shows that the performance of TMOs match the top 25% of local councils in England.<sup>37</sup> Thus, it is highly likely that a TMO will achieve a better value for money than the council in terms of both quality and cost, with the surplus funds generated reinvested back into the community. Furthermore, a TMO is able to borrow in its own name and would be able to finance the People’s Plan without recourse to the HRA debt.<sup>38</sup>

## 7.3 Structure 3: Sale & Leaseback with Community Entity

Under a sale & leaseback structure with a community owned entity (COE), the council would ‘sell’ properties requiring refurbishment to the COE, which would then raise the necessary funds in its own name. The council would then “lease” the properties back from the COE. In summary:

- Debt is raised by the COE outside of the HRA
- Council tenants remain secure tenants under the 1985 Housing Act because their landlord is still Lambeth council

<sup>36</sup> <https://www.ofgem.gov.uk/environmental-programmes/energy-company-obligation-eco>

<sup>37</sup> <http://www.nftmo.com/content/content.numo?ida=3&idas=19>

<sup>38</sup>

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/270362/131126\\_Annex\\_C\\_RTM\\_Guide\\_Book\\_2\\_Guidance\\_on\\_the\\_schedules\\_4.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/270362/131126_Annex_C_RTM_Guide_Book_2_Guidance_on_the_schedules_4.pdf)

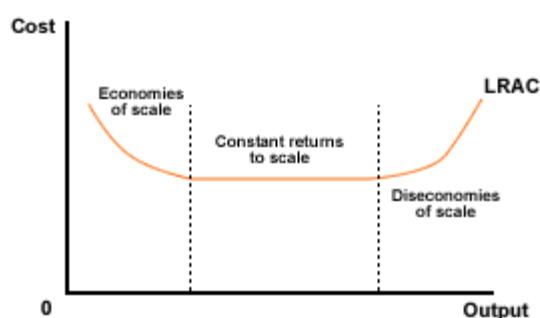
- COE receives lease payments from the council. From this income stream, debt repayments would be covered.

The COE could also be used to raise further grant funds and other income sources to invest into the community.

## 7.4 Structure 4: Full Community Ownership

There is an opportunity to place Cressingham Gardens into community ownership. There are a number of legal routes to achieve this. From a financial perspective there are, however, a number of attractive benefits:

- i. **Community ownership is not subject to Lambeth's HRA debt cap**  
By establishing a new entity separate from the council, the community would be able to raise new debt to finance the refurbishment and The People's Plan.
- ii. **Clear connection between the estate's assets, income generated and costs incurred**  
Initial discussions with various organisations indicate a clear preference for a community ownership structure due to the transparency and clear connection that can be made between the assets/income and the funding
- iii. **Economies of scale rather than diseconomies of scale**  
With 300 homes, Cressingham Gardens can achieve scale in delivery and negotiation, without experiencing the diseconomies of scale that Lambeth council is currently experiencing (e.g. limited or no competition in supplier market due to size of contracts, lack of employee knowledge over local situations, etc). If more scale than 300 homes is required for any particular purpose, then we might access the network of similar estates.



- iv. **Less regulatory risk**  
Subject to the exact legal structure, community ownership could offer less regulatory risk to the community and its homes. Currently, local authorities are being subjected to seismic changes within the social housing sector and the uncertainty is not expected to stop in the near future.

There would be initial costs associated with setting up such a structure and these would need to be factored into the financial model. These include legal costs, establishing an office and estate transfer cost, etc. The tax implications are dependent on the exact nature of the legal structure

and are yet to be fully investigated. In comparison with Lambeth's SPV proposal, community ownership would be a better financial structure due to (i) and (ii).

## **7.5 Structure 5: *Energiesprong*<sup>39</sup>**

Energiesprong is a successful Dutch programme that delivers fully integrated Net Zero Energy (E=0)<sup>40</sup> refurbishment packages, supported by long term performance guarantees (30-40 years). It is now being rolled out in the UK. The Energiesprong business case for social housing is based on transforming the energy bills of tenants into an energy plan. The energy plan is a "service fee" that costs the tenant the same as the bill that was previously paid to the utility company. This fee can be seen as the instalment on the loan taken for the refurbishment. Tenants are also protected from future energy price rises as the investment is a fixed cost and the energy plan can therefore be too. Energiesprong UK has already received a contract from the GLA to adapt the finance model for London-specific implementation.

This approach to green retrofit is possible with a Community Ownership structure and possibly a TMO/Lambeth structure. We are unable to determine whether it would be possible under the current Lambeth HRA structure due to the non-disclosure by Lambeth of its latest HRA 30-year business plan and HRA debt capacity. However, based on the 2014 version of the HRA business plan, it would be possible for Lambeth to undertake this approach to the refurbishment.

Based on an initial review of bills, Cressingham Gardens households are typically spending around £50 and up to £110 per month in some cases for gas and electricity. Across the estate, this is approximately equivalent to £180k - £400k per year (excluding any new homes)

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<sup>39</sup> [http://www.energiesprong.eu/wp-content/uploads/2016/02/EnergieSprong\\_UK-Transition\\_Zero\\_document.pdf](http://www.energiesprong.eu/wp-content/uploads/2016/02/EnergieSprong_UK-Transition_Zero_document.pdf)

<sup>40</sup> Net Zero Energy (E=0) means the house annually generates as much renewable energy on-site (or near-site) as it consumes. This applies to all thermal (heating and water) and electric (lights and appliances) demand.



## 8. Funding sources

There are a wide selection of funding sources available to support TPP. All sources previously mentioned in this document have been summarised below, followed by more detailed description in the second part of this section:

- **Grant funding**  
Funds provided to typically achieve social outcomes. Funds don't have to be repaid unless activities not carried out:
  - Government
  - EU
  - Charitable Grants
  - CSR Grants
  - Crowd Funding
- **Debt**  
Funds are advanced to carry out activities and need to be repaid together with interest:
  - Banks & Loan Aggregators
  - Insurance & Pension Funds
  - Bonds
  - Social Impact Debt
- **Quasi-Debt**  
There are no funds advanced upfront. However, payments for performance/use are made over an extended period of time.
  - Long-term Contracts
- **Equity & Quasi-Equity**  
Equity funds are advanced upfront in exchange for an equity ownership. The return is at risk. Quasi-equity funding instruments that mimic the risk profile of equity without the direct ownership.
  - Equity: Direct Equity
  - Quasi-equity: Instruments structured to provide Equity risk levels
- **Green Funds**
  - ECO funding
  - European Energy Efficiency Fund (EEEF)
- **Other**
  - Forfeiting

### 8.1 Grant funding

#### 8.1.1 Government Grants

Government provides incentives for the construction of new homes, conversions and refurbishment of voids. TPP better meets central government requirements and eligibility for government funding than Council Option 5 (Full demolition):

## **New Homes Bonus for Local Authorities**<sup>41</sup>

The New Homes Bonus is a grant paid by central government to local councils to reflect and incentivise housing growth in their areas. The amount paid is based on the amount of extra Council Tax revenue raised for new-build homes, conversions and long-term empty homes brought back into use. It provides additional payment for providing affordable homes. It is paid each year for 6 years. Councils can decide how to spend the New Home Bonus, but they are expected to consult communities about how they will spend the money.

The new housing in the undercover car parks and in replacement of the voices in the People's Plan would be eligible for the New Homes Bonus. Using the DCLG's NHB Calculator, the People's Plan would generate up to £330k<sup>42</sup> over 6 years for Lambeth Council regardless of how the homes are delivered (ie by Lambeth or by the community directly). This money could be directly put back into Cressingham Gardens.

## **£140m fund towards regeneration programmes supported by the community**

Central government has also announced a £140m loan fund towards regeneration programs that are supported by the community. The newly appointed chair of the Estate Regeneration Advisory Panel, Lord Heseltine, which will approve the schemes to receive the funding, has stated that groups other than local authorities may put forward proposals. Furthermore, he stated that:<sup>43</sup>

- "People who live on these estates will define the solution"
- "we are not going to impose any government plan on anyone"
- Tenants rights would "absolutely" have to be protected

## **8.1.2 EU Grants**

There are a number of EU grants that TPP may be eligible for either as an individual project or part of a wider consortium, subject to the timing of the grant calls.

An example of where TPP may fit into a wider consortium project is the Dutch Energiesprong refurbishment program, which was awarded €3.6 million of Horizon 2020 grant funding in November 2015 to kick-start net-zero refurbishment in the UK and France, using the social housing sector as a catalyst. One of the stipulations imposed by the grant, is that they are required to deliver 5,000 refurbished homes in the UK.

An example of possible funding for the TPP as an individual project is via the European Structural & Investment Funds (ESIF) managed by the DCLG in the UK on behalf of the EU.

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<sup>41</sup>

<https://www.gov.uk/government/collections/new-homes-bonus-provisional-allocations-for-2016-to-2017-and-consultation-on-reforming-the-bonus>

<sup>42</sup> Calculated using the DCLG's New Homes Bonus Calculator

<sup>43</sup> <http://m.insidehousing.co.uk/heseltine-regen-plans-wont-be-imposed-on-communities/7013528.article>

### **8.1.3 Charitable Grants**

The following organisations provide grants that can be used to cover specific components of the People's Plan which would need to be taken on a case by case basis:

#### **Big Lottery Fund**

Provides grants to enable people to improve their communities. Specifically, their vision is: "We believe people should be in the lead in improving their lives and communities. Our approach will focus on the skills, assets and energy that people can draw upon and the potential in their ideas. We feel strong that strong, vibrant communities can be built and renewed by the people living in them – making them ready for anything in the face of future opportunities and challenges." The most relevant grants for the People's Plan are the Awards for All and Reaching Communities.

#### **Heritage Lottery Fund**

Provides grants to projects that have a lasting difference for heritage, people and communities. The most relevant to the People's Plan are the Young Roots, Start-up and Our Heritage grants in light of the officially recognised architecture heritage of Cressingham Gardens and the above national average proportion of youth in the community.

#### **Power to Change**

Provides grants to support, develop and grow community businesses. These grants would be able to support the residents' ideas in the People's Plan that would be classified as community businesses.

### **8.1.4 CSR Grants & Support**

Many large corporates have created programmes under the concept of "Corporate Social Responsibility". They are highly diverse, though these programmes can be tapped to support components of TPP. For example, Habitat for Humanity benefits from CSR programmes to help finance the refurbishment of long-term void homes which are then made available to those on the housing waiting list as genuinely affordable homes. They have established easy ways for corporates and their employees to give back to the community (e.g. corporate matching for employee donations, payroll giving, financial partnerships, donation of products, etc)

### **8.1.5 Crowd Funding**

There are numerous platforms upon which community based initiatives can raise funds from the wider community. Given the wider community support for Cressingham Gardens, there is confidence that community crowd-funded funds can be raised for clearly defined components of TPP, for example the community wifi project or the phased green space strategy.

## **8.2 Debt**

### **8.2.1 Banks & Loan Aggregators**

Banks and other loan aggregators provide long-term debt finance (up to 30 years) at a level that could cover the cost of the People's Plan against the revenues generated by the estate. Initial discussions have taken place and there is interest to fund the People's Plan. The preference is

for a clear & simple Community Ownership structure. However, debt funding may be available for a more complex TMO/Lambeth or other hybrid structure.

The five main UK banks actively lend to the social housing sector. Similarly, the European Investment Bank is also an active lender (directly and via The Housing Finance Corporation) into the UK to support retrofitting measures and construction of highly energy-efficient new housing.<sup>44</sup> EIB provides very cost competitive loans. For example, in 2015 Paradigm Housing undertook a EIB drawdown via THFC for £33m at 2.26% for a 20 year average life.<sup>45</sup>

## 8.2.2 Insurance & Pension Funds

Pension funds are showing an increasing interest in housing as an investment that delivers stable long term returns that match well with their liabilities. They have been looking at various different forms of accessing housing:<sup>46</sup>

- i. Buying housing bonds directly - see below for further discussion.
- ii. Investing in housing fund vehicles - Gives exposure to a portfolio of different housing bonds/loans diversified across different RSL's, in different parts of the country. For example, The Housing Finance Corporation is an aggregating funder to the housing association sector.
- iii. Development partnerships – Equity investments in housing. For example, in January 2016, British insurer Legal & General together with the Dutch pension fund PGGM announced that they will be constructing 3,000 apartments under a “build-to-rent” plan. They are targeting yields of 3-5%. Other insurance companies and pension funds investing in private rental housing include M&G (asset management arm of insurer Prudential) and Hermes Investment.<sup>47</sup>
- iv. Sale and leaseback – Involves buying a number of existing properties and leasing them back to the council/housing association for a period of 30 – 50 years. Depending on the agreement, the property ownership may revert back to the council/housing association, in which case the pension scheme investor would receive the amortisation of the capital value (ie income stream) over the term of the lease.

## 8.2.3 Bonds

Medium and smaller housing association are able to access the bond market via The Housing Finance Corporation. This source of funding is not available to Lambeth as a council as it is not a registered housing provider, but would be available to under community owned structure. Some of the latest bond sales through THFC include:

2016: Cornerstone Housing - £5m, 28 years, fixed 2.81%  
2015: Riverside Housing - £15m, 2.795%

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<sup>44</sup> <http://www.ft.com/cms/s/0/4489efe0-97e9-11e3-8dc3-00144feab7de.html#axzz404gy0FU4>  
<http://www.eib.org/infocentre/stories/all/2014-november-06/supporting-greener-social-housing-in-london.htm>

<sup>45</sup> <http://www.thfcorp.com/whatsnew/pressreleases.htm>

<sup>46</sup>

[http://www.plsa.co.uk/PolicyandResearch/DocumentLibrary/~/\\_media/Policy/Documents/0302-Investment-Insight-Social-Housing%20b.pdf](http://www.plsa.co.uk/PolicyandResearch/DocumentLibrary/~/_media/Policy/Documents/0302-Investment-Insight-Social-Housing%20b.pdf)

<sup>47</sup> <http://www.theguardian.com/business/2016/jan/27/legal-general-to-build-and-rent-out-3000-new-uk-homes>

2015: Orwell Housing - £5m, 27 years, 2.78%

2015: Combined bond for 6 housing associations - £208m, 28 years, 2.89%

## 8.2.4 Social Impact Debt

Social impact debt is debt instruments that are linked to achieving social impact as well. These can be structured in various different ways, however, some examples include:

- Allia Charitable Bonds – Allia provides investors an opportunity to invest in low-risk ethical investments that brings forward future interest in an upfront donation to their chosen charity. The bonds issued by Allia are on-lent at a fixed rate to a social housing provider with a single repayment with compound interest after 5 years.<sup>48</sup> This type of funding would enable the short-term funding of TPP, but would require refinancing after 5 years.
- Social Impact Bonds – A financial mechanism in which investors pay for a set of inventions to improve a social outcome that is of social and/or financial interest to a government commissioner.<sup>49</sup> SIBs have been adopted in a number of different contexts including foster care, youth engagement, social engagement amongst elderly through to reoffending rates amongst prisoners. Given the different elements of TPP and the demographics of the community, it may be possible to structure a SIB to fully or partially fund TPP.

## 8.3 Quasi-Debt

### 8.3.1 Long-term Contracts

Long-term contracts can achieve to pay for a service over the longer term without the need to provide for an upfront investment. This form of financing could be used for funding elements of TPP including:

- Fit outs of converted spaces by delivery organisations (e.g. GP surgery, nursery, etc)
- Installation of solar panels on roofs

## 8.4 Equity & Quasi-equity Instruments

Quasi-equity and equity instruments attract a higher return than say debt instruments as they are associated with higher levels of risk. Equity provides for a form of ownership participation. Quasi-equity, although doesn't provide direct ownership participation, it mimics the risk profile of equity. This type of funding is considered in scenarios where there are higher levels of risk associated with delivery.

Equity funding is not favoured by the community as it is a form of privatisation and against the ethos of the community. Consequently, quasi-equity and equity are currently not considered appropriate for funding the People's Plan.

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<sup>48</sup> <http://allia.org.uk/what-we-do/charitable-bonds/>

<sup>49</sup> <http://www.socialfinance.org.uk/services/social-impact-bonds/>

## 8.5 Green Funds

Alternative initiatives and funding sources that could support TPP include:

### 8.5.1 ECO funding

The Energy Company Obligation (ECO) is a government scheme to obligate larger suppliers to deliver energy efficient measures to domestic premises in the UK.<sup>50</sup> The scheme has been further extended beyond 2015 and is now known as ECO2 (currently running until 31 March 2017). ECO has 3 obligations:

1. Carbon Emissions Reduction Obligation – Suppliers must promote ‘primary measures,’ including roof and wall insulation and connections to district heating systems. Other ‘secondary measures,’ which improve the insulating properties of a premises can also be installed at the same premises as primary measures
2. Carbon Saving Community Obligation – Suppliers must promote insulation measures and connections to district heating systems in areas of low income.
3. Home Heating Cost Reduction Obligation – Suppliers must promote measure which improve the ability of low income and vulnerable households (the ‘affordable warmth group’) to heat their homes. This includes actions that result in heating savings, such as the replacement or repair of a boiler.

Note: **Green Deal** financing ended in 2015

### 8.5.2 European Energy Efficiency Fund (EEEF)<sup>51</sup>

The eef makes direct investments into projects from project developers, energy service companies (ESCOs), small scale renewable energy and energy efficiency service and supply companies. Investment instruments include senior debt, mezzanine instruments, leasing structures and forfeiting loans. Debt investment can have a maturity of up to 15 years. They will also consider equity (co-)investments for renewable energy over the lifetime of projects or equity participation in special purpose vehicles, both in cooperation directly with municipalities, or with public and private entities acting on behalf of those authorities. The areas in which EEEF can invest and are most relevant to TPP are:

- Energy Saving and Energy Efficiency
  - Public and private buildings incorporating renewable energy and/or energy efficiency solutions including those based on the usage of Information and Community Technologies (ICT)
  - High energy efficient combined heat and power (CHP), including micro-cogeneration, and district heating/cooling networks, in particular from renewable energy sources
  - Local infrastructure, including efficient lighting of outdoor public infrastructure such as street and traffic lighting, electricity storage solutions, smart metering, and smart grids, that make full usage of ICT.

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<sup>50</sup> <https://www.ofgem.gov.uk/environmental-programmes/energy-company-obligation-eco>

<sup>51</sup> <http://www.eeef.eu>

- Energy efficiency and renewable energy technologies with innovation and economic potential using the best available procedures
- Renewable Energy Sources
  - Distributed generation from local renewable energy sources, to medium and low voltage (100kV and lower) distribution networks.
  - Smart-grids enabling higher renewable energy sources uptake.
  - Energy storage to allow storing part of the energy produced from intermittent sources during low-consumption hours and feeding this energy back at times of peak-demand.
  - Microgeneration from renewable energy sources meaning distributed energy from renewable energy, typically below 50kW output that is concerned with heat and/or power production technology aimed at the individual domestic households, houses of multiple occupancy, and multiple dwellings. The technologies include but are not limited to photovoltaic, micro-wind power, micro-hydro power, ground-, water- and air source heat pumps, solar heating, solid biomass/biogas heating, and micro CHP using renewable energy sources.

## **8.6 Other**

### **8.6.1 Forfeiting/ Factoring**

Selling a receivable in exchange for a discounted lump sum upfront. From a housing perspective, this could be the selling of future rental income receipts in exchange for a discounted amount upfront.

### **8.6.2 Single Capital Pot “Loan” £7.5m**

Through its financial data sheets provided to residents, Lambeth has noted that it has a £7.5m loan available for the regeneration of Cressingham Gardens from the Single Capital Pot. However as no details have been provided of how this loan is paid back and requests for further information have been refused.

## 9. Assessments

### 9.1 Criteria for assessment

Lambeth's regeneration team have presented a set of criteria to residents as the basis for a decision on the future of Cressingham Gardens Estate<sup>52</sup>. For sake of clarity these have been exactly copied here, though an index has been added to aid legibility. CGE resident additions have also been appended:

All options must achieve these criteria:	People's Plan	Lambeth's Option 5
1. Viability: option achieves a positive Net Present Value (NPV).	✓ Minimum £7m NPV up to over £13m NPV over 30 years	✘/? Lambeth report states £0.8m NPV over 60 years, but many errors, including £7.5m Lambeth grant subsidy as income and doesn't take into account abnormals. Corrected NPV max negative -£6.7m
2. Deliverable: that delivery risk is manageable and that phasing and construction programmes are feasible (as far as can be ascertained at the moment)	✓ All elements in People's Plan have successful examples elsewhere in London. Smaller scale intervention and thus lower deliver risk compared to full demolition	✘ Lambeth has not directly delivered a development (to our knowledge) since the 1970s. SPV also against Central Government guidance
3. Meets Key Guarantees: delivers the reprovion of existing homes in line with the Key Guarantees to residents.	✓	✘ Replaces the current 28 x 4-bedroom house with only 4 x 4 bedroom flats
4. Meets Planning Policy and Tenancy Strategy: option meets as minimum, council planning policy and council tenancy strategy on affordable housing for the construction of net additional new homes. (40 per cent affordable, of which 15 per cent is council rent levels)	✓ In fact easily delivers more council rent homes than outlined in Lambeth's Tenancy Strategy	✓

<sup>52</sup> Cressingham Gardens Q&A issued 17th February 2016. The criteria listed are taken from a response provided by the council to the following question "On what basis will the Cabinet make a decision about the future of Cressingham Gardens". This is understood to be the most up-to-date criteria provided so far.



<b>Further criteria to be considered:</b>		
5. Favouring options where the quantity of new homes provided is higher.	✓ New homes being delivered. However simply increasing density does not automatically have a desirable outcome - to meet the Labour administration's own aims, these need to be substantially genuinely affordable and at council rent levels.	✓ But majority (60%) of extra new homes at un-affordable levels, plus replacement homes for homeowners assume an average 40% market value gap.
6. Favouring options where the quantity of new homes for council rent is higher.	✓ Up to 29-33 extra new homes at council rent (not intermediate/LAHA rent)	✓ Only 23 extra at council rent
7. Optimal tenure split: aim to achieve a tenure split between market and affordable homes, which is closest to 60% affordable/40% market split.	✓ Requirement for only 3 homes to be sold privately to break even, ie over 90% affordable (at council rent) can be achieved.	✗ Net gain doesn't meet aspired optimal tenure split, nor the requirement of 100% of 'affordable' to be council rent (see beginning section "TPP vs Option 5")
8. Nature of market housing: preference for private rent (not sale).	✓ Possible, but preference in People's Plan is for higher levels of council rent.	✓
9. Pay back period: favouring options that provide shorter payback periods, while acknowledging that the council is able to invest in the local community over a far longer period than a private developer, to support the needs of local families.	✓ 15 years	✗ Over 60 year pay-back
10. Subsidy: Favouring options that require the least subsidy to meet other criteria listed above	✓ No subsidy required from Lambeth	✗ £7.5m Lambeth grant/subsidy required to make positive NPV
<b>Factors to consider:</b>		
11. Financial resources available to fund refurbishment.	✓ Sufficient debt headroom in HRA, but also already in	<b>N/a</b>

	discussion with other organisations	
12. Financial resources available to fund regeneration.	✓ Sufficient debt headroom in HRA, but also already in discussion with other organisations	✗ No evidence provided
13. The condition of the estate and properties on the estate.	✓ Existing homes brought up to LHS at a minimum, and then to higher green retrofit standards.	✓ Risk of teething issues (e.g. Myatts Field North has leaking roofs and frequently no hot water)
14. The likely cost of refurbishment of properties.	✓ Positive NPV and can be afforded	N/a
15. Relative cost of refurbishment of properties compared to other estates.	? There are outstanding queries in relation to apparent errors and inconsistencies in the information presented to residents by the council. However on the available evidence, the cost of the LHS on Cressingham is in line with the borough average.	N/a
16. The demand for new homes.	✓ Cressingham Gardens is a highly popular estate and additional homes would be highly sought after	✗ Majority of extra new homes unaffordable
17. The potential for delivery of additional new homes.	✓ See above	✓
18. The viability of redevelopment options.	✓ Positive NPV and fundable	✗ Negative NPV, plus SPV caught under HRA debt cap.
<b>The People's Plan additional criteria:</b>		
19. Prevent unnecessary demolition for benefit of social well being and smaller environmental impact.	✓ Potentially only 7 void flats and 5 tenanted properties demolished on Crosby Walk	✗ Full demolition

20. Keep people in their homes, and be sensitive to the relative impact of options on tenants and homeowners.	✓	✘
21. Preserve the community support network developed over many years	✓	✘
22. Conserve the original vision for the estate (integration with park setting, mix of generations and backgrounds, convivial layout enhancing life quality from a social and family point of view)	✓	? Unknown until designs created, but Lambeth planning department has already expressed concerns and are not convinced <sup>53</sup>
23. Significantly improve the quality of repairs and maintenance	✓ Assuming more influence/control by residents	? Unknown, but unlikely as Lambeth states they want to do repairs in-house
24. Add value via a range of community and innovation opportunities	✓	? Unknown, e.g. no new community hall in current proposal
25. Improve the carbon footprint of the estate	✓	✘ Demolition
22. No / minimal impact on Brockwell Park's environs and views	✓ No impact on views from the park or height of buildings immediately bordering the park	✘ Height will need to be increased resulting in impact on Brockwell Park views.

## 9.2 Wellbeing Assessment

### 9.2.1 Mental & Physical Wellbeing

The People's Plan avoids the negative impacts of demolition and relocation where the mental health of residents is highly affected, with reports of increased stress, anxiety and depression post- demolition<sup>54</sup>. This is felt across the board, but impacts elderly and vulnerable people the most. This stress is linked to feelings of disempowerment around something as fundamental as home, with its deeply embedded emotional and financial investment, being taken away against

<sup>53</sup> Estate Regeneration Board minutes - 2nd June 2015

<https://www.whatdotheyknow.com/request/280121/response/717404/attach/3/Estate%20Regeneration%20Board.pdf>

<sup>54</sup> <http://www.engineering.ucl.ac.uk/engineering-exchange/demolition-refurbishment-social-housing/>

the will of the majority of CGE residents. By contrast, a sense of empowerment will be engendered through a community-led process of improving people's homes.

At the community level, refurbishment averts the isolation caused by displacement, and through the retrofit process connections between the residents will increase, who will continue to work effect the plan together. Connections with the wider community who have been enormously supportive of residents' efforts, would also be strengthened, creating further opportunities for social capital. In addition, residents' sense of security will be maintained, resulting from the strong sense of neighbourliness and low crime rates.

The Social Life report cites 'frustration caused by day-to-day problems of repairs to homes and shared spaces', which inevitably negatively impacts on wellbeing. There is strong evidence<sup>55</sup> that many of these problems are not the fault of the design but the way that the repairs have been managed and executed (Tall Survey p163-165, 2013). TPP proposal provides strong evidence that these issues are surmountable both from a technical<sup>56</sup>, financial and a management perspective. It is further expected that improved physical health will also result from refurbishment, particularly around energy-based improvements (mould and damp eradicated, lower energy bills) and improved access.

## 9.2.2 Children & Youth

Through the community discussion it was often noted that Lambeth's regeneration consultation and proposals showed a glaring absence of any consideration or strategy for the children and youth of the estate. Cressingham Gardens has an above average number of young residents under the age of 16. The impact of demolition and disruption to their education has not been evaluated or considered to our knowledge by the council.

There is research into the impact of residential mobility on educational attainment and in summary:

- Moves imply changes in household routines, which can disrupt development (Evans & Wachs, 2010)<sup>57</sup>
- Uprooting a child from her neighborhood deprives her of important social capital that may be parlayed into educational assets. Changing the network of families in one's neighborhood may serve as a sort of reset button for community resources that have been empirically connected to student achievement, including webs of school-related information sharing between parents, parental monitoring, and learning opportunities (Coleman, 1988<sup>58</sup>; Leventhal & Brooks-Gunn, 2000<sup>59</sup>)
- The effect of mobility on their parents may be indirectly detrimental to their achievement. Parents who struggle with financial issues around housing have been shown to suffer from depression, social withdrawal, and increased work hours with taking on second and

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<sup>55</sup> Tall survey. Section 19. Pt 10. 2013

<sup>56</sup> 'Sketch Proposals for Cressingham Gardens'. Sturgis Carbon Profiling LLP.

<sup>57</sup> Evans, G. W., & Wachs, T. D. (Eds.). (2010) "Chaos and its influence on children's development: An ecological perspective" Washington, DC: American Psychological Association

<sup>58</sup> Coleman, J. S. (1988). "Social capital in the creation of human capital." *American Journal of Sociology*, 94 (Suppl. 95), S94–S12

<sup>59</sup> Leventhal, T., & Brooks-Gunn, J. (2000). "The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes." *Psychological Bulletin*, 126(2), 309–33

third jobs (Kingsley, Smith, & Price, 2009<sup>60</sup>). These burdens may detract from parents' abilities to support the educational development of their children.

- There is evidence to suggest that residential moves are associated with failure to complete high school. Haveman, Wolfe, and Spaulding (1991)<sup>61</sup> found that residential mobility at all levels of schooling is associated with a lower probability of high school graduation
- Maths and reading attainment is negatively impacted after a residential move and becomes a source of inequality in academic achievement through primary school (Voight, Shinn & Nation, 2012)<sup>62</sup>

Children on Cressingham Gardens are currently performing academically very well including receiving Lambeth awards for academic achievement and scholarships. Many of the young adults who have grown up on the estate have gone on to university. Indeed the educational attainment in the area of Cressingham Gardens, according to ONS statistics, is contrary to what the level of the other measures such as income would indicate.

The People's Plan aims to avert the detrimental impact on children and youth under a demolition scenario. Instead, it is looking at ways of even further improving the wellbeing of the up and coming generation.

### 9.2.3 HACT Analysis

Under law (Public Services (Social Value) Act 2012), Lambeth Council must consider the economic, social and environmental well-being of any format of regeneration of Cressingham Gardens.

In 2014, resident reps on the Project Team set up by the council requested full study by SLAM in order to understand the wellbeing, health and social care costs associated with each of the regeneration options. Sadly, Lambeth council officers refused and decided to only engage SLAM at a future date to look at how to minimise the costs associated with their chosen option. Also as part of the Wellbeing Subgroup facilitated by Social Life, the impact on wellbeing of each of the options was supposed to be assessed. However, this work was never completed due to the time limitations imposed by Lambeth council, in particular by unlawfully cutting the consultation short. In the "resumed" consultation, Lambeth officers have refused to allow this work to be completed. Nevertheless, even Social Life's cursory calculations indicated refurbishment-related financial benefits of between hundreds of thousands and millions of pounds. While those pros are difficult to realise on the regeneration balance-sheet, they should be among the priorities when considering the bigger picture and be included in an overall "Social Return on Investment" (SROI) measure.

Consequently, we have undertaken an analysis of the wellbeing impacts using the framework and model developed by the Housing Associations Charitable Trust (HACT). It is an extremely useful model as it allows for the identification of social impacts, the number of residents that it will affect and most crucially provides equivalent financial values through its Social Value Bank. From this analysis we estimate that the People's Plan will generate around £23m pa positive

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<sup>60</sup> Kingsley, G. T., Smith, R., & Price, D. (2009). "The impacts of fore-closures on families and communities" Washington, DC: The Urban Institute.

<sup>61</sup> Haveman, R., Wolfe, B., & Spaulding, J. (1991). "Childhood events and circumstances influencing high school completion" *Demography*, 28,133–157

<sup>62</sup> Voight, Shinn & Nation (2012) "The Longitudinal Effects of Residential Mobility on the Academic Achievement of Urban Elementary and Middle School Students", *EDUCATIONAL RESEARCHER* 41:385

social impact. In comparison, Option 5: Full Demolition is estimated to generate around £22m pa negative social impact.

### **9.3 Policy and Legal Risk Assessment**

There is concern about the level of risk-taking by the council in the manner in which it is pursuing the regeneration, when there are so many legal uncertainties. Less than three years after the system of HRA self-financing was introduced, the new Conservative Government announced the introduction of legislation under the Welfare Reform and Work Act that will change the basis of that debt settlement by compelling councils to reduce rents by 1% per year over the next four years and to sell off “high value” council housing on the open market to finance the extension of right-to-buy for housing association tenants and the discounts given to those tenants. Furthermore, the DCLG has issued clear guidance that a SPV structure will not be allowed to circumvent secure tenants’ rights.

The council is currently pressing on with emptying the estate of residents, seemingly to create favourable conditions for demolition, which residents consider to be reckless under the circumstances if so much change at central government level. Lambeth makes public claims about its intentions to build “homes for the people of Lambeth” which, if given proper consideration, seem very unlikely to be fulfilled, at least not in any meaningful way.

Meanwhile, because tenants moved under regeneration are classified “Priority A” for alternative social housing, the regeneration proposal is already further burdening the housing waiting list and forcing families already on the list to stay even longer in temporary accommodation - a situation quite contrary to the stated aims of regeneration.

There are also widespread concerns over the hundreds of thousands of pounds of public money currently being gambled on a regeneration programme whose odds of success are so low.

#### **9.3.1 Right-to-Buy Extension to Housing Associations**

There is a huge question mark around whether Homes for Lambeth will be able to get the funding to carry out the redevelopment, because it is at risk of having to sell all of the newbuilds (vacant high value housing) to fund the right-to-buy extension. LBL needs at least a £100m investment from a private company but there is, as LB of Islington has confirmed<sup>63</sup>, a risk that in order to fund the government's right-to-buy extension, all new "council owned" homes might have to be sold. We do not believe an investor is likely to buy into that until there is clarification.

#### **9.3.2 SPVs not to be used to circumvent right-to-buy**

Some councils are looking to set up SPV's outside the HRA to raise finance and develop new housing for sale or for market rent but the Government has made it clear that such SPVs or local housing companies should not be used to circumvent a tenant's right to buy:<sup>64</sup>

*“It is important that new council tenants should have access to the Right to Buy, and that new homes should not be built by councils which are excluded from the Right to Buy. In order to be eligible, local authority tenants need to have a secure tenancy. All forms of secure council tenancies are subject to the Right to Buy, including new flexible tenancies, regardless of whether they are accounted for in the local authority's Housing Revenue Account or the General Fund.”*

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<sup>63</sup>

<http://www.theguardian.com/society/2015/jun/28/right-to-buy-islington-council-caledonian-road-speculators-sell-off>

<sup>64</sup> <https://www.gov.uk/government/speeches/housing-update-march-2015>

Lambeth's financial model is very much predicated on the removal of the RTB and therefore if it is prevented from doing so by government, there is a significant risk that Homes for Lambeth would be unable to provide very many council rent homes, if any at all, on the redeveloped Cressingham Gardens. This is presumably why some councils, having taken stock of the risks, are not using SPVs to provide social rented homes.

### 9.3.3 SPVs not to be used to avoid HRA cap to provide affordable housing

In addition, the Government has stated that council provided social or affordable rented housing should be accounted for within the HRA – see housing minister Brandon Lewis' statement to the House of Commons:<sup>65</sup>

*“The government is aware that some authorities may be using their general power of competence under the Localism Act 2011 to develop new social or affordable housing and accounting for that stock in its General Fund. Accounting for stock in this way is not in line with government policy and if councils continue to develop social or affordable stock which they fail to account for within the Housing Revenue Account the Secretary of State will consider issuing a direction under section 74 of the Local Government and Housing Act 1989 to bring that stock into the Housing Revenue Account.”*

Several local authorities around the UK have considered exercising the general power under s1 Localism Act 2011 to set up SPVs for the purpose of delivering social housing. Many have been advised by international law firm, Trowers & Hamblins, who have cautioned in their general advice to the GLA issued in June 2014:

*“...there is a general requirement that if the exercise of the Section 1 power is for a "commercial purpose" then a council must use a company to do so; the SPV would fulfil this requirement. Shared ownership or affordable rented properties provided to people who could not otherwise afford to rent a property on the open market and where the provision of accommodation is meeting a specific need probably would not be classified as a commercial purpose but the letting of housing at market rents is likely to be deemed to be so. ...it is likely that a council wishing to provide "social rent" level housing through an SPV will find it more difficult to justify the reasonable use of Section 1 of the 2011 Act.”*

Of the local authorities whose proposals we have examined so far, none have opted to use a SPV for the primary purpose of delivering social housing. And, where councils have used a SPV to deliver small numbers of social housing units out of SPV headroom, they have not demolished existing homes or stripped tenants of their statutory rights under Housing Act 1985 to do so.

Lambeth Council's own document in support of the use of a SPV cited several examples of successful implementation. In fact, on closer inspection, they are very misleading:

PROJECT	COMMENTS
LB Ealing – Broadway Living	Not SPV. No loss of council tenant rights
UAC Thurrock Gloriana	Former school. Affordable rent & market sale. No social housing. No loss of council tenant rights
LB Lewisham	Catford Shopping Centre & Mercator Road, Lee. Commercial units only – not for provision of housing. 6 new homes on vacant site in JV with Lewisham Homes. Cabinet Minister for Housing, Susan Wise “considered special

<sup>65</sup> <https://www.gov.uk/government/speeches/housing-update-march-2015>

	purpose vehicle financing but it “wasn't right for us” (Inside Housing 23/5/13)
Enfield Innovations	Small sites – none inhabited by secure council tenants. 57 x market rent, 17 x shared ownership, 20 x social rent. No loss of council tenant rights
LB Wandsworth	Winstanley & York Road. Some demolition & some refurbishment. No loss of council tenant rights. Not being delivered through a SPV.
LB Southwark	Empty sites & non-residential property. Social rent & market rent. No loss of council tenant rights.
LB Barking & Dagenham	Empty site. No displacement or loss of council tenant rights. Very limited provision of social housing.
Kensington & Chelsea	Various sites. Some empty. No loss of council tenant rights.
Greater Manchester Pension Fund	Involves only leveraging value of housing stock. No displacement & no loss of council tenant rights.

Following advice from Trowers & Hamblins on the merits of setting up what it terms a “local housing delivery organisation”, Hinckley & Bosworth Borough Council has unequivocally stated:<sup>66</sup>

*“It is important to emphasise that the LDHO will not and cannot deliver social housing”*

It is up to each democratically elected council, in consultation with their tenants, to decide how best to manage their housing stock, but within the constraints of their Housing Revenue Account Business Plan and giving due attention to the Government’s changing approach to council housing as set out in the Housing and Planning Bill and the Welfare Reform and Work Bill.

Given all of these risks to both the security of residents and the Lambeth's finances, then it would be foolish of Lambeth to ignore TPP, which demonstrably fulfills the council's stated aims, along with those of the community and others. It is deliverable at a fraction of the cost and is relatively low risk.

## **9.4 Leading heritage organisation support**

Britain's leading architectural heritage organisations have written to Lambeth Council urging them to retain and repair the Cressingham Gardens Estate. Their formal support letters and documents can be found at the following website: <http://cressingham-support.weebly.com>. And the text of “Save Britain’s Heritage” report can be found in the appendix to this document. To summarise:

### **9.4.1. The Twentieth Century Society**

The 20th Century Society is an influential organisation that exists to safeguard the heritage of architecture and design in Britain from 1914 onwards. The 20th Century Society submitted a full application for submission to English Heritage that the Cressingham Gardens Estate be listed because of its historic architectural significance.

<sup>66</sup>

<http://modern.gov.hinckley-bosworth.gov.uk/documents/s5140/Local%20Housing%20Company%20v4EH.pdf>  
<http://modern.gov.hinckley-bosworth.gov.uk/documents/s5140/Local%20Housing%20Company%20v4EH.pdf>



*“This estate is not just a strong candidate for listing – it’s a fantastic place to live”, said Henrietta Billings, Senior Conservation adviser, Twentieth Century Society. “The 1960s design – which is largely unaltered since it was built – responds to the landscape in a superbly subtle and sensitive way, and it gives residents a public realm that really works. The estate needs refurbishment and maintenance, not wholesale redevelopment”*

#### **9.4.2. SAVE Britain's Heritage**

SAVE is an independent organisation focussed on conservation and speaking out for the historic environment. SAVE wrote a report and strong letter of objection to proposals to demolish Cressingham Gardens describing CGE as *“... a remarkable example of a model village layout designed with great imagination and care to provide attractive community living”*. They set out the following objections and stated they would call for a public enquiry on the following grounds:

- Historical importance of Cressingham Gardens.
- The national significance its model layout.
- The strong opposition locally and amongst national bodies.
- The council has failed to apply government policy.
- Failure to designate a conservation area as supported by English Heritage (Now historic England).
- Important considerations in relation to Brockwell park.
- Proposed density levels.
- Appalling distress to many residents and likelihood it will be strongly contested involving enormous amounts of time, energy and money.

#### **9.4.3. English Heritage (now Historic England)**

A government service championing England's heritage and giving expert, constructive advice. Strongly suggested that CGE be included in the Brockwell Park conservation area.

#### **9.4.4. Brockwell Park Community Partners**

Bringing together park users, groups and stakeholders since 1995. Have expressed concern over the protection of the western border of Brockwell Park, which is a Grade 2 listed park and has become part of the park's skyline:

*“Buildings should not be above the tree line and that the open nature of the approach from Tulse Hill should also be protected”<sup>67</sup>*

#### **9.4.5. Other local organisations**

The Herne Hill Society, Friends Of Brockwell Park, and the Brixton Society have all formally or informally expressed concerns with regard to densification causing issues with the landscape.

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67

<https://brockwellparkcommunitypartners.org.uk/2015/06/25/cressingham-gardens-estate-vista-must-be-preserved/>

## **10. Appendix**

***A. Images from TPP Jan - Mar 2016 survey***

***B. Social Life Wellbeing Report***

***C. SAVE Britain's Heritage - Letter to the Council***

***D. English Heritage report***

***E. Original Design Brochure (1960s) by Lambeth***

***F. Sturgis Report: Renewable Technologies***

***G. Sturgis Report: Green Retrofit***

***H. Judicial Review Ruling***

***I. Tall Survey: Summary***

***J. Trowers & Hamlins Report to GLA June 2014***

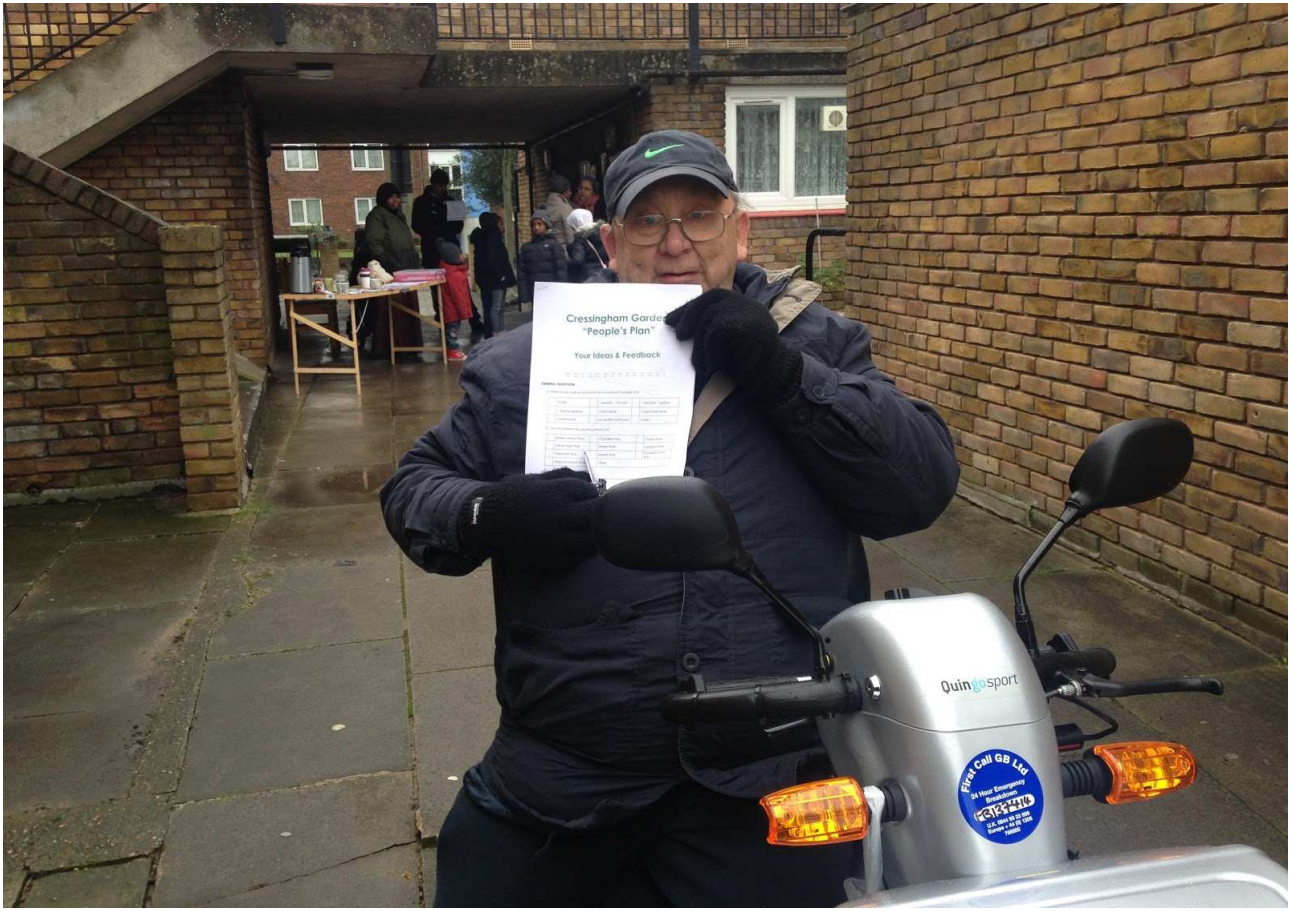
***K. Academic research: Voight, Shinn & Nation (2012)***

***L. HRA Debt Analysis***

***M. Re-Created Option 5 Financial Model***

***N. TPP Financial Viability Analysis***

## **A. Images from TPP Jan - Mar 2016 survey**



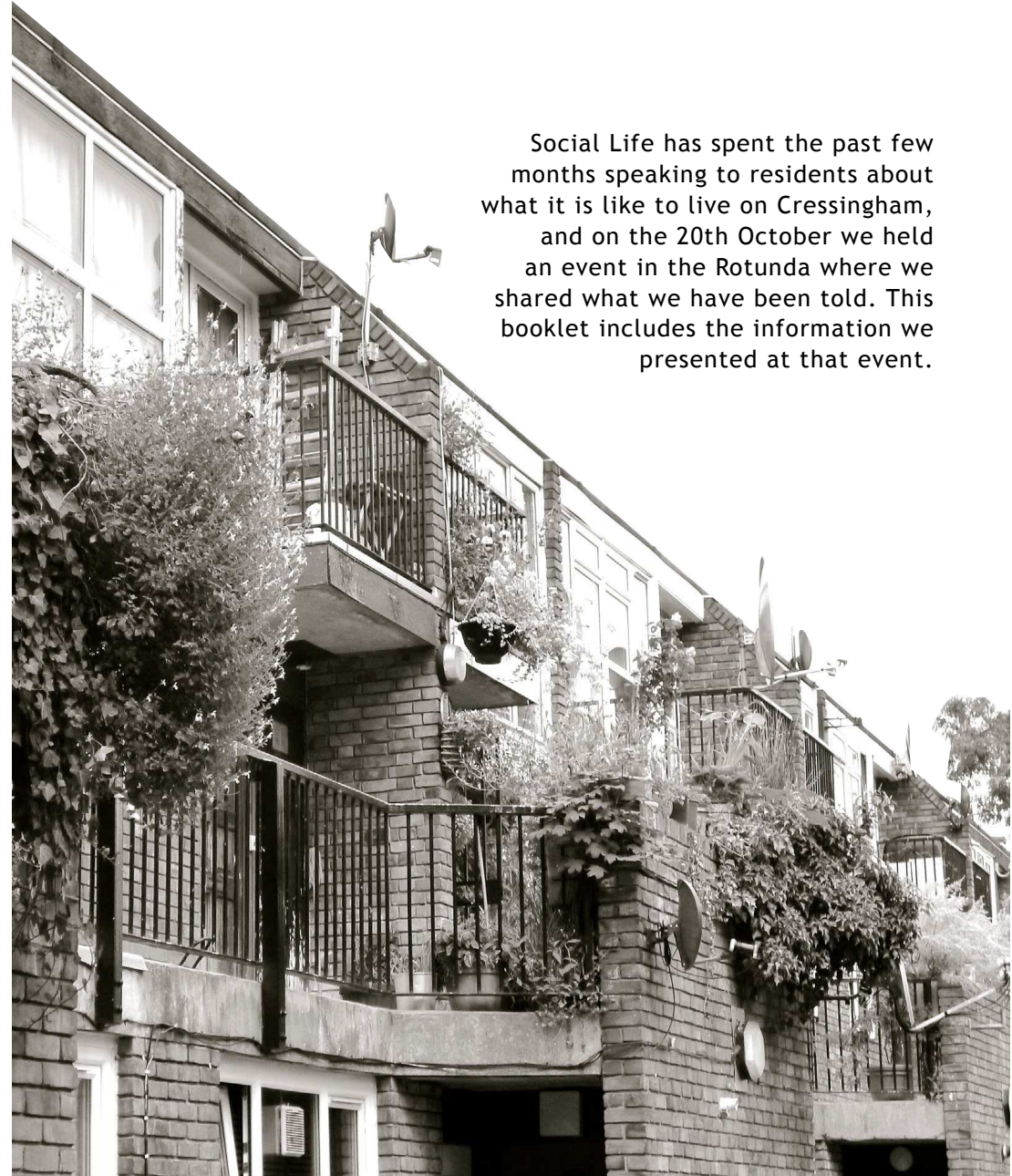


## **B. Social Life Wellbeing Report & Booklet**

# Living on Cressingham

This booklet reports on conversations with over 100 residents on Cressingham Gardens estate.

Social Life has spent the past few months speaking to residents about what it is like to live on Cressingham, and on the 20th October we held an event in the Rotunda where we shared what we have been told. This booklet includes the information we presented at that event.



# Cressingham Gardens Estate

## Cressingham's history

Cressingham Gardens was built between 1967 and 1978 by Lambeth council. It is a low rise, low density estate, originally designed by Edward Hollamby, Lambeth's borough architect. The estate was built to 'Parker Morris standards' which means homes are spacious and light inside.

It was built around the many trees on the site, its design blends well into Brockwell Park and separates it from Tulse Hill. The estate is designed in blocks, with houses and flats opening into shared areas. There are many large green areas, gardens and balconies.

The names of the estate and blocks reflect the history of Tulse Hill. "Mercy Cressingham, spinster" owned the land when it was used for farming, from 1806 onwards. "Bodley", "Upgroves" and "Scarlettes" were all names of former Manors in Tulse Hill. The architect was strongly influenced by William Morris and the social ideals of the Arts and Crafts movement, which is reflected in the careful design of the estate.



Sue's daughter on Hardel Walk in the 1980s, Sue in 2013.

*"The house is not just a house, it's a home"* Scarlett Manor resident



Bodley Manor Way.



Scarlette Manor resident in his living room; a typical back garden; a typical stairwell on Hardel Walk; Longford Walk resident in front of her house.





# Living on Cressingham

## Homes

Many people are happy with their homes on Cressingham and appreciate the light, spacious design.

On most blocks there are residents who are living in overcrowded conditions. Some would like to move to a home with more bedrooms, others are reluctant to move because they would like to stay on the estate, and are willing to put up with being overcrowded to stay on Cressingham.

The majority of people have had problems with their houses. But many said that the benefits of the estate outweigh any problems.

*"How much nicer can you get, at the end of a long day working, to go and sit out there"*  
Scarlette Manor resident on their garden

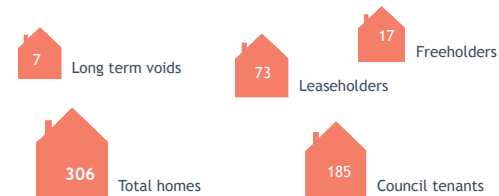
One resident expressed that his living standards are holding him back and making him unhappy.

Some people told us that the flats are expensive to heat, that they can be too hot in Summer and cold in winter.

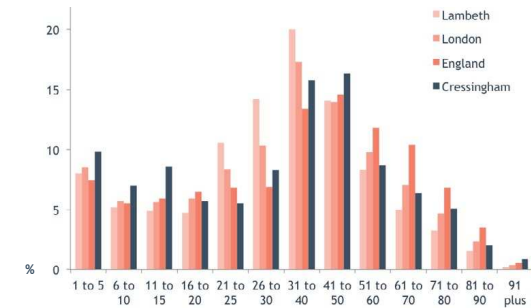
*"If I'm going to give up my great living room, my garden and park over the road, I want something as good."*  
Longford Walk resident

## Who lives on Cressingham?

The estate was originally built as council housing but now is home to a mixture of council tenants, leaseholders, freeholders and private tenants. There are 306 homes on the estate, 209 of these are home to council tenants, there are 73 leaseholders and 17 freeholders. Some of the leasehold and freeholders now rent out their homes.



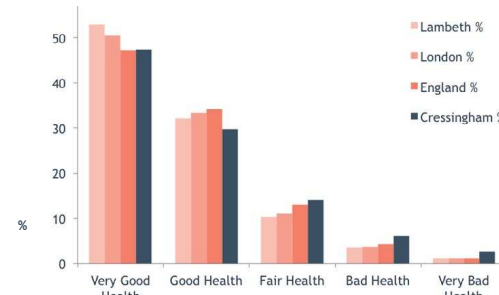
## Age



Comparing Cressingham's population to the Lambeth average, there are more children and young people under 20 living on the estate, more people over 40, and fewer people in their 20s and 30s. More people on Cressingham are unemployed or long term sick than the Lambeth average, fewer people work full time. People living on Cressingham are more likely to consider they are in poor health than people across Lambeth.

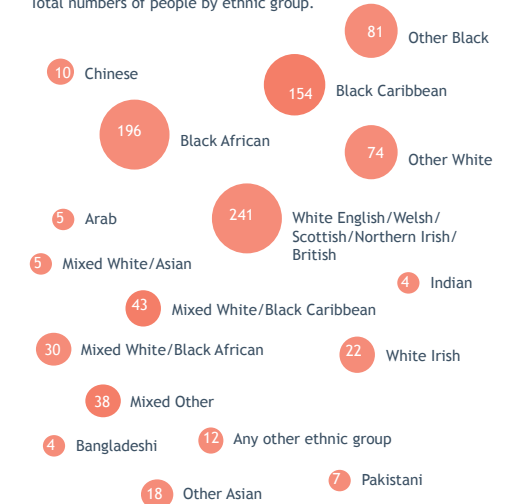
The three biggest ethnic groups that residents consider they belong to are White British, Black African and Black Caribbean. The majority of people living on the estate were born in the UK. Slightly more people are overcrowded than the Lambeth average. A quarter of council tenants on the estate have made an application to the council to transfer to a new property. This is slightly lower than the average for the borough.

## Health



## Ethnic origin

Total numbers of people by ethnic group.



All these statistics come from the Office of National Statistics and are for 2011. They cover the Cressingham Gardens estate and a small area on the other side of Tulse Hill.



Image: Longford Walk; Bubbles: What residents liked and didn't like the most about their homes, by number of responses.

# Social Life's work

## Why is Social Life here?

Social Life has been appointed by Lambeth Council to work with the residents of Cressingham Gardens to consider the different options for the future of the estate.

Social Life will work with tenants and residents to develop a set of proposals. We will give everyone living on the estate a voice in shaping what happens in the future. Our starting point has been the discussions between residents and the council that began in 2012.

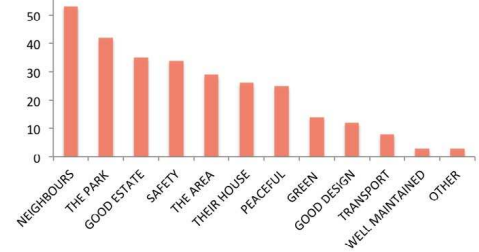
### Developing options for the estate with residents

Social Life will be running a taskforce - a series of four meetings - from December 2013 to February 2014. Our aim is to bring together a group of residents that reflect the different blocks, housing types and backgrounds of the people living on the estate.

The taskforce will be run as a series of "deliberative workshops". This is a way of bringing a group of people together to explore an issue in-depth, to look at new information, and to come to a shared view. We believe that everyone makes better decisions when they are given an opportunity to talk through the issues and when they are given good information and support from experts.

We aim to develop options for the future of the estate. We need residents to volunteer to take part in this taskforce. We want people to commit to as many meetings as possible, but we know you all have busy lives. We will make sure that what is coming out of the taskforce meetings is made available to all residents through estate notice boards, through a website that Lambeth is setting up.

Social Life is a social enterprise set up by the Young Foundation in 2012.



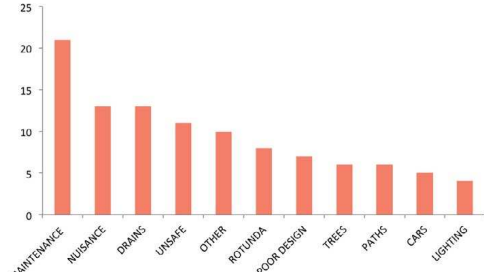
What Cressingham residents said they like about living here, by number of responses (from 118 interviews).

### Talking to residents

The Social Life team have spoken to 109 households on Cressingham Gardens, with two to four Social Life staff visiting the estate to speak to residents on 22 occasions in total.

Most of these visits have been with the Social Life trolley. On some visits we spoke to residents in their homes or on their doorsteps, often following up initial contacts that we had made through our trolley visits.

These conversations have helped us understand residents' perceptions of the estate, the council, what they know of plans for future change, and how they would want to be involved in this. We have also looked at the statistics about comparable areas, using data that Social Life has developed.



What Cressingham residents said they would change about the estate, by numbers of responses (from 118 interviews).



Social Life's work from July to October 2013.

## The Rotunda

### The Rotunda

The Rotunda is valued by many for its special architectural history. In the last year the TRA have put a lot of work into renovating the building and would like to make it a resource for the whole community. The management of the Rotunda is voluntary and carried out by residents. Different residents have been involved in trying to run activities in the past but it has been hard for them to maintain that commitment.

Some activities that people would like to see are English lessons, dance classes, fitness activities, activities for young people like roller blading and table tennis, and play schemes in the school holidays.

A small number of people, most of them elderly, spoke of how they believe that the Rotunda used to serve the community

"I would like to see it fixed up, have a team to run it, generate some income that could contribute to repairs"  
Bodley Manor resident

"If we could have an exercise club down there that would be brilliant"  
Hardel Walk resident

"We should learn to knit, make cushions, put on a play"  
Uproove Manor resident

better. These people described how there used to be more activities for residents, like the Over 55s Tea Afternoon which was an opportunity for older residents to get together, have some refreshments and talk. Many of the residents who used to go to this said they would love to see activities like this happen again.



Image: The Rotunda; Bubbles: Some of the suggested activities that residents said they would like to see in the Rotunda.

# Living on Cressingham

## The sense of community

What residents said that they most liked about the estate was the strong community feel. Forty-seven residents talked to us about their good relationships with their neighbours.

### Block unity

The ten blocks of Cressingham Gardens are designed so that each one has a small pedestrian street or walkway that binds the two rows of houses facing each other. Each block has its own distinct identity, some are higher and face onto the street, others are bungalows next to the park. Each block also has its own smaller community, with neighbours, especially longer standing residents, often knowing every single person living on their block. Hardele Walk, the largest block, tends to have clusters of neighbours with each raised level. People spoke about how the layout of the blocks means that you constantly bump into your neighbours, seeing each other coming and going.

There is a high level of trust on the estate and a lot of residents will leave their front doors open or hang out in their block walkway so that they can keep an eye on their children or chat with their neighbours. Some blocks have communal gardens.

*"It's definitely friendly"* Roper's Walk resident

One Hardele resident told us that 45 different nationalities live in her block, including people from Jamaica, Ireland, Portugal, England, Nigeria ... she enjoys going to the different celebrations and sharing food from different countries.

### Mutual support

According to some residents, there is a lot of inter-generational support on Cressingham. Many older people have said neighbours kids will help them with their shopping. Younger people told us that their parents send them out to help with shopping or shovel snow in the winter. And this support is also reciprocated; older people look after kids if a parent needs to pop out, or watch out for them playing out front. One woman said the local kids

*"It creates a community through all the ages"* Bodley Manor resident

call her "Nanny" and another looks after her neighbour's baby.

There are a lot of people on the estate in ill-health and many that are living alone. For them it is important to know that their neighbours will check in on them to make sure they're ok.

*"It's a really lovely community"* Scarlett Manor resident

Several people told us they know their neighbours will come and help if they are unwell and this gives them peace of mind. One resident from Bodley Manor pointed out how important neighbourliness is for people's mental health, saying it happens here "in a very natural way".

Many residents leave a spare set of door keys with their neighbours. They look after neighbours' plants or pets while they are away, and notice if they haven't seen someone for a while.

## The Tenants and Residents Association

There is an active Tenants and Residents Association (TRA) that came together a year ago. The TRA meets fortnightly and has organised planting, improvements to the estate, the Open House in September, and an estate action day where over 70 repairs were carried out and many trees removed.

The TRA has surveyed the estate to find out whether residents want to stay on the estate, what repairs they need done, and what they think about possible regeneration plans. The TRA describes its aim as: "to represent residents, ensuring that an option to repair the estate remains a firm option."

The TRA is endeavouring to ensure transparency from Lambeth Council, by scrutinising their claims relating to the proposed regeneration. If the research shows that repairs are the best option, the TRA would campaign for that."

Some residents not actively involved in the TRA feel that the TRA doesn't understand the experience of everyone living on the estate, and there is a perception amongst some that it "isn't for them". The TRA would like more people to be involved and to run wider activities but feel all their time has had to be focused on the future changes.

## What we've found

The current **design** of the estate appears to support local social life and resident wellbeing, **residents value the good relations** between neighbours, the **easy access to the park** and the **bus stops**.

Cressingham is largely a peaceful estate where neighbours have **good social relationships**.

Social networks are mainly within blocks. Residents describe the estate as being "**safe**" and "**peaceful**".

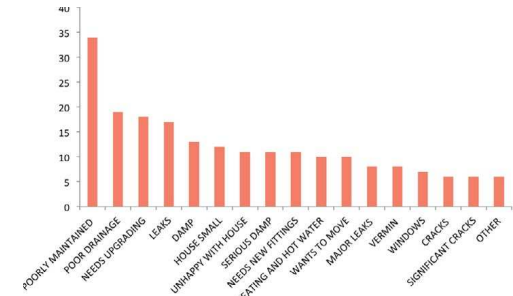
Cressingham is seen as a **safe place**, and (apart from isolated incidents) this perception is reflected in crime statistics. Some longer standing residents have said that the **estate has improved a lot, it used to feel more unsafe in the past**.

There are problems with **disrepair** in some individual properties, and in the common areas in some blocks. **Residents of certain blocks experience shared problems**, possibly caused by wider structural problems of the estate and by faults in the design (to be confirmed by the survey which will report at the end of October)

Common problems include **leaks, blocked drains and damp**

Some residents - social and private tenants, freeholders and leaseholders - would be **happy to leave the estate, either to get a home that suits their needs better**, or for personal reasons. Some people living with disrepair and structural problems would be happy to move to a better home without problems. Some people would like a **better or larger home** on the estate.

Some **vulnerable residents** are living in homes with **severe disrepair**. There is a feeling that getting repairs done takes a long time and is often ineffective.



What Cressingham residents said about the problems with their homes, by numbers of responses (from 118 interviews).

People have a **high degree of attachment to their estate**, for some this is because of the design and architecture; others have less attachment to the buildings but wish to retain their good relationships with their neighbours and the peacefulness of the estate.

The vast majority of residents would **prefer to stay** on the estate.

Compared to similar areas, Cressingham has **lower crime** than we would expect. Cressingham residents' sense of belonging and their **feelings of safety are higher than in similar areas**. They also have better relationships with their neighbours.

Many residents are **confused by the process** to date, and believe that there is already a plan to demolish the estate. There is a group who are unwilling to take part in consultation because of **time delays** and because they feel they have made their feelings known in the past. Some residents are **actively campaigning** against substantive change for the estate; another group who used to participate in the TRA feel **alienated from current TRA activities**.

# Living on Cressingham

*"When we came here we thought 'my god! It's wonderful!'"* Hardel Walk resident

*"It was like a fairytale, so beautiful!"* Hardel Walk resident

## The estate's character

"Peaceful" and "quiet" were commonly used to describe why people liked living on the estate. There are many things that give the estate this special quality, some people say it's because of its village-like feel and others say it's because it's next to the park.

Many people fear that if there are more people living on the estate, its unique character will change.

One resident from Scarlette Manor said he likes the layout because it's set back from the main road and there's the park, so it's ideal for kids to play. Hearing kids running around makes the estate feel safe and lively. He wants his kids to play here as they grow up.

*"It's a beautiful place to live in"*  
Uprove Manor resident

Many of the residents that moved onto the estate in the 1970s are still living here. Families have gone through a whole cycle of expanding and then shrinking. There are some families with three generations living on the estate. However many of the original residents have left or passed away. People miss their old friends.

The original residents have mixed views about how the estate has changed. Some people feel that when they moved in it was a wonderful estate and now it has been left to decline. Others remember crack dens and squats and say the estate feels much better now.

According to many of residents we spoke to, there is a perception that the estate as a whole has been very poorly maintained over the years.

*"They've let it go to rack and ruin"*  
Longford resident



Hambridge Way.

## Safety

Although some residents feel unsafe, for the majority, Cressingham is a safe place where they are not afraid of crime.

Crime statistics for Tulse Hill show that the estate has lower crime than other estates in the area. Local agencies told us the same thing.

Residents described there being a lot of 'natural surveillance' on the estate with residents always keeping an eye out for each other. For example, they will watch each other's children when they're playing outside and alert one another if there are unfamiliar people hanging around.

*"I leave the door open and let the kids play outside. You don't get that often in London"*  
Longford Walk resident

Some people talked about how the layout and design of the estate contributes to the sense of safety: the kitchens face onto the block walkways, and cars cannot get onto the estate.

Some people liked the fact that Cressingham doesn't have some of the characteristics of other nearby estates like dark stairwells. The car parks on Cressingham used to attract anti-social behaviour but this seems to have stopped.

Some residents have had people breaking into their homes through their back gardens and there are houses with barbed wire attached to their garden walls. Two residents spoke to us about difficult incidents in the past, and how these brought neighbours together.

One resident living in the north part of Crosby Walk says that the empty homes, which she called the "concrete jungle", make her feel very unsafe. Another resident living in this end of the estate says he is used to the empty homes now, people look out for each other, but he won't go to the rest of the estate because there you have "to watch your back".



Hardel Walk.



Some residents said the area between the back gardens of Hardel Walk and the fronts of Hambridge Way feels unsafe.

# Living on Cressingham

## Estate maintenance

Residents get on very well with the estate cleaners from Pinnacle; many mentioned how the public spaces are well kept. Others told us that they have to do the maintenance of the communal spaces themselves.

Some residents have set up a gardening club to maintain the communal spaces and are taking real pride how Cressingham looks. There is a feeling that some residents could maintain the spaces outside their homes better. People complained about rubbish being dumped.

People feel fed up of asking the Council and Lambeth Living for things to be done, and a lot of people told us they are doing repairs themselves. Some worry about the amount of money they have spent on them.

*“The estate is managed by people who don’t have the skills to manage an estate, they don’t understand buildings, trees and plants”* Hardel Walk resident



Vacant properties on Crosby Walk.

## The wider area

One of the unique qualities of the estate is its proximity to Brockwell Park. Almost all residents told us they liked living here because of it.

The common green spaces on the estate, including the mounds, are used less because people go to the park. People with small children often let their kids play out on the estate. The green spaces are well used for gardening.

Residents liked the location of the estate. There is access to many buses that can take you to Brixton, Tulse Hill and Streatham for example. Many people feel that this community is part of the wider Brixton community. However some expressed concerns that the face of Brixton is changing and there’s a fear that these changes, particularly in terms of the population, will spread to Cressingham.

*“The park is such a bonus, moving would be a massive change”* Crosby Walk resident



Image: Resident-led planting across the estate’s public spaces; Bubbles: What residents liked and didn’t like most about the estate, by number of responses.



Bodley Manor home next to Brockwell Park.



Informal shortcuts to the park used by younger residents.

# Block headlines

Here is the breakdown of the comments residents have made, by block; what they liked about the estate; what they would change about the estate; and if they had any problems with their home.

**● Hardel Walk**

**We carried out 29 interviews with 27 households. We asked what they liked about the estate:**  
 15 said their neighbours  
 12 said they feel safe  
 11 said being close to the park  
 8 said it is a good estate  
 8 said it was peaceful  
 7 said their house  
 6 said they liked the wider area  
 6 said good transport links  
 5 said good design  
 5 said the greenness  
 1 said the estate is well maintained  
 1 said that local schools are good.

**We asked what they would change about the estate:**  
 8 said poor maintenance  
 6 said problems with their neighbours  
 6 said the poor design of their homes and the layout of the estate  
 4 said the drains and gutters  
 3 said they want the Rotunda to be used more  
 2 said it feels unsafe  
 2 said the estate needs more lighting  
 1 said problems caused by trees  
 1 said the paths  
 1 said problems with cars, parking and car parks  
 1 said that residents should make more effort to look after the estate  
 1 said that there is no playground for older children  
 1 wants a summer school or activities for young  
 1 wants the Rotunda to be repaired  
 1 wanted to see fewer "trophy dogs" on the estate  
 1 wanted to see something done about drug dealing.

**We asked if they had any problems with their home:**  
 7 said their home was poorly maintained  
 5 said their houses generally needed upgrading or refurbishing  
 4 said they had leaks  
 4 said poor drainage inside their house  
 3 said they want to move to another house  
 2 said they were unhappy with their house  
 2 said they had damp  
 2 said their house was too small  
 2 said the cost of heating and hot water  
 2 said they had problems with their windows  
 1 said they had major leaks  
 1 said they had cracks in their house  
 1 said that slugs fall in through the roof  
 1 person said their home was too hot in summer, too cold in winter.

**● Ropers Walk**

**We had 4 interviews with 4 households. We asked what they liked about the estate:**  
 2 said it is a good estate  
 1 said their neighbours  
 1 said good design  
 1 said the greenness  
 1 said their house.  
**We asked what they would change about the estate:**  
 1 said poor maintenance  
 1 said problems with cars, parking and car parks.

**No one reported any problems with their home.**

**● Ugrove Manor Way**

**We carried out 14 interviews with 11 households. We asked what they liked about the estate:**  
 5 said their neighbours  
 5 said their house  
 4 said it is a good estate  
 4 said it was peaceful  
 4 said being close to the park  
 3 said they liked the wider area  
 1 said the greenness  
 1 said they feel safe  
 1 said the estate is well maintained

**We asked what they would change about the estate:**  
 4 said problems with their neighbours  
 4 said the drains and gutters  
 3 said poor maintenance  
 3 said problems with cars, parking and car parks  
 1 said it feels unsafe  
 1 said problems caused by trees  
 1 said the estate needs more lighting  
 1 said the paths.

**We asked if they had any problems with their home:**  
 7 said their home was poorly maintained  
 4 said they had major leaks  
 3 said their houses generally needed upgrading or refurbishing  
 3 said poor drainage inside their house  
 3 said they needed new bathrooms and kitchens  
 3 said they had problems with vermin  
 2 said they were unhappy with their house, feeling they had too many problems and were tired of trying to get things fixed  
 2 said they had significant cracks in their house  
 2 said the cost of heating and hot water  
 2 said they need a new oven  
 1 said they had serious damp  
 1 said they had leaks  
 1 said their house was too small  
 1 said they want to move to another house.

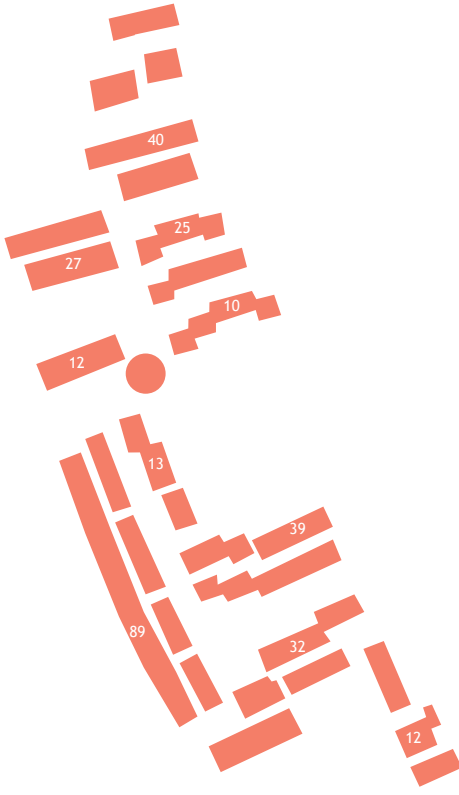


Image: Cressingham's blocks with the number of homes in each.

**● Longford Walk**

**We carried out interviews with 9 households. We asked what they liked about the estate:**  
 8 said their neighbours  
 5 said they feel safe  
 4 said it was peaceful  
 4 said they had major leaks  
 3 said they liked the wider area  
 3 said being close to the park  
 2 said good design  
 1 said their house  
 1 said the estate is well maintained  
 1 said good transport links.

**We asked what they would change about the estate:**  
 1 said poor maintenance  
 1 said problems with their neighbours  
 1 said they want the Rotunda to be used more  
 1 said the drains and gutters  
 1 wanted service charges for leaseholders to be lower.

**We asked if they had any problems with their home:**  
 5 said poor drainage inside their house  
 3 said they had leaks  
 3 said their home was poorly maintained  
 2 said they had problems with vermin  
 1 said their house generally needed upgrading or refurbishing  
 1 said they had damp  
 1 said they had serious damp  
 1 said they had major leaks  
 1 said they had cracks in their house  
 1 said their house was too small  
 1 said the cost of heating and hot water  
 1 said they had problems with their windows  
 1 said they want to move to another house.

**● Bodley Manor Way**

**We carried out 14 interviews with 11 households. We asked what they liked about the estate:**  
 7 said their neighbours  
 4 said it is a good estate  
 4 said they feel safe  
 2 said being close to the park  
 2 said good design  
 1 said it was peaceful  
 1 said they liked the wider area  
 1 said the greenness  
 1 said their house  
 1 said they liked the parking.

**We asked what they would change about the estate:**  
 2 said poor maintenance  
 2 said they want the Rotunda to be used more  
 1 said it feels unsafe  
 1 said the paths  
 1 said the drains and gutters.

**We asked if they had any problems with their home:**  
 4 said their home was poorly maintained  
 3 said they had serious damp  
 2 said they were unhappy with their house  
 2 said they had leaks  
 2 said they had problems with their windows  
 1 said they had cracks in their house  
 1 said the zinc roof is too hot.

**● Scarlett Manor Walk**

**We carried out interviews with 7 households. We asked what they liked about the estate:**  
 5 said their neighbours  
 5 said they feel safe  
 3 said it is a good estate  
 3 said being close to the park  
 2 said it was peaceful  
 2 said they liked the wider area  
 2 said the greenness  
 1 said their house  
 1 likes the TRA and what they do for the community.

**We asked what they would change about the estate:**  
 3 said poor maintenance  
 3 said problems caused by trees  
 1 said the paths  
 1 said they want the Rotunda to be used

**We asked if they had any problems with their home:**  
 4 said they had damp  
 3 said their houses generally needed upgrading or refurbishing  
 2 said their home was poorly maintained  
 2 said the cost of heating and hot water  
 1 said they were unhappy with their house, feeling they had too many problems and were tired of trying to get things fixed  
 1 said they had serious damp  
 1 said they had leaks  
 1 said their house was too small  
 1 said poor drainage inside their house  
 1 said they needed new bathrooms and kitchens.

**● Hambridge Way**

**We carried out interviews with 8 households. We asked what they liked about the estate:**  
 5 said their neighbours  
 3 said being close to the park  
 3 said the greenness  
 3 said it was peaceful  
 2 said their house  
 2 said they liked the wider area  
 1 said it is a good estate  
 1 said good design of their home and the layout of the estate  
 1 said they feel safe  
 1 said good transport links.

**We asked what they would change about the estate:**  
 2 said it feels unsafe  
 2 said the drains and gutters  
 1 said the paths  
 1 said problems with their neighbours  
 1 said they want the Rotunda to be used more.

**We asked if they had any problems with their home:**  
 3 said their home was poorly maintained  
 3 said they want to move to another house  
 2 said they were unhappy with their house  
 2 said they had significant cracks in their house  
 2 said poor drainage inside their house  
 2 said their house was too small  
 2 said they needed new bathrooms and kitchens  
 1 said their houses generally needed upgrading or refurbishing  
 1 said they had damp  
 1 said they had serious damp  
 1 said they had leaks  
 1 said they had cracks in their house  
 1 said they had problems with their windows.

**● Chandler's Way**

**We carried 4 interviews with 4 households. We asked what they liked about the estate:**  
 2 said they liked the wider area  
 2 said their house  
 2 said being close to the park  
 1 said their neighbours  
 1 said it is a good estate  
 1 said good design of their home and the estate  
 1 said it was peaceful.

**We asked what they would change about the estate:**  
 1 said the paths  
 1 said problems caused by trees  
 1 wants the council to create a register of vulnerable on the estate.

**We asked if they had any problems with their home:**  
 1 said poor drainage inside their house  
 1 said the cost of heating and hot water.

**● Papworth Way**

**We carried out interviews with 4 households. We asked what they liked about the estate:**  
 3 said it is a good estate  
 2 said they liked the wider area  
 2 said being close to the park.

**We asked what they would change about the estate:**  
 1 said it feels unsafe.

**We asked if they had any problems with their home:**  
 2 said their home was poorly maintained  
 2 said they needed new bathrooms and kitchens  
 1 said their house generally needed upgrading or refurbishing  
 1 said they had damp  
 1 said they had serious damp  
 1 said they had leaks.

**● Crosby Walk**

**We carried out 22 interviews with 20 households. We asked what they liked about the estate:**  
 12 said being close to the park  
 8 said they liked the wider area  
 6 said their neighbours  
 6 said it is a good estate  
 6 said they feel safe  
 6 said their house  
 2 said it was peaceful  
 1 said the greenness  
 1 said they liked the Rotunda.

**We asked what they would change about the estate:**  
 4 said it feels unsafe  
 3 said poor maintenance  
 1 said the estate needs more lighting  
 1 said problems with their neighbours  
 1 said the poor design of their homes and the layout of the estate  
 1 said the drains and gutters  
 1 would change the green bins.

**We asked if they had any problems with their home:**  
 6 said their home was poorly maintained  
 5 said their house was too small  
 4 said their houses generally needed upgrading or refurbishing  
 4 said they had damp  
 4 said they had leaks  
 3 said poor drainage inside their house  
 3 said they needed new bathrooms and kitchens  
 2 said they had major leaks  
 2 said they had cracks in their house  
 2 said they had significant cracks in their house  
 2 said they were unhappy with their house, feeling they had too many problems and were tired of trying to get things fixed  
 2 said the cost of heating and hot water  
 2 said they want to move to another house  
 2 said they had problems with vermin  
 1 said they had problems with their windows  
 1 said they have a problem with asbestos.

# *Get involved!*

Email: [hello@social-life.co](mailto:hello@social-life.co)

Tel: 07975738097

## Taskforce meetings

Now we have a clearer picture of what it is like to live here, we are starting a series of taskforce meetings with residents, talk about the estate's future.

**We are looking for a committed group of residents to take part.**

We would like people to come to all of the meetings, so that they can follow the discussion, be informed, and help shape the options.

Come along to the kick off meeting on Tuesday 10 December to find out what it's all about.

**The meetings will be at the Rotunda, the dates are:**

**Tuesday 10 December, 7-8pm**

**Thursday 9 January, 7-9pm**

**Saturday 25 January, tbc**

**Tuesday 4 February, 7-9pm**

It would be wonderful if you could be one of the taskforce. If you are interested, **please get in touch.**





# Understanding wellbeing on Cressingham Gardens

29th January 2012

## Summary

This report was written by Social Life to feed into discussions of the Cressingham Gardens Wellbeing Working Group. This group came together from December 2014 to January 2015 to focus on how to understand and boost wellbeing on Cressingham Gardens estate. The residents had two key interests: to understand the nature and value of wellbeing on the estate; and to find out more about the numbers of vulnerable residents living on the estate, and their support needs.

The focus has been on *personal* or *subjective* wellbeing: wellbeing experienced by individuals, sometimes referred to as quality of life. Other definitions of wellbeing, including environmental and economic wellbeing are commonly used, however for this work the main interest was in the subjective experience of residents, how they feel about their everyday lives and how this is linked to their experience of living on Cressingham Gardens.

The group was supported by Social Life. Social Life was asked to explore relevant research about what influences wellbeing in local areas and the impact of regeneration schemes on wellbeing; to assemble data about social need and social sustainability on Cressingham Gardens; and to investigate how a value could be put on residents wellbeing at the present time, and through the potential regeneration process.

The key issues affecting residents' wellbeing on Cressingham gardens are:

- The positive impact of the strong levels of neighbourliness and belonging, as identified in Social Life's research in summer 2013
- The low levels of actual reported crime, and of fear of crime and anti-social behaviour
- The positive impact of the design of the estate, the light, well-designed homes that feel spacious and comfortable
- The proximity to Brockwell Park
- The green spaces on the estate and the number of community initiatives to enhance the common areas through planting and environmental works
- The mix of people from different backgrounds, ages, ethnicities and tenures



- The higher proportion of people who can be considered vulnerable, including people with disabilities and long-term conditions, and mental health issues
- The negative impact of the levels of stress and anxiety caused by the prolonged decision making process about the future of the estate
- The negative impact of the perceived lack of control over the decision making process, associated with the prolonged time scale and ambiguities
- The negative impact of damp and disrepair on those residents living in sub-standard properties
- The frustration caused by day-to-day problems of repairs to homes and shared spaces.

All these factors have been identified through a broad number of research reports as correlating with subjective wellbeing.

Social Life looked at different models to see how a value could be placed on these issues.

The “wellbeing value” model developed by the London School of Economics (LSE) and HACT (the Housing Associations Charitable Trust) has been used to quantify the value to residents in financial terms of the high levels of neighbourliness and belonging, and lower fear of crime<sup>1</sup>. This wellbeing value is the amount of extra money that residents would need to earn to feel a comparable level of wellbeing. This is not actual money, it is a proxy value developed by HACT to help recognise the value to different people of different social interventions.

Wellbeing values were estimated based on Social Life’s research in 2013<sup>2</sup>, and Social Life’s predictive data about community dynamics in local neighbourhoods. This is an experimental approach; it is the first time these two methods have been combined.

There were a limited number of issues that could be explored because of the scarce data about the actual experience and views of Cressingham residents.

- Using this model to value the outcomes, where appropriate evidence exists, revealed that: the total wellbeing value for Cressingham of neighbourliness is in the region of £332,200 each year. This is based on an assessment of how often people regularly stop and talk to neighbours and their ability to obtain advice from someone within the neighbourhood.
- The model can also be applied to an estimate of the numbers of people living with damp, and the value (which is a negative cost in this case) is in the region of minus £230,000 each year.
- There is also a significant contribution to resident wellbeing from low crime levels, and low fear of crime, possibly over £2.5m. The data available for this estimate is less reliable.

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<sup>1</sup> Community investment values from the Social Value Bank, 2014, HACT and Daniel Fujiwara [www.socialvaluebank.org](http://www.socialvaluebank.org)

<sup>2</sup> see exhibition boards from October 2013, [http://www.social-life.co/media/files/SMALL\\_FINAL\\_Exbtn\\_boards\\_updated.pdf](http://www.social-life.co/media/files/SMALL_FINAL_Exbtn_boards_updated.pdf)

The value to public services from low levels of crime was estimated using a model developed for the Cabinet Office by New Economy.

- It is estimated that the value to public services of the low levels of crime, compared to the rest of the Tulse Hill area is £23,300 each year.

It is not possible to model how these values would apply to different options of a reconfigured estate without more detail about the design, the impact on existing residents, both homeowners and council tenants, and the future population. A full survey would also need to be carried out of existing residents.

## What is known about wellbeing on Cressingham Gardens?

This section describes the findings of Social Life's earlier research on the estate, explores what is known about the estate's residents and levels of vulnerability on the estate, and describes what we would expect wellbeing levels to be on similar areas.

### 1.1 Research into the experience of residents of Cressingham Gardens

In the Summer of 2013, Social Life spoke to over 100 residents about their experience of living on Cressingham Gardens estate. The research was carried out through semi-structured interviews, and the results were coded to analyse key trends and issues. Social Life concluded that:

- The current design of the estate appears to support local social life and resident wellbeing; residents value the good relations between neighbours, the easy access to the park and the bus stops.
- Cressingham is largely a peaceful estate where neighbours have good social relationships. Social networks are mainly within blocks. Residents describe the estate as being "safe" and "peaceful".
- Cressingham is seen as a safe place, and (apart from isolated incidents) this perception is reflected in crime statistics. Some longer standing residents have said that the estate has improved a lot, it used to feel less safe in the past.
- There are problems with disrepair in some individual properties, and in the common areas in some blocks. Residents of certain blocks experience shared problems, possibly caused by wider structural problems of the estate and by faults in the design.
- Common problems include leaks, blocked drains and damp.
- Some residents - social and private tenants, freeholders and leaseholders - would be happy to leave the estate, either to get a home that suits their needs better, or for personal reasons. Some people living with disrepair and structural problems would be happy to move to a better home without problems. Some people would like a better or larger home on the estate.
- Some vulnerable residents are living in homes with severe disrepair. There is a feeling that getting repairs done takes a long time and is often ineffective.
- People have a high degree of attachment to their estate, for some this is because of the design and architecture; others have less attachment to the buildings but wish to retain their good relationships with their neighbours and the peacefulness of the estate.
- The vast majority of residents would prefer to stay on the estate.
- Compared to similar areas, Cressingham has lower crime than we would expect. Cressingham residents' sense of belonging and their feelings of safety are higher than in similar areas. They also have better relationships with their neighbours.

- Many residents are confused by the process to date, and believe that there is already a plan to demolish the estate.
- There is a group who are unwilling to take part in consultation because of time delays and because they feel they have made their feelings known in the past. Some residents are actively campaigning against substantive change for the estate; another group who used to participate in the TRA feel alienated from current TRA activities.

## 1.2 What do we know about Cressingham's residents

The estate was originally built as council housing but now is home to a mixture of council tenants, leaseholders, freeholders and private tenants.

We looked at data about unemployment, health, overcrowding and the age and ethnicity of people living on the estate. All this is from the Office for National Statistics, and was collected in the 2011 census. This is most up-to-date data available.

Comparing Cressingham's population to the Lambeth average, there are:

- More children and young people under 20 living on the estate, more people over 40 and fewer people in their 20s and 30s
- More people on Cressingham are unemployed and fewer people work full time
- People living on Cressingham are more likely to consider they are in poor health
- Slightly more people are overcrowded
- A quarter of council tenants have applied to the council to for a transfer, which is slightly lower than the Lambeth average.

### Using census data to make estimates about Cressingham

It is not possible to analyse census statistics by the exact geographic footprint of the estate. The best approximation is to combine three output areas<sup>3</sup> (small areas used for statistical analysis that have a population of approximately 300 households).

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<sup>3</sup> for more about output areas, see the ONS website <http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/output-area--oas-/index.html>

Figure 1: output areas used to construct statistical area



Source: [www.neighbourhood.statistics.gov.uk/dissemination/](http://www.neighbourhood.statistics.gov.uk/dissemination/)

This constructed area has a population of 401 households, and a resident population of 917 people.

There are 299 households on Cressingham Gardens, which is three quarters of the number of households in the constructed statistical area. Three quarters of the resident population of the statistical area is 688 people.

Census data for the constructed area indicates that it is home to 681 residents over 18. If the estate population is three quarters of the total population, then the estimated adult resident population of the estate is 511 people.

Our assumptions for this report are therefore that the resident population of Cressingham is 688 people, and that 511 of these are adults over 18.

### 1.3 Vulnerable residents living on the estate

Census figures show that, compared to the Lambeth average, Cressingham residents are more likely to have need of support from family, friends, neighbours or agencies. They are more likely to:

- have dependent children
- be lone parents
- be unemployed and with dependent children

- have a long term health condition or disability
- be in poor health.

**Table 1: vulnerability and support needs on Cressingham gardens, household data**

	London Borough Lambeth		Cressingham constructed area		Est. actual estate (75% of constructed area)	
	Number	%	Number	%	Number	%
All Households, March 2011	4,066		401		299	
Households with dependent children: All ages	1031	25.4	139	34.7	104	34.7
All Lone Parent Households with Dependent Children Where the Lone Parent is Aged 16 to 74	433	10.6	75	18.7	56	18.7
No Adults in Employment in Household; With Dependent Children	233	5.7	38	9.5	29	9.5
No Adults in Employment in Household; No Dependent Children	695	17.1	109	27.2	82	27.2
Dependent Children in Household; All Ages	1,031	25.4	139	34.7	104	34.7
Dependent Children in Household; Age 0 to 4	477	11.7	59	14.7	44	14.7
One Person in Household with a Long-Term Health Problem or Disability; With Dependent Children	160	3.9	24	6	18	6
One Person in Household with a Long-Term Health Problem or Disability; No Dependent Children	621	15.3	108	26.9	81	26.9

**Table 2: vulnerability and support needs on Cressingham gardens, household data**

	London Borough Lambeth		Cressingham constructed area		Est. actual estate (75% of constructed area)	
	Number	%	Number	%	Number	%
All Usual Residents, 2011	303,086		917		688	
Day-to-Day Activities Limited a Lot	18,618	6.1	101	11.0	75	11.0
Day-to-Day Activities Limited a Little	20,053	6.6	90	9.8	67	9.8
Day-to-Day Activities Not Limited	264,415	87.2	753	82.1	562	82.1
Day-to-Day Activities Limited a Lot; Age 16 to 64	10,432	3.4	55	6.0	41	6.0
Day-to-Day Activities Limited a Little; Age 16 to 64	12,878	4.2	55	6.0	41	6.0
Day-to-Day Activities Not Limited; Age 16 to 64	201,803	66.6	487	53.1	363	53.1

	London Borough Lambeth		Cressingham constructed area		Est. actual estate (75% of constructed area)	
	Number	%	Number	%	Number	%
All Usual Residents, 2011	303,086		917		688	
Very Good Health	160,326	52.9	448	48.9	334	48.9
Good Health	97,286	32.1	281	30.6	210	30.6
Fair Health	31,188	10.3	133	14.5	99	14.5
Bad Health	10,729	3.5	58	6.3	43	6.3
Very Bad Health	3,557	1.2	24	2.6	18	2.6

	London Borough Lambeth		Cressingham constructed area		Est. actual estate (75% of constructed area)	
	Number	%	Number	%	Number	%
All Usual Residents, 2011	303,086		917		688	
Provides No Unpaid Care	282,609	93.2	846	92.3	631	92.3
Provides 1 to 19 Hours Unpaid Care a Week	13,035	4.3	56	6.1	42	6.1
Provides 20 to 49 Hours Unpaid Care a Week	3,172	1	17	1.9	13	1.9
Provides 50 or More Hours Unpaid Care a Week	4,270	1.4	25	2.7	19	2.7

Source: [www.neighbourhood.statistics.gov.uk/dissemination/](http://www.neighbourhood.statistics.gov.uk/dissemination/)

Census questions used: Health and Provision of Unpaid Care, 2011 (KS301EW);

Lone Parent Households with Dependent Children, 2011 (KS107EW);

Social Life distributed a short survey to residents to ask about types of vulnerability, and support needs. 18 responses were received. Of these, 11 respondents had either a disability, a long-term illness or mental health issues. Of these people who self identified as vulnerable, just over half of them said they depend on their neighbours for help and support. Only one had relatives living on the estate.

**Table 3: results of Social Life survey December 2014**

	Number of responses
Number with disability or long term illness	11
Considering themselves frail	6
With mental health problems	7
Vulnerable people who depend on neighbours	6
Vulnerable people who have relatives living on the estate	1
Not vulnerable but living with children	2
Not vulnerable, or with living children	5

Total number of responses = 18

Another indication of levels of vulnerability are the numbers of home visits that have been requested from the Independent Resident Advisor working on Cressingham Gardens, and Social Life. Overall? nearly 30 home visits have been requested by people who do not feel they can attend meetings.

### 1.4 Predicting wellbeing and social sustainability

We have looked at data sources that Social Life uses regularly in our work that help us understand how people experience their local areas. This draws on perception data - data about how people feel about different aspects of their lives - taken from open source national datasets held by government and research councils. This includes the Understanding Society Survey, the largest longitudinal survey in the UK, funded by the Economic and Social Research Council and government departments, and managed by the University of Essex. The Home Office's Crime Survey England & Wales (formerly the British Crime Survey); the Cabinet Office's Community Life survey and the Taking Part Survey, set up by the Department for Culture, Media and Sport are also used.

Social Life has analysed selected questions from these surveys to match data to local areas using the Office for National Statistics' (ONS) Output Area Classifications and Index of Multiple Deprivation. This reveals to what extent different types of neighbourhood differ from the national average. This approach is used in the social sustainability measurement frameworks that Social Life has developed for Sutton Council, for Notting Hill Housing and for private housing developers.

This data tells us what we can *expect* people in different neighbourhoods to feel about their local areas, it is a tool for discussion more than an exact representation of what exists - it does not use actual data about particular places.

We have looked at this data to see what it reveals about Cressingham.

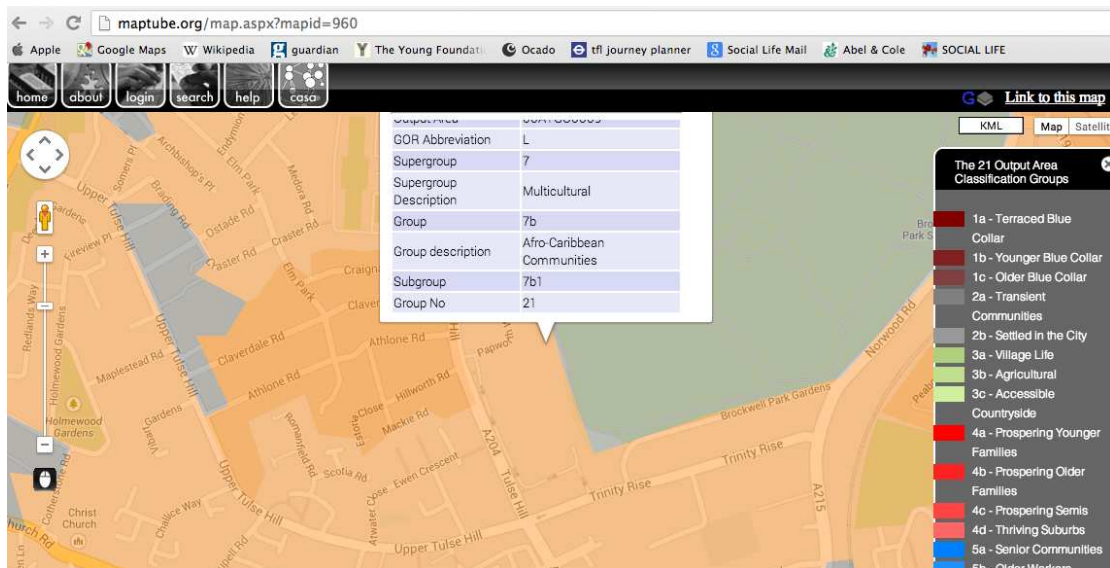


### Understanding the statistical profile of the estate

The starting point is to establish the classification of the Cressingham estate area - the OAC and IMD for the relevant ONS output areas (150 households).

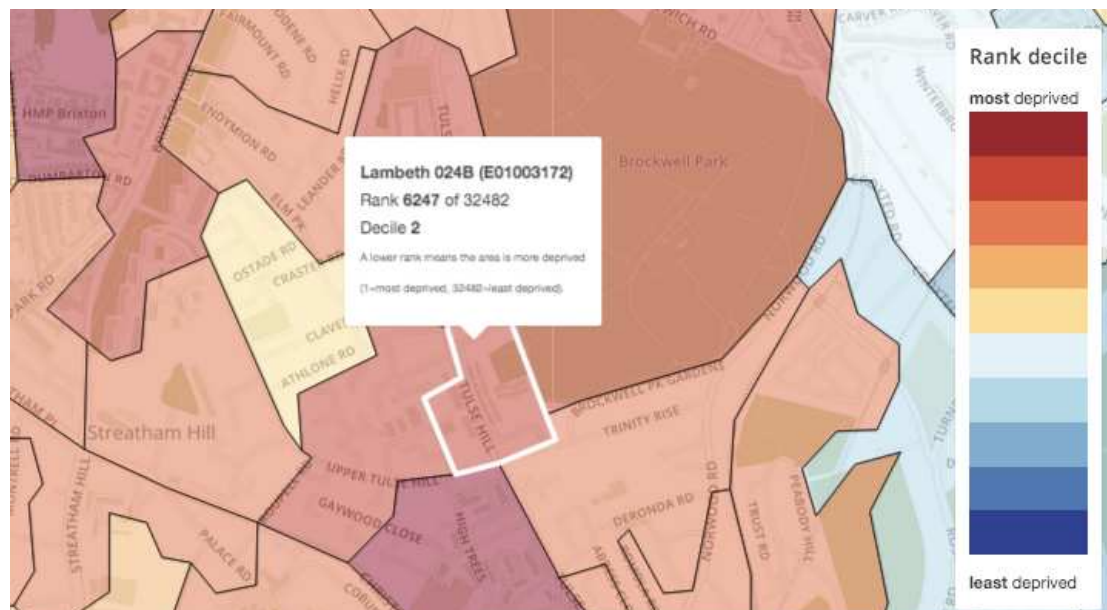
Cressingham falls within three output areas, which are all classified as “7b1”, and fall within the second IMD decile - this means that if small areas nationally were ranked in order, Cressingham would be between the worst 10 and 20 per cent of deprived areas. This is based on census statistics from 2011 - in 2001 the estate was more deprived and fell into the worst 10 per cent of deprived areas.

Figure 2: Cressingham OAC classification



Source: <http://maptube.org/map.aspx?mapid=960>

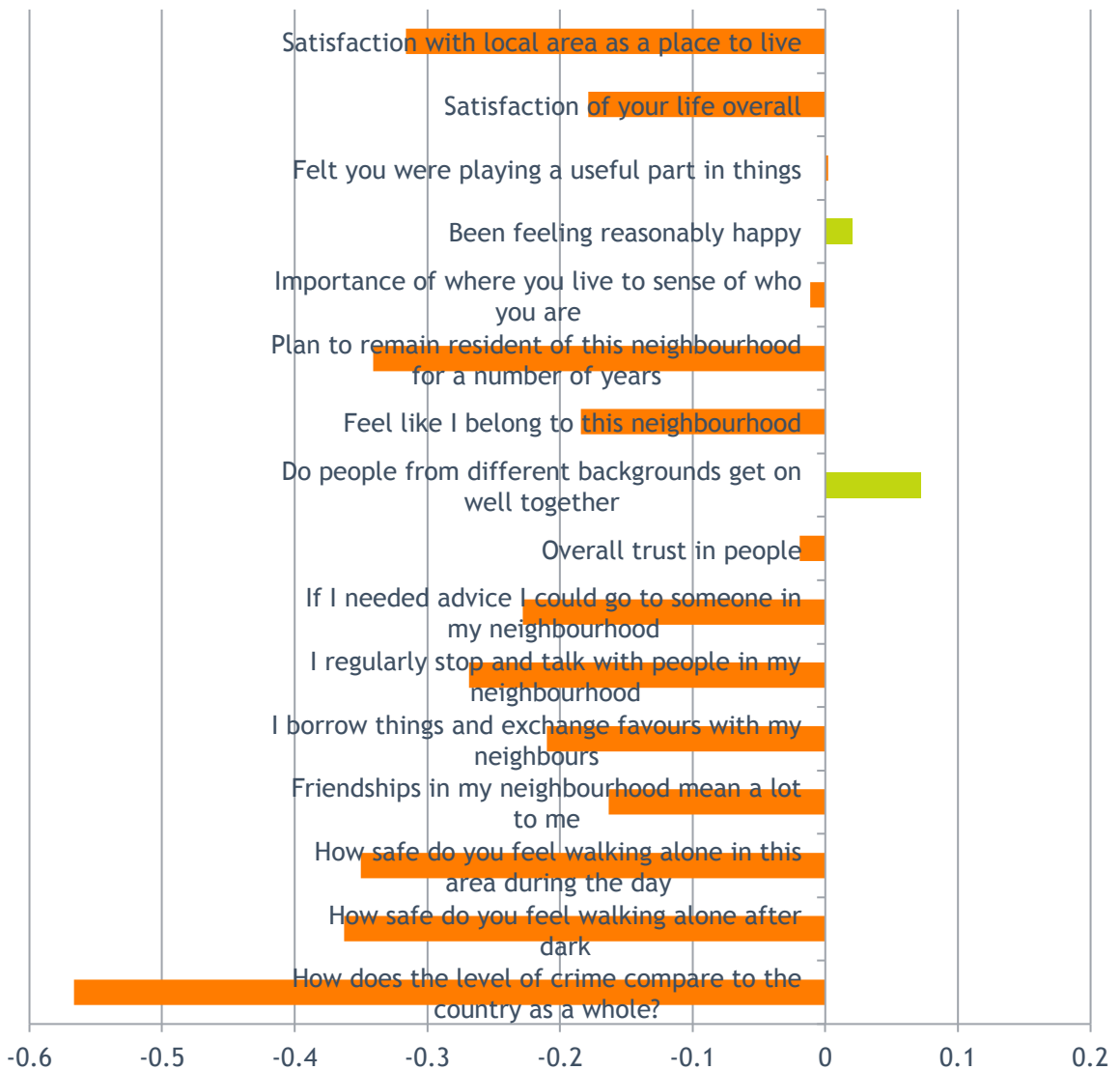
Figure 3: Cressingham IMD classification



Source: <http://opendatacommunities.org/showcase/deprivation>

The graph below shows that in terms of safety, neighbourliness and belonging, areas that are comparable to Cressingham typically fall below the national average. This means that we would *expect* Cressingham’s residents to feel unsafe; and have weak sense of belonging to the area.

**Figure 4: predicted community capacity, wellbeing and crime indicators in areas similar to Cressingham gardens**



0 = the national average, anything to the left of this is below the national average (and is orange on this graph), anything to the right is above average (indicated in green).

Source: Social Life community dynamics data

Social Life’s qualitative work on Cressingham reveals a different picture: Cressingham’s communities appears to feel much more neighbourly, happier, safer, and rooted in the local area than would be expected of comparable areas.

### **Unpicking one indicator: comparing crime**

Focusing on crime gives an illustration of this difference between the conclusions of our conversations, and what we would expect from analysis of national data. Resident, the police and Lambeth anti-social behaviour officers all report that Cressingham has a low crime level. Young people living on the estate told us that other young people can visit their homes, but are much less likely to feel safe visiting other Tulse Hill estates.

However, the predictive data suggests that residents would feel differently, that they would feel less safe, and also as if their neighbourhood is more dangerous than others.

Actual crime data from the metropolitan police supports what residents report: there are incidents on and around Cressingham, particularly connected to the Tescos on Tulse Hill. However there are relatively few incidents on the estate. This was corroborated by Lambeth's community safety team (see section 3 for more information on crime statistics).

## **2 Valuing wellbeing**

Residents were interested in finding out whether a value could be put on the wellbeing experienced by Cressingham residents. Social Life identified that the wellbeing evaluation approach, developed by HACT<sup>4</sup> and economists from LSE (through Simetrica)<sup>5</sup>, could be used alongside Social Life's predictive data to value the benefit to residents. Valuing the benefit to the wider public sector was also explored, and some modeling has been done to focus on the savings from the estate's low crime rate.

### **2.1 The Wellbeing Valuation approach**

The Wellbeing Valuation approach has been developed by economists Daniel Fujiwara and Paul Dolan from the LSE. They have created an approach to understanding the value of different outcomes (for example getting a job, being in debt, or living with disrepair), which tries to place a monetary value on interventions on the basis of their impact on people's life satisfaction. They have applied this to a number of different activities and issues, including volunteering, mental health, and housing.

HACT worked with the LSE and a number of different housing associations to understand how this approach could be used to understand housing association's activities, both their housing activities and their broader social role, including their impact on crime, employment, health and the strength of local communities. HACT have developed the approach further into a tool that can be used to quantify the value of social activities,

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<sup>4</sup> for more information go to <http://www.hact.org.uk/>

<sup>5</sup> for more information go to <http://www.simetrica.co.uk/#!/about-us/c1mke>

and have created a “value bank” of different interventions and issues. All housing associations and small organizations can use this free of charge.

Wellbeing Valuation is attracting increasing attention in the UK and more widely. It is recognized by HM Treasury in its Green Book guidance on cost benefit analysis and is being used by other OECD governments.

## 2.2 How is this relevant to Cressingham Gardens?

Although this approach has been developed to evaluate the impact of projects and interventions, it is possible to use it to develop a broad estimate of what is known about the strengths and weaknesses of Cressingham Gardens estate, looking at the strengths of the community, its strong sense of belonging and social ties, and some of the physical problems in the homes, particularly damp. To do this we use data from national surveys regularly used by Social Life (the same data used by LSE in their wellbeing valuation work from the Understanding Society Survey); the findings of Social Life’s research on the estate in 2013; and the results of the Tall housing conditions survey in 2014.

There are other values in the value bank that could potentially apply to Cressingham- for example gardening, being involved in a tenants group - but we have no figures available to estimate how this differs from the national average.

## 2.3 What are the relevant figures in the Wellbeing Valuation model?

The value bank gives different figures for inside and outside of London, and for the impact on adults under 25 years old, 25 to 49, and over 50. The monetary values given are the cost for an individual, for a year.

HACT and LSE also advise against “double counting” - that issues that are too similar should not be counted at the same time.

**Table 4: National average values of local environmental factors**

<i>Outcome</i>	<i>Average value</i>
No problem with teenagers hanging around	£5,760
No problem with vandalism/graffiti	£4,072
Not worried about crime	£11,873
No problem with anti-social behaviour	£6,403
Police do good job	£5,340
No litter problems	£3,555
Able to obtain advice locally	£2,457
Good neighbourhood	£1,747
Talks to neighbours regularly	£3,848

*Source: Measuring the social impact of community investment, HACT, 2014*

NB: these are national averages. In general the value of different outcomes is greater to older people than younger people, and is often higher outside than inside London. Eg the value of “talks to neighbours regularly” is £3,247 for the London average, and £3,872 outside London.

**Table 5: The value of housing quality indicators**

*NB: as these are all problems or deficits this table is actually indicating a loss of wellbeing, rather than a positive as in the table above*

<i>Housing problem</i>	<i>Average Value</i>
Neighbour noise	£1,068
Damp	£1,068
Poor lighting	£1,044
No garden	£783
Condensation	£645
Rot	£598
Vandalism	£436
All 7 problems combined	£5,642

*Source: The Social Impact of Housing Providers, Daniel Fujiwara, HACT, 2013*

**Table 6: Value of housing, by housing quality types**

*NB: as these are all problems or deficits this table is actually indicating a loss of wellbeing, rather than a positive as in the table above*

<i>Type of home</i>	<i># problems (max 6)</i>	<i>Average Value (compared to good quality HA)</i>
'Average' local authority	1.05	£320
'Poor quality' local authority	2.05	£973
'Average' private rental	1.04	£320
'Poor quality' private rental	2.06	£997
'Average' housing association	0.99	£297
'Good quality' housing association	0.54	N/A

*Source: The Social Impact of Housing Providers, Daniel Fujiwara, HACT, 2013*

### **Avoiding over-claiming benefits**

The Wellbeing Valuation model including two ways to avoid overestimating the benefits of different interventions in their model.

This first is to factor in what is known as “deadweight”, what outcomes would have happened anyway. This is based on Homes and Community Agency guidance (the HCA Additionality Guide from January 2014). This suggests that the total benefit is reduced by 19 per cent for social and community, and crime outcomes.

The second is to avoid adding together different outcomes that are so closely related that to count both of them would be to double count. The table below gives the outcomes that should not be counted together in the “local environment” indicators. The squares highlighted with a cross should not be added together.

**Table 7: Which wellbeing values can be applied together?**

	Local environment	No problem with teenagers hanging around	No problem with vandalism/graffiti	Not worried about crime	No problem with anti-social behaviour	Police do good job	No litter problems	Able to obtain advice locally	Good neighbourhood	Feel belonging to neighbourhood	Talks to neighbours regularly
<b>Local environment</b>											
No problem with teenagers hanging around		█	✓	✓	x	✓	✓	✓	✓	✓	✓
No problem with vandalism/graffiti		✓	█	x	x	✓	✓	✓	✓	✓	✓
Not worried about crime		✓	x	█	x	x	✓	✓	✓	✓	✓
No problem with anti-social behaviour		x	x	x	█	✓	✓	✓	✓	✓	✓
Police do good job		✓	✓	x	✓	█	✓	✓	✓	✓	✓
No litter problems		✓	✓	✓	✓	✓	█	✓	✓	✓	✓
Able to obtain advice locally		✓	✓	✓	✓	✓	✓	█	✓	✓	✓
Good neighbourhood		✓	✓	✓	✓	✓	✓	✓	█	x	x
Feel belonging to neighbourhood		✓	✓	✓	✓	✓	✓	✓	x	█	x
Regularly stop and talk to neighbours		✓	✓	✓	✓	✓	✓	✓	x	x	█

Source: Measuring the social impact of community investment, HACT, 2014

### 2.4 Using predicative data to model wellbeing values

Social Life’s data map data from the Understanding Society Survey to small local areas. This includes data belonging, getting advice locally and talking to neighbours. This uses the same questions used in the Wellbeing Valuation model:

- I feel like I belong to this neighbourhood
- I regularly stop and talk with people in my neighbourhood
- If I needed advice about something I could go to someone in my neighbourhood.

By comparing what we would expect in an area like Cressingham Gardens with what came out of our qualitative research, we can estimate wellbeing values. The limitation is that Social Life’s data was gathered through a different approach, using qualitative research techniques rather than a representative sample survey. However we can make estimates based on the Social Life findings.

Social Life’s research established that fear of crime, sense of belonging and neighbourliness on Cressingham are strong. If we assume these are similar to the national average (this is a conservative assumption) then we can apply the values in the wellbeing value model and estimate the benefit of this to Cressingham.

Within the Wellbeing Valuation model, the value of “I feel like I belong to this neighbourhood” and “regularly stop and talk to neighbours” should not be double counted.

**Table 8: Estimating wellbeing values**

	% positive response 7b1/IMD 2 (areas like Cressingham)	% positive response UK	Difference 7b1/IMD2 to UK average	Difference local area score to UK average as no of Cressingham residents *	Value per adult per year (London, 25-50 year olds)	Wellbeing value for all residents of Cressingham’s score
Feel belonging to neighbourhood **	56.0%	64.1%	8.1%	41	£2,682	£110,770
Regularly stop and talk to neighbours **	56.0%	67.2%	11.2%	56	£3,344	£192,200
If I needed advice about something I could go to someone in my neighbourhood	42.0%	51.1%	9.1%	46	£3,003	£140,026

\*\* These should not be double counted

- Number of adult residents on Cressingham estimated as 511, see section 1.3 above.

We have also explored whether we can map data about people’s perceptions of how crime in their local area compares to the national average. The limitation is that the Social Life’s data and the wellbeing value methodology are based on different survey data - the wellbeing value approach uses responses to “how worried are you about being a victim of crime” from the Understanding Society Survey, whereas the Social Life data relates to a different question in the Crime Survey England & Wales “How does the level of crime in your local area compare to the country as a whole?”. As well as the inconsistency in data sources, we cannot necessarily assume that the responses to the two questions may be the same. For example, one individual may feel safe and not worried about being a victim of crime yet feel their local neighbourhood is in general less safe than the national average.

However, given these caveats, if it was assumed the question results are comparable, and we use the same assumption used above, that residents perceptions are more similar to the national average than what we would expect in similar areas, then this would indicate a wellbeing value of over £2.5m. This figure

is however less reliable than the figures for belonging, talking to neighbours and obtaining advice in the neighbourhood and cannot be used with the same confidence.

**Table 9: Ballpark estimate of low crime wellbeing values (less reliable)**

	% positive response 7b1/IMD 2 (areas like Cressingham)	% positive response UK	Difference 7b1/IMD2 to UK average	Difference local area score to UK average as no of Cressingham residents *	Value per adult per year (London, 25-50 year olds)	Wellbeing value for all residents of Cressingham's score
How does the level crime in your local area compare to the country as a whole? **	28.2%	55.0%	26.8%	137	£18,998	£2,603,680

\* number of adult residents on Cressingham estimated as 511, see section 1.3 above.

\*\* used as equivalent to “not worried about crime”, therefore less robust comparison than other figures.

## 2.5 Using housing conditions data to model wellbeing values

Damp and disrepair were cited as problems by residents, and the 2014 survey carried out by TALL established that a significant number of properties are damp. It is estimated that this could be 30 per cent of all properties on the estate.

If the wellbeing value (or in this case, cost) to each resident of having a damp property is £1,068 per resident, and that 90 properties are damp, then we can estimate the wellbeing value (or cost of the damp) for residents as being over £161,000.

**Table 10: estimating wellbeing values of damp**

Wellbeing cost per resident	Number of damp properties	Number of residents affected by damp properties *	Wellbeing cost of damp
£1,068	90	151	£229,981

\* number of adult residents on Cressingham estimated as 511, see section 1.3 above. Number of adult residents in 90 properties estimated as proportion of 299 households, giving average of 1.7 adults per property.



## 2.6 Total wellbeing value

Total wellbeing value for Cressingham of the outcomes that have data and evidence sufficiently robust to use in value calculations:

- Regularly stop and talk to neighbours, plus able to obtain advice locally = £332,227
- Impact of living with damp = - £229,981
- Plus a significant contribution from low crime levels, possibly over £2m.

*These figures assume that levels of neighbourliness, and advice giving are around the national average, rather than what would be expected in comparable areas.*

## 3 Valuing the impact on public services

Research into the impact of neighbourliness and belonging has highlighted their links with a number of positive social outcomes including low crime and anti-social behaviour, improved health, and higher educational achievement.

The impact on public services of the strong neighbourly relationships and sense of belonging on Cressingham could potentially feed into:

- Reduced cost of adult social care: support for vulnerable people reduces the call on these services
- Lower number of GP appointments: good neighbourly support reduces people's use of GPs for problems associated with anxiety and loneliness
- More support for families, helping children and parents to thrive, reducing problem behaviour in school and boosting achievement
- Reduced crime impacts on police and court services.

Within the scope of this work we have not been able to gather robust and reliable data to make an estimate of the cost savings to health and education.

We can however model an estimate on the savings in terms of crime using statistics for rates of crime in the Tulse Hill Ward.

To do this, we used a model developed by New Economy for the Cabinet Office in 2014<sup>6</sup>. This models the cashable savings from preventing different outcomes, including crime. "Cashable" means that the figures have been adjusted to show the savings that would accrue in reality to different agencies.

It is possible to identify the number of crimes committed on the estate from the police's crime maps<sup>7</sup>. From this we can see that there is disproportionately lower crime on Cressingham Gardens than for the rest of Tulse Hill, if we look at the

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<sup>6</sup> Supporting public service transformation: cost benefit analysis guidance for local partnerships, 2014, HM Treasury and New Economy

<sup>7</sup> <http://www.police.uk/metropolitan/00AYGU/crime/>

proportion of crimes on the estate compared to the proportion of Tulse Hill’s population that lives on the estate.

We can estimate the number of crimes that would be committed if the estate had the average level of crime in the ward, and from that calculate the difference between the actual rate of crime and the expected level.

We believe that this is a conservative approach because crime on council estates is typically higher than in more affluent residential areas, and Tulse Hill is a mixture of these types of area.

**Table 12: Crime on Cressingham Gardens, December 2013 to November 2014**

	Asb	Burglary	Violence & sexual offences	Bicycle theft	Robbery	Drugs	Other crime	Theft from the person	Criminal damage and arson	Other theft	Public order
Nov-14	2	1	1								
Oct-14		1	2								
Sep-14	1	1		1	1						
Aug-14		1									
Jul-14						1	1	1			
Jun-14									1		
May-14										1	1
Apr-14	4	1	1								
Mar-14	1	1	1								
Feb-14			1							4	
Jan-14				1						2	
Dec-13	2	1	2								
Total in 12 months	10	7	8	2	1	1	1	1	1	7	1
Total no of crimes	39										

In the 12 months from December 2013 to November 2014, the total number of notifiable offences, or crimes, in the Tulse Hill ward was 1,671 incidents.

To see whether the Cressingham Gardens figures represent a proportionate share of Tulse Hill ward crime, we need to first look at the relative population of the ward.

We can then find the difference between the Cressingham actual figure and what we expect the proportion to be. If the figure is less, then we can consider the difference between the actual figure and what is expected as the reduction due to the overall safety and low crime on the estate.

We can then apply a cost estimate of the saving to the public sector, based on the model devised by New Economy for the Cabinet Office in 2014.

**Table 13: Estimating savings from lower than expected crime on Cressingham**

	Number of incidents	Cressingham as % of Tulse Hill
Total crime Cressingham Gardens	40	2.4
Total crime Tulse Hill	1671	
Total households Cressingham Gardens	299	4.5
Total households Tulse Hill Ward	6,622	

Total crime Cressingham Gardens if proportionate to population of Tulse Hill	75
Difference between actual and proportionate crime	36

Average cost of crime incident (New Economy)	Number of crimes fewer than would be expected	Cost saving
£647	35	£23,292

From this calculation, the savings to public services from the low level of crime on Cressingham Gardens can be estimated to be £23,292 each year.

## References

**Community investment values from the Social Value Bank, 2014**

HACT and Daniel Fujiwara ([www.hact.org.uk](http://www.hact.org.uk) / [www.simetrica.co.uk](http://www.simetrica.co.uk))

[www.socialvaluebank.org](http://www.socialvaluebank.org)

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**Supporting public service transformation: cost benefit analysis guidance for local partnerships, 2014**

HM Treasury and New Economy

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/300214/cost\\_benefit\\_analysis\\_guidance\\_for\\_local\\_partnerships.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300214/cost_benefit_analysis_guidance_for_local_partnerships.pdf)

For more information, contact [nicola.bacon@social-life.co](mailto:nicola.bacon@social-life.co)

## **C. SAVE Britain's Heritage - Letter to the Council**



Lambeth Council  
Lambeth Town Hall  
Brixton Hill  
SW2 1RW

10<sup>th</sup> July 2015

Dear Cabinet Members,

**Cressingham Gardens; Report Number: 41/15-16**

I am writing to register our very strong objection to the proposals to demolish Cressingham Gardens to be considered at your meeting in Lambeth Town Hall at 7pm on Monday 13<sup>th</sup> July. [see <http://moderngov.lambeth.gov.uk/mgAi.aspx?ID=29000#mgDocuments>].

In our view, the whole of Cressingham Gardens is of special architectural and historic interest and its planning is a remarkable example of a model village layout designed with great imagination and care to provide attractive community living.

The proposal is the more disturbing in view of the strongly expressed desire of many of the residents to remain in their homes.

We understand your council seeks to use the land to create a greater density of housing. However to begin by vacating and demolishing such a large group of homes, which the residents evidently enjoy, is entirely mistaken and also counter-productive.

Equally relevant and important, the proposal is completely contrary to current government policy. This policy is set out in the attached written statement to Parliament dated 16 January 2015 issued by the Department for Communities and Local Government. This statement is of general relevance, but also relates to a comparable large-scale proposed demolition of 439 homes in Liverpool. These were also neither listed nor in a conservation area but still deemed by the Minister to be of architectural and historic interest.

I quote the relevant passages below:

*The Coalition Agreement outlined this government's commitment to introduce a range of measures to get empty homes back into use, reflecting the 2010 general election manifesto pledges of both Coalition parties. We want to increase housing supply, remove the blight that rundown vacant properties cause and help support local economic growth from refurbishment and improvements.*

*This government is championing a series of policies to get empty buildings back into use. We have:*

- *Provided over £200 million to fund innovative schemes run by community groups, councils and housing associations up and down the country to create new homes from empty properties, both residential and commercial.*
- *Rewarded councils for bringing 100,000 empty homes back into use through the New Homes Bonus.*
- *Given councils new powers to remove council tax subsidies to empty homes, and use the funds to keep the overall rate of council tax down. HM Treasury have also changed tax rules to discourage the use of corporate envelopes to invest in high value housing which may be left empty or under-used to avoid paying tax.*
- *Taken forward the best practice recommendations produced by our independent empty homes adviser, George Clarke – such as refurbishment and upgrading of existing homes should be the first and preferred option, and that demolition of existing homes should be the last option after all forms of market testing and options for refurbishment are exhausted; we have embedded these principles in our housing programme funding schemes.*
- *Cancelled the last Administration's Housing Market Renewal Pathfinder programme which imposed targets on councils to demolish homes.*
- *Amended national planning policy through the National Planning Policy Framework to encourage councils to bring back empty properties back into use.*
- *Reformed Community Infrastructure Levy rules to provide an increased incentive for brownfield development, and extended exemptions for empty buildings being brought back into use.*

- *Lifted the burden of section 106 tariffs on vacant buildings being returned to use.*
- *Introduced a Right to Contest, building on the existing Community Right to Reclaim Land, which lets communities ask that under-used or unused land owned by public bodies is brought back into beneficial use.*
- *Funded a new re-occupation business rate relief to help bring empty shops back into use.*
- *Reformed permitted development rights in a number of ways to free up the planning system and facilitate the conversion of redundant and under-used non-residential buildings into new homes.*

If your council is minded to proceed with its proposals to demolish we will call for a Public Inquiry on the following grounds, amongst others:

First, the architectural and historic importance of Cressingham Gardens.

Second, the national significance of its model layout in terms of design, type and period.

Third, the very strong opposition not only locally, but amongst national bodies concerned with the environment.

Fourth, the fact that Lambeth Council has failed to apply government policy on demolition.

A further reason for a very strong objection is the failure to designate a conservation area, and indeed to carry out an initial assessment for a conservation area. Historic England has supported the designation of a conservation area. This, combined with current government policy, should lead your council to reverse its policy for the site and invest in a scheme of refurbishment and improvement.

There are also important considerations in relation to Brockwell Park. This, in terms of its landscape and design, is one of the most historic landscape parks in south London, and in London as a whole. The Cressingham Gardens estate is remarkable as it is almost invisible from the park, for the reason that it is designed not to rise above the trees.

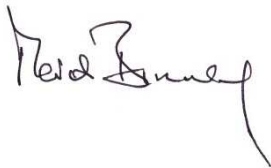
Your new proposed development is to be of such density that it will rise above the tree line and thus destroy the sense of country-in-town (sometimes known as rus-in-urbe), which is such an important quality of this and other London parks.

If your council proceeds with the proposal to demolish Cressingham Gardens it will cause appalling distress to many of the residents and is likely to be very strongly contested, a process that will involve an enormous amount of time, energy and money.

Earlier government policies of demolition areas of historic housing have now been reversed and refurbishment is now the preferred option. We strongly urge you to adopt this approach.

Should your council advance the argument that the properties are too difficult or expensive to repair we will commission evidence from engineers, architects and surveyors assessing the practicality and cost of repair and refurbishment. This we did at the Welsh Streets Inquiry and the evidence was accepted by the Secretary of State.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Marcus Binney', with a long, sweeping tail stroke extending downwards and to the right.

Marcus Binney CBE Hon FRIBA

Executive President



## **D. English Heritage report**

## Case Name: Cressingham Gardens

## Case Number: 1415845

### Background

We have been asked to assess Cressingham Gardens housing estate for listing. The estate is owned by Lambeth Borough Council, and falls within the Council's regeneration programme. This regeneration programme has led to uncertainty over the future of the estate, and has prompted this listing application.

### Asset(s) under Assessment

Facts about the asset(s) can be found in the Annex(es) to this report.

Annex	List Entry Number	Name	Heritage Category	EH Recommendation
1	N/A	Cressingham Gardens	Listing	Do not add to List

### Visits

Date	Visit Type
02 August 2013	Full inspection

### Context

Cressingham Gardens stands on the boundary with Brockwell Park, which is a designated conservation area. The conservation area extends into the estate to include the central open space, but all other parts of the estate are excluded.

When the application to list Cressingham Gardens was received, it was acknowledged that there had not been a detailed study of Lambeth Borough Council's post-war housing, and therefore there was a limit to our understanding of the context of this particular scheme. English Heritage therefore commissioned an internal report into the output of the Borough under its principal architect and Director of Development, Edward Hollamby. This research has proved valuable in undertaking this assessment, and is shortly to be made publicly accessible online as part of the English Heritage Research Report Series.

### Assessment

#### CONSULTATION

The listing applicant, the London Borough of Lambeth (owner and Local Planning Authority), the Greater London Historic Environment Record (GLHER), and the Twentieth Century Society were all provided with the factual details of the case. Consultation responses were received from all consultees other than the GLHER, which confirmed it had no comments to make on the case.

The Twentieth Century Society supported the listing of the estate, and provided a useful summary of other Lambeth estates, both those comparable with Cressingham Gardens, and those which are in a different idiom.

Lambeth provided a response which gave a helpful summary of the housing output during the 1960s and '70s, picking out a few specific examples. The response also made a number of comments and observations regarding Cressingham Gardens, which are summarised below. We have not responded individually to each of the points raised in the consultation response as they either overlap with the content of the Discussion section below; they have been addressed by the commissioning of the English Heritage research report; or

they are addressed/countered in the points raised by the applicant and/or our response to the applicant's points.

Points raised by the London Borough of Lambeth:

1. It is difficult to say that Cressingham is one of the best in a Lambeth context or in a Greater London context as we have insufficient information on Hollamby's work to allow proper assessment.
2. Cressingham is an attractive estate by virtue of the careful placement of blocks within the landscape and the considerate orientation and massing of the blocks, giving the majority of residences in the main part a view of this landscape. There is a variety of unit types to provide a mixed community and the house designs maximise daylight into the interiors.
3. However, the aesthetic is austere and the quality of detailing not very good. The original construction detailing is lacking in finesse and alterations to windows and doors and re-roofing have robbed the buildings of much of their original detailing and character. Other new work - externally run mains gas pipes, unsympathetically placed boiler flues and satellite dishes all diminish the quality further.
4. None of the design features it exhibits are particularly unusual; they are all found elsewhere. For example orientation to maximise views, the groupings of houses and flats in a 'mega structure' over a parking under-croft, vehicle segregation / pedestrian walks, communal landscapes and community facilities are all common for the period and are found across Lambeth.
5. Architecturally the housing designs mimic some of the 1950s SPAN developments in the way they bring light into the interiors; this approach was used on other Lambeth developments.
6. Despite claims to interest being made regarding the use of 'patio housing', none of the houses on the estate actually exhibit true patio house characteristics.
7. A significant degree of the attractiveness is derived from the mature tree planting – much of which has been / is to be removed to prevent further structural damage to the buildings. The trees are not protected and listing will not protect these or any other landscape features.

The listing applicant also provided a detailed consultation response. The relevant points raised are summarised below. Most of the points overlap with the content of the Discussion section, and therefore we have only responded here to those points which are not addressed elsewhere.

1. Cressingham Gardens is 'an exceptional example of a coherent combination of architectural and social vision in UK public housing', articulating 'a distinctive response to the conditions of its time'.
2. Its continued success and popularity is testament to the success of its original design.
3. It stands out amongst Edward Hollamby's other low-rise estates in three areas: '1) Architecture and design for creating a community; 2) Integration with the natural environment; 3) Stylistic cohesion of estate design and layout'.
4. It differentiates from other contemporary estates in that 1) front doors face each other onto Walks or Ways. Most (if not all) of the other estates of the period had front doors facing back gardens. 2) Kitchens (and kitchen windows) are located at the level of Walks/Ways, to reduce the level of isolation. 3) it has an organic, rather than formal layout of dwellings.

EH response: these are very specific claims which summarise some key characteristics of Cressingham, but these characteristics are not unique to this estate, and can be found in various forms in others of the period. As discussed below, where Lambeth's output is of note, is in absorbing progressive ideas into housing best practice.

5. It is one of the earliest implementations of 'Patio Housing'

EH response: the housing referred to as patio housing at Cressingham Gardens is different from the patio housing used at other Lambeth schemes such as Alexandra Drive – which fulfils the more typical definition of the typology – L-shaped houses where the wall of one house shields the garden of the next. The houses at Cressingham simply have small courtyard gardens enclosed by brick walls. That notwithstanding, patio

housing was first used in English social housing at Bishopsfield Estate, Harlow (1960-1), and was a device introduced from the Continent.

6. In relation to alterations to the fabric of the estate: fewer than 10 garden walls have been replaced with fencing, and fewer than 10 roofs have been recovered in felt.

EH response: degree of alteration will be discussed below.

The consultation response also contains a brief comparison of Cressingham Gardens with other Lambeth estates, an exercise which is carried out to the extent necessary in the Discussion below.

## DISCUSSION

The second half of the C20 was one of the most exciting and imaginative periods for public and private house building in English architectural history, and therefore the best examples will merit designation. The massive scale on which housing was constructed after the Second World War means that the pool of potential candidates is large, but architectural quality can vary widely, and the vulnerability to damaging alterations can be high. The overarching criteria for listing are special architectural or historic interest, and particularly careful assessment of buildings post-dating 1945 is required. English Heritage's 2011 Selection Guide: The Modern House and Housing (Domestic Buildings 4), notes that key considerations in general terms include architectural interest, intactness of design, whether the design was influential, or a particularly good example of a development in housing. When specifically considering low-rise developments, like Cressingham Gardens, their frequently simple virtues do make them difficult to assess; to be listable, they should survive reasonably intact, and show special imagination in the layout of roads, buildings, and hard and soft landscaping. Elevational treatments may be simple, but they should be immaculately detailed.

Within the genre of low-rise, high-density, social housing of the post-war period, Camden Borough Council is widely recognised as producing some of the most important examples nationally. Several of Camden's estates have been listed, as have a number of housing schemes produced by other authorities; therefore key benchmarks for the type have been set. Research undertaken by English Heritage to assist with this assessment concluded that after Camden Borough Council, whose heyday was the mid 1960s to early 1970s, Lambeth produced the most consistent and extensive body of public housing, hitting its stride slightly later, in the mid-1970s. That notwithstanding, it does not necessarily follow that the importance of Lambeth's body of housing as a whole, will mean that any individual schemes will warrant designation. All schemes must be assessed in the national context, and meet the high bar for special architectural or historic interest in their own right.

Under Edward (Ted) Hollamby, Lambeth's architects worked in groups, and Hollamby encouraged individuals, and groups, to develop distinctive architectural approaches. However, there were certain qualities within Lambeth schemes which were founded in Hollamby's architectural and social ideology, as well as those which reflected wider architectural trends. Lambeth schemes were often notable for the successful integration of community and welfare buildings, and a number saw the retention of historic housing and the integration of new buildings into existing patterns of topography, grain and historic character. Hollamby believed that 'the architecture should be delightful, liveable with, not overwhelming, maybe exciting, relating to the surroundings'. Materials were chosen carefully, with brick favoured, and dark-stained timber windows, which were easier to maintain than painted ones. Following the principles of the 1963 Buchanan report, vehicular access was segregated from pedestrian circulation. In earlier Lambeth schemes, Hollamby did not oppose the use of tall point blocks, however there was a distinct move away from high rise development into the 1970s. This was a national trend, influenced by events such as the collapse of Ronan Point in 1968, and changes in social conditions. The growing demand to preserve parts of the inner city encouraged the building of social housing that did not look like a housing estate, the need to develop more tricky in-fill or backland sites, and the need for both high densities and a variety of different types of accommodation to suit a mixed demographic, all influenced this move to lower-rise development and the move towards creating a new urban vernacular. Key characteristics of Lambeth estates of the 1970s - building typologies such as the 'patio' house; the development of complex layering of mixed size units; the regard for public and private open spaces, and the exploitation of natural topography - all show the influence of continental ideas, which had been adopted to varying extent in other English social housing schemes, including the particularly early example of Bishopsfield, Harlow (1960-61). Lambeth was not a pioneer in this regard, but stands out for the way it saw these various progressive ideas and approaches absorbed into English housing best practice.

Lambeth produced a large body of housing under Ted Hollamby, and it is in the smaller schemes of the 1970s, including Cressingham Gardens, where the qualities of contextualism, humanity, and community-centric design are most in evidence. Cressingham Gardens adopts building types and forms used elsewhere on other Lambeth schemes – perhaps most obviously Cressingham's 'Walks' are found in a

slightly less tightly-planned form, on the Magdalen Estate on Streatham Hill (built 1968-69), which also retained a number of mature trees on the site. The aesthetics of angular, robust plains of brickwork and split-pitch roofs are identifiable in schemes like Woodvale (completed 1975), which is arranged around a large central greensward. However, where Cressingham is distinct from a number of other Lambeth developments is in the informality and spatial interest of its planning. The topography of the site is exploited, and the blocks are off-set, or otherwise arranged, to create a sense of townscape. At its most successful, such as the view west along Chandler's Walk, enclosed by the garden walls to one side, and the row of bungalows to the other, the planning is exceptional. However, the success of the planning is not consistent throughout the site. The vehicular route which runs along Papworth Way, and then heads north, isolates the northern part of the estate from the village interconnectivity at its heart. This isolation is also the case at Ropers Walk to the far south. Architecturally, again, there are notable highlights, the Rotunda is a building of simple charm; solid and robust, its circular half-sunken form gives an air of mystery from the outside, and a warm intimacy within. From the elevated Walks, the architecture provides a sense of enclosure, as well as having an interesting, stepped form, giving a character reminiscent of a narrow hill-town street. From within the long sweep of Hardel Walk, this is particularly effective, but in the shorter walks the transition from this enclosure into the main circulation routes is rather abrupt. The architecture of the Ways, though solid and humane, lacks the creativity of plan and composition of the Walks. All the buildings, which are simply, robustly, detailed, have suffered as a result of wholesale window replacement, and the gradual attrition of their original uniformity. The loss of some of the original brick garden walls is also unfortunate, as these are a fine, structured, counterpoint to the informal green spaces onto which they back. Some of the hard landscaping has also suffered from poor quality repair or alteration.

Outside of the environment created by the Walks, the interest of the estate comes not from the architectural quality of the structural elements, but from the quality of the spaces left in between; in some cases this is a tightly controlled relationship between built elements (as at Chandlers Way), but in a number of cases this is dependent on the quality of the natural environment to distinguish it, and there is little in the way of structured, or planned, landscaping within some of these areas. This point is not a criticism of the scheme, it is part of what gives the estate its character, but does highlight one of the problems that Cressingham Gardens presents as a listing candidate. The estate is a strong example of the important legacy of progressive public housing that Ted Hollamby and his department brought to Lambeth. Yet other examples of London low-rise schemes, such as the Queens Road Estate, Richmond, by Darbourne and Darke (built 1971-83), and Camden's Alexandra Road (built 1972-78) and Dunboyne Road (built 1971-77) - all listed at Grade II or II\*, are distinguished by a strong, consistent, structurally coherent, architectural expression which extends across their sites, as well as immaculate quality of detail both in their architecture and the structured, and structural, nature of the landscaping that integrates the buildings and their environment. The nature of the planning at Cressingham is very different, and this is part of its interest and value, but it is not of consistent quality across the estate, and the use of a number of largely unstructured spaces between housing blocks lessens the strength of the architectural ensemble as a whole. Cressingham stands out for the informality of its planning, which reflects the careful respect paid to Brockwell Park, but listing can only recognise structures, not the open spaces in between them, and in this case the buildings themselves are not architecturally interesting enough, unaltered enough, or have a sufficiently strong architectural relationship with one another across the site, to merit listing as a group. For these reasons, Cressingham Gardens is not recommended for listing.

However, it is considered that the estate could benefit from greater formal recognition as a successful and popular housing scheme which achieves a particularly careful contextual response to its sensitive setting, adjacent to Brockwell Park Conservation Area. It is also one of the more interesting housing schemes from this important period in the development of social housing, produced by one of the most progressive authorities. Cressingham Gardens has strong local interest and for this reason it is felt that a future reappraisal of the boundaries of Brockwell Park Conservation Area should give serious consideration to whether the estate should be included within it, in a similar way to previous extensions of the conservation area boundaries have encompassed other areas of housing of historic value adjacent to the park. As acknowledged in the Brockwell Park Conservation Area Extension Report of 1999, the park is 'a major asset and it is extremely important to preserve and maintain its setting and the residential nature and scale of the built environment surrounding it'. Cressingham Gardens is testament to the fact that despite pressure for high density development, Ted Hollamby and his department were equally conscious of the importance of the park's setting and produced a scheme which responded to this with skill and sensitivity, both in the scale and massing of the built elements, as well as through the integration of these elements with informal open spaces which bring a park-like character into the estate.

## CONCLUSION

After examining all the records and other relevant information and having carefully considered the architectural and historic interest of this case, the criteria for listing are not fulfilled. For this reason,

Cressingham Gardens, built 1971-78, by Lambeth Borough Council Architects' Department under Edward Hollamby is not recommended for listing.

#### REASONS FOR DESIGNATION DECISION

Cressingham Gardens, built 1971-78, by Lambeth Borough Council Architects' Department under Edward Hollamby, is not recommended for listing for the following principal reasons:

\* Variable architectural interest: some elements within the scheme are creatively planned and visually engaging, whereas others have lesser interest; overall it lacks the structural cohesion, strong architectural expression as an ensemble, and the quality of detail, of the best public housing schemes of the period;

\* Variable quality of planning: while the relationship between some elements within the scheme is exceptionally successful, the relationship between other elements is either less well resolved, or has a much looser, more informal, quality;

\* Alteration: the wholesale window replacement and gradual attrition of the uniformity of the buildings has undermined in part the quality of their simple, robust, details.

#### **Countersigning comments:**

Agreed. We have commissioned additional research to ensure an understanding of where Cressingham Gardens sits in the body of Lambeth's housing output of the 1960s and 70s and have also carefully considered the merits of this particular scheme. As our advice sets out we believe that there are some very good qualities about Cressingham Gardens but also some shortcomings such that overall it cannot be recommended for listing given the necessarily high bar for post-war buildings. We do recognise its local significance, however, and conservation area status is suggested as a means of reflecting its overall character.

V. Fiorato, 5th December 2013

# Annex 1

## Factual Details

**Name:** Cressingham Gardens

**Location:** Cressingham Gardens SW2

County	District	District Type	Parish
Greater London Authority	Lambeth	London Borough	Non Civil Parish

## **History**

Cressingham Gardens was built as a public housing estate in 1971-78 by Lambeth Borough Council. The estate was designed and constructed under Edward (Ted) Hollamby, Borough Architect until 1972, when he became Borough Planner and Director of Development; and Roger Bicknell, who Hollamby appointed as Project Architect from 1972 onwards.

The site, which immediately borders Brockwell Park to the west, had previously been occupied by a number of large Victorian villas, which were acquired by Compulsory Purchase Order and cleared to make way for the development. The estate was one of a number built by Lambeth in the late 1960s and 1970s as part of an ambitious housing strategy. The design for Cressingham Gardens was approved in January 1969, and work began on site in May 1971. During the course of construction the site was extended slightly to the north when a small additional piece of land became available, allowing another housing block to be added to the scheme, but otherwise the estate was built as originally approved. The estate's long gestation period – almost 10 years from the time the scheme was approved – was the result of a number of problems. Following commencement on site, the original contractors were very soon significantly behind schedule, construction came to a complete halt during the National Building Strike, and by 1973 the contractors had withdrawn from the site. From thereon the estate was built by direct labour. The first houses were handed over in 1976, with the last ones handed over in 1978.

Edward Hollamby (1921-1999) was an architect and town planner, who spent his career in the public sector; working for London County Council, Lambeth Borough Council, and then the Docklands Development Corporation. A committed socialist, Hollamby was a follower of William Morris's beliefs in good design, art for the masses and social improvement, and he and his wife Doris owned and lived in Morris' former house, the Red House, for over 45 years. Hollamby worked on a large number of housing projects during his career, these varied in character from earlier high-rise point blocks, to the low-rise high-density housing for which he became best known. The design and layout of Cressingham Gardens is founded on some fundamental principles espoused by Hollamby as an architect of public housing. The estate was designed to respond to the nature of its location: the heights of the various blocks respond to the topography of the site, their scale and orientation working to control views into and out of the neighbouring Brockwell Park. A variety of unit types were provided to suit different lifestyles and age-groups, and these were arranged in a way intended to create a genuine, integrated, community, centred around shared open space, and a community building (known as the Rotunda). Provision was made for both public open spaces, where mature trees were retained to give a verdant character and to blend with the neighbouring park; and small private patios, balconies, and gardens, to give residents a genuine sense of personal privacy.

In its basic form, the estate remains much as it was when it was first completed. However, almost all of the windows (which were originally metal-framed) and many of the original timber, glazed or flush-panel, front doors have been replaced, and some maintenance and repair has not been carried out with original materials. Garden walls which have failed, for example, have been replaced with close-boarded fences, and roofs, which were originally metal-covered, where replaced, have been replaced with felt.

## **Details**

Cressingham Gardens was built as a public housing estate in 1971-78 by Lambeth Borough Council Architect's Department, under Ted Hollamby.

**MATERIALS:** the housing blocks are of brick cross-wall construction, some raised on concrete decks, with an internal skin of concrete block. The facing bricks are yellow Otterham second hard stocks. Clerestory ridge-lights are set within a strip of weatherboarding, originally timber, now uPVC. The windows are almost

exclusively uPVC, and doors vary between timber, aluminium and uPVC. Roofs are covered in ribbed metal sheet, except where they have been replaced with felt. Garden walls, retaining walls, and some balustrading are brick; some garden walls have been replaced with timber close-boarding. Pathways are concrete-slatted, and steps are concrete, some of the latter having been tarmaced over. Railings and some balustrades are painted tubular steel.

The 'Rotunda' – originally built as a children's nursery, but now used also as a community centre - is of timber-frame and brick construction, with a felt roof (originally metal-sheet).

**SETTING AND LAYOUT:** the estate is situated on a site of approximately 10 acres between Brockwell Park to the east, and Tulse Hill to the west. It is very broadly rectangular (running length-wise north/south), and slopes upwards to a plateau in the centre, along the boundary with the park.

The plateau at the centre of the estate provides the principal public open space, and also gives access directly into Brockwell Park. The space is landscaped with three grassy mounds, intersected with sunken paths. At the north-west corner of the open space is the Rotunda. The housing is arranged in a C-shape around the central open space, and is interspersed with other, smaller, green open spaces. With the exception of Hardel Walk, Hambridge Way, and part of Uprove Manor Way, which run parallel with Tulse Hill and the park boundary, all the blocks are arranged at right-angles to Tulse Hill and the park. Terraced bungalows, and two-storey blocks are arranged around the central open space, with the tallest blocks (of four storeys) around the outer, and topographically lower, perimeter of the estate.

**CIRCULATION:** vehicles are largely kept to the perimeter of the site, with the majority of the estate being interconnected through a series of pedestrianised paths. The housing blocks are accessed either at ground level from 'Ways', or from raised first-floor 'Walks' above communal garages.

**UNIT TYPOLOGY:** the more simply-planned units are arranged in terraces facing onto either the central open space, or onto the ground-level pedestrianised 'Ways'. These units take the form of either one-bedroomed bungalows, one-bedroomed flats (arranged one over the other in two-storey blocks), or two-storey, four-bedroomed, houses.

More sophisticated planning is used for the units accessed from the raised pedestrianised 'Walks'. Also arranged in terraces, to one side of each Walk is a series of one-bedroomed flats accessed directly from the Walk. Above each flat is a four-bedroomed maisonette accessed from a raised communal walkway. To the other side of the Walk are three-storey, split-level, two-bedroomed houses, accessed from the Walk at the mid level of each house.

**EXTERIOR:** the overriding architectural aesthetic of the estate is defined by the robust plains of yellow brickwork broken by horizontal bands of exposed concrete structure, which form the elevations of the buildings, balcony walls, garden walls, retaining walls, and balustrading. The topography of the site, the varying heights of the blocks, and the relationship of the blocks to one another, means that in places these plains of brickwork form interesting geometric compositions and vistas through the site.

The buildings have shallow double-pitched roofs, the pitches off-set, with ridge-level clerestory windows. The split-level houses have a continuous skylight strip which runs along the front of the roof, giving light to the entrance halls and kitchens of each house beneath. All units have one range of floor-to-ceiling windows, either opening out onto balconies, patio gardens, or, in the case of the maisonettes, looking out over the tops of the other units, and into the surrounding trees. Windows and doors are set in from the face of the walls, and, on the upper floors, are set just beneath eaves level, giving the brickwork the appearance of a screen into which the openings are punched.

**INTERIOR:** the interiors of the units vary depending on their type, but they are generally simply detailed, with open-tread stairs, relatively open-plan living spaces, and where the original survives, chunky timber joinery.

#### ROTUNDA

The Rotunda is a single-storey circular building with a shallow conical roof, accessed from the west between curved brick walls. It is walled to the north, east and west in brick, and by glazed timber-framing to the south, where it looks out onto a sheltered playground. The building and its playground is on a single level, but the ground level around it rises to the east, meaning it appears semi-submerged from the public open space. The internal planning is simple, with a principal circular hall, and smaller rooms set around the edge, accessed from folding glazed doors. To the south west of the hall is an entrance lobby and store room. The floors are of timber, with brick sets in the lobby, and the ceilings are lined with timber boarding.



**Selected Sources**

Franklin G and Harwood E, Housing in Lambeth 1965-80 and its National Context, 2013  
Oxford Dictionary of National Biography, Edward Hollamby,  
<http://www.oxforddnb.com/templates/article.jsp?articleid=73652&back=>, 27 August 2013

**Map**

**National Grid Reference:** TQ3134073645



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The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - 1416816\_1.pdf

## **E. Original Design Brochure (1960s) by Lambeth**

# **1 Introduction**

The scheme described in this brochure has been prepared for the redevelopment of a site near the summit of Tulse Hill backing onto and overlooking Brockwell Park with views extending over Central London. The proposals include the erection of 290 dwellings and a nursery school and allows for the relocation of McGregor House a boys' hostel owned by Homes for Working Boys in London.

## **2 The Site**

The site which occupies the sites of Nos. 109-147 Tulse Hill is approximately 10 acres in extent. It is bounded by Tulse Hill on the west, Brockwell Park on the east, Trinity Rise on the south and the sides of the petrol filling station at 109 Tulse Hill and of the Council's Day Nursery at 107 Tulse Hill on the north. Within this area a small three storey block of privately owned post-war flats at No. 115 Tulse Hill occupies a site extending half way across the site of the proposed development and at the southern end seven two storey houses at Nos. 126-138 Trinity Rise occupy half the frontage to that road. The Council has already approved the relocation of McGregor House (which at present occupies No. 127 Tulse Hill) at the junction of Tulse Hill and Trinity Rise.

The most notable features of the site are the large numbers of fine established trees, the grassed plateau at present used as a playing field, and its relationship to Brockwell Park. These features taken together give it a rare quality of fine landscape which has been sympathetically exploited in preparing the overall layout of the scheme.

## **3 Development Proposals**

It is proposed to provide all the accommodation needed in low rise dwellings. This will avoid any visual obstruction on the views from Brockwell Park and will ensure that all dwellings will have a close contact with the site. Part of the plateau has been kept clear of buildings to extend the landscape of the Park into the site. The buildings are arranged around this in such a way that the lower buildings are adjacent to it with the height increasing to a maximum of four storeys around the perimeter of the site away from the park. Among these buildings as many of the existing trees as possible will be retained and where necessary will be reinforced by new planting. Along the Tulse Hill frontage virtually all the trees adjacent to the boundary will be retained although the G.L.C's. road widening proposals at the northern end of the site will mean the loss of some trees in that area. A "tongue" of landscaped ground will extend from the northern end of the plateau out to Tulse Hill providing an

attractive view into the site for passing pedestrians and traffic and aiding the impression of a green route already partially evident lower down Tulse Hill adjacent to the Dick Sheppard School. Through this landscaped tongue a main pedestrian way leads to the nursery school and then between one and two storey dwellings to a proposed entry to Brockwell Park.

Vehicles generally are kept to the perimeter of the site, one short service road being provided to serve the northern part of the site including the nursery school. A longer one having access onto both Tulse Hill and Trinity Rise serves the remainder of the scheme and also provides vehicle access to McGregor House. Garaging is provided under the higher blocks around the site perimeter adjacent to the service roads. Within the site access to the dwellings is entirely pedestrian although provision will be made for fire brigade vehicles, ambulances etc. to get close to all dwellings in emergencies.

## 4 Dwelling Types

All the dwelling types have been designed to conform to the Mandatory Standards required by the Ministry of Housing and Local Government under the Housing Subsidies Act 1967. With the exception of the special block (type C) designed for disabled persons, the buildings fall into two main types. Type A is the larger and contains the communal garages. A pedestrian way is situated over this with four person houses on one side and two person flats and five person maisonettes on the other. Type B consists of a central pedestrian way at ground level with six person houses on one side and two tiers of two person flats on the other. The six person and two person dwellings are also used on their own in appropriate parts of the site and in the case of the two person dwellings both as two storey flats and as bungalows. A specially designed two storey block (type C) situated adjacent to the existing flats at No. 115 Tulse Hill contains on the ground floor six disabled persons dwellings, each with its own garage with easy access off the service road, and on the first floor eight bed-sitting room flats.

70% of one and two person dwellings will be equipped and heated to the standards required for elderly persons.

### Block Type A

4 Person houses

5 person maisonettes over 2 person flats.

		Sq. Ft.
4 P House	Living room	274
	Dining/Kitchen	110
	2 Bed room	118
	2 Bed room	109
	Overall (including store)	820

5 P Maisonette	Living room	178
	Dining/Kitchen	120
	2 Bed room	161
	2 Bed room	105
	1 Bed room	69
	Overall (including store)	915
2 P Flat	Living room	192
	Kitchen	72
	2 Bed room	122
	Overall (including store)	510

### Block Type B

6 person houses

2 person flats

6 P House	Living room	208
	Dining/Kitchen	153
	2 Bed room	132
	2 Bed room	104
	1 Bed room	79
	1 Bed room	73
	Overall (including store)	1040
2 P Flat (Upper)	Living room	198
	Kitchen	62
	2 Bed room	122
	Overall (including store)	510
2 P Flat (Lower)	Living room	212
	Kitchen	79
	2 Bed room	122
	Overall (including store)	533

### Block Type C

1 person flats

2 person disabled persons flats

4 person disabled persons flats

		Sq. Ft.
1 P Flat	Bed/Sitting room	190
	Kitchen	53
	Overall (including store)	348
2P Flat	Living room	186
	Kitchen	52
	2 Bedroom	152
	Overall (including store)	531
4 P Flat	Garage	
	Living room	175
	Dining/Kitchen	120
	2 Bedroom	172
	2 Bed room	142
	Overall (including store)	815

## **5 Nursery School**

The Development Committee on 16th October, 1967, agreed to inform the I.L.E.A. that the Council would be prepared to meet their request that provision should be made for a nursery school on the Tulse Hill site, as part of the Council's development. The I.L.E.A. have asked that a school for 40 children be provided and a site of 0.14 acres has been allocated for this centrally on the site in a position easily reached both by children on the new scheme and from the surrounding area.

The detailed design for this building will be submitted later but its extent is indicated on the layout.

## **6 Space and Water Heating**

All dwellings will be heated by individual gas fired units in each dwelling. The units will be of sufficient capacity to heat the living rooms to 68°F, while the rest of the dwellings will have background heating to between 50° and 55°F. For the Old Persons dwellings the temperature will be 70°F in living rooms and kitchens. Hot water supply will be from gas fired circulators.

## **7 Refuse Disposal**

Each dwelling has provision for paper sacks for domestic refuse. Disposal points are positioned on natural routes out of the site. Bulk refuse containers located in the refuse chambers at garage level in the type A blocks can be emptied into refuse vehicles on the service roads adjacent. A store for bulky items of refuse will also be provided.

## **8 Construction**

All dwellings are of simple brick crosswall construction with concrete floors at ground level and between dwellings and timber intermediate floors and roofs. External walls are of cavity construction. The garages below the type A blocks are of reinforced concrete construction. The roofs will be insulated against heat loss to give a 'U' value of 0.15 and the floors and external walls to give a 'U' value of 0.2.

## **9 Landscaping**

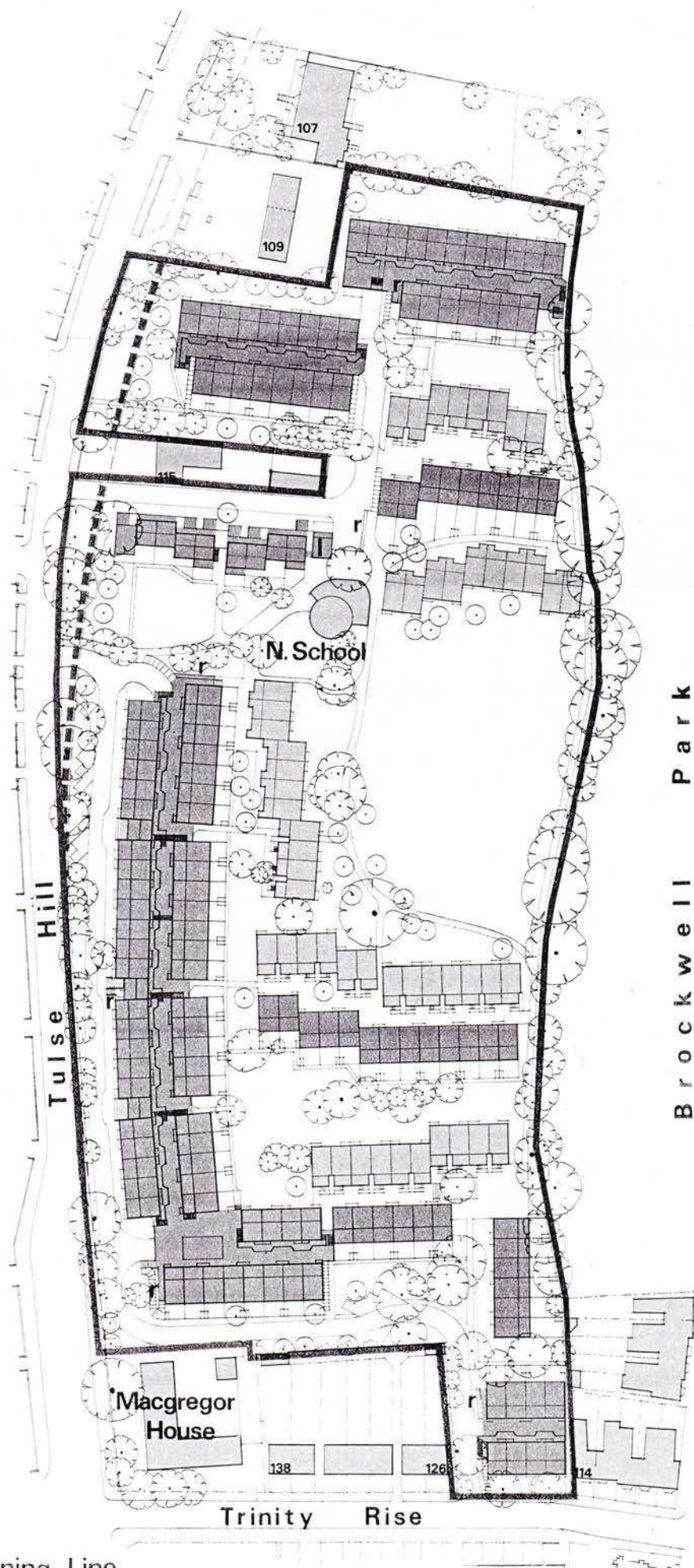
Wherever possible existing trees and planting will be retained and additional planting will be carried out to reinforce this.

Advantage will be taken of the fine views of Brockwell Park through the screen of trees along the rear boundary of the site. The quality of this landscape setting is shown on the cover of this brochure and every effort will be made to retain its character. Interesting glimpses of the views towards the park will be obtainable from many points between the buildings and from the upper (living) floors of the perimeter dwellings. Paved access routes on the entry sides of dwellings will contrast with the larger green, treed spaces on the living sides many of which link visually with the open plateau and the park beyond.

## 10 Schedule of Accommodation

Six person houses	34
Five person maisonettes	51
Four person houses	51
Four person (disabled) flats	3
Two person flats	120
Two person (disabled) flats	3
Two person bungalows	17
One person flats	11
Dwellings	290
Garage spaces	224
Parking spaces	29
Refuse chambers	6
Bulk refuse store	1
Launderette	1
Transformer chambers	2
Gardeners store	1
Nursery School	1
Net area of site	9.49 acres
Gross area of housing site	9.96 acres
Gross area of site including Nursery School	10.10 acres
Total number of bed spaces	966
Density in bed spaces per acre	97
Estimated population at 1.1 persons per habitable room	920.7
Density in persons per acre	92.4

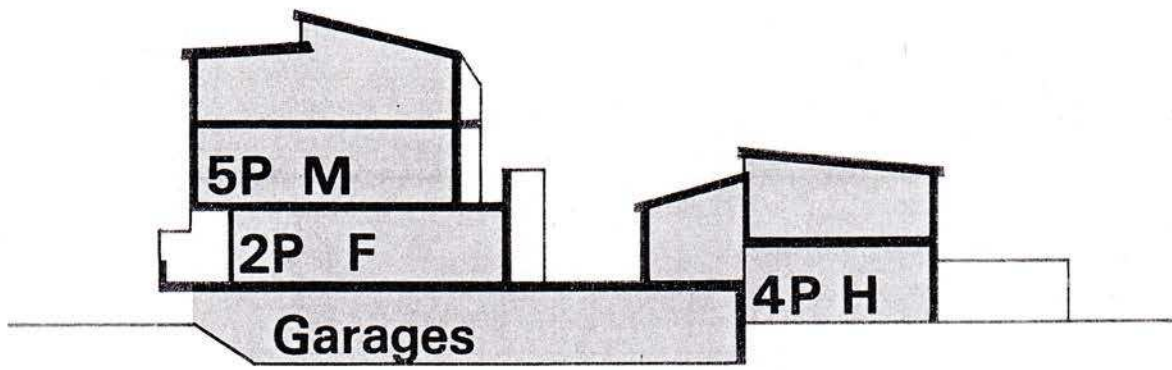




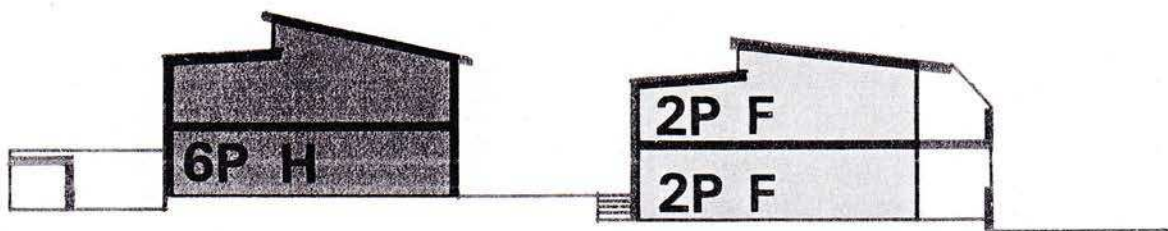
- Road Widening Line
- ⊗ Existing Trees
- New Trees
- l Launderette
- r Refuse Chambers

# Site Layout

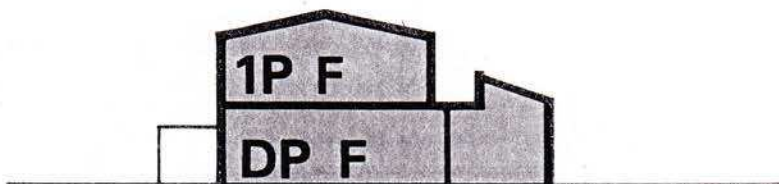




**Block Type A**



**Block Type B**

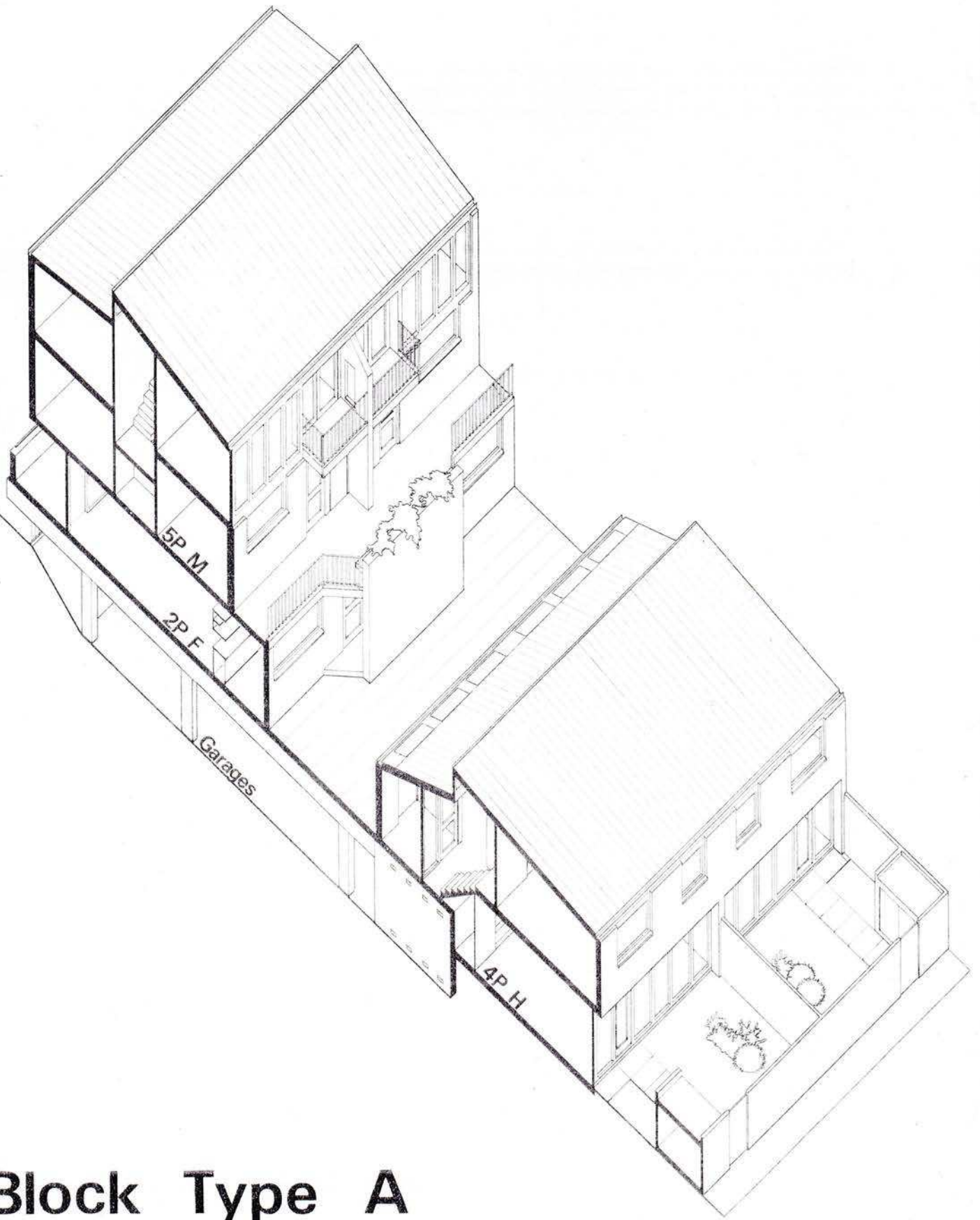


**Block Type C**



**2P Bungalow**

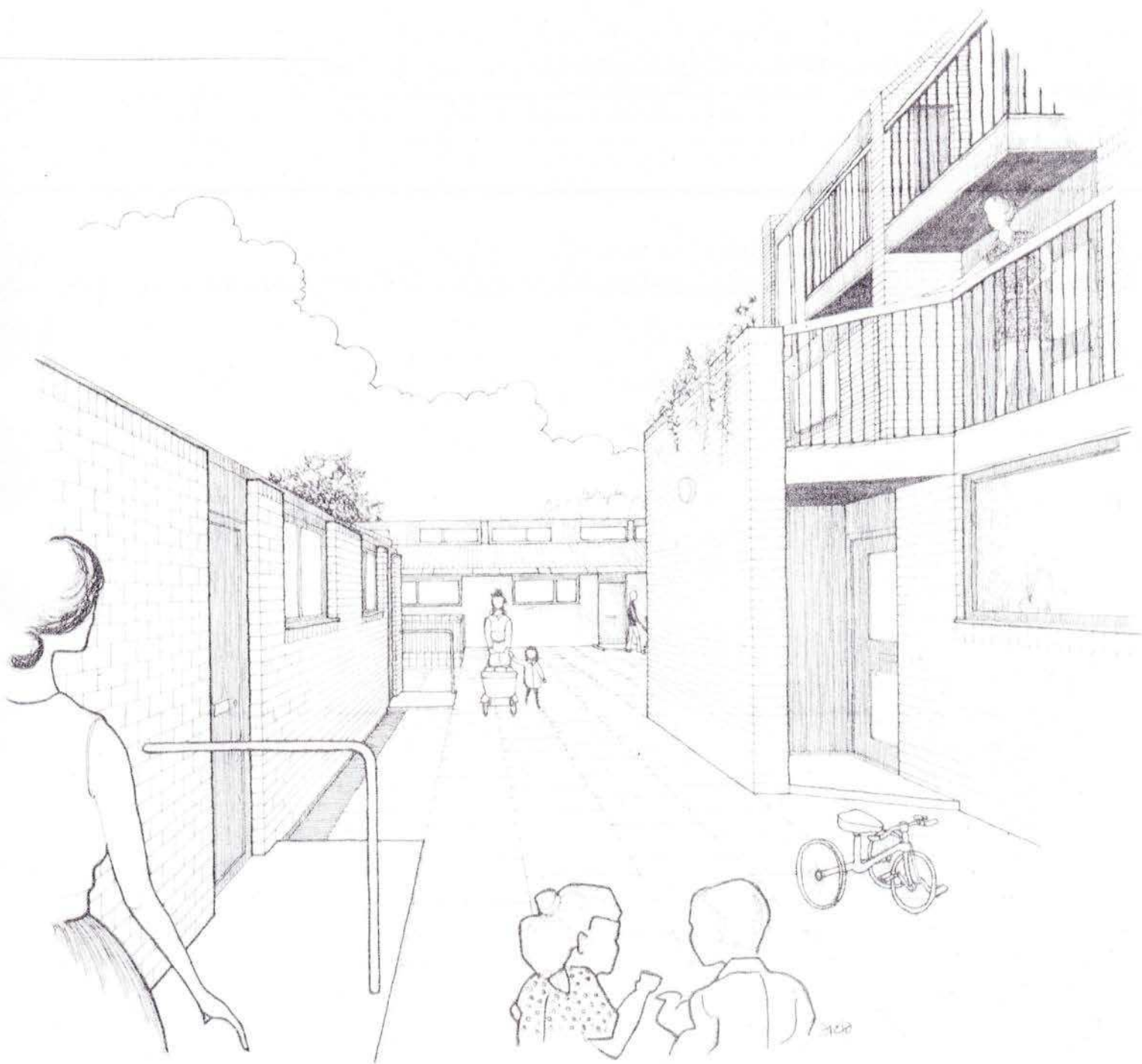
# Key Sections



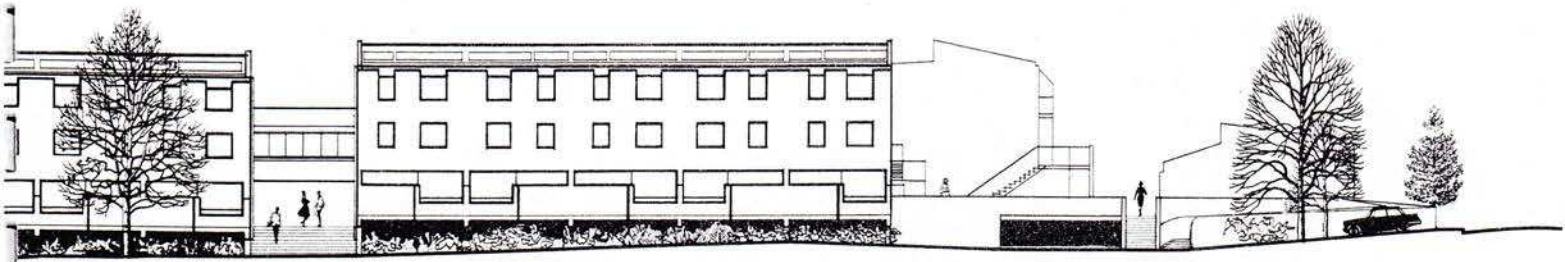
**Block Type A**



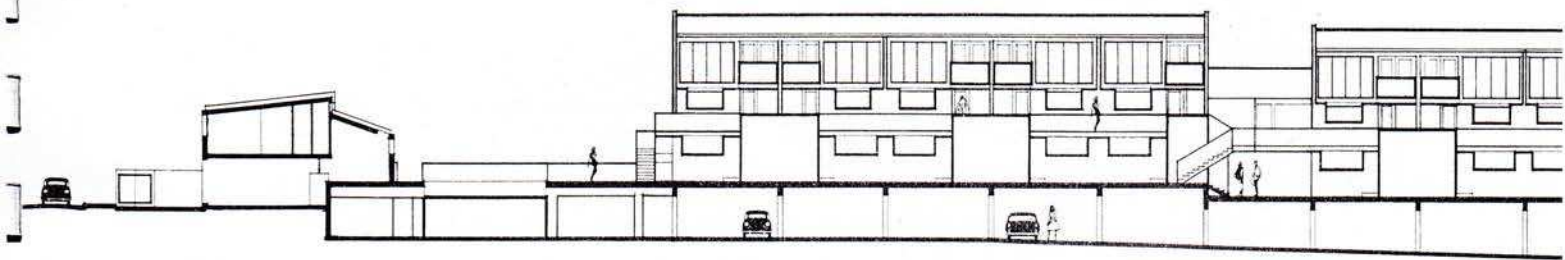
**Block Type A** Access Way



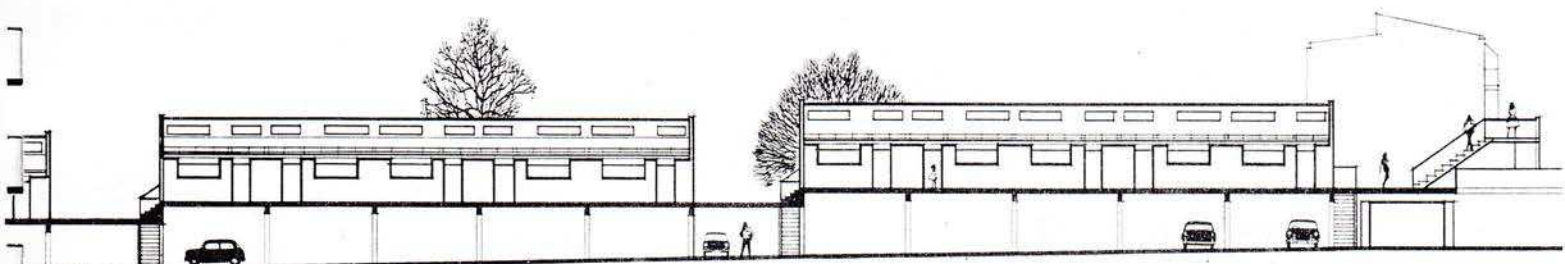
**Block Type A**



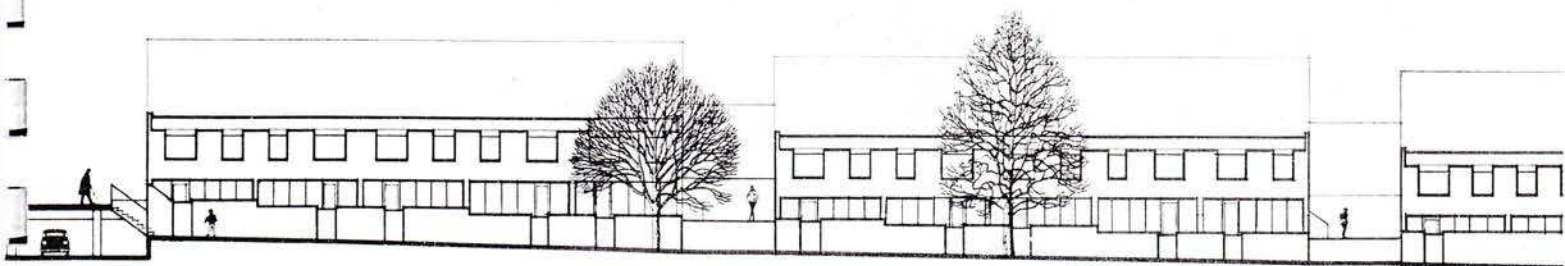
Elevation a.a



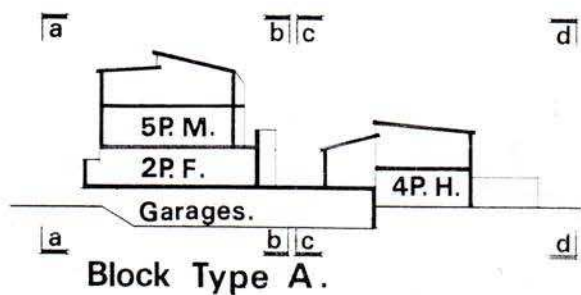
Elevation b.b



Elevation c.c

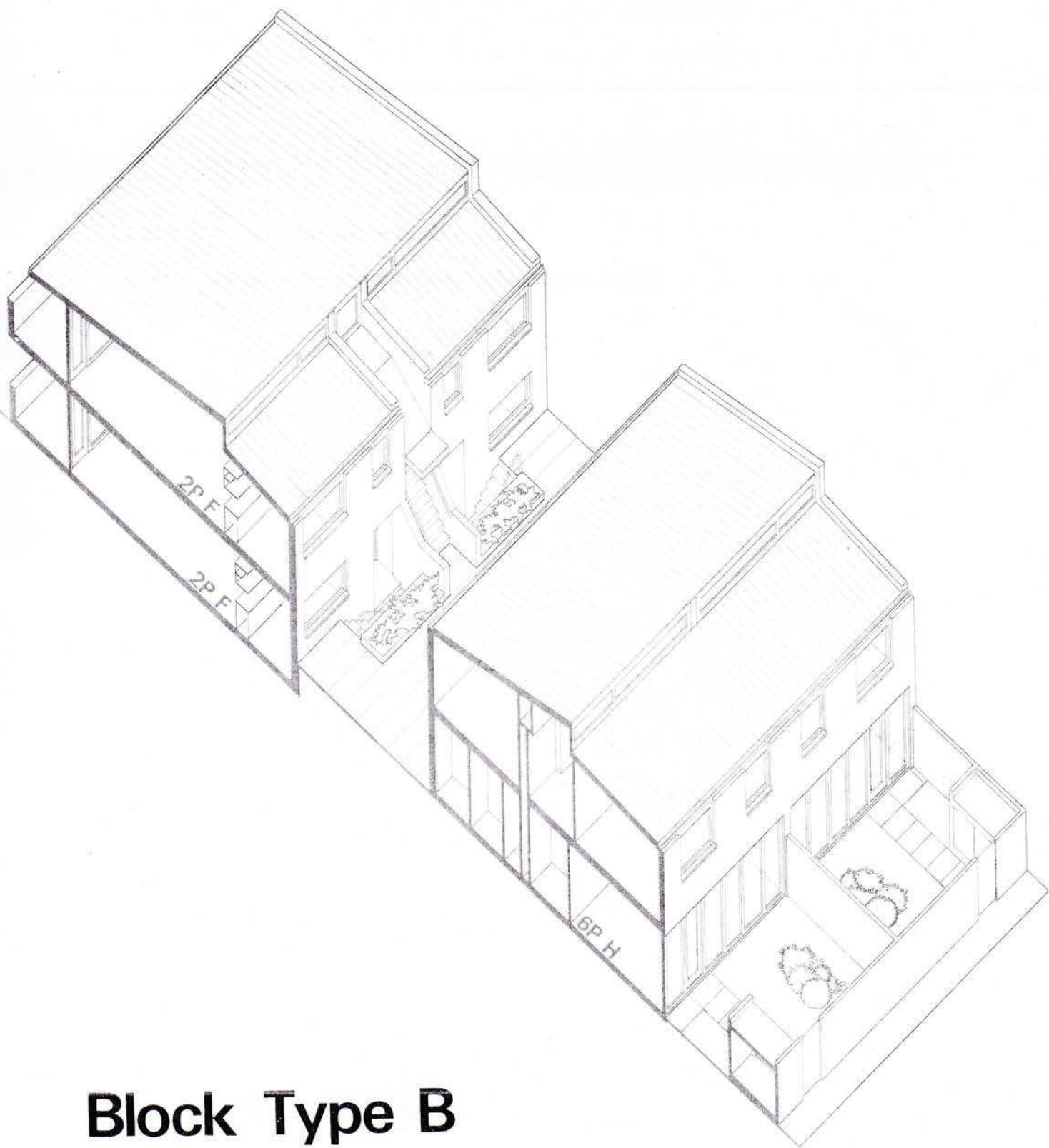


Elevation d.d

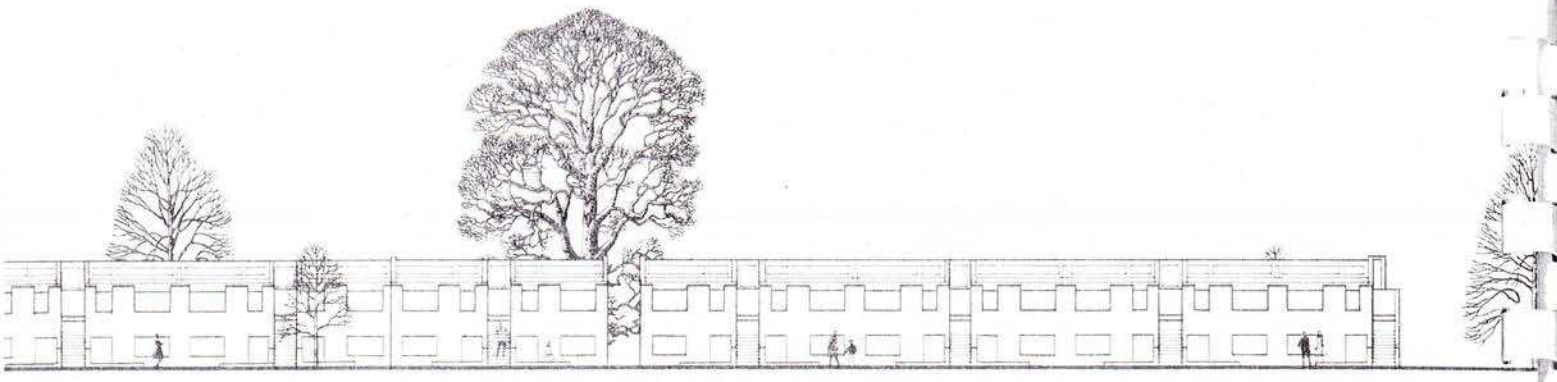


# Elevations

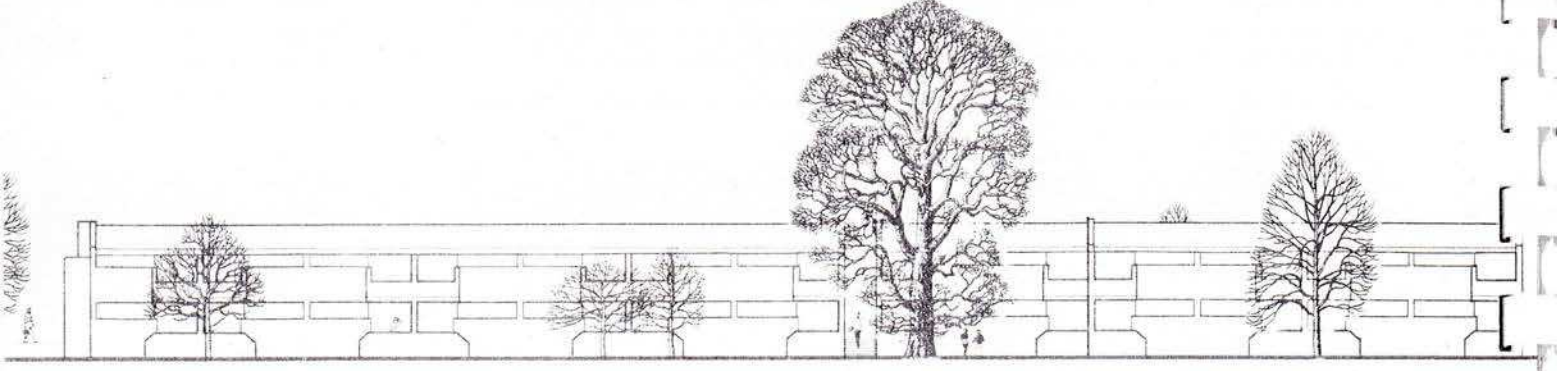




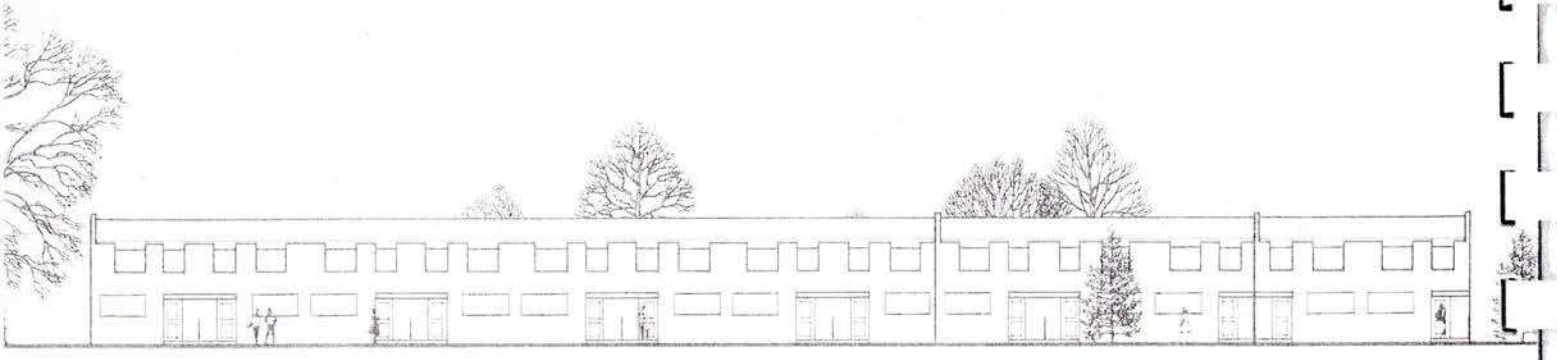
**Block Type B**



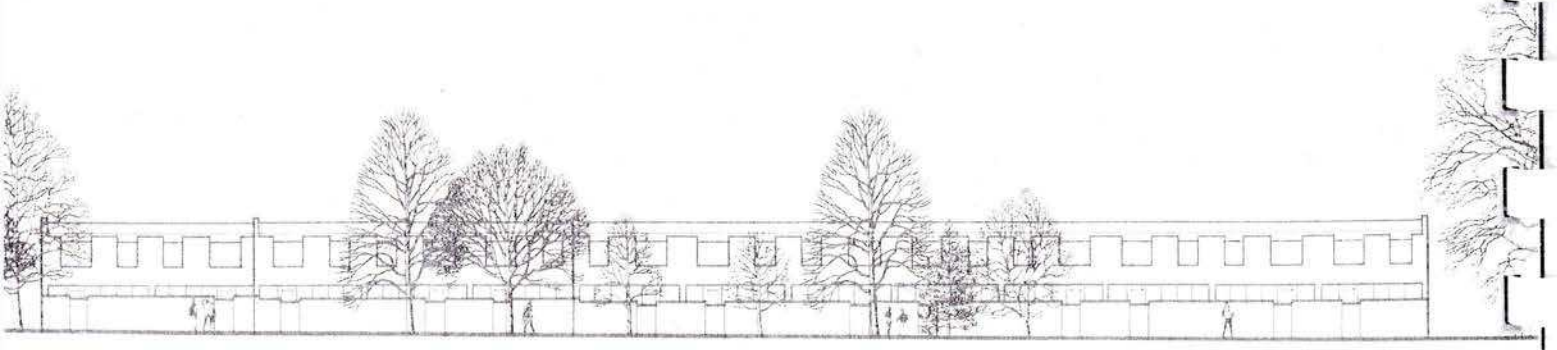
Elevation a.a



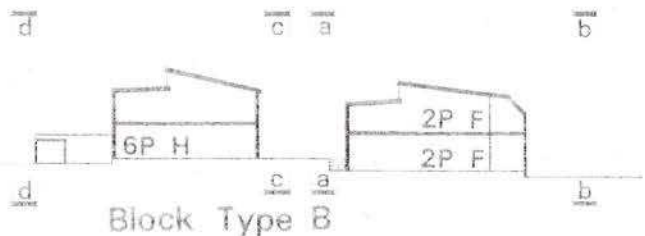
Elevation b.b



Elevation c.c



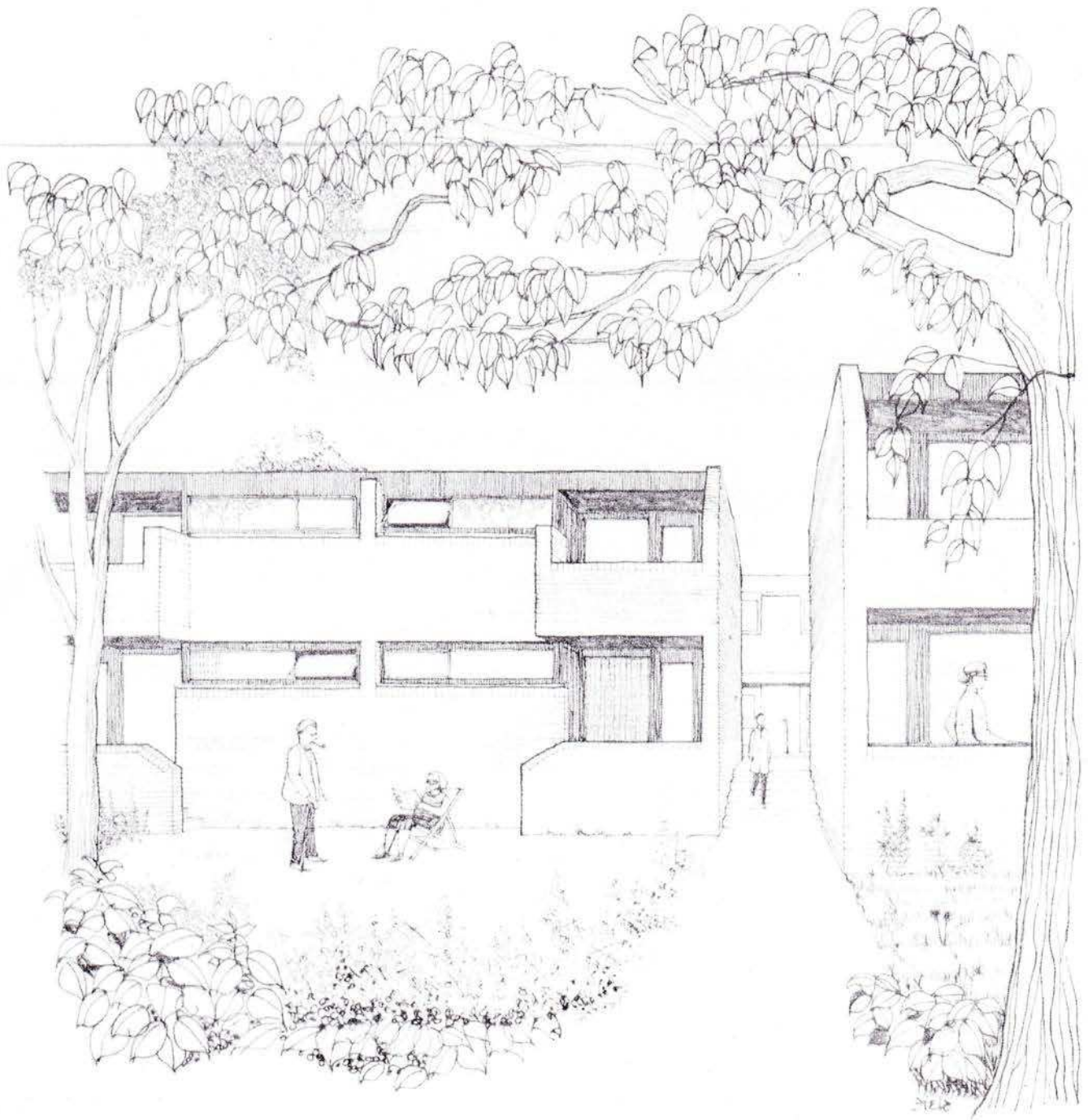
Elevation d.d



# Elevations



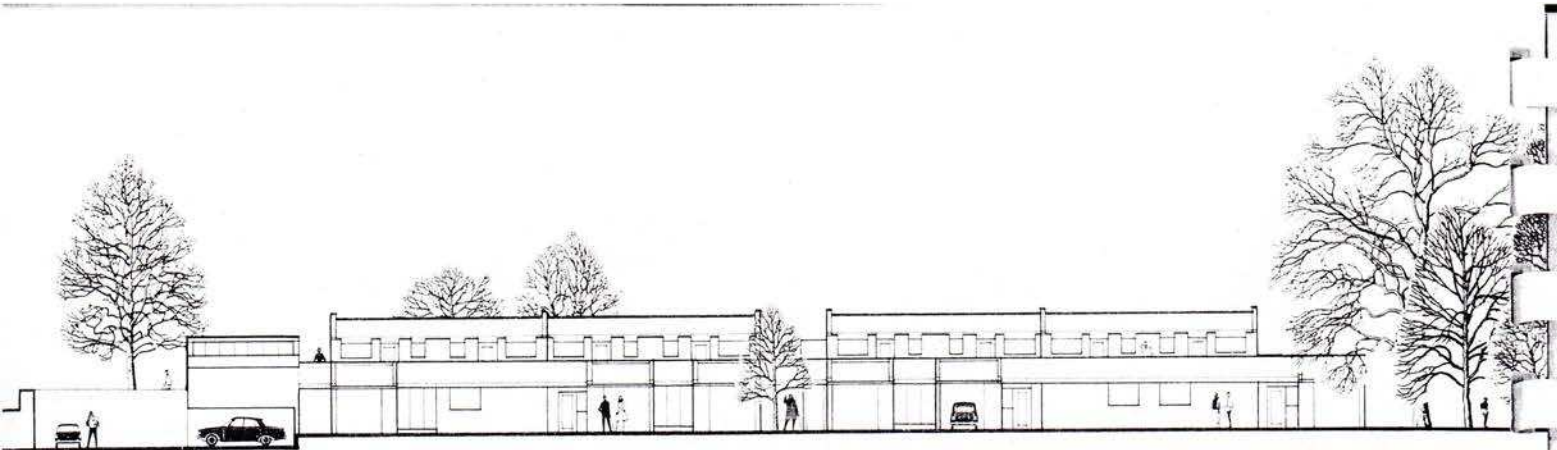




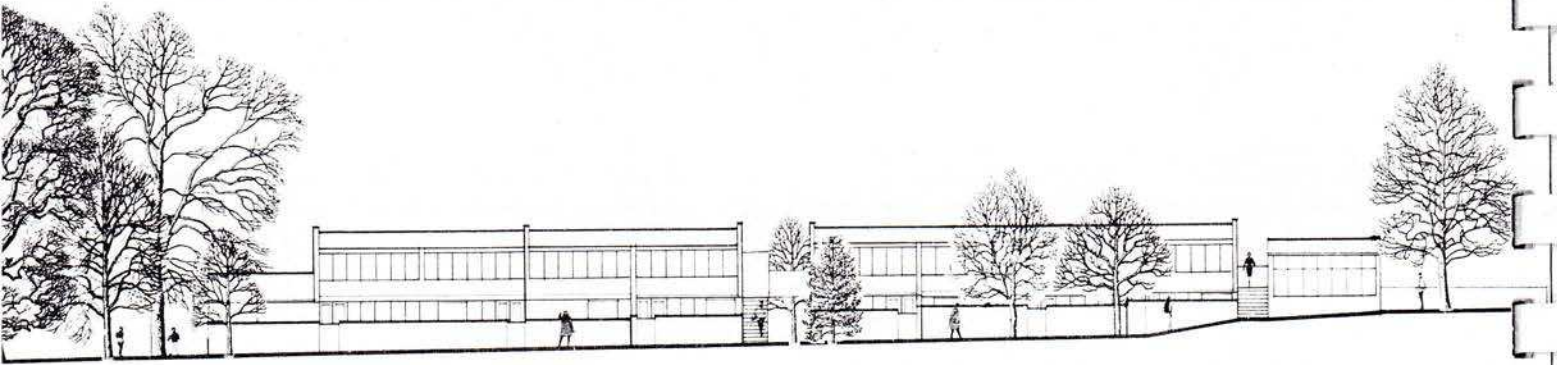
**Block Type B**



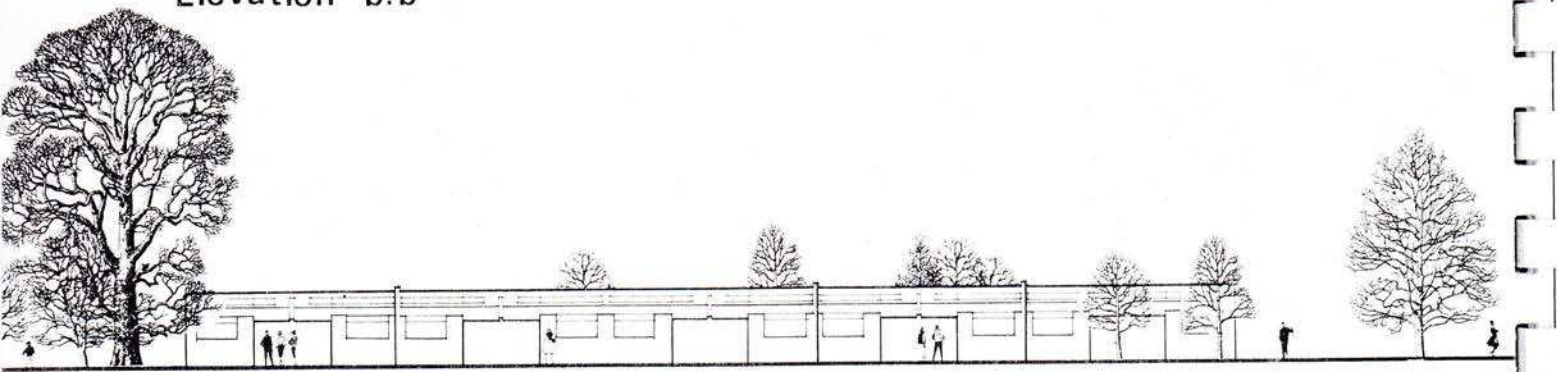
**Block Type B** Access Way



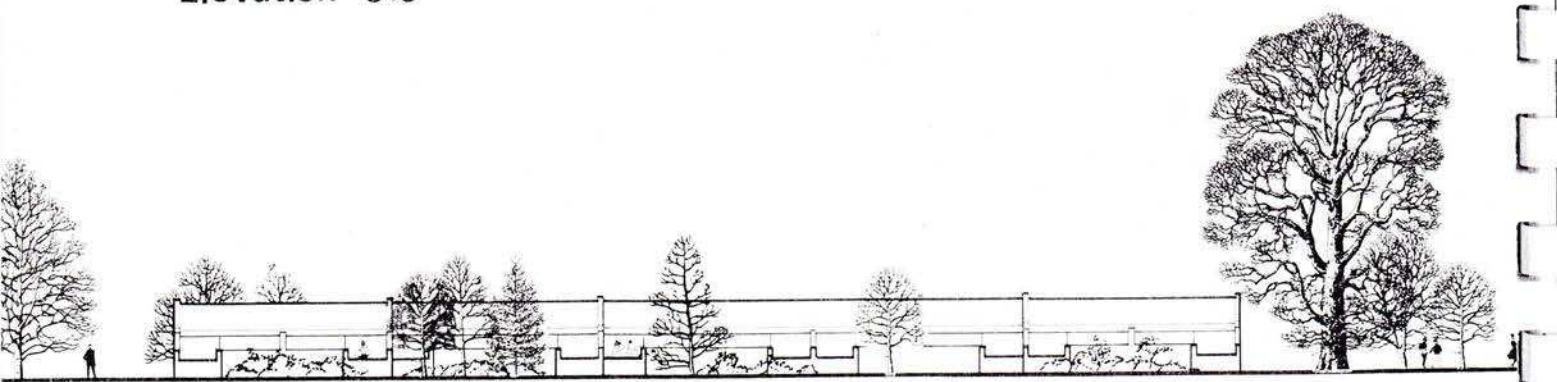
Elevation a.a



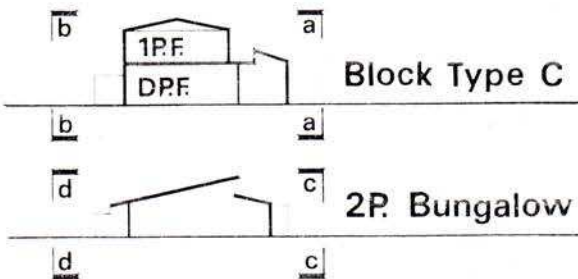
Elevation b.b



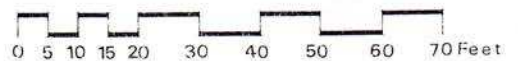
Elevation c.c



Elevation d.d



# Elevations



## **F. Sturgis Report: Renewable Technologies**

# Cressingham Gardens

London, SW2

Renewable Technologies Technical Report \_Rev E

October, 2015



For Cressingham Gardens Community

by **sturgis** carbon profiling™

# Executive Summary

## Scope of the report

Sturgis Carbon Profiling (SCP) was commissioned by the Community of Cressingham Gardens to gauge the opportunity for the installation of the renewable technologies suitable to support the 306 homes on the estate.

This is a follow-on report from the Technical Feasibility Study that was issued in December 2014 in support for Urban Community Energy Fund grant application.

This report aims to provide detailed technical analysis of the renewable systems which look at the technical suitability and costs in more detail.

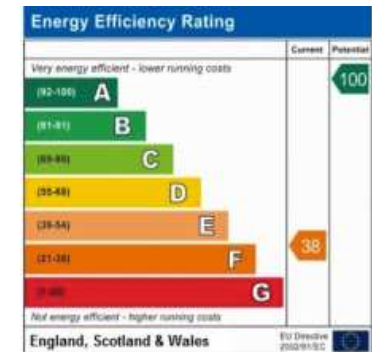
From the list of eight renewable technologies presented in the original study, also enclosed, only four were selected as identified as most appropriate in the first feasibility report due to the technical and planning constraints:

- **Solar photovoltaic panels;**
- **Mechanical Heat Recovery Ventilation (MVHR);**
- **Gas operated Combined Heat and Power (CHP);**
- **Anaerobic digestion (AD) with CHP.**

Renewable heat network was removed from the scope after public consultation with the residents as received negative feedback.

This report will look at further recommendations for the development, costs of the systems and will review the public opinion in relation to each of the above technologies.

Please refer to Appendix A for definition of terms in relation to financing and funding chapters.



### Cressingham Gardens Retrofit program

A separate report is available by Sturgis Carbon Profiling looking at the feasibility & costs of low-energy EnerPHit Retrofit of the estate, a step-by-step approach that is aiming to achieve the following:

- Eradicate fuel poverty on the estate;
- Improving the health & wellbeing of the residents, particularly as the estate has a high proportion of the young, elderly and disabled.
- Aiming to deliver Zero Carbon refurbishment in reality, not just on paper.
- Minimising maintenance cycles and associated costs.

# Executive Summary

## Background

Cressingham Gardens is a medium-density low-rise estate built in late 60s/70s in Tulse Hill, London. It is a very popular estate because it faces green and leafy Brockwell Park, and has excellent transport links (only 15 min bus ride away from Brixton station).

There is a vibrant community that live on the estate that consists of 306 homes, located in one of the more deprived neighbourhoods in England (based on data from ONS) . 70% of the homes are council homes and 30% direct homeowners.

Some of the homes on the estate need urgent repair works to bring it back to its former glory. Despite the council's poor record of repairs & maintenance, the design & architecture of the estate has created an amazing community and one that has a below level of crime. It is actually a role model community and highly desired by all that live both on and off the estate. The demand for properties is extremely high, because people rarely leave due to the high quality of life and community.

Lambeth Council is developing proposals for full demolition of the estate, as it states it cannot afford repairs and refurbishment to a decent homes standard. The proposals are currently at a master-planning stage. Lambeth estimates that it will take three to four years to get to the project off the ground.

The residents are looking for an alternative vision that would not require the demolition of homes and displacement of the community. As part of this alternative vision, residents would like to incorporate renewable technologies that will make the estate a sustainable role model for London.



*Cressingham Gardens bird-eye view showing village-like layout that encourages community feel*

**One of the objectives of this report is to find a solution that works under both scenarios - Lambeth demolition proposal or resident led alternative refurbishment proposal - to ensure that the full return on the investment can be realised**

## Executive Summary



*Cressingham is a well looked after estate with community gardens and green leafy neighbourhoods*



*Village-like design using pedestrianised streets, high level balconies and maximising day lighting to create a safe community feel.*



# 1. Photovoltaic Panels

# Photovoltaic Panels

## What are Photovoltaic Panels?

### Photovoltaics (PVs) explained

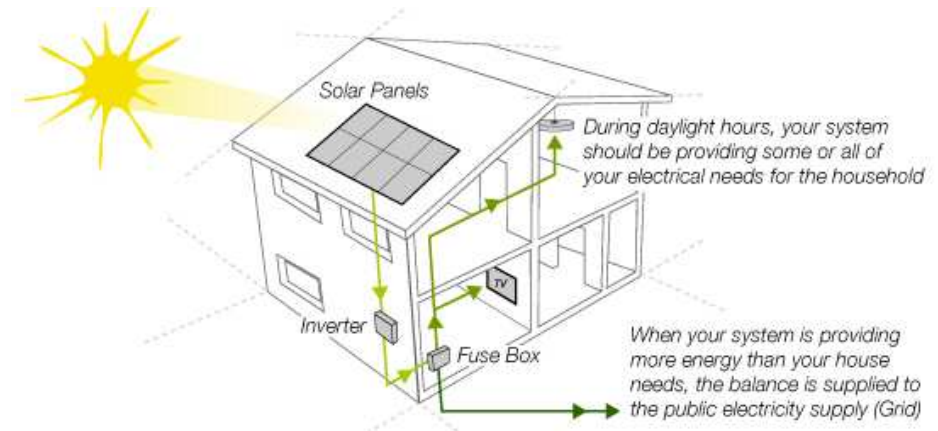
Photovoltaic cells directly convert sunlight into electrical current using semi-conductors. The output of a cell is directly proportional to the intensity of the light received by the active surface of the cell. Exposure to sunlight causes electricity to flow through the cells. Direct sunlight produces the greatest output, but power is produced even when overcast.

### Benefits

- PV panels provide clean, green energy from the Sun, which is free and abundant!
- Their cost is currently on a fast reducing track, which makes it an economically viable solution.
- Operating and maintenance costs for PV panels are considered to be low, almost negligible, compared to costs of other renewable energy systems.
- PV panels have no mechanically moving parts, consequently they have far less breakages or require less maintenance than other renewable energy systems.
- PV panels are totally silent, producing no noise at all; consequently, they are a perfect solution for urban areas and for residential applications.
- Government subsidy funding (FITs, tax credits etc.) is available for PV panels, thus financial incentive for PV panels make solar energy panels an attractive investment alternative.
- Residential solar panels are easy to install on rooftops or on the ground without any interference to residential lifestyle.



*Proposal is to use standard Photovoltaic silicon cells.*



*The electrical power generated by PV panels can either be used at home or sold to the Grid.*

# 1. Photovoltaic Panels

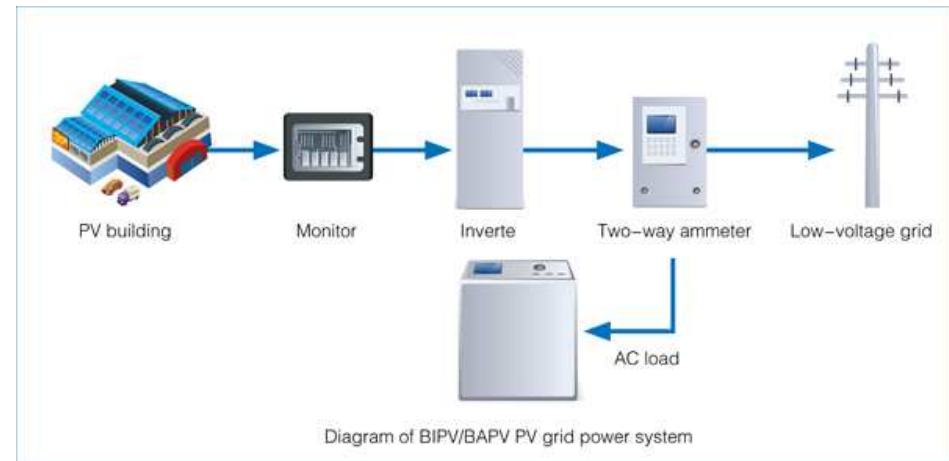
## System integration

Photovoltaic panels can either be integrated modules (incorporated into glazing, the facade or roof tiles of a pitched roof, etc.) or mounted in angled arrays on a flat roof.

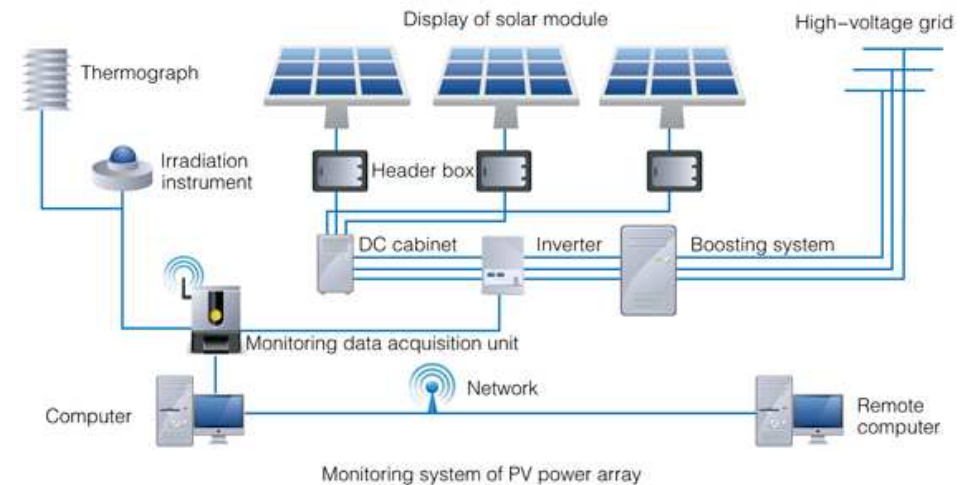
- PV modules are based on silicon cells are the most common type and are being considered for this project because of the cost and performance benefits;
- Poly silicon panels are moderately cheaper with corresponding lower performance;
- Mono-silicon panels are more expensive but with higher levels of performance.

Electricity from the PV array system could be installed in the following configuration:

1. Used for profit only (100% of energy generated sold). As this requires less conversion, this type of system is cheaper to install.
2. Fed via inverters into the distribution network of the building where it is anticipated the half of the electricity will be consumed. A further connection will enable unconsumed electricity to be sold back to the electricity grid. This type of system offers social benefits and applies for government subsidies.
3. Future-proof system that uses battery for household power storage. Once the battery is fully loaded, the remaining electricity is sold to the grid. Until recently, this was a very expensive and inefficient option.



*Building integrated PV system application, where the energy generated is utilised in people's homes (average assumed 50% used and 50% sold).*



*Large PV Grid connection is a kinds power generation system where all energy is taken to the AC grid via the PV inverter. It considered cheaper to install (35-45%) and has increased system life (no fault time).*

# Photovoltaic Panels

## Constraints

### Orientation

Optimum electrical output is obtained from: PV panels facing +/- 45° of South. The Cressingham Gardens is low-rise estate with an expanse of roofs that have East, South and West orientation, optimum for the maximum electricity generation.

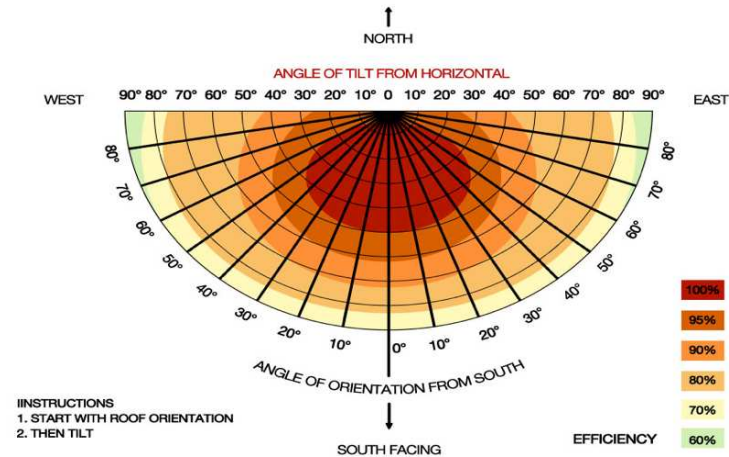
The Cressingham Gardens has shallow roofs inclined at 15 ° from the horizontal. PV panels that are inclined at 10° to 30° from the horizontal are optimum for electricity generation and allow the self-cleaning by the action of rain.

Assume all roofs on the Estate are available for PV installation, excluding rooflights and zones required for their maintenance. There are 206 roofs available on the estate (see Estate plan on p.9).

It is important to avoid locating PV on surfaces that are permanently shaded, even transient shadows should be avoided where possible. Cressingham Gardens has a few mature trees that should be considered in the PV layout design. However, majority of roof have very little overshadowing (assume <20%).

### Maintenance

Panels are typically warranted for 20 years. Safe access around the panels and to other roof plant should be maintained.



PV panel orientation efficiency diagram

Overshading	% of sky blocked by obstacles.	Overshading factor
Heavy	> 80%	0.5
Significant	> 60% - 80%	0.65
Modest	20% - 60%	0.8
None or very little	< 20%	1.0

*Note: Overshading must be assessed separately for solar panels, taking account of the tilt of the collector. Usually there is less overshadowing of a solar collector compared to overshadowing of windows for solar gain (Table 6d).*

Table A: Overshading factor, assume 1 for Cressingham Gardens roofs

Tilt of collector	Orientation of collector				
	South	SE/SW	E/W	NE/NW	North
Horizontal			961		
30°	1073	1027	913	785	730
45°	1054	997	854	686	640
60°	989	927	776	597	500
Vertical	746	705	582	440	371

Table B: Annual solar radiation, assume 961 kWh/m<sup>2</sup> for typical shallow sloping roof

# Photovoltaic Panels

## Constraints

### Structural Survey

Structural Survey has been conducted by TALL Structural Engineers undertaken in 2014 that looked at the general conditions of the Estate's existing roofs.

The report outlines the following condition:

- The majority of the existing roofs are metal zinc clad and are in poor condition;
- The roof joists found to be 250 x 47 @600c/c with herringbone strutting between the joists.
- The original chipboard decks was fixed to the heads of the joists. A low level moisture was present.
- No joists would appear rotten or needed replacement.
- Rockwool insulation has only been placed between joists where roof was replaced.

A general conclusion includes:

- Present roof structure would be suitable to support a new enhanced roof with a similar lightweight finish + a layer of insulation.
- Where deck is damaged by water, it needs replacement but preferably throughout.
- Separate roof loading calculation is required to ascertain the structural integrity of the roof to support PV panels.

See enclosed full Structural Report and sketches overleaf.

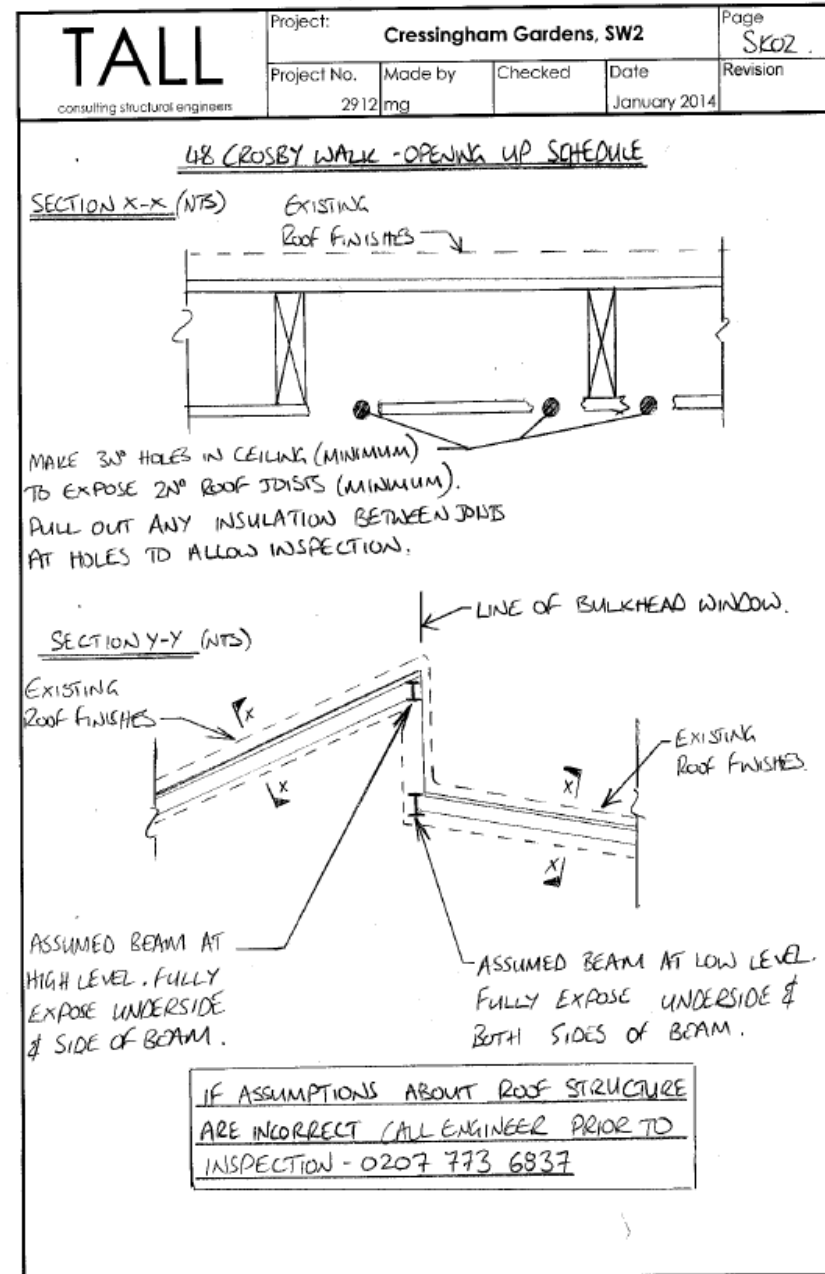
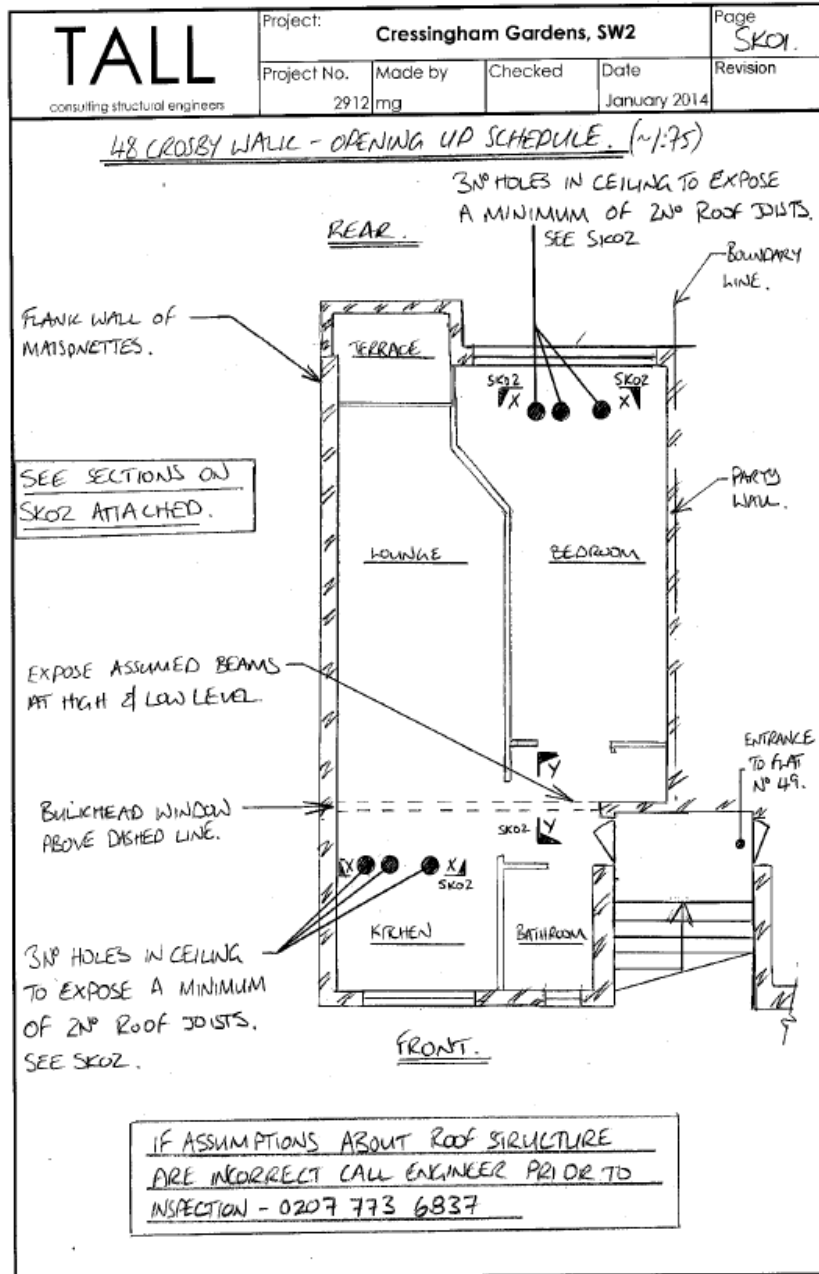


*Existing roofs of Cressingham Gardens are predominantly low-rise zinc clad roofs.*



*Some are in the better conditions than others are due to be replaced in 2015 by the Lambeth Council.*

# Photovoltaic Panels



# Photovoltaic Panels

## Constraints

### Local Planning Issues

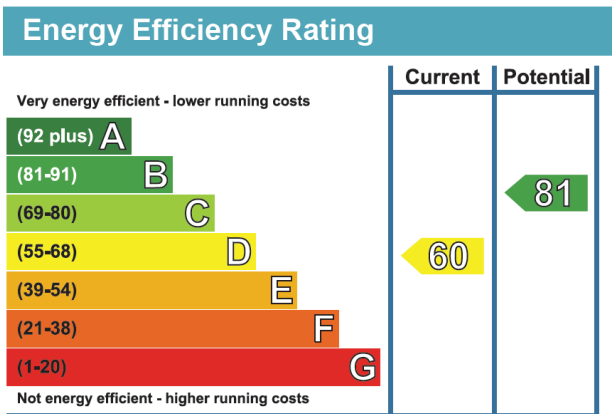
Cressingham Gardens is not located in a Conservation area and does not have Listed Building status.

Roof-mounted PV panels must not exceed the existing envelope size of the estate, and generally should remain hidden from view. Planning permission will be required but no constraints are foreseen.

### Energy rating

Evidence of property's EPC rating will be required for each property when applying for FITs. If no evidence showing the EPC has a band D or higher then the lower rate will apply. Current EPC rating of majority of properties is D, and hence will not be an issue.

The installation of PVs is planned alongside major estate renovation of which roof works are the first phase of the development. We anticipate EPC rating to improve.



EPC rating from a typical 2-bed property, Hardel Walk



Roof spaces suitable for PV installation

- Properties for roof renewal suitable for PV installation
- Sold freeholds
- Live right-to-buy

### Roof capacity

No. of roofs = 206  
 Average roof area (5.6x10m) = 56m<sup>2</sup>  
 Usable roof area 35% = 19.6m<sup>2</sup>  
 Panel size (1.05x1.56m) = 1.64m<sup>2</sup>  
 No. of panels per roof = 12 (3 rows of 4 panels)

**Total no. of panels = 2,472**

### Roof orientation

Each house has a relatively shallow sloping roof with dual orientation.

**SW/ NE = 43**

**N/ S = 163**

## Successful Precedence

### Brixton Energy Solar

Brixton Energy Solar is a co-operative set up to enable local people to invest in renewable energy generation in Brixton and raise funds for energy efficiency initiatives. This is the first inner-city community-owned solar power stations in Britain, consists of:

- Solar 1 - 37kW solar array on Elmore House on the Loughborough Estate (completed 30March2012).
- Solar 2 - 45kW solar array on 5 blocks in Styles Gardens, Loughborough Estate (completed 31October2012).
- Solar 3 - 52.5kW solar array on 4 buildings in Roupell Park Estate (on-going, 100% funding raised).
- Solar 4 - currently in planning stage.

The income from the project is derived principally from the government's Feed-in Tariff scheme, which is guaranteed for 20 years (on-going).

Some of the energy generated by the project is used on site with the remainder energy sold directly back to the grid. After operating costs are deducted, profits resulting from the sale of energy are used to support local energy efficiency initiatives and provide Co-operative members with an annual return on their investment.

A portion of the revenue generated through the project will be placed into a Community Energy Efficiency Fund (CEEF). This fund will then be used to improve the energy efficiency of the housing stock in Brixton, thereby taking meaningful steps to alleviate fuel poverty for some of the poorest residents.

For more info - <http://www.repowering.org.uk/projects>

## Project details



To date, Solar 1 & 2 projects have generated in excess of 50,000kWh of community-owned renewable energy in Brixton.

**4.0%** estimated return\* each year

**50%** tax relief\* via SEIS

**20%** social return\* to a Community Fund

**100%** raised with Local Investors for the Solar 3 (£65,650)

\*See Appendix A for explanation of terms.



# Photovoltaic Panels

## Incentives

### Feed-in Tariffs (FITs)

- **Generation tariff:** Your energy supplier will pay you a set rate for each unit (or kWh) of electricity you generate. The tariff levels are guaranteed for the period of up to 20 years. The tariffs are to be reviewed every three months and will be revised according to deployment rates. See table below for latest rates.
- **Export tariff:** You will get a further 4.77p/kWh from your energy supplier for each unit you export back to the electricity grid, so you can sell any electricity you generate but don't use yourself. Until smart meters are installed, it is estimated as being 50 per cent of the electricity you generate (only systems above 30kWp need to have an export meter fitted).

### Energy bill savings

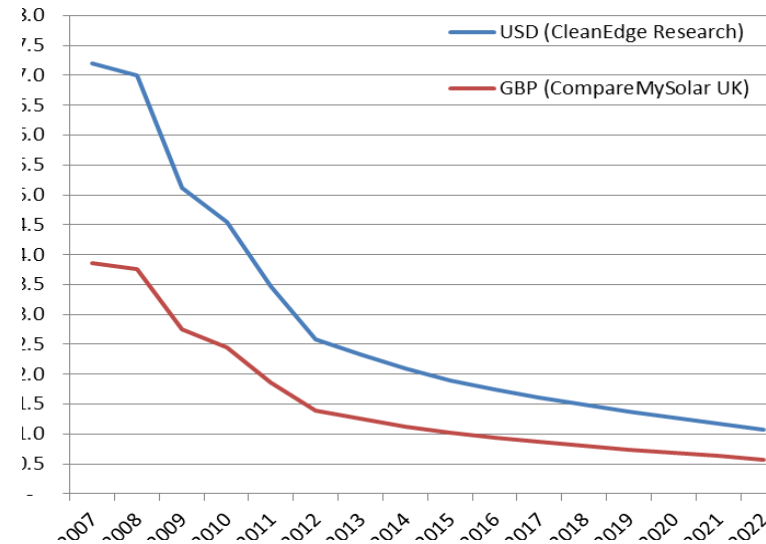
You will be making approx. 50% savings on your electricity bills because generating electricity to power your appliances means you don't have to buy as much electricity from your energy supplier. The amount you save will vary depending how much of the electricity you use on site.

### Renewable Heat Incentive (RHI)

RHI was launched in April 2014 by paying subsidy for renewable heating systems. It does not include PV installation.

**Note:** The Department of Energy and Climate Change (DECC) has announced that it they are looking to stop the pre-registration of the project that allows to fix the FIT and hence build a robust business plan for the project. SCP advises that Cressingham Community accelerates the application process.

### Trends



As the graph shows, the price of a solar PV array has dropped considerably over the years - by 80%+ (20% in 2012 alone), which resulted in a great increase in PV installations (more than 500,000 households have installed solar panels to date).

A typical 3.5kW grid-connected PV roof (covering about 25 square metres) is likely to cost around **£6,000**.

### Summary of PV Feed-in Tariffs

System size	Generation Tariff			Export Tariff
	1 Oct 2015 - 31 Dec 2015			
	Higher rate (≥ EPC D)	Medium rate (multiple ownership)	< EPC D	
4kW or under	12.47 p/kWh	12.47 p/kWh	5.94 p/kWh	4.85 p/kWh
> 4kW – 10kW	11.30 p/kWh	11.30 p/kWh	5.94 p/kWh	
> 10kW – 50kW	11.30 p/kWh	11.30 p/kWh	5.94 p/kWh	
> 50kW – 100kW	9.63 p/kWh	9.63 p/kWh	5.94 p/kWh	
> 100kW - 150kW	9.63 p/kWh		2.64 p/kWh	
> 150kW - 250kW	9.21 p/kWh		2.28 p/kWh	
> 250kW	5.94 p/kWh		1.03 p/kWh	
Stand-alone	4.28 p/kWh		1.03 p/kWh	

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Green Deal

Green Deal Loan could be provided to homeowners for up to 32% of the total installation cost of PV system. However, this funding is not be available for large-scale community-run PV installation.

### Green Investment Bank (GIB)

The Green Investment Bank was set up by the UK Government as a public company in October 2012. The Bank has £3 billion to invest in sustainable projects, where public capital is used to support private investment. Community-scale renewable projects are widely supported by the GIB.

### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security. Only available through accredited EFG lenders, detailed on the Department for Business Innovation & Skills (BIS) website, available until 31 March 2015.

### Capital Grant Aid

Capital grant schemes are available to support some of the community projects. However, it is generally not possible for a generator to benefit from both FITs/RHI and a grant from a public body except in specific circumstances.

### Other Grant Aid and Support

WRAP provides funding on occasion, including capital grants.

### Enhanced Capital Allowance

The Enhanced Capital Allowance Energy scheme provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria.

### Private Equity

Private equity finance may also be an option. Brixton Energy Solar is a good example of successful privately funded scheme by the local residents that benefit from 4% return on their investment.



# Photovoltaic Panels

## Investment cost & return - installation <50Kw (327Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh	38,212
Estimated Generation power, kW - assume 5% loss	47.2
Panel Type	Sunpower 327
Panel output, Wp	327
No of households	306
No of available roofs	20
No of units (8 panels per house)	152
Peak power, kWp	49.7
Solar Radiation (table A, p.6)	961
Zpv Overshadow Factor (table B, p.6)	1

CAPITAL EXPENDITURE	
Cost of unit	£ 663.71
Cost of all units	£ 100,885
Installation	inc. above
Preparation of roof (strengthening, etc)	inc. in retro work
Consultants fees (planning app, etc)	£ 45,000

<b>Total Expenditure</b>	<b>£ 145,885</b>
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RUNNING COSTS/ per year	
Electricity used by system	£0.1379
Maintenance cost/ per annum	£ 532
<b>Sub-total</b>	<b>£ 532</b>

SAVINGS/ per year	
Electricity generated @80% peak power, kWh**	38,212
Electricity cost saved for households @50%	£0.1379
Gas generated	0
Gas cost saved for households	£0.0463
<b>Sub-total</b>	<b>£ 2,635</b>

INCENTIVES/ per year	
Feed-In Tarriff - Generation Income @100%	£0.0369
Feed-In Tarriff - Export Income @50%	£0.0485
<b>Sub-total</b>	<b>£ 2,337</b>

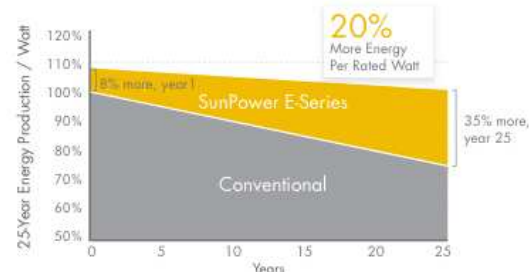
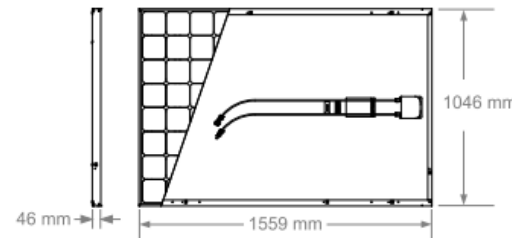
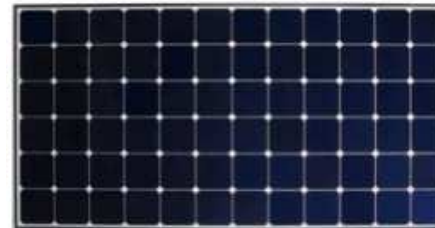
<b>Total Value</b>	<b>£ 4,439</b>
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<b>Total potential saving per household</b>	<b>£ 15</b>
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Investment Cost (ex VAT)	£100,884.57
Investment Cost (incl VAT)	£105,928.80
Return (IRR)	5% 1.13%
Pay Back Years	23.86

CO2 Saving annual (kg)	20,788
CO2 Saving life (kg)	519,689

### Example of manufacturer info Sunpower 327 PV Panel



The performance of solar PV systems is not certain due to the variability of annual solar radiation location. This estimate is based upon the manufacturer's data (Sunpower) and government guidance (SAP). It should not be considered as a guarantee of performance. \* Peak power, kWp is the output power achieved by a Solar module under full solar radiation (under set Standard Test Conditions). Solar radiation of 1,000 watts per square meter is used to define a standard nominal output and is based on measurements under optimum condition. \*\* Estimated radiation, kWh is power under actual radiation conditions. In practice, this will be approximately 15-20% lower due to the considerable heating of the solar cells.

## SUNPOWER® E20 SERIES

OPERATING CONDITION AND MECHANICAL DATA	
Temperature	-40°C to +85°C
Max load	Wind: 2400 Pa, 245 kg/m <sup>2</sup> front & back Snow: 5400 Pa, 550 kg/m <sup>2</sup> front
Impact resistance	25mm diameter hail at 23 m/s
Appearance	Class A
Solar Cells	96 Monocrystalline Moxeon Gen II
Tempered Glass	High transmission tempered Anti-Reflective
Junction Box	IP-65 Rated
Connectors	MC4
Frame	Class 1 black anodized (highest AAMA rating)
Weight	18,6 kg

ELECTRICAL DATA		
	<b>E20-327</b>	<b>E19-320</b>
Nominal Power <sup>12</sup> (P <sub>nom</sub> )	327 W	320 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency <sup>13</sup>	20.4%	19.8%
Rated Voltage (V <sub>mpp</sub> )	54.7 V	54.7 V
Rated Current (I <sub>mpp</sub> )	5.98 A	5.86 A
Open-Circuit Voltage (V <sub>oc</sub> )	64.9 V	64.8 V
Short-Circuit Current (I <sub>sc</sub> )	6.46 A	6.24 A
Max. System Voltage	1000 V IEC & 600 V UL	
Maximum Series Fuse	20 A	
Power Temp Coef.	-0.38% / °C	
Voltage Temp Coef.	-176.6 mV / °C	
Current Temp Coef.	3.5 mA / °C	

TESTS AND CERTIFICATIONS	
Standard tests	IEC 61215, IEC 61730, UL1703
Quality tests	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, PV Cycle
Ammonia test	IEC 62716
Salt Spray test	IEC 61701 (passed maximum severity)
PID test	Potential-Induced Degradation free: 1000V <sup>10</sup>
Available listings	TUV, MCS, UL, JET, KEMCO, CSA, CEC, FSEC

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** More efficient panels are more expensive, should only be considered if there is limited space on the roof, which is not the case at Cressingham.

# Photovoltaic Panels

## Investment cost & return - installation <50Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh	37,671
Estimated Generation power, kW - assume 5% loss	46.6
Panel Type	Sunpower 245
Panel output, Wp	245
No of households	306
No of available roofs	25
No of units (8 panels per house)	200
Peak power, kWp	49.0
Solar Radiation (table A, p.6)	961
Zpv Overshadow Factor (table B, p.6)	1

CAPITAL EXPENDITURE	
Cost of unit	£ 476.27
Cost of all units	£ 95,253
Installation	inc. above
Preparation of roof (strengthening, etc)	inc. in retro work
Consultants fees (planning app, etc)	£ 45,000

<b>Total Expenditure</b>	<b>£ 140,253</b>
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RUNNING COSTS/ per year	
Electricity used by system	£0.1379
Maintenance cost/ per annum	£ 532
<b>Sub-total</b>	<b>£ 532</b>

SAVINGS/ per year	
Electricity generated @80% peak power, kWh**	37,671
Electricity cost saved for households @50%	£0.1379
Gas generated	0
Gas cost saved for households	£0.0463
<b>Sub-total</b>	<b>£ 2,597</b>

INCENTIVES/ per year	
Feed-In Tarriff - Generation Income @100%	£0.0369
Feed-In Tarriff - Export Income @50%	£0.0485
<b>Sub-total</b>	<b>£ 2,304</b>

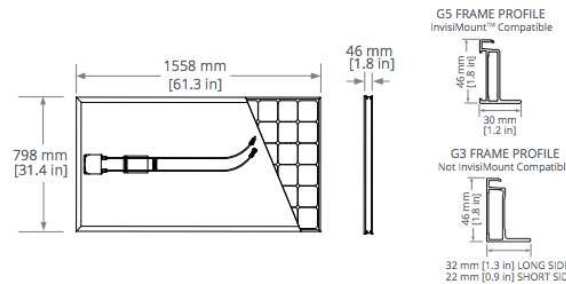
<b>Total Value</b>	<b>£ 4,369</b>
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<b>Total potential saving per household</b>	<b>£ 14</b>
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Investment Cost (ex VAT)	£95,253.33
Investment Cost (incl VAT)	5% £100,016.00
Return (IRR)	1.46%
Pay Back Years	22.89

CO2 Saving annual (kg)	20,493
CO2 Saving life (kg)	512,328

### Example of manufacturer info Sunpower 245 PV Panel



The performance of solar PV systems is not certain due to the variability of annual so radiation location. This estimate is based upon the manufacturer's data (Sunpower) a government guidance (SAP). It should not be considered as a guarantee of performance. \* Peak power, kWp is the output power achieved by a Solar module under full solar radiation (under set Standard Test Conditions). Solar radiation of 1,000 watts per square meter is used to define a standard nominal output and is based on measurements under optimum condition.

\*\* Estimated radiation, kWh is power under actual radiation conditions. In practice, it will be approximately 15-20% lower due to the considerable heating of the solar cells



Operating Condition And Mechanical Data	
Temperature	-40°F to +185°F (-40°C to +85°C)
Impact resistance	1 inch (25mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	72 Monocrystalline Maxeon Gen II
Tempered Glass	High transmission tempered Anti-Reflective
Junction Box	IP-65, MC4 Compatible
Weight	33 lbs (15 kg)
Max load	G5 Frame: Wind: 83 psf, 4000 Pa, 407 kg/m² front & back Snow: 167 psf, 8000 Pa, 815 kg/m² front
	G3 Frame: Wind: 50 psf, 2400 Pa, 244 kg/m² front & back Snow: 112 psf, 5400 Pa, 550 kg/m² front
Frame	Class 1 black anodized (highest AAMA rating)

Tests And Certifications	
Standard tests <sup>13</sup>	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-155, PV Cycle
Sustainability	Cradle to Cradle (eligible for LEED points) <sup>14</sup>
Ammonia test	IEC 62716
Desert test	10.1109/PVSC.2013.6744437
Salt Spray test	IEC 61701 (maximum severity)
PID test	Potential-Induced Degradation free: 1000V <sup>9</sup>
Available listings	UL, CEC, CSA, TUV, JET, MCS, FSEC

Electrical Data		
	SPR-E20-245	SPR-E19-235
Nominal Power (P <sub>nom</sub> ) <sup>11</sup>	245 W	235 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency <sup>12</sup>	20.0%	19.3%
Rated Voltage (V <sub>mpp</sub> )	40.5 V	40.5 V
Rated Current (I <sub>mpp</sub> )	6.05 A	5.80 A
Open-Circuit Voltage (V <sub>oc</sub> )	48.8 V	48.4 V
Short-Circuit Current (I <sub>sc</sub> )	6.43 A	6.18 A
Max. System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	15 A	
Power Temp Coef.	-0.38% / °C	
Voltage Temp Coef.	-132.5 mV / °C	
Current Temp Coef.	3.5 mA / °C	

Suitable for installation at Cressingham Garden Estate?

Yes

**Conclusion:** Less efficient panels are cheaper and provide greater return for the project. Different sizes of installation reviewed overleaf and compared in the Conclusion chapter.

# Photovoltaic Panels

## Investment cost & return - installation <100Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		76,849
Estimated Generation power, kW - assume 5% loss		95.0
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		51
No of units (8 panels per house)		408
Peak power, kWp		100.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	247,523
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>292,523</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		76,849
Electricity cost saved for households @50%	£0.1379	£ 5,299
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 5,299</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£2,029
Feed-In Tarriff - Export Income @50%	£0.0485	£1,864
<b>Sub-total</b>		<b>£ 3,892</b>
<b>Total Value</b>	<b>£</b>	<b>8,659</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>28</b>
Investment Cost (ex VAT)		£247,522.72
Investment Cost (incl VAT)	5%	£259,898.86
Return (IRR)		-0.41%
Pay Back Years		30.01
CO2 Saving annual (kg)		41,806
CO2 Saving life (kg)		1,045,150

## Investment cost & return - installation <150Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		114,520
Estimated Generation power, kW - assume 5% loss		141.5
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		76
No of units (8 panels per house)		608
Peak power, kWp		149.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	368,857
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>413,857</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		114,520
Electricity cost saved for households @50%	£0.1379	£ 7,896
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 7,896</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£3,023
Feed-In Tarriff - Export Income @50%	£0.0485	£2,777
<b>Sub-total</b>		<b>£ 5,800</b>
<b>Total Value</b>	<b>£</b>	<b>13,165</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>43</b>
Investment Cost (ex VAT)		£368,857.39
Investment Cost (incl VAT)	5%	£387,300.26
Return (IRR)		-0.28%
Pay Back Years		29.42
CO2 Saving annual (kg)		62,299
CO2 Saving life (kg)		1,557,478

# Photovoltaic Panels

## Investment cost & return - installation <250Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		191,370
Estimated Generation power, kW - assume 5% loss		236.5
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		127
No of units (8 panels per house)		1,016
Peak power, kWp		248.9
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	616,380
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>661,380</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		191,370
Electricity cost saved for households @50%	£0.1379	£ 13,195
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 13,195</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£5,052
Feed-In Tarriff - Export Income @50%	£0.0485	£4,641
<b>Sub-total</b>		<b>£ 9,693</b>
<b>Total Value</b>	<b>£</b>	<b>22,356</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>73</b>
Investment Cost (ex VAT)		£616,380.11
Investment Cost (incl VAT)	5%	£647,199.11
Return (IRR)		-0.17%
Pay Back Years		28.95
CO2 Saving annual (kg)		104,105
CO2 Saving life (kg)		2,602,628

## Investment cost & return - installation >250Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		310,411
Estimated Generation power, kW - assume 5% loss		383.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		206
No of units (8 panels per house)		1,648
Peak power, kWp		403.8
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	999,798
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>1,044,798</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		310,411
Electricity cost saved for households @50%	£0.1379	£ 21,403
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 21,403</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0228	£7,077
Feed-In Tarriff - Export Income @50%	£0.0485	£7,527
<b>Sub-total</b>		<b>£ 14,605</b>
<b>Total Value</b>	<b>£</b>	<b>35,476</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>116</b>
Investment Cost (ex VAT)		£999,797.65
Investment Cost (incl VAT)	5%	£1,049,787.54
Return (IRR)		-0.27%
Pay Back Years		29.59
CO2 Saving annual (kg)		168,863
CO2 Saving life (kg)		4,221,585

## Photovoltaic Panels

### Investment cost & return - installation <50Kw (245Wp panel) – current FIT

Estimated Generation energy, kWh		37,671
Estimated Generation power, kW - assume 5% loss		46.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		25
No of units (8 panels per house)		200
Peak power, kWp		49.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	476.27
Cost of all units	£	95,253
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>140,253</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		37,671
Electricity cost saved for households @50%	£0.1379	£ 2,597
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 2,597</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.1130	£4,257
Feed-In Tarriff - Export Income @50%	£0.0485	£914
<b>Sub-total</b>		<b>£ 5,170</b>
<b>Total Value</b>	<b>£</b>	<b>7,236</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>24</b>
Investment Cost (ex VAT)		£95,253.33
Investment Cost (incl VAT)	5%	£100,016.00
Return (IRR)		5.41%
Pay Back Years		13.82
CO2 Saving annual (kg)		20,493
CO2 Saving life (kg)		512,328

### Investment cost & return - installation >250Kw (245Wp panel) – current FIT

Estimated Generation energy, kWh		310,411
Estimated Generation power, kW - assume 5% loss		383.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		206
No of units (8 panels per house)		1,648
Peak power, kWp		403.8
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	999,798
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>1,044,798</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		310,411
Electricity cost saved for households @50%	£0.1379	£ 21,403
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 21,403</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0594	£18,438
Feed-In Tarriff - Export Income @50%	£0.0485	£7,527
<b>Sub-total</b>		<b>£ 25,966</b>
<b>Total Value</b>	<b>£</b>	<b>46,837</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>153</b>
Investment Cost (ex VAT)		£999,797.65
Investment Cost (incl VAT)	5%	£1,049,787.54
Return (IRR)		1.36%
Pay Back Years		22.41
CO2 Saving annual (kg)		168,863
CO2 Saving life (kg)		4,221,585

## 2. MVHR



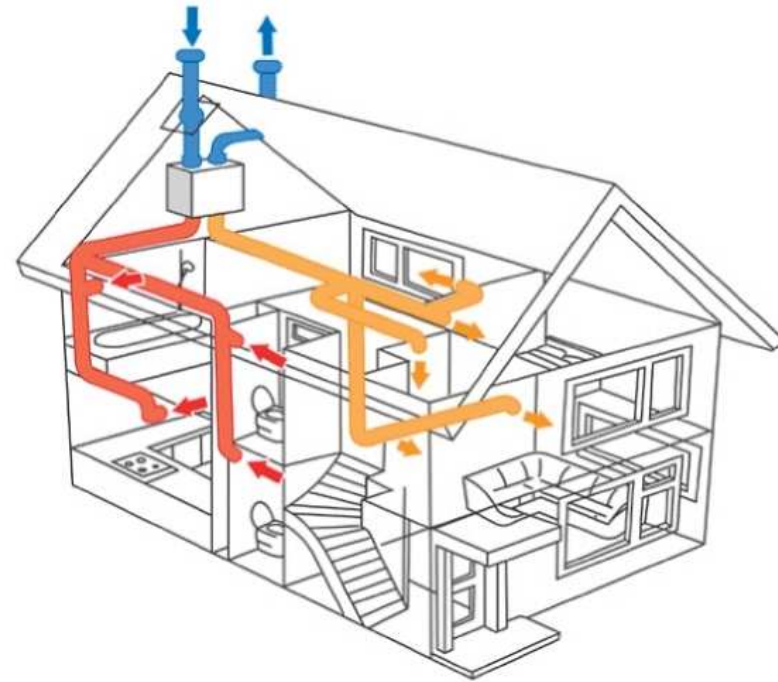
## What is MVHR?

### MVHR explained

Mechanical Ventilation with Heat Recovery (MVHR) is a whole house ventilation system that both supplies and extracts air throughout a property. It offers a balanced low energy ventilation solution for new dwellings and re-uses up to 95% of the heat that would have otherwise have been lost.

### Benefits

- Year round removal of condensation and indoor pollutants.
- A direct impact on the Dwelling Emission Rate required in SAP, helping reduce the carbon footprint of the property.
- Fresh filtered air supplied to dwelling, ideal for allergy sufferers and those with conditions such as asthma.
- A balanced ventilation system for the whole house and recovering of heat that would have otherwise have been lost.
- Low noise, non-intrusive ventilation system – located away from the room, however consideration should be given to duct runs to ensure cross-talk contamination doesn't happen AND the unit is sized correctly so it is not running a high rate all of the time.
- Poor ventilation can result in condensation forming on internal walls, which encourage mould growth and can result in health problems for the occupants. MVHR would prevent this by keeping a constant supply of fresh air (in line with the minimum Building Regulation requirements).
- MVHR offers excellent thermal comfort when coupled with low air permeability measures.



*MVHR provides ventilation for full house by supplying air to living areas and extracting from wet rooms (bathroom and kitchen)*



*Intake air is filtered inside MVHR ensuring constant supply of fresh air*

## System integration

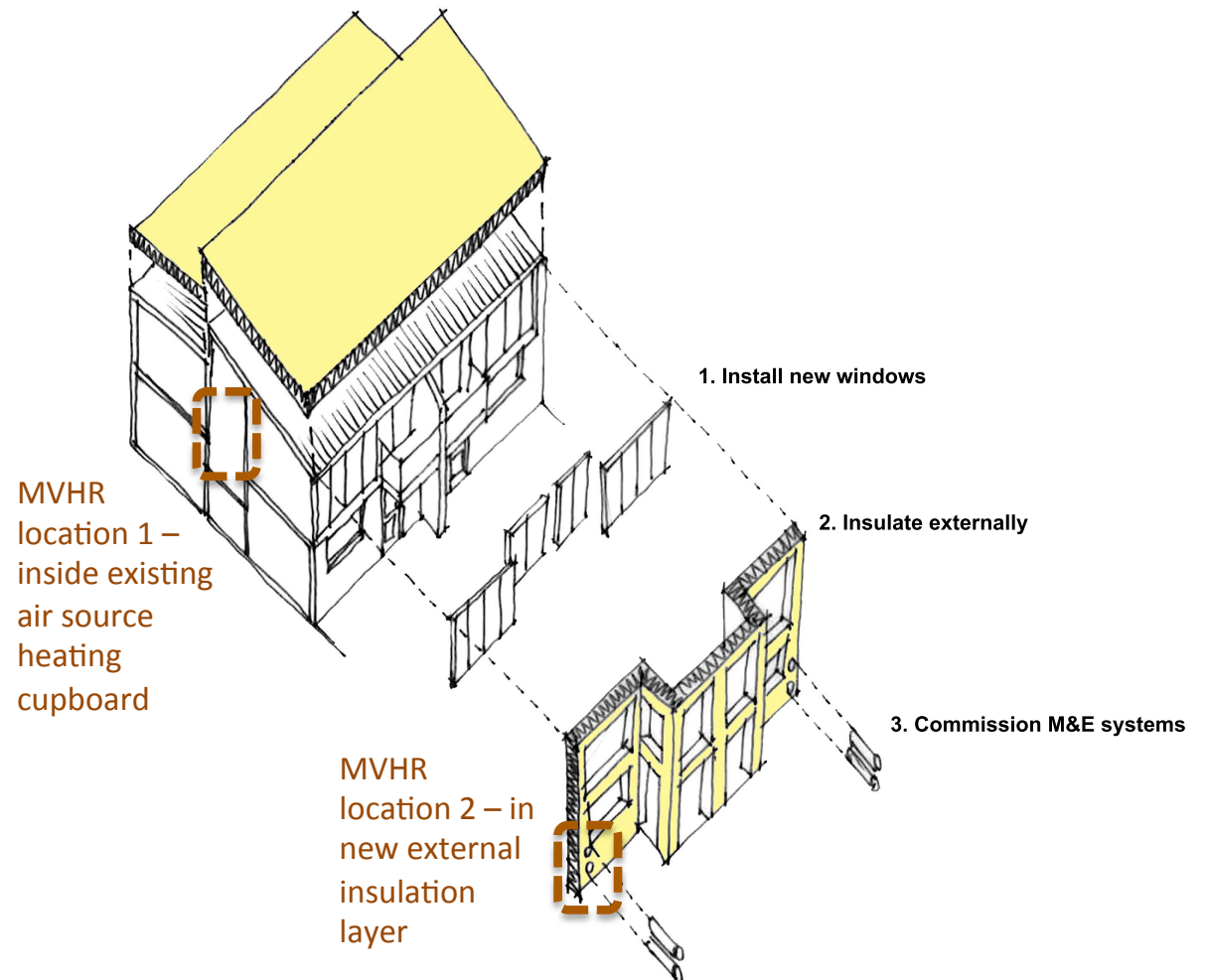
Heat Recovery Ventilation system comprises a Heat Recovery Unit and a network of ducts which are connected to each room. From a single or a communal unit. It works by continuously extracting air from the wet rooms of the property and at the same drawing in fresh supply air from outside.

The heat from the extracted stale air is recovered via a heat exchanger inside the heat recovery unit which is then reused to temper the filtered supply air for the habitable rooms such as living rooms and bedrooms.

The MVHR will be a requirement for the PassivHaus/ EnerPHit refurbishment because the air permeability of the dwellings will be substantially reduced during the refurbishment to minimise the heat loss. For more information refer to EnerPHit Feasibility Report.

The MVHR unit can be fitted in the following locations in Cressingham Estate homes:

1. Inside the properties that already have plant space for air source heating, which means no additional ductwork will be required as it formed part of original architectural design.
2. On the inside or outside the property. If external insulation is applied across the estate, MVHR can be hidden within the insulation layer, and can be easily accessed for filter replacement.



*Typical Cressingham Garden retrofit works sequencing*

## Constraints

### Maintenance

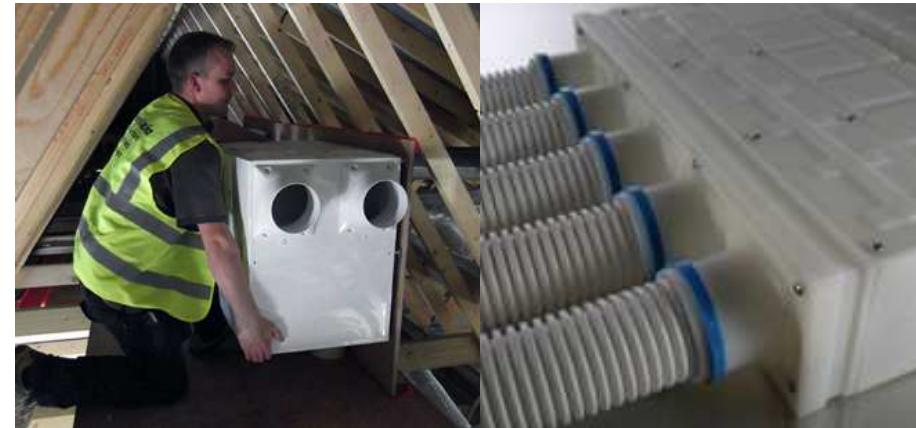
MVHRs are typically warranted for 10 years, and will require minimum maintenance, if installed and certified correctly. SCP recommend external commissioning is complete with a member of the certified body to ensure that the lengthens the life of the system and filters.

The filters need to be changed every 6-12 months, subject to the type of the unit. These could be washable or replaceable types. By integrating the system in the external façade means that the unit can be accessed and maintained at any time without disturbing the residents.

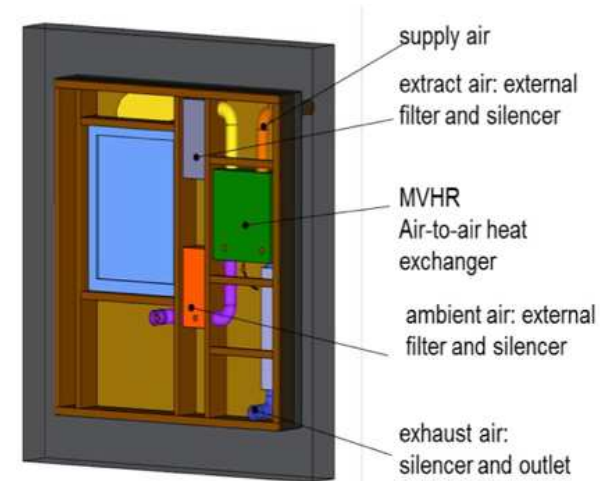
### Local Planning Issues

Separate planning permission for installation of MVHR units will not be required, if incorporated into external works package.

The location of the extract and intake air ducts should be reviewed at planning stage and incorporated on the drawings; these should be a minimum width apart and minimum distance away from gas flue, in accordance to the Building Regulations.



*MVHR unit comes in different shapes and sizes to suit installation type (ceiling/ wall mounted, external/ internal), size of the dwelling and system requirements. The duct work is also*



*MVHR unit can be hidden inside external insulation layer*

## Incentives

### Feed-in-tariff (FIT)

FIT is not available for the MVHR installation.

### Energy bill savings

You will be making 10-30% savings on your heating bill by improving the fabric of the building and re-using the stale air to recover any heat being extracted from the dwelling, subject to the building baseline air infiltration rate.

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

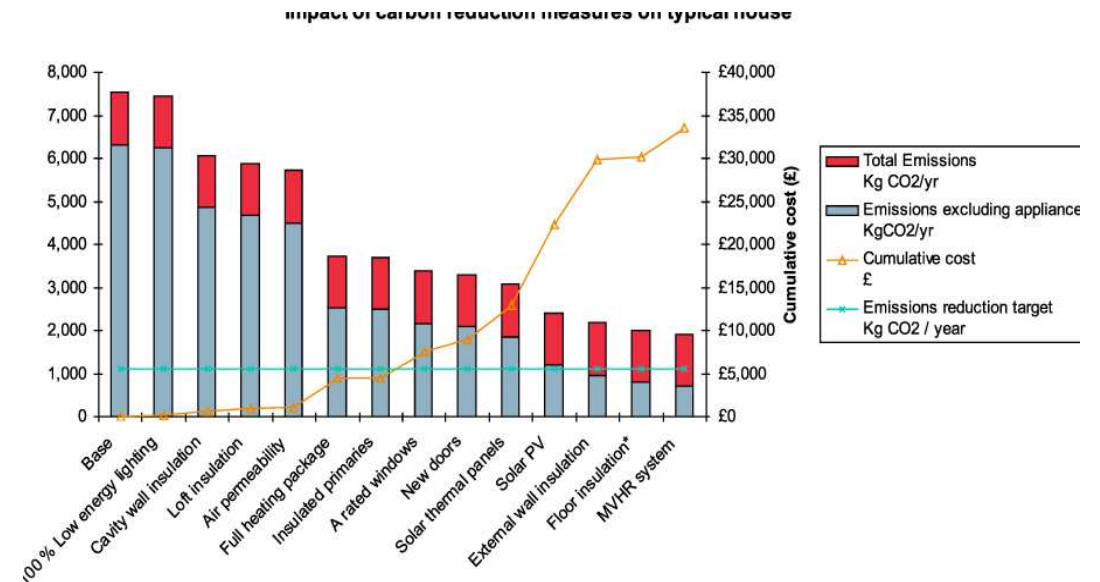
### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security.

### Private Equity

Private equity finance may also be an option. To read more about what banks and financier.

## Trends



As a general trend MVHR has a relatively small return on investment compared to some of the over green measures, see graph above. However, when combined to the improvement to the airtightness of the building. The energy saved could be as much as 20-30% in an average household.

Nevertheless it is becoming a very popular ventilation method in dwellings, as it reduces the building's humidity and hence condensation, and improves the air quality by filtering unwanted particles, dust and pollution, which is beneficial to people's health and wellbeing.

A typical MVHR unit suitable for 2-bed dwelling costs in the range of **£1,000 to £5,000**. It is always worth checking the unit's efficiency and electricity use to improve the energy saving.

## Summary of PV Feed-in Tariffs

Not available

Successful Precedence

Wilcomte House EnerPHit

Wilcomte House in Portsmouth is a development of three 11 storey 3-blocks of pre-fabricated concrete residential maisonettes (107 units) being retrofitted to the EnerPHit standard. It is only case study from the UK participating in the EU funded EuroPHit project, using a 'step-by-step' approach.

For this project, a new steel structure has been designed to allow the envelope to be extended and to enclose the walkway between the maisonettes, improving safety and allowing easier detailing and installation of external wall insulation.

The external wall and roof Rockwool insulation not only improves the energy efficiency, but allows refurbishment work to be carried out with the occupants in situ, minimising inconvenience for occupants and reducing temporary relocation costs (u-value - 0.14 W/m<sup>2</sup>K). Existing windows will be replaced with triple glazed Ecohaus Internorm windows (U-value - 0.93 W/m<sup>2</sup>K).

Airtightness will be achieved by application of external render. MVHR Zehnder units will be installed in individual flats with outlets positioned above the front door (see installation photographs).

For more info - <http://www.passivhaustrust.org.uk/news/detail/?nid=506#.VVyl2WTBzRY>

Project details



Portsmouth City Council is the client on the project driving this innovative EuroPHit case study project.

**£750** estimated energy saving per dwelling per year

**15%** funded by EU ECO Funding

**85%** funded by Portsmouth City Council

## Investment cost & return

Estimated Energy Saved, kWh/a	781,096
Estimated Power Saved, kW/a	89
Unit Type	Brink Renovent Sky 150
Unit efficiency	84%
No of houses	306
No of units	306

<b>CAPITAL EXPENDITURE</b>	
Cost of unit	£ 1,716
Cost of ducts and sundries	£ 550
Installation	£ 650
Consultants fees (planning app, design, etc)	£ 25,000

<b>Total Expenditure</b>	<b>£ 917,296</b>
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<b>RUNNING COSTS/ per year</b>	
Electricity cost	£0.1379
Water costs	£ -
Maintenance cost/ per annum	£ 20
<b>Sub-total</b>	<b>£ 61</b>

<b>SAVINGS</b>	
Electricity recovered	0
Electricity cost saved for households	£0.1379
Gas recovered (heating, assumed 20% saving)	2,853
Gas cost saved for households @100%	£0.0463
<b>Sub-total</b>	<b>£ 132</b>

<b>INCENTIVES</b>	
Feed-In Tarriaff, 50% electricity sold	£ -
Renewable Heat Incentives - biogas	£ -
<b>Sub-total</b>	<b>£ -</b>

<b>Total Value</b>	<b>£ 21,636</b>
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<b>Total potential saving per household</b>	<b>£ 71</b>
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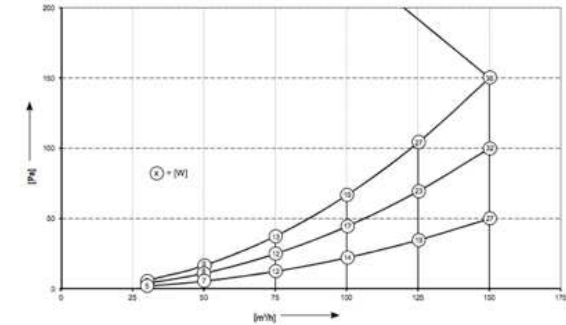
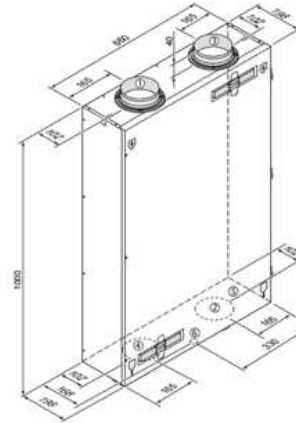
Investment Cost (ex VAT)	£ 917,296
Investment Cost (incl VAT)	20% £ 1,100,755
Return (IRR)	2.35%
Pay Back Years	42.4

CO2 Saving annual (kg)	424,916
CO2 Saving life (kg)	20 yrs 8,498,320

The performance of MVHR systems is impossible to predict as it depends on the airtightness of the property as well as the system. This estimate is based on existing projects using the manufacturer's data from Energy Savings Advisor and costs provided by PassivHaus Store. Installation costs come from the SCP database of projects.

**Note:** The additional investment costs are likely to be less, if the existing ventilation units in kitchen and bathrooms require replacements.

## Example of manufacturer info – Brink Renovent Sky 150



TECHNICAL SPECIFICATIONS		
	Renovent Sky	Renovent Sky Plus
Ventilation capacity at 150 Pa [m³/h]	Maximum 300	Maximum 300
System sound [dB(A)]	< 40 at 225 m³/h and 75 Pa	< 40 at 225 m³/h and 75 Pa
Rated power [W] without preheater	15 at 100 m³/h and 11 Pa 26 at 150 m³/h and 25 Pa 58 at 225 m³/h and 56 Pa 116 at 300 m³/h and 100 Pa	15 at 100 m³/h and 11 Pa 26 at 150 m³/h and 25 Pa 58 at 225 m³/h and 56 Pa 116 at 300 m³/h and 100 Pa
SFP (Specific Fan Power)	Approx 0.24 W/m³ (at 225 m³/h and 50 Pa)	Approx 0.24 W/m³ (at 225 m³/h and 50 Pa)
Dimension duct connection [mm]	4 x Ø150/160	4 x Ø150/160
L x W x H [mm]	1185 x 644 x 310	1185 x 644 x 310
Air filtering	2 x G4-filter (option: F7 filter for supply)	2 x G4-filter (option: F7 filter for supply)
Weight [kg]	± 37	± 37
Connection options (outside appliance)	E-bus, 4-way switch, wireless remote control, service connector, preheater	E-bus, 4-way switch, wireless remote control, service connector, preheater, postheater, EWT, 24 V power supply 4.5 VA, 0-10 V output, 2 inputs; programmable as 0-10V input or potential free contact
Accessories	Preheater 1000 W	Preheater 1000 W, postheater 1000 W

Suitable for installation at Cressingham Garden Estate?

Yes

**Conclusion:** MVHR is not mutually exclusive from other renewable installations, can be done over time.

### 3. Combined Heat and Power (CHP)

# 3. Combined Heat and Power (CHP)

## What is CHP?

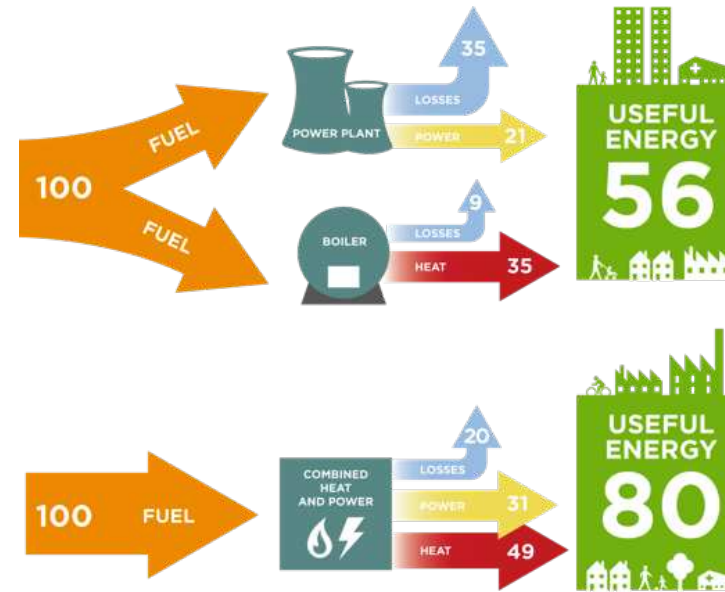
### CHP explained

Combined heat and power (CHP) integrates the production of usable heat and power (electricity), in one single, highly efficient process. The conventional gas fired CHP plant is a well-proven model of providing low carbon energy from site based plant.

CHP recovers the waste heat from a site based power generation prime mover (e.g. engine or fuel cell) via the engine water jacket, exhaust gases and oil cooler (dependent on model). This can provide low carbon, lower cost heat and electricity, with lower CO2 emissions than the electricity grid, where the integration and operation of the CHP plant is optimised.

### Benefits

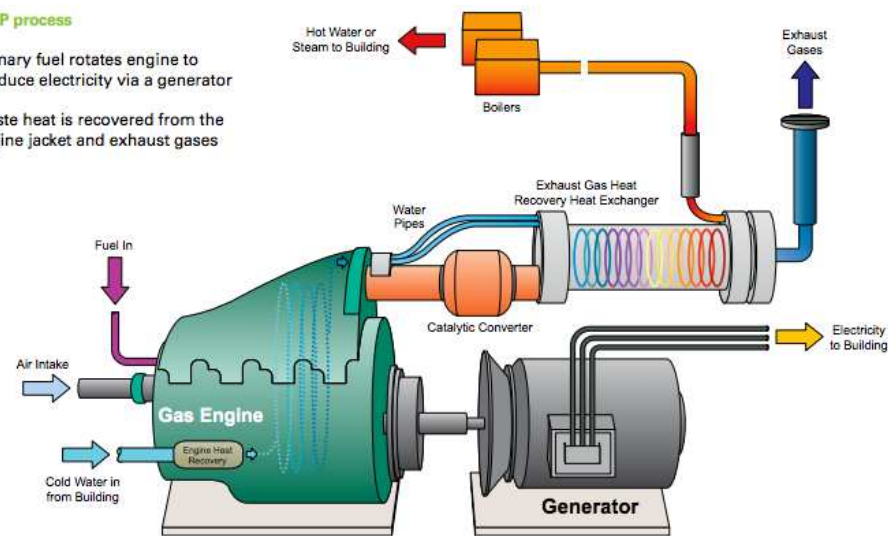
- Minimum 10% energy savings.
- Cost savings of 15-40% over electricity sourced from the grid and heat generated by on-site boilers.
- Minimum 10% CO2 savings for good quality natural gas CHP in comparison to conventional forms of energy generation.
- High overall efficiency – approx. 80% at the point of use.
- Additional guarantee of continuity in energy supplies for operator & consumer.
- Proven and reliable technology with established supplier base.



CHP has efficiency of 80%, compared to the traditional energy delivery process of 56%, which saved approx. 10% of energy and carbon

### The CHP process

1. Primary fuel rotates engine to produce electricity via a generator
2. Waste heat is recovered from the engine jacket and exhaust gases



CHP process illustrated



# Combined Heat and Power (CHP)

## System integration

There are two types of the gas CHP plant can be implemented when redeveloping the existing site or replacing individual aging boiler plant.

- Micro-CHP designed for individual households.
- Centralised packaged CHP plant with integrated heating network.

In this report, SCP reviewing the centralised CHP plant as it offers the most running cost and emissions benefit. Micro-CHP is still in development and will not be a robust solution required for large scale housing project.

The Cressingham Estate has capacity for integration of the CHP in either of the following locations:

1. Car parking areas (shown in yellow) – there area number of under-utilised parking spaces on the estate that could be converted into a plant room.
2. New out building on site (indicated in pink) – locating the plant away from the people homes to avoid complaints from residents and have better access.

Refer to the estate plan diagram.

Industry Best Practice and CIBSE guidance has identified that the effective integration of CHP requires the plant to operate in excess of 4000-4500 hours per annum (10-12 hrs a day), in order to be most effective.

Because of the proximity of the dwellings, location of the exhaust flue and operational hours should be carefully considered at the design stage, also issues of smell and noise.



Areas identified as suitable for anaerobic digester plant installation

# Combined Heat and Power (CHP)

## District Heating Network

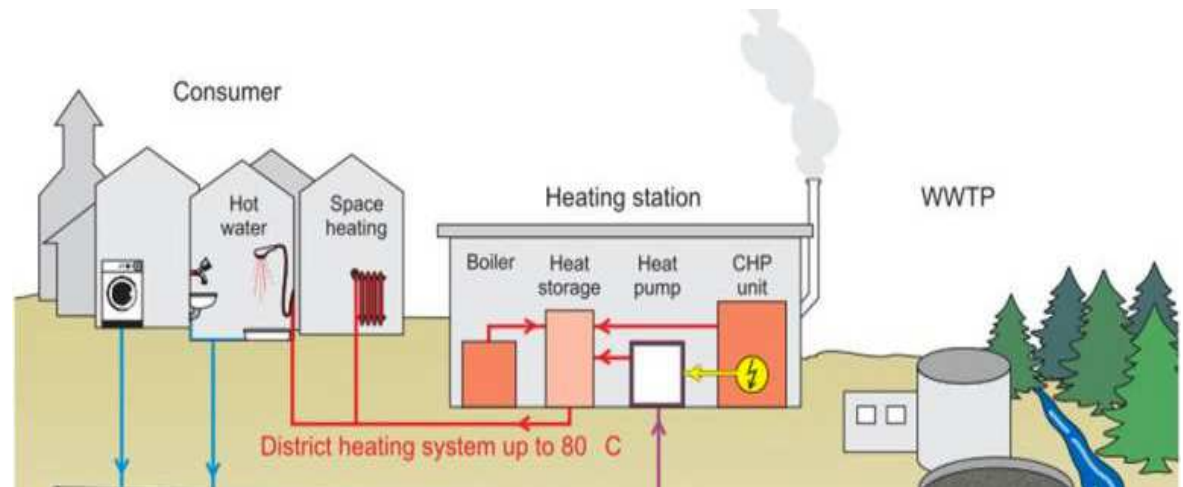
The CHP plant is usually operated together with the district heating network. It means the hot water from the CHP will be distributed to the residents of the Cressingham Estate, instead of the individual boilers.

The key considerations of district heating development include:

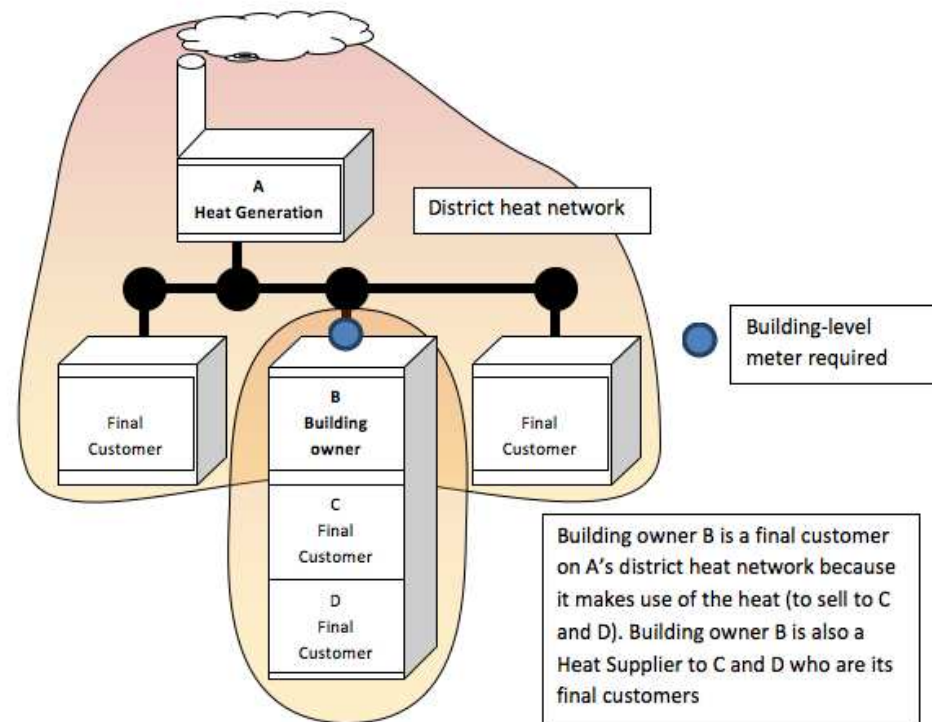
- Design of physical infrastructure between heat production plant and consumers;
- Contract consideration between the project sponsors and developers;
- Tariff structure as part of the business plan for the project;
- Local planning issues.

The residents would effectively be the purchasers of the heat and have a direct financial arrangement with a heat supplier to provide the heating to them. It means that the community owned CHP would benefit the residents, whereby the energy bills will be reduced compared to the standard energy providers. For more information on the heating network, please see the GLA's District Heating Manual for London, the Heat Network Metering and Billing Regulation 2014 and <https://www.gov.uk/heat-networks>.

The cost of the installation of the heating network has been included in the financial model for the CHP installation, and form part of the proposal.



*District Heating Network se-up diagram*



*District Heating Network responsibilities*

# Combined Heat and Power (CHP)

## Constraints

### Maintenance

The plant is typically warranted for 20 years. Annual maintenance of the plant and operating systems will be required.

Maintenance for the supporting network of pipes/ ducts will be required on annual basis, including system's mechanical and controls operation. It is recommended that the long term maintenance contract is signed with the installer of the system.

Centralised air heating system may be considered as many Cressingham homes already have central duct as part of the original architectural design. Otherwise, the heat will be delivered into individual flats using the hot water pipework to feed the existing radiators. This is subject to detailed design of the system.

### Local Planning Issues

Planning application will be required.

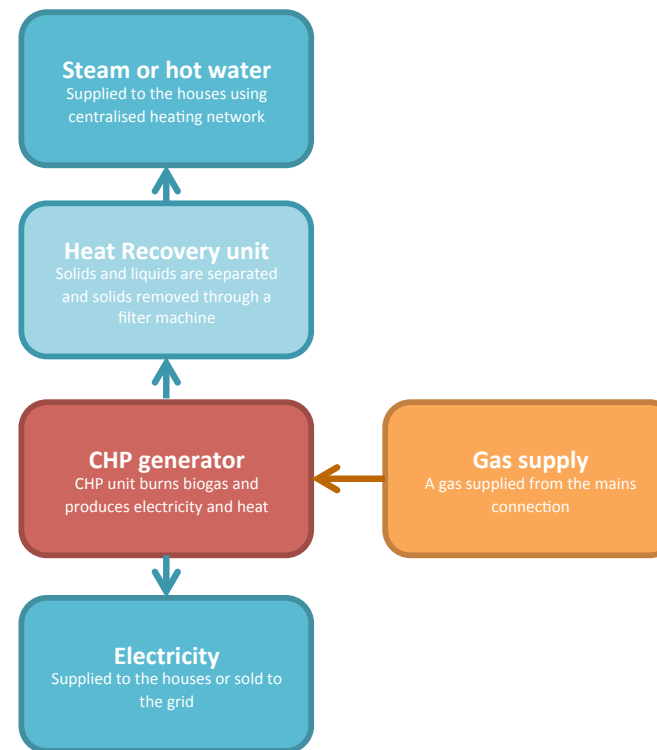
### Other considerations

In order to realise a project of this type in such as constrained urban site, significant potential negative impacts need to be mitigated at the design stage, including:

- Air quality - NOx and particles pollution from CHP plant, compliance with EU standards
- Noise – acoustic design to isolate the machinery
- Environmental permit
- Training of the plant operative(s)
- Biogas compliance – BS EN 60079 H&S explosives storage standard
- Health & Safety – robust design in accordance with IEC 61882, OHAS and COSHH



CHP installation



CHP process

# Combined Heat and Power (CHP)

## Successful Precedence

### Southampton Science Park (Best AD Award 2012)

The University of Southampton Science Park (USSP), having installed energy efficient climate control systems in the form of air source heat pumps and heat recovery mechanisms in both new and refurbished buildings, have entered into an Electricity Service Company (ESCo) relationship with SEaB Energy ([www.seabenergy.com](http://www.seabenergy.com)) to deploy the innovative MUCKBUSTER® SEaB MB400 onsite containerised anaerobic digestion solution.

SEaB Energy supplies a compact and easy to install turnkey anaerobic digestion (AD) solution on sites generating between 200 and 1000 tonnes of food and bio waste per year. The system is known as MUCKBUSTER® SEaB MB400 in the food processing and on-site catering and accommodation sectors. The systems generates energy and offset and new income. They are designed to produce between 8kWe - 55kWe electricity via a combined heat and power unit (CHPs). The system also provides PAS110 pasteurisation, so that residual organic digestates can be sold as fertiliser or mulch.

The Science Park will take advantage of the energy harvesting potential of food and organic waste, which, to date, has been an untapped resource. Electricity and heat generated from the biogas production will be used within the business park offices and research and development laboratories on site.

A digester unit is being installed and is running an 8kW combined heat and power unit (CHP) unit, and produces an average of 46 m<sup>3</sup>/day of methane (CH<sub>4</sub>) based on the estimated annual feedstock. This in turn provides the Kenneth Dibben building with 35MWh/annum of electricity.

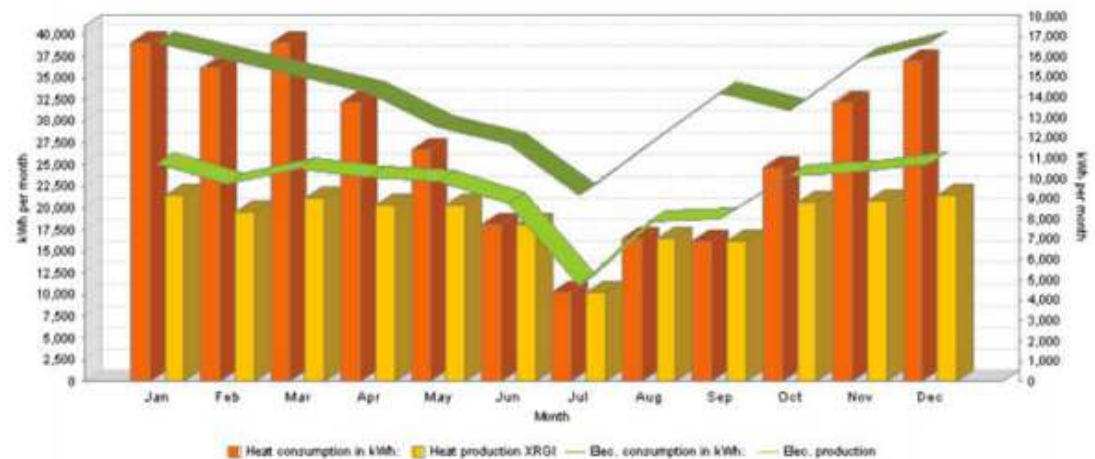
## Project details



Sav-Systems installed in this award winning eco social housing scheme supplies 172,368kWh of electricity and 328,482kWh of heating and domestic hot water.

**36tCO<sub>2</sub>** CO<sub>2</sub> reduction using CHP, equivalent to 21% reduction.

**£11,924** running and maintenance costs reduction compared to conventional boiler system.



# Combined Heat and Power (CHP)

## Incentives

### Renewable Obligation (ROCs)

ROCs are available to commercial electricity generators of CHP cogeneration, which are usually ones that are able to demonstrate the production of multiple MWh of electricity production (also considered a metric that symbolises the starting point for mass scale consumption). The level of support varies depending on the CHP cogeneration type, i.e. dedicated biomass fuel with CHP cogeneration can demonstrate sustainable fuel supply, and will gain increased entitlement.

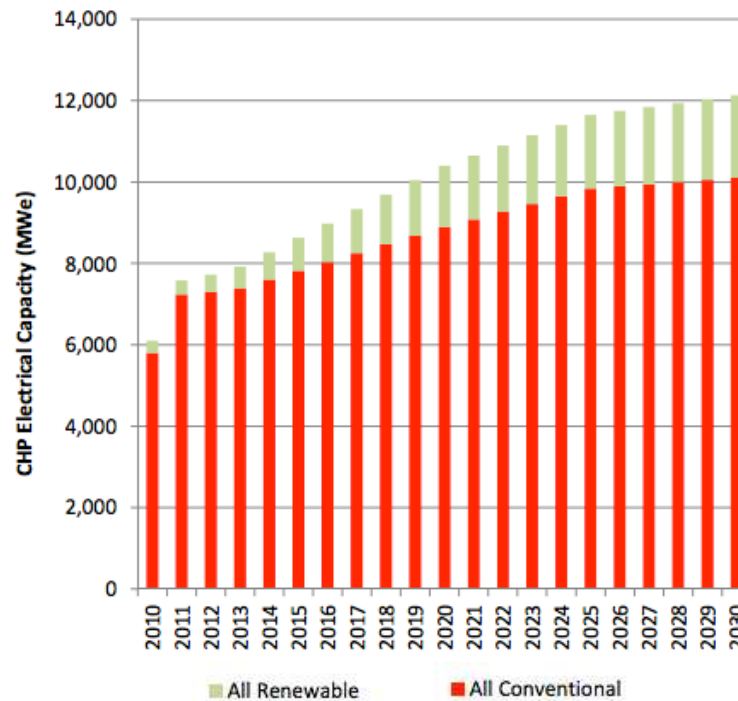
### Feed-In Tariff

FiTs support only micro-generators of renewable electricity. If you are a small business or a community project, you need to have a declared net capacity up to 2kW for micro cogeneration CHP up to 30,000 installations). Income can be earned both from the generation tariff and the export tariff, see table below.

### Energy bill savings

You will be making approx. 10% savings on your electricity bills because generating electricity on site is a much more efficient process.

## Trends



Ricardo-AEA have issued report on projections of the CHP capacity and use to 2030, which shows continuous growth with increasing demands up to 2030. At the moment CHP achieves as much as 6 times carbon saving compared to the electrical grid in the UK. However, as the grid decarbonises, the CHP demand may also slow down.

A typical 3.5kW grid-connected PV roof (covering about 25 square metres) is likely to cost around **£6,000**.

## Summary of Micro-CHP Feed-In Tariffs

System size	Tariff Band (TIC kW)	Generation Tariff	Export Tariff
		15 Mar 2013 - 31 Mar 2016	
4kW or under	2kW or under	13.45 p/kWh	4.85 p/kWh

# Combined Heat and Power (CHP)

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Discount Energy Purchase (DEP)

With DEP the client signs an Energy contract to purchase the electricity generated by a CHP unit over a number of years. Ideal for project that does not have capital funds. With DEP a third party company like ENER-G installs, operate and finances the Cogeneration installation, at no cost to the energy user and simply contract the energy produced by the CHP back at a discounted rate.

For more info: [www.esta.org.uk/EVENTS/2012\\_09\\_11\\_The\\_Energy\\_Event/documents/TEE2012\\_2C\\_EnerG\\_Chassagne.pdf](http://www.esta.org.uk/EVENTS/2012_09_11_The_Energy_Event/documents/TEE2012_2C_EnerG_Chassagne.pdf)

### Capital purchase

Capital purchase enables businesses to claim 100% first year capital allowances on investments in energy saving technologies and products, such as CHP. Allowing businesses the ability to write off the whole cost of their investment against taxable profits from the period the investment was made.

### Energy Service Company (ESCO)

ESCO is a commercial or non-profit business providing energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, etc. The building occupants then benefit from the energy savings and pay a fee to the ESCo in return. At all times, the saving is guaranteed to exceed the fee.

### Energy Service Agreement (ESA)

An Efficiency Services Agreement is a pay-for-performance financing solution that allows customers to implement energy efficiency projects, such as CHP systems, without any upfront capital outlay. Energy Conservation Measures (ECM's) guarantee annual savings to the Customer's energy and operational budgets. A proportion of the savings can then be "recycled" to cover the cost of implementing and operating the ECM's throughout the ESA/ESPC contract term, typically 10 or 15 years.

# Combined Heat and Power (CHP)

## Investment cost & return - FIT from Jan 2016

Estimated Generated Energy, kWh/a	756,864
Estimated Generated Power, kW/a	86
Unit Type	Ener-G 35M CHP unit
No of houses	306
No of CHP units	1

CAPITAL EXPENDITURE	
Cost of unit	£ 78,125
Installation	£ 5,000
Preparation of the ground/ outhouse	£ 10,000
Connection cost of heat network	£ 4,500
Installation of heat network	£ 3,000
Consultants fees (planning app, etc)	£ 3,500

<b>Total Expenditure</b>	<b>£ 2,391,625</b>
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RUNNING COSTS/ per year	
Gas used, kWh/a	969,732
Gas cost per year	£ 0.0463
Maintenance cost/ per annum	£ 14,933
<b>Sub-total</b>	<b>£ 59,832</b>

SAVINGS	
Hours run, with 10% downtime	7884
Electricity generated, 100% utilised	275,940
Electricity cost saved @50%	£ 0.1379
Heat generated (heating), 88.4% utilised	480,924
Gas cost saved @100%	£ 0.0463
<b>Sub-total</b>	<b>£ 60,319</b>

INCENTIVES	
Feed-In Tarriff, 50% electricity sold	£ 0.0912
Renewable Heat Incentives - biogas	£ 0.0750
<b>Sub-total</b>	<b>£ 48,652</b>

<b>Total Value</b>	<b>£ 49,139</b>
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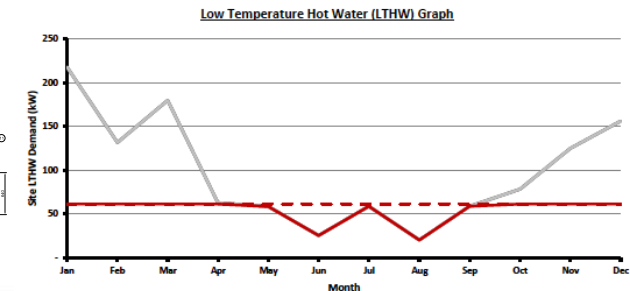
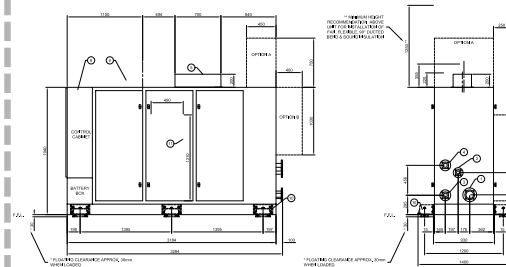
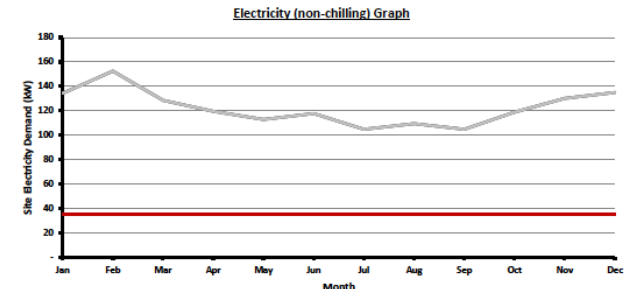
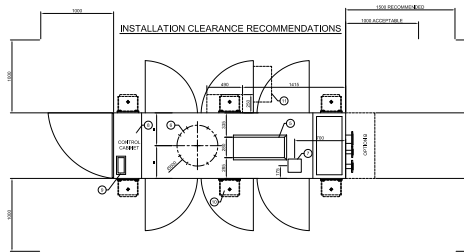
<b>Total potential saving per household</b>	<b>£ 161</b>
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Investment Cost (ex VAT)	£ 2,391,625
Investment Cost (incl VAT)	20% £ 2,869,950
Return (IRR)	-5.70%
Pay Back Years	48.7

CO2 Saving annual (kg)	411,734
CO2 Saving life (kg)	20 yrs 8,234,680

The performance of CHP systems is relatively stable, however, heating output for the system has different utilisation factors subject to the seasonal temperature variations. The values above have been provided by Ener-G CHP supplier.  
The cost data for the heat network is taken from Poyry's Potential and Costs of District Heating Networks for small terraced house.

## Example of manufacturer info – Ener-G E35 Natural Gas CHP Unit



Energy Balance and Part Load Data @ 0.95PF					
		Units	100%	75%	50%
Electrical Output	(+/-3%)	kW	35	26	18
Electrical Efficiency (Net)	(+/-5%)	%	31.6%	29.1%	25.2%
Heat Output	(+/-10%)	kW	61	51	41
Thermal Efficiency (Net)	(+/-8%)	%	55.2%	56.8%	59.3%
Fuel Input (Net)	(+/-5%)	kW	111	90	69
Total Efficiency (Net)	(+/-8%)	%	86.8%	85.9%	84.5%
Heat Output from Jacket Water	(+/-8%)	kW	38	33	29
Heat Output from Exhaust Gas @ Outlet Temp.	(+/-8%)	kW	23	18	12
Aftercooler Heat Output	(+/-8%)	kW	N/A	N/A	N/A
Radiated Heat Output	(+/-8%)	kW	9	7	5
Combustion Air Flow	(+/-5%)	Nm <sup>3</sup> /h	105	85	66
Fuel Mass Flow (ρ = 0.75kg/Nm <sup>3</sup> )	(+/-5%)	kg/h	8.3	6.8	5.2
Fuel Volume Flow (LHV = 10kWh/Nm <sup>3</sup> )	(+/-5%)	Nm <sup>3</sup> /h	11.1	9.0	6.9
Exhaust Mass Flow (Wet)	(+/-5%)	kg/h	144	117	90
Exhaust Volume Flow @ Outlet Temp.	(+/-5%)	m <sup>3</sup> /h	160	130	100

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** Cost of the CHP plant is negligible when compared to the cost of installation of the heating network

## 4. Anaerobic Digestion (AD) with CHP



## 4. Anaerobic Digestion (AD) with CHP

### What is Anaerobic Digester (AD)?

#### AD explained

AD is a simple biological process using naturally occurring bacteria to break down organic material such as food waste, animal slurry or crops that takes place in sealed, oxygen-free tanks to produce biogas.

The word Anaerobic actually means 'in the absence of oxygen'. The biogas naturally created in the sealed tanks is used as a fuel in a CHP (combined heat and power) unit to generate renewable energy, such as electricity and heat.

What's left from the process is a nutrient rich biofertiliser which is pasteurised to kill any pathogens and then stored in large covered tanks ready to be applied twice a year on farmland in place of fossil fuel derived fertilisers.

Every tonne of food waste recycled by anaerobic digestion as an alternative to landfill prevents between 0.5 and 1.0 tonne of CO<sub>2</sub> entering the atmosphere.

#### Benefits

- Anaerobic digestion creates biogas, a renewable source of energy that is used similar to natural gas.
- Diverting food scraps from landfills to digesters reduces methane emissions from landfills.
- Diverting Fats, Oil, and Grease (FOG) from the wastewater infrastructure prevents combined sewer overflows, protects water quality and saves money.
- Using the solid residual as a soil amendment can reduce the need for chemical fertilizers, improve plant growth, reduce soil erosion and nutrient run-off.



*MVHR provides ventilation for full house.*



*The electrical power generated by PV panels can either be used at home or sold to the Grid.*

# Anaerobic Digestion (AD) with CHP

## System integration

The Cressingham Estate has capacity for integration of the anaerobic digester in either of the following locations:

1. Car parking areas (shown in yellow) – there area number of under-utilised parking spaces on the estate that could be converted into a plant room.
2. New out building on site (indicated in pink) – locating the plant away from the people homes to avoid complaints from residents and have better access.

Refer to the estate plan diagram.

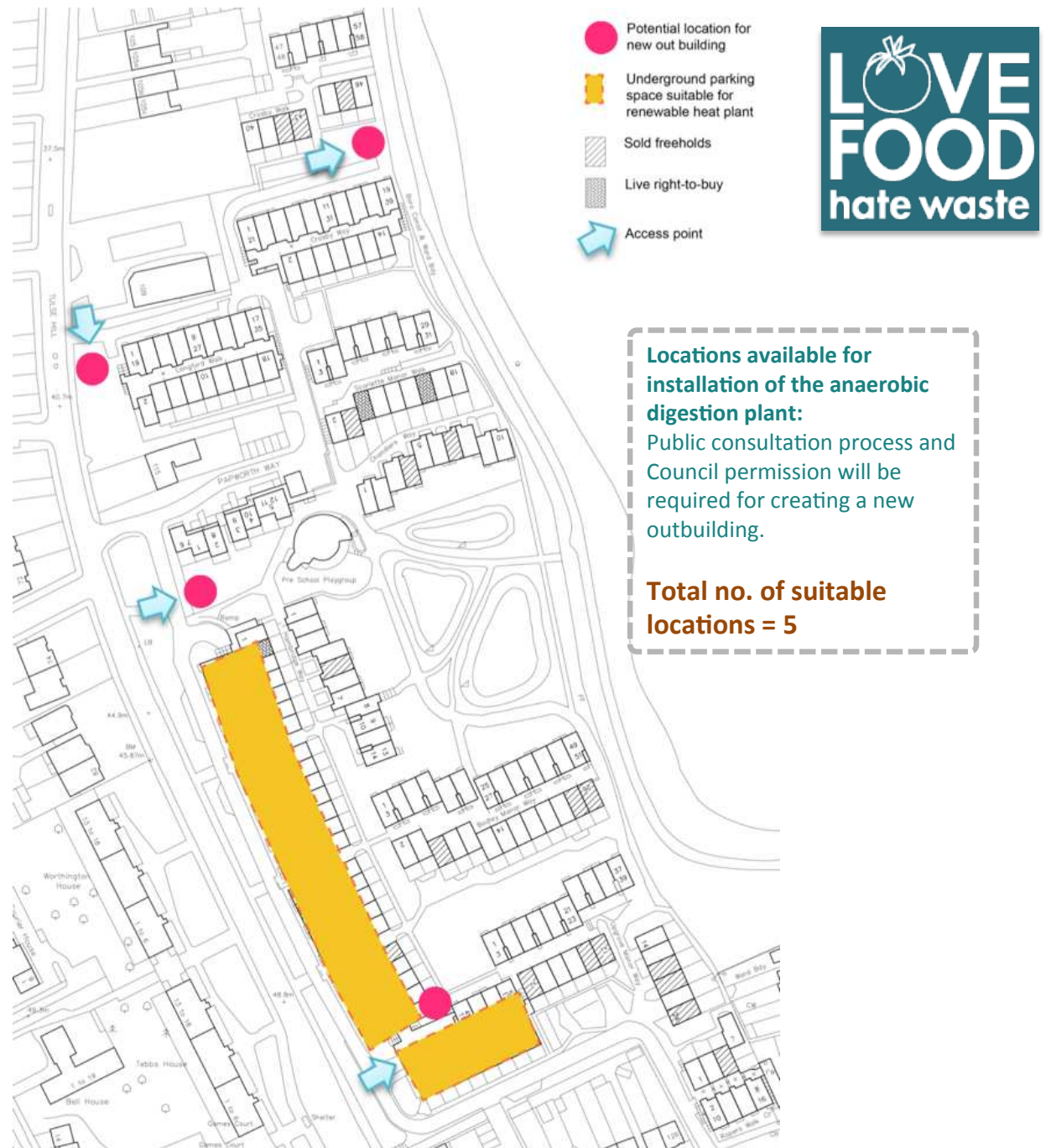
Lambeth has a large number of housing estate, such as Cressingham that could be utilized in the food and organic waste collection. There is also supply from restaurants (cooking oil and food waste) within 3 miles of the site.

To achieve maximum efficiency, additional sites have been integrated into the financial model, including waste from 9 restaurants, 5 schools or 750 unit housing estate (the figures are based on assumptions).

There is no project of this type and scale in Lambeth at the moment. AD plant would be one of the first projects of its kind with a potential to develop a workable supply chain in the area making it easier to access this market in the future.

The symbiotic relationship could be developed with the Brockwell Park, where 'soft' green waste is collected and fed into the digester, whilst the waste product is used back for the park planters and/or allotments.

AD plant is operated together with the District Heating Network ,which is explained in detail in the CHP chapter. The cost of the installation of the heating network has been included in the financial model for the AD plant.



Areas identified as suitable for anaerobic digester plant installation

# Anaerobic Digestion (AD) with CHP

## Constraints

### Maintenance

The plant are typically warranted for 25 years. Maintenance and reliability issues remain a key factor in specifying anaerobic digester. The plant will require at least 1no. full time trained operative to collect and feed the waste into the digester, as well as clean out and maintain the system. By-product being non-toxic and disposed of in the usual waste stream or used as a fertiliser. It is recommended that the long term maintenance contract is signed with the installer of the system.

### Local Planning Issues

Planning application will be required.

We foresee most resistance from the residents with AD plant proposal because of the noise and smell issues.

### Other considerations

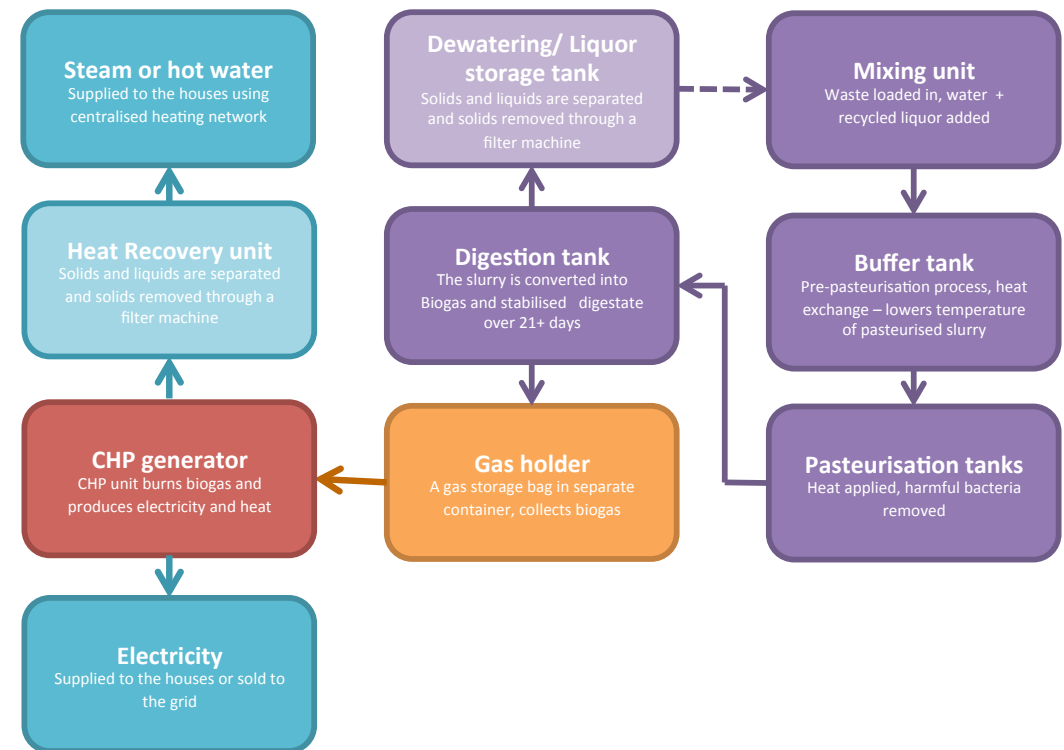
In order to realise a project of this type in such as constrained urban site, significant potential negative impacts need to be mitigated at the design stage, including:

- Air quality - NOx and particles pollution from CHP plant, compliance with EU standards
- Odour emission from waste reception
- Noise – acoustic design to isolate the machinery
- Waste collection permit
- Environmental permit
- Training of the plant operative(s)
- Transportation issues - delivery to and from site
- Digestate compliance - PAS110 certification
- Water usage and treatment – rainwater collection possible
- Biogas compliance – BS EN 60079 H&S explosives storage standard
- Health & Safety – robust design in accordance with IEC

38 61882, OHAS and COSHH



Anaerobic digester plant – compact installation



Anaerobic digester process

# Anaerobic Digestion (AD) with CHP

## Incentives

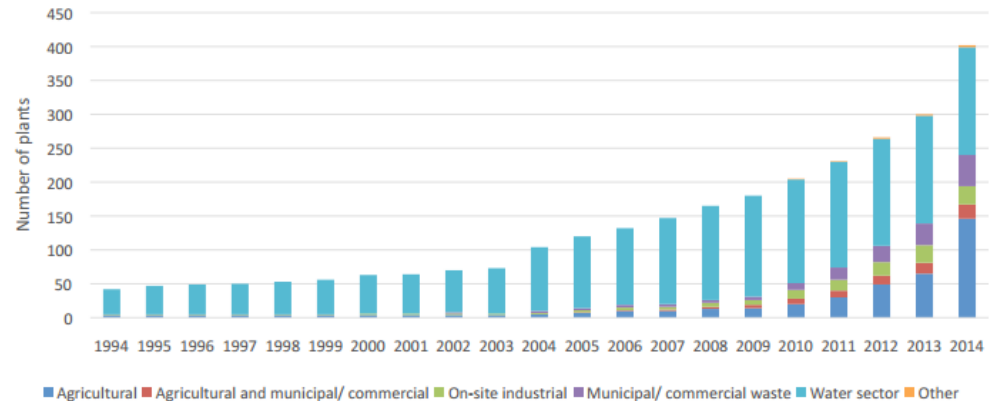
### Feed-in Tariffs (FITs)

- Generation tariff:** your energy supplier will pay you a set rate for each unit (or kWh) of electricity you generate. Once your system has been registered, the tariff levels are guaranteed for the period of the tariff (up to 20 years) and are index-linked. The tariffs are to be reviewed every three months and will be revised according to deployment rates (see table below).
- Export tariff:** No export tariff is available as of April 2015.

### Energy bill savings

You will be making approx. 50% savings on your electricity bills because generating electricity to power your appliances means you don't have to buy as much electricity from your energy supplier. The amount you save will vary depending how much of the electricity you use on site.

## Trends



According to the Anaerobic Digestion Marker Report 2015, there are AD capacity has increased by nearly 30% in 2014. The image shows the cumulative number of operational AD plants in the UK - of which there are 246 non-sewage AD plants in the UK and over 300 are new proposed schemes in planning. Just under a half of which are food waste plants. Larger agricultural schemes are most popular

A typical 5.1kW CHP plant that is fed by the 4,000 litre/hr AD plant costs approx. **£100,000**.

## Summary of Anaerobic digester Feed-in Tariffs

System size	Generation Tariff	Export Tariff	Renewable Heat Incentives
	1 Oct 2015 - 31 Mar 2016		
≤250kW	9.12 p/kWh	-	0.075 p/kWh
>250kW - 500kW	8.42 p/kWh	-	0.075 p/kWh
>500kW	8.68 p/kWh	-	0.075 p/kWh

# Anaerobic Digestion (AD) with CHP

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Anaerobic Digestion Loan Fund (ADLF)

The ADLF is a £10 million fund designed to support the development of new AD capacity in England (subsidiary of Wrap). The fund can provide asset backed loans for plant, machinery and/or groundworks. The loan is for between £50,000 and £1,000,000, requests above this figure will be considered only at the discretion of the Investment Committee. The maximum term of the loan is five years, though early repayment or shorter terms are regarded favourably.

### Green Investment Bank (GIB)

The Green Investment Bank was set up by the UK Government as a public company in October 2012. Energy from Waste, which includes anaerobic digestion, is a specific priority area for the bank and this has already seen investment in a number of projects, such as the TEG Group's anaerobic digestion facility in East London.

### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security.

### Capital Grant Aid

Capital grant schemes are available to support AD plant construction. Community Grant Scheme occasionally have funding available to support specific types of projects or certain elements of AD projects. The conditions for receiving funding vary. The Feed-in Tariff (FiT) and Renewable Heat Incentive (RHI) schemes are intended to replace, not supplement, public grant schemes as the principal means of incentivising small-scale, low-carbon electricity generation. Because of this, and to ensure value for money for consumers and compliance with EU law on state aids, it is generally not possible for a generator to benefit from both FiTs/RHI and a grant from a public body except in specific circumstances.

### Other Grant Aid and Support

WRAP provides funding on occasion, including capital grants. WRAP's Organics Funding Guide provides information on support for bio-energy and food waste processing projects.

### Enhanced Capital Allowance

The Enhanced Capital Allowance Energy scheme provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria. With CHP, case by case Certification is needed to ensure support is provided for 'good quality' certified CHP, achieved using the CHP Quality Assurance programme (CHPQA).

### Private Equity

Private equity finance may also be an option. To read more about what banks and financiers may be looking for (refer to page 75 of this report into the economics of AD by the NNFFC Bioeconomy Consultants).

For more info: <http://www.biogas-info.co.uk/funding-qa.html>



# Anaerobic Digestion (AD) with CHP

## Successful Precedence

### Southampton Science Park (Best AD Award 2012)

The University of Southampton Science Park (USSP), having installed energy efficient climate control systems in the form of air source heat pumps and heat recovery mechanisms in both new and refurbished buildings, have entered into an Electricity Service Company (ESCo) relationship with SEaB Energy ([www.seabenergy.com](http://www.seabenergy.com)) to deploy the innovative MUCKBUSTER® SEaB MB400 onsite containerised anaerobic digestion solution.

SEaB Energy supplies a compact and easy to install turnkey anaerobic digestion (AD) solution on sites generating between 200 and 1000 tonnes of food and bio waste per year. The system is known as MUCKBUSTER® SEaB MB400 in the food processing and on-site catering and accommodation sectors. The systems generates energy and offset and new income. They are designed to produce between 8kWe - 55kWe electricity via a combined heat and power unit (CHPs). The system also provides PAS110 pasteurisation, so that residual organic digestates can be sold as fertiliser or mulch.

The Science Park will take advantage of the energy harvesting potential of food and organic waste, which, to date, has been an untapped resource. Electricity and heat generated from the biogas production will be used within the business park offices and research and development laboratories on site.

A digester unit is being installed and is running an 8kW combined heat and power unit (CHP) unit, and produces an average of 46 m<sup>3</sup>/day of methane (CH<sub>4</sub>) based on the estimated annual feedstock. This in turn provides the Kenneth Dibben building with 35MWh/annum of electricity.

## Project details



This MUCKBUSTER® SEaB MB400 digester has a payback of within 4 years.

**3.5kg** of food waste is produced by each household a week

**£16,215** digestive value

**£16,215** digestive value

**£6,470** running and maintenance costs (excl. collection of waste)

# Anaerobic Digestion (AD) with CHP

## Investment cost & return

Estimated Generated Energy, kWh/a	111,500
Estimated Generated Power, kW/a	13
Unit Type	<b>MUCKBUSTER® SEaB MB400 (4kW)</b>
No of houses	306
No of houses (assume 85% contribution)	260
No of units	1
Waste generated, kg.year	47,338.20

CAPITAL EXPENDITURE	
Cost of unit	£ 98,655
Installation of unit	£ 5,000
Preparation of the ground/ outhouse	£ 10,000
Connection cost of heat network	£ 4,500
Installation of heat network	£ 3,000
Consultants fees (planning app, etc)	£ 3,500

<b>Total Expenditure</b>	<b>£ 1,035,155</b>
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RUNNING COSTS/ per year	
Electricity cost	£ 0.1379
Water costs	£ 600
Collection of waste (1 operative @3 days/week)	£ 14,500
Maintenance cost/ per annum	£ 5,000
<b>Sub-total</b>	<b>£ 20,970</b>

SAVINGS	
Electricity generated, kWh/a	35,000
Electricity cost saved @50%	£ 0.1379
Gas generated (heating), kWh/a	75,000
Gas cost saved @100%	£ 0.0463
Compost value	£ 400
Waste disposal saving	£ 15,000
<b>Sub-total</b>	<b>£ 21,286</b>

INCENTIVES	
Feed-In Tarriff, 50% electricity sold	£ 0.0912
Renewable Heat Incentives - biogas	£ 0.0750
<b>Sub-total</b>	<b>£ 7,221</b>

<b>Total Value</b>	<b>£ 7,537</b>
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<b>Total potential saving per household</b>	<b>£ 25</b>
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Investment Cost (excl. VAT)	£ 1,035,155
Investment Cost (incl. VAT)	20% £ 1,242,186
Return (IRR)	-11.76%
Pay Back Years	137.3

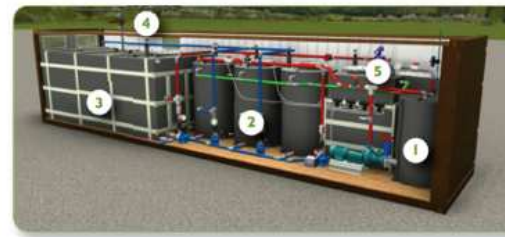
CO2 Saving annual (kg)	60,656
CO2 Saving life (kg)	20 yrs 1,213,120

The performance of AD and CHP systems is impossible to predict with certainty due to the variability of the waste availability, type of waste and correct use of the system. This estimate is based on existing projects using the manufacturer's data from MUCKBUSTER® SEaB. The cost data for the heat network is taken from Poyry's Potential and Costs of District Heating Networks for small terraced house.

maximum capacity, approx. additional 9 restaurants, 3 schools or 750 unit housing estate.

## Example of manufacturer info - MUCKBUSTER® SEaB MB400

### MUCKBUSTER®/SEaB MB400 TECHNICAL DETAILS



- 1 Waste loaded, chopped and mixed
- 2 Pasteurisation
- 3 Digestion
- 4 Gas Production
- 5 Digestate and mulch offload



### PERFORMANCE

0.5tonne MUCKBUSTER® / SEaB MB400 System.							
Waste Stream	CHP Rating (kW)	Yearly Production					
		Biogas(m³)	Electrical (kWh)	Heat (kWh)	Liquid Fertiliser (T)	Mulch (T)	Payback (Years)
Manure	3.5	17 500	27 500	60 000	98	15	6
Food Waste	4	22 500	35 000	75 000	98	5	4
Brewery Waste	6	31 500	43 500	95 000	98	10	3.5

### DIMENSIONS

- Ext Dimensions: 12.19m long x 2.44m wide x 2.9m tall (40ft x 8ft x 9.5ft) M<sup>2</sup> = 32
- Weight Empty: ≈ 8,000kg
- Weight Full: ≈ 42,000kg

### PRODUCT COMPONENTS

- Recycled Shipping Container
- Waste input processing unit (Hopper/Chopper/Mixer)
- Plastic Tanks
- Piping, Pumps and Computerised Valves
- De-Watering unit for Digestate and Mulch
- Control System
- Optional Loading Systems
- Gas storage unit
- CHP

### STANDARDS / CERTIFICATION

PAS 110  
DSEAR / CE  
T24/25 waste exemption licence in UK

## IS THE MUCKBUSTER® RIGHT FOR YOU?

**Do you have enough waste?** You need a minimum of 400kgs of biowaste per day for the basic unit to payback in an attractive number of years.

**Do you have enough space?** You need good access for delivery of the system, which is housed within a 40ft shipping container and could potentially be expanded with the addition of a 20ft or 40ft shipping container for larger site requirements. The CHP can be deployed outside, within an existing site power generation facility or within a shipping container.

**Any local regulations?** Environmental regulations differ by country and there is growing support for micro anaerobic digestion. As the technology is mobile and de-installable and re-installable, planning is less of an issue. It is best to check with local regulations prior to deployment.

**Will I be able to maintain it?** The system is designed for automated operation and remote management. Annual planned maintenance can be conducted by the approved reseller.

**Can I reuse the fertiliser and mulch by-products?** Absolutely, the fertiliser is a valuable organic product for agricultural and landscape application and the mulch is perfect for animal bedding or ground cover.

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** Cost of the AD and CHP plant is negligible when compared to the cost of installation of the heating network

# Conclusion



# Conclusion

## Summary of findings

### Background

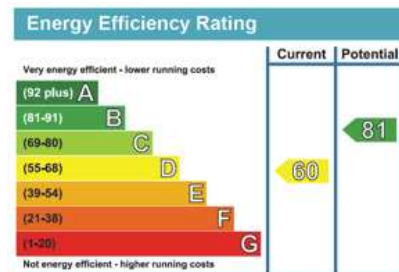
Sturgis Carbon Profiling (SCP) were commissioned by the Cressingham Garden residents to look into the sustainable retrofit of their estate, which included the installation of the renewable technologies with the main aim to:

- Reduce the energy bills and eradicate fuel poverty on the estate;
- Provide community with an additional income that could be spent on social projects, young people training schemes, further energy efficiency improvements, etc.
- Make homes greener, healthier and more sustainable.

SCP have won a UCEF Stage 1 grant to cover their fees in reviewing the feasibility of the installation of renewable technologies on the estate.

This technical report was produced by SCP is looking at the economic feasibility, financial returns, constraints, available funding and public opinion of four renewable systems in detail, including:

1. Photovoltaic (PV) panels array of 50 and 70kW output,
2. Mechanical Ventilation with Heat Recovery (MVHR),
3. Combined Heat and Power (CHP) operated using natural gas, and
4. CHP operated using biogas produced by food waste Anaerobic Digester.



### Assumptions

- The feed-in-tariffs are fixed for 20 year period. It is hard to predict what will happen after that period, therefore, we assume the FIT will be equivalent to the energy price after 20 years (taking current value).
- SCP have not taken inflation and rises into account as part of this calculation.
- The payback calculated are linear.
- SCP excluded any disposal costs or value of the installations after at the end of life (assumed 20 years).
- The cost information provided by individual manufacturers may not be accurate representation of the competitive market.
- Any loan repayment or finance costs have not been included.

### Analysis of results

- Based on the predicted future savings (IRR results), which include FIT income, the PV installation under 50kW will provide the greatest return on investment than other systems. It is also 11% better than installing a 70kW PV system due to the reduction in the feed-in-tariffs for larger installations.
- The insulation of MVHR can be installed along side the any of the other technologies, and is recommended because of the wellbeing benefits of having fresh filtered air, particularly for the elderly and young children.
- Combined Heating and Power (CHP) and Anaerobic Digester (AD) with CHP were found to be not economic because of the high cost of laying down the new district heating network.

# Conclusion

## Summary of findings

Installation type	Total Energy Produced, kWh - per year	Total Value - per year	Potential Saving per Household - per year	Investment Cost (exc. VAT)**	IRR	Pay back (years)
<b>PV panels - FIT from Jan 2016</b>						
327 PV panels - up to 50kW	38,212	£ 4,439	£ 15	£ 100,885	1.13%	24
245 PV panels - up to 50kW	37,671	£ 4,369	£ 14	£ 95,253	1.46%	23
245 PV panels - up to 100kW	76,849	£ 8,659	£ 28	£ 247,523	-0.41%	30
245 PV panels - up to 150kW	114,520	£ 13,165	£ 43	£ 368,857	-0.28%	29
245 PV panels - up to 250kW	191,370	£ 22,356	£ 73	£ 616,380	-0.17%	29
245 PV panels - up to 400kW	310,411	£ 35,476	£ 116	£ 999,798	-0.27%	30
<b>PV panels - Current FIT***</b>						
245 PV panels - up to 50kW	37,671	£ 7,236	£ 24	£ 95,253	5.41%	14
245 PV panels - up to 500kW	310,411	£ 46,837	£ 153	£ 999,798	1.36%	22
<b>Other - Current FIT</b>						
MVHR + airtightness	781,096	£ 21,636	£ 71	£ 917,296	2.35%	51
Gas CHP	756,864	£ 49,139	£ 161	£ 2,391,625	-5.70%	49
AD with CHP	111,500	£ 7,537	£ 25	£ 1,035,155	-9.88%	141



1. Installation **up to 400kW** generates approx. 70% of the total electrical energy use of the estate (306 homes), based on household bills for 2014, see Appendix B. It is not the most financially viable but is appropriate in size and saving potential. We would be looking to go out for a competitive tender to improve the IRR once the industry is stabilised subsequent to government FIT reductions as we are anticipating substantial price drop.

2. Most financially viable installation is **up to 50kW** as has payback period under the life of the panel. However, the size of the system is too small to provide meaningful returns to the residents.

1+2. PV installation works under both scenarios Lambeth demolition proposal or resident led alternative refurbishment proposals. The PV panels could be relocated to a re-built estate.

3. MVHR installation is not mutually exclusive from the renewable systems installation and offers better returns. It will be harder to raise funding for the MVHR installation and airtightness improvements as it does not fall within the Low and Zero Carbon Technologies.

**Note:**

\*Information above is based on the energy bills for 2014 of the Cressingham Garden residents.

\*\* The cost data was provided by the renewable system manufacturers, and excludes VAT which is variable depending on the installation and potentially could be claimed back through tax relief.

\*\*\* We have included current FIT for comparison but excluded it from the proposal at this stage.

## Summary of findings

### Conclusion

The maximum PV array of up to 400kW (206 roofs) was chosen as the best renewable technology option for the estate because it:

- Is considered the most appropriate for the estate by the residents,
- Is both suitable for the installation on shallow sloping roofs of the existing estate and relocation to the new development that is at the masterplanning stage with the Lambeth Council.
- Currently achieves relatively poor rate of return (IRR) and pay back period due to the fall of the FIT but as the prices of PV installations are expected to fall next year, we are expecting substantial reductions in costs of PVs.

In summary, PV array of 1650 panels requires a total investment of just under **£1M** (excl. VAT, subject to the community tax relief schemes).

This will generate **310,000kWh** of energy, which is equivalent to approx. 70% of total electricity use of the estate (306 homes) based on household bills for 2014, see Appendix B. We expect 50% of total energy produced being used by residents and 50% being sold to the grid using the latest Feed-In-Tariffs.

This is equivalent to total value of **£35,500** or **£153** saving per household, some of which the residents wish to spend on community projects. (Please note: the sums exclude loan repayments, which is subject to available funding and grants).

SCP are now looking to resubmit for Stage 2 UCEF grant that will release further funding to progress the project.

## Summary of findings

### Risks

1. The feed-in-tariffs are taken from current government subsidies tables. They change every 3 months, and are generally being reduced. Therefore, the current financial model may need to be updated as the project progresses.
2. Currently the government is running a consultation process to change the Feed-In-Tariff (FIT) accreditation proposing to remove the pre-accreditation. This puts this project at risks as pre-accreditation allows to fix the FIT while the project is being developed allowing to write a robust business case for the proposals. SCP would recommend expediting the project in order to avoid this risk. For more information: <https://www.gov.uk/government/consultations/changes-to-feed-in-tariff-accreditation>
3. Lambeth Council are currently looking at the masterplanning scheme for regeneration of the site, which includes option for full demolition of the estate. They expressed their general support for the project, because they see benefit in this type of the installation, assuming:
  - PV panels could be easily relocated from existing roofs and reconnected to new development, if such proceeds.
  - Current residents will benefit from reduced energy bills as the regeneration project program is likely to stretch out for year.
  - Renewable installation of this scale will provide reassurance to the residents that they will be rehoused in the new properties on site which will make the residents happier and feeling more secure.
  - It adds to the environmental credentials which are written into the council policies.
  - It will save money for the council - in 3-4 years time the Feed-in-tariffs will be much lower than the current rates, diminishing the return.However the Council have not yet provided a written support document until they have more detailed information on the funding and progress the masterplanning scheme further.

## Recommendations



SCP advise Cressingham Garden community to undertake further work, which is not included in the current scope:

- Estimate value of potential grant funding available to pay for the capital expenditure;
- The cost of borrowing money to make up the shortfall up to the value of capital expenditure;
- Conduct further community consultation;
- Arrange further Lambeth Council consultation;
- Submit application for full planning permission;
- Optional - estimate value of wellbeing improvements to help secure the funding using SROI methodology, i.e. saving in NHS bills for Lambeth.

# Conclusion

## Cressingham Gardens Vision

### Low Energy Retrofit with Community Fund

A portion of the revenue generated through the project will be placed into a Community Fund. This fund will then be used to improve the energy efficiency of Cressingham Estate, provide opportunities for young people, training schemes and organise community activities.

The Cressingham Garden is generally in poor condition due to the chronic lack of funding provided by Lambeth Council. The residents are very keen to remain in their properties as the general layout of the estate, its central location and established community are well loved and cherished.

Based on five community consultation workshops conducted by Sturgis Carbon Profiling, the residents support the idea of the estate being refurbished to low energy standard. They would keenly embrace the low energy bills and eradication of the fuel poverty, providing the works do not require a large up front investment.

The residents understand that this is a long term goal and are happy to support the Low Energy EnerPHit proposals, providing the most acute problems, such as roof and gutter leaks are prioritised and the estate aesthetic is conserved.

Please refer to a separate EnerPHit Report for more information on the Deep Retrofit proposal and costs.

## Cressingham Gardens – Current Financial Model



**6.7%** estimated return each year that can be reinvested in the community, which is equivalent to:

**£35,500** total value or **£116** potential saving per household, which could be allocated as follows:

**50%** savings to energy bills and

**50%** in Community Fund allocated to community projects and further green refurbishment measures.

(Please note: the above is subject to loan repayments.)

## Conclusion

### Social and Wellbeing value

#### Using PV installation to benefit community

SCP reviewed the social and wellbeing benefits of the proposal using some of the Social Return on Investment (SROI) principles for Cressingham Gardens, the following benefits were identified:

1. The estate residents are expected to gain the most value from the proposal, including:
  - Reduction of energy bills and eradication of fuel poverty;
  - More power to the community by allocating the Community Fund from the financial return, to be spent on the community projects i.e. community garden projects, children's play sessions, sporting activities, elderly clubs in the existing community center (Rotunda);
  - Improving energy efficiency of the homes by running energy efficiency workshops, conducting energy surveys, etc and funding further green improvement to the estate through energy bills, i.e. using ESCo funding model.
  - Reduction of social isolation and more community integration through the management of the new community run organisation (ESCo).
2. The estate young people and unemployed may display improved behaviour through the involvement in the training workshops run by professional construction workers, i.e. employing practical skills installing green home improvement, plumbing, electricals, etc.
3. The estate elderly and disabled residents would be able to keep thermostats on higher, more comfortable temperature setting.
4. Lambeth Council is likely to have less 'unhappy' residents and hence spent less time and money on management of the estate.
5. The public health service (NHS) is likely to benefit by spending less money on treatment of the residents, i.e. flues, cold, asthma that is normally associated with cold draughty homes in fuel poverty.

### Community Energy Efficiency Fund in action



On an example of a precedent project from Brixton Solar Energy, the money raised for the Community Energy Efficiency Fund (CEEF) have so far achieved the following:

- Work experience on the renewable energy installation for one resident.
- Home energy audits that included installation of low energy lighting and power down plugs on two estates.
- Energy surveys throughout the estate over the course of 8 months.
- Energy Advice Sessions for the total of 132 people.
- Local leadership as the project management includes two local residents.
- Community events, including drought proofing workshop and other low cost energy efficiency measures.

SCP have already run five energy efficiency and green retrofit workshops with the residents of the Cressingham Garden and received a great feedback and interest from the residents.

# Appendices

## Terms Explained

### Estimated Return

The estimated annual return to members of the co-operative is based on projected income and expenditure over the life of the solar array, using the assumptions stated in the business case.

### The Community Fund

A portion of the revenue generated through the financially profitable project may be placed into a Community Fund. This fund is then be used to fun Community projects, which may include energy efficiency measures, provide opportunities for young people, training schemes, other community actives, etc.

### Internal Rate of Return (IRR)

The internal rate of return is the discount rate that will make a series of nominal cash flows have a NPV of ZERO. An investment's IRR is useful because it creates comparison for investment costs. (If IRR is bigger than the interest rate on borrowed costs, you make profit).

### Payback Period

Payback period is the time in which the initial cash outflow of an investment is expected to be recovered from the cash inflows generated by the investment. Formula:  
Payback Period = Initial Investment/ Cash Inflow per Period

### Social Return on Investment (SROI)

SROI is a framework for measuring and accounting for this much broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental and economic costs and benefits.

SROI measures change in ways that are relevant to the people or organisations that experience or contribute to it. It tells the story of how change is being created by measuring social, environmental and economic outcomes and uses monetary values to represent them.

### Tax Relief (via CITR)

Community development finance institutions (CDFIs) is an investment vehicle that can deliver financial and social returns, and the Government has put in place a tax incentive to foster more investment in these important organisations. The scheme is called the Community Investment Tax Relief (CITR).



## Appendix B

### Cressingham Garden Estate Estimated Annual Energy Use

\*Note: The energy use is based on the energy bills provided by the residents and average energy prices in the UK for 2014.

House type	Data	Electricity				Gas				Total energy used, kWh	Total energy bill, £ (excl. VAT)	Total bills, £ (incl. 5% VAT)	No of units
		Energy used, kWh	Rate, £/kWh	Standard charge, £/year	Cost, £/year	Energy used, kWh	Rate, £/kWh	Standard charge, £/year	Cost, £/year				
0-bed	as measured	1,058	£ 0.1832	£ -	£ 194	4,877	£ 0.0504	£ -	£ 246	5,935	£ 440	£ 462	11
	standardised	1,058	£ 0.1379	£ 53	£ 199	4,877	£ 0.0463	£ 55	£ 281	5,935	£ 480	£ 480	
1-bed	as measured 1	3,301	£ 0.1425	£ 66	£ 536	7,425	£ 0.0515	£ -	£ 382	10,726	£ 918	£ 964	151
	as measured 2	1,379	£ 0.1349	£ 95	£ 281	6,937	£ 0.0500	£ 95	£ 442	8,316	£ 723	£ 759	
	standardised	3,301	£ 0.1379	£ 53	£ 509	7,425	£ 0.0463	£ 55	£ 399	10,726	£ 907	£ 907	
2-bed	as measured	2,327	£ 0.1671	£ 22	£ 367	17,375	£ 0.0514	£ 85	£ 977	19,701	£ 1,344	£ 1,411	53
	standardised	2,327	£ 0.1379	£ 53	£ 374	17,375	£ 0.0463	£ 55	£ 859	19,701	£ 1,233	£ 1,233	
3-bed	as measured	4,257	£ 0.1305	£ 110	£ 666	14,757	£ 0.0305	£ 124	£ 573	19,014	£ 1,239	£ 1,301	50
	standardised	4,257	£ 0.1379	£ 53	£ 640	14,757	£ 0.0463	£ 55	£ 738	19,014	£ 1,378	£ 1,378	
4-bed	as measured 1	2,024	£ 0.1196	£ 74	£ 316	9,747	£ 0.0447	£ 95	£ 531	11,771	£ 847	£ 889	41
	as measured 2	2,810	£ 0.1271	£ 50	£ 408	18,395	£ 0.0454	£ 16	£ 819	21,205	£ 1,226	£ 1,288	
	standardised	2,417	£ 0.1379	£ 53	£ 387	14,071	£ 0.0463	£ 55	£ 706	16,488	£ 1,093	£ 1,093	
<b>Total</b>	<b>Cressingham average weighed*</b>	<b>1,472</b>	<b>£ 0.1379</b>	<b>£ 53</b>	<b>£ 256</b>	<b>7,506</b>	<b>£ 0.0463</b>	<b>£ 55</b>	<b>£ 402.26</b>	<b>8,978</b>	<b>£ 659</b>	<b>£ 691</b>	<b>306</b>
<b>Total</b>	<b>DECC UK average**</b>	<b>3,300</b>	<b>£ 0.1379</b>	<b>£ 53</b>	<b>£ 508</b>	<b>16,500</b>	<b>£ 0.0463</b>	<b>£ 55</b>	<b>£ 819</b>	<b>18,600</b>	<b>£ 1,327</b>	<b>£ 1,393</b>	<b>306</b>

Total Electricity (306 homes)	450,342	£ 78,411
Total Gas used (306 homes)	2,747,163	£ 123,093
<b>Total (as measured)</b>	<b>3,197,505</b>	<b>£ 201,504</b>

Average Electricity (306 homes)	1,009,800	£ 155,560
Average Gas (306 homes)	5,049,000	£ 250,519
<b>Total (DECC estimate)</b>	<b>6,058,800</b>	<b>£ 406,079</b>

<b>Difference</b>	<b>-50%</b>	<b>-£ 204,575</b>
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**Note:**

\*Information above is based on the energy bills for 2014 of the Cressingham Garden residents.

\*\* The data was standardised against the UK average energy costs taken from DECC from 2013 Housing Survey data.

52\*\* Cressingham Garden Estate have smaller bills compared to the average UK housing.

## **G. Sturgis Report: Green Retrofit**

# Cressingham Gardens

London, SW2

Renewable Technologies Technical Report \_Rev E

October, 2015



For Cressingham Gardens Community

by

sturgis

carbon profiling™

# Executive Summary

## Scope of the report

Sturgis Carbon Profiling (SCP) was commissioned by the Community of Cressingham Gardens to gauge the opportunity for the installation of the renewable technologies suitable to support the 306 homes on the estate.

This is a follow-on report from the Technical Feasibility Study that was issued in December 2014 in support for Urban Community Energy Fund grant application.

This report aims to provide detailed technical analysis of the renewable systems which look at the technical suitability and costs in more detail.

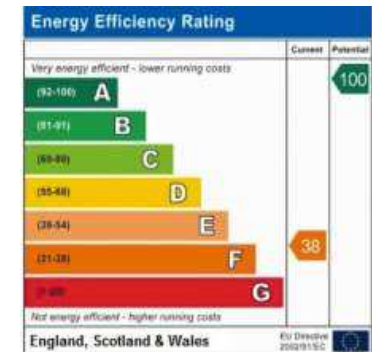
From the list of eight renewable technologies presented in the original study, also enclosed, only four were selected as identified as most appropriate in the first feasibility report due to the technical and planning constraints:

- **Solar photovoltaic panels;**
- **Mechanical Heat Recovery Ventilation (MVHR);**
- **Gas operated Combined Heat and Power (CHP);**
- **Anaerobic digestion (AD) with CHP.**

Renewable heat network was removed from the scope after public consultation with the residents as received negative feedback.

This report will look at further recommendations for the development, costs of the systems and will review the public opinion in relation to each of the above technologies.

Please refer to Appendix A for definition of terms in relation to financing and funding chapters.



### Cressingham Gardens Retrofit program

A separate report is available by Sturgis Carbon Profiling looking at the feasibility & costs of low-energy EnerPHit Retrofit of the estate, a step-by-step approach that is aiming to achieve the following:

- Eradicate fuel poverty on the estate;
- Improving the health & wellbeing of the residents, particularly as the estate has a high proportion of the young, elderly and disabled.
- Aiming to deliver Zero Carbon refurbishment in reality, not just on paper.
- Minimising maintenance cycles and associated costs.

# Executive Summary

## Background

Cressingham Gardens is a medium-density low-rise estate built in late 60s/70s in Tulse Hill, London. It is a very popular estate because it faces green and leafy Brockwell Park, and has excellent transport links (only 15 min bus ride away from Brixton station).

There is a vibrant community that live on the estate that consists of 306 homes, located in one of the more deprived neighbourhoods in England (based on data from ONS) . 70% of the homes are council homes and 30% direct homeowners.

Some of the homes on the estate need urgent repair works to bring it back to its former glory. Despite the council's poor record of repairs & maintenance, the design & architecture of the estate has created an amazing community and one that has a below level of crime. It is actually a role model community and highly desired by all that live both on and off the estate. The demand for properties is extremely high, because people rarely leave due to the high quality of life and community.

Lambeth Council is developing proposals for full demolition of the estate, as it states it cannot afford repairs and refurbishment to a decent homes standard. The proposals are currently at a master-planning stage. Lambeth estimates that it will take three to four years to get to the project off the ground.

The residents are looking for an alternative vision that would not require the demolition of homes and displacement of the community. As part of this alternative vision, residents would like to incorporate renewable technologies that will make the estate a sustainable role model for London.



*Cressingham Gardens bird-eye view showing village-like layout that encourages community feel*

**One of the objectives of this report is to find a solution that works under both scenarios - Lambeth demolition proposal or resident led alternative refurbishment proposal - to ensure that the full return on the investment can be realised**

## Executive Summary



*Cressingham is a well looked after estate with community gardens and green leafy neighbourhoods*



*Village-like design using pedestrianised streets, high level balconies and maximising day lighting to create a safe community feel.*

# 1. Photovoltaic Panels

# Photovoltaic Panels

## What are Photovoltaic Panels?

### Photovoltaics (PVs) explained

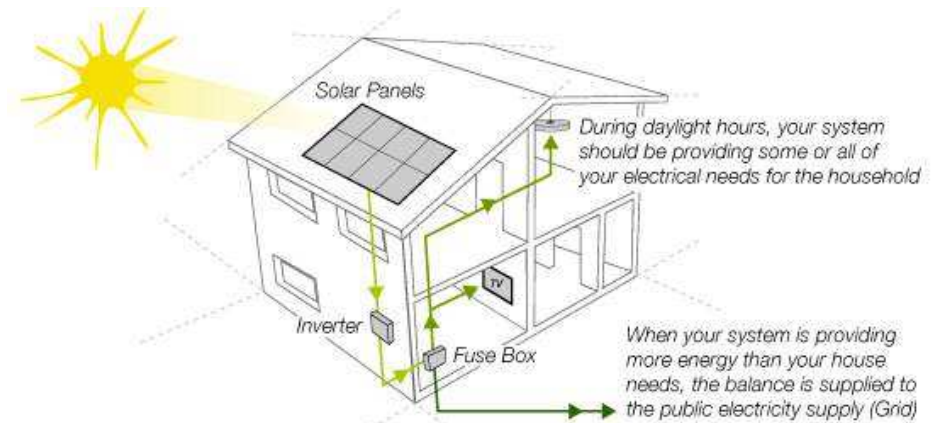
Photovoltaic cells directly convert sunlight into electrical current using semi-conductors. The output of a cell is directly proportional to the intensity of the light received by the active surface of the cell. Exposure to sunlight causes electricity to flow through the cells. Direct sunlight produces the greatest output, but power is produced even when overcast.

### Benefits

- PV panels provide clean, green energy from the Sun, which is free and abundant!
- Their cost is currently on a fast reducing track, which makes it an economically viable solution.
- Operating and maintenance costs for PV panels are considered to be low, almost negligible, compared to costs of other renewable energy systems.
- PV panels have no mechanically moving parts, consequently they have far less breakages or require less maintenance than other renewable energy systems.
- PV panels are totally silent, producing no noise at all; consequently, they are a perfect solution for urban areas and for residential applications.
- Government subsidy funding (FITs, tax credits etc.) is available for PV panels, thus financial incentive for PV panels make solar energy panels an attractive investment alternative.
- Residential solar panels are easy to install on rooftops or on the ground without any interference to residential lifestyle.



*Proposal is to use standard Photovoltaic silicon cells.*



*The electrical power generated by PV panels can either be used at home or sold to the Grid.*



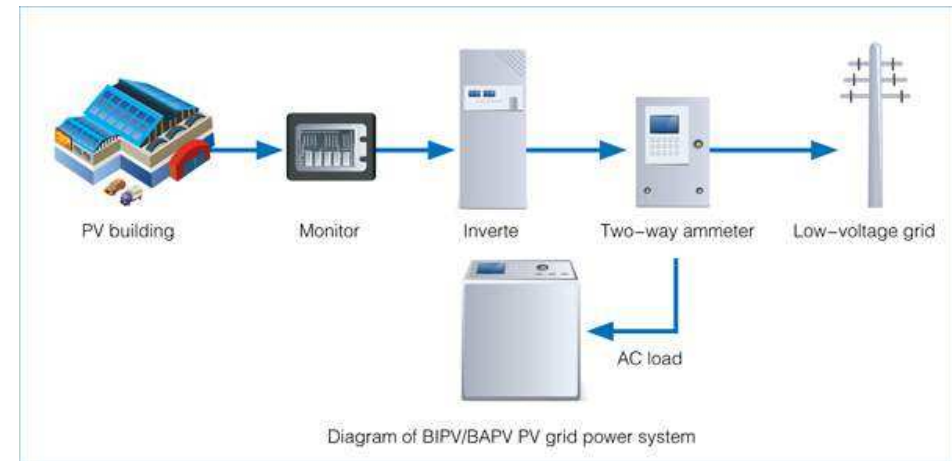
### System integration

Photovoltaic panels can either be integrated modules (incorporated into glazing, the facade or roof tiles of a pitched roof, etc.) or mounted in angled arrays on a flat roof.

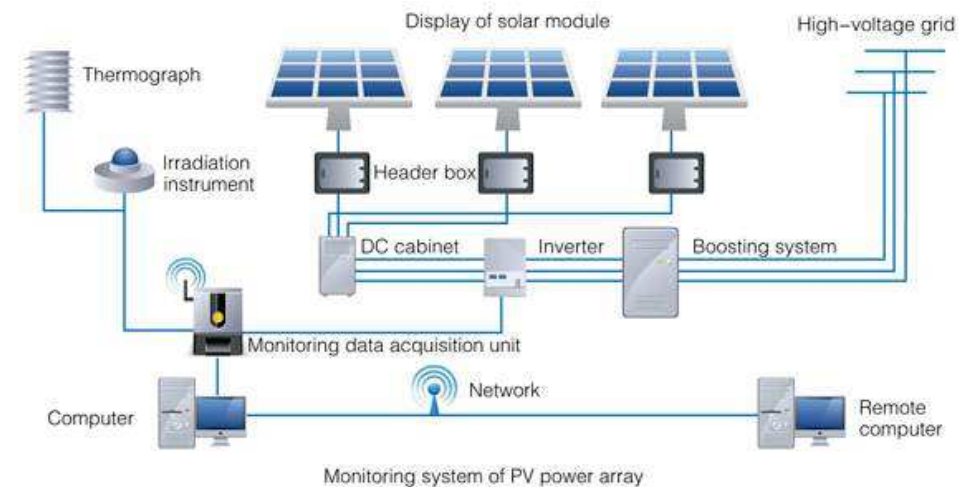
- PV modules are based on silicon cells are the most common type and are being considered for this project because of the cost and performance benefits;
- Poly silicon panels are moderately cheaper with corresponding lower performance;
- Mono-silicon panels are more expensive but with higher levels of performance.

Electricity from the PV array system could be installed in the following configuration:

1. Used for profit only (100% of energy generated sold). As this requires less conversion, this type of system is cheaper to install.
2. Fed via inverters into the distribution network of the building where it is anticipated the half of the electricity will be consumed. A further connection will enable unconsumed electricity to be sold back to the electricity grid. This type of system offers social benefits and applies for government subsidies.
3. Future-proof system that uses battery for household power storage. Once the battery is fully loaded, the remaining electricity is sold to the grid. Until recently, this was a very expensive and inefficient option.



*Building integrated PV system application, where the energy generated is utilised in people's homes (average assumed 50% used and 50% sold).*



*Large PV Grid connection is a kinds power generation system where all energy is taken to the AC grid via the PV inverter. It considered cheaper to install (35-45%) and has increased system life (no fault time).*

# Photovoltaic Panels

## Constraints

### Orientation

Optimum electrical output is obtained from: PV panels facing +/- 45° of South. The Cressingham Gardens is low-rise estate with an expanse of roofs that have East, South and West orientation, optimum for the maximum electricity generation.

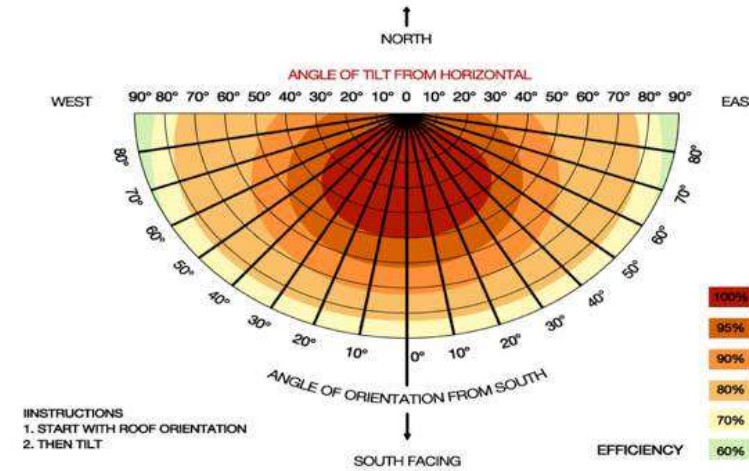
The Cressingham Gardens has shallow roofs inclined at 15° from the horizontal. PV panels that are inclined at 10° to 30° from the horizontal are optimum for electricity generation and allow the self-cleaning by the action of rain.

Assume all roofs on the Estate are available for PV installation, excluding rooflights and zones required for their maintenance. There are 206 roofs available on the estate (see Estate plan on p.9).

It is important to avoid locating PV on surfaces that are permanently shaded, even transient shadows should be avoided where possible. Cressingham Gardens has a few mature trees that should be considered in the PV layout design. However, majority of roof have very little overshadowing (assume >20%).

### Maintenance

Panels are typically warranted for 20 years. Safe access around the panels and to other roof plant should be maintained.



PV panel orientation efficiency diagram

Overshading	% of sky blocked by obstacles.	Overshading factor
Heavy	> 80%	0.5
Significant	> 60% - 80%	0.65
Modest	20% - 60%	0.8
None or very little	< 20%	1.0

Note: Overshading must be assessed separately for solar panels, taking account of the tilt of the collector. Usually there is less overshadowing of a solar collector compared to overshadowing of windows for solar gain (Table 6d).

Table A: Overshading factor, assume 1 for Cressingham Gardens roofs

Tilt of collector	Orientation of collector				
	South	SE/SW	E/W	NE/NW	North
Horizontal			961		
30°	1073	1027	913	785	730
45°	1054	997	854	686	640
60°	989	927	776	597	500
Vertical	746	705	582	440	371

Table B: Annual solar radiation, assume 961 kWh/m<sup>2</sup> for typical shallow sloping roof

# Photovoltaic Panels

## Constraints

### Structural Survey

Structural Survey has been conducted by TALL Structural Engineers undertaken in 2014 that looked at the general conditions of the Estate's existing roofs.

The report outlines the following condition:

- The majority of the existing roofs are metal zinc clad and are in poor condition;
- The roof joists found to be 250 x 47 @600c/c with herringbone strutting between the joists.
- The original chipboard decks was fixed to the heads of the joists. A low level moisture was present.
- No joists would appear rotten or needed replacement.
- Rockwool insulation has only been placed between joists where roof was replaced.

A general conclusion includes:

- Present roof structure would be suitable to support a new enhanced roof with a similar lightweight finish + a layer of insulation.
- Where deck is damaged by water, it needs replacement but preferably throughout.
- Separate roof loading calculation is required to ascertain the structural integrity of the roof to support PV panels.

See enclosed full Structural Report and sketches overleaf.

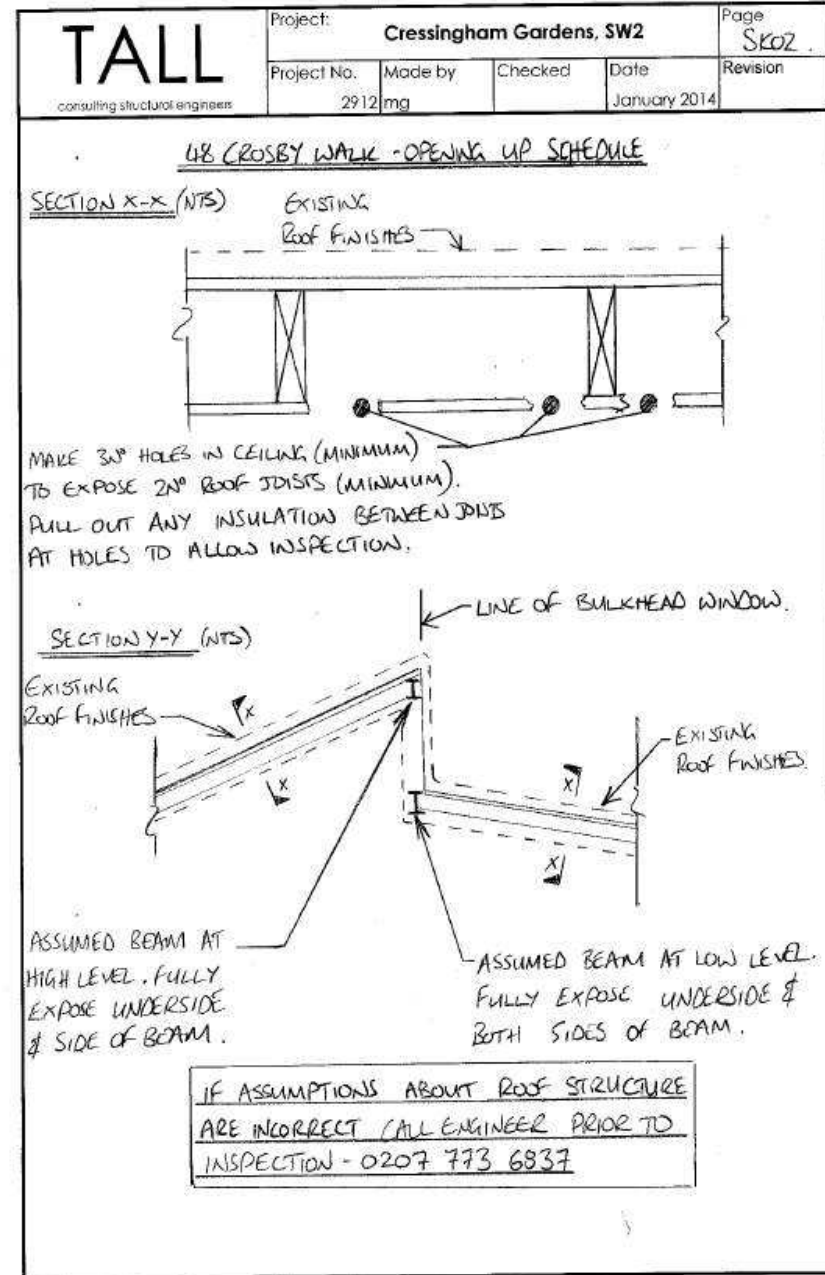
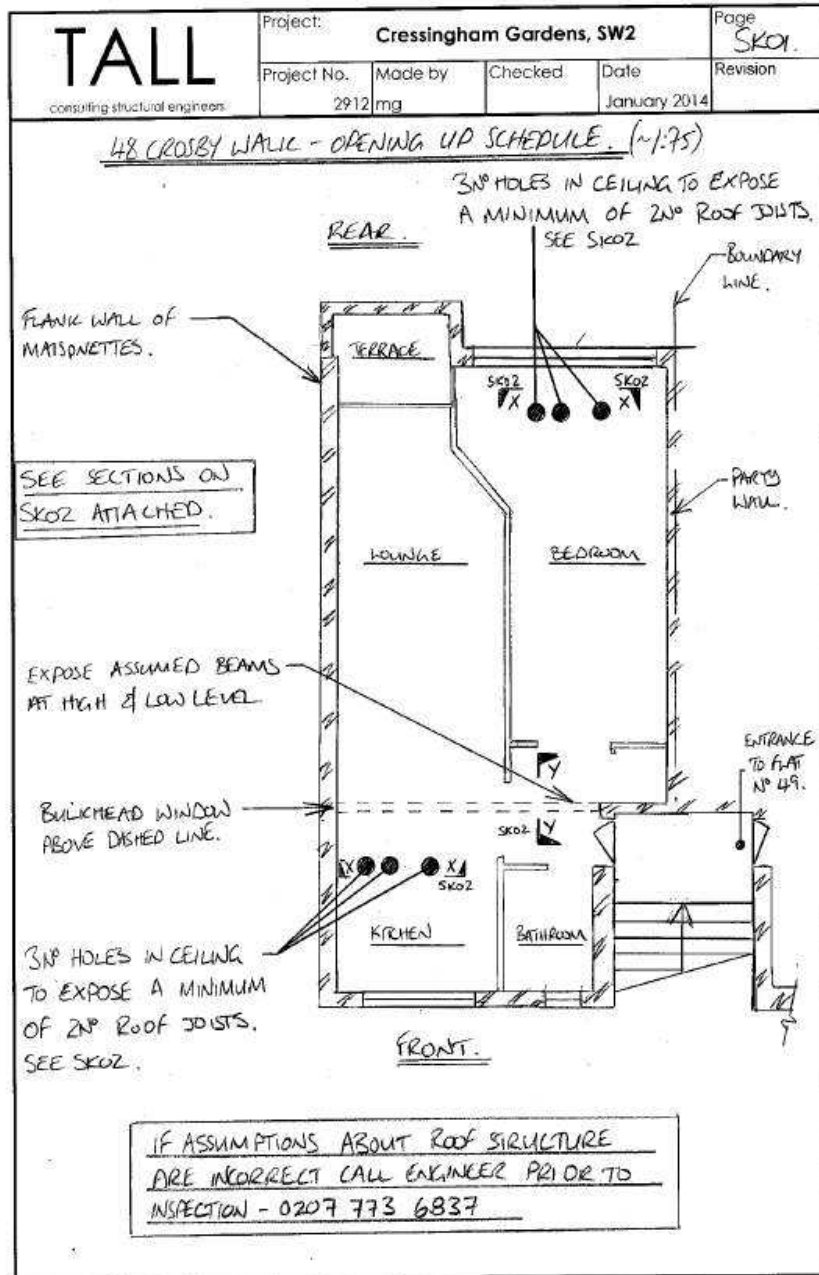


*Existing roofs of Cressingham Gardens are predominantly low-rise zinc clad roofs.*



*Some are in the better conditions than others are due to be replaced in 2015 by the Lambeth Council.*

# Photovoltaic Panels



# Photovoltaic Panels

## Constraints

### Local Planning Issues

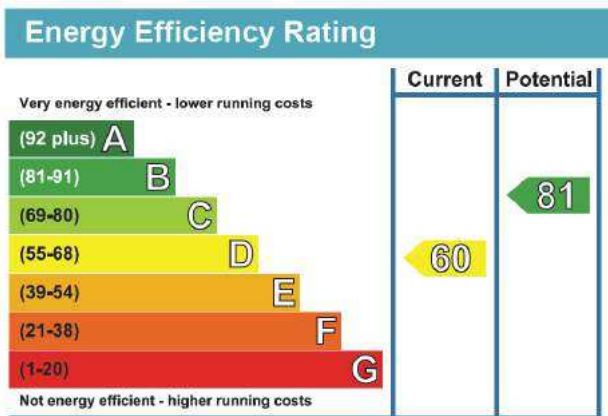
Cressingham Gardens is not located in a Conservation area and does not have Listed Building status.

Roof-mounted PV panels must not exceed the existing envelope size of the estate, and generally should remain hidden from view. Planning permission will be required but no constraints are foreseen.

### Energy rating

Evidence of property's EPC rating will be required for each property when applying for FITs. If no evidence showing the EPC has a band D or higher then the lower rate will apply. Current EPC rating of majority of properties is D, and hence will not be an issue.

The installation of PVs is planned alongside major estate renovation of which roof works are the first phase of the development. We anticipate EPC rating to improve.



EPC rating from a typical 2-bed property, Hardel Walk



- Properties for roof renewal suitable for PV installation
- Sold freeholds
- Live right-to-buy

### Roof capacity

No. of roofs = 206  
 Average roof area (5.6x10m) = 56m<sup>2</sup>  
 Usable roof area 35% = 19.6m<sup>2</sup>  
 Panel size (1.05x1.56m) = 1.64m<sup>2</sup>  
 No. of panels per roof = 12 (3 rows of 4 panels)

**Total no. of panels = 2,472**

### Roof orientation

Each house has a relatively shallow sloping roof with dual orientation.

**SW/ NE = 43**

**N/ S = 163**

Roof spaces suitable for PV installation

## Successful Precedence

### Brixton Energy Solar

Brixton Energy Solar is a co-operative set up to enable local people to invest in renewable energy generation in Brixton and raise funds for energy efficiency initiatives. This is the first inner-city community-owned solar power stations in Britain, consists of:

- Solar 1 - 37kW solar array on Elmore House on the Loughborough Estate (completed 30March2012).
- Solar 2 - 45kW solar array on 5 blocks in Styles Gardens, Loughborough Estate (completed 31October2012).
- Solar 3 - 52.5kW solar array on 4 buildings in Roupell Park Estate (on-going, 100% funding raised).
- Solar 4 - currently in planning stage.

The income from the project is derived principally from the government's Feed-in Tariff scheme, which is guaranteed for 20 years (on-going).

Some of the energy generated by the project is used on site with the remainder energy sold directly back to the grid. After operating costs are deducted, profits resulting from the sale of energy are used to support local energy efficiency initiatives and provide Co-operative members with an annual return on their investment.

A portion of the revenue generated through the project will be placed into a Community Energy Efficiency Fund (CEEF). This fund will then be used to improve the energy efficiency of the housing stock in Brixton, thereby taking meaningful steps to alleviate fuel poverty for some of the poorest residents.

For more info - <http://www.repowering.org.uk/projects>

## Project details



To date, Solar 1 & 2 projects have generated in excess of 50,000kWh of community-owned renewable energy in Brixton.

**4.0%** estimated return\* each year

**50%** tax relief\* via SEIS

**20%** social return\* to a Community Fund

**100%** raised with Local Investors for the Solar 3 (£65,650)

\*See Appendix A for explanation of terms.

# Photovoltaic Panels

## Incentives

### Feed-in Tariffs (FITs)

- **Generation tariff:** Your energy supplier will pay you a set rate for each unit (or kWh) of electricity you generate. The tariff levels are guaranteed for the period of up to 20 years. The tariffs are to be reviewed every three months and will be revised according to deployment rates. See table below for latest rates.
- **Export tariff:** You will get a further 4.77p/kWh from your energy supplier for each unit you export back to the electricity grid, so you can sell any electricity you generate but don't use yourself. Until smart meters are installed, it is estimated as being 50 per cent of the electricity you generate (only systems above 30kWp need to have an export meter fitted).

### Energy bill savings

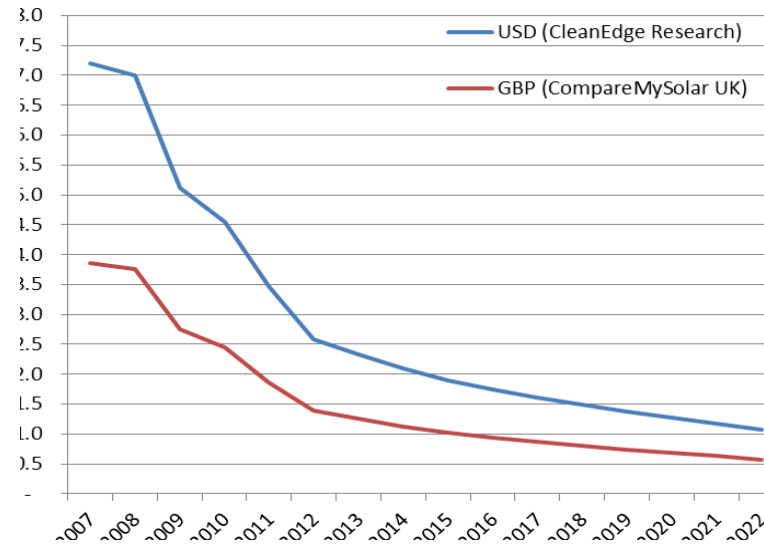
You will be making approx. 50% savings on your electricity bills because generating electricity to power your appliances means you don't have to buy as much electricity from your energy supplier. The amount you save will vary depending how much of the electricity you use on site.

### Renewable Heat Incentive (RHI)

RHI was launched in April 2014 by paying subsidy for renewable heating systems. It does not include PV installation.

**Note:** The Department of Energy and Climate Change (DECC) has announced that it they are looking to stop the pre-registration of the project that allows to fix the FIT and hence build a robust business plan for the project. SCP advises that Cressingham Community accelerates the application process.

## Trends



As the graph shows, the price of a solar PV array has dropped considerably over the years - by 80%+ (20% in 2012 alone), which resulted in a great increase in PV installations (more than 500,000 households have installed solar panels to date).

A typical 3.5kW grid-connected PV roof (covering about 25 square metres) is likely to cost around **£6,000**.

## Summary of PV Feed-in Tariffs

System size	Generation Tariff			Export Tariff	
	1 Oct 2015 - 31 Dec 2015				
	Higher rate (≥ EPC D)	Medium rate (multiple ownership)	< EPC D		
4kW or under	12.47 p/kWh	12.47 p/kWh	5.94 p/kWh	1.63 p/kWh	
> 4kW – 10kW	11.30 p/kWh	11.30 p/kWh	5.94 p/kWh		
> 10kW – 50kW	11.30 p/kWh	11.30 p/kWh	5.94 p/kWh	3.69 p/kWh	4.85 p/kWh
> 50kW – 100kW	9.63 p/kWh	9.63 p/kWh	5.94 p/kWh	2.64 p/kWh	
> 100kW - 150kW	9.63 p/kWh				
> 150kW - 250kW	9.21 p/kWh				
> 250kW	5.94 p/kWh				
Stand-alone	4.28 p/kWh			1.03 p/kWh	

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Green Deal

Green Deal Loan could be provided to homeowners for up to 32% of the total installation cost of PV system. However, this funding is not be available for large-scale community-run PV installation.

### Green Investment Bank (GIB)

The Green Investment Bank was set up by the UK Government as a public company in October 2012. The Bank has £3 billion to invest in sustainable projects, where public capital is used to support private investment. Community-scale renewable projects are widely supported by the GIB.

### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security. Only available through accredited EFG lenders, detailed on the Department for Business Innovation & Skills (BIS) website, available until 31 March 2015.

### Capital Grant Aid

Capital grant schemes are available to support some of the community projects. However, it is generally not possible for a generator to benefit from both FITs/RHI and a grant from a public body except in specific circumstances.

### Other Grant Aid and Support

WRAP provides funding on occasion, including capital grants.

### Enhanced Capital Allowance

The Enhanced Capital Allowance Energy scheme provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria.

### Private Equity

Private equity finance may also be an option. Brixton Energy Solar is a good example of successful privately funded scheme by the local residents that benefit from 4% return on their investment.





# Photovoltaic Panels

## Investment cost & return - installation <50Kw (327Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh	38,212
Estimated Generation power, kW - assume 5% loss	47.2
Panel Type	Sunpower 327
Panel output, Wp	327
No of households	306
No of available roofs	20
No of units (8 panels per house)	152
Peak power, kWp	49.7
Solar Radiation (table A, p.6)	961
Zpv Overshadow Factor (table B, p.6)	1

CAPITAL EXPENDITURE	
Cost of unit	£ 663.71
Cost of all units	£ 100,885
Installation	inc. above
Preparation of roof (strengthening, etc)	inc. in retro work
Consultants fees (planning app, etc)	£ 45,000

<b>Total Expenditure</b>	<b>£ 145,885</b>
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RUNNING COSTS/ per year	
Electricity used by system	£0.1379
Maintenance cost/ per annum	£ 532
<b>Sub-total</b>	<b>£ 532</b>

SAVINGS/ per year	
Electricity generated @80% peak power, kWh**	38,212
Electricity cost saved for households @50%	£0.1379
Gas generated	0
Gas cost saved for households	£0.0463
<b>Sub-total</b>	<b>£ 2,635</b>

INCENTIVES/ per year	
Feed-In Tarriff - Generation Income @100%	£0.0369
Feed-In Tarriff - Export Income @50%	£0.0485
<b>Sub-total</b>	<b>£ 2,337</b>

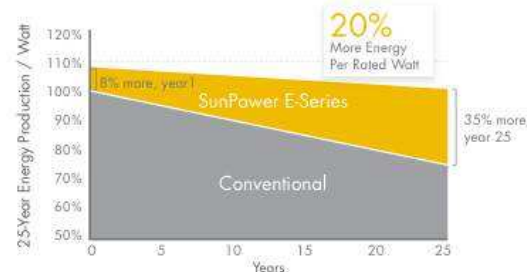
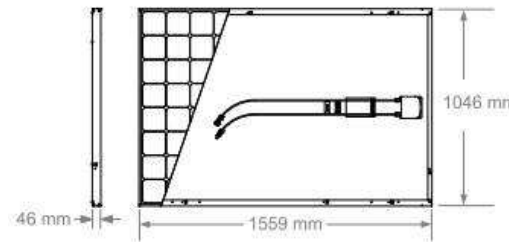
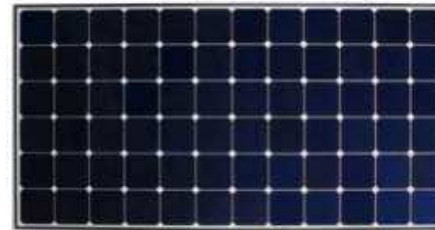
<b>Total Value</b>	<b>£ 4,439</b>
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<b>Total potential saving per household</b>	<b>£ 15</b>
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Investment Cost (ex VAT)	£100,884.57
Investment Cost (incl VAT)	5% £105,928.80
Return (IRR)	1.13%
Pay Back Years	23.86

CO2 Saving annual (kg)	20,788
CO2 Saving life (kg)	519,689

### Example of manufacturer info Sunpower 327 PV Panel



The performance of solar PV systems is not certain due to the variability of annual solar radiation location. This estimate is based upon the manufacturer's data (Sunpower) and government guidance (SAP). It should not be considered as a guarantee of performance. \* Peak power, kWp is the output power achieved by a Solar module under full solar radiation (under set Standard Test Conditions). Solar radiation of 1,000 watts per square meter is used to define a standard nominal output and is based on measurements under optimum condition. \*\* Estimated radiation, kWh is power under actual radiation conditions. In practice, this will be approximately 15-20% lower due to the considerable heating of the solar cells.

OPERATING CONDITION AND MECHANICAL DATA	
Temperature	- 40°C to +85°C
Max load	Wind: 2400 Pa, 245 kg/m <sup>2</sup> front & back Snow: 5400 Pa, 550 kg/m <sup>2</sup> front
Impact resistance	25mm diameter hail at 23 m/s
Appearance	Class A
Solar Cells	96 Monocrystalline Moxeon Gen II
Tempered Glass	High transmission tempered Anti-Reflective
Junction Box	IP-65 Rated
Connectors	MC4
Frame	Class 1 black anodized (highest AAMA rating)
Weight	18,6 kg

ELECTRICAL DATA		
	E20-327	E19-320
Nominal Power <sup>12</sup> (Pnom)	327 W	320 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency <sup>13</sup>	20.4%	19.8%
Rated Voltage (Vmpp)	54.7 V	54.7 V
Rated Current (Impp)	5.98 A	5.86 A
Open-Circuit Voltage (Voc)	64.9 V	64.8 V
Short-Circuit Current (Isc)	6.46 A	6.24 A
Max. System Voltage	1000 V IEC & 600 V UL	
Maximum Series Fuse	20 A	
Power Temp Coef.	-0.38% / °C	
Voltage Temp Coef.	-176.6 mV / °C	
Current Temp Coef.	3.5 mA / °C	

TESTS AND CERTIFICATIONS	
Standard tests	IEC 61215, IEC 61730, UL1703
Quality tests	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, PV Cycle
Ammonia test	IEC 62716
Salt Spray test	IEC 61701 (passed maximum severity)
PID test	Potential-Induced Degradation free: 1000V <sup>10</sup>
Available listings	TUV, MCS, UL, JET, KEMCO, CSA, CEC, FSEC

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** More efficient panels are more expensive, should only be considered if there is limited space on the roof, which is not the case at Cressingham.

# Photovoltaic Panels

## Investment cost & return - installation <50Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh	37,671
Estimated Generation power, kW - assume 5% loss	46.6
Panel Type	Sunpower 245
Panel output, Wp	245
No of households	306
No of available roofs	25
No of units (8 panels per house)	200
Peak power, kWp	49.0
Solar Radiation (table A, p.6)	961
Zpv Overshadow Factor (table B, p.6)	1

CAPITAL EXPENDITURE	
Cost of unit	£ 476.27
Cost of all units	£ 95,253
Installation	inc. above
Preparation of roof (strengthening, etc)	inc. in retro work
Consultants fees (planning app, etc)	£ 45,000

<b>Total Expenditure</b>	<b>£ 140,253</b>
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RUNNING COSTS/ per year	
Electricity used by system	£0.1379
Maintenance cost/ per annum	£ 532
<b>Sub-total</b>	<b>£ 532</b>

SAVINGS/ per year	
Electricity generated @80% peak power, kWh**	37,671
Electricity cost saved for households @50%	£0.1379
Gas generated	0
Gas cost saved for households	£0.0463
<b>Sub-total</b>	<b>£ 2,597</b>

INCENTIVES/ per year	
Feed-In Tarriff - Generation Income @100%	£0.0369
Feed-In Tarriff - Export Income @50%	£0.0485
<b>Sub-total</b>	<b>£ 2,304</b>

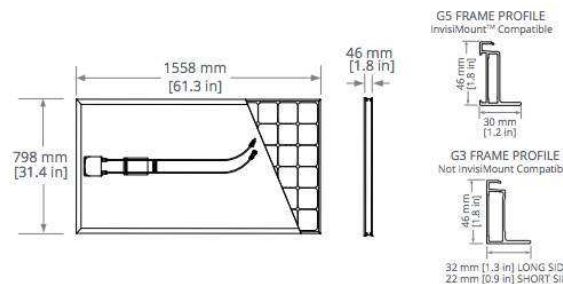
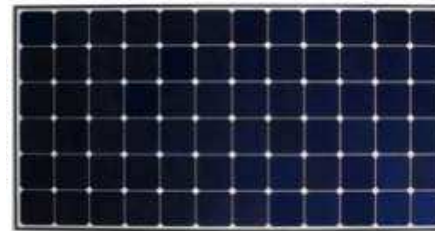
<b>Total Value</b>	<b>£ 4,369</b>
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<b>Total potential saving per household</b>	<b>£ 14</b>
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Investment Cost (ex VAT)	£95,253.33
Investment Cost (incl VAT)	5% £100,016.00
Return (IRR)	1.46%
Pay Back Years	22.89

CO2 Saving annual (kg)	20,493
CO2 Saving life (kg)	512,328

### Example of manufacturer info Sunpower 245 PV Panel



The performance of solar PV systems is not certain due to the variability of annual so radiation location. This estimate is based upon the manufacturer's data (Sunpower) a government guidance (SAP). It should not be considered as a guarantee of performance. \* Peak power, kWp is the output power achieved by a Solar module under full solar radiation (under set Standard Test Conditions). Solar radiation of 1,000 watts per square meter is used to define a standard nominal output and is based on measurements under optimum condition.

\*\* Estimated radiation, kWh is power under actual radiation conditions. In practice, it will be approximately 15-20% lower due to the considerable heating of the solar cells



Operating Condition And Mechanical Data	
Temperature	-40°F to +185°F (-40°C to +85°C)
Impact resistance	1 inch (25mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	72 Monocrystalline Moxeon Gen II
Tempered Glass	High transmission tempered Anti-Reflective
Junction Box	IP-65, MC4 Compatible
Weight	33 lbs (15 kg)
Max load	G5 Frame: Wind: 83 psf, 4000 Pa, 407 kg/m <sup>2</sup> front & back Snow: 167 psf, 8000 Pa, 815 kg/m <sup>2</sup> front
	G3 Frame: Wind: 50 psf, 2400 Pa, 244 kg/m <sup>2</sup> front & back Snow: 112 psf, 5400 Pa, 550 kg/m <sup>2</sup> front
Frame	Class 1 black anodized (highest AAMA rating)

Tests And Certifications	
Standard tests <sup>1,3</sup>	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-155, PV Cycle
Sustainability	Cradle to Cradle (eligible for LEED points) <sup>14</sup>
Ammonia test	IEC 62716
Desert test	10.1109/PVSC.2013.6744437
Salt Spray test	IEC 61701 (maximum severity)
PID test	Potential-Induced Degradation free: 1000V <sup>9</sup>
Available listings	UL, CEC, CSA, TUV, JET, MCS, FSEC

Electrical Data		
	SPR-E20-245	SPR-E19-235
Nominal Power (P <sub>nom</sub> ) <sup>11</sup>	245 W	235 W
Power Tolerance	+5/-0%	+5/-0%
Avg. Panel Efficiency <sup>12</sup>	20.0%	19.3%
Rated Voltage (V <sub>mpp</sub> )	40.5 V	40.5 V
Rated Current (I <sub>mpp</sub> )	6.05 A	5.80 A
Open-Circuit Voltage (V <sub>oc</sub> )	48.8 V	48.4 V
Short-Circuit Current (I <sub>sc</sub> )	6.43 A	6.18 A
Max. System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	15 A	
Power Temp Coef.	-0.38% / °C	
Voltage Temp Coef.	-132.5 mV / °C	
Current Temp Coef.	3.5 mA / °C	

Suitable for installation at Cressingham Garden Estate?

Yes

**Conclusion:** Less efficient panels are cheaper and provide greater return for the project. Different sizes of installation reviewed overleaf and compared in the Conclusion chapter.

# Photovoltaic Panels

## Investment cost & return - installation <100Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		76,849
Estimated Generation power, kW - assume 5% loss		95.0
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		51
No of units (8 panels per house)		408
Peak power, kWp		100.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	247,523
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>292,523</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		76,849
Electricity cost saved for households @50%	£0.1379	£ 5,299
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 5,299</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£2,029
Feed-In Tarriff - Export Income @50%	£0.0485	£1,864
<b>Sub-total</b>		<b>£ 3,892</b>
<b>Total Value</b>	<b>£</b>	<b>8,659</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>28</b>
Investment Cost (ex VAT)		£247,522.72
Investment Cost (incl VAT)	5%	£259,898.86
Return (IRR)		-0.41%
Pay Back Years		30.01
CO2 Saving annual (kg)		41,806
CO2 Saving life (kg)		1,045,150

## Investment cost & return - installation <150Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		114,520
Estimated Generation power, kW - assume 5% loss		141.5
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		76
No of units (8 panels per house)		608
Peak power, kWp		149.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	368,857
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>413,857</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		114,520
Electricity cost saved for households @50%	£0.1379	£ 7,896
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 7,896</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£3,023
Feed-In Tarriff - Export Income @50%	£0.0485	£2,777
<b>Sub-total</b>		<b>£ 5,800</b>
<b>Total Value</b>	<b>£</b>	<b>13,165</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>43</b>
Investment Cost (ex VAT)		£368,857.39
Investment Cost (incl VAT)	5%	£387,300.26
Return (IRR)		-0.28%
Pay Back Years		29.42
CO2 Saving annual (kg)		62,299
CO2 Saving life (kg)		1,557,478

# Photovoltaic Panels

## Investment cost & return - installation <250Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		191,370
Estimated Generation power, kW - assume 5% loss		236.5
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		127
No of units (8 panels per house)		1,016
Peak power, kWp		248.9
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	616,380
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>661,380</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		191,370
Electricity cost saved for households @50%	£0.1379	£ 13,195
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 13,195</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0264	£5,052
Feed-In Tarriff - Export Income @50%	£0.0485	£4,641
<b>Sub-total</b>		<b>£ 9,693</b>
<b>Total Value</b>	<b>£</b>	<b>22,356</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>73</b>
Investment Cost (ex VAT)		£616,380.11
Investment Cost (incl VAT)	5%	£647,199.11
Return (IRR)		-0.17%
Pay Back Years		28.95
CO2 Saving annual (kg)		104,105
CO2 Saving life (kg)		2,602,628

## Investment cost & return - installation >250Kw (245Wp panel) - FIT from Jan 2016

Estimated Generation energy, kWh		310,411
Estimated Generation power, kW - assume 5% loss		383.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		206
No of units (8 panels per house)		1,648
Peak power, kWp		403.8
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	999,798
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>1,044,798</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		310,411
Electricity cost saved for households @50%	£0.1379	£ 21,403
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 21,403</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0228	£7,077
Feed-In Tarriff - Export Income @50%	£0.0485	£7,527
<b>Sub-total</b>		<b>£ 14,605</b>
<b>Total Value</b>	<b>£</b>	<b>35,476</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>116</b>
Investment Cost (ex VAT)		£999,797.65
Investment Cost (incl VAT)	5%	£1,049,787.54
Return (IRR)		-0.27%
Pay Back Years		29.59
CO2 Saving annual (kg)		168,863
CO2 Saving life (kg)		4,221,585

## Photovoltaic Panels

### Investment cost & return - installation <50Kw (245Wp panel) – current FIT

Estimated Generation energy, kWh		37,671
Estimated Generation power, kW - assume 5% loss		46.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs		25
No of units (8 panels per house)		200
Peak power, kWp		49.0
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	476.27
Cost of all units	£	95,253
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>140,253</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		37,671
Electricity cost saved for households @50%	£0.1379	£ 2,597
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 2,597</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.1130	£4,257
Feed-In Tarriff - Export Income @50%	£0.0485	£914
<b>Sub-total</b>		<b>£ 5,170</b>
<b>Total Value</b>	<b>£</b>	<b>7,236</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>24</b>
Investment Cost (ex VAT)		£95,253.33
Investment Cost (incl VAT)	5%	£100,016.00
Return (IRR)		5.41%
Pay Back Years		13.82
CO2 Saving annual (kg)		20,493
CO2 Saving life (kg)		512,328

### Investment cost & return - installation >250Kw (245Wp panel) – current FIT

Estimated Generation energy, kWh		310,411
Estimated Generation power, kW - assume 5% loss		383.6
Panel Type		Sunpower 245
Panel output, Wp		245
No of households		306
No of available roofs - maximum available		206
No of units (8 panels per house)		1,648
Peak power, kWp		403.8
Solar Radiation (table A, p.6)		961
Zpv Overshadow Factor (table B, p.6)		1
<b>CAPITAL EXPENDITURE</b>		
Cost of unit	£	607
Cost of all units	£	999,798
Installation		inc. above
Preparation of roof (strengthening, etc)		inc. in retro work
Consultants fees (planning app, etc)	£	45,000
<b>Total Expenditure</b>	<b>£</b>	<b>1,044,798</b>
<b>RUNNING COSTS/ per year</b>		
Electricity used by system	£0.1379	£ -
Maintenance cost/ per annum		£ 532
<b>Sub-total</b>		<b>£ 532</b>
<b>SAVINGS/ per year</b>		
Electricity generated @80% peak power, kWh**		310,411
Electricity cost saved for households @50%	£0.1379	£ 21,403
Gas generated		0
Gas cost saved for households	£0.0463	£ -
<b>Sub-total</b>		<b>£ 21,403</b>
<b>INCENTIVES/ per year</b>		
Feed-In Tarriff - Generation Income @100%	£0.0594	£18,438
Feed-In Tarriff - Export Income @50%	£0.0485	£7,527
<b>Sub-total</b>		<b>£ 25,966</b>
<b>Total Value</b>	<b>£</b>	<b>46,837</b>
<b>Total potential saving per household</b>	<b>£</b>	<b>153</b>
Investment Cost (ex VAT)		£999,797.65
Investment Cost (incl VAT)	5%	£1,049,787.54
Return (IRR)		1.36%
Pay Back Years		22.41
CO2 Saving annual (kg)		168,863
CO2 Saving life (kg)		4,221,585

## 2. MVHR

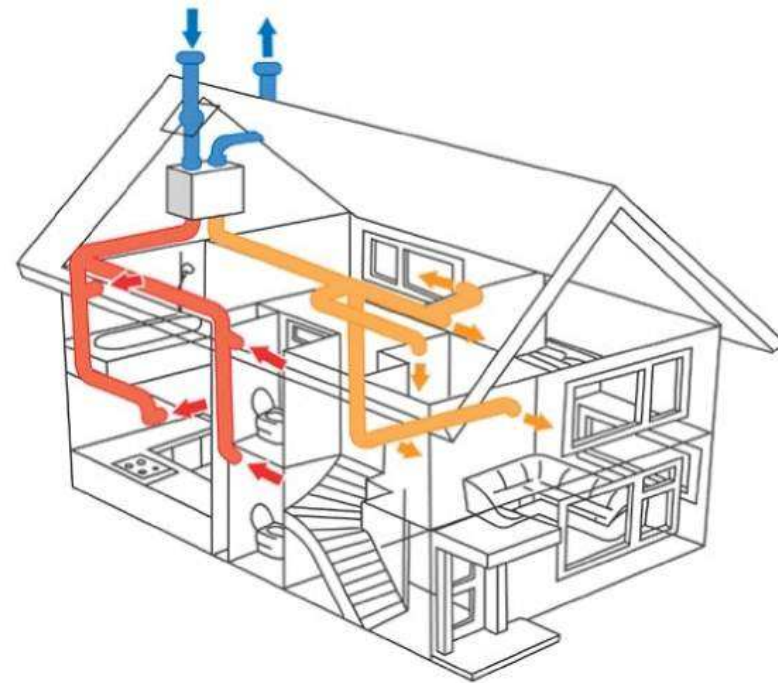
## What is MVHR?

### MVHR explained

Mechanical Ventilation with Heat Recovery (MVHR) is a whole house ventilation system that both supplies and extracts air throughout a property. It offers a balanced low energy ventilation solution for new dwellings and re-uses up to 95% of the heat that would have otherwise have been lost.

### Benefits

- Year round removal of condensation and indoor pollutants.
- A direct impact on the Dwelling Emission Rate required in SAP, helping reduce the carbon footprint of the property.
- Fresh filtered air supplied to dwelling, ideal for allergy sufferers and those with conditions such as asthma.
- A balanced ventilation system for the whole house and recovering of heat that would have otherwise have been lost.
- Low noise, non-intrusive ventilation system – located away from the room, however consideration should be given to duct runs to ensure cross-talk contamination doesn't happen AND the unit is sized correctly so it is not running a high rate all of the time.
- Poor ventilation can result in condensation forming on internal walls, which encourage mould growth and can result in health problems for the occupants. MVHR would prevent this by keeping a constant supply of fresh air (in line with the minimum Building Regulation requirements).
- MVHR offers excellent thermal comfort when coupled with low air permeability measures.



*MVHR provides ventilation for full house by supplying air to living areas and extracting from wet rooms (bathroom and kitchen)*



*Intake air is filtered inside MVHR ensuring constant supply of fresh air*

## System integration

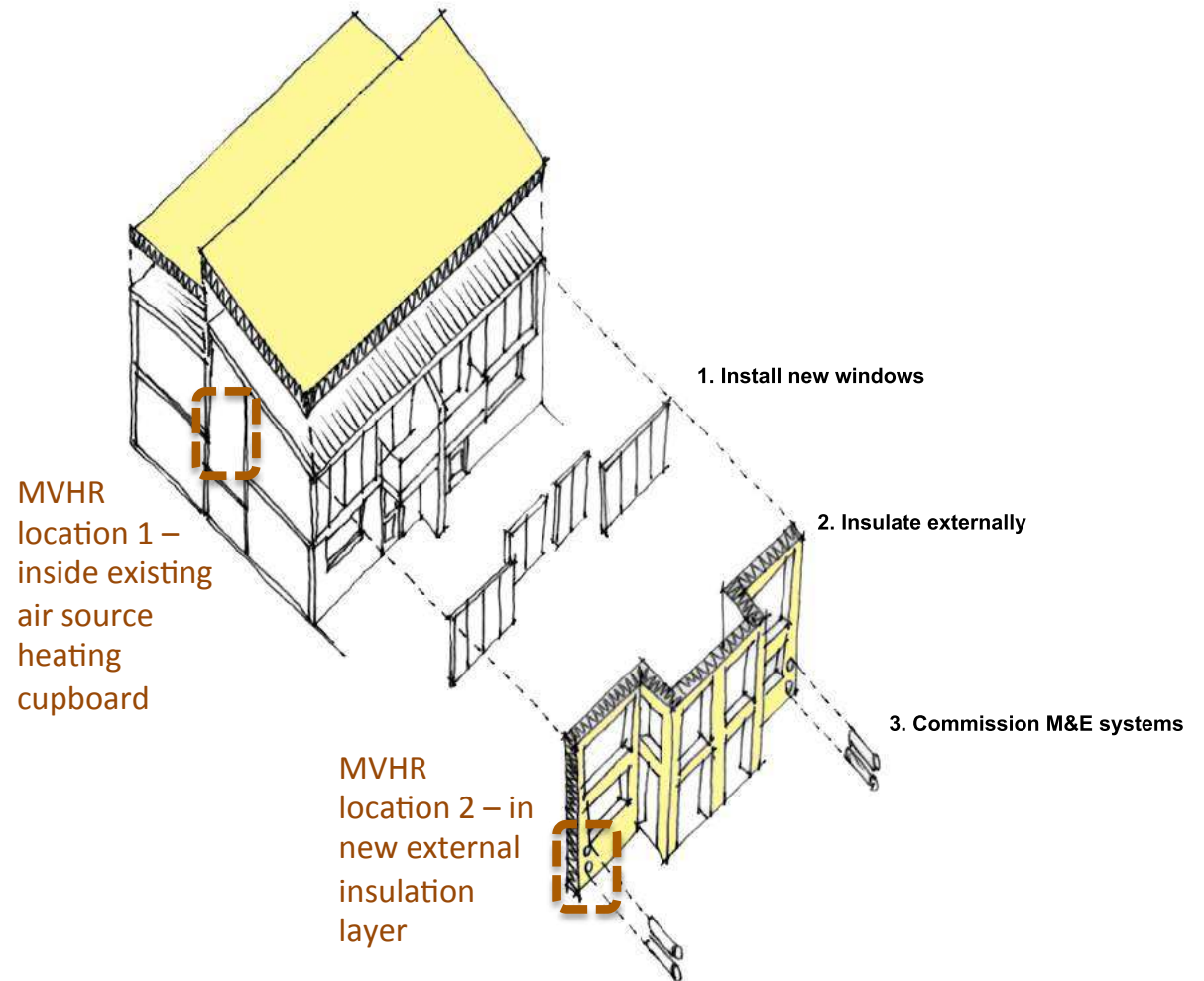
Heat Recovery Ventilation system comprises a Heat Recovery Unit and a network of ducts which are connected to each room. From a single or a communal unit. It works by continuously extracting air from the wet rooms of the property and at the same drawing in fresh supply air from outside.

The heat from the extracted stale air is recovered via a heat exchanger inside the heat recovery unit which is then reused to temper the filtered supply air for the habitable rooms such as living rooms and bedrooms.

The MVHR will be a requirement for the PassivHaus/ EnerPHit refurbishment because the air permeability of the dwellings will be substantially reduced during the refurbishment to minimise the heat loss. For more information refer to EnerPHit Feasibility Report.

The MVHR unit can be fitted in the following locations in Cressingham Estate homes:

1. Inside the properties that already have plant space for air source heating, which means no additional ductwork will be required as it formed part of original architectural design.
2. On the inside or outside the property. If external insulation is applied across the estate, MVHR can be hidden within the insulation layer, and can be easily accessed for filter replacement.



*Typical Cressingham Garden retrofit works sequencing*



## Constraints

### Maintenance

MVHRs are typically warranted for 10 years, and will require minimum maintenance, if installed and certified correctly. SCP recommend external commissioning is complete with a member of the certified body to ensure that the lengthens the life of the system and filters.

The filters need to be changed every 6-12 months, subject to the type of the unit. These could be washable or replaceable types. By integrating the system in the external façade means that the unit can be accessed and maintained at any time without disturbing the residents.

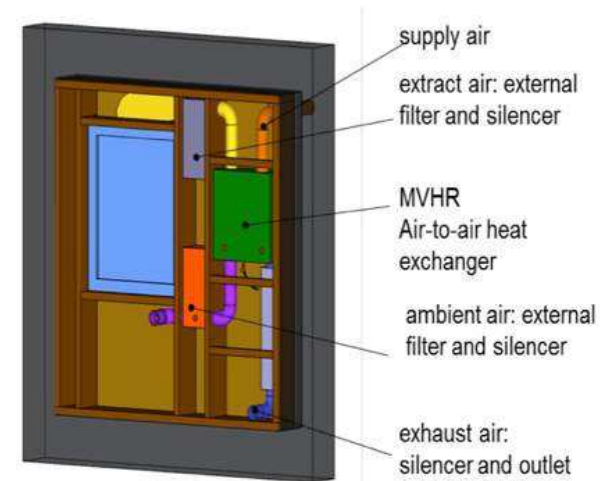
### Local Planning Issues

Separate planning permission for installation of MVHR units will not be required, if incorporated into external works package.

The location of the extract and intake air ducts should be reviewed at planning stage and incorporated on the drawings; these should be a minimum width apart and minimum distance away from gas flue, in accordance to the Building Regulations.



*MVHR unit comes in different shapes and sizes to suit installation type (ceiling/ wall mounted, external/ internal), size of the dwelling and system requirements. The duct work is also*



*MVHR unit can be hidden inside external insulation layer*

## Incentives

### Feed-in-tariff (FIT)

FIT is not available for the MVHR installation.

### Energy bill savings

You will be making 10-30% savings on your heating bill by improving the fabric of the building and re-using the stale air to recover any heat being extracted from the dwelling, subject to the building baseline air infiltration rate.

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

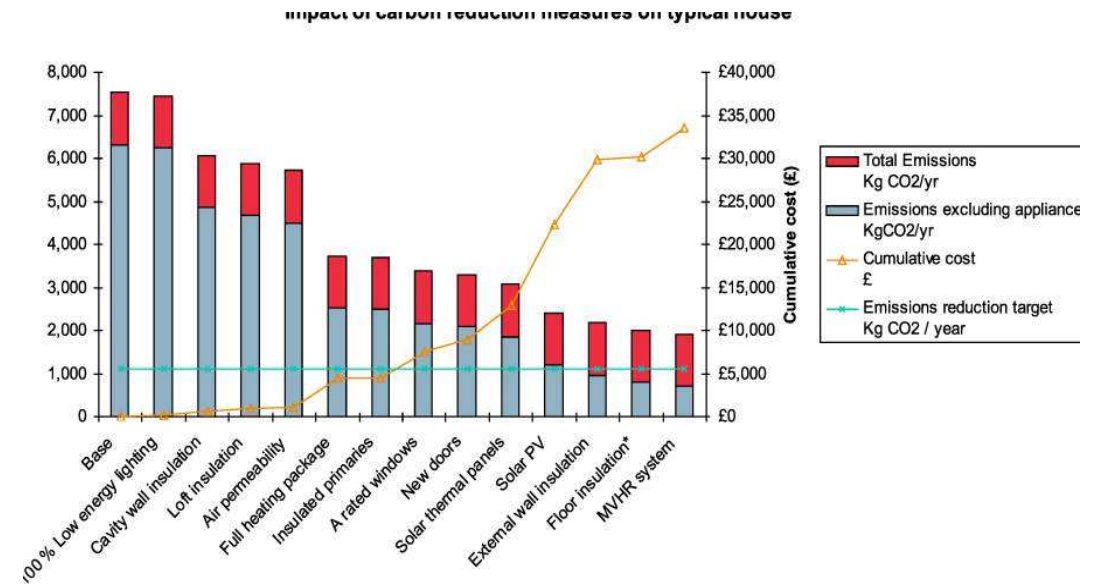
### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security.

### Private Equity

Private equity finance may also be an option. To read more about what banks and financier.

## Trends



As a general trend MVHR has a relatively small return on investment compared to some of the over green measures, see graph above. However, when combined to the improvement to the airtightness of the building. The energy saved could be as much as 20-30% in an average household.

Nevertheless it is becoming a very popular ventilation method in dwellings, as it reduces the building's humidity and hence condensation, and improves the air quality by filtering unwanted particles, dust and pollution, which is beneficial to people's health and wellbeing.

A typical MVHR unit suitable for 2-bed dwelling costs in the range of **£1,000 to £5,000**. It is always worth checking the unit's efficiency and electricity use to improve the energy saving.

## Summary of PV Feed-in Tariffs

Not available

Successful Precedence

Wilcomte House EnerPHit

Wilcomte House in Portsmouth is a development of three 11 storey 3-blocks of pre-fabricated concrete residential maisonettes (107 units) being retrofitted to the EnerPHit standard. It is only case study from the UK participating in the EU funded EuroPHit project, using a 'step-by-step' approach.

For this project, a new steel structure has been designed to allow the envelope to be extended and to enclose the walkway between the maisonettes, improving safety and allowing easier detailing and installation of external wall insulation.

The external wall and roof Rockwool insulation not only improves the energy efficiency, but allows refurbishment work to be carried out with the occupants in situ, minimising inconvenience for occupants and reducing temporary relocation costs (u-value - 0.14 W/m<sup>2</sup>K). Existing windows will be replaced with triple glazed Ecohaus Internorm windows (U-value - 0.93 W/m<sup>2</sup>K).

Airtightness will be achieved by application of external render. MVHR Zehnder units will be installed in individual flats with outlets positioned above the front door (see installation photographs).

For more info - <http://www.passivhaustrust.org.uk/news/detail/?nid=506#.VVyl2WTBzRY>

Project details



Portsmouth City Council is the client on the project driving this innovative EuroPHit case study project.

**£750** estimated energy saving per dwelling per year

**15%** funded by EU ECO Funding

**85%** funded by Portsmouth City Council

## Investment cost & return

Estimated Energy Saved, kWh/a	781,096
Estimated Power Saved, kW/a	89
Unit Type	Brink Renovent Sky 150
Unit efficiency	84%
No of houses	306
No of units	306

<b>CAPITAL EXPENDITURE</b>	
Cost of unit	£ 1,716
Cost of ducts and sundries	£ 550
Installation	£ 650
Consultants fees (planning app, design, etc)	£ 25,000

<b>Total Expenditure</b>	<b>£ 917,296</b>
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<b>RUNNING COSTS/ per year</b>		
Electricity cost	£0.1379	£ 41
Water costs		£ -
Maintenance cost/ per annum		£ 20
<b>Sub-total</b>		<b>£ 61</b>

<b>SAVINGS</b>		
Electricity recovered		0
Electricity cost saved for households	£0.1379	£ -
Gas recovered (heating, assumed 20% saving)		2,853
Gas cost saved for households @100%	£0.0463	£ 132
<b>Sub-total</b>		<b>£ 132</b>

<b>INCENTIVES</b>		
Feed-In Tarriff, 50% electricity sold	£ -	£ -
Renewable Heat Incentives - biogas	£ -	£ -
<b>Sub-total</b>		<b>£ -</b>

<b>Total Value</b>	<b>£ 21,636</b>
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<b>Total potential saving per household</b>	<b>£ 71</b>
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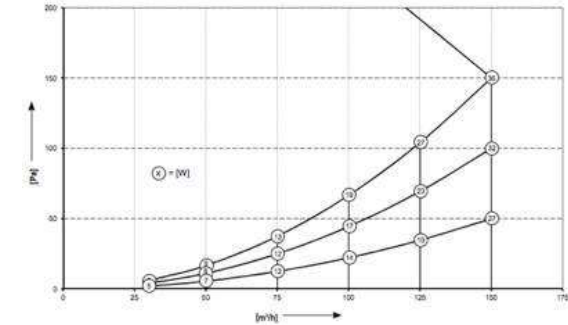
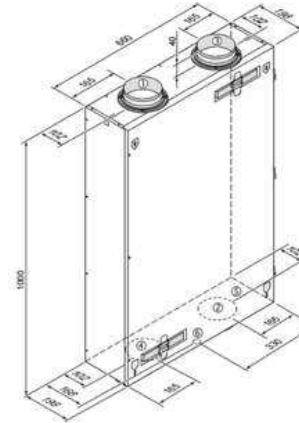
Investment Cost (ex VAT)	£ 917,296
Investment Cost (incl VAT)	20% £ 1,100,755
Return (IRR)	2.35%
Pay Back Years	42.4

CO2 Saving annual (kg)	424,916
CO2 Saving life (kg)	20 yrs 8,498,320

The performance of MVHR systems is impossible to predict as it depends on the airtightness of the property as well as the system. This estimate is based on existing projects using the manufacturer's data from Energy Savings Advisor and costs provided by PassivHaus Store. Installation costs come from the SCP database of projects.

**Note:** The additional investment costs are likely to be less, if the existing ventilation units in kitchen and bathrooms require replacements.

## Example of manufacturer info – Brink Renovent Sky 150



TECHNICAL SPECIFICATIONS		
	Renovent Sky	Renovent Sky Plus
Ventilation capacity at 150 Pa [m³/h]	Maximum 300	Maximum 300
System sound [dB(A)]	< 40 at 225 m³/h and 75 Pa	< 40 at 225 m³/h and 75 Pa
Rated power [W] without preheater	15 at 100 m³/h and 11 Pa 26 at 150 m³/h and 25 Pa 58 at 225 m³/h and 56 Pa 116 at 300 m³/h and 100 Pa	15 at 100 m³/h and 11 Pa 26 at 150 m³/h and 25 Pa 58 at 225 m³/h and 56 Pa 116 at 300 m³/h and 100 Pa
SFP (Specific Fan Power)	Approx 0.24 W/m³ (at 225 m³/h and 50 Pa)	Approx 0.24 W/m³ (at 225 m³/h and 50 Pa)
Dimension duct connection [mm]	4 x Ø150/160	4 x Ø150/160
L x W x H [mm]	1185 x 644 x 310	1185 x 644 x 310
Air filtering	2 x G4-filter (option: F7 filter for supply)	2 x G4-filter (option: F7 filter for supply)
Weight [kg]	± 37	± 37
Connection options (outside appliance)	E-bus, 4-way switch, wireless remote control, service connector, preheater	E-bus, 4-way switch, wireless remote control, service connector, preheater, postheater, EWT, 24 V power supply 4.5 VA, 0-10 V output, 2 inputs; programmable as 0-10V input or potential free contact
Accessories	Preheater 1000 W	Preheater 1000 W, postheater 1000 W

Suitable for installation at Cressingham Garden Estate?

Yes

**Conclusion:** MVHR is not mutually exclusive from other renewable installations, can be done over time.

### 3. Combined Heat and Power (CHP)

# 3. Combined Heat and Power (CHP)

## What is CHP?

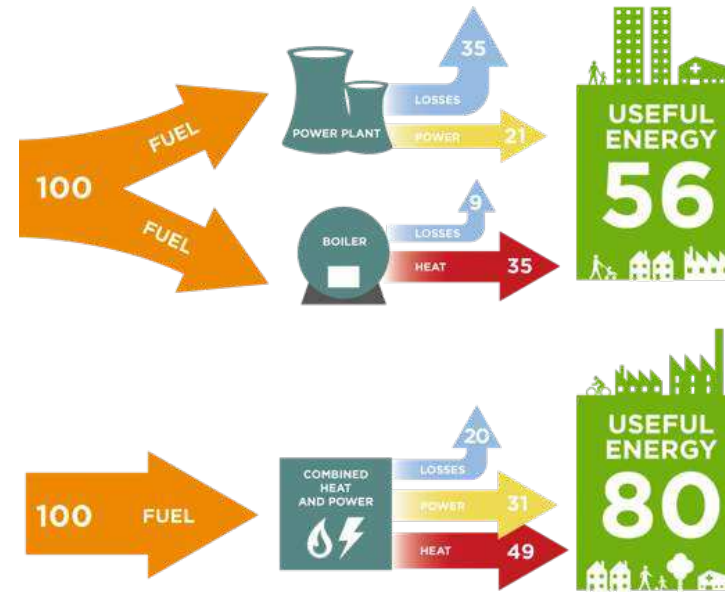
### CHP explained

Combined heat and power (CHP) integrates the production of usable heat and power (electricity), in one single, highly efficient process. The conventional gas fired CHP plant is a well-proven model of providing low carbon energy from site based plant.

CHP recovers the waste heat from a site based power generation prime mover (e.g. engine or fuel cell) via the engine water jacket, exhaust gases and oil cooler (dependent on model). This can provide low carbon, lower cost heat and electricity, with lower CO2 emissions than the electricity grid, where the integration and operation of the CHP plant is optimised.

### Benefits

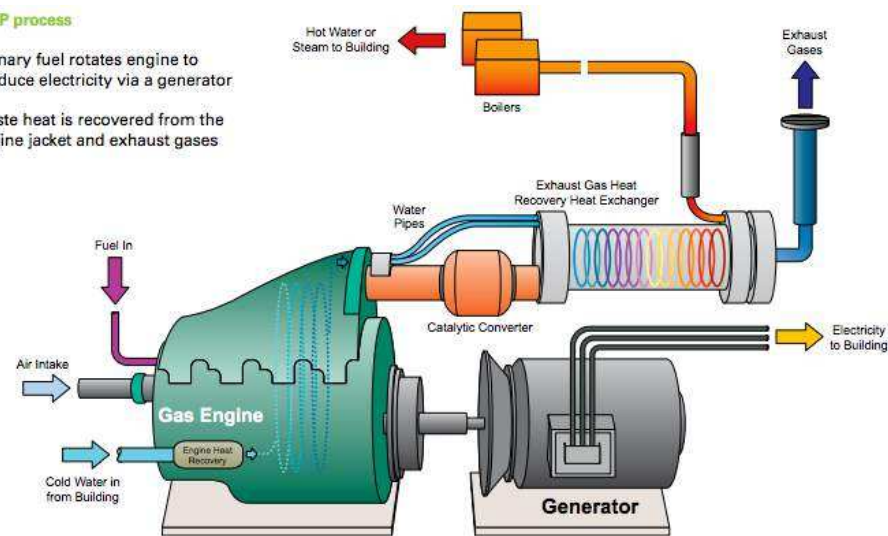
- Minimum 10% energy savings.
- Cost savings of 15-40% over electricity sourced from the grid and heat generated by on-site boilers.
- Minimum 10% CO2 savings for good quality natural gas CHP in comparison to conventional forms of energy generation.
- High overall efficiency – approx. 80% at the point of use.
- Additional guarantee of continuity in energy supplies for operator & consumer.
- Proven and reliable technology with established supplier base.



CHP has efficiency of 80%, compared to the traditional energy delivery process of 56%, which saved approx. 10% of energy and carbon

### The CHP process

1. Primary fuel rotates engine to produce electricity via a generator
2. Waste heat is recovered from the engine jacket and exhaust gases



CHP process illustrated

# Combined Heat and Power (CHP)

## System integration

There are two types of the gas CHP plant can be implemented when redeveloping the existing site or replacing individual aging boiler plant.

- Micro-CHP designed for individual households.
- Centralised packaged CHP plant with integrated heating network.

In this report, SCP reviewing the centralised CHP plant as it offers the most running cost and emissions benefit. Micro-CHP is still in development and will not be a robust solution required for large scale housing project.

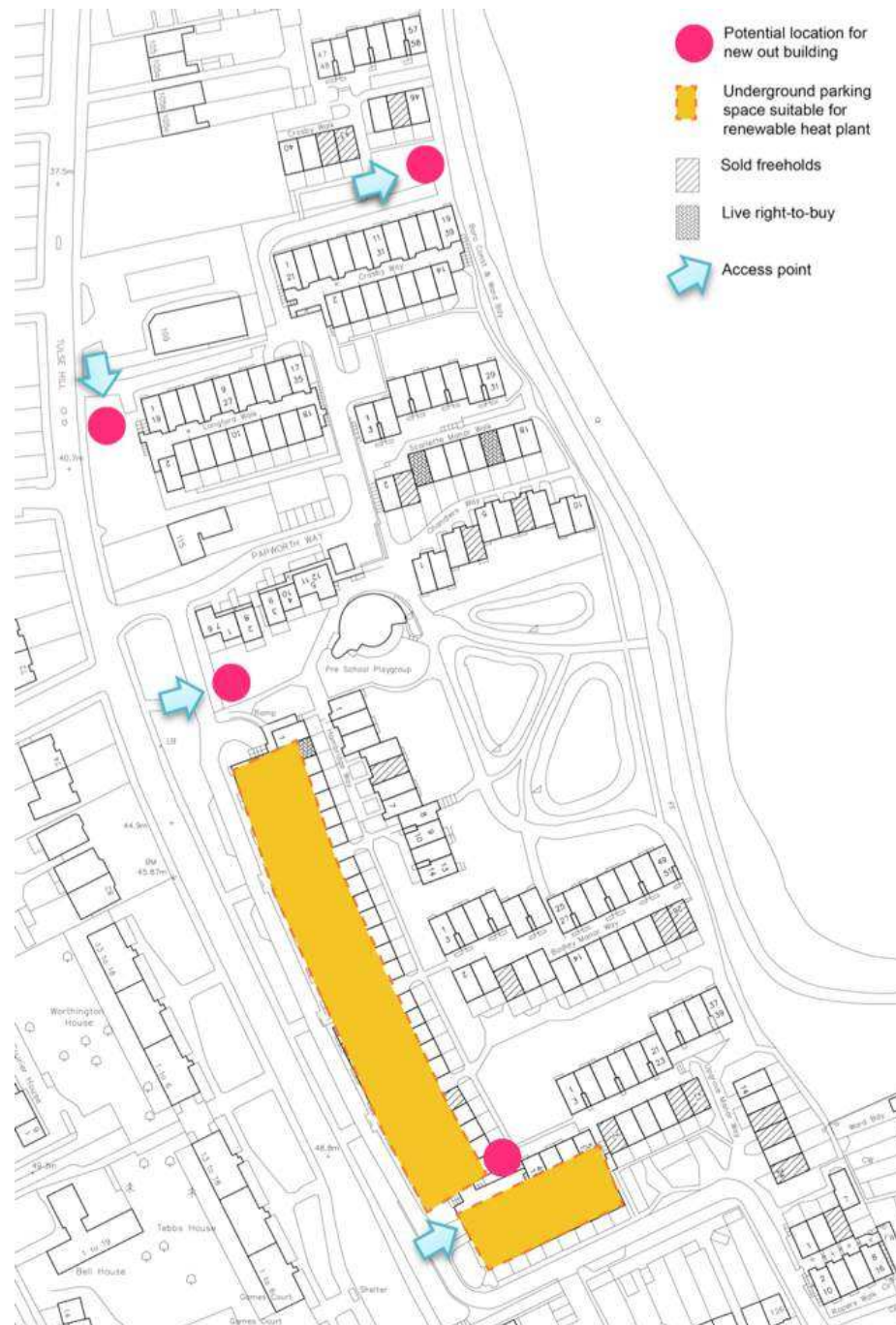
The Cressingham Estate has capacity for integration of the CHP in either of the following locations:

1. Car parking areas (shown in yellow) – there area number of under-utilised parking spaces on the estate that could be converted into a plant room.
2. New out building on site (indicated in pink) – locating the plant away from the people homes to avoid complaints from residents and have better access.

Refer to the estate plan diagram.

Industry Best Practice and CIBSE guidance has identified that the effective integration of CHP requires the plant to operate in excess of 4000-4500 hours per annum (10-12 hrs a day), in order to be most effective.

Because of the proximity of the dwellings, location of the exhaust flue and operational hours should be carefully considered at the design stage, also issues of smell and noise.



Areas identified as suitable for anaerobic digester plant installation

# Combined Heat and Power (CHP)

## District Heating Network

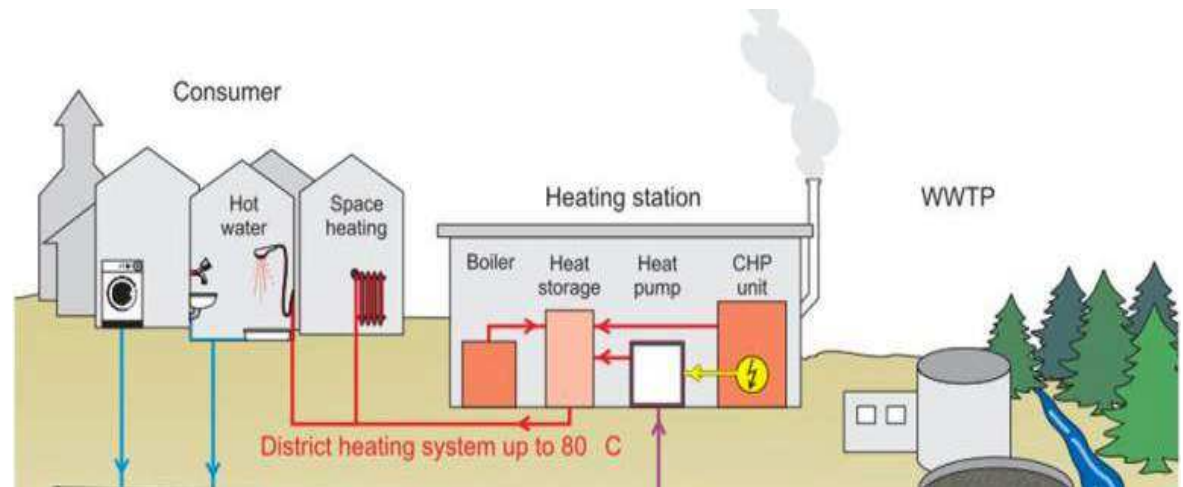
The CHP plant is usually operated together with the district heating network. It means the hot water from the CHP will be distributed to the residents of the Cressingham Estate, instead of the individual boilers.

The key considerations of district heating development include:

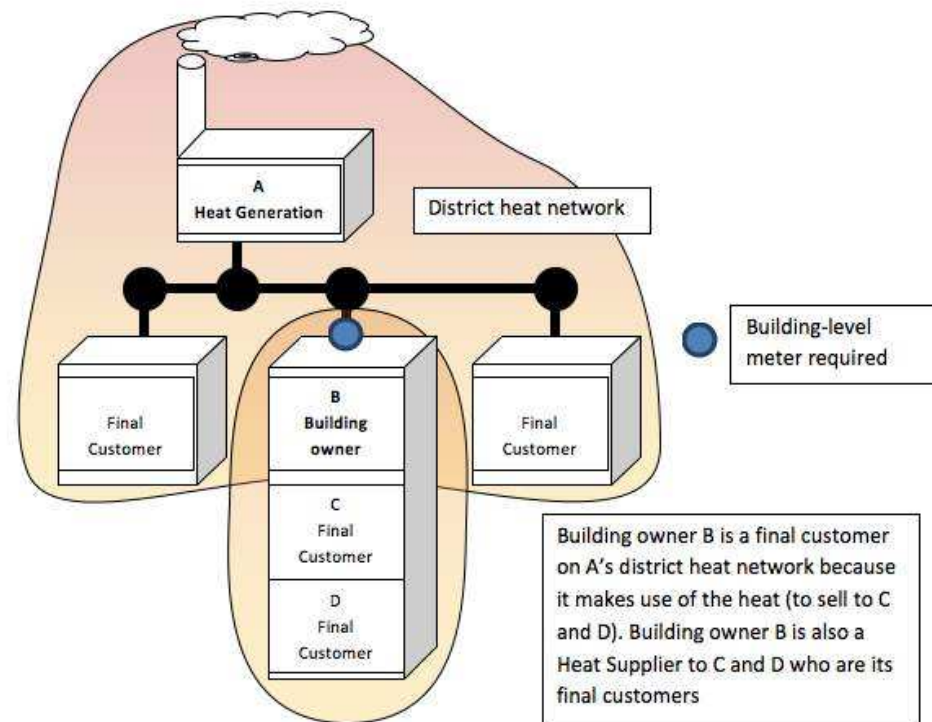
- Design of physical infrastructure between heat production plant and consumers;
- Contract consideration between the project sponsors and developers;
- Tariff structure as part of the business plan for the project;
- Local planning issues.

The residents would effectively be the purchasers of the heat and have a direct financial arrangement with a heat supplier to provide the heating to them. It means that the community owned CHP would benefit the residents, whereby the energy bills will be reduced compared to the standard energy providers. For more information on the heating network, please see the GLA's District Heating Manual for London, the Heat Network Metering and Billing Regulation 2014 and <https://www.gov.uk/heat-networks>.

The cost of the installation of the heating network has been included in the financial model for the CHP installation, and form part of the proposal.



*District Heating Network se-up diagram*



*District Heating Network responsibilities*



# Combined Heat and Power (CHP)

## Constraints

### Maintenance

The plant is typically warranted for 20 years. Annual maintenance of the plant and operating systems will be required.

Maintenance for the supporting network of pipes/ ducts will be required on annual basis, including system's mechanical and controls operation. It is recommended that the long term maintenance contract is signed with the installer of the system.

Centralised air heating system may be considered as many Cressingham homes already have central duct as part of the original architectural design. Otherwise, the heat will be delivered into individual flats using the hot water pipework to feed the existing radiators. This is subject to detailed design of the system.

### Local Planning Issues

Planning application will be required.

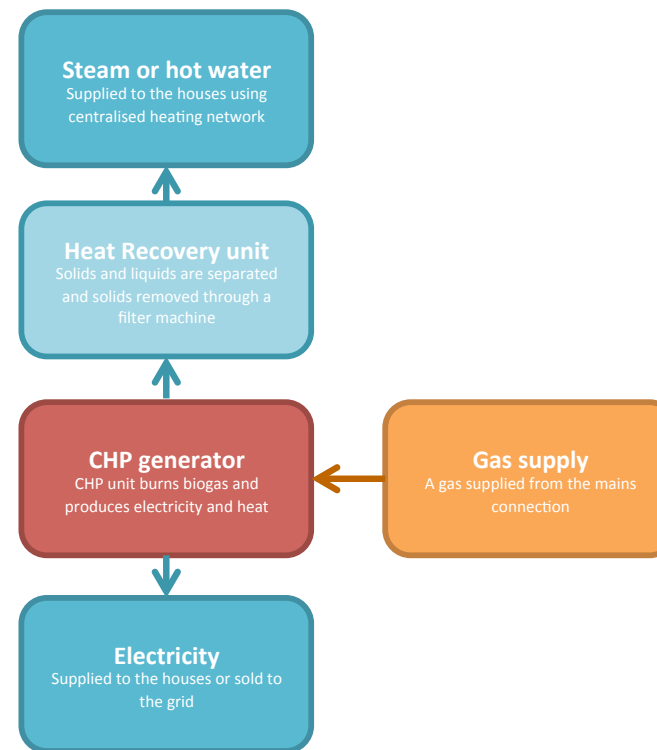
### Other considerations

In order to realise a project of this type in such as constrained urban site, significant potential negative impacts need to be mitigated at the design stage, including:

- Air quality - NOx and particles pollution from CHP plant, compliance with EU standards
- Noise – acoustic design to isolate the machinery
- Environmental permit
- Training of the plant operative(s)
- Biogas compliance – BS EN 60079 H&S explosives storage standard
- Health & Safety – robust design in accordance with IEC 61882, OHAS and COSHH



CHP installation



CHP process

# Combined Heat and Power (CHP)

## Successful Precedence

### Southampton Science Park (Best AD Award 2012)

The University of Southampton Science Park (USSP), having installed energy efficient climate control systems in the form of air source heat pumps and heat recovery mechanisms in both new and refurbished buildings, have entered into an Electricity Service Company (ESCo) relationship with SEaB Energy ([www.seabenergy.com](http://www.seabenergy.com)) to deploy the innovative MUCKBUSTER® SEaB MB400 onsite containerised anaerobic digestion solution.

SEaB Energy supplies a compact and easy to install turnkey anaerobic digestion (AD) solution on sites generating between 200 and 1000 tonnes of food and bio waste per year. The system is known as MUCKBUSTER® SEaB MB400 in the food processing and on-site catering and accommodation sectors. The systems generates energy and offset and new income. They are designed to produce between 8kWe - 55kWe electricity via a combined heat and power unit (CHPs). The system also provides PAS110 pasteurisation, so that residual organic digestates can be sold as fertiliser or mulch.

The Science Park will take advantage of the energy harvesting potential of food and organic waste, which, to date, has been an untapped resource. Electricity and heat generated from the biogas production will be used within the business park offices and research and development laboratories on site.

A digester unit is being installed and is running an 8kW combined heat and power unit (CHP) unit, and produces an average of 46 m<sup>3</sup>/day of methane (CH<sub>4</sub>) based on the estimated annual feedstock. This in turn provides the Kenneth Dibben building with 35MWh/annum of electricity.

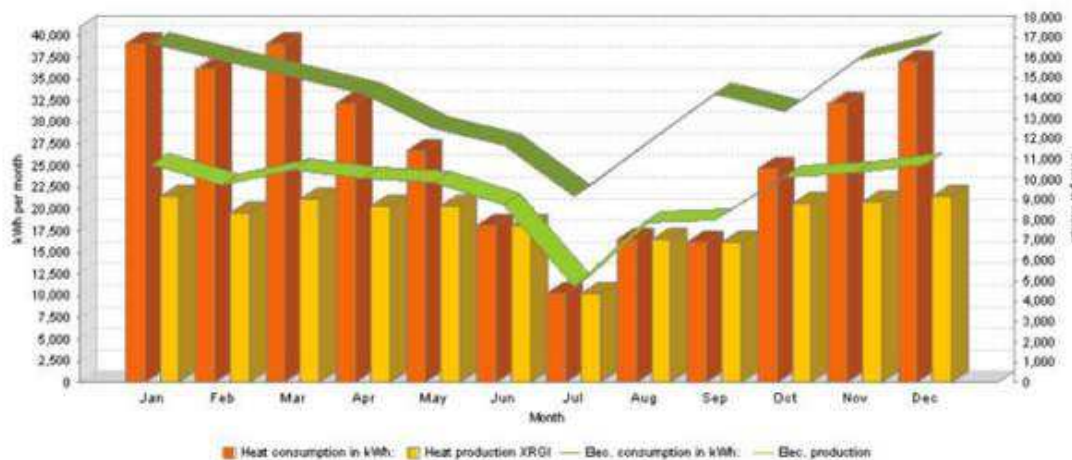
## Project details



Sav-Systems installed in this award winning eco social housing scheme supplies 172,368kWh of electricity and 328,482kWh of heating and domestic hot water.

**36tCO<sub>2</sub>** CO<sub>2</sub> reduction using CHP, equivalent to 21% reduction.

**£11,924** running and maintenance costs reduction compared to conventional boiler system.



# Combined Heat and Power (CHP)

## Incentives

### Renewable Obligation (ROCs)

ROCs are available to commercial electricity generators of CHP cogeneration, which are usually ones that are able to demonstrate the production of multiple MWh of electricity production (also considered a metric that symbolises the starting point for mass scale consumption). The level of support varies depending on the CHP cogeneration type, i.e. dedicated biomass fuel with CHP cogeneration can demonstrate sustainable fuel supply, and will gain increased entitlement.

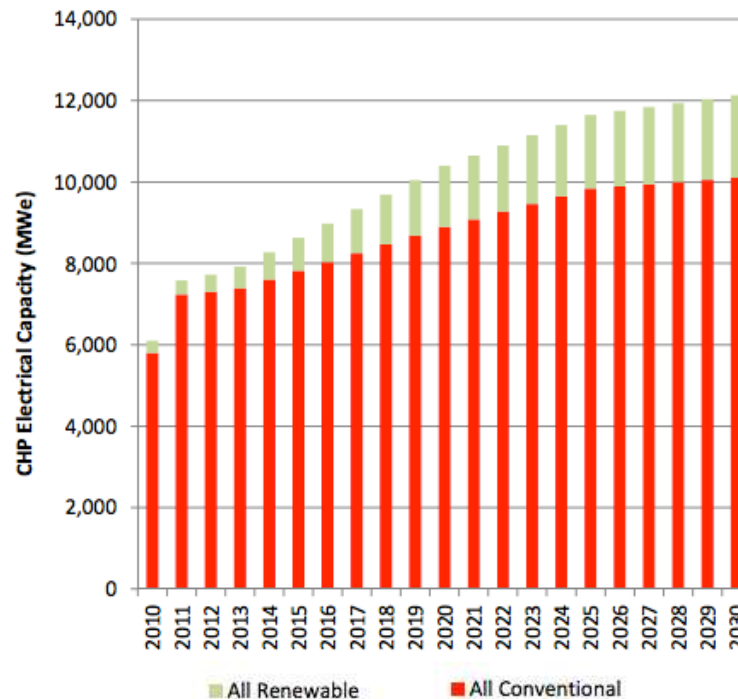
### Feed-In Tariff

FiTs support only micro-generators of renewable electricity. If you are a small business or a community project, you need to have a declared net capacity up to 2kW for micro cogeneration CHP up to 30,000 installations). Income can be earned both from the generation tariff and the export tariff, see table below.

### Energy bill savings

You will be making approx. 10% savings on your electricity bills because generating electricity on site is a much more efficient process.

## Trends



Ricardo-AEA have issued report on projections of the CHP capacity and use to 2030, which shows continuous growth with increasing demands up to 2030. At the moment CHP achieves as much as 6 times carbon saving compared to the electrical grid in the UK. However, as the grid decarbonises, the CHP demand may also slow down.

A typical 3.5kW grid-connected PV roof (covering about 25 square metres) is likely to cost around **£6,000**.

## Summary of Micro-CHP Feed-In Tariffs

System size	Tariff Band (TIC kW)	Generation Tariff	Export Tariff
		15 Mar 2013 - 31 Mar 2016	
4kW or under	2kW or under	13.45 p/kWh	4.85 p/kWh

# Combined Heat and Power (CHP)

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Discount Energy Purchase (DEP)

With DEP the client signs an Energy contract to purchase the electricity generated by a CHP unit over a number of years. Ideal for project that does not have capital funds. With DEP a third party company like ENER-G installs, operate and finances the Cogeneration installation, at no cost to the energy user and simply contract the energy produced by the CHP back at a discounted rate.

For more info: [www.esta.org.uk/EVENTS/2012\\_09\\_11\\_The\\_Energy\\_Event/documents/TEE2012\\_2C\\_EnerG\\_Chassagne.pdf](http://www.esta.org.uk/EVENTS/2012_09_11_The_Energy_Event/documents/TEE2012_2C_EnerG_Chassagne.pdf)

### Capital purchase

Capital purchase enables businesses to claim 100% first year capital allowances on investments in energy saving technologies and products, such as CHP. Allowing businesses the ability to write off the whole cost of their investment against taxable profits from the period the investment was made.

### Energy Service Company (ESCO)

ESCO is a commercial or non-profit business providing energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, etc. The building occupants then benefit from the energy savings and pay a fee to the ESCo in return. At all times, the saving is guaranteed to exceed the fee.

### Energy Service Agreement (ESA)

An Efficiency Services Agreement is a pay-for-performance financing solution that allows customers to implement energy efficiency projects, such as CHP systems, without any upfront capital outlay. Energy Conservation Measures (ECM's) guarantee annual savings to the Customer's energy and operational budgets. A proportion of the savings can then be "recycled" to cover the cost of implementing and operating the ECM's throughout the ESA/ESPC contract term, typically 10 or 15 years.

# Combined Heat and Power (CHP)

## Investment cost & return - FIT from Jan 2016

Estimated Generated Energy, kWh/a	756,864
Estimated Generated Power, kW/a	86
Unit Type	Ener-G 35M CHP unit
No of houses	306
No of CHP units	1

CAPITAL EXPENDITURE	
Cost of unit	£ 78,125
Installation	£ 5,000
Preparation of the ground/ outhouse	£ 10,000
Connection cost of heat network	£ 4,500
Installation of heat network	£ 3,000
Consultants fees (planning app, etc)	£ 3,500

<b>Total Expenditure</b>	<b>£ 2,391,625</b>
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RUNNING COSTS/ per year	
Gas used, kWh/a	969,732
Gas cost per year	£ 0.0463
Maintenance cost/ per annum	£ 14,933
<b>Sub-total</b>	<b>£ 59,832</b>

SAVINGS	
Hours run, with 10% downtime	7884
Electricity generated, 100% utilised	275,940
Electricity cost saved @50%	£ 0.1379
Heat generated (heating), 88.4% utilised	480,924
Gas cost saved @100%	£ 0.0463
<b>Sub-total</b>	<b>£ 60,319</b>

INCENTIVES	
Feed-In Tarriff, 50% electricity sold	£ 0.0912
Renewable Heat Incentives - biogas	£ 0.0750
<b>Sub-total</b>	<b>£ 48,652</b>

<b>Total Value</b>	<b>£ 49,139</b>
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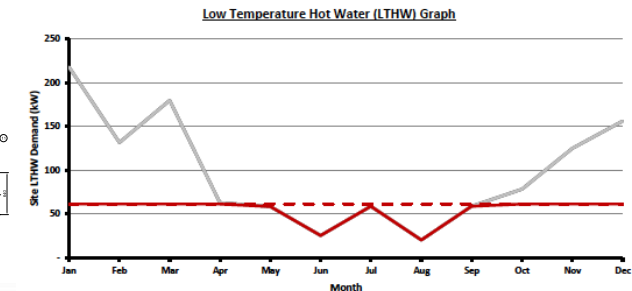
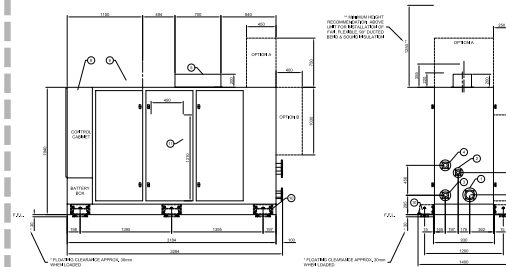
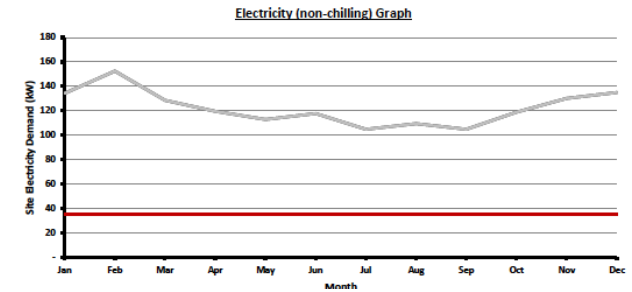
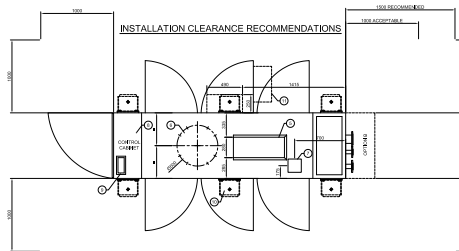
<b>Total potential saving per household</b>	<b>£ 161</b>
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Investment Cost (ex VAT)	£ 2,391,625
Investment Cost (incl VAT)	20% £ 2,869,950
Return (IRR)	-5.70%
Pay Back Years	48.7

CO2 Saving annual (kg)	411,734
CO2 Saving life (kg)	20 yrs 8,234,680

The performance of CHP systems is relatively stable, however, heating output for the system has different utilisation factors subject to the seasonal temperature variations. The values above have been provided by Ener-G CHP supplier.  
The cost data for the heat network is taken from Poyry's Potential and Costs of District Heating Networks for small terraced house.

## Example of manufacturer info – Ener-G E35 Natural Gas CHP Unit



Energy Balance and Part Load Data @ 0.95PF					
		Units	100% 1000h	75% 750h	50% 500h
Electrical Output	(+/-3%)	kW	35	26	18
Electrical Efficiency (Net)	(+/-5%)	%	31.6%	29.1%	25.2%
Heat Output	(+/-10%)	kW	61	51	41
Thermal Efficiency (Net)	(+/-8%)	%	55.2%	56.8%	59.3%
Fuel Input (Net)	(+/-5%)	kW	111	90	69
Total Efficiency (Net)	(+/-8%)	%	86.8%	85.9%	84.5%
Heat Output from Jacket Water	(+/-8%)	kW	38	33	29
Heat Output from Exhaust Gas @ Outlet Temp.	(+/-8%)	kW	23	18	12
Aftercooler Heat Output	(+/-8%)	kW	N/A	N/A	N/A
Radiated Heat Output	(+/-8%)	kW	9	7	5
Combustion Air Flow	(+/-5%)	Nm <sup>3</sup> /h	105	85	66
Fuel Mass Flow (ρ = 0.75kg/Nm <sup>3</sup> )	(+/-5%)	kg/h	8.3	6.8	5.2
Fuel Volume Flow (LHV = 10kWh/Nm <sup>3</sup> )	(+/-5%)	Nm <sup>3</sup> /h	11.1	9.0	6.9
Exhaust Mass Flow (Wet)	(+/-5%)	kg/h	144	117	90
Exhaust Volume Flow @ Outlet Temp.	(+/-5%)	m <sup>3</sup> /h	160	130	100

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** Cost of the CHP plant is negligible when compared to the cost of installation of the heating network

## 4. Anaerobic Digestion (AD) with CHP

## What is Anaerobic Digester (AD)?

### AD explained

AD is a simple biological process using naturally occurring bacteria to break down organic material such as food waste, animal slurry or crops that takes place in sealed, oxygen-free tanks to produce biogas.

The word Anaerobic actually means 'in the absence of oxygen'. The biogas naturally created in the sealed tanks is used as a fuel in a CHP (combined heat and power) unit to generate renewable energy, such as electricity and heat.

What's left from the process is a nutrient rich biofertiliser which is pasteurised to kill any pathogens and then stored in large covered tanks ready to be applied twice a year on farmland in place of fossil fuel derived fertilisers.

Every tonne of food waste recycled by anaerobic digestion as an alternative to landfill prevents between 0.5 and 1.0 tonne of CO<sub>2</sub> entering the atmosphere.

### Benefits

- Anaerobic digestion creates biogas, a renewable source of energy that is used similar to natural gas.
- Diverting food scraps from landfills to digesters reduces methane emissions from landfills.
- Diverting Fats, Oil, and Grease (FOG) from the wastewater infrastructure prevents combined sewer overflows, protects water quality and saves money.
- Using the solid residual as a soil amendment can reduce the need for chemical fertilizers, improve plant growth, reduce soil erosion and nutrient run-off.



*MVHR provides ventilation for full house.*



*The electrical power generated by PV panels can either be used at home or sold to the Grid.*

# Anaerobic Digestion (AD) with CHP

## System integration

The Cressingham Estate has capacity for integration of the anaerobic digester in either of the following locations:

1. Car parking areas (shown in yellow) – there area number of under-utilised parking spaces on the estate that could be converted into a plant room.
2. New out building on site (indicated in pink) – locating the plant away from the people homes to avoid complaints from residents and have better access.

Refer to the estate plan diagram.

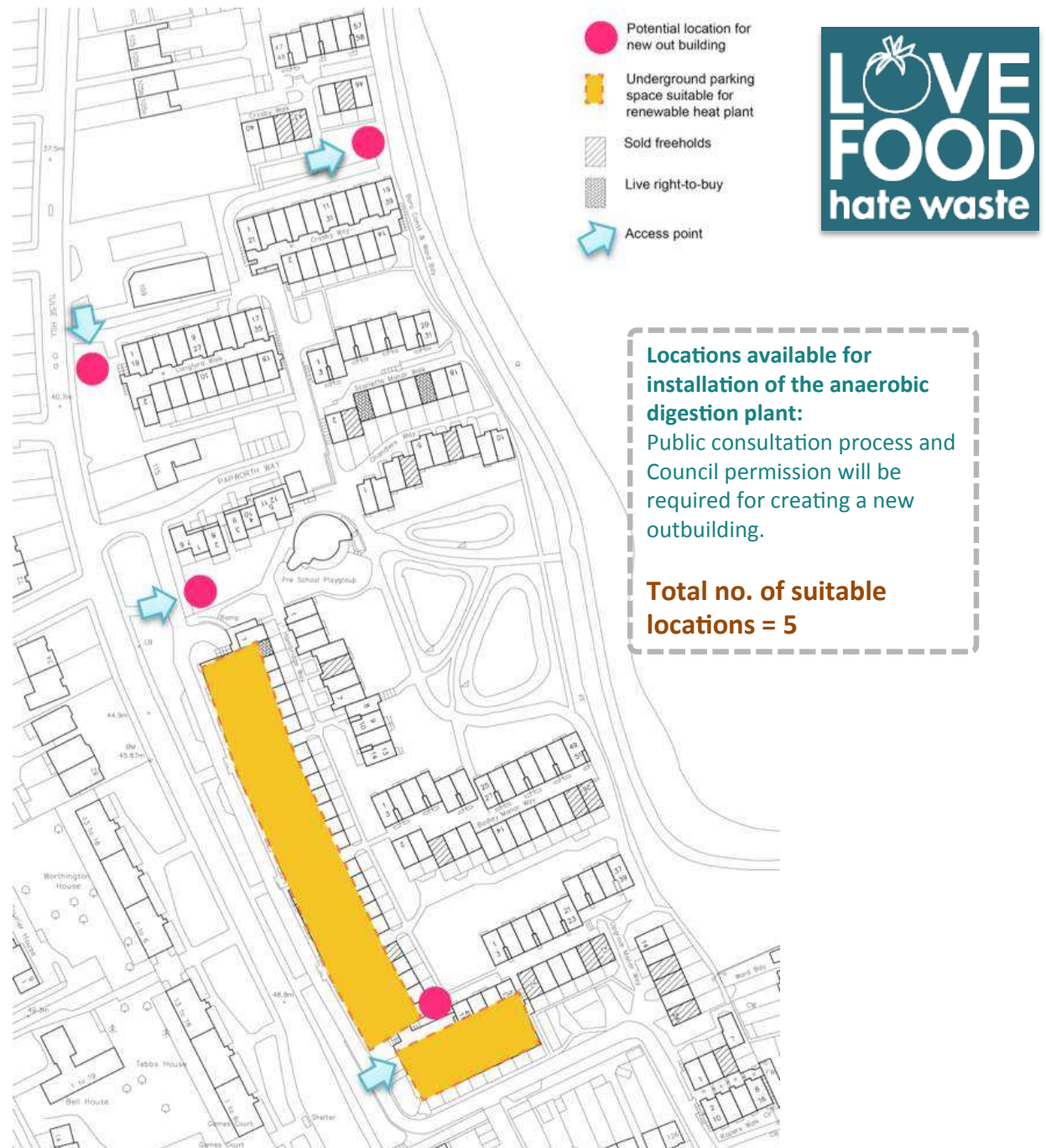
Lambeth has a large number of housing estate, such as Cressingham that could be utilized in the food and organic waste collection. There is also supply from restaurants (cooking oil and food waste) within 3 miles of the site.

To achieve maximum efficiency, additional sites have been integrated into the financial model, including waste from 9 restaurants, 5 schools or 750 unit housing estate (the figures are based on assumptions).

There is no project of this type and scale in Lambeth at the moment. AD plant would be one of the first projects of its kind with a potential to develop a workable supply chain in the area making it easier to access this market in the future.

The symbiotic relationship could be developed with the Brockwell Park, where ‘soft’ green waste is collected and fed into the digester, whilst the waste product is used back for the park planters and/or allotments.

AD plant is operated together with the District Heating Network ,which is explained in detail in the CHP chapter. The cost of the installation of the heating network has been included in the financial model for the AD plant.



Areas identified as suitable for anaerobic digester plant installation



# Anaerobic Digestion (AD) with CHP

## Constraints

### Maintenance

The plant are typically warranted for 25 years. Maintenance and reliability issues remain a key factor in specifying anaerobic digester. The plant will require at least 1no. full time trained operative to collect and feed the waste into the digester, as well as clean out and maintain the system. By-product being non-toxic and disposed of in the usual waste stream or used as a fertiliser. It is recommended that the long term maintenance contract is signed with the installer of the system.

### Local Planning Issues

Planning application will be required.

We foresee most resistance from the residents with AD plant proposal because of the noise and smell issues.

### Other considerations

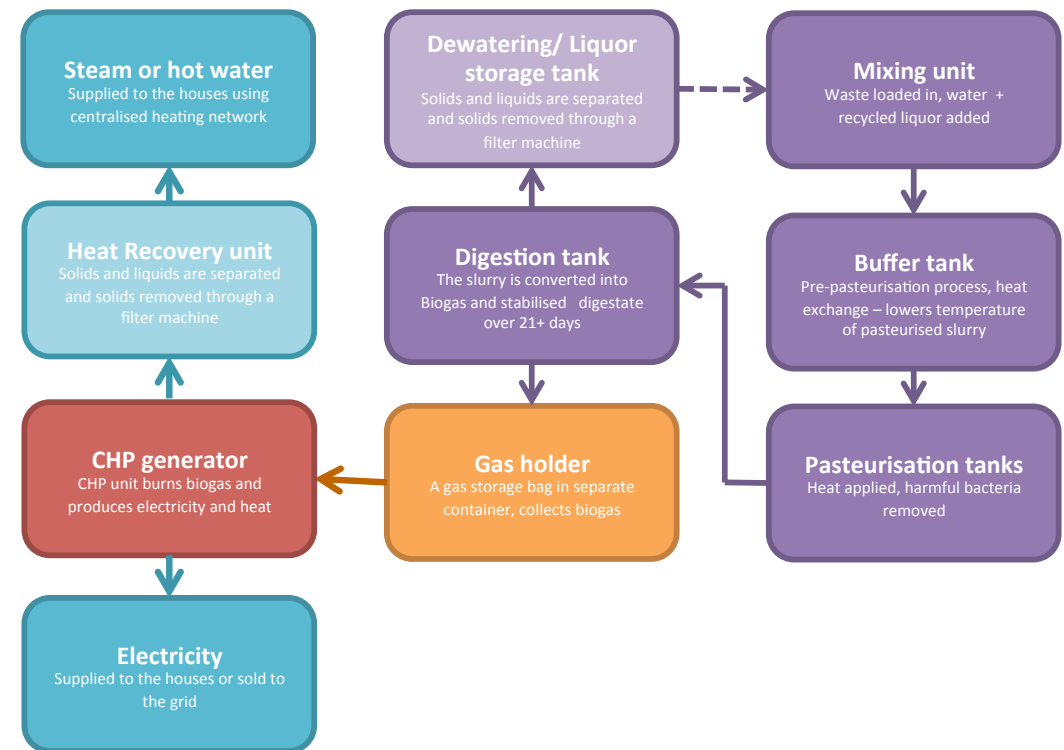
In order to realise a project of this type in such as constrained urban site, significant potential negative impacts need to be mitigated at the design stage, including:

- Air quality - NOx and particles pollution from CHP plant, compliance with EU standards
- Odour emission from waste reception
- Noise – acoustic design to isolate the machinery
- Waste collection permit
- Environmental permit
- Training of the plant operative(s)
- Transportation issues - delivery to and from site
- Digestate compliance - PAS110 certification
- Water usage and treatment – rainwater collection possible
- Biogas compliance – BS EN 60079 H&S explosives storage standard
- Health & Safety – robust design in accordance with IEC

38 61882, OHAS and COSHH



Anaerobic digester plant – compact installation



Anaerobic digester process

# Anaerobic Digestion (AD) with CHP

## Incentives

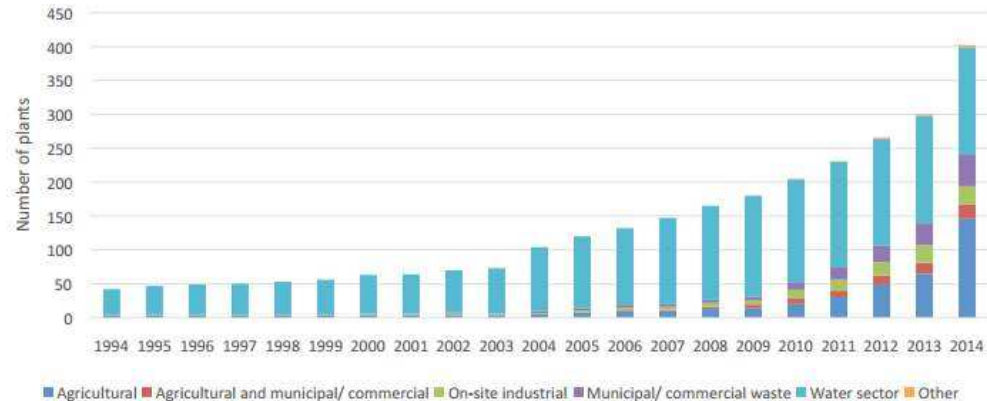
### Feed-in Tariffs (FITs)

- Generation tariff:** your energy supplier will pay you a set rate for each unit (or kWh) of electricity you generate. Once your system has been registered, the tariff levels are guaranteed for the period of the tariff (up to 20 years) and are index-linked. The tariffs are to be reviewed every three months and will be revised according to deployment rates (see table below).
- Export tariff:** No export tariff is available as of April 2015.

### Energy bill savings

You will be making approx. 50% savings on your electricity bills because generating electricity to power your appliances means you don't have to buy as much electricity from your energy supplier. The amount you save will vary depending how much of the electricity you use on site.

## Trends



According to the Anaerobic Digestion Marker Report 2015, there are AD capacity has increased by nearly 30% in 2014. The image shows the cumulative number of operational AD plants in the UK - of which there are 246 non-sewage AD plants in the UK and over 300 are new proposed schemes in planning. Just under a half of which are food waste plants. Larger agricultural schemes are most popular

A typical 5.1kW CHP plant that is fed by the 4,000 litre/hr AD plant costs approx. **£100,000**.

## Summary of Anaerobic digester Feed-in Tariffs

System size	Generation Tariff	Export Tariff	Renewable Heat Incentives
	1 Oct 2015 - 31 Mar 2016		
≤250kW	9.12 p/kWh	-	0.075 p/kWh
>250kW - 500kW	8.42 p/kWh	-	0.075 p/kWh
>500kW	8.68 p/kWh	-	0.075 p/kWh

# Anaerobic Digestion (AD) with CHP

## Funding

### Urban Community Energy Fund (UCEF)

UCEF provide contingent loans of up to £130,000 towards the detailed project development costs. This could include the costs of developing and submitting a full planning application, carrying out community consultation, securing all necessary permits and grid connections, arranging power purchase agreements and costing contracts for supply and installation.

### Anaerobic Digestion Loan Fund (ADLF)

The ADLF is a £10 million fund designed to support the development of new AD capacity in England (subsidiary of Wrap). The fund can provide asset backed loans for plant, machinery and/or groundworks. The loan is for between £50,000 and £1,000,000, requests above this figure will be considered only at the discretion of the Investment Committee. The maximum term of the loan is five years, though early repayment or shorter terms are regarded favourably.

### Green Investment Bank (GIB)

The Green Investment Bank was set up by the UK Government as a public company in October 2012. Energy from Waste, which includes anaerobic digestion, is a specific priority area for the bank and this has already seen investment in a number of projects, such as the TEG Group's anaerobic digestion facility in East London.

### Enterprise Finance Guarantee (EFG)

The Enterprise Finance Guarantee (EFG) is a targeted measure intended to facilitate additional commercial lending to viable Small- and Medium-sized Enterprises unable to obtain a normal commercial loan due to having no or insufficient security.

### Capital Grant Aid

Capital grant schemes are available to support AD plant construction. Community Grant Scheme occasionally have funding available to support specific types of projects or certain elements of AD projects. The conditions for receiving funding vary. The Feed-in Tariff (FiT) and Renewable Heat Incentive (RHI) schemes are intended to replace, not supplement, public grant schemes as the principal means of incentivising small-scale, low-carbon electricity generation. Because of this, and to ensure value for money for consumers and compliance with EU law on state aids, it is generally not possible for a generator to benefit from both FiTs/RHI and a grant from a public body except in specific circumstances.

### Other Grant Aid and Support

WRAP provides funding on occasion, including capital grants. WRAP's Organics Funding Guide provides information on support for bio-energy and food waste processing projects.

### Enhanced Capital Allowance

The Enhanced Capital Allowance Energy scheme provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria. With CHP, case by case Certification is needed to ensure support is provided for 'good quality' certified CHP, achieved using the CHP Quality Assurance programme (CHPQA).

### Private Equity

Private equity finance may also be an option. To read more about what banks and financiers may be looking for (refer to page 75 of this report into the economics of AD by the NNFFCC Bioeconomy Consultants).

For more info: <http://www.biogas-info.co.uk/funding-qa.html>



# Anaerobic Digestion (AD) with CHP

## Successful Precedence

### Southampton Science Park (Best AD Award 2012)

The University of Southampton Science Park (USSP), having installed energy efficient climate control systems in the form of air source heat pumps and heat recovery mechanisms in both new and refurbished buildings, have entered into an Electricity Service Company (ESCo) relationship with SEaB Energy ([www.seabenergy.com](http://www.seabenergy.com)) to deploy the innovative MUCKBUSTER® SEaB MB400 onsite containerised anaerobic digestion solution.

SEaB Energy supplies a compact and easy to install turnkey anaerobic digestion (AD) solution on sites generating between 200 and 1000 tonnes of food and bio waste per year. The system is known as MUCKBUSTER® SEaB MB400 in the food processing and on-site catering and accommodation sectors. The systems generates energy and offset and new income. They are designed to produce between 8kWe - 55kWe electricity via a combined heat and power unit (CHPs). The system also provides PAS110 pasteurisation, so that residual organic digestates can be sold as fertiliser or mulch.

The Science Park will take advantage of the energy harvesting potential of food and organic waste, which, to date, has been an untapped resource. Electricity and heat generated from the biogas production will be used within the business park offices and research and development laboratories on site.

A digester unit is being installed and is running an 8kW combined heat and power unit (CHP) unit, and produces an average of 46 m<sup>3</sup>/day of methane (CH<sub>4</sub>) based on the estimated annual feedstock. This in turn provides the Kenneth Dibben building with 35MWh/annum of electricity.

## Project details



This MUCKBUSTER® SEaB MB400 digester has a payback of within 4 years.

**3.5kg** of food waste is produced by each household a week

**£16,215** digestive value

**£16,215** digestive value

**£6,470** running and maintenance costs (excl. collection of waste)

# Anaerobic Digestion (AD) with CHP

## Investment cost & return

Estimated Generated Energy, kWh/a	111,500
Estimated Generated Power, kW/a	13
Unit Type	MUCKBUSTER® SEaB MB400 (4kW)
No of houses	306
No of houses (assume 85% contribution)	260
No of units	1
Waste generated, kg.year	47,338.20

CAPITAL EXPENDITURE	
Cost of unit	£ 98,655
Installation of unit	£ 5,000
Preparation of the ground/ outhouse	£ 10,000
Connection cost of heat network	£ 4,500
Installation of heat network	£ 3,000
Consultants fees (planning app, etc)	£ 3,500

<b>Total Expenditure</b>	<b>£ 1,035,155</b>
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RUNNING COSTS/ per year	
Electricity cost	£ 0.1379
Water costs	£ 600
Collection of waste (1 operative @3 days/week)	£ 14,500
Maintenance cost/ per annum	£ 5,000
<b>Sub-total</b>	<b>£ 20,970</b>

SAVINGS	
Electricity generated, kWh/a	35,000
Electricity cost saved @50%	£ 0.1379
Gas generated (heating), kWh/a	75,000
Gas cost saved @100%	£ 0.0463
Compost value	£ 400
Waste disposal saving	£ 15,000
<b>Sub-total</b>	<b>£ 21,286</b>

INCENTIVES	
Feed-In Tarriff, 50% electricity sold	£ 0.0912
Renewable Heat Incentives - biogas	£ 0.0750
<b>Sub-total</b>	<b>£ 7,221</b>

<b>Total Value</b>	<b>£ 7,537</b>
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<b>Total potential saving per household</b>	<b>£ 25</b>
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Investment Cost (excl. VAT)	£ 1,035,155
Investment Cost (incl. VAT)	20% £ 1,242,186
Return (IRR)	-11.76%
Pay Back Years	137.3

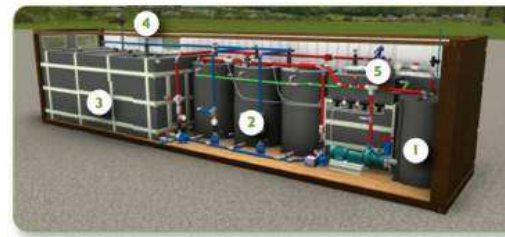
CO2 Saving annual (kg)	60,656
CO2 Saving life (kg)	20 yrs 1,213,120

The performance of AD and CHP systems is impossible to predict with certainty due to the variability of the waste availability, type of waste and correct use of the system. This estimate is based on existing projects using the manufacturer's data from MUCKBUSTER® SEaB. The cost data for the heat network is taken from Poyry's Potential and Costs of District Heating Networks for small terraced house.

maximum capacity, approx. additional 9 restaurants, 3 schools or 750 unit housing estate.

## Example of manufacturer info - MUCKBUSTER® SEaB MB400

### MUCKBUSTER®/SEaB MB400 TECHNICAL DETAILS



- 1 Waste loaded, chopped and mixed
- 2 Pasteurisation
- 3 Digestion
- 4 Gas Production
- 5 Digestate and mulch offload



### PERFORMANCE

0.5tonne MUCKBUSTER® / SEaB MB400 System.							
Waste Stream	CHP Rating (kW)	Biogas(m³)	Yearly Production				Payback (Years)
			Electrical (kWh)	Heat (kWh)	Liquid Fertiliser (T)	Mulch (T)	
Manure	3.5	17 500	27 500	60 000	98	15	6
Food Waste	4	22 500	35 000	75 000	98	5	4
Brewery Waste	6	31 500	43 500	95 000	98	10	3.5

### DIMENSIONS

- Ext Dimensions: 12.19m long x 2.44m wide x 2.9m tall (40ft x 8ft x 9.5ft) M² = 32
- Weight Empty: ≈ 8,000kg
- Weight Full: ≈ 42,000kg

### PRODUCT COMPONENTS

- Recycled Shipping Container
- Waste input processing unit (Hopper/Chopper/Mixer)
- Plastic Tanks
- Piping, Pumps and Computerised Valves
- De-Watering unit for Digestate and Mulch
- Control System
- Optional Loading Systems
- Gas storage unit
- CHP

### STANDARDS / CERTIFICATION

PAS 110  
DSEAR / CE  
T24/25 waste exemption licence in UK

### IS THE MUCKBUSTER® RIGHT FOR YOU?

**Do you have enough waste?** You need a minimum of 400kgs of biowaste per day for the basic unit to payback in an attractive number of years.

**Do you have enough space?** You need good access for delivery of the system, which is housed within a 40ft shipping container and could potentially be expanded with the addition of a 20ft or 40ft shipping container for larger site requirements. The CHP can be deployed outside, within an existing site power generation facility or within a shipping container.

**Any local regulations?** Environmental regulations differ by country and there is growing support for micro anaerobic digestion. As the technology is mobile and de-installable and re-installable, planning is less of an issue. It is best to check with local regulations prior to deployment.

**Will I be able to maintain it?** The system is designed for automated operation and remote management. Annual planned maintenance can be conducted by the approved reseller.

**Can I reuse the fertiliser and mulch by-products?** Absolutely, the fertiliser is a valuable organic product for agricultural and landscape application and the mulch is perfect for animal bedding or ground cover.

Suitable for installation at Cressingham Garden Estate?

No

**Conclusion:** Cost of the AD and CHP plant is negligible when compared to the cost of installation of the heating network

# Conclusion

# Conclusion

## Summary of findings

### Background

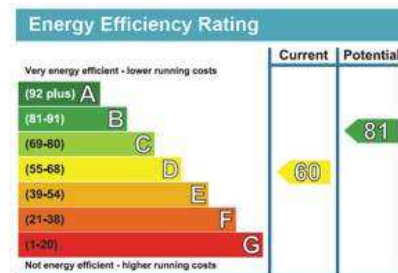
Sturgis Carbon Profiling (SCP) were commissioned by the Cressingham Garden residents to look into the sustainable retrofit of their estate, which included the installation of the renewable technologies with the main aim to:

- Reduce the energy bills and eradicate fuel poverty on the estate;
- Provide community with an additional income that could be spent on social projects, young people training schemes, further energy efficiency improvements, etc.
- Make homes greener, healthier and more sustainable.

SCP have won a UCEF Stage 1 grant to cover their fees in reviewing the feasibility of the installation of renewable technologies on the estate.

This technical report was produced by SCP is looking at the economic feasibility, financial returns, constraints, available funding and public opinion of four renewable systems in detail, including:

1. Photovoltaic (PV) panels array of 50 and 70kW output,
2. Mechanical Ventilation with Heat Recovery (MVHR),
3. Combined Heat and Power (CHP) operated using natural gas, and
4. CHP operated using biogas produced by food waste Anaerobic Digester.



### Assumptions

- The feed-in-tariffs are fixed for 20 year period. It is hard to predict what will happen after that period, therefore, we assume the FIT will be equivalent to the energy price after 20 years (taking current value).
- SCP have not taken inflation and rises into account as part of this calculation.
- The payback calculated are linear.
- SCP excluded any disposal costs or value of the installations after at the end of life (assumed 20 years).
- The cost information provided by individual manufacturers may not be accurate representation of the competitive market.
- Any loan repayment or finance costs have not been included.

### Analysis of results

- Based on the predicted future savings (IRR results), which include FIT income, the PV installation under 50kW will provide the greatest return on investment than other systems. It is also 11% better than installing a 70kW PV system due to the reduction in the feed-in-tariffs for larger installations.
- The insulation of MVHR can be installed along side the any of the other technologies, and is recommended because of the wellbeing benefits of having fresh filtered air, particularly for the elderly and young children.
- Combined Heating and Power (CHP) and Anaerobic Digester (AD) with CHP were found to be not economic because of the high cost of laying down the new district heating network.

# Conclusion

## Summary of findings

Installation type	Total Energy Produced, kWh - per year	Total Value - per year	Potential Saving per Household - per year	Investment Cost (exc. VAT)**	IRR	Pay back (years)
<b>PV panels - FIT from Jan 2016</b>						
327 PV panels - up to 50kW	38,212	£ 4,439	£ 15	£ 100,885	1.13%	24
245 PV panels - up to 50kW	37,671	£ 4,369	£ 14	£ 95,253	1.46%	23
245 PV panels - up to 100kW	76,849	£ 8,659	£ 28	£ 247,523	-0.41%	30
245 PV panels - up to 150kW	114,520	£ 13,165	£ 43	£ 368,857	-0.28%	29
245 PV panels - up to 250kW	191,370	£ 22,356	£ 73	£ 616,380	-0.17%	29
245 PV panels - up to 400kW	310,411	£ 35,476	£ 116	£ 999,798	-0.27%	30
<b>PV panels - Current FIT***</b>						
245 PV panels - up to 50kW	37,671	£ 7,236	£ 24	£ 95,253	5.41%	14
245 PV panels - up to 500kW	310,411	£ 46,837	£ 153	£ 999,798	1.36%	22
<b>Other - Current FIT</b>						
MVHR + airtightness	781,096	£ 21,636	£ 71	£ 917,296	2.35%	51
Gas CHP	756,864	£ 49,139	£ 161	£ 2,391,625	-5.70%	49
AD with CHP	111,500	£ 7,537	£ 25	£ 1,035,155	-9.88%	141

1. Installation **up to 400kW** generates approx. 70% of the total electrical energy use of the estate (306 homes), based on household bills for 2014, see Appendix B. It is not the most financially viable but is appropriate in size and saving potential. We would be looking to go out for a competitive tender to improve the IRR once the industry is stabilised subsequent to government FIT reductions as we are anticipating substantial price drop.

2. Most financially viable installation is **up to 50kW** as has payback period under the life of the panel. However, the size of the system is too small to provide meaningful returns to the residents.

1+2. PV installation works under both scenarios Lambeth demolition proposal or resident led alternative refurbishment proposals. The PV panels could be relocated to a re-built estate.

3. MVHR installation is not mutually exclusive from the renewable systems installation and offers better returns. It will be harder to raise funding for the MVHR installation and airtightness improvements as it does not fall within the Low and Zero Carbon Technologies.

**Note:**

\*Information above is based on the energy bills for 2014 of the Cressingham Garden residents.

\*\* The cost data was provided by the renewable system manufacturers, and excludes VAT which is variable depending on the installation and potentially could be claimed back through tax relief.

\*\*\* We have included current FIT for comparison but excluded it from the proposal at this stage.



## Summary of findings

### Conclusion

The maximum PV array of up to 400kW (206 roofs) was chosen as the best renewable technology option for the estate because it:

- Is considered the most appropriate for the estate by the residents,
- Is both suitable for the installation on shallow sloping roofs of the existing estate and relocation to the new development that is at the masterplanning stage with the Lambeth Council.
- Currently achieves relatively poor rate of return (IRR) and pay back period due to the fall of the FIT but as the prices of PV installations are expected to fall next year, we are expecting substantial reductions in costs of PVs.

In summary, PV array of 1650 panels requires a total investment of just under **£1M** (excl. VAT, subject to the community tax relief schemes).

This will generate **310,000kWh** of energy, which is equivalent to approx. 70% of total electricity use of the estate (306 homes) based on household bills for 2014, see Appendix B. We expect 50% of total energy produced being used by residents and 50% being sold to the grid using the latest Feed-In-Tariffs.

This is equivalent to total value of **£35,500** or **£153** saving per household, some of which the residents wish to spend on community projects. (Please note: the sums exclude loan repayments, which is subject to available funding and grants).

SCP are now looking to resubmit for Stage 2 UCEF grant that will release further funding to progress the project.

## Summary of findings

### Risks

1. The feed-in-tariffs are taken from current government subsidies tables. They change every 3 months, and are generally being reduced. Therefore, the current financial model may need to be updated as the project progresses.
2. Currently the government is running a consultation process to change the Feed-In-Tariff (FIT) accreditation proposing to remove the pre-accreditation. This puts this project at risks as pre-accreditation allows to fix the FIT while the project is being developed allowing to write a robust business case for the proposals. SCP would recommend expediting the project in order to avoid this risk. For more information: <https://www.gov.uk/government/consultations/changes-to-feed-in-tariff-accreditation>
3. Lambeth Council are currently looking at the masterplanning scheme for regeneration of the site, which includes option for full demolition of the estate. They expressed their general support for the project, because they see benefit in this type of the installation, assuming:
  - PV panels could be easily relocated from existing roofs and reconnected to new development, if such proceeds.
  - Current residents will benefit from reduced energy bills as the regeneration project program is likely to stretch out for year.
  - Renewable installation of this scale will provide reassurance to the residents that they will be rehoused in the new properties on site which will make the residents happier and feeling more secure.
  - It adds to the environmental credentials which are written into the council policies.
  - It will save money for the council - in 3-4 years time the Feed-in-tariffs will be much lower than the current rates, diminishing the return.However the Council have not yet provided a written support document until they have more detailed information on the funding and progress the masterplanning scheme further.

## Recommendations



SCP advise Cressingham Garden community to undertake further work, which is not included in the current scope:

- Estimate value of potential grant funding available to pay for the capital expenditure;
- The cost of borrowing money to make up the shortfall up to the value of capital expenditure;
- Conduct further community consultation;
- Arrange further Lambeth Council consultation;
- Submit application for full planning permission;
- Optional - estimate value of wellbeing improvements to help secure the funding using SROI methodology, i.e. saving in NHS bills for Lambeth.

# Conclusion

## Cressingham Gardens Vision

### Low Energy Retrofit with Community Fund

A portion of the revenue generated through the project will be placed into a Community Fund. This fund will then be used to improve the energy efficiency of Cressingham Estate, provide opportunities for young people, training schemes and organise community activities.

The Cressingham Garden is generally in poor condition due to the chronic lack of funding provided by Lambeth Council. The residents are very keen to remain in their properties as the general layout of the estate, its central location and established community are well loved and cherished.

Based on five community consultation workshops conducted by Sturgis Carbon Profiling, the residents support the idea of the estate being refurbished to low energy standard. They would keenly embrace the low energy bills and eradication of the fuel poverty, providing the works do not require a large up front investment.

The residents understand that this is a long term goal and are happy to support the Low Energy EnerPHit proposals, providing the most acute problems, such as roof and gutter leaks are prioritised and the estate aesthetic is conserved.

Please refer to a separate EnerPHit Report for more information on the Deep Retrofit proposal and costs.

## Cressingham Gardens – Current Financial Model



**6.7%** estimated return each year that can be reinvested in the community, which is equivalent to:

**£35,500** total value or **£116** potential saving per household, which could be allocated as follows:

**50%** savings to energy bills and

**50%** in Community Fund allocated to community projects and further green refurbishment measures.

(Please note: the above is subject to loan repayments.)

## Conclusion

### Social and Wellbeing value

#### Using PV installation to benefit community

SCP reviewed the social and wellbeing benefits of the proposal using some of the Social Return on Investment (SROI) principles for Cressingham Gardens, the following benefits were identified:

1. The estate residents are expected to gain the most value from the proposal, including:
  - Reduction of energy bills and eradication of fuel poverty;
  - More power to the community by allocating the Community Fund from the financial return, to be spent on the community projects i.e. community garden projects, children's play sessions, sporting activities, elderly clubs in the existing community center (Rotunda);
  - Improving energy efficiency of the homes by running energy efficiency workshops, conducting energy surveys, etc and funding further green improvement to the estate through energy bills, i.e. using ESCo funding model.
  - Reduction of social isolation and more community integration through the management of the new community run organisation (ESCo).
2. The estate young people and unemployed may display improved behaviour through the involvement in the training workshops run by professional construction workers, i.e. employing practical skills installing green home improvement, plumbing, electricals, etc.
3. The estate elderly and disabled residents would be able to keep thermostats on higher, more comfortable temperature setting.
4. Lambeth Council is likely to have less 'unhappy' residents and hence spent less time and money on management of the estate.
5. The public health service (NHS) is likely to benefit by spending less money on treatment of the residents, i.e. flues, cold, asthma that is normally associated with cold draughty homes in fuel poverty.

### Community Energy Efficiency Fund in action



On an example of a precedent project from Brixton Solar Energy, the money raised for the Community Energy Efficiency Fund (CEEF) have so far achieved the following:

- Work experience on the renewable energy installation for one resident.
- Home energy audits that included installation of low energy lighting and power down plugs on two estates.
- Energy surveys throughout the estate over the course of 8 months.
- Energy Advice Sessions for the total of 132 people.
- Local leadership as the project management includes two local residents.
- Community events, including drought proofing workshop and other low cost energy efficiency measures.

SCP have already run five energy efficiency and green retrofit workshops with the residents of the Cressingham Garden and received a great feedback and interest from the residents.

# Appendices

## Terms Explained

### Estimated Return

The estimated annual return to members of the co-operative is based on projected income and expenditure over the life of the solar array, using the assumptions stated in the business case.

### The Community Fund

A portion of the revenue generated through the financially profitable project may be placed into a Community Fund. This fund is then be used to fun Community projects, which may include energy efficiency measures, provide opportunities for young people, training schemes, other community actives, etc.

### Internal Rate of Return (IRR)

The internal rate of return is the discount rate that will make a series of nominal cash flows have a NPV of ZERO. An investment's IRR is useful because it creates comparison for investment costs. (If IRR is bigger than the interest rate on borrowed costs, you make profit).

### Payback Period

Payback period is the time in which the initial cash outflow of an investment is expected to be recovered from the cash inflows generated by the investment. Formula:  
Payback Period = Initial Investment/ Cash Inflow per Period

### Social Return on Investment (SROI)

SROI is a framework for measuring and accounting for this much broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental and economic costs and benefits.

SROI measures change in ways that are relevant to the people or organisations that experience or contribute to it. It tells the story of how change is being created by measuring social, environmental and economic outcomes and uses monetary values to represent them.

### Tax Relief (via CITR)

Community development finance institutions (CDFIs) is an investment vehicle that can deliver financial and social returns, and the Government has put in place a tax incentive to foster more investment in these important organisations. The scheme is called the Community Investment Tax Relief (CITR).

## Appendix B

### Cressingham Garden Estate Estimated Annual Energy Use

\*Note: The energy use is based on the energy bills provided by the residents and average energy prices in the UK for 2014.

House type	Data	Electricity				Gas				Total energy used, kWh	Total energy bill, £ (excl. VAT)	Total bills, £ (incl. 5% VAT)	No of units
		Energy used, kWh	Rate, £/kWh	Standard charge, £/year	Cost, £/year	Energy used, kWh	Rate, £/kWh	Standard charge, £/year	Cost, £/year				
0-bed	as measured	1,058	£ 0.1832	£ -	£ 194	4,877	£ 0.0504	£ -	£ 246	5,935	£ 440	£ 462	11
	standardised	1,058	£ 0.1379	£ 53	£ 199	4,877	£ 0.0463	£ 55	£ 281	5,935	£ 480	£ 480	
1-bed	as measured 1	3,301	£ 0.1425	£ 66	£ 536	7,425	£ 0.0515	£ -	£ 382	10,726	£ 918	£ 964	151
	as measured 2	1,379	£ 0.1349	£ 95	£ 281	6,937	£ 0.0500	£ 95	£ 442	8,316	£ 723	£ 759	
	standardised	3,301	£ 0.1379	£ 53	£ 509	7,425	£ 0.0463	£ 55	£ 399	10,726	£ 907	£ 907	
2-bed	as measured	2,327	£ 0.1671	-£ 22	£ 367	17,375	£ 0.0514	£ 85	£ 977	19,701	£ 1,344	£ 1,411	53
	standardised	2,327	£ 0.1379	£ 53	£ 374	17,375	£ 0.0463	£ 55	£ 859	19,701	£ 1,233	£ 1,233	
3-bed	as measured	4,257	£ 0.1305	£ 110	£ 666	14,757	£ 0.0305	£ 124	£ 573	19,014	£ 1,239	£ 1,301	50
	standardised	4,257	£ 0.1379	£ 53	£ 640	14,757	£ 0.0463	£ 55	£ 738	19,014	£ 1,378	£ 1,378	
4-bed	as measured 1	2,024	£ 0.1196	£ 74	£ 316	9,747	£ 0.0447	£ 95	£ 531	11,771	£ 847	£ 889	41
	as measured 2	2,810	£ 0.1271	£ 50	£ 408	18,395	£ 0.0454	-£ 16	£ 819	21,205	£ 1,226	£ 1,288	
	standardised	2,417	£ 0.1379	£ 53	£ 387	14,071	£ 0.0463	£ 55	£ 706	16,488	£ 1,093	£ 1,093	
<b>Total</b>	<b>Cressingham average weighed*</b>	<b>1,472</b>	<b>£ 0.1379</b>	<b>£ 53</b>	<b>£ 256</b>	<b>7,506</b>	<b>£ 0.0463</b>	<b>£ 55</b>	<b>£ 402.26</b>	<b>8,978</b>	<b>£ 659</b>	<b>£ 691</b>	<b>306</b>
<b>Total</b>	<b>DECC UK average**</b>	<b>3,300</b>	<b>£ 0.1379</b>	<b>£ 53</b>	<b>£ 508</b>	<b>16,500</b>	<b>£ 0.0463</b>	<b>£ 55</b>	<b>£ 819</b>	<b>18,600</b>	<b>£ 1,327</b>	<b>£ 1,393</b>	<b>306</b>

Total Electricity (306 homes)	450,342	£ 78,411
Total Gas used (306 homes)	2,747,163	£ 123,093
<b>Total (as measured)</b>	<b>3,197,505</b>	<b>£ 201,504</b>

Average Electricity (306 homes)	1,009,800	£ 155,560
Average Gas (306 homes)	5,049,000	£ 250,519
<b>Total (DECC estimate)</b>	<b>6,058,800</b>	<b>£ 406,079</b>

<b>Difference</b>	<b>-50%</b>	<b>-£ 204,575</b>
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**Note:**

\*Information above is based on the energy bills for 2014 of the Cressingham Garden residents.

\*\* The data was standardised against the UK average energy costs taken from DECC from 2013 Housing Survey data.

\*\*Cressingham Garden Estate have smaller bills compared to the average UK housing.

## **H. Judicial Review Ruling**





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# England and Wales High Court (Administrative Court) Decisions

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**Neutral Citation Number: [2015] EWHC 3386 (Admin)**

Case No: CØ2685/2015

**IN THE HIGH COURT OF JUSTICE  
QUEEN'S BENCH DIVISION  
ADMINISTRATIVE COURT**

Royal Courts of Justice  
Strand, London, WC2A 2LL  
24/11/2015

**B e f o r e :**

**THE HONOURABLE MRS JUSTICE ELISABETH LAING DBE**

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**Between:**

**BOKROSOVA**

**Claimant**

**- and -**

**LONDON BOROUGH OF LAMBETH**

**Defendant**

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**David Wolfe Q.C. and Leon Glenister (instructed by Leigh Day) for the Claimant  
Jon Holbrook (instructed by Lambeth Legal) for the Defendant  
Hearing dates: 3 - 4 November 2015**

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**HTML VERSION OF JUDGMENT**

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**Mrs Justice Elisabeth Laing DBE:**

1. On 9 March 2015 the Cabinet of the Defendant ('the Council') resolved among other things
  - a. that the cost estimate to bring the Cressingham Gardens Estate ('CGE') up to the Lambeth Housing Standard ('LHS') was £9.4m;
  - b. that there was then no provision for the cost of a refurbishment-only programme in the Council's LHS programme, and the Council had a duty to say what was feasible within budgetary constraints;
  - c. to recommend that officers consult further on options for significant regeneration of CGE (as set out in the report) and that a viable regeneration proposal be brought back to the Council's Cabinet ('the Cabinet') in May 2015 with full supporting evidence;
  - d. that there was a commitment to work with residents to develop the regeneration proposals.
2. This claim was lodged on 9 June 2015. Permission to apply for judicial review was given by Holman J on 10 July 2014 on two grounds (by reference to the grounds pleaded in the claim form). It was arguable that the decision to drop options 1-3 was unlawful because
  - a. in breach of section 105 of the Housing Act 1985 and of the common law requirements for a lawful consultation the Cabinet did not conscientiously take into account the views of residents expressed in response to the information pack and other information provided at workshops and meetings; and
  - b. in breach of the general requirements of lawful consultation (as above) the Council decided not to proceed with options 1-3 because they were 'not affordable'.
3. The Claimant was represented by Mr Wolfe QC and Mr Glenister. The Defendant was represented by Mr Holbrook. I am grateful to all counsel for their helpful skeleton arguments and to Mr Wolfe and Mr Holbrook for their oral submissions.

*The background**The Lambeth Estate Regeneration Programme*

4. On 22 October 2012, a report on the Lambeth Estate Regeneration Programme ('LERP') was presented to the Cabinet and approved. The aim of the programme was to improve existing residents' housing and to provide new homes at council rent levels. Three principles had been used to identify estates which were suitable for regeneration. They were to focus on the estates where (1) the costs of providing the LHS were prohibitive; (2) residents and the Council considered that bringing housing up to the LHS would fail to address underlying issues such as the basic condition of the homes or wider problems experienced by residents; and (3) the wider benefits of regeneration would justify it.
5. The report noted that in March 2012 the Council had approved the LHS. It required nearly £500m to be spent over five years. There was a £56m funding shortfall and some problems would not be solved by implementing the LHS. This had led to preparatory work on the LERP. Paragraph 2.8 of the report identified CEG as an estate which met two of the criteria. The annual maintenance costs were high but structural problems meant that there was little visible improvement from repairs.

‘Together difficult decisions need to be made as to whether to continue investing in properties... or whether to look at alternative options’. The Council was said to be exploring the options with residents; after a six-month period of ‘co-producing options’, a ‘preferred option’ would be presented to the Cabinet.

### *December 2012*

6. In December 2012, a document headed ‘Cressingham Gardens: the case for action’ was sent to residents. It said that CGE was popular but that 43% of tenanted properties were ‘non decent’. The Council had spent £1.84m on ‘responsive repairs’ in the past six years, but the overall condition of the properties was not improving. Simply refurbishing all the homes was not the answer. Tenants’ lives could be improved by offering them new homes. The Council could look at whether there were ways to manage CGE better. The Council would work with tenants and the tenants’ and residents’ association (‘TRA’) to ‘look at all possible options for improving [CGE]; and so long as they are high quality, affordable, sustainable and meet the needs of residents... then they will be considered.’
7. The Council had given information to the TRA about refurbishment costs. Basic refurbishment would cost £3.4m. There were three issues with those costs. The actual costs could be greater, basic refurbishment would lead to limited improvements to the inside of homes, and it did not include the cost of remedying structural problems. The Council explained what further works would be needed. The Council considered that the actual cost of bringing CGE up to the LHS would be significantly more than £3.4m. The Council then set out a timetable for engaging with the residents of part of CGE on those issues.

### *Social Life’s activities in 2013*

8. Between July and September 2013, Social Life, a firm engaged by the Council, led a ‘consultation and co-production process’. They interviewed residents. Their findings were published in October 2013.

### *The project delivery team*

9. According to the report for the Cabinet meeting on 9 March 2015, the next ‘significant period of engagement’ began in November 2014. However, before that, the Council established, in spring 2014, a ‘project delivery team’ for CGE. Its terms of reference included considering ‘regeneration options’ for CGE which met the aims of the Council and ‘Community wider objectives’, steering and managing regeneration options and co-producing the regeneration options with the residents. The project team members were to ‘scrutinise, question and investigate information’ and raise issues which had been highlighted by residents. Strategic Urban Futures (‘SUF’) were appointed by the Council to help the residents.
10. Email exchanges in late September and October 2014 between Ms Gniewosz, a leaseholder, and council officers show that she was asking for detailed financial information about the options, including full 30-year cash-flow models for each of the options to enable options to be played with, and 30-year forecasts of debt headroom and the Housing Revenue Account (‘HRA’) financial model. On 7 October 2014, the project team members, including Ms Gniewosz, were emailed a number of attachments for a meeting the following Friday. They included, I am told by Mr Holbrook, 30-year ‘rough’ NPV (that is, ‘net present value’) models for the options which were then being considered, including the refurbishment option. This was the only time any financial information was provided to the project team, Mr Wolfe submitted. Ms Gniewosz repeated her

earlier request when these documents were emailed to her.

11. On 15 October 2014 there was a meeting of the project team. Ms Gniewosz was present. Mr Vokes, for the Council, set out a 'programme of engagement which would enable residents to discuss the different options for the future of CGE'. Provisional dates for workshops were set out. Paragraph 3.1 of the minutes records that a sub-group would be set up to look at financial modelling. The first step would be to agree assumptions to be used in the model. Those included buy-back values for leaseholders, the value of new properties and information on the LHS costs. Paragraph 3.2 says, 'It was agreed that an NPV calculation would be used so that the options could be compared however the Council stressed that if [CGE] went back into the LHS programme then the Council would not use an NPV financing model as the estate would be treated in the same way as all other estates being refurbished so the works would be funded through the LHS financial model'.
12. On 16 October 2015 Mr Vokes of the Council emailed Ms Gniewosz among others to say that it had been agreed at the meeting the previous night to set up a sub-group of the project team which would develop an NPV model for each of the options. The purpose was to provide 'a comparable baseline'. The NPV models needed to be completed for the first workshop on 29 October 2014. In fact, though there were later emails on this topic, no further NPV models were ever produced.

#### *21 October 2014 letter to residents*

13. On 21 October 2014 Mr Vokes wrote to the residents. He said the Council understood residents' concerns and frustration. The purpose of 'this engagement' was to come up with a solution to those concerns about the poor condition of their homes and to look at opportunities for building new extra homes. The Council did not intend to sell CGE to a private developer. No decision on the future of CGE had been made. The Council had set out a new timetable of workshops so that as many people as possible could get involved. The workshops would start in early November and run until the end of January 2015. Social Life and others would be co-ordinating additional sessions to discuss some issues more fully. These would discuss green retrofitting, and alternative resident management options. 'At the end of this process you will be asked for your views on each of the affordable and feasible options for [CGE]' as part of the test of opinion. Mr Holbrook submitted that these words showed that the Council was preparing the ground to discount some options if they proved not to be affordable or feasible.
14. The letter set out a timetable for 5 workshops. The first would set up working groups. It was suggested that one of those would deal with financial modelling, one with green retrofitting and one with resident management options. Workshop 2 was to for tenants to discuss 'What does the refurbishment option mean for you? ....'. Workshop 3 was for leaseholders and freeholders to discuss similar options. Workshop 4 was for 'feedback' from workshops to residents, and workshop 5 was 'a final session setting out all the options in detail'.

#### *The finance sub-group 27 October 2014*

15. There was a meeting of the finance sub-group on 27 October 2014. It was agreed that the purpose was to 'produce a model which will assist residents in their decision making process in respect of any option presented'. The model would be a 30-year discounted cash flow ('DCF') version identifying a net present value. This is the only meeting of this sub-group which took place, although there were two later meetings of what Mr Holbrook referred to as the 'ad hoc' group, which I describe below. A undated note of that meeting was also prepared by Gary Chase, who, according to Ms Gniewosz, is an independent financial expert brought in by SUF. Mr Chase expressed his surprise that the NPV calculation was not being done by a financial expert, and his

views that he would have liked to see a draft NPV to discuss and review, and that information should be provided before the next meeting in excel format. He recorded that it was agreed that 'after the npv analysis' the Council would 'demonstrate the effect on their HRA and affordability issues for each option.'

*31 October 2014 email*

16. On 31 October 2014, Simon Slater of SUF emailed residents. He said that he had met Mr Vokes to find out how the consultation would work. He indicated that sub-groups would 'probably meet 2-3 times during the consultation process and their deliberations will feed back into the wider consultation process'.

*6 November 2014 letter*

17. On 6 November 2015 Mr Vokes wrote again to the residents. On the reverse of the letter was a timetable of workshops. It was the same as the timetable attached to the 21 October letter, except that it added that there would be a test of opinion in February 2015; and once that had happened, a report would be presented to the Cabinet with the results of the test of opinion so that a decision could be made.
18. Mr Vokes attached background information for the workshops which were going to take place during November, December and January. The pack provided 'the Council's view on what the issues and challenges are and what the headline options for [CGE] are'. The Council was committed to a huge capital investment of £490m. There was an urgent need for new homes. For every family in a Lambeth Council home, there was somebody on the waiting list. 27,000 families were living in overcrowded accommodation. The population was growing, increasing pressure on housing. The Council believed new homes at council rent levels could be built at CGE and existing homes could be improved.
19. A survey by Tall of a sample of homes had shown problems. The Council was concerned that the amount of money needed to repair CGE was more than it had available. To bring the homes up to LHS would cost £14m. The average cost of doing LHS works in CGE was higher than the average for other estates (£45,000 per tenanted home as opposed to £16,000). Those costs would be reviewed as part of the process to get a more accurate picture. 'That sum of money is not possible either for Lambeth tenants or the Council'. Most of the money spent on housing came from tenants' rents. If more is spent on one estate than on others, that has to come from all tenants' rents. The amount the Council could borrow was capped. But those challenges did not lessen, in any way, the Council's commitment to providing better quality homes for all tenants.
20. Under the heading 'Developing options for the estate' the document said that options had first been worked up over the summer. The Council explained how the regeneration of an estate could be funded. Under the heading 'What are the options?' the Council listed the options which had been looked at. 'Ultimately' the Council could only consider options which were affordable. So that the Council could compare options and see what could be afforded, the Council had looked at the income and expenditure for each option over a 30-year period. All the options had used a cross subsidy approach by which money raised through private sales would be reinvested in CGE to provide new homes at council rent levels. Option 1 was that all the homes would be refurbished. Options 2 and 3 provided for refurbishment with increasing levels of demolition and new building. Option 4 was described as 'medium intervention development' and option 5 as 'comprehensive redevelopment'.

21. Under option 1, the Council said that refurbishment would cost £12-15m, but other necessary repairs would increase that cost. The works would have a substantial impact on residents. It would mean that further substantial works would be needed in the future for which no funding was currently available. This option provided no new homes. 'In order for this option to be considered the Council would need to look at ways of reducing the refurbishment figure and/or finding alternative funding sources (in addition to LHS monies) to deliver the works'.
22. Option 2 involved the demolition of 19 homes and the building of 38 new ones. The aim was to generate a small surplus which could be used to subsidise the refurbishment costs of existing properties. Under option 3, 31 homes would be demolished; three owned, 22 tenanted and six which were empty. 22 new council homes would be provided for the displaced tenants, 12 new council homes and 19 homes for sale. This model assumed that the home owners would be bought out, and that would generate a small surplus to help pay for the refurbishment of the other properties. Option 4 was deliverable with a small deficit. Option 5 was unlikely to be supported by local people and the financial analysis showed a significant deficit. This option was 'clearly unaffordable'.
23. Under 'Decision making and next steps' the document said that a series of workshops would enable these options to be discussed. Sub-groups would meet to consider such issues as finances. At the end of the process, '...you will be asked for your view on each of the affordable and deliverable options as part of the test of opinion'. The options would be presented to the Cabinet member for Housing 'along with the comments received' so a decision could be made on the preferred option. A further consultation would be carried out after the decision of the Cabinet member.

#### *Emails in November 2014*

24. On 11 November 2014, Social Life emailed the residents. The email said that four more workshops were planned. Working groups had been set up and would 'feed back their work to the larger workshops'. These included groups on resident management options, green retrofitting and NPV modelling. The last had already started and was looking at 'the detail of how the assessment of financial viability is made'.
25. Mr Vokes sent an email on 13 November 2015 to Ms Gniewosz, saying that the NPV group was still led by Alistair Russell. He was an employee of Ian Sayer & Co, a firm of surveyors. Mr Vokes said he had forwarded various requests for information and as soon as he had that information he would set up a further NPV sub-group meeting to 'agree the assumptions and progress the modelling'. This was a response to an inquiry from Ms Gniewosz on 12 November. She said she was worried that nothing was happening as there had been no attempt to provide the group with 'any of the promised data' and no follow-up meeting had been arranged.
26. Also on 13 November 2014, Ms Gniewosz emailed Mr Vokes. She asked whether he would be reconvening the NPV team before 22 November 2015. He replied that once he had received updated information from LL [that is, Lambeth Living, the Council's Arms Length Management Organisation] he was going to ask Alistair [Russell] to reconvene the NPV financial modelling group so the updated information could be discussed and included in the models.

#### *Events in December 2014*

27. On 1 December 2014, the project team met. The minutes record that various sub-groups had been set up, including a 'Finance and NPV' group.
28. On 12 December 2015, Social Life emailed the residents about a meeting on 19 January 2015. The same day, Ms Gniewosz said in an email that she was concerned that there had not been a second

meeting of the finance sub-group. She asked when she could expect 'even an excel model'. This email was forwarded to Mr Vokes. On 19 December Simon Slater asked Alistair Russell when the next meeting of the finance sub-group would be. His reply was that that it would be early in the New Year. He was waiting for answers from the Council to questions asked by Ms Gniewosz. He would then complete the model, and issue it in advance.

29. In December 2014, a further report set out the Council's commitment to 1000 homes at council rent levels. It recommended that an important route to this should be the regeneration of estates. The role of the Council was to fill gaps which the market could not. It was important to recognise the high level of housing need in the borough. There had been high levels of economic polarisation and of population growth in Lambeth. The future needs of residents would not be served by market forces alone. Lambeth's estates were its biggest asset and if the Council was to tackle the housing crisis it needed to use that land 'efficiently and effectively to deliver benefit to as many people as possible'.
30. CGE had been included in phase 1 of the LERP; but discussions with the residents had been going on since 2013. CGE was chosen because it would be expensive to refurbish and the low density of the estate meant that there was scope to increase the number of homes. A project team including representatives of residents had been set up and a design team, cost consultant and engagement team had been engaged in order to explore options for the future of the estate.

#### *Events in January 2015*

31. On 12 January 2015, there was a further meeting of the project team. The minutes record that Ms Gniewosz raised a concern about finance issues, and introduced Simon Morrow (a quantity surveyor she had instructed). He had surveyed 22 properties on the CGE but would not say which ones. Those present agreed to have a special meeting on 26 January to discuss the figures produced by him, by LL and by Ian Sayers. LL were to provide a breakdown of their figures.
32. On 14 January 2015, Ms Gniewosz emailed Mr Vokes, among others. She asked when the next finance meeting was going to be. She was 'constantly asking', but getting no answer. She said to Mr Vokes that he had mentioned that there was a new set of numbers and asked him to send them before the next meeting. He said in his reply that the Council had asked LL to meet the residents' quantity surveyor (Ian Morrow) to discuss costs. Once this had happened, 'We will update the appraisals and reconvene the financial sub-group'. The notes of the 19 January working group feedback session record that the residents' representatives on the finance working group were meeting with the Council on 26 January 'to go through the refurbishment costs with Quantity Surveyors. Aim is to agree a realistic figure that will go into each of the 5 options'.
33. On Monday 26 January 2015, Ms Gniewosz emailed Social Life about the last workshop (planned for 31 January 2015). Among other things, she said that she had still not seen a 'full financial model – ever'. She was sick of asking for the basics and not getting them. She asked what the point of a project team was if they were not being shown information in draft. It was a sham consultation. There was no way LL's costs would be ready by Saturday.
34. Mr Vokes emailed Ms Gniewosz on 26 January. He said that they were waiting for the outcome of that evening's meeting, at which costs would be discussed, so that Alistair could update the appraisals and circulate them to the finance sub-group. Ms Gniewosz asked why the financial models could not be sent out. It was 'absolutely unprofessional' that no figures had been sent out since October; and the model had never been sent. It was 'totally a sham'. She asked when the finance sub-group meeting would be; it was not advisable to send out figures to residents which had not been discussed. Mr Vokes replied that the Council would not issue financial information on

Saturday which had not been discussed. It would issue such information on the refurbishment costs 'subject to tonight's meeting'.

35. There was a meeting of the 'ad hoc group' on 26 January 2015. Ms Gniewosz says that at that meeting LL were unable to justify their figures.
36. On 28 January Mr Vokes emailed Mr Slater and others. Mr Slater had asked, in the wake of the meeting on 26 January, what information would be available on Saturday about refurbishment costs. 'Saturday' was 31 January, when the final workshop was due to happen. Mr Vokes replied that the tenant offers would be ready on Saturday; and was hoping that the freehold questions would be answered by then. He suggested that details be provided on the agreed refurbishments, but that they should say that there were areas which were not agreed and needed to be looked at in more detail. The Council had recommended to LL that they commission a quantity surveyor to review the information and produce a 'properly costed report based on evidence and sensible assumptions'.
37. The meeting which had been due to take place on 31 January 2015 was cancelled by the Council. The flyer announcing this said that this was because it had not been possible fully to involve the project team in planning that session. The Council would meet the project team on 2 February 2015 to discuss the next steps.

#### *The meeting of 2 February 2015*

38. The minutes of that meeting record that LL had gone through the comparative figures and a further meeting would be arranged to run through LL's findings with residents. That meeting 'subsequently' took place on 16 February (from which I infer that the minutes of the meeting of 2 February were compiled after 16 February 2015).

#### *Email exchanges on 13 February 2015*

39. On 13 February 2015 the project team were emailed documents for discussion at a project team meeting on 2 March 2015. These included a project time line. This showed a refurbishment costings review continuing for another three weeks '(?)', and the preparation of a design options information pack also continuing for some weeks. The Cabinet was to make a decision in May 2015. Mr Slater replied to this email. He thought the timeline needed to reflect the completion of workstreams and feedback to the project board to assess outcomes. He said that after discussion and hopefully agreement of refurbishment costs, the financial viability sub-group needed to meet in order to assess the impact of those figures on financial viability. Ms Gniewosz added in a further email that no time had been allowed for that meeting. The sub-group had only met once, in October, and needed to meet again before the information pack was drawn up.

#### *The 13 February 2015 document*

40. Also on 13 February 2015, Julie Curtis created a document. She was then the senior accountant managing the Council's HRA. She was also a member of the project group, or at least, attended their meetings, and was copied into many, if not all, of the emails from Ms Gniewosz asking for financial information. At some point in February it seems that she emailed this document to Mr Vokes, although the Council has not disclosed that email. This document was addressed to the CGE 'project group'.
41. This document was annexed to Mr Vokes's third witness statement. It was not produced until the second morning of the hearing. That was a surprising development. It might be thought that this document had been asked for by Ms Gniewosz in requests made under the Freedom of Information



Act 2000 ('FOIA'), before this litigation began, and by the Claimant's solicitors in the letter before claim. It is an important document, because it is said to be what led the Council to withdraw three options from the consultation arrangements. So irrespective of any requests by the Claimant or by anyone else, the Council should have disclosed it in this litigation sooner than it did, pursuant to its duty of candour. Mr Vokes explained that he has been very busy on various projects since about November 2014. He receives 200 emails a day and had overlooked it.

42. Ms Gniewosz made two FOIA requests. In response to the first, she received, in December 2014, the 30-year HRA business plan in the form of a multiple sheet excel spreadsheet. Ms Gniewosz says, in her second witness statement, that she later asked for the information supporting the conclusions of the Cabinet (on 9 March 2015) that options 1-3 were not affordable. The author of the Council's initial response to her second FOIA request stated that he/she had 'been advised by colleagues that the 9 March Cabinet paper includes both within the body of the report and in the accompanying appendices the documentation, evidence and analysis to support the conclusion that options 1-3 were not affordable'. Ms Gniewosz asked for a review, and on 10 August 2015 was sent 'HRA Model Dashboard 20142015.xlsx'. That file extension suggests this is a plan with a base year of 2014-15. In her first witness statement, Ms Gniewosz says that the sheet tab entitled 'O-Dash' seems to be very similar to a document disclosed by the Council in its response to the letter before claim; all the numbers are the same, but the heading is different, and comments have been removed. In her second witness statement she says that this document is also very similar to the document which was provided in December 2014. The plan does not identify individual estates, she adds. That evidence has not been contradicted by the Council. Her analysis of this document is that, given the Council's assumption that the refurbishment works would be incurred over a 6-year period, they could be afforded.
43. Ms Curtis said in the 13 February 2015 document that option 1 would rely solely on funding from 'within the HRA as there would be no additional income streams or funding available'. The other options included some external funding that 'make them more financially viable and do not place additional pressures on the HRA, along with delivering New Homes'. She gave a cost for refurbishment of £9.9 m which is somewhat different from the LL figure. She said that it would need to be met 'from within the HRA as there is currently no provision for this scheme of works within the Council's LHS programme'. The 'current version' of the HRA business plan with 2015/16 as the base year, she said, indicated that 'there is minimal or no scope for any additional funding of Capital or revenue works over the current LHS programme and the ongoing investment required in stock post LHS. The HRA business plan assumes contributions from Leaseholders to the financing of the Capital spend requirements. This profile has risks attached to it...'. Despite leaseholder contributions and the recent Decent Homes Backlog funding for 2015/16, there was still a funding gap for years 4 to 5 of the business plan. The Council was committed to the LHS programme and investment in housing stock as described in the 'Building Cost Model'. Her conclusion was that option 1 was not 'financially viable or supportable by the Council and should be disregarded going forwards'.

*Mr Vokes's evidence about the Council's financial analysis*

44. In his first witness statement, Mr Vokes said that from November 2014 to March 2015, the Council had done a 'detailed analysis' of its HRA business plan 'to see whether or how additional funding could be secured for refurbishment works on the estate. But it was not possible. All income and expenditure for the estate is part of the HRA because the estate is council property. This means that there are strict budgeting controls because the Council cannot by law run a deficit on the HRA, which is a ring-fenced account in the Council's overall accounting systems'. It may be that 'additional' means 'in addition to the £3.4m referred to in paragraph 4.c) of Mr Vokes's first witness

statement’.

45. He also said in his first witness statement that refurbishment money must come from reserves in the HRA, borrowing via the HRA or from grants from central Government (the Decent Homes Programme). There were no reserves in the HRA. Borrowing via the HRA was capped, and the Council had reached its cap. ‘The Central Government grant secured by [the Council] is being used to deliver refurbishment works to council properties throughout the borough.’ He added that it would theoretically have been possible to spend more on CGE by spending less on other estates, but that this would have been ‘grossly unfair to the Council’s other leaseholders and tenants’, because the average unit cost of refurbishment is so much higher for CGE than for other estates.
46. What Mr Vokes said about this in his second witness statement was that at about the time of the ‘second ad hoc meeting’ of 16 February 2015, he received ‘the updated HRA business plan which confirmed that no more than £3.4m would be available for the estate from the HRA’. This, he says, was the information which prompted the letter of 26 February 2015 (to which I will come). I observe that the document dated 13 February does not seem to be the updated HRA business plan (although it may refer to it) and it does not seem to show that any money at all let alone ‘no more than 3.4m’ is available for the estate from the HRA.

#### *Further events in February 2015*

47. On 16 February 2015 there was a further meeting of the ‘ad hoc group’.
48. On 18 February 2015, Mr Vokes replied to a complaint Ms Gniewosz had made in November 2014. She responded on 22 February 2015. She said, among other things, that she had consistently asked for NPV calculations as per the HM Treasury Green Book.

#### *Councillor Bennett’s letter of 26 February 2015*

49. On 26 February 2015 Councillor Bennett, the Council’s Cabinet member for Housing, wrote to residents to ‘update’ them on ‘the consultation on the future of [CGE]’. He said that CGE had been identified as a possible estate for regeneration in 2012 because of the unaffordable cost of bringing homes up to the LHS and because there was a pressing need for more homes for rent across the borough. The Council needed to find places to build those homes. In December 2014, the Council had decided to provide a ‘sizeable proportion’ of those homes on six estates, including CGE. Various ‘illustrative’ options had been considered. ‘The intention has always been to work toward a viable solution for the estate and to consult with you as part of the decision making process’.
50. The Council had now done the necessary financial analysis on the refurbishment options (1-3). ‘We have worked with residents on the costings, and even using a best-case scenario the lowest cost for refurbishment of the whole estate is still *three times what the council can afford* and it would not be right to continue to consult with residents about *an* option which is simply unaffordable and cannot happen’. A paper would be presented to the Cabinet in March 2015 which would recommend that ‘those options which neither significantly reduce the costs to refurbish the estate to an affordable level nor deliver the number of new homes that the Council would expect to see, will not be consulted on further’ [my emphasis].

#### *Emails on 27 February 2015*

51. On 27 February Mr Miah of the Council circulated further documents for the project team meetings which were scheduled for the evening of 2 March 2015 (he had already sent some by email on 13 February 2015). Simon Slater emailed him the same day to ask for the draft cabinet report to be

circulated. Councillor Bennett's letter referred to financial viability, but there were no figures in the letter and 'no updated financial or unit options 4 and 5 since October'.

### *2 March 2015 meeting*

52. There was a meeting of the project team on 2 March. By that stage, the cabinet report for the meeting on 9 March had been published. The minutes record Ms Gniewosz expressing dissatisfaction that no NPV assessment had been done, and her belief that if it had been done it would have shown that refurbishment was the only viable option. A council representative explained that this was 'cost-prohibitive within the existing HRA business plan'.

### *3 March 2015 email*

53. Mr Miah emailed the project team on 3 March 2015 with the programme for the next three months of the project. A paper would be presented to the Cabinet on 9 March which 'conclude[d] that Options 1, 2 and 3 are not affordable to be progressed'. Councillor Bennett would explain the Council's thinking on 14 March. The Council would carry out a test of opinion during April, and in May the Cabinet would consider a detailed paper setting out recommendations for the future of CGE.

### *The report for the Cabinet meeting of 9 March 2015*

54. The Cabinet considered a report which was available on the Council's website from 27 February 2015. The report said that the Council was committed to providing 1000 extra homes over the next four years at council rent levels using external capital and long-term investment models. The purpose of the report was to provide an up-date on the CGE regeneration project. A further paper with a recommendation on the preferred option would be put before the Cabinet in May 2015.
55. Under the heading 'Finance summary' the report said that the cost estimate to bring CGE up to the LHS was £9.4m. The original 2012 LHS business plan had a provision of £3.4 for those works. There was no current provision in the LHS business plan and expenditure would need to be re-allocated from other HRA investment programme schemes. The latest version of the HRA business plan (with 2015-16 as the base year) showed that there was 'minimal or no scope for additional funding of capital or revenue works over the current LHS programme and the ongoing investment required in the stock post LHS'. The report made recommendations which are reflected in the resolution I described in paragraph 1, above.
56. The report set out the history. It recounted that the 'options analysis' had 'looked at 5 different scenarios' which were summarised in the report. Of option 1 the report said 'This option would not deliver any new homes at Council rent levels and there is insufficient headroom within the HRA to fund the levels of work required on the estate'.
57. The other options were also described. Each option was assessed against a set of criteria. Paragraph 2.5 of the report said that 'the intention has always been to narrow down the options before going back to the residents as part of the decision making process'. Paragraph 2.9 said that a three-month programme of engagement had 'recently been completed. The Council agreed with the residents to continue exploring refurbishment as an option within that process however it has been clear that full refurbishment of the estate or a significant proportion of the estate is currently unaffordable within the constraints of the [HRA].
58. The Council also does not consider any pure refurbishment option to be in accordance with the Council policy to ...deliver[ ] more homes at Council rent levels. [CGE] has been included in the

estates regeneration programme, as set out in the Cabinet Paper of December 2014, because there is an opportunity to deliver new homes. Therefore those options which neither significantly reduce the costs to refurbish the estate to an affordable level nor deliver the quantum of new homes that the Council would expect to see will not be consulted on further'. This would enable the Council and residents to focus on options which significantly reduced costs and delivered new homes. That recommendation had been made in letter from [Councillor Bennett] to residents.

59. More information about finance was given in section 3 of the report. The 'upfront capital budget' for LHS had been derived from the 30-year borrowing plan in the HRA. A funding shortfall of £56m had been identified. HRA borrowing was capped and the current forecast showed no borrowing headroom until 2020-21 at the earliest. The actual costs of refurbishment would be considerably higher than the October 2012 estimate of £3.4m in the LHS business plan. The updated cost estimate was £9.4m (excluding the cost of replacing windows).
60. That would need to be met from the HRA, as there was no provision for it in the LHS programme. The LHS cost for CGE was more than £30,000 per unit compared with an average of £11,500-£19,900. The latest version of the HRA business plan (base year 2015-16) showed that there was minimal or no scope for any additional funding of capital or revenue works over the current LHS programme and the continuing spending on stock post LHS. The HRA business plan assumed contributions from leaseholders and this was a risky assumption. Despite those contributions and recent decent homes backlog funding, there was still a funding gap over years 4-5 of the business plan. The estimate by the residents' quantity surveyor was about £7m, but that excluded costs which were necessary.
61. The Council needed to look at other options for CGE. The options which include an element of new build would be able to attract other funding (three examples were given). Those would help to reduce the cost to the Council.
62. The report referred to section 105 of the Housing Act 1985, and to the recent decision of the Supreme Court in *Moseley*. The Council was required before making any decision to consider representations made to it in accordance with those arrangements. Procedural fairness sometimes requires an authority to explain why alternative proposals have been rejected when consulting residents.
63. The report then said that Social Life had led the consultation and co-production process. It referred to interviews with residents in 2013. The report said that the next significant period of engagement began in November 2014. 'In recognition that the uncertainty over the future of the estate was a serious concern to residents, the Council agreed a 3 month engagement plan at the end of which a decision on the estate could be taken'. Six workshops were run in total plus a feedback session from the six working groups that had been set up to explore particular issues in depth.' The workshops were then described. The working groups were listed, but the finance group was not mentioned. The table did not mention that, as per the notes of the 19 January 2015 feedback session, the work of the finance sub-group had not been completed. Nor did it say that the engagement programme, as originally planned, had not been completed.
64. The views which tenants had expressed to Social Life on 'different indicative options' at workshops on 22 November and 10 December 2014, homeowners at a workshop on 22 November 2014, and residents at a workshop on 7 November 2014 were tabulated. The report audit trail shows that the original discussion with a cabinet member had been on 11 February 2015, and that Finance had been involved in the report since 13 February 2015. The report deadline was 20 February 2015 and it was finally sent on 27 February 2015.

*The legal framework*

65. Section 105 of the Housing Act 1985 is headed 'Consultation on matters of housing management'. It provides, as far as is relevant:

**“(1) A landlord authority shall maintain such arrangements as it considers appropriate to enable those of its secure tenants who are likely to be substantially affected by a matter of housing management to which this section applies—**

**(a) to be informed of the authority’s proposals in respect of the matter, and**

**(b) to make their views known to the authority within a specified period;**

**and the authority shall, before making any decision on the matter, consider any representations made to it in accordance with those arrangements.**

**(2) For the purposes of this section, a matter is one of housing management if, in the opinion of the landlord authority, it relates to—**

**(a) the management, maintenance, improvement or demolition of dwelling-houses let by the authority under secure tenancies, or**

**(b) the provision of services or amenities in connection with such dwelling-houses;**

**but not so far as it relates to the rent payable under a secure tenancy or to charges for services or facilities provided by the authority.**

**(3) This section applies to matters of housing management which, in the opinion of the landlord authority, represent—**

**(a) a new programme of maintenance, improvement or demolition, or**

**(b) a change in the practice or policy of the authority,**

**and are likely substantially to affect either its secure tenants as a whole or a group of them who form a distinct social group or occupy dwelling-houses which constitute a distinct class (whether by reference to the kind of dwelling-house, or the housing estate or other larger area in which they are situated).**

...

**(5) A landlord authority shall publish details of the arrangements which it makes under this section, and a copy of the documents published under this subsection shall—**

**(a) be made available at the authority’s principal office for inspection at all reasonable hours, without charge, by members of the public, and**

**(b) be given, on payment of a reasonable fee, to any member of the**

**public who asks for one. “**

66. This provision requires a relevant authority to maintain such arrangements as it considers appropriate to enable secure tenants who are likely substantially to be affected by a matter of housing management to which section 105 applies to be informed of the authority's proposals about it and to make their views known to an authority within a specified period.
67. The obligation to make arrangements appears to be a general one, but the drafting contemplates relatively detailed arrangements: the arrangements must enable tenants to make their views known 'within a specified period'; and the authority must publish 'details' of the arrangements which it does make. Section 105 imposes obligations to make arrangements which enable tenants to be informed about an authority's proposals and to make their views (on such proposals) known to the authority. An important specific obligation section 105 imposes is to consider any representations made to it 'in accordance with those arrangements before making any decision on the matter'.
68. A matter is a matter of housing management if 'in the opinion of the authority' it relates to, for example, maintenance improvement or demolition of dwelling houses let by the authority. The section applies to matters of housing management which 'in the opinion of the authority' represent a new programme of maintenance etc, or a change in the policy or practice of the authority'. There is no dispute that the future of CGE was 'a matter of housing management' and one to which section 105 applied, as the cabinet report recognised. Nor is there any suggestion that the arrangements in this case were not appropriate.
69. The drafting of section 105 makes it clear that in three respects, Parliament intended that the authority, and not the court, should be the primary decision maker. Those are the questions whether the arrangements are appropriate, whether a matter is a matter of housing management and whether a matter of housing management is a matter to which section 105 applies.
70. The Council submits that there is no legal basis for supplementing the statutory duty with a common law concept of fairness. Mr Holbrook summarises the duty as a tripartite duty: 'inform; respond and consider'. He relies on *R v Brent London Borough Council ex p Morris* (1997) 30 HLR 324 as authority for the proposition that the duty imposed by section 105 is not very onerous.
71. But the points made in the passages on which he relies relate to specific challenges made by the applicant in that case to the arrangements which the local housing authority in that case had made in order to comply with section 105. The Court of Appeal decided no more than that the arrangements made by the local housing authority in that case did comply with section 105, despite the attacks made on them by the applicant. In that case the local housing authority set up area housing boards and carried out consultation under section 105 through those boards. Meetings of the boards were held at least quarterly and were open to the public. Notices advertising them were published, as were copies of the agenda.
72. The first question is what arrangements the local housing authority has made in order to comply with the duty imposed by section 105. Once the local housing authority has made such arrangements, there are two further potential questions. One potential question, answered in *Morris*, in relation to the arrangements made by the local housing authority in that case, was whether those arrangements were appropriate, and, in that sense, complied with section 105. As the court stressed in *Morris*, it is for the local housing authority, not the court, to decide what arrangements are appropriate. It is only if the local housing authority's view is *Wednesbury* unreasonable that the court can intervene on that issue.

73. The second question which may arise, the local housing authority having made such arrangements, is whether it has complied with the obligations imposed by section 105 against the background of those arrangements. This may raise, and in this case does starkly raise, the question whether, a local housing authority having made and published arrangements in accordance with section 105, it may then lawfully depart from those arrangements, and, if so, in what circumstances. That, in my judgment, is one of the questions raised by this case, rather than the first potential question to which I have just referred.
74. A second question raised by this case is the relationship between a statutory obligation to consult and the decisions on consultation generally. That is a question which was considered by the Supreme Court in *R (Moseley) v Haringey London Borough Council* [2014] UKSC 56; [2014] 1 WLR 3947. Both sides referred to this decision. Mr Wolfe submitted, in effect, that the test whether or not a consultation is lawful is the test in *R v North and East Devon Health Authority ex p Coughlan* [2001] QB 213: see paragraph 25 of Lord Wilson's judgment, with which Lord Kerr concurred.
75. That test, in short, is that whether or not there is a statutory obligation to consult, consultation must take place when proposals are still at a formative stage; it must include sufficient reasons for the proposals to enable consultees to consider them, and respond to them intelligently; enough time must be given for that; and the consultation responses must be taken conscientiously into account when the decision is taken. Lord Reed pointed out that statutory obligations to consult vary widely in content (at paragraph 36). The obligation to consult in that case was imposed, he said, not to ensure procedural fairness, but to 'ensure public participation in the local authority's decision making process' (at paragraph 38). However, he went on to say, in order for consultation to achieve that objective, it must fulfil basic minimum requirements. He referred, in that context, to one aspect of the *Coughlan* test.
76. The two remaining members of the Supreme Court expressed their agreement with both speeches.
77. Section 105 does not refer to 'consultation'. But it is, in substance, an obligation to consult. Its components reflect the elements of lawful consultation described in *Coughlan*. I doubt therefore whether there is any difference between the obligations imposed by section 105 and those set out in *Coughlan*. Lord Reed's speech sheds light on the purpose of section 105. It is, in part, to ensure the participation of tenants in decisions which will substantially affect their homes.

### *Discussion*

78. I have to decide four questions.
- a. Was the Council's decision on 9 March 2015 to stop consulting on options 1, 2 and 3 unlawful?
  - b. If so, does it appear to me to be highly likely that the outcome for the claimant would not have been substantially different if the conduct complained of had not occurred ('the section 31(2A) question')?
  - c. If so, are there nonetheless reasons of exceptional public interest for granting relief to the Claimant ('the section 31(2B) question')?
  - d. If so, was there undue delay in making the application for judicial review and do I consider that the granting of the relief sought would cause substantial hardship to, or substantially prejudice the rights of any person or be detrimental to good administration

(‘the section 31(6) question’)?

*(1) Was the decision of 9 March unlawful?*

79. I have set out the facts in detail. Having done that, I can give the reasons for my decision relatively shortly. The section 105 arrangements in this case consisted of the detailed and sophisticated programme of consultation which was announced in the letters of 21 October and 6 November 2014. The decision of 9 March 2015 had two relevant effects. It was a decision to renege on those arrangements, and it meant that the Council was unable, before making a decision on the regeneration of the estate, to consider the representations which would have been generated had the arrangements been followed.
80. Mr Holbrook stressed in his submissions how politically sensitive the decision in this case was, and how difficult it was, because it involved balancing the interests of different groups (tenants, homeowners and leaseholders on the estate; and other tenants, whose rents could be adversely affected by a decision to spend more on CGE). I accept that submission. Those factors, I infer, led the Council initially to decide on the elaborate arrangements for tenant involvement which it chose in this case. I infer that the Council took the sensible view that it was only by closely involving the tenants, and getting them to understand exactly what the difficulties with the various options might be, that it could have any chance of gaining their assent to the contentious decision about the future of CGE which it would ultimately have to make.
81. I also accept Mr Holbrook’s submission that the Council was careful to prepare the ground for a decision to reject option 1, by saying, more than once, that any option had to be affordable. But that is not necessarily an answer to the challenge in this case. Mr Holbrook rightly accepted that the Council could have made it clearer than it did that it was permitting itself to halt the consultation if it decided in the course of the consultation that an option was unaffordable. In my judgment, the Council did not make that clear at all. Further, as Mr Wolfe rightly accepted, the Council could lawfully have rejected options 1-3 at the end of the announced process of consultation. The question is whether it was lawful for the Council to reject options 1-3 without completing the process which it had advertised to tenants, and, thus, in breach of the section 105 arrangements it had chosen to make.
82. This is not an easy question. Mr Holbrook’s most powerful submission, which is reflected in the language of some of the documents to which I have referred, was that the Council could not be required to continue with the advertised consultation when it knew that an option or options were not affordable. As soon as it realised that, it was entitled, if not obliged, to call off the consultation. He said that, ‘It is the nature of consultation that as unknowns become knowns, things change, Lambeth has to respond’. He also submitted that the Council had to learn from what happened, and to adjust to problems it saw with the consultation. However, in part, at least, that last submission was based on a different part of Mr Holbrook’s case, which was, in a nutshell, that the consultation had become unmanageable, and the Council had to make clear that it, rather than the tenants, was the ultimate decision maker: ‘There comes a point where it ceases to be consultation and becomes tenant-led decision making’.
83. There are at least two questions here. One is whether, as a matter of law, the Council could lawfully renege on the section 105 arrangements if it discovered a sufficiently significant change of circumstances. A second is whether, as a matter of fact, there was such a change. In that context, I have reflected on the first submission I described in the previous paragraph.
84. I asked Mr Holbrook during the hearing what changed between October 2014 and 26 February



2015. He accepted, I think, that even with what was known in October 2014, option 1 was ‘a big ask’. Yet the Council decided to consult on it, along with the other options; in the early stages, indeed, option 5 (which Mr Holbrook told me the Council has in the end chosen) looked an even less likely choice. There was a lack of clarity, on the Council’s case, about whether, even in 2012, there was as much as £3.4m available to be spent on CGE. There was also a lack of clarity, on the Council’s case, both on the documents, and in Mr Holbrook’s submissions, about what other sources of money there might be to help pay for the refurbishment of CGE. Tenants were encouraged to think in the course of the consultation that ‘green retrofitting’ might help (there was a sub-group working on this) and that tenant management options might also work (there was also a sub-group about that).

85. The impression I have formed from the documents as a whole is that the Council considered from the outset that it was very unlikely to be able to afford to refurbish CGE, but that it considered that it was important to explore thoroughly with the tenants whether that was so, and if so, why. That is precisely why the finance sub-group was set up, with the promise that NPV models for all options would be considered.
86. I have made allowances for the heavy responsibilities which Mr Vokes was carrying at the relevant time. I also bear in mind that Mr Vokes has not been cross-examined. Yet I am uneasy about Ms Curtis’s document and its relationship with the consultation and the decision-making processes. I mention three points here. The date of the document is inconsistent with the period of financial analysis referred to in Mr Vokes’s first witness statement. The document does not say that options 2 and 3 are unaffordable; indeed, to the extent that it adverts to them, it suggests the reverse. To that extent, the decision of the Cabinet to stop consulting on options 2 and 3 seems inconsistent with the document. The document does not say that ‘no more than £3.4m’ would be available for CGE from the HRA; but that is what Mr Vokes says in his second witness statement.
87. I do not need to decide whether, as a matter of law, the Council could have stopped the consultation if there had been a sufficiently important change of circumstances. I assume, without deciding, that it could have done so. I am not satisfied, on the evidence, however, that enough changed in February 2015 to entitle the Council to stop consulting on options 1, 2 and 3, contrary to the terms of the section 105 arrangements it had published. My conclusion is that by deciding to remove options 1, 2 and 3 from the consultation on 9 March 2015, the Council acted unlawfully.

*(2) The section 31(2A) question*

88. The effect of section 31(2A) is to deprive a claimant of relief to which he or she might otherwise be entitled. Section 31(2A) does not expressly impose a burden of proof on a defendant, but it seems to me, in accordance with general principle, that he who asserts must prove. In other words, if the Council asserts that section 31(2A) applies, it must satisfy me that that does.
89. Mr Holbrook submitted that the question was whether on any reconsideration the Council would make the same decision. He submitted, partly by reference to the current position, that it would do (see the material in paragraphs 30-34 of Mr Vokes’s first witness statement). For example, after Holman J granted permission, but before the Council found out about that, the Council made a further decision, on 13 July 2015, to re develop the whole estate. Mr Wolfe submitted that that was the wrong question. The question was, instead, whether, if the Council had not acted unlawfully, in the way that it did (ie, if conduct complained of had not occurred), the Council would, on 9 March 2015, nonetheless have made the decision which it did.
90. The application of section 31(2A) to this case is not straightforward. What section 31(2A) seems to

be asking, albeit not clearly, is whether, if the defendant's unlawful conduct is taken out of the equation, that would make any difference to the outcome for the claimant. If the section 105 arrangements had not been breached, the financial position would have been much more fully before the Council. In simple terms, it does not appear to me, if that had been the position, that it is highly likely that the decision would have been the same. I do not consider that the test in section 31(2A) is met. I am therefore not required by section 31(2A)(a) to refuse relief.

(3) *The section 31(2B) question*

91. In case I am wrong about that, I should indicate whether I would have considered that it was appropriate to grant relief for reasons of exceptional public interest. The factors are finely balanced. Mr Holbrook urged on me many powerful points. He referred to the Council's very difficult financial position, the balance to be struck between the interests of residents of CGE, and of the Council's other tenants, and of those on the waiting list, the urgent need for works to be done to CGE, and the need for residents to be certain about the future of CGE. I acknowledge the cumulative force of all those points. On the other side is the need to hold a public body to its promises about how it is to involve tenants in a very important decision about the future of their homes. On balance, I consider that the general public interest factors on which Mr Holbrook relied outweigh the need to hold the Council to its promises to the tenants of CGE. So if I had needed to make a decision on this question, I would have decided that it was not appropriate to grant relief on public interest grounds.

(4) *Delay*

92. This claim was lodged on the last day of the three-month period provided for by CPR 54.5(i)(a). The claimant said nothing about this timing in her grounds of claim. In its summary grounds, the Council argued that this was not prompt enough, in a context where the Council would be making a further decision within the next two weeks, and council staff had been spending considerable time and effort on working up options 4 and 5. Delay in the project would be unfortunate given the desperate shortage of housing in the borough. The Claimant replied to the summary grounds and explained that part of the delay was caused by the Council's tergiversations in the pre-claim correspondence. The Claimant applied for legal aid on 21 April 2015, and it was not granted until 10 June 2015. When Holman J granted permission to apply for judicial review he did not refer to any lack of promptness.
93. In its detailed grounds the Council pointed out that the Claimant had not explained the delay of more than six weeks between the date of the decision and the application for legal aid. The grant of relief would cause substantial hardship to the Council and to the residents of the estate, and would be likely to be detrimental to good administration. This in turn elicited a further witness statement dated 22 September 2015 from the Claimant, who explained that she had consulted solicitors at the beginning of March. They agreed to investigate. There were many documents to consider. The lawyers then asked for more information. The investigation took about four weeks. She was advised that it was better to apply for legal aid once the investigation was finished. The lawyers arranged a meeting on 17 April at which they gave a positive view, and an emergency application for legal aid was made on 21 April 2015.
94. Mr Wolfe relied on *R (Lichfield) Securities v Lichfield District Council* [2001] EWCA Civ 304; [2001] PLR 33. He submitted that there was a distinction between promptness and delay. The former had been decided by Holman J and I could not revisit it. I do not accept that analysis. I do, however, accept that by implication, Holman J decided not to refuse permission because of a lack of promptitude, or because of undue delay coupled with prejudice (see CPR 54.5(1) and section 31(6)

of the Senior Courts Act 1981).

95. A claimant who brings a claim at the end of, or close to the end of, the three-month period is wise to account for that period in the grounds of claim. A claimant cannot assume that lodging a claim right at the end of the three months insulates him or her against a finding of lack of promptness or of undue delay. The Claimant did not deal with promptness/delay in the grounds of claim. She gave no explanation about timing until her reply. That was served in response to the Council's summary grounds, in which the Council raised delay. She gave no account of what happened in the first half of the three-month period in the reply. The Council pointed out, in its detailed grounds, that the Claimant had not explained why she waited until 21 April 2015 before applying for legal aid. She did, however, explain why in September 2015.
96. In those circumstances, I do not consider that the issue of delay was 'properly argued out at the leave stage', not least because there was no adversarial hearing (as there had been in *Lichfield*); nor do I think that there are unambiguous findings about it by Holman J which it would be wrong for me to revisit. In *Lichfield*, Keene J (as he then was) gave a fully reasoned judgment dealing with the argument that leave should be refused because of lack of promptness (see paragraph 10 of the judgment of the Court of Appeal). Moreover, I have material which Holman J did not have.
97. Has there been undue delay? Now that the entire three-month period had been explained, I do not consider that there has. The Claimant acted promptly throughout. That the claim was not lodged sooner, was, in part, because of the time it took for the lawyers to investigate and advise, and for legal aid to be granted. It was also partly because of the Council's equivocations in the pre-action letters about precisely what it had decided. These persisted in its summary grounds, in which it complained that the application of judicial review was premature.

### *Conclusion*

98. For these reasons, my conclusions are that the decision of 9 March 2015 was unlawful and that there are no bars to the grant of relief. The Claimant asked in the claim form for a declaration and a quashing order, and it seems to me that she is entitled to that relief.
99. The issues relating to relief were fully argued at the hearing. Nonetheless, without inviting such submissions, I will give parties an opportunity, having considered the terms of this judgment, to make further submissions about relief if they have any new points to make.

### *Postscript*

100. The Council made further submissions in response to the previous paragraph of this judgment after it was circulated in draft. I was not persuaded by those submissions that I should not quash the decision of 9 March 2015. I could not see, having rejected the Council's arguments about potential discretionary bars to relief, on what principled basis I could withhold relief. The parties' written submissions suggested that there might be doubt about the effect of a quashing order in this case. I should make it clear that its effect is that the whole decision of March 2015 is quashed. How the Council chooses to approach its reconsideration of the questions decided by the resolutions it made on 19 March 2015, is a matter for it to decide, in the light of the terms of this judgment.

## **I. Tall Survey: Summary**

## 2. EXECUTIVE SUMMARY

The defects evident on the Cressingham Gardens Estate can be divided into structural and non-structural categories. The non-structural ones tend to be the more widespread and serious of the two.

The structural condition of the buildings on the Cressingham Gardens Estate is generally acceptable but there are local areas, some quite significant, that warrant repair.

From a review of the reports handed to us spanning over 12 years it does not appear that cracks that are shown in photographs have got significantly larger since they were noted in these reports and they should be repaired.

However, extensive work is required at the Estate as a whole to bring other non-structural items up to a reasonable standard of living for the residents on the Estate.

We believe that the original roof and gutter details are responsible for much of the damp that exists on the internal walls in the Estate. The replacement of these throughout the Estate, with an improved gutter detail, will prevent much of these problems from getting significantly worse.

As some of the houses have been substantially affected by damp there will need to be significant work in the properties to ensure that the building materials that have become damp are appropriately dried out before redecoration. This will have to be addressed on a house by house basis by a competent contractor who is experienced with this kind of work.

The general upkeep of the Estate must be maintained to prevent significant structural issues arising in the future and much of this will be taken care of by removing or pruning trees throughout the Estate at periodical intervals.

There have been extensive problems caused by trees and the lack of maintenance. This has manifested itself in several areas of the Estate in particular the cracks at ground floor to the rear elevations of the maisonettes at Bodley and Upgrove Manor Way.

Similarly the drains throughout the Estate will all need to be surveyed and fixed where these are broken. It is of the utmost importance that like the maintenance of the trees these be maintained at regular intervals to prevent future problems which may include backing up into houses or water pooling at gullies.

These too have caused considerable damage over the history of the Estate and, if these are damaged by tree roots, leaking water into the soil can be a further cause of the kind of movement that has been prominent to the buildings on the Estate.

# **J. Trowers & Hamlins Report to GLA June 2014**



**dated June 2014**

**Local Government Association**

**Report on the options and models available to local  
authorities wishing to develop new housing**

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**1**

# Report on the options and models available to local authorities wishing to develop new housing

## 1 Introduction

1.1 As part of the Local Government Association's Investment in Housing Project we have been asked to prepare a report outlining the legal perspective on the options and models available to local authorities wishing to develop new housing. The report is to complement the viability study being carried out with Social Finance in relation to new housing development delivered without public subsidy but using debt instruments in order to deliver mixed tenure schemes.

1.2 We are therefore looking at housing outwith the Housing Revenue Account (**HRA**) and therefore the HRA debt cap.

1.3 For the purpose of this report we have discounted the option of a joint venture with a registered provider (**RP**) or other third parties. This could be the subject of a separate report but here we focus on local authority vehicles which are "on balance sheet" or "off balance sheet".

1.4 In particular, the structures we consider in this report are as follows:

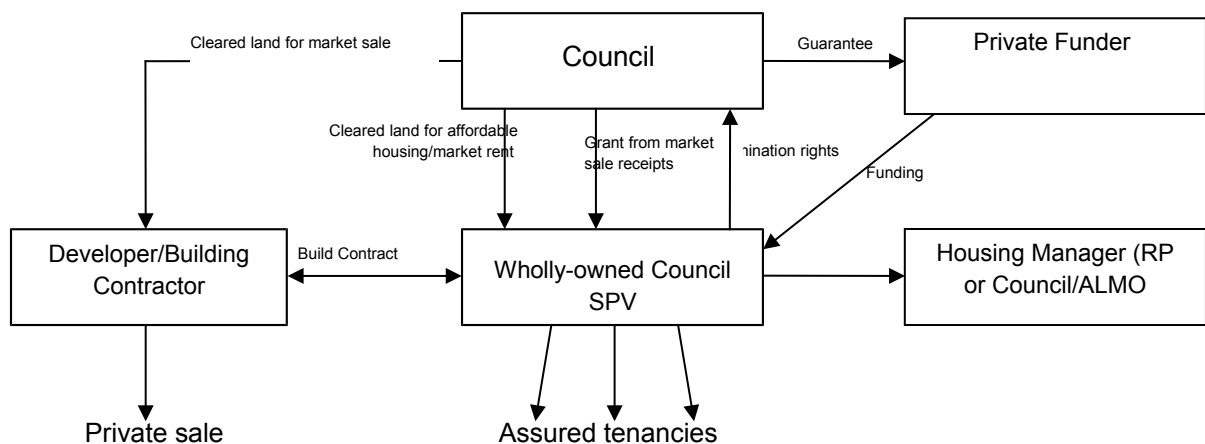
1.4.1 A wholly-owned council special purpose vehicle (**SPV**);

1.4.2 An "on balance sheet" SPV between two local authorities; and

1.4.3 An "off balance sheet" SPV.

1.5 We consider each of these options in turn below.

## 2 Wholly-owned council SPV



This model takes the land to be developed outside the council's HRA, with land to be developed for affordable housing and/or market rent sitting in the wholly-owned council SPV. Funding would be provided by a private lender (supported by a council guarantee) and potentially also by subsidy from the land sold to the developer/building contractor for market sale units.



## 2.1 Corporate structure

The wholly-owned council SPV could take any corporate form but the most suitable ones are likely to be a company limited by guarantee (**CLG**) or a company limited by shares (**CLS**). A CLS may offer certain flexibilities in future (e.g. restructuring, investment, partnership) and stamp duty land tax (**SDLT**) relief may be available on transfers of land from the council to the SPV if it is set up as a CLS. However, if it proposed that the SPV would be an RP and/or a charity a CLG would be the more typical corporate form for such a vehicle.

## 2.2 Charitable status

Consideration would need to be given as to whether the SPV should be a charity (assuming that it would be carrying out activities which are capable of being charitable, which would depend in part on who it is to house – clearly the provision of market rent accommodation would not be a charitable activity). The key advantages are the basic exemptions from SDLT and corporation tax in relation to charitable activities. The key disadvantages are the restriction on the SPV's activities and an additional layer of regulation by the Charity Commission. A financial analysis would be required to determine whether the advantages outweigh the disadvantages. The Charity Commission would, amongst other things, need to be satisfied that the proposed charity is independent of the State in order to confirm its registration as a charity. If the council was the sole member and also had control of the appointment of directors it is unlikely that the Charity Commission would approve registration.

## 2.3 Powers

### HRA or General Fund

2.3.1 Whether any property is to be accounted for in the HRA or the General Fund depends upon what powers a council uses to develop the property. If a power under Part II of the Housing Act 1985 (the **1985 Act**) is used then the development must be accounted for in the council's HRA.

2.3.2 There are however two other available sources of power which a council might use to develop properties through an SPV, namely Section 1 of the Localism Act 2011 (the **2011 Act**) and Section 12 of the Local Government Act 2003 (the **2003 Act**). If either or both of these powers were to be used then the relevant properties would be General Fund properties.

2.3.3 It is important to note however that there is a distinction between having a power available and the reasonable use of that power. A council would be required to provide reasonable justification for using either Section 1 of the 2011 Act or Section 12 of the 2003 Act rather than the principal housing powers under Part II of the 1985 Act which might seem more obvious or appropriate. There would be a risk of challenge on the grounds of unreasonable exercise of power and/or breach of pre-commencement restrictions limiting the use of the general power of competence under Section 1 of the 2011 Act, most likely from central Government, if it viewed a scheme as simply a mechanism to avoid HRA ring-fencing or the HRA debt cap or to avoid the Right to Buy. Public law consideration in relation to the exercise of powers by local authorities (including those highlighted in the line of cases cited in paragraph 2.3.4 below) would

need to be properly followed as they would amount to pre-commencement restrictions on the exercise of the general power.

2.3.4 The line of case law including *Hazell v Hammersmith & Fulham LBC* [1992] 2 AC 1, *Crédit Suisse v Allerdale Borough Council* [1997] QB 306 and *Crédit Suisse and Another v Waltham Forest LBC* [1997] QB 362 highlights the importance for councils to ensure that they act within their powers and discharge their functions in a way permitted by statute. That said, local authority powers have changed since these cases were decided. Although at the time it was found that councils did not have a power to discharge the relevant functions through a company and guarantee the company's obligations and/or indemnify it against losses suffered, councils now have much broader powers. This was recognised by Neill LJ in his Court of Appeal judgement in *Crédit Suisse v Waltham Forest LBC* [1997] as he stated that later similar schemes may have or will become within the powers of local authorities but he was there constrained to look at the position in October 1988. Indeed, under Section 1 of the 2011 Act councils are now required to carry out activities which are for a commercial purpose - which would include development of housing for market rent - through a company.

2.3.5 It may be that there is reasonable justification for providing housing, particularly where it differs from a council's HRA general needs housing, within an SPV; for example, the council may wish to differentiate between its general needs stock and housing that it develops for intermediate or market accommodation which it provides either for investment purposes or, say, to economically active individuals in order to achieve wider community and regeneration objectives. It would be more difficult to justify the provision of general needs housing at social rent levels through an SPV. It is important to highlight that each particular project would need to be subject to an individual vires review to ensure that the council was acting within its powers in providing housing through an SPV and in particular that public law considerations, including those enunciated in the cases cited in **paragraph 2.3.4**, are fully met. For completeness the general power of competence does not itself confer a power to a local authority to do anything which it is unable to do by virtue of a pre-commencement limitation or post commencement limitation.<sup>1</sup>

### **Section 1 of the 2011 Act – general power of competence**

2.3.6 Subject to the above considerations, a council may use its general power of competence under Section 1 of the 2011 Act to develop housing in the General Fund through an SPV, although its application must be carefully considered and appropriate in the relevant circumstances.

2.3.7 As mentioned above, there is a general requirement that if the exercise of the Section 1 power is for a "commercial purpose" then a council must use a company to do so; the SPV would fulfil this requirement. Shared ownership or

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<sup>1</sup> " 'Pre-commencement limitation' means a prohibition, restriction or other limitation expressly imposed by a statutory provision that: (a) is contained in this Act or in any other Act passed no later than the end of the session in which this Act is passed; or (b) is contained in an instrument made under an Act or comes into force before the commencement of Section 1." (Section 1(4) Localism Act 2011).

" 'post-commencement limitation' means a prohibition, restriction or other limitation expressly imposed by a statutory provision that: (a) is contained in an Act passed after the end of the Session in which this Act was passed; or (b) is contained in an instrument made under an Act and comes into force on or after the commencement of Section 1." (Section 1(4) Localism Act 2011).

affordable rented properties provided to people who could not otherwise afford to rent a property on the open market and where the provision of accommodation is meeting a specific need probably would not be classified as a commercial purpose but the letting of housing at market rents is likely to be deemed to be so. As stated at **paragraph 2.3.5**, it is likely that a council wishing to provide "social rent" level housing through an SPV will find it more difficult to justify the reasonable use of Section 1 of the 2011 Act.

## **Section 12 of the 2003 Act - investment power**

2.3.8 Councils may also be able to use their investment power under Section 12 of the 2003 Act, if they are able to satisfy themselves that the development of the properties is an investment rather than a commercial purpose. Under Section 15 of the 2003 Act, before exercising the power to invest a council must have regard to guidance issued by the Secretary of State. This is set out in the Department for Communities and Local Government "Guidance on Local Government Investments" published on 11 March 2010. Councils should also consider related guidance published by CIPFA under "Treasury Management in the Public Services: Code of Practice and Cross Sectorial Guidance Notes" and "The Prudential Code for Capital Finance in Local Authorities".

## **Transfer of council land**

2.3.9 A council's power to transfer land – both to the SPV and to the developer/building contractor of any market sale element – are contained in Section 32 of the 1985 Act for HRA land and Section 123 of the Local Government Act 1972 (the **1972 Act**) for General Fund land. Unless the land to be transferred is General Fund land and it is being disposed of for consideration that is the best that can reasonably be obtained, the Secretary of State's consent to the disposal would be required, which may be either a specific or general consent.

If any HRA or General Fund land is to be disposed of at an undervalue for the purpose of the SPV providing accommodation to be let on the land, this will be regarded as financial assistance and/or gratuitous benefit under Sections 24 and 25 of the Local Government Act 1988 (the **1988 Act**). Again, the prior consent of the Secretary of State is required under Section 25 but there are some general consents which may be available. If consent is given under Section 25 then it is likely that no other consent under either Section 123 of the 1972 Act or Section 32 of the 1985 Act will be required (depending upon the terms of the Section 25 consent).

## **2.4 Funding**

2.4.1 If the SPV is to obtain the finance directly then a key issue would be satisfying the funder that it has sufficient security cover and the SPV has sufficient repayment capacity, bearing in mind the absence of a track record.

2.4.2 It should be noted that Section 4(1) of the 2003 Act provides the Secretary of State with the power to impose restrictions in relation to borrowing by local authorities and under Section 4(2) the Secretary of State can, by direction, set limits on borrowing by a particular authority for the purpose of ensuring that that

authority does not borrow more than it can afford. There is therefore a risk that the Government might in future impose borrowing caps nationally and/or locally in relation to General Fund borrowing. Given that an SPV which is controlled by a council would have its accounts consolidated with the council's accounts, this cap might also impact upon the SPV's borrowing capabilities.

2.4.3 The power to provide grant funding (perhaps from market sale receipts) from a council to an SPV or for the council to give a guarantee to the SPV's funders where the SPV is to provide rented accommodation is contained in Section 24 of the 1998 Act (subject to consent under Section 25). If the funding or guarantee is to relate to housing accommodation for sale then Section 24 of the 1988 Act will not apply and the council would need to use another power, potentially Section 1 of the 2011 Act subject to the considerations outlined at **paragraph 2.3** above.

2.4.4 Local authorities are of course subject to a duty to obtain value for money pursuant to their best value duty under Section 3 of the Local Government Act 1999. Any local authority choosing to carry out a function (in this case through an SPV) using a particular source of funding, particularly if funding is cheaper elsewhere, would have to be able to justify why pursuing a particular funding source (e.g. institutional investment) over another funding source (council borrowing from the Public Works Loan Board and on-lending it to the SPV), which might be cheaper, was the preferred route.

2.4.5 A further point to note regarding the wholly-owned council SPV model is that a council would not be able to make its retained RTB receipts available to such an SPV. This is because the form of retention agreement between local authorities and Government in respect of RTB receipts provides that any body to which the local authority pays some or all of the retained amounts must not be a body in which the authority holds "a controlling interest".

## 2.5 **RTB**

The RTB would not apply to any units owned by a wholly-owned council SPV by virtue of the council not being the Landlord.

## 2.6 **Tax issues**

2.6.1 Financial modelling would be required to determine how much corporation tax would be payable by the SPV and, therefore, whether charitable status should be considered.

2.6.2 SDLT would be payable upon transfers of land from the council to the SPV unless a relief can be claimed. A relief may be available if the SPV is set up as a CLS, as a non-profit RP or as a charity.

2.6.3 VAT would also need to be considered, particularly bearing in mind that the SPV would need to obtain services from third parties.

## 2.7 **EU Procurement**

- 2.7.1 With regard to any transfer of land by a council to either a developer/building contractor for market sale or to the SPV, if it a pure disposal of land then it would not be subject to advertisement under the EU procurement rules – this is known as the "land exemption". However, if the agreement between the council and the recipient of the land imposes specific requirements of the council as to what is to be developed on the site, it is likely to be reviewed as a "public Works contract" rather than a pure land disposal.
- 2.7.2 Nevertheless, with regard to any transfer of land by a council to its wholly-owned SPV, even if the agreement does amount to a public works contract it is likely that in these circumstances the "Teckal exemption" will apply. The Teckal exemption allows public contracts in relation to works, services or supplies to be let by a council to a third party without following a competitive process under the EU procurement rules where (i) the council exercises over the third party a level of control similar to that which it exercises over its internal department; and (ii) the third party carries out the "essential part" of its activities for the council. A new EU procurement Directive, which is due to be implemented in the UK through regulations in 2015 or 2016, will codify the Teckal exemption. It should be noted that, under the Directive, in order to satisfy the second limb of the Teckal exemption, no more than 20% of a third party's activities should be provided to organisations other than the relevant council.
- 2.7.3 The wholly-owned council SPV may also be a "contracting authority" and, as such, would itself be subject to the EU procurement rules. This means that it would need to procure any construction or refurbishment works and housing management which it wishes to outsource in accordance with the EU procurement rules. We would note, however, that the so-called "reverse Teckal" exemption - which is codified under the new procurement Directive - could apply in relation to any works or services which the SPV contracts from its parent council.

## 2.8 **State Aid**

If a council provides grant to the SPV, provides a guarantee to the SPV's private funders and/or it transfers land at an undervalue then this is likely to constitute State Aid. However, if the aid is given in relation to the provision of social or intermediate housing a "services in the general economic interest" exemption may apply, subject to certain conditions being satisfied. This exemption would not apply however if the housing were to be developed for letting at market rent.

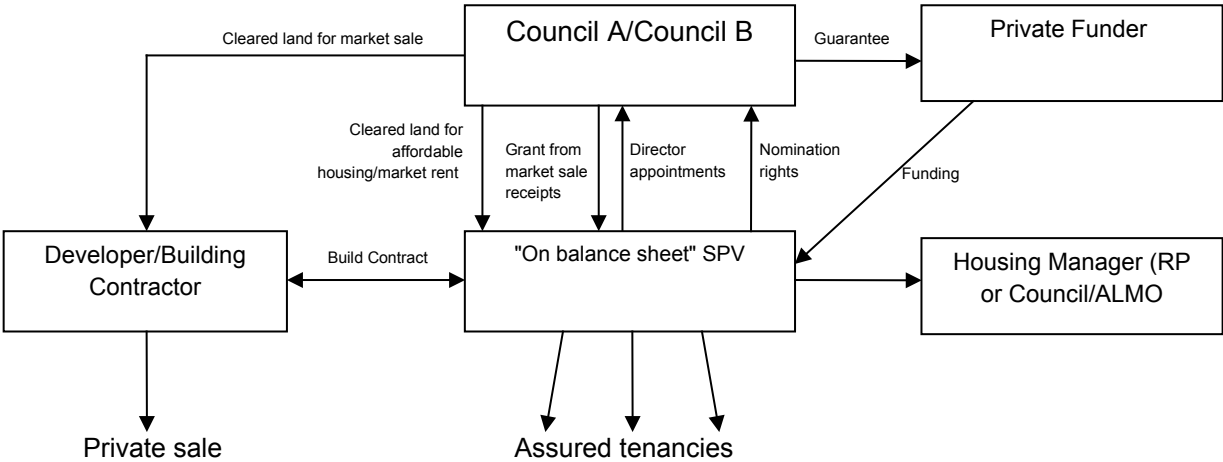
## 2.9 **Financial return to the Council**

The form of corporate structure chosen will largely determine the ability of the Council to receive a financial return from the SPV. If the SPV is constituted as a charity or RP (or both) then there can be no distribution of profits to members, all profits would be reinvested in pursuit of the objects of the SPV. Whilst it is technically possible for a CLG to be set up so as to distribute profit to members this is not a common approach and most CLGs are non-profit distributing organisations. A CLS would be able to distribute profits to its members and with the Council as Sole Shareholder it would be the sole beneficiary of such distribution under this route. It should be noted however that it is the directors who

would be required to make any decision on whether a distribution should be made and only after being satisfied that there are distributable profits available.

The Council could also receive payments through the provision of services to the SPV and such services could be provided irrespective of the corporate form. There are however limitations on the amount that the Council could charge for the services depending on the powers being used to provide the services. If the services were being provided under the Local Authority (Goods and Services) Act 1970 then the SPV would be required to be a 'public body' for the purposes of the Act and the Council and the SPV would be entitled to agree the terms as to payment as they consider appropriate. The most likely route would be the power to charge (section 93) or trade (section 95) of the Local Government Act 2003. A Council can charge for the services it provides (which it is able to provide but not legally required to provide) but is limited to recovering its costs of provision. If a Council wanted to trade with the SPV and thus make a 'turn' on the provision of services it is likely that in order to do so, either using the trading powers in the Local Government Act 2003 or the general power to competence in the Localism Act 2011, it would be required to provide those services through a company.

**3 "On balance sheet" SPV**



Again, this model takes the land to be developed outside of the council's HRA, with the land to be developed for affordable housing this time sitting in an SPV which would be jointly owned by two (or more) local authorities. Again, in addition to the private funding accessed with the LGA's support, further cross subsidy for the affordable housing might come in the form of land sold to a developer/building contractor for market sale. Most of our advice in **section 2** above applies equally to this "on balance sheet" SPV so we have only highlighted the differences below.

**3.1 Corporate structure**

In addition to the corporate forms described at **paragraph 2.1** above, if there are to be at least 3 local authority owners of the SPV it could also be set up as a community benefit society (**CBS**), as industrial and provident societies will be known from August 2014. If the SPV were to be an RP and also a charity, the CBS would have a key advantage because currently RPs which are CBSs would be exempt from registration with the Charity Commission. However, if the SPV is to carry out housing for market rent then it would not

be a charity and there is no obvious advantage in adopting a CBS corporate form. It is therefore still likely that the SPV would be set up either as a CLS or a CLG. It should be noted that the advantage of setting up a CLS to benefit from SDLT relief, as noted at **paragraph 2.1** above in relation to the wholly-owned council SPV, would be unlikely to apply to the "on balance sheet" SPV as this relief only applies where the party transferring the land owns at least a 75% share in the transferee.

**3.2 Funding**

Whether a council who is a member of the SPV could make its retained RTB receipts available to the SPV will depend upon whether that particular council has a "controlling interest" in the SPV. This will depend upon the share which the council in question holds in the SPV and any other rights it has to direct the SPV's actions – for example, the right to appoint and remove board members or to direct the SPV to take or withhold from taking any action.

**3.3 Tax issues**

The tax issues for the "on balance sheet" SPV will be similar to those for the wholly-owned council SPV. However, as noted at **paragraph 4.1** above, the SDLT relief which would apply where the council transferring land owns at least a 75% share in the SPV may not be applicable to the "on balance sheet" SPV model. It may be therefore that SDLT would be payable on transfers of land from the council to the SPV unless it is set up as a non-profit RP or as a charity.

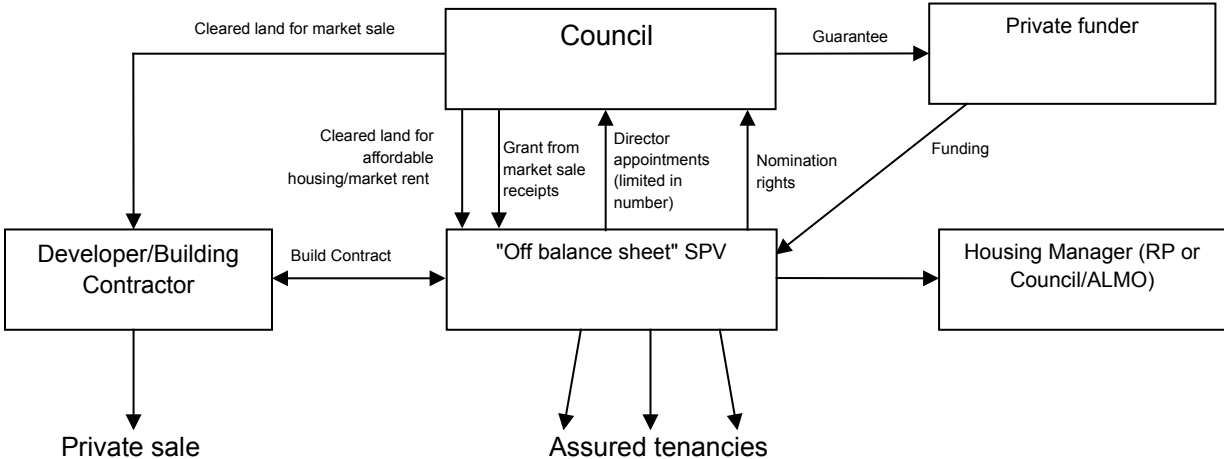
**3.4 EU procurement**

The new EU procurement Directive which codifies the "Teckal exemption" also extends the scope of the exemption to bodies which are jointly controlled by two or more contracting authorities.

**3.5 Financial return to the Councils**

The matters highlighted in paragraph 2.9 apply equally here albeit that a shareholder's agreement would set out the arrangements for distribution of dividends between the Member Councils.

**4 "Off balance sheet" SPV**



Most of our advice in **section 2** above applies equally to this "off balance sheet" SPV so we have only highlighted the differences below.

The "off balance sheet" SPV would, by its nature, not be controlled by a council. A council would therefore need to be comfortable with the reduced control compared to an "on balance sheet" or wholly-owned subsidiary SPV model. On the other hand, this model provides the opportunity for stakeholder involvement in the SPV as tenants could be involved on the board or, alternatively (or in addition), independent individuals with the relevant expertise could be brought in. If a council has retained a substantial amount of RTB receipts to be used for the provision of social housing, this model may also be worth considering.

#### 4.1 **Corporate structure**

As for the "on balance sheet" SPV model, if there are to be at least 3 owners of the SPV it could be set up as a CBS as well as a CLG or CLS. The same considerations would apply however as set out at **paragraph 3.1** above.

#### 4.2 **Off balance sheet accounting test**

4.2.1 The provisions regarding proper local authority accountancy practice are set out in CIPFA's "Code of Practice on Local Authority Accounting in the United Kingdom" (the **Code**). Under the Code, if a council's controls over a company include holding a majority of the voting power of the company or the council owns half or less of the voting power of the company but it has:

- (a) the power over more than half of the voting rights by virtue of an agreement with other stakeholders in the company;
- (b) the power to appoint or remove the majority of directors;
- (c) the power to cast the majority of votes at board meetings; or
- (d) the power to govern the financial and operating policies of the company,

then is it likely to be treated as a subsidiary of the council and included in the council's accounts.

4.2.2 In order that the SPV is not controlled by the council (and is therefore not "on balance sheet") both board membership and ownership of the SPV should demonstrate independence from the council. This means that the board should comprise a majority of independent board members (who might be individuals with relevant experience or perhaps some council tenants) who are not associated with the council. With regard to the ownership of the SPV, one option would be for the ownership of the SPV to reflect the board membership of the SPV, in which case the independent (possibly including tenant) board members would be the majority owners of the company. In any event a council would need to be mindful that there could not be any agreements in place which



effectively provide the council with control over more than 50% of the membership voting rights in the SPV, the power to appoint or remove the majority of directors, the power to cast the majority of votes at board meetings or the power effectively to run the SPV since otherwise it may be deemed to be controlled by the council, which would give rise to "on balance sheet" treatment.

#### 4.3 **Funding**

4.3.1 The main advantage of the "off balance sheet" SPV model is that any borrowing by the SPV will not be consolidated with the Council's accounts. It would therefore not be taken into account if any General Fund borrowing cap is imposed by the Government in future.

4.3.2 Another particular advantage of the "off balance sheet" SPV is the fact that the council would be able to make available its RTB receipts to the SPV as it would not have a "controlling interest".

#### 4.4 **Tax**

Again, the tax issues would be similar as for the other models described in this report but, unlike the wholly-owned council SPV, the "off balance sheet" SPV would not be able to benefit from the SDLT relief that could apply where a council owns at least 75% of an interest in the SPV which is set up as a CLS. SDLT would therefore be payable unless the SPV is set up as a non-profit RP or as a charity.

#### 4.5 **EU procurement**

We noted at **paragraphs 2.7** and **3.4** above that the Teckal exemption may potentially apply in respect of works and services provided between a council and the SPV if the structure described in **Section 2** or **Section 3** above were to be adopted. This exemption would not apply in respect of this "off balance sheet" structure as the council would not exercise the necessary degree of control over the SPV to satisfy that exemption. Therefore, if any contracts are let by the council to the SPV or vice versa then the EU procurement rules will apply.

#### 4.6 **Financial return to the Council**

The matters highlighted in paragraph 3.5 apply equally here with the shareholder's agreement setting out arrangements for distribution of dividends between the different shareholders.

### 5 **Conclusion**

This report covers a broad range of issues and is a summary only. The key differences between the models we have considered is the ability of the "off balance sheet" (and potentially the "on balance sheet") SPV to receive the council's RTB receipts and for the "off balance sheet" SPV to borrow without increasing the council's overall General Fund debt, which is subject to the risk of being capped in the future by Government and, depending on the nature of the particular scheme to be operated by the SPV, an "off balance sheet" SPV is likely to be less susceptible to the risk of challenge. On the other hand, the "off balance sheet" model inevitably means that the council has a smaller degree of control over the SPV than under the wholly-owned council SPV model. Under

all three models however the council would be able to have some involvement at board membership and at membership level in contrast to the "traditional" model of developing new housing through RP partners.

**Trowers & Hamlins LLP**  
**June 2014**

**K. Academic research: Voight, Shinn & Nation  
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## The Longitudinal Effects of Residential Mobility on the Academic Achievement of Urban Elementary and Middle School Students

Adam Voight, Marybeth Shinn and Maury Nation  
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# The Longitudinal Effects of Residential Mobility on the Academic Achievement of Urban Elementary and Middle School Students

Adam Voight<sup>1</sup>, Marybeth Shinn<sup>1</sup>, and Maury Nation<sup>1</sup>

Residential stability matters to a young person's educational development, and the present housing crisis has disrupted the residential stability of many families. This study uses latent growth-curve modeling to examine how changing residences affects math and reading achievement from third through eighth grade among a sample of urban elementary and middle-school students. Results show that residential moves in the early elementary years have a negative effect on math and reading achievement in third grade and a negative effect on the trajectory of reading scores thereafter. Further, there is a negative contemporaneous effect of mobility on math scores in third through eighth grade but no such contemporaneous effect on reading scores. Implications for research and practice are discussed.

**Keywords:** achievement; at-risk students; longitudinal studies; poverty; social context; urban education

What happens outside of school matters to a young person's educational development. This is a fundamental premise for thinkers in the tradition of Bronfenbrenner's (1979) ecological theory and the sociology of education. Theorists of teaching and learning use the metaphor of the instructional triangle to understand the educational process and depict the dynamic relationship between student, teacher, and subject matter. Ecological and social thinkers argue that this triangle is embedded in a complex web of environmental factors, including features of the school, the surrounding community, and students' families, to name just a few. These factors condition how the instructional triangle functions and thus how students learn and grow.

One dimension of students' ecologies that has taken on increased relevance in recent years is their living arrangements. The present housing crisis and economic recession have disrupted the residential stability of many families through a wave of foreclosures and unemployment, compounding a decade-long surge in residential moves that peaked in 2006 (U.S. Census Bureau, 2009). This phenomenon has been particularly severe in

urban areas (U.S. Census Bureau, 2009), which makes the question of how residential mobility affects urban students all the more salient. The home is arguably the most influential setting in young people's development, and the recent upward trend in residential mobility has made the effort to foster a positive, stable home environment more challenging.

This study explores the effect of changing residences on young people's academic achievement. A review of previous research on residential mobility, summarized below, yielded a limited picture of the relationship between mobility and youth outcomes. Most of this research treats residential mobility as a cumulative variable, measured over a period of years, as a predictor of more distal academic outcomes. Although many studies control for eligibility for free and reduced-price lunch at the time the outcome is assessed, this is a weak proxy for the multiple forms of socioeconomic disadvantage that might cause both mobility and poor achievement. The present study applies a latent growth-curve modeling technique to longitudinal data from an urban school district to learn how associations of mobility with academic achievement may differ across levels of schooling. Specifically, we examine how changing residences is associated with math and reading achievement from third grade through eighth grade, both contemporaneously and residually. Because we examine not only the associations of cumulative early mobility with achievement but also the changes in individual trajectories associated with later moves, we can isolate the effects of moves from those of more enduring forms of disadvantage.

## Residential Mobility and Youth Outcomes

Moving homes is not inherently bad. If a change of residence accompanies a parent's promotion to a higher paying job, for example, it may lead to positive outcomes for a young person and her family. However, even positive moves for parents may be stressful for children, and when families are forced to move because of financial constraints—enduring poverty or an economic shock from a foreclosure or loss of a job, for example—the result is likely less favorable. In a context of relatively high poverty rates, characteristic of many urban settings, residential moves are often made for less than ideal reasons (Scanlon & Devine, 2001; Schachter, 2001). Indeed, most of the empirical work

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examining residential mobility has associated it with negative youth outcomes. We make the assumption that within a population of urban public school students, most residential moves are born more from necessity than from opportunity.

### *Residential Versus School Mobility*

There is a correlation between changing residences and changing schools, but the one does not necessitate the other. Recent data from the U.S. Census Bureau (2011) indicate that the majority of residential moves made nationwide are by urban residents moving within the same metropolitan area. Further, previous research with a nationally representative sample of young people has shown that only about a quarter of all residential moves bring about a change of school (Swanson & Schneider, 1999). In our urban sample, we find that for all students who were in a study school in both the 2008–2009 and 2009–2010 school years, 42% of students who moved homes during that period also changed schools.

Thus, although residential mobility is the primary phenomenon of interest to the present study, it often prompts a school move, as well, even when the residential move is made within the same metropolitan area. The general conclusion of research on school mobility and achievement is that the two are negatively associated. A report by the National Research Council and Institute of Medicine (2010) and a meta-analysis by Mehana and Reynolds (2004) both concluded that in the elementary grades, changing schools has a negative effect on math and reading achievement equivalent to a 3- to 4-month disadvantage in learning.

### *Residential Mobility and Achievement*

Compared to the literature on school mobility and achievement, there is relatively little research on how moving residences affects learning. Theoretically, change is in and of itself stressful, and moves have long figured in inventories of stressful life events. Moves imply changes in household routines, which can disrupt development (Evans & Wachs, 2010). Uprooting a child from her neighborhood deprives her of important social capital that may be parlayed into educational assets. Changing the network of families in one's neighborhood may serve as a sort of reset button for community resources that have been empirically connected to student achievement, including webs of school-related information sharing between parents, parental monitoring, and learning opportunities (Coleman, 1988; Leventhal & Brooks-Gunn, 2000). Apart from the loss of social capital for youth, the effect of mobility on their parents may be indirectly detrimental to their achievement. Parents who struggle with financial issues around housing have been shown to suffer from depression, social withdrawal, and increased work hours with taking on second and third jobs (Kingsley, Smith, & Price, 2009; Libman, Saegert, & Fields, 2008). These burdens may detract from parents' abilities to support the educational development of their children.

There is evidence to suggest that residential moves are associated with failure to complete high school. Haveman, Wolfe, and Spaulding (1991) found that residential mobility at all levels of schooling is associated with a lower probability of high school graduation. These authors treated mobility as three separate

cumulative variables (moves between ages 4 to 7, 8 to 11, and 12 to 15) to predict the likelihood of high school graduation. The sample had a high proportion of low-income youth, and the findings suggested that mobility was as powerful or more powerful a predictor of dropout than persistent poverty. In another study that modeled each of residential and school mobility as two cumulative variables (moves in Grades 8 to 10 and 10 to 12), residential moves in high school were associated with a higher likelihood of dropping out, whereas school changes did not have this deleterious impact (Swanson & Schneider, 1999).

A number of studies have also found negative associations between residential mobility and academic achievement. Pribesh and Downey (1999) used the 1988 and 1992 waves of National Educational Longitudinal Study (NELS) and modeled residential mobility as a predictor of achievement for students in 12th grade in 1992. Treating residential mobility as a cumulative 1988–1992 variable, they found that residential mobility has a strong negative effect on math and reading achievement. Somewhat paradoxically, in the aforementioned Swanson and Schneider (1999) study, residential mobility between 8th and 10th grade was shown to predict *improved* math achievement, a finding understood by the authors to indicate that families often move for positive reasons that benefit their children's education. This study also used the nationally representative NELS data set, and its conclusions may not be entirely transferable to a more urban, low-SES population.

In one of the few studies of residential mobility among elementary and middle school students, Obradovic and colleagues (2009) treated residential mobility as part of a more general risk index that included homelessness. Their sample included four different diverse cohorts of urban public-school students, each in second through fifth grade during the first of three annual waves of data collection. They found that being homeless and highly mobile at any point during the 3-year period was associated with a significant reduction in the intercept of math and reading achievement for all cohorts. The 3-year trajectory of achievement was significantly associated with being homeless and highly mobile in comparison with relatively advantaged students only in the second-grade cohort for reading and the second- and third-grade cohorts for math.

Overall, the research and theoretical literature indicates that residential mobility has detrimental associations with achievement and high school completion, especially among urban youth. Indirectly, it may hamper their parents' ability to provide effective care and monitoring, and the social capital that more stable youth enjoy may dissipate as well. Residential moves are oftentimes associated with a change of school. The literature on school mobility is more extensive and suggests that early school changes are associated with poor achievement in the 1st years of school, and that this association may diminish as students age. The evidence on cumulative mobility is consistent with two rather different causal interpretations. Moves may have a direct detrimental impact on youth outcomes, or a third variable, plausibly unmeasured forms of family disadvantage, may lead to both mobility and poor achievement. An important advance in the present study is to examine the effects of year-by-year moves within the context of students' own trajectories of achievement. We can thus examine the extent to which moves at different grade

**Table 1**  
**Sample Descriptive Statistics**

<i>N</i>	8,337						
Asian	3.5%						
Black	45.1%						
Latino/Latina	20.5%						
White	30.6%						
Female	47.7%						
<b>Grade</b>	<b>K-2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<i>n</i>	1,663	3,892	4,147	5,998	4,774	3,573	2,640
Free-lunch eligible	69.0%	70.4%	70.2%	71.7%	71.1%	70.1%	70.7%
Reduced-price-lunch eligible	5.8%	6.1%	6.5%	6.3%	6.6%	6.8%	5.8%
Residential moves (mean)	0.395	0.162	0.154	0.181	0.165	0.183	0.173
Math scores (mean)	–	49.3	49.5	46.1	46.8	45.7	42.6
Reading scores (mean)	–	48.5	46.3	45.2	48.0	44.9	41.6

Note. Math and reading scores are based on state standardized tests and reported in terms of normal curve equivalents (NCEs) on a scale of 1 to 99. Reported sample size at each grade level indicates the total number of students for which data were available at that grade level, irrespective of the year in which data were collected.

levels are associated with deviations from these trajectories, isolating the effect of moves from enduring forms of disadvantage that are known to be associated with academic achievement.

### Research Questions

The primary questions driving this study are twofold: (a) how is residential mobility during the early elementary years (kindergarten through second grade) associated with the trajectory of urban students' math and reading achievement during later elementary and middle school (third through eighth grade) and (b) how are later moves associated with deviations from students' trajectories of math and reading achievement through elementary and middle school (third through eighth grade)?

## Method

### Sample and Measures

The study used school administrative data from 11 middle schools (Grades 5 through 8) in a large urban district in Tennessee. The schools are a sample of the 36 middle schools in the district and were participants in a larger study of youth violence prevention because of their relatively high rates of bullying. School enrollment ranged between 400 and 750, and all but one school was predominantly composed of minority and economically disadvantaged students, based on eligibility for the Free/Reduced-Price Lunch program (FRPL). Data were available annually from 2003 to 2009 for 8,337 students enrolled in the 11 middle schools in 2009. Thus, for a student in eighth grade in 2009, school records were available from second grade through eighth grade for all years for which she was enrolled in any district school. Likewise, for a student in sixth grade in 2009, administrative data from kindergarten through sixth grade were available. Descriptive statistics for the study sample are shown in Table 1.

**Residential mobility.** The primary variable of interest to this study is residential moves. In the study district, a change of address is documented in a student's school records. A move during the summer months when school is not in session would be reflected in the subsequent year's data. In any given year during the period

for which data were available, most students did not move at all. The highest mobility rate in any year was 2008 when 16.5% of students moved. The most moves for a student in any year of data collection was five, but because so few students moved more than once per year (less than 3% in each year for which data were available) residential mobility in Grades 3 through 8 was treated as a binary variable (0 = *did not move*; 1 = *moved at least once*).

To examine the effect of early elementary mobility on achievement, a kindergarten-through-second-grade (K-2) mobility index was calculated by summing the number of moves on a student's record in kindergarten, first, and second grade and dividing this sum by the number of years that the student was in the data during these grades. Further, an additional move was added to the sum—prior to division—if a student had missing data during kindergarten, first, or second grade when she otherwise would have been included. For example, if a sixth-grade student in 2009 has data on record for all grades except kindergarten, the assumption is that she moved into the district catchment area between kindergarten and first grade and an additional move is assumed. Kindergarten is universal, free, and full-day in the study district.

The data further indicate that poorer students are more likely to move relative to their higher-SES peers. This reinforces the importance of examining the associations of moves with changes in student trajectories of achievement over time, to avoid confounds with enduring disadvantage. A significantly greater proportion of movers than nonmovers were FRPL eligible across all 8 years of data. For example, in 2009, 21% of all sample students were not FRPL eligible, but only 11% of students who had moved at least once during that year were not FRPL eligible ( $\chi = 72.93, p < .001$ ). Over all 8 years of data, there were 99 instances of extreme mobility (three or more moves during the year); only 3 of these cases were students who were not eligible for FRPL.

The mobility rates for the sample during the span of data collection were congruous with the overall mobility rates in the Southern United States, according to U.S. Census (2011) figures. The effect of the national housing crisis may have been later to hit the sample district, as the peak mobility year was 2008 com-

pared to the 2003 for the region. However, rates did not vary dramatically over this period. From 2005 to 2009, the sample mobility rate (students who moved at least once) was between 15.3% and 16.5%. Prior to 2005, the rates were consistently around 12%.

**Achievement.** State standardized test scores for both math and reading serve as the outcome variables in this study. The test is administered to all third- through eighth-grade students. Scores are reported in terms of normal curve equivalents (NCEs), measured on a scale of 1 to 99. NCEs are determined based on a student's relative position vis-à-vis her grade-level peers statewide. Therefore, a score of 50 implies that a student is exactly average.

**Socioeconomic status.** In an effort to distinguish residential mobility from general socioeconomic status in this study, FRPL eligibility is included as a control variable. FRPL is an ordinal variable, with students being eligible for free lunch, reduced-priced lunch, or neither, depending on the family's level of need. FRPL is an imperfect proxy for SES, but it helps to approximate a family's economic situation. Like mobility, FRPL is assessed annually and included as a time-variant covariate. Students' FRPL eligibility is relatively static from year to year, with no more than 13% of students changing statuses between any 2 years of data collection.

### Analyses

Latent growth-curve modeling (LGM) was used to model the longitudinal effects of residential mobility on student achievement. LGM estimates latent intercepts and growth trajectories in an outcome variable for all participants, allowing for inclusion of time-invariant and time-varying covariates (Meredith & Tisak, 1990). Two separate LGMs were estimated in MPlus 6 for math achievement and reading achievement, respectively. The data were transformed to depict grade-level as the indicator of time ( $\lambda_t$  in the equations below), rather than the year in which data were collected. Thus, there are six repeated measures in the models, representing the six grade levels (third through eighth) at which students were tested on math and reading. The trajectories of achievement scores over time were modeled as linear trends ( $\beta_i$ ). Predictor variables included K-2 mobility, which was treated as a time-invariant covariate, which is to say that every student has a single K-2 mobility score ( $k2mobility_i$ ) representing her residential moves during that period. Annual residential mobility from Grade 3 through 8 was also included in the model as a time-variant predictor variable, both contemporaneously with achievement and lagged 1 year behind achievement ( $moved_{it}$  and  $moved_{it-1}$ , respectively). The generic equations for both math and reading achievement outcome are as follows:

$$\begin{aligned} \text{(Level 1)} \quad & y_{it} = \alpha_i + (\lambda_t)\beta_i + moved_{it}\gamma_{0t} + moved_{it-1}\gamma_{1t} + frpl_{it}\gamma_{2t} + frpl_{it-1}\gamma_{3t} + \epsilon_{it} \\ \text{(Level 2)} \quad & \alpha_i = \mu_\alpha + k2mobility_i\pi_{01} + frpl2_i\pi_{02} + \zeta_{\alpha i} \\ \text{(Level 2)} \quad & \beta_i = \mu_\beta + k2mobility_i\pi_{11} + frpl2_i\pi_{12} + \zeta_{\beta i} \end{aligned}$$

FRPL was included in models as a control, both as a time-invariant covariate ( $frpl2_i$ , representing a student's FRPL in second grade) and a time-variant contemporaneous and lagged covariate

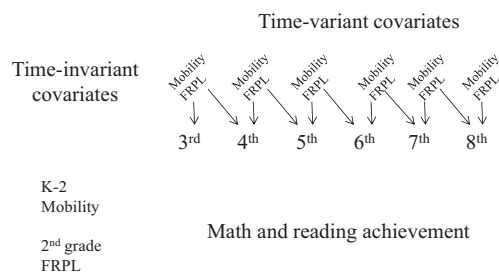


FIGURE 1. Modeled relationships between time-invariant covariates, time-variant covariates, and math and reading achievement.

( $frpl_{it}$  and  $frpl_{it-1}$ , respectively). Modeling FRPL helps to separate the effects of mobility and economic disadvantage, oftentimes confounded in mobility research (Burkam, Lee, & Dwyer, 2009; Mehana & Reynolds, 2004). The model results allow for an interpretation of the association of K-2 mobility with students' third-grade achievement as well as with the linear trajectory of their achievement from Grades 3 through 8, accounting for variation in FRPL. Furthermore, the models estimate the association of residential mobility in Grades 3 through 8 on deviations from each student's trajectory of achievement during the year of the move as well as the subsequent year, controlling for early achievement and changes in FRPL status.

The 1-year-lagged variables for mobility and FRPL ( $moved_{it-1}$  and  $frpl_{it-1}$ , respectively) are not included in the model as predictors of achievement in third grade. The intercept term in the Level 1 equation ( $\alpha_i$ ) represents students' third-grade achievement, and the effect of K-2 mobility and second-grade FRPL eligibility are modeled as predictors of the intercept and slope in the Level 2 equation. The model specifications are also illustrated in Figure 1.

There are some missing data as many students were not in one of the 11 sample schools at times throughout the 8-year range of data collection. LGM allows missing data to be treated as missing at random, employing a full maximum likelihood procedure that includes in the analysis any case (i.e., year nested within student) for which outcome data are available.

## Results

### Unconditional Trajectory of Math and Reading Achievement

A baseline model (i.e., absent any predictor variables aside from time) for both math and reading scores shows that there was a general downward trend in achievement from Grade 3 to 8 (shown in Figure 2). The model-implied mean math and reading scores in the third grade were 53.34 ( $p < .001$ ) and 52.41 ( $p < .001$ ) NCEs, respectively; the model-implied mean rate of change was  $-2.75$  NCEs per year for math ( $p < .001$ ) and  $-2.74$  NCEs per year for reading ( $p < .001$ ). This suggests that although sample students perform on par with their statewide peers in third grade, their relative achievement decreases as they progress through elementary and middle school.



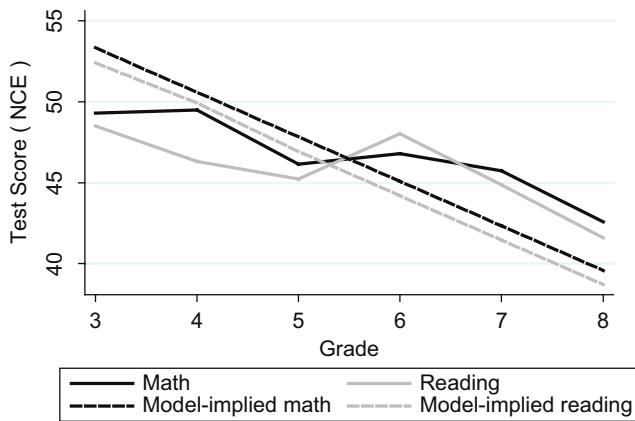


FIGURE 2. Sample mean math and reading scores and model-implied mean math and reading scores, by grade.

### Associations of Early Elementary Residential Mobility With Achievement

As Table 2 shows, the inclusion of the mobility predictor variables—and FRPL controls—in the model illustrates the import of changing residences across grade levels. First, the model implies that K–2 mobility had a significant negative association with math ( $\pi = -1.44, p < .05$ ) and reading ( $\pi = -1.70, p < .01$ ) achievement in third grade, the 1st year of testing. For every move during the period between kindergarten and second grade, there was an associated drop in test scores of approximately 1.5 NCEs in third grade. For example, a student eligible for free lunch who does not move during the K–2 period has a predicted math score of 48.41 NCEs in third grade; another student also eligible for free lunch who moved twice during the K–2 period (as was the case for 5% of the sample) is expected to have a math score of 45.54 NCEs.

There was also a significant association of K–2 mobility with the linear trajectory of reading scores between third and eighth grade ( $\pi = -0.38, p < .05$ ), implying that residential moves during one’s early schooling negatively relate to reading achievement through elementary and middle school. For example, a free-lunch-eligible student with no K–2 moves would have an expected reading score of 47.71 NCEs in third grade, whereas a free-lunch-eligible student with two K–2 moves would have an expected reading score of 44.30 NCEs in third grade, a three-NCE difference. However, because of the effect of K–2 mobility on the trajectory of reading achievement, these same two students would be expected to have respective reading scores of 32.60 and 27.29 NCEs by eighth grade (holding subsequent mobility constant, and assuming free-lunch eligibility in seventh and eighth grade), a difference of >5 NCEs. NCEs are preferred over percentile scores because of their equal-interval scale, but in terms of percentile scores the former student would be expected to score at the 21st percentile and the latter student at the 14th percentile. Early elementary mobility appears to widen the achievement gap between the urban students in our sample and their peers statewide. This enduring effect of K–2 mobility was not evidenced for math achievement.

### Association of Year-by-Year Moves With Achievement During the Testing Years

Year-by-year moves were more highly associated with math than with reading achievement. For math achievement, changing residences during the testing years evinced a consistently significant negative association. The effect appears to be greatest during third grade ( $\gamma = -4.27, p < .001$ ) and eighth grade ( $\gamma = -3.18, p < .01$ ). There was also a significant negative effect in fourth, fifth, and sixth grade and a 1-year lagged effect in seventh grade. This implies that taking into consideration the expected decline in math scores over time, there is an additional expected temporary decrease in math scores of 1 to 4.5 NCEs for a residential move between third and eighth grade. The model suggests that a free-lunch-eligible student who did not move in eighth grade would have an expected math score of 39.28 NCEs, whereas a free-lunch-eligible student who does move during eighth grade would have an expected score of 36.093 NCEs, holding earlier achievement and moves constant. Somewhat unexpectedly, the results show that mobility does not have a contemporaneous or 1-year lagged effect on reading achievement at any grade level.

The 1-year-lagged association of mobility with test scores was largely insignificant. The only significant lagged association was between seventh-grade math achievement and sixth-grade mobility. The general absence of significant findings associated with 1-year-lagged mobility implies that contemporaneous mobility may be more salient to math achievement and that the modeling of more distantly lagged mobility predictors may be unnecessary. In additional analyses, not shown, inclusion of community-level mobility (to index macro-level economic circumstances) did not make any substantive contribution to the findings and worsened overall model fit.

In sum, early elementary mobility is associated with a downward trajectory in reading scores throughout the testing years, whereas math scores seem more sensitive to proximal mobility. For the sake of illustration, a free-lunch-eligible student from a sample school who does not move at all over the course of Kindergarten through eighth grade would have an expected math score of 39.28 NCEs, whereas a free-lunch-eligible student who moves once during the K–2 period and again in eighth grade would be expected to have a score of 34.66 NCEs. Highly mobile urban eighth-graders in our sample had expected math scores markedly further below the statewide norm of 50 NCEs compared to their more stable classmates. In terms of percentile scores, the two hypothetical students described here would be expected to score at the 30th and the 24th percentiles, respectively.

### Discussion

Early elementary mobility (K–2) may set urban students back in terms of math and reading achievement at the earliest level of testing (third grade). Our results imply that this gap is not made up over time—the third-grade achievement starting point is lower for early movers in both reading and math. Their trajectory of math achievement over time runs roughly parallel to that of their less mobile peers, with temporary declines associated with subsequent moves, whereas for reading achievement their trajectory declines more steeply. This suggests that early elementary

**Table 2**  
**Contemporaneous and Lagged Effects of Residential Mobility on Math and Reading Achievement**

Mobility	Math achievement					
	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
K–Grade 2	–1.44* (0.64)	–0.18 (0.21)	–0.18 (0.21)	–0.18 (0.21)	–0.18 (0.21)	–0.18 (0.21)
Grade 3	–4.27*** (1.27)	–1.23 (0.81)	–	–	–	–
Grade 4	–	–2.59** (0.86)	–1.34* (0.67)	–	–	–
Grade 5	–	–	–1.98** (0.68)	–0.79 (0.64)	–	–
Grade 6	–	–	–	–2.00** (0.68)	–1.59* (0.82)	–
Grade 7	–	–	–	–	–0.40 (0.81)	–0.14 (1.07)
Grade 8	–	–	–	–	–	–3.18** (0.99)

Mobility	Reading achievement					
	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
K–Grade 2	–1.70** (0.54)	–0.38* (0.18)	–0.38* (0.18)	–0.38* (0.18)	–0.38* (0.18)	–0.38* (0.18)
Grade 3	–1.96 (1.06)	–1.28 (0.71)	–	–	–	–
Grade 4	–	–1.12 (0.73)	–0.92 (0.71)	–	–	–
Grade 5	–	–	–0.33 (0.67)	–0.38 (0.63)	–	–
Grade 6	–	–	–	0.43 (0.69)	–0.45 (0.79)	–
Grade 7	–	–	–	–	0.15 (0.79)	–2.02 (1.01)
Grade 8	–	–	–	–	–	–1.79 (1.08)

Note. Analysis control for free- and reduced-price-lunch eligibility. Standard errors are in parentheses. K–Grade 2 mobility results indicate the effects of the time-invariant K–2 mobility covariate on the (a) intercept of the growth curve (i.e., third-grade achievement) and the (b) slope of the growth curve (a fixed value for fourth through eighth-grade achievement).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

mobility is a source of inequality in academic achievement through primary school.

Disruption of routines and social ties during these formative years of schooling may have an enduring detrimental effect on children's learning. The foundation of a child's reading competency may be particularly affected by these early disruptions, as there is a negative residual effect of mobility through middle school. Neighborhood and household resources—such as the provision of books, educational toys, learning experiences and routines, and structure—have been shown to be important determinants of young children's verbal ability, in particular (Leventhal & Brooks-Gunn, 2000). Tumult brought on by moving during this early period may unsettle children's reading development in an enduring fashion.

In addition to early mobility, moves at any time during the "testing years" of elementary and middle school (i.e., third through eighth grade) are associated with reductions in math but

not reading achievement. For reading achievement, once the long-term effect of K–2 mobility is taken into account, more proximal moves during the third-through-eighth-grade period appear to have little import. This may imply that if children are able to establish a foundation in reading during early elementary school without mobility disruptions, they may be insulated from the effects of subsequent moves—at least in terms of their reading achievement. Reading may be a refuge for children who have established sufficient skill to make it enjoyable.

The same is not true of math achievement, however. The contemporaneous and lagged associations of mobility from Grades 3 to 8 were highly significant, implying that a student can experience a drop of 2 to 4 NCEs in achievement for a move during the testing years. The association was relatively consistent across grades. For reference, a recent study found that math-focused comprehensive school reform explains an annual difference of approximately 1 NCE in the math scores of urban middle school

students (Mac Iver & Mac Iver, 2010). Further, in Tennessee, the state in which the present research was conducted, it is considered “exceptional” by the state department of education in their value-added assessment for an elementary or middle school to increase its average math score by 1.5 NCEs and their average reading score by 1.2 NCEs from one year to the next (Tennessee Department of Education, 2009). Thus, for children who move, a decline of 2 to 4 NCEs is substantial enough to offset the benefits of other achievement-oriented reforms and to partially hinder their academic growth in school.

A central contribution of this study is to show that residential moves were associated with negative deviations from students’ own trajectories in math achievement. Because analyses control for prior achievement, early mobility, and economic circumstances that allowed eligibility for free and reduced-price lunches, the reductions in math performance do not simply reflect enduring social and economic disadvantage. Third variable causation is still plausible—it may be that circumstances such as parental job loss or severe illness that led to the move are the main culprits, but only contemporaneous events associated with mobility are plausible third variables. Although the analyses remain correlational, they have moved the field closer to understanding causality. In the case of reading, where early mobility was associated with both initial reading scores and subsequent poor trajectories, an explanation based on enduring social disadvantage remains plausible. It is also possible, in both cases, that residential mobility is a mediating mechanism that explains how more general family disruptions affect achievement, and this consideration could be taken into account in future research.

A weakness of the present study is that it does not model information on students’ school mobility. Our data show that in 2009, residential moves were accompanied by a change of school slightly less than half the time, but the school system did not make data on school moves in other years available. This fact makes it somewhat difficult to assert whether the demonstrated effects of residential mobility are due to stress and dislocation in the home environment or the school environment.

This uncertainty affects the practical implications of the study, to a degree, as well. For example, a common approach to managing a highly mobile student body is for districts to implement a standard curriculum to ensure that students who transfer school simply pick up where they left off in the sequencing of classroom instruction. This solution would not help highly mobile students who do not change schools.

Other interventions that focus more on the socioemotional aspects of mobility—for example, adjustment counseling and tutoring for mobile students and providing networking opportunities for the parents of mobile children—are just as relevant for residential movers as they are for school changers. Urban schools, in particular, can make efforts to monitor not only newly enrolled students (thus experiencing school mobility) but also students who change residences while maintaining enrollment in the school. The results of the present study suggest that supplemental resources may be best employed beginning in the early elementary years and continuing through middle school. Future analyses of this type could explore whether the contemporaneous effect of mobility on achievement persists into the high school years.

On a social policy level, this study implies that reducing residential mobility is in the interest of urban elementary and middle school students. Our findings suggest that on average, students from the sampled urban schools performed substantially below the statewide norm on achievement tests by eighth grade. They suggest further that residential stability during the elementary and middle school years may explain why that gap is smaller for some students than others. Policies that make it easier for low-income families to stay in their homes—including affordable housing and efforts to enforce fair housing laws and combat predatory lending—could be helpful in reducing mobility. A multipronged effort to reduce residential mobility could have important benefits. The present housing crisis makes initiatives such as these even more imperative. In the effort to improve educational outcomes for urban students, helping to make their homes more stable may be an important step.

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## **L. HRA Debt Analysis**

## HRA DEBT ANALYSIS

HRA Business Plan (provided Dec 2014)	Year starting...														
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Closing Debt (£'000)	402,953	394,894	386,996	379,256	371,671	364,238	356,953	349,814	342,818	335,961	329,242	322,657	316,204	309,880	303,682
Debt Cap (£'000)	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078
Headroom (£'000)	5,125	13,184	21,082	28,822	36,407	43,840	51,125	58,264	65,260	72,117	78,836	85,421	91,874	98,198	104,396
TPP if 100% HRA Debt funded (£'000)	0	2,625	4,645	6,715	6,051	5,636	4,871	4,046	3,158	2,240	3,499	2,490	1,406	2,107	977
Headroom after TPP (£'000)	5,125	10,559	16,437	22,106	30,355	38,205	46,254	54,218	62,103	69,877	75,337	82,931	90,468	96,091	103,418
<b>Adjusted HRA Business Plan for Backlog Funding &amp; 1% Rent Reduction</b>															
Closing Debt + Rent Loss Impact - £23m Backlog	385,462	383,040	380,878	378,987	369,588	360,287	351,081	341,965	332,934	323,984	315,110	306,308	297,573	288,901	280,682
Debt Cap (£'000)	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078
Adjusted Headroom (£'000)	22,616	25,038	27,200	29,091	38,490	47,791	56,997	66,113	75,144	84,094	92,968	101,770	110,505	119,177	127,396
Full TPP Funding Requirement (£'000)	0	2,625	4,645	6,715	6,051	5,636	4,871	4,046	3,158	2,240	3,499	2,490	1,406	2,107	977
Headroom after TPP (£'000)	22,616	22,413	22,555	22,376	32,439	42,155	52,126	62,067	71,986	81,854	89,468	99,280	109,099	117,071	126,418

## HRA DEBT ANALYSIS

<b>HRA Business Plan (provided Dec 2014)</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>
Closing Debt (£'000)	297,609	291,657	285,823	280,107	274,505	269,015	263,634	258,362	253,195	248,131	243,168	238,305
Debt Cap (£'000)	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078
Headroom (£'000)	110,469	116,421	122,255	127,971	133,573	139,063	144,444	149,716	154,883	159,947	164,910	169,773
TPP if 100% HRA Debt funded (£'000)	109	0	0	0	0	0	0	0	0	0	0	0
Headroom after TPP (£'000)	110,360	116,421	122,255	127,971	133,573	139,063	144,444	149,716	154,883	159,947	164,910	169,773
<b>Adjusted HRA Business Plan for Backlog Funding</b>												
Closing Debt + Rent Loss Impact - £23m Backlog	274,609	268,657	262,823	257,107	251,505	246,015	240,634	235,362	230,195	225,131	220,168	215,305
Debt Cap (£'000)	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078	408,078
Adjusted Headroom (£'000)	133,469	139,421	145,255	150,971	156,573	162,063	167,444	172,716	177,883	182,947	187,910	192,773
Full TPP Funding Requirement (£'000)	109	0	0	0	0	0	0	0	0	0	0	0
Headroom after TPP (£'000)	133,360	139,421	145,255	150,971	156,573	162,063	167,444	172,716	177,883	182,947	187,910	192,773

## **M. Re-created Option 5 Financial Model**



# ASSUMPTIONS

Blue denotes council assumption

Red denotes adjusted/added assumption

Shaded means not used

Currently not included in model:

\* Land purchase, HRA repayment or ground lease payments

\* CIL, s106 contributions

## CONSTANTS

sqft/m2	#	10.764
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## PROGRAMME

Build Duration	wks	244
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## S CURVES

	Start	Months	End	Years	
Pre-start period	Oct-16	5	Mar-17	Mar-17	
Signing the unconditional contract	Mar-17	0	Mar-17	Mar-17	
Phase construction start date	Apr-17	56	Dec-21	Dec-21	
Phase construction end date	Apr-17	56	Dec-21	Dec-21	
Phase sales end date	Dec-23	0	Dec-23	Dec-23	
Residential construction period	Apr-17	56	Dec-21	Dec-21	5
Private dwelling sales (off plan sales)	Feb-17	57	Nov-21	Nov-21	
Private dwelling sales (post completion sa	Dec-21	24	Dec-23	Dec-23	
Staircasing period	Dec-23	451	Jul-61	Jul-61	
Leaseholder buy-outs	Jan-17	0	Jan-17	Jan-17	
Consolidate programme of construction a	Apr-17	80	Dec-23	Dec-23	
End date for overall development	Dec-21	658	Oct-76	Oct-76	

## ACCOMMODATION

Unit Sizes	NIA m2	sqft
1 bed flat	50	538
2 bed flat	70	753
3 bed flat	86	926
4 bed flat	99	1,066
5 bed flat	112	1,206
1 bed house	50	538
2 bed house	79	850
3 bed house	93	1,001
4 bed house	106	1,141
5 bed house	119	1,281

## RENTS, OPERATIONAL ALLOWANCES & VALUES

### Council Rent (replacement)

#### Gross rent per week

1 bed	£	117
2 bed	£	135
3 bed	£	144
4 bed	£	158
5 bed	£	166

Voids	%	5%
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Management & lettings cost	%	20%
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Maintenance costs	%	21% Based on "Rents & Affordability Calculator" provided by Lambeth
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#### Net Rent after voids, mgt & lettings

1 bed	76%
2 bed	76%

## ASSUMPTIONS

Blue denotes council assumption

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Shaded means not used

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\* Land purchase, HRA repayment or ground lease payments

\* CIL, s106 contributions

3 bed	76%
4 bed	76%
5 bed	76%

### Affordable Rent (net gain)

#### Gross rent per week

1 bed	£	204.08
2 bed	£	265.29
3 bed	£	144
4 bed	£	158
5 bed	£	166

Voids	%	5%
Management & lettings cost	%	15%
Maintenance costs	%	21%

#### Net Rent after voids, mgt & lettings

1 bed	81%
2 bed	81%
3 bed	81%
4 bed	81%
5 bed	81%

### Market Rent

#### Gross rent per week

1 bed	£	354.21
2 bed	£	453.96
3 bed	£	605.62
4 bed	£	757.29
5 bed	£	757.29

Voids	%	5%
Management & lettings cost	%	25%
Maintenance costs	%	21%

#### Net Rent after voids, mgt & lettings

1 bed	71%
2 bed	71%
3 bed	71%
4 bed	71%
5 bed	71%

### Private Sale

OMV	£/sqft	588.32
1 bed flat	£	316,634
2 bed flat	£	443,287
3 bed flat	£	544,610
4 bed flat	£	626,935
5 bed flat	£	709,260
1 bed house	£	316,634
2 bed house	£	500,281
3 bed house	£	588,939

## ASSUMPTIONS

Blue denotes council assumption

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Shaded means not used

Currently not included in model:

\* Land purchase, HRA repayment or ground lease payments

\* CIL, s106 contributions

4 bed house	£	671,264
5 bed house	£	753,589

### DECANTING / DISTURBANCE COSTS, and BUY-OUTS

#### Existing Council Rent Decant

Assumed Homeloss pæ	£	5,300
Assumed Disturbance	£	3,000
Double decant	%	25%

#### Existing Leaseholder/Freeholder Decant

Disturbance	£	4,000
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#### Homeowner Buy Outs

Buy-out rate	%	20%
Uplift*	%	23%

\* Homeloss of 10%, stamp duty 5%, legal costs 5%, miscellaneous 3%

Price	£/sqft	Buy-Out Price
	Size (m2)	
1 bed	50	250,801
2 bed	76	381,218
3 bed	86	431,378
4 bed	99	496,586
5 bed	112	561,795

#### Staircasing

Retained Equity by LBI %		30%
Staircasing (dwellings/ #)		2

### BUILD COSTS

Demolition cost £ 2,795,000 *Ian Sayer model*

Build cost	£/m2	1,750
Build cost w/ contingency	£/m2	1,925

Sales Upgrade	£	25,000
Flat multiple*	#	1.17

\* Additional cost for communal areas

Build Cost Contingency % 10%

#### Abnormals

Car parking	£	3,600,000 <i>Ian Sayer model</i>
Community hall	£	1,000,000 <i>Ian Sayer model</i>
Wheelchair provision	£	250,000 <i>Ian Sayer model</i>
CSH 4	£	4,640,000 <i>Ian Sayer model</i>

## ASSUMPTIONS

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Shaded means not used

Currently not included in model:

\* Land purchase, HRA repayment or ground lease payments

\* CIL, s106 contributions

Lifts	£	600,000	<i>Ian Sayer model</i>
Ext - Statutory Services	£	1,624,000	<i>Ian Sayer model</i>
External Works	£	1,995,200	<i>Ian Sayer model</i>
Drainage	£	1,160,000	<i>Ian Sayer model</i>
Infrastructure Costs	£	1,500,000	<i>Ian Sayer model</i>
Watermain	£	350,000	<i>S. Morrow estimate</i>
Japanese Knotweed	£	2,000,000	<i>Guess (Olympic park stadium, 10 acres, £70m)</i>
<b>TOTAL</b>	<b>£</b>	<b>18,719,200</b>	

### STATUTORY COSTS

s106 (new dwellings)

CIL (gross resi additional area)

% pmt at start of phase

% pmt at end of phase

### FEES & PERCENTAGES

Professional Fees	%	8.0%
% upfront	%	50.0%
SPV Overheads	%	1.5%
Sales & Marketing	%	3.5%
Developer's Margin	%	0.0%
Developer's Manager	%	1.0%
Corporation Tax	%	0.0%

### INFLATION

	Annual	Mthly Equiv
Private rent	3.0%	0.25%
Private sale	5.0%	0.41%
Net Gain Council rent	2.2%	0.18%
Shared Equity (Replac	2.2%	0.18%
Net Gain Affordable D	2.2%	0.18%
Income from car parki	2.2%	0.18%
Non-residential incom	2.2%	0.18%
Capitalised Ground Re	2.2%	0.18%
Other income	2.2%	0.18%
Regeneration growth	2.2%	0.18%
HCA Grant/Investmen	2.2%	0.18%
Residential build costs	4.0%	0.33%
Non-residnetial build	4.0%	0.33%
Professional fees	0.0%	0.00%
Statutory costs	0.0%	0.00%
Community investmer	0.0%	0.00%
Other costs	0.0%	0.00%
AH overheads	1.3%	0.11%
Developer's managem	1.3%	0.11%
Sub debt funding LBL	0.0%	0.00%
Prelim fees	4.0%	0.33%

## ASSUMPTIONS

Blue denotes council assumption

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Shaded means not used

Currently not included in model:

\* Land purchase, HRA repayment or ground lease payments

\* CIL, s106 contributions

### CASHFLOW

		Mthly Equiv
NPV Discount Factor	%	6.1%
Inflation included?		y
NPV Cashflow period	yrs	60

### Development Finance

Sub debt funding by LBL  
Senior debt funding by LBL bank  
LBL equity

Finance costs (annual rate):  
Sub debt funding by LBL  
Senior debt funding by LBL bank  
LBL equity

Commercial uplift on Finance Rates

### Investment Finance

Sub debt funding by LBL  
Senior debt funding by LBL bank  
LBL equity

Finance costs (annual rate):  
Sub debt funding by LBL  
Senior debt funding by LBL bank  
LBL equity

Commercial uplift on Finance Rates

### Prudential

Average property price

RBT Buy Back Pot	£	1,680,000
LBL Grant for Pre Contract Fees		7,475,649

RTB receipts deployed for build

Land Pmts - Ground Rent Pmts on Occupation  
£ per plot/ PA









## RE-CREATION OF AIREY MILLER MODEL

NPV: -19,393,826

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<b>DEMOLITION &amp; ABNORMALS</b>																	
TOTAL	0	4,442,590	4,442,590	4,442,590	4,442,590	3,743,840	0	0	0	0	0	0	0	0	0	0	0
Demolition Costs	0	698,750	698,750	698,750	698,750	0	0	0	0	0	0	0	0	0	0	0	0
Abnormals	0	3,743,840	3,743,840	3,743,840	3,743,840	3,743,840	0	0	0	0	0	0	0	0	0	0	0
<b>BUILD COSTS</b>																	
<b>FEES</b>																	
TOTAL	3,961,245	1,312,270	1,334,531	1,357,866	1,382,323	1,373,017	35,523	36,304	37,103	37,919	38,753	39,606	40,477	41,368	42,278	43,208	44,159
Professional Fees	3,961,245	797,839	797,839	797,839	797,839	769,889	0	0	0	0	0	0	0	0	0	0	0
SPV Overheads	0	0	6,512	13,311	20,406	27,806	35,523	36,304	37,103	37,919	38,753	39,606	40,477	41,368	42,278	43,208	44,159
Sales & Marketing	0	314,971	330,720	347,256	364,619	382,849	0	0	0	0	0	0	0	0	0	0	0
Developer's Management Fees	0	199,460	199,460	199,460	199,460	192,472	0	0	0	0	0	0	0	0	0	0	0
<b>MAINTENANCE</b>																	
TOTAL	0	0	0	93,216	190,533	292,087	398,018	508,468	519,654	531,086	542,770	554,711	566,915	579,387	592,134	605,160	618,474
Council rent (replacement)	0	0	0	49,968	102,135	156,573	213,356	272,563	278,559	284,687	290,951	297,351	303,893	310,579	317,412	324,395	331,531
Affordable rent (net gain)	0	0	0	30,247	61,826	94,779	129,152	164,992	168,622	172,331	176,123	179,997	183,957	188,004	192,140	196,367	200,688
Market rent	0	0	0	13,000	26,573	40,736	55,509	70,913	72,473	74,068	75,697	77,363	79,065	80,804	82,582	84,398	86,255







**RE-CREATION OF AIREY**

NPV: -19,393,826

Year	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Year #	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

**DEMOLITION & ABNORMALS**

TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demolition Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abnormals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**BUILD COSTS**

**FEES**

TOTAL	45,130	46,123	47,138	48,175	49,234	50,318	51,425	52,556	53,712	54,894	56,101	57,336	58,597	59,886	61,204	62,550	63,926	65,333
Professional Fees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPV Overheads	45,130	46,123	47,138	48,175	49,234	50,318	51,425	52,556	53,712	54,894	56,101	57,336	58,597	59,886	61,204	62,550	63,926	65,333
Sales & Marketing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Developer's Management Fees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**MAINTENANCE**

TOTAL	632,080	645,986	660,198	674,722	689,566	704,737	720,241	736,086	752,280	768,830	785,744	803,031	820,698	838,753	857,205	876,064	895,337	915,035
Council rent (replacement)	338,825	346,279	353,897	361,683	369,640	377,772	386,083	394,577	403,258	412,129	421,196	430,462	439,933	449,611	459,503	469,612	479,943	490,502
Affordable rent (net gain)	205,103	209,615	214,226	218,939	223,756	228,679	233,710	238,851	244,106	249,476	254,965	260,574	266,307	272,165	278,153	284,272	290,526	296,918
Market rent	88,153	90,092	92,074	94,100	96,170	98,286	100,448	102,658	104,916	107,225	109,583	111,994	114,458	116,976	119,550	122,180	124,868	127,615









**RE-CREATION OF AIREY**

NPV: -19,393,826

Year	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
Year #	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53

**DEMOLITION & ABNORMALS**

TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Demolition Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abnormals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**BUILD COSTS**

**FEES**

TOTAL	66,770	68,239	69,740	71,275	72,843	74,445	76,083	77,757	79,467	81,216	83,002	84,828	86,695	88,602	90,551	92,543	94,579	96,660
Professional Fees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPV Overheads	66,770	68,239	69,740	71,275	72,843	74,445	76,083	77,757	79,467	81,216	83,002	84,828	86,695	88,602	90,551	92,543	94,579	96,660
Sales & Marketing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Developer's Management Fees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**MAINTENANCE**

TOTAL	935,166	955,739	976,765	998,254	1,020,216	1,042,661	1,065,599	1,089,042	1,113,001	1,137,487	1,162,512	1,188,087	1,214,225	1,240,938	1,268,239	1,296,140	1,324,655	1,353,798
Council rent (replacement)	501,293	512,321	523,592	535,111	546,884	558,915	571,211	583,778	596,621	609,747	623,161	636,871	650,882	665,201	679,836	694,792	710,078	725,699
Affordable rent (net gain)	303,450	310,126	316,949	323,922	331,048	338,331	345,774	353,381	361,156	369,101	377,221	385,520	394,002	402,670	411,529	420,582	429,835	439,291
Market rent	130,422	133,292	136,224	139,221	142,284	145,414	148,613	151,883	155,224	158,639	162,129	165,696	169,341	173,067	176,874	180,766	184,742	188,807

## RE-CREATION OF AIREY

NPV: -19,393,826

Year	2069	2070	2071	2072	2073	2074	2075
Year #	54	55	56	57	58	59	60

### SUMMARY CASHFLOWS

#### SUMMARY CASHFLOW

Rental income	6,585,768	6,730,655	6,878,729	7,030,061	7,184,723	7,342,786	7,504,328
Council rent (replacement)	3,530,283	3,607,949	3,687,324	3,768,445	3,851,351	3,936,080	4,022,674
Affordable (net gain)	2,137,004	2,184,018	2,232,067	2,281,172	2,331,358	2,382,648	2,435,066
Market rent	918,481	938,687	959,339	980,444	1,002,014	1,024,058	1,046,587
Private homes	0	0	0	0	0	0	0
Private sales	0	0	0	0	0	0	0
Staircasing	0	0	0	0	0	0	0
<b>TOTAL CASH INFLOW</b>	<b>6,585,768</b>	<b>6,730,655</b>	<b>6,878,729</b>	<b>7,030,061</b>	<b>7,184,723</b>	<b>7,342,786</b>	<b>7,504,328</b>
Buy-out cost	0	0	0	0	0	0	0
Disturbance costs	0	0	0	0	0	0	0
Demolition costs	0	0	0	0	0	0	0
Abnormals	0	0	0	0	0	0	0
Build Cost	0	0	0	0	0	0	0
Council rent (replacement)	0	0	0	0	0	0	0
Affordable (net gain)	0	0	0	0	0	0	0
Market rent	0	0	0	0	0	0	0
Private sales	0	0	0	0	0	0	0
Private (replacements)	0	0	0	0	0	0	0
Fees	98,787	100,960	103,181	105,451	107,771	110,142	112,565
Maintenance	1,383,581	1,414,020	1,445,128	1,476,921	1,509,413	1,542,620	1,576,558
<b>TOTAL CASH OUTFLOW</b>	<b>1,482,368</b>	<b>1,514,980</b>	<b>1,548,309</b>	<b>1,582,372</b>	<b>1,617,184</b>	<b>1,652,762</b>	<b>1,689,123</b>
<b>TOTAL NET CASH FLOW</b>	<b>5,103,400</b>	<b>5,215,675</b>	<b>5,330,420</b>	<b>5,447,689</b>	<b>5,567,538</b>	<b>5,690,024</b>	<b>5,815,205</b>

#### DISCOUNTED SUMMARY CASHFLOW

Rental income	286,986	276,463	266,326	256,561	247,153	238,091	229,361
Council rent (replacement)	153,838	148,197	142,763	137,529	132,486	127,628	122,948
Affordable (net gain)	93,124	89,709	86,420	83,251	80,198	77,258	74,425
Market rent	40,024	38,557	37,143	35,781	34,469	33,205	31,988
Private homes	0	0	0	0	0	0	0
Private sales	0	0	0	0	0	0	0
Staircasing	0	0	0	0	0	0	0
<b>TOTAL DISCOUNTED CASH INFLOW</b>	<b>286,986</b>	<b>276,463</b>	<b>266,326</b>	<b>256,561</b>	<b>247,153</b>	<b>238,091</b>	<b>229,361</b>
Buy-out cost	0	0	0	0	0	0	0
Disturbance costs	0	0	0	0	0	0	0
Demolition costs	0	0	0	0	0	0	0
Abnormals	0	0	0	0	0	0	0
Build Cost	0	0	0	0	0	0	0
Council rent (replacement)	0	0	0	0	0	0	0
Affordable (net gain)	0	0	0	0	0	0	0
Market rent	0	0	0	0	0	0	0
Private sales	0	0	0	0	0	0	0
Private (replacements)	0	0	0	0	0	0	0

## RE-CREATION OF AIREY

NPV: -19,393,826

Year	2069	2070	2071	2072	2073	2074	2075
Year #	54	55	56	57	58	59	60
Fees	4,305	4,147	3,995	3,848	3,707	3,571	3,440
Maintenance	60,292	58,081	55,951	53,900	51,924	50,020	48,186
<b>TOTAL CASH OUTFLOW</b>	<b>64,597</b>	<b>62,228</b>	<b>59,946</b>	<b>57,748</b>	<b>55,631</b>	<b>53,591</b>	<b>51,626</b>
<b>TOTAL DISCOUNTED CASH FLOW</b>	<b>222,389</b>	<b>214,235</b>	<b>206,380</b>	<b>198,812</b>	<b>191,522</b>	<b>184,500</b>	<b>177,735</b>

## CASH INFLOWS

### NET RENTAL INCOME

<b>TOTAL</b>	<b>6,585,768</b>	<b>6,730,655</b>	<b>6,878,729</b>	<b>7,030,061</b>	<b>7,184,723</b>	<b>7,342,786</b>	<b>7,504,328</b>
1 bed flat	1,173,087	1,198,895	1,225,270	1,252,226	1,279,775	1,307,930	1,336,705
2 bed flat	3,172,310	3,242,100	3,313,427	3,386,322	3,460,821	3,536,959	3,614,772
3 bed flat	1,350,441	1,380,151	1,410,514	1,441,545	1,473,259	1,505,671	1,538,796
4 bed flat	294,196	300,668	307,283	314,043	320,952	328,013	335,229
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	265,092	270,924	276,884	282,976	289,201	295,564	302,066
3 bed house	199,687	204,080	208,570	213,158	217,848	222,640	227,538
4 bed house	130,956	133,837	136,781	139,791	142,866	146,009	149,221
5 bed house	0	0	0	0	0	0	0
<b>Council rent (replacement)</b>	<b>3,530,283</b>	<b>3,607,949</b>	<b>3,687,324</b>	<b>3,768,445</b>	<b>3,851,351</b>	<b>3,936,080</b>	<b>4,022,674</b>
1 bed flat	791,214	808,621	826,410	844,592	863,173	882,162	901,570
2 bed flat	1,758,254	1,796,935	1,836,468	1,876,870	1,918,161	1,960,361	2,003,489
3 bed flat	901,669	921,505	941,778	962,497	983,672	1,005,313	1,027,430
4 bed flat	79,146	80,888	82,667	84,486	86,345	88,244	90,186
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	0	0	0	0	0	0	0
3 bed house	0	0	0	0	0	0	0
4 bed house	0	0	0	0	0	0	0
5 bed house	0	0	0	0	0	0	0
<b>Affordable (net gain)</b>	<b>2,137,004</b>	<b>2,184,018</b>	<b>2,232,067</b>	<b>2,281,172</b>	<b>2,331,358</b>	<b>2,382,648</b>	<b>2,435,066</b>
1 bed flat	298,701	305,272	311,988	318,852	325,867	333,036	340,363
2 bed flat	1,094,274	1,118,348	1,142,951	1,168,096	1,193,794	1,220,058	1,246,899
3 bed flat	306,567	313,312	320,205	327,249	334,449	341,806	349,326
4 bed flat	126,140	128,915	131,751	134,649	137,612	140,639	143,733
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	211,795	216,454	221,216	226,083	231,057	236,140	241,335
3 bed house	57,481	58,746	60,038	61,359	62,709	64,089	65,499
4 bed house	42,047	42,972	43,917	44,883	45,871	46,880	47,911
5 bed house	0	0	0	0	0	0	0
<b>Market rent</b>	<b>918,481</b>	<b>938,687</b>	<b>959,339</b>	<b>980,444</b>	<b>1,002,014</b>	<b>1,024,058</b>	<b>1,046,587</b>
1 bed flat	83,172	85,002	86,872	88,783	90,736	92,732	94,772
2 bed flat	319,782	326,818	334,008	341,356	348,866	356,541	364,385
3 bed flat	142,205	145,334	148,531	151,799	155,138	158,552	162,040
4 bed flat	88,909	90,865	92,864	94,908	96,995	99,129	101,310
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	53,297	54,470	55,668	56,893	58,144	59,423	60,731
3 bed house	142,205	145,334	148,531	151,799	155,138	158,552	162,040

## RE-CREATION OF AIREY

NPV: -19,393,826

Year	2069	2070	2071	2072	2073	2074	2075
Year #	54	55	56	57	58	59	60
4 bed house	88,909	90,865	92,864	94,908	96,995	99,129	101,310
5 bed house	0	0	0	0	0	0	0

### PRIVATE SALE

Private sales	0	0	0	0	0	0	0
1 bed flat	0	0	0	0	0	0	0
2 bed flat	0	0	0	0	0	0	0
3 bed flat	0	0	0	0	0	0	0
4 bed flat	0	0	0	0	0	0	0
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	0	0	0	0	0	0	0
3 bed house	0	0	0	0	0	0	0
4 bed house	0	0	0	0	0	0	0
5 bed house	0	0	0	0	0	0	0

### STAIRCASING INCOME

Private sales	0	0	0	0	0	0	0
1 bed flat	0	0	0	0	0	0	0
2 bed flat	0	0	0	0	0	0	0
3 bed flat	0	0	0	0	0	0	0
4 bed flat	0	0	0	0	0	0	0
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	0	0	0	0	0	0	0
3 bed house	0	0	0	0	0	0	0
4 bed house	0	0	0	0	0	0	0
5 bed house	0	0	0	0	0	0	0

## CASH OUTFLOWS

### BUY-OUT COSTS

Private (replacements)	0	0	0	0	0	0	0
1 bed flat	0	0	0	0	0	0	0
2 bed flat	0	0	0	0	0	0	0
3 bed flat	0	0	0	0	0	0	0
4 bed flat	0	0	0	0	0	0	0
5 bed flat	0	0	0	0	0	0	0
1 bed house	0	0	0	0	0	0	0
2 bed house	0	0	0	0	0	0	0
3 bed house	0	0	0	0	0	0	0
4 bed house	0	0	0	0	0	0	0
5 bed house	0	0	0	0	0	0	0

### DISTURBANCE COSTS

Council Tenants	0	0	0	0	0	0	0
Homeless + Disturbance	0	0	0	0	0	0	0
Disturbance Double Decant	0	0	0	0	0	0	0
Homeowners - Replacement	0	0	0	0	0	0	0
Disturbance	0	0	0	0	0	0	0

## RE-CREATION OF AIREY

NPV: -19,393,826

Year	2069	2070	2071	2072	2073	2074	2075
Year #	54	55	56	57	58	59	60

### DEMOLITION & ABNORMALS

TOTAL	0	0	0	0	0	0	0
Demolition Costs	0	0	0	0	0	0	0
Abnormals	0	0	0	0	0	0	0

### BUILD COSTS

#### FEES

TOTAL	98,787	100,960	103,181	105,451	107,771	110,142	112,565
Professional Fees	0	0	0	0	0	0	0
SPV Overheads	98,787	100,960	103,181	105,451	107,771	110,142	112,565
Sales & Marketing	0	0	0	0	0	0	0
Developer's Management Fees	0	0	0	0	0	0	0

#### MAINTENANCE

TOTAL	1,383,581	1,414,020	1,445,128	1,476,921	1,509,413	1,542,620	1,576,558
Council rent (replacement)	741,665	757,981	774,657	791,699	809,117	826,917	845,110
Affordable rent (net gain)	448,956	458,833	468,927	479,244	489,787	500,562	511,575
Market rent	192,960	197,206	201,544	205,978	210,510	215,141	219,874

## **N. TPP Financial Viability Analysis**



## FINANCIAL FORECAST - BASELINE LF

	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
<b>CASH INFLOWS</b>												
<b>Council Rents</b>												
0 bed	62,886	64,773	66,716	68,718	70,779	72,903	75,090	77,342	79,663	82,053	84,514	87,050
1 bed	855,358	881,019	907,450	934,673	962,713	991,595	1,021,343	1,051,983	1,083,542	1,116,049	1,149,530	1,184,016
2 bed	254,973	262,622	270,501	278,616	286,975	295,584	304,451	313,585	322,992	332,682	342,663	352,943
3 bed	283,655	292,165	300,930	309,957	319,256	328,834	338,699	348,860	359,326	370,105	381,209	392,645
4 bed	346,310	356,699	367,400	378,422	389,774	401,468	413,512	425,917	438,695	451,855	465,411	479,373
Total Gross Rents	1,803,183	1,857,278	1,912,996	1,970,386	2,029,498	2,090,383	2,153,094	2,217,687	2,284,218	2,352,744	2,423,327	2,496,026
less: Bad Debts/Voids	-9,016	-9,286	-9,565	-9,852	-10,147	-10,452	-10,765	-11,088	-11,421	-11,764	-12,117	-12,480
Total Net Rents	1,794,167	1,847,992	1,903,431	1,960,534	2,019,350	2,079,931	2,142,329	2,206,599	2,272,797	2,340,981	2,411,210	2,483,546
<b>Leaseholders</b>												
Annual service charges (ex. Building Insurance)	51,394	52,679	53,996	55,346	56,730	58,148	59,602	61,092	62,619	64,185	65,789	67,434
LHS contribution	-	-	-	-	-	-	-	-	-	-	-	-
Cyclical window replacement	-	-	-	-	-	-	-	-	-	-	-	-
5 year cyclical	-	-	-	-	-	-	68,451	-	-	-	-	-
10 year cyclical	-	403,337	-	-	-	-	-	-	-	-	-	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	469,869
Total	51,394	456,016	53,996	55,346	56,730	58,148	128,053	61,092	62,619	64,185	65,789	537,303
<b>Freeholders</b>												
Annual service charges	-	-	-	-	-	-	-	-	-	-	-	-
LHS contribution (roof replacement)	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL CASH INFLOWS</b>	<b>1,845,561</b>	<b>2,304,008</b>	<b>1,957,428</b>	<b>2,015,880</b>	<b>2,076,080</b>	<b>2,138,079</b>	<b>2,270,381</b>	<b>2,267,690</b>	<b>2,335,416</b>	<b>2,405,165</b>	<b>2,476,999</b>	<b>3,020,849</b>

<b>CASH OUTFLOWS</b>												
<b>Repairs &amp; Maintenance</b>												
Annual maintenance	307,383	315,067	322,944	331,018	339,293	347,775	356,470	365,381	374,516	383,879	393,476	403,313
LHS standard	-	-	-	-	-	-	-	-	-	-	-	-
Cyclical window replacement	-	-	-	-	-	-	-	-	-	-	-	-
5 year cyclical	-	-	-	-	-	-	551,209	-	-	-	-	-
10 year cyclical	-	3,247,924	-	-	-	-	-	-	-	-	-	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	3,783,680
Total	307,383	3,562,992	322,944	331,018	339,293	347,775	907,679	365,381	374,516	383,879	393,476	4,186,993
<b>Other Costs</b>												
Annual management	369,112	460,802	391,486	403,176	415,216	427,616	454,076	453,538	467,083	481,033	495,400	604,170
Total	369,112	460,802	391,486	403,176	415,216	427,616	454,076	453,538	467,083	481,033	495,400	604,170
<b>TOTAL CASH OUTFLOWS</b>	<b>676,495</b>	<b>4,023,793</b>	<b>714,430</b>	<b>734,194</b>	<b>754,509</b>	<b>775,391</b>	<b>1,361,755</b>	<b>818,920</b>	<b>841,599</b>	<b>864,912</b>	<b>888,876</b>	<b>4,791,163</b>

<b>OVERALL FINANCIALS</b>												
<b>NET CASH FLOW BEFORE FUNDING</b>	<b>1,169,066</b>	<b>(1,719,785)</b>	<b>1,242,998</b>	<b>1,281,687</b>	<b>1,321,571</b>	<b>1,362,688</b>	<b>908,626</b>	<b>1,448,771</b>	<b>1,493,817</b>	<b>1,540,253</b>	<b>1,588,123</b>	<b>(1,770,314)</b>
Discount factor	0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow	577,084	(816,283)	567,288	562,447	557,644	552,878	354,475	543,458	538,804	534,185	529,603	(567,654)
<b>NPV</b>	<b>6,560,576</b>											





## FINANCIAL FORECAST - CARPARK HOUSING

Professional Fees	39,817	39,817	39,817	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	19,908	19,908	19,908	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncosts	11,945	11,945	11,945	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Promotion/Marketing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal Fees	3,982	3,982	3,982	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>473,818</b>	<b>473,818</b>	<b>473,818</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual maintenance	6,044	12,390	19,050	19,526	20,014	20,514	21,027	21,553	22,092	22,644	23,210	23,790	24,385	24,995	25,620	26,260	26,917
5 year cyclical	-	-	-	-	-	-	-	-	40,283	-	-	-	-	45,577	-	-	-
10 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>6,044</b>	<b>12,390</b>	<b>19,050</b>	<b>19,526</b>	<b>20,014</b>	<b>20,514</b>	<b>21,027</b>	<b>21,553</b>	<b>62,375</b>	<b>22,644</b>	<b>23,210</b>	<b>23,790</b>	<b>24,385</b>	<b>70,572</b>	<b>25,620</b>	<b>26,260</b>	<b>26,917</b>
<b>Other Costs</b>																	
Annual management	8,621	17,069	25,348	25,094	25,847	26,622	27,421	28,244	29,091	29,964	30,863	31,789	32,742	33,724	34,736	35,778	36,852
<b>Total</b>	<b>8,621</b>	<b>17,069</b>	<b>25,348</b>	<b>25,094</b>	<b>25,847</b>	<b>26,622</b>	<b>27,421</b>	<b>28,244</b>	<b>29,091</b>	<b>29,964</b>	<b>30,863</b>	<b>31,789</b>	<b>32,742</b>	<b>33,724</b>	<b>34,736</b>	<b>35,778</b>	<b>36,852</b>
<b>TOTAL CASH OUTFLOWS</b>	<b>488,483</b>	<b>503,277</b>	<b>518,216</b>	<b>44,620</b>	<b>45,861</b>	<b>47,137</b>	<b>48,448</b>	<b>49,797</b>	<b>91,466</b>	<b>52,608</b>	<b>54,073</b>	<b>55,579</b>	<b>57,127</b>	<b>104,296</b>	<b>60,356</b>	<b>62,038</b>	<b>63,768</b>

## OVERALL FINANCIALS

<b>NET CASH FLOW BEFORE FUNDING</b>	<b>(445,379)</b>	<b>(417,932)</b>	<b>(391,477)</b>	<b>80,851</b>	<b>83,374</b>	<b>85,975</b>	<b>88,657</b>	<b>91,422</b>	<b>53,989</b>	<b>97,211</b>	<b>100,241</b>	<b>103,364</b>	<b>106,584</b>	<b>64,326</b>	<b>113,325</b>	<b>116,853</b>	<b>120,490</b>
Discount factor	1.000	0.962	0.925	0.889	0.855	0.822	0.790	0.760	0.731	0.703	0.676	0.650	0.625	0.601	0.577	0.555	0.534
Discounted cash flow	(445,379)	(401,858)	(361,943)	71,876	71,268	70,665	70,067	69,473	39,449	68,299	67,719	67,143	66,572	38,633	65,442	64,884	64,331
<b>NPV</b>	<b>134,354</b>																



## FINANCIAL FORECAST - CARPARK H

Professional Fees	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncosts	-	-	-	-	-	-	-	-	-	-	-	-	-
Promotion/Marketing	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal Fees	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual maintenance	27,589	28,279	28,986	29,711	30,454	31,215	31,995	32,795	33,615	34,455	35,317	36,200	37,105
5 year cyclical	-	-	-	-	-	-	58,342	-	-	-	-	-	-
10 year cyclical	-	343,775	-	-	-	-	-	-	-	-	-	440,061	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	27,589	372,054	28,986	29,711	30,454	31,215	90,338	32,795	33,615	34,455	35,317	476,261	37,105
<b>Other Costs</b>													
Annual management	37,957	39,096	40,269	41,477	42,721	44,003	45,323	46,683	48,083	49,526	51,011	52,542	54,118
<b>Total</b>	37,957	39,096	40,269	41,477	42,721	44,003	45,323	46,683	48,083	49,526	51,011	52,542	54,118
<b>TOTAL CASH OUTFLOWS</b>	65,547	411,150	69,255	71,188	73,175	75,218	135,661	79,478	81,698	83,981	86,328	528,802	91,223

## OVERALL FINANCIALS

<b>NET CASH FLOW BEFORE FUNDING</b>	124,239	(215,670)	132,089	136,196	140,431	144,796	90,954	153,935	158,717	163,647	168,728	(266,094)	179,367
Discount factor	0.513	0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow	63,781	(106,461)	62,695	62,158	61,626	61,098	36,902	60,053	59,537	59,026	58,518	(88,736)	57,514
<b>NPV</b>	134,354												



## FINANCIAL FORECAST - CROSBY VOIDS HOUSING

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17
Enhanced finishing	25,000	25,000	25,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Professional Fees	73,833	68,333	68,333	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	36,917	34,167	34,167	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncosts	22,150	20,500	20,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Promotion/Marketing	3,557	3,321	3,321	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal Fees	7,383	6,833	6,833	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>882,174</b>	<b>816,488</b>	<b>816,488</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual maintenance	3,285	6,734	10,353	10,612	10,877	11,149	11,428	11,714	12,006	12,307	12,614	12,930	13,253	13,584	13,924	14,272	14,629
5 year cyclical	-	-	-	-	-	-	-	-	24,520	-	-	-	-	27,743	-	-	-
10 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>3,285</b>	<b>6,734</b>	<b>10,353</b>	<b>10,612</b>	<b>10,877</b>	<b>11,149</b>	<b>11,428</b>	<b>11,714</b>	<b>12,006</b>	<b>12,307</b>	<b>12,614</b>	<b>12,930</b>	<b>13,253</b>	<b>13,584</b>	<b>13,924</b>	<b>14,272</b>	<b>14,629</b>
<b>Other Costs</b>																	
Annual management	5,235	10,371	15,410	15,265	15,722	16,192	16,677	17,175	18,214	18,218	18,763	19,324	19,902	21,092	21,111	21,742	22,393
<b>Total</b>	<b>5,235</b>	<b>10,371</b>	<b>15,410</b>	<b>15,265</b>	<b>15,722</b>	<b>16,192</b>	<b>16,677</b>	<b>17,175</b>	<b>18,214</b>	<b>18,218</b>	<b>18,763</b>	<b>19,324</b>	<b>19,902</b>	<b>21,092</b>	<b>21,111</b>	<b>21,742</b>	<b>22,393</b>
<b>TOTAL CASH OUTFLOWS</b>	<b>890,693</b>	<b>833,593</b>	<b>842,251</b>	<b>25,877</b>	<b>26,599</b>	<b>27,341</b>	<b>28,104</b>	<b>28,889</b>	<b>30,221</b>	<b>30,525</b>	<b>31,377</b>	<b>32,254</b>	<b>33,155</b>	<b>34,676</b>	<b>35,034</b>	<b>36,014</b>	<b>37,021</b>

### OVERALL FINANCIALS

<b>NET CASH FLOW BEFORE FUNDING</b>	<b>(254,520)</b>	<b>(171,739)</b>	<b>(155,201)</b>	<b>50,450</b>	<b>52,011</b>	<b>53,620</b>	<b>55,278</b>	<b>56,988</b>	<b>60,852</b>	<b>60,566</b>	<b>62,438</b>	<b>64,368</b>	<b>66,356</b>	<b>70,784</b>	<b>70,519</b>	<b>72,697</b>	<b>74,942</b>
Discount factor	1.000	0.962	0.925	0.889	0.855	0.822	0.790	0.760	0.731	0.703	0.676	0.650	0.625	0.601	0.577	0.555	0.534
Discounted cash flow	(254,520)	(165,133)	(143,492)	44,850	44,459	44,072	43,687	43,306	44,464	42,553	42,181	41,812	41,446	42,511	40,723	40,366	40,012

NPV

523,766



## FINANCIAL FORECAST - CROSBY VO

	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Enhanced finishing	-	-	-	-	-	-	-	-	-	-	-	-	-
Professional Fees	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncosts	-	-	-	-	-	-	-	-	-	-	-	-	-
Promotion/Marketing	-	-	-	-	-	-	-	-	-	-	-	-	-
Legal Fees	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
Annual maintenance	14,994	15,369	15,753	16,147	16,551	16,965	17,389	17,823	18,269	18,726	19,194	19,674	20,166
5 year cyclical	-	-	-	-	-	-	35,513	-	-	-	-	-	-
10 year cyclical	-	209,254	-	-	-	-	-	-	-	-	-	267,863	-
30 year cyclical	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>14,994</b>	<b>15,369</b>	<b>15,753</b>	<b>16,147</b>	<b>16,551</b>	<b>16,965</b>	<b>17,389</b>	<b>17,823</b>	<b>18,269</b>	<b>18,726</b>	<b>19,194</b>	<b>19,674</b>	<b>20,166</b>
<b>Other Costs</b>													
Annual management	23,062	23,752	24,463	25,195	25,948	26,725	28,285	28,348	29,196	30,069	30,969	31,895	32,850
<b>Total</b>	<b>23,062</b>	<b>23,752</b>	<b>24,463</b>	<b>25,195</b>	<b>25,948</b>	<b>26,725</b>	<b>28,285</b>	<b>28,348</b>	<b>29,196</b>	<b>30,069</b>	<b>30,969</b>	<b>31,895</b>	<b>32,850</b>
<b>TOTAL CASH OUTFLOWS</b>	<b>38,057</b>	<b>39,121</b>	<b>40,216</b>	<b>41,342</b>	<b>42,499</b>	<b>43,689</b>	<b>45,674</b>	<b>46,171</b>	<b>47,465</b>	<b>48,795</b>	<b>50,163</b>	<b>51,569</b>	<b>53,015</b>

### OVERALL FINANCIALS

<b>NET CASH FLOW BEFORE FUNDING</b>	<b>77,256</b>	<b>79,640</b>	<b>82,098</b>	<b>84,632</b>	<b>87,243</b>	<b>89,934</b>	<b>95,752</b>	<b>95,567</b>	<b>98,514</b>	<b>101,551</b>	<b>104,681</b>	<b>107,907</b>	<b>111,233</b>
Discount factor	0.513	0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow	39,661	39,313	38,967	38,625	38,285	37,948	38,849	37,283	36,954	36,628	36,305	35,985	35,667
<b>NPV</b>	<b>523,766</b>												



## FINANCIAL FORECAST - GREEN PHASE 1

For modelling purposes have assumed 100% of homes (but excluding voids block) receive works regardless of tenure, and then recharged 100%. However, homeowners could opt out, but financials net net would be the same

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
<b>CASH INFLOWS</b>																		
<b>Leaseholders</b>																		
Leaseholder contribution	65,699	65,699	65,699	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	65,699	65,699	65,699	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Freeholders</b>																		
Freeholder contribution	15,560	15,560	15,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	15,560	15,560	15,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL CASH INFLOWS</b>	<b>81,259</b>	<b>81,259</b>	<b>81,259</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>CASH OUTFLOWS</b>																		
<b>Costs</b>																		
Phase 1 refurb	254,150	254,150	254,150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Professional fees	25,415	25,415	25,415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	12,708	12,708	12,708	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	292,273	292,273	292,273	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL CASH OUTFLOWS</b>	<b>292,273</b>	<b>292,273</b>	<b>292,273</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>OVERALL FINANCIALS</b>																		
<b>NET CASH FLOW BEFORE FUNDING</b>	<b>(211,014)</b>	<b>(211,014)</b>	<b>(211,014)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Discount factor	1.000	0.962	0.925	0.889	0.855	0.822	0.790	0.760	0.731	0.703	0.676	0.650	0.625	0.601	0.577	0.555	0.534	0.513
Discounted cash flow	(211,014)	(202,898)	(195,094)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NPV</b>	<b>(609,005)</b>																	

## FINANCIAL FORECAST - GREEN PHA

For modelling purposes have assumed 100% of homes (but e.

	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
<b>CASH INFLOWS</b>												
<b>Leaseholders</b>												
Leaseholder contribution	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
<b>Freeholders</b>												
Freeholder contribution	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL CASH INFLOWS</b>	-	-	-	-	-	-	-	-	-	-	-	-
<b>CASH OUTFLOWS</b>												
<b>Costs</b>												
Phase 1 refurb	-	-	-	-	-	-	-	-	-	-	-	-
Professional fees	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL CASH OUTFLOWS</b>	-	-	-	-	-	-	-	-	-	-	-	-
<b>OVERALL FINANCIALS</b>												
<b>NET CASH FLOW BEFORE FUNDING</b>	0	0	0	0	0	0	0	0	0	0	0	0
Discount factor	0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow	0	0	0	0	0	0	0	0	0	0	0	0
<b>NPV</b>	<b>(609,005)</b>											

## FINANCIAL FORECAST - SOLAR PANELS

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18
<b>CASH INFLOWS</b>																		
<b>Feed-In-Tariffs</b>																		
FIT-Generation Income	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248
FIT-Export Income	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527
Total FIT	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775
<b>Energy Savings</b>																		
Energy cost savings to households	21,403	21,938	22,486	23,048	23,625	24,215	24,821	25,441	26,077	26,729	27,397	28,082	28,784	29,504	30,242	30,998	31,773	32,567
Energy cost savings: communal electricity	18,121	18,574	19,038	19,514	20,002	20,502	21,015	21,540	22,079	22,631	23,196	23,776	24,371	24,980	25,604	26,245	26,901	27,573
Total	39,524	40,512	41,525	42,563	43,627	44,718	45,836	46,981	48,156	49,360	50,594	51,859	53,155	54,484	55,846	57,242	58,673	60,140
<b>TOTAL CASH INFLOWS</b>	<b>61,299</b>	<b>62,287</b>	<b>63,300</b>	<b>64,338</b>	<b>65,402</b>	<b>66,493</b>	<b>67,611</b>	<b>68,757</b>	<b>69,931</b>	<b>71,135</b>	<b>72,369</b>	<b>73,634</b>	<b>74,930</b>	<b>76,259</b>	<b>77,621</b>	<b>79,018</b>	<b>80,449</b>	<b>81,915</b>
<b>CASH OUTFLOWS</b>																		
<b>Installation</b>																		
Cost of units	667,154																	
Consultants fees	25,000																	
Total	692,154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Ongoing</b>																		
Maintenance	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532
Total	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532
<b>TOTAL CASH OUTFLOWS</b>	<b>692,686</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>
<b>OVERALL FINANCIALS</b>																		
<b>NET CASH FLOW BEFORE FUNDING</b>	<b>(631,387)</b>	<b>61,755</b>	<b>62,768</b>	<b>63,806</b>	<b>64,870</b>	<b>65,961</b>	<b>67,079</b>	<b>68,225</b>	<b>69,399</b>	<b>70,603</b>	<b>71,837</b>	<b>73,102</b>	<b>74,398</b>	<b>75,727</b>	<b>77,089</b>	<b>78,486</b>	<b>79,917</b>	<b>81,383</b>
Discount factor	1.000	0.962	0.925	0.889	0.855	0.822	0.790	0.760	0.731	0.703	0.676	0.650	0.625	0.601	0.577	0.555	0.534	0.513
Discounted cash flow	(631,387)	59,380	58,033	56,723	55,451	54,215	53,013	51,845	50,709	49,605	48,531	47,486	46,469	45,480	44,517	43,580	42,668	41,780
<b>NPV</b>	<b>657,981</b>																	

## FINANCIAL FORECAST - SOLAR PANI

	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
<b>CASH INFLOWS</b>												
<b>Feed-In-Tariffs</b>												
FIT-Generation Income	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248	14,248
FIT-Export Income	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527	7,527
Total FIT	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775	21,775
<b>Energy Savings</b>												
Energy cost savings to households	33,381	34,216	35,071	35,948	36,846	37,768	38,712	39,680	40,672	41,688	42,731	43,799
Energy cost savings: communal electricity	28,263	28,969	29,693	30,436	31,197	31,977	32,776	33,595	34,435	35,296	36,178	37,083
Total	61,644	63,185	64,764	66,383	68,043	69,744	71,488	73,275	75,107	76,984	78,909	80,882
<b>TOTAL CASH INFLOWS</b>	<b>83,419</b>	<b>84,960</b>	<b>86,540</b>	<b>88,159</b>	<b>89,818</b>	<b>91,519</b>	<b>93,263</b>	<b>95,050</b>	<b>96,882</b>	<b>98,760</b>	<b>100,684</b>	<b>102,657</b>
<b>CASH OUTFLOWS</b>												
<b>Installation</b>												
Cost of units	-	-	-	-	-	-	-	-	-	-	-	-
Consultants fees	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-	-
<b>Ongoing</b>												
Maintenance	532	532	532	532	532	532	532	532	532	532	532	532
Total	532	532	532	532	532	532	532	532	532	532	532	532
<b>TOTAL CASH OUTFLOWS</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>	<b>532</b>
<b>OVERALL FINANCIALS</b>												
<b>NET CASH FLOW BEFORE FUNDING</b>	<b>82,887</b>	<b>84,428</b>	<b>86,008</b>	<b>87,627</b>	<b>89,286</b>	<b>90,987</b>	<b>92,731</b>	<b>94,518</b>	<b>96,350</b>	<b>98,228</b>	<b>100,152</b>	<b>102,125</b>
Discount factor	0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow	40,915	40,073	39,253	38,454	37,675	36,916	36,176	35,455	34,752	34,067	33,399	32,747
<b>NPV</b>	<b>657,981</b>											

## FINANCIAL FORECAST - OVERALL SUMMARY

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	
<b>NET CASH FLOWS</b>																			
Basic Refurbishment	Yes	-1,162,353	-1,176,116	-1,189,891	737,437	457,512	784,236	808,729	833,981	860,015	-1,398,349	914,527	943,056	-891,900	1,002,790	646,225	1,066,278	1,099,502	1,133,755
New Homes: CarPark Conversion	Yes	-445,379	-417,932	-391,477	80,851	83,374	85,975	88,657	91,422	53,989	97,211	100,241	103,364	106,584	64,326	113,325	116,853	120,490	124,239
New Homes: Crosby	Yes	-254,520	-171,739	-155,201	50,450	52,011	53,620	55,278	56,988	60,852	60,566	62,438	64,368	66,356	70,784	70,519	72,697	74,942	77,256
<i>Remove: Crosby Void Basic Refurbishment</i>	Yes	80,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green Retrofit Phase 1	Yes	-211,014	-211,014	-211,014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PVs/Solar Panels	Yes	-631,387	61,755	62,768	63,806	64,870	65,961	67,079	68,225	69,399	70,603	71,837	73,102	74,398	75,727	77,089	78,486	79,917	81,383
Green EnergieSprong Refurb (Incremental)	No	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Note: PVs and Green Mutually Exclusive</i>																			
<b>NET CASH FLOW BEFORE FUNDING</b>		(2,624,653)	(1,915,045)	(1,884,815)	932,544	657,767	989,793	1,019,744	1,050,616	1,044,255	(1,169,968)	1,149,043	1,183,889	(644,561)	1,213,627	907,159	1,334,314	1,374,851	1,416,633
Discount factor		1.000	0.962	0.925	0.889	0.855	0.822	0.790	0.760	0.731	0.703	0.676	0.650	0.625	0.601	0.577	0.555	0.534	0.513
Discounted cash flow		(2,624,653)	(1,841,389)	(1,742,617)	829,029	562,262	813,537	805,918	798,382	763,027	(822,004)	776,252	769,032	(402,591)	728,873	523,862	740,897	734,044	727,261
<b>NPV</b>		7,347,671																	

## FINANCIAL FORECAST - OVERALL SL

	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	
<b>NET CASH FLOWS</b>													
Basic Refurbishment	Yes	1,169,066	-1,719,785	1,242,998	1,281,687	1,321,571	1,362,688	908,626	1,448,771	1,493,817	1,540,253	1,588,123	-1,770,314
New Homes: CarPark Conversion	Yes	-215,670	132,089	136,196	140,431	144,796	90,954	153,935	158,717	163,647	168,728	-266,094	179,367
New Homes: Crosby	Yes	79,640	82,098	84,632	87,243	89,934	95,752	95,567	98,514	101,551	104,681	107,907	111,233
<i>Remove: Crosby Void Basic Refurbishment</i>	Yes	0	0	0	0	0	0	0	0	0	0	0	0
Green Retrofit Phase 1	Yes	0	0	0	0	0	0	0	0	0	0	0	0
PVs/Solar Panels	Yes	82,887	84,428	86,008	87,627	89,286	90,987	92,731	94,518	96,350	98,228	100,152	102,125
Green EnergieSprong Refurb (Incremental)	No	0	0	0	0	0	0	0	0	0	0	0	0
<i>Note: PVs and Green Mutually Exclusive</i>													
<b>NET CASH FLOW BEFORE FUNDING</b>		<u>1,115,923</u>	<u>(1,421,170)</u>	<u>1,549,834</u>	<u>1,596,987</u>	<u>1,645,588</u>	<u>1,640,381</u>	<u>1,250,859</u>	<u>1,800,520</u>	<u>1,855,364</u>	<u>1,911,890</u>	<u>1,530,089</u>	<u>(1,377,590)</u>
Discount factor		0.494	0.475	0.456	0.439	0.422	0.406	0.390	0.375	0.361	0.347	0.333	0.321
Discounted cash flow		550,851	(674,548)	707,324	700,812	694,365	665,546	487,987	675,405	669,210	663,075	510,250	(441,726)
<b>NPV</b>		<b>7,347,671</b>											