Greenwich Millennium Village, London, United Kingdom

Architect | Architect: Master plan by Ralph Erskine, different architects designing the 4 Phases
Année de construction | Year of construction : Regeneration started 1997, Phase 1&2 completed

Texte de description | Description text

Greenwich Millennium Village (GMV) is a sustainable mixed-use residential development, which ‘is located on the Greenwich Peninsula, a 121-hectare brownfield redevelopment site formerly occupied by the town gas works, on the southern banks of the River Thames in south east London, about 9 kilometers from the London city center.’ (Foletta, 2011, p.10). At the moment 2 out of a total of 4 phases are completed. The current phases include 1’095 homes, a primary school, a health center, a village square with shops, a yacht club, two parks (ecology park and southern park) and podium gardens. The village gives priority to people over cars; therefore it has small-scale streets with limited disabled parking and semi-public areas with landscaped courtyards and parking below. The GMV is considered as a great example of a sustainable community, which was built using best practice and some of the most advanced technology. This development therefore seeks to establish new sustainable methods of construction for the future.

Photographies du projet | Pictures of the project

Picture 1: Facade facing the lake of the ecology park
Picture 2: Bus stop at the GMV

Source Picture 2: National Archives of the CABE Website
Photographies du projet | Pictures of the project

Picture 3: Communal seating area

Picture 4: Communal seating in the courtyard

Picture 5: Bicycle storage

Picture 6: GMV Primary School

Source Pictures 3, 5-6: National Archives of the CABE Website
Source Picture 4: openbuildings.com
Picture 7: Site plan of the project within the larger neighbourhood
Source: Studio Egret West

Picture 8: Current visualisation of the master plan for the GMV project
Source: Greenwich Millennium Village Website (gmv.gb.com)
Picture 9: Elevation of the project (Phase 2)

Picture 10: Elevations of the houses (Phase 2)

Picture 11: Section of a typical house (Phase 2)

Source for Pictures 9-11: Proctor Matthews Architects
The evaluation of a neighbourhood has to be done with an outlook on the larger spatial and historical context, hence certain issues and criteria have been prioritised in this analysis. Of particular interest are topics that are relevant for London as a city in general, such as transportation or affordable housing / social justice. In addition to that we placed an emphasis on the environmental aspects of sustainability, as the GMV project prides itself on their respective achievements, therefore an adequate examination of this claim is necessary. Finally the aspect of cost in regards to building usage and maintenance is analysed as it often stands in conflict with other sustainability dimensions. Therefore the chosen criteria are: mobility (3.4.1), exterior spaces (3.3.2), environmental impact of construction materials (3.1.2), mixed use developments (1.3.1), social justice (1.1.3) and use and maintenance costs (2.2.1). Each of the reasons why these criteria have been chosen will shortly be explained below.

Because of the site's location more towards the outer edge of of London (9 km from the city centre), and because London is amongst one of the largest and most congested cities in Europe, the Greenwich Millennium Village Project must be evaluated on the topic of transportation and mobility (SIA 112/1 3.4.1). Hand in hand with this goes the evaluation of the presence of mixed uses in the development (SIA 112/1 1.3.1), as a lack thereof will usually lead to a higher need or want of mobility and is therefore likely to induce more congestion. Similarly, as social justice and the provision of affordable housing, or more generally speaking the support of socially disadvantaged people, is one of the topics that is very relevant for London as a whole we chose to analyse this criterion (SIA 112/1 1.1.3).

The evaluation of the used construction materials and their environmental impact (SIA 112/1 3.1.2) is particularly interesting as GMV was designed to be a flagship sustainable development and ‘is considered a benchmark for the sustainable development of new communities’ (EPR Architects, n.d.). Consequently it should have paid particular attention to these aspects. By evaluating this criterion we attempt to review whether this goal was in fact met or not. Similarly the peninsula on which the project is being realised was originally a very rich wildlife habitat but it has since been very strongly damaged by heavy industrial uses in the late 1800s up until around 1980, as well as later dockside activities that took place there also until the 1980s (Shin, 2006). As the project placed emphasis on wanting to reinstate these wildlife habitats through means of an ecology park and other general brownfield cleanup activities, we chose to analyse criteria 3.3.2, dealing with exterior spaces.

Finally we evaluate the criterion of utilisation and maintenance costs (SIA 112/1 2.3.1) as it often stands in direct conflict with other sustainability goals. As previously mentioned there was a strong emphasis on the environmental side of sustainability in the GMV project, therefore the aim is to analyse whether it was possible to deal with these oftentimes contrary goals.
An evaluation made by the Institute for Transportation and Development Policy (ITDP) (after Phase 1 was completed) shows that GMV is well-served by public transit, and that measures have been taken to reduce car dependency by restricting parking (only 80% of units have parking spaces available) and using design to locate parking spaces away from individual properties. Residents are also not allocated a specific parking space but rather merely a right to park in the designated spaces within the development. Visitors can not park in the garages and are instead encouraged to use public transportation. Pedestrians are given priority over cars inside the neighborhood and cycle and pedestrian routes, as well as dedicated busways have been created, which can be seen in the image above (Foletta, 2011).

The report also shows that the use of public transport is high for commuting (79% of commuters use public transit) and that the use of cars is much lower than for other areas of London (only 18% of trips made by GMV residents are by car). The figures also show that there are only 350 cars per 1’000 residents and that the public transport mode share is at 49%, meaning that nearly half of all trips made by the inhabitants of GMV are by public transport. Similarly the non-motorised mode share (that is walking or cycling) is at a total of 32% or nearly a third (ibid, 2011). However, car ownership is higher than in Inner London (0.65 cars per households against 0.50 for Inner London) and half of the GMV residents use their car for their main weekly food shopping trip outside of the neighborhood.

3.3.2. Environnement - Sol, paysage - Espaces extérieurs

The environmental projects realised for the Greenwich Millennium Village (GMV) are part of a larger framework regarding regeneration (here mainly in the sense of ecological restoration, as opposed to regeneration in the built environment) of the Greenwich Peninsula. ‘The site, formerly a gasworks that operated for 100 years, was largely derelict and heavily contaminated with industrial waste. Much of the wildlife was lost and the site had been largely unused since the mid-1980s.’ (Kim, 2005, p.190). The significant ground contamination is a result of the historical use as a site for gas works, steel works and a fuel depot.
The ground was partly remediated in the 1990s by the Environmental Agency who carried out remedial actions which included: the removal of a 7 million liter tar well, washing 30,000 m\(^3\) of soil, treating 66,000 m\(^3\) of contaminated groundwater and effluent, and recycling 245,000 m\(^3\) natural and engineering materials for backfill (Forest Research, 1999; ENVIRON, 2011).

For the GMV Project one of the main challenges was to prevent pollution of the Thames. In order to achieve this English Partnerships (now the Homes and Communities Agency) installed a slurry wall adjustment to the river, which prevented shallow contaminated water from migrating into the river. In addition a capping layer was installed across the entire site in order to ensure that the future site users are separated from the remaining lower ground level contaminated materials’ (Kildsgaard, 2008).

Furthermore, one of the main targets of the Master Plan of Greenwich Millennium Village was to restore contaminated industrial land and to rehabilitate brownfield. Further emphasis was placed on the preservation of the existing ecology and animal habitat and providing a diverse complex of wetland habitats (ibid, 2008). Additionally GMV features two parks, the Southern Park and the Ecology Park, which are both Sites of Local Importance for Nature Conservation (SLINCs). The Southern Park acts as the ‘village green’ and the Ecology Park allows for a major regeneration of the ecosystem by providing habitat for migrating species and a wide variety of wildlife.

3.1.2. Environnement - Matériaux de construction - Impacts environnementaux

One of the main targets of the master plan of the GMV was to minimise the (environmental) impacts during construction, including strong reductions in primary and embodied energy consumption, construction waste, water use and construction costs and time. In order to meet these targets the Hanson Environment Fund and GMV Ltd sponsored construction waste benchmarking and minimisation research, which took place from 2000 to 2003. Furthermore the SMARTWaste system (a modular based online tool) was implemented during construction, incorporating a BRE (Building Research Establishment Ltd) Environmental Manager and a site observer.

The reduction of embodied energy by 50% was a main goal, which was achieved through the use of locally sourced materials, recycled materials, certified manufacturing systems and lightweight building methods. To achieve a higher thermal mass (for energy efficiency) particular emphasis was placed on the cladding and roofing materials, which usually (with the structure) represent more or less 80% of the total embodied energy of a typical residential building. The recycled products comprised timber, metals and plasterboard (Hawley, R. et alt., 2001; Cherry, A. Hodkinson R., 2009).

The materials used during the construction were rated “A” by the BRE Green Guide (walls, windows, roof, etc.). Also the used insulation materials had zero ozone-depleting potential and the timber was from accredited Forestry Stewardship Council sources. For the concrete framed construction, which had a relatively high embodied energy, alternative approaches were considered. For example a partial use of cement replacement concrete was adopted (SECURE, 2007; Ibid, 2009).

Finally significant reductions in construction related emissions were achieved. In 1997 the practice benchmark CO\(_2\) emissions associated with embodied energy in construction was 647 kg CO\(_2\) per m\(^2\) (annually: 42 kg CO\(_2\) per m\(^2\)) and the achieved benchmark by the project was 460 kg CO\(_2\) per m\(^2\) (annually: 14 kg CO\(_2\) per m\(^2\)). Also an average of 23 m\(^3\) of waste was generated per dwelling, which is very significant when compared to the base benchmark of 1999, which was at 50 m\(^3\) of waste generated per dwelling (Ibid, 2009).
1.3.1. Société - Exploitation, viabilité - Proximité d’approvisionnement, affectation mixte

A fundamental condition to reduce car ownership and use is, with the offer of public transit, the proximity of housing, jobs, shops and other amenities or in summary the mix of functions in the neighborhood, making it less necessary to own and use a car to go to work or elsewhere. Although achieving a mixed-use development is a goal of the GMV project, the report of the ‘Institute for Transportation and Development Policy’ shows that, in this regard, the first phase of the project was not sufficient (Foletta, 2011).

Half of the residents still use a car to do their main shopping once a week (ibid, 2011). It is of course a difficult task to create and bring shops and other (leisure) activities into an entirely new neighborhood, which does not have established inhabitants or visitors, and this has to be addressed in the medium-term. However once certain car-oriented habits by inhabitants have been established it may become increasingly difficult to influence them otherwise.

It also seems that it is difficult to influence surrounding developments developments, which are not directly part of the project. For instance the ITDP report shows that a big supermarket opened just south of the GMV and within just 1km distance of most of the realised developments at that time, which did brand itself on being Britain’s first low energy food store, however while it did include natural lighting and ventilation it was still primarily catering to customers arriving by car, with a very ‘extensive parking lot’ next to it (Foletta, 2011). Hence GMV residents were not encouraged to do their weekly shopping with less impactful modes of travel.

1.1.3. Société - Vie en commun – Solidarité, justice sociale

A first aspect on social justice which is mentioned in the SIA recommendation is that the project should establish objectives and solutions targeting the most disadvantaged. We can observe that such objectives and solutions were defined within the GMV. The main instrument selected to foster social justice is social housing, which was planned to be distributed evenly across the neighborhood, and to be indistinguishable from private housing (Mills-Powell et al. n.d.). Integrating social housing within the neighbourhood is also in line with another principle underlined by the SIA, namely the financial support for targeted groups of people. Moreover, some design strategies have been proposed to enhance community building, which can be considered as adequate for integrating disadvantaged inhabitants:

- Generating a sense of neighbourhood (green spaces, community centres, neighbourhood rooms)
- Welfare (community health centre)
- Education (primary school)
- Flexible tenure

In practice, some changes have occurred during and after construction, which jeopardize the social justice objectives stated by the project. In fact Kim points out that ‘the plan to build mix tenure within a single apartment block and to create a randomly mixed community was changed to mixed tenures within a street’ (Kim, 2005, p.196). He explains that this change is due to major differences in viewpoint between the architects and the developers of the project. It seems that the latter were afraid of potential management problems arising from mixed tenures. They also expected that private owners would not want to live close to social housing occupants. In light of this, they proposed to concentrate the 226 social apartments in a comparatively inconvenient location, which resulted in vehement criticism from the architects and the public. Today, despite the official GMV website stating the will to create a mixed community, the existence of social housing is not mentioned on the website. The pictures of the interiors and the existence of a yacht club, for instance, indicate that the place is more targeted for upper social categories.
2.2.1. Economie - Frais d’exploitation et d’entretien - Exploitation et entretien

The SIA 112/1 recommendation specifies the importance of taking into account costs incurred during the use and for the maintenance of a building, as these costs generally represent the largest part of the costs of a building during its life cycle (SIA, 2004). Hence the SIA also emphasises the importance of keeping these costs low without incurring a reduction in the value of the building (ibid, 2004). They define one of the main matters of expense to be the energy costs of a building and they ultimately recommend taking into account the foreseeable costs for energy consumption and facilitating upkeep (ibid, 2004).

Particularly with regards to this the conflicting interests between environmental sustainability goals and economic sustainability goals could not be met in this case. The scheme includes a combined heat and power plant (CHP or also known as cogeneration), which is very efficient from an energy point of view, as less heat is lost as waste heat. However it turns out that in its practical application there were significant limitations ‘due to tariffs, restrictions on ‘private wiring’ and (... because) electricity companies have shown (...) great reluctance to purchase surpluse energy’ (URBED, 2009). Overall the CHP system took eight years to be fully functional (ibid, 2009). This has also led to residents have to pay a very significant service charge (around £50/ week for social housing and £100/week for private housing) (ibid, 2009).

Similarly a report by the Oxford University Centre for the Environment mentions that multiple housing developers have incurred difficulties installing microgeneration devices on their own, that is without a fixed Energy Service Company (ESCO) contract. For the GMV development they highlight that ‘several natural gas CHP engines were installed but it appears that at least one of the engines has never run, with at least part of the system operating in heat-only mode’ (Saxena and Hinnells, n.d.). They attribute a large part of these issues to ‘poor specification; or poor integration of the different system components’ (ibid, n.d.). Their main argument is that contracts with ESCOs need to framed around the kWh of energy supplied instead of merely the installed kW capacity, which is certainly also something that would have applied in the case of the GMV.

This illustrates that in the planning phase there probably was insufficient consideration on the one hand of the difficulties associated with installing a relatively new and not yet widespread energy provision technology and on the other hand of how further actors, such as ESCOs needed to be involved in the process early enough in order to guarantee full functionality of the installed technologies. All of this led to unexpectedly high costs during operation, which might have been reduced through foresightful planning.
As stated in the introduction, we chose to analyse GMV with an emphasis on its relationship within London as a whole. Being a peripheral neighbourhood, the first criteria we selected were transportation and the functional mix. The analysis shows that significant efforts were made in this respect, resulting in strong public transportation connections and room for slower modes of transportation. However, the results achieved during the first phases in terms of functional mix were limited and it has become evident that it is difficult to influence dynamics developing nearby the project but outside of its perimeter.

A second challenge that characterises the GMV project is that it has been built on a formerly contaminated land. The strategies put in place (restoration of contaminated ground; rehabilitation of brownfield; prevention of further pollution of the Thames, and eventually, the creation of two parks) can, as we showed, be considered successful. Moreover, the environmental impact during construction, with respect to the energy used and the quality of the utilised construction materials have been assessed in very positive ways by several controlling agencies. These efforts can serve as good practice for similar projects.

Probably the most controversial aspect is the one of social justice. While the community spirit has been actively fostered by several strategies (from shared green space to public services such as schools), efforts have failed when it comes to creating a socially mixed neighbourhood. Contrary to the initial wish of the architects, the developers tended to orient the project more towards a luxurious neighbourhood. A provocative hypothesis proposed by Secchi is that eco-village developments appear as being an example of a new type of gated communities, using the ecological rhetoric to legitimise themselves (Secchi, 2014). One could argue that this is also partially the case for the GMV development. More generally however, we can assume that the promotion of an equitable and diverse community would in fact necessitate a deeper and more systematic knowledge on the (future) inhabitants and their respective attitudes, values and aspirations.

In terms of the costs use, especially with regards to energy costs, it is clear that there was insufficient consideration of the difficulties associated with installing innovative technologies that are not yet widely in use. Here foresightful planning and negotiations with ESCOs could have made a significant difference. This is a lesson that can be carried forward in future stages and other developments of this kind.

Overall it seems that the project has had many beneficial sides, also for the London as a whole. Derelict land was re-used, a formerly active biohabitat was restored and at least partially re-instated and significant efforts were made to realise a truly sustainable project, especially from an ecological point of view. This has also led to the project receiving strong attention, both in popular and academic publications and it being perceived as somewhat of a landmark project. On a city and even national scale this is certainly of great importance, as ecological sustainability in building is a relatively recent phenomenon in Britain and the overall quality of the building stock is very low in this respect.

However as this analysis and many other evaluations show building a new neighbourhood from scratch has its limitations, especially when trying to establish links with the existing urban fabric in a relatively remote location and building up social structures. For the upcoming phases of the project as well as its future use it is crucial that the links with the immediately surrounding neighbourhoods are strengthened (for instance Greenwich Village) and the project does not remain insular but is instead integrated into a broader development in order to establish it as a functioning part of London and not a mere dormitory town.

Références | References


