

Medium-Density Mixed Housing: sustainable design and construction of South African social housing

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INTRODUCTION

Medium-Density Mixed Housing (MDMH), of which social housing (SH) is one component, is perceived to have the capacity to contribute to the transformation of fragmented South African cities more than the massive roll-out of government-subsidised 'one-house-per-plot typology'. It is also perceived that higher densities are more economically and environmentally sustainable. If these perceptions lead to large numbers of MDMH projects being built in the near future, the projects will have a significant impact environmentally, socially and economically.

MDMH is defined as housing that has a minimum of 50 dwelling units per hectare (du/ha) and a maximum of 125 du/ha. These densities have different spatial and physical manifestations. MDMH is generally characterised by ground-level entry, private external space for each dwelling unit, close proximity to secure parking – thus these developments are rarely over three to four levels high. Social housing (SH) is defined as medium- to high-density housing with different tenure options but excluding immediate ownership. SH is developed and managed by accredited institutions and receives government subsidy. It caters for the R1 500 to R7 500 monthly income bracket. While it is an important model for future housing, SH also has its dangers as it is a typology which may become stigmatised, thus the call for an approach to design that may offer opportunities for change and variety.

MDMH PROJECT OUTCOMES

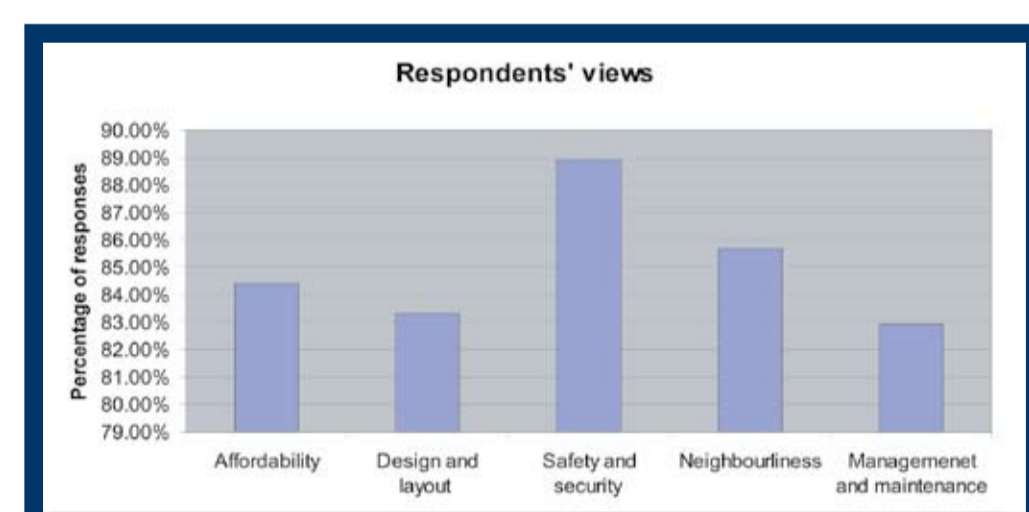
Some of the key findings of the CSIR MDMH project (2007-09) project are listed as follows:

1. MDMH may offer more opportunities with regards to de-concentrating poverty, revitalising neighbourhoods, enabling greater social mix and contributing to opportunities for improved safety.
2. Case studies indicate that people are willing to consider alternative housing typologies for the benefit of being closer to job opportunities and/or more security.
3. MDMH housing has the potential to add to the viability of a project by promoting affordable housing options and the opportunity to include low(er) cost housing in mixed developments. It is found, within certain limits, that developers may use cross-subsidization to achieve a better social mix and a degree of integration.
4. There is a willingness from investors to spend on developments that have a mix of tenure options and income groups. This is therefore seen as a financially viable approach to housing.
5. It was also found that it is possible to use subsidies to achieve medium density RDP developments.

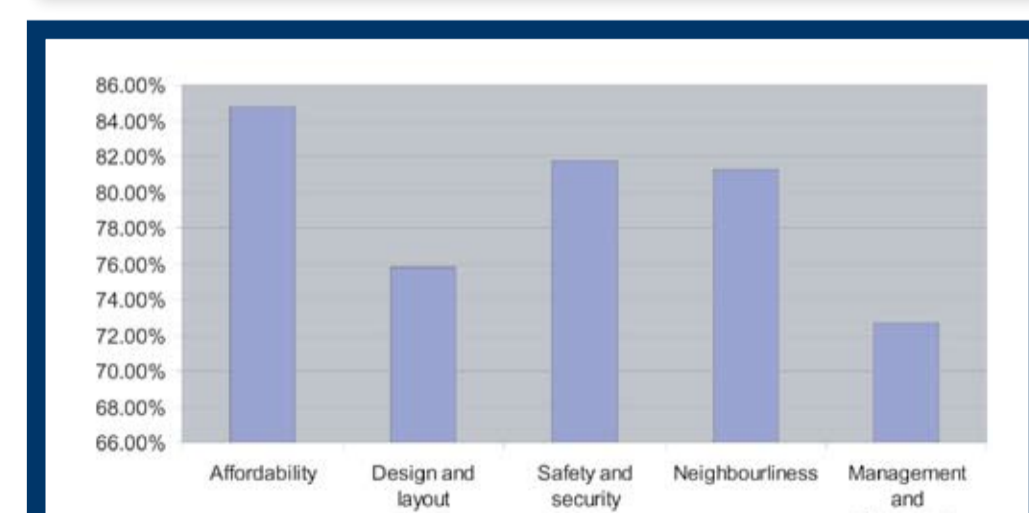
In addition, it was also attempted to objectively describe and rate the characteristics of the residential built environment in an urban setting. A tool was developed that facilitates a qualitative and quantitative (mixed) approach to assessment. This may allow for better informed design decision-making based on empirical research. By assessing proposals for new developments, the gap between policy-makers, designers, developers and end-users could be closed.

BRICKFIELDS AND CARR GARDENS

The model to analyse MDMH developments was developed by the CSIR (Landman et al., 2007 and Du Toit and Landman, 2007). As an example, two projects analysed using this model are presented. Brickfields and Carr Gardens are both SH projects located in Johannesburg. These subsidised rental developments have a number of shared characteristics and the comparisons between them are presented in the images to better explain the tools used in the study.



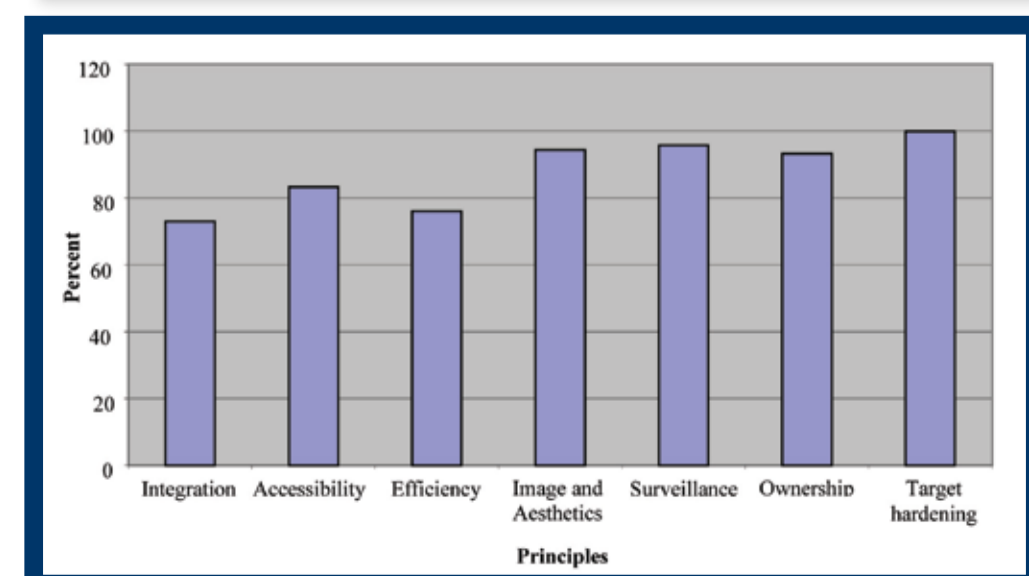
Brickfields: Importance of various categories as perceived by residents



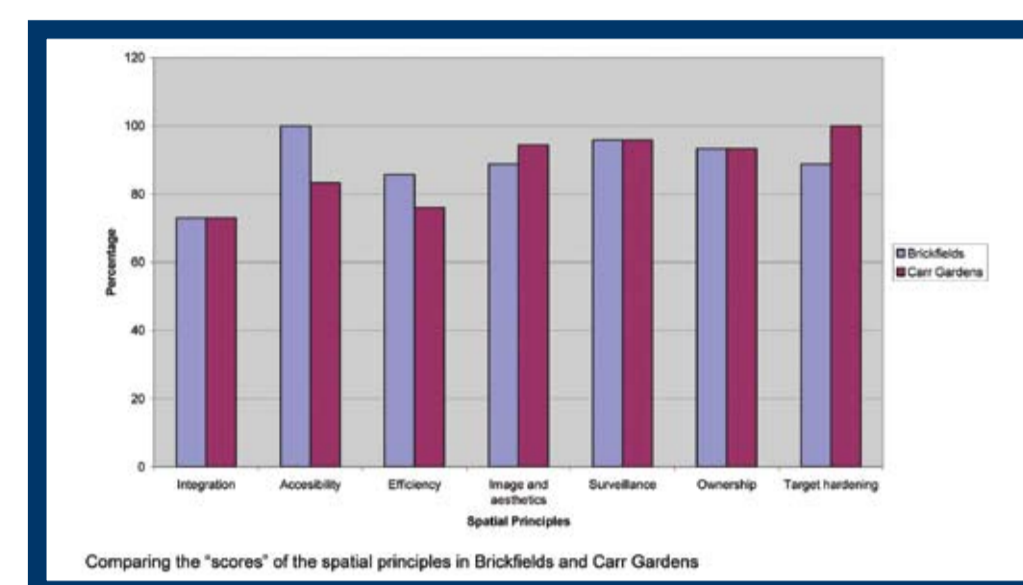
Carr Gardens: Importance of various categories as perceived by residents



Comparison of the spatial performance of Brickfields, per principle



Comparison of the spatial performance of Carr Gardens, per principle



Comparing the "scores" of the spatial principles in Brickfields and Carr Gardens

TIME-BASED ARCHITECTURE: CONCEPTS OF PARTICIPATION, CHOICE, VARIETY AND CHANGE

While the tools used in the study did acknowledge that there needed to be a mix of unit types, finishes and sizes, it did not assess the potential of the buildings to adapt to future needs and market demand.

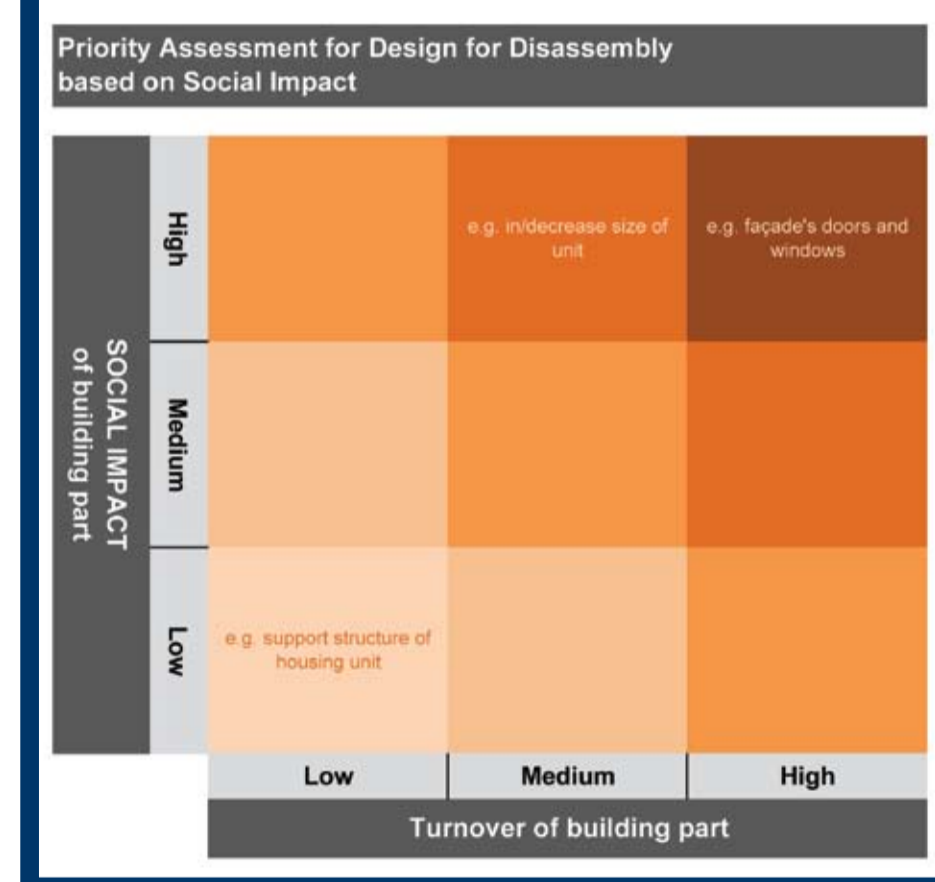
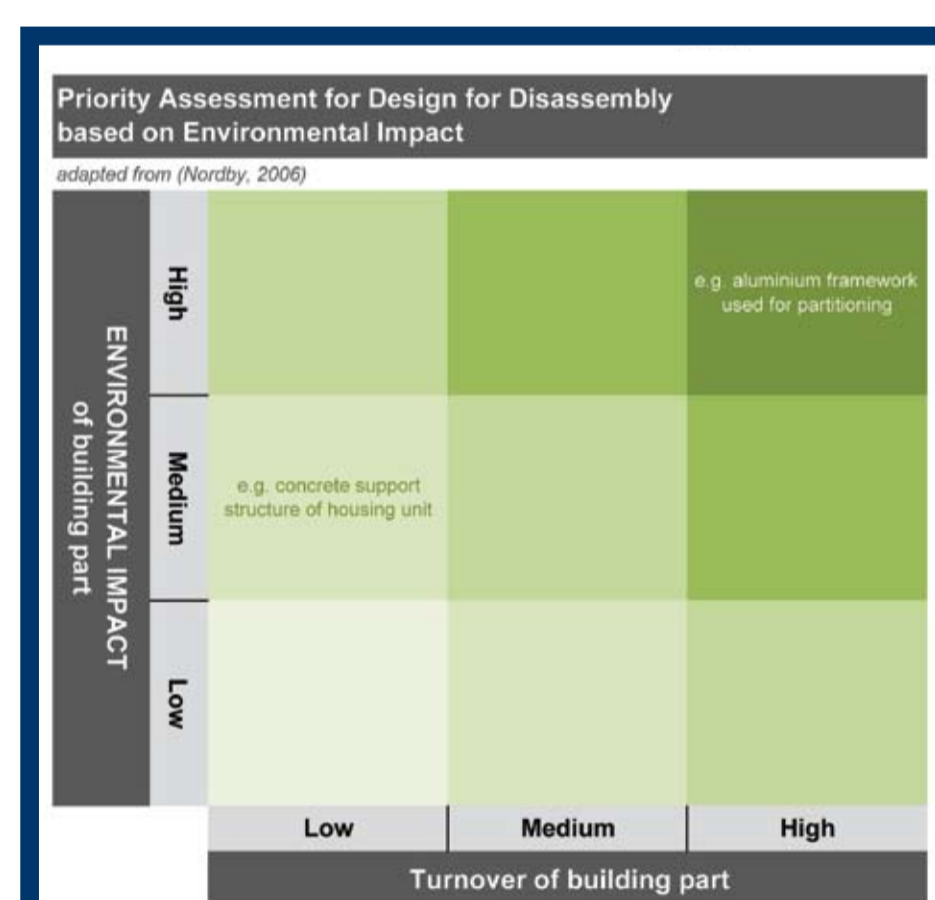
Time-based Architecture (TBA) or 4-Dimensional Design (4D design) "... refers to a design attitude to conceive 'objects' from a long-term vision, therefore integrating the fourth dimension, i.e. time, in the initial design phase." Open building practitioners and researchers generally refer to this as the "disentanglement" of buildings, systems and components.

The ability to adapt a building is, for the largest part, determined by two parameters: whether or not the construction can be disassembled and reconfigured or re-used; and the amount of effort that is needed to do this. Therefore, the most crucial aspect of "Design for Disassembly" (DfD) is the detailing of connections between a building's different components; DfD means designing buildings that can be disassembled and reassembled part per part (Durmisevic, 2006); it assures that connections can be undone. "Design for Compatibility" (DfC), on the other hand, ensures that elements can be connected to each other, because their measurements are all based on the same sequence.

ASSESSING ADAPTABILITY IN THE DESIGN OF SUBSIDISED RENTAL HOUSING IN SA

Any proposed assessment of adaptability should be based on a set of weighted performance standards. To keep the assessment clear, a categorisation of the performance standards is deemed necessary. This would be based on either the function of the evaluated constructional component (e.g. structure, skin, partitioning, finishing), or on the intended benefit (e.g. altering the built form, increasing user participation, reducing maintenance cost). Because it is so crucial in DfD, detailing should be a separate category.

The determination of priority and potential user benefit



Two additional aspects are considered to be important when implementing the above-mentioned assessment methods are the determination of priority and the addition of potential user benefit. A possible method of attributing priority to parts of a construction is shown in Nordby et al., (2006: p 7).

Prioritising has three advantages - firstly, it helps in pinpointing the parts of a construction that result in the highest cost-benefit when conceived as adaptable structures. The second advantage is that prioritising could help to keep the assessment process manageable through categorising the different components or structures based on their unique characteristics. When a component has a high disassembly priority, for example, it could be assessed using a separate method. This keeps the existing tool more streamlined and easy to use. Last but certainly not least, priority could be used to determine the weighting factor of the performance standards used in the assessment. This way, the weighting of adaptability specifications would be determined by building type and specific requirements. The impact of adaptable architecture on the user of a building could also be introduced to further influence the weighting of the performance standards.

CAPACITY FOR CHANGE AS A REQUIREMENT FOR SOCIAL HOUSING

There is an assumption that rental housing, seeing cycles of tenants over its lifetime, might not have to be adaptable. The argument is that the users are not the owners and will only inhabit the units temporarily. However, it is argued that change is important for new tenants, old tenants and for the institution that owns and manages the residential properties. This makes the building stock more viable in the long run, more able to adapt to changes in market demand and allows easier maintenance by disentangling building systems and components.

Medium-Density Mixed Housing has a minimum of 50 dwelling units per hectare (du/ha) and a maximum of 125 du/ha.



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