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Extra Care Housing: a paradigm shift

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Key words

extra care housing, group housing, housing for older people, settlement

Contents

Chapter 1

Abstract

This report sets out to investigate if and how a spatial extra care housing typology can be defined within the context of housing for older people in the UK. In particular, it focuses on the concept of domesticity in relation to the perception of public, semi-public and private domains.

Four sheltered housing schemes that have been remodelled into extra care housing within the past four years, have been selected as case studies. The spatial distribution of various public, semi-public, and private domains of the pre-remodelled and remodelled schemes have been analyzed quantitatively and interpretively, to determine how their distribution might help bolster or undermine the ethos behind extra care housing. Likewise, the spatial layouts of the sheltered, as well as extra care schemes have been analysed syntactically, to determine how different spatial morphologies and their probabilistic functions might begin to help define extra care housing as a new type of group housing for older people.

The findings of the report suggest that the extent to which the spatial configuration of a scheme affects one's notions of self-containment and control, has a direct impact on whether the scheme performs as a building or as a settlement. It is furthermore argued that the more a scheme functions as a settlement, the less institutional it feels. Thus, as a typology, a successful extra care scheme can be defined as a building that works as a settlement.

Introduction

This Thesis is concerned with the extent to which an emerging type of group housing for older people known as extra care housing, has spatial connotations. Extra care did not arise out of a vacuum and so, in order to understand the phenomenon, it is first necessary to set out the historical and cultural context within which housing and care services for older people in the UK have evolved. After major destruction caused by WWII, the focus on creating sufficient family housing to accommodate the war-torn nation, led to a neglect of provision for other types of housing like that for the older sector of society (Sheltered Housing Review, 2004). In addition, a general shortage of accommodation for families and under-occupation of family homes by older people whose families no longer lived at home led to concerns that the 'general needs' social housing stock was not being efficiently used (Hanson, 2001, p.169). To remedy this imbalance, in 1948 the government introduced Part III of the National Assistance Act which placed the responsibility of providing care and housing with the local authorities, and less than ten years later this was followed by the Housing Act (1957) that encouraged local authorities to provide special housing for the more frail elderly. For the first time, local authorities were encouraged to provide "accommodation mid-way between self-contained dwellings and hostels providing care" (Ministry of Housing and Local Government, 1958). However, it was not until 1969 that these 'sheltered housing' schemes were classified, and nuances in different degrees of care and communal provision were introduced to describe the various categories of sheltered housing, (Housing the Elderly, 1976).

Since the mid-1980s as a result of cuts in public spending and a change of direction in central government policy, local authorities have been forced to relinquish their responsibility as housing providers and they now act primarily as regulators of housing provision. As a result, funded through the Housing Corporation, housing associations and the voluntary sector have taken on a more active role in supplying housing. Since the creation of the

1984 Residential Homes Act, which established clear criteria for the registration of private residential homes, there has been a constant tendency to shift away from public to private care provision. At the same time the 'right to buy' movement, which started in the 1980s, has led a majority of older people (61% of those over 65 in 2001) to own their houses. As a result, whereas in the 1970s and 1980s some older people moved from their rented council houses into rented sheltered housing, in the past two decades more people are considering private retirement options.

In today's Britain, as a drastic decrease in birth rate and an increase in life expectancy mean that, progressively, older people constitute a much larger section of society, the issue of choice and provision of appropriate housing for older people seem to be gaining more significance with each decade that passes. As the number of older people in the society is on the increase, their changing aspirations (Hanson, 2001) which place particular importance on issues of privacy, autonomy, and independence, as well as a move away from institutional care provision to one that puts the focus on the individual, affect the way future housing models are developed. In the past decade extra care housing, as one such model, has seen a growth in popularity. In fact, the recent focus on this intermediate level of housing and support has led many housing providers to consider converting some of their hard-to let (Tinker et al, 1995) housing stock into extra care housing.

This report is an extension to a wider EPSRC-funded research project on remodelled extra care schemes that involves collaboration between a multidisciplinary team of architects, social gerontologists, rehabilitative engineers and occupational therapists from University College London and King's College London. The main objective of the collaborative project is to examine how local authority and housing association sheltered housing and residential care homes have been remodelled to become extra care housing. The outcome of the study will be advice for local authorities and housing association about remodelling in the future.

The aim of this MSc-Built Environment report is to examine how extra care housing, as a type housing with integrated care that seeks to move away

from the institutional model of care provision, brings its various programmatic requirements and stake-holders under one roof, and if by doing so it can be defined as a new spatial and social "model of care in group housing for older people. To this end, the report sets out to investigate how various ways of achieving control and privacy might have an effect on the extent to which an environment might feel domestic or institutional.

Four remodelled sheltered housing schemes from various parts of England have been selected as case studies, to investigate how the remodelling has converted them into extra care housing. In the selection of case studies, care was given to include a variety of examples that were considered to score differently on the domesticity scale and their spatial standards. The spatial distribution of various public, semi-public, and private facilities have been analysed quantitatively and interpretively to see how their distribution might begin to inform questions about the domesticity of each scheme. Next a series of space syntax tools have been employed to syntactically analyse the spatial layout of each scheme to determine how their spatial configuration might have an effect on how control - in the expropriation of space - and various privacy levels can be achieved.

Although there are other housing types for older people with an integrated care component (e.g. residential care homes or nursing homes), extra care housing is new in the sense that its underlying principles include independence, social inclusion, and flexible care and support. In general its characteristic features such as self-contained dwellings, communal lounges, and assisted bathrooms are designed to bolster its underlying core values. It can be argued that the extent to which a balance is struck between achieving its main objectives and providing a domestic setting where the residents' sense of privacy, self-esteem and dignity is protected, play a major role in measuring the success or failure of an extra care scheme. The findings of this report seem to suggest that the measure of domesticity is closely linked to notions of perceived control and indirectly connected to whether a scheme functions as a building with a imposed order, or as a settlement with an inherent structure.

Literature Review

Since the questions this report seeks to examine are multi-faceted, the literature review draws upon a multitude of disciplines. The first part of this chapter makes an attempt to place extra care housing within the wider context of housing for older people, before describing some of its characteristics as well as aims and objectives. The second section of this chapter attempts to bring together some of the relevant literature that might help shed light on how the interface between various public, semi-public and private components of extra care facilities might play a key role in providing a balanced life to its residents.

The emergence of Extra Care Housing

A relatively recent design guideline suggests that, currently, housing and care provision for older people in the UK falls into seven separate groupings, (Robson *et al.*, 1997; 8-9):

Level 1:   non-specialised and non-adapted dwellings ('staying put' or living with relatives)

Level 2:   independent dwellings which have been purpose-built or adapted for fit and active older people who may need some support but can generally look after themselves

Level 3:   purpose-built, self-contained dwellings (to mobility standards) in groups with warden attendance and minimal communal facilities, for active elderly (corresponds to 'Category 1')

Level 4:   purpose-built self-contained dwellings (to full mobility and wheelchair standards) in groups with warden attendance and access to communal facilities, for physically frail elderly (corresponds to 'Category 2')

Level 5:   similar to level 4 but with extra care support available and the option to take communal meals, sometimes referred to as Category 2.5

Level 6:   residential care homes for elderly who may be mentally and physically frail and in need of constant personal care

Level 7:   nursing homes for elderly who are sick or very frail and need qualified nursing care

Recent publications refer to the fact that an integrated approach to providing housing, care, and support tailored to meet the needs of older people is replacing residential care homes in many areas of the country (Baker, 2000, p. 400). The increasing unpopularity of sheltered housing in general and of residential care homes in particular has led the Department of Health to make a significant budget available to invest in creating more extra care housing schemes.

As a housing model that incorporates social as well as care facilities, it provides fully independent housing units with comprehensive communal and care features in a setting where 24-hour flexible care and support can be delivered. (Vallelly et al, 2006) The Department of Health has drawn up the following list of good practice guidelines for meeting the housing and care needs of older people living in extra care housing in the UK:

- Living at home – not in a home,
- Having one's own front door,
- The provision of culturally sensitive services delivered within a familiar locality,
- Flexible care delivery based on individual need – which can increase or diminish according to circumstance,
- The opportunity to preserve or rebuild independent living skills,
- The provision of accessible buildings with smart technology that make independent living possible for people with physical or cognitive disabilities, including dementia,
- Building a real community, including mixed tenures and mixed abilities, which is permeable to the wider community and benefits from the variety of provisions available to all citizens.

However, despite a plethora of good practise guidelines produced in the past decade by various stake holders ranging from housing and health authorities to academic experts, the defining characteristics of extra care

housing remain open. One of the earliest and most comprehensive design guidelines for extra care housing published in 1996 (Robson *et al.,* p. 16) sums up the main architectural features of extra care housing as follows:

- Self-contained flats with bathroom, kitchen and separate sleeping and living rooms, designed to mobility standards with the built-in possibility to upgrade them to wheelchair standards,
- Daily provision of at least on cooked meal in a communal or shared dining room,
- Use of a communal or shared sitting room, a tenants laundry room, a fully equipped assisted bathroom, guest rooms, and a maintained garden or open area,
- Access to specialised care services such as hairdressing, chiropody etc.,
- Provision of at least one lift in multi-floor schemes,
- Provision for storage and charging of external wheelchairs,
- A non resident manager who is responsible for managing the housing, organising social activities and coordinating care services,
- Facilities for carers, e.g. a staff room, a changing room and sleep-over rooms

Extra care housing aims to provide a tailor-made, flexible form of support and care, which is considered not only to be cost-effective and efficient in the long run, but also more respectful of the dignity and aspirations of the older generation. Compared to residential care homes, tenants in extra care housing are granted much more control, as their tenancy rights are kept separate from and are unaffected by their care packages.

Besides the housing component, to various degrees extra care housing encompasses issues of care, health and the resident's social life, and therefore requires a partnership between housing, care and community care providers. (Parry and Thompson, 2005, P.81) In short, it seeks to bolster the sense of independence of the residents and provide a setting where there they can socialize while having care and support services delivered to

them, on site. An essential principle at the heart of extra care housing is a focus on individual tenants and their rehabilitation, while promoting their independence and social inclusion in a domestic environment.

Privacy gradient and control

Striking the right balance between privacy and sociability, in an environment where multiple stake-holders are brought under one roof to deliver various services, is not an easy task. A relatively recent piece of research on defining domesticity (Hanson et al, 2003) in relation to older people's housing and care choices suggests that there is a strong link between older people's perception of independence and their notions of self-esteem, self-determination and dignity. In fact, the study goes on to distinguish between five conditions that are deemed necessity to support domesticity in the area of housing, support and care experiences for older people in the UK. They include notions of privacy, control, self-containment, personalization and independence. The degree, to which these concepts are promoted or inhibited are considered to play a major role in how domestic or institutional an environment feels.

In extra care housing one of the main goals is to promote the resident's sense of independence. This is partly achieved through encouraging the resident to do as many of their chores as possible, and partly through the delivery of flexible care and support services. At the same time as there is an attempt to provide self-containment at level of individual dwellings, there is also an effort to provide many of the services the residents might need on site. However, although concepts of self-containment and independence seem to be built into one's understanding of extra care housing, notions of privacy, control and personalization become more ambiguous in an environment where various programmes and stake-holders with different degrees of privacy requirement are brought together.

As a housing concept based on the idea of 'neighbourliness' (Parry and Thompson, 2005), extra care housing is geared to reduce the social isolation of frail older people by providing access to community activities. In

some cases the communal facilities serve as a community resource which brings people from the surrounding neighbourhood into the scheme. (Fletcher et al, 1999) Hence, because of the inherent nature of its programme, extra care housing brings various public, semi-public and private facilities under one roof. The question than becomes, how is the right balance between the residents' privacy and their sociability achieved without making a scheme institutional.

Recent literature on how to address issues of control and access to various public, semi-public and private facilities in situations of group living tend to recommend the model of 'progressive privacy' as one of the more desired options.
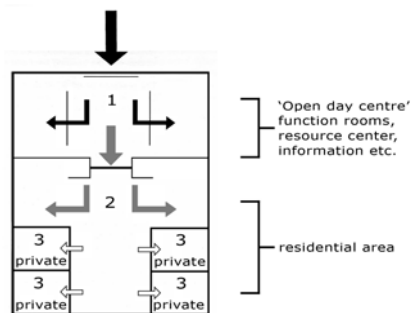
Figure 1: Concept Diagram of Progressive Privacy (after Torrington, 1996)

As defined in Remodelling Sheltered Housing (Trotter, et al 1998), 'progressive privacy´ breaks up a scheme into three zones to include a semi-public and communal space with an open door and a 'pop in' area where people from the community outside are encouraged to enter, a selection of more sheltered areas, which are not freely open to everyone from the outside and where entry is restricted to people who have a reason to be there, and the private dwellings which are fully controlled by the individual residents.

The concept of 'progressive privacy' ranks each constituent element on a scale of ascending privacy with the most public spaces close to the main entrance and the private dwellings the farthest away from the main entrance. However, as the diagram indicates this approach to zoning requires clear boundaries that are set not necessarily by the residents, but either by the designers or the 'people in charge', be it the scheme manager, the care staff, or the housing provider. Some of the recommendations in

line with the concept of 'progressive privacy' for example are that the scheme manager's office should be located next to the building's main entrance, and that "the scheme manager should have a good view of the entrance to the site and the approach of the building and the building entrance hall itself." (Robson et al, 1996; 94)

Another option to achieving control and various privacy levels has been described in another piece of research conducted in the context of restrictive settings in the United States (Peatros, 1997). Some of the findings of this research suggest that the probabilistic function[1] of space can be employed to achieve control through natural surveillance. The study found that in restricted settings where measures of control and surveillance were implemented through abrupt transitions and hard boundaries, it resulted in a more formal interaction between the staff and the residents, and contributed to the institutional feel of the facilities. In the case studies where the generative effect of spatial configuration on 'the probabilistic spatial patterning of movement and interaction' were supported by the programme, however, control and surveillance were achieved through 'natural surveillance', and a more complex hierarchy of transition. This resulted in a more relaxed and informal social interface between staff and residents.

In a different study of residential care homes Peace et al (1982) examined how the residents and staff of residential care homes perceived and used the buildings in which they lived and worked. The study found that in the context of group living where different parts of the programme require various degrees of privacy, circulation spaces can have multiple functions. It was found that they can either serve as a link between various programmatic elements (e.g. Dining / Lounge and bedrooms); they can define boundaries between different Groups/ Public / Private; or they can provide buffer zones between bedroom areas and public area, for example. (Peace et al, 1982; 19) In investigating the collective and individual lives of the residents, it was established that the public / private distinction rested

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[1] "... probabilistic function concerns the generation of movement, awareness, encounter and communication as a by-product of configuration over and beyond the requirements of particular organized activities." (Peatros, 1997, paraphrasing Hillier and Hanson, 1984)

at least in part, upon rights of access to particular spaces and that different users have different rights of access. (ibid; 16-17)

In extra care housing, like in residential care homes, the building users fall into the three groups of residents, staff and visitors. While for the residents the scheme is primarily a place where they live, and for the staff, it is a place of work; for the visitors it might mainly serve a community resource. Achieving the right balance in satisfying needs of different groups of building users, without institutionalising the scheme poses a great challenge in a setting that is primarily a domestic function, because most environments with similar mix of requirements and users tend to be institutional buildings.

In their 1984 book 'The Social Logic of Space', Hillier and Hanson differentiate between how buildings and exterior spaces of urban fabric[2] generate and control encounters. They argue while interior spaces of buildings are defined as places of social reproduction with a high degree of determinacy, the exterior urban fabric is a place for social production with a certain level of structure. In other words, whereas a building might to some extent be characterised by some level of formality and 'imposed' order, settlement space is characterised by informality and an inherent configurational structure, which might give rise to such probabilistic functions of spaces as 'natural movement'[3] (Hillier, 1996), 'natural surveillance' and co-presence.

Around the same time, in his book 'The Practice of Everyday Life' (1984), Michel de Certeau establishes a close link between the way individuals operate in a society and the shaping of their environment. He argues that in general individuals' modes of operation in a society are closely related to ideas of power and can be categorised either as strategies or tactics.

De Certeau defines strategy as a way of operating that is characterized by a postulation of power which relies on the establishment of a proper *place* as a delimited environment from which it can operate. The subject of strategy

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[2] The urban grid is the pattern of public spaces linking the buildings of a settlement, regardless of its degree of geometric regularity. (Hillier, 2001)
[3] Movement generated as a result of configuration.

is said to be in a privileged position of surveillance, and can contemplate and lay out the rules of operation while capitalizing on the acquired advantages in order to control and make predictions. Examples of elements in the society that employ strategy as their mode of operation are political, economic, or scientific institutions.

A tactic on the other hand is marked by an absence of power. It cannot count on a base and will therefore have to manoeuvre in the space and the laws of the other in order to operate. The subject of a tactic is concerned with passing through rather than occupying a *place*. It therefore relies on a clever use of time rather than *place*, and looks for opportunities to manipulate events in order to turn them into advantages. De Certeau intimates that the majority of individuals engaged in everyday practices of walking, shopping, reading etc. predominantly employ tactics as their method of utilizing *space*.

In other words, de Certeau's places of strategy can be described as buildings – in particular buildings of an institutional or corporate nature (e. g. hospitals, hotels, residential care homes) – where a mix or different categories of users, occupy the building and control is achieved through imposed rules and spatial segregation. By contrast, a settlement space – space outside the buildings –where there is more of an equality of access, and hence less control (Hillier and Hanson, 1984), could be described as tactical space.

Institutional buildings and settlements are two scenarios where a mix of programmes are brought together to serve a variety of user groups. Hillier and Hanson (1984) stipulated that the difference between building space and settlement space lays in the way they generate and control encounters. A more recent study (Hillier, 2001) of various Arab and western cities suggests that settlement spaces can exert control in a much less imposing way, through their configurational structure. The study found that in many Arab cities, where cultural sensitivities between the two sexes calls for the residential neighborhoods to be protected from the intrusion of outsiders, "strangers tend to be guided much more to certain public areas in the town, and access to local areas is rendered much more forbidding by the more

complex axial structure." In other words, the study clearly highlighted the town center as an integration core, while the residential areas were shown to be in the most segregated parts or the settlement structure.

At this point, as a move away from institutionalisation, the question becomes if in principle extra care housing can employ the inherent underlying rules of the settlement structure on its circulation spaces to achieve control and privacy[4]. And if so, to what extent does the fact that a scheme works as a building or a settlement affects one's perception of how domestic or institutional it feels. These are some of the questions this report seeks to answer.

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[4] The idea of the spatial metaphor of settlement in buildings is in essence not new, although its application in the domestic setting is. Examples where some kind of a "main street" is proposed as a unifying factor for the organisation housed, has a long and distinguished history in a series of flagship buildings (e.g. office, lab buildings, schools, etc.) that have been deemed to have achieved this objective, but the metaphor has not always been able to deliver in terms of creating or sustaining a community among the building's occupants.

Chapter 3

Methodology

Given the complexity of the issues at hand and their multi faceted dimensions, analysis has been conducted at two levels. First, comparisons are drawn between the four case studies in terms of possible similarities or differences in their general spatial configurations. Furthermore, a quantitative analysis method which has mainly been developed for the EPSRC-funded research on remodelled extra care schemes, was employed. The analysis of the spatial distribution of various public, semi-public or private programmes of each scheme, seeks to determine whether a shift of emphasis from one sector to the other between the original and the remodelled building could be detected.

Secondly, the quantitative approach has been complimented by a series of syntactical analysis in order to examine and study the implications of the various configurations and spatial layouts of each case study. To this end, a series of space syntax methodologies has been employed to measure some values of axial integration and convex properties of the public and semi-public communal spaces in each scheme. The aim of the analysis was to detect and measure the effects of remodelling on the configuration of the public and private spaces and hence their possible implications for the private and collective lives of the residents.

Quantitative Analysis

Public, Semi-Public, Private distribution of space

All the characteristic constituents of extra care housing were colour coded and marked on the plans according to the 6 categories of private, semi-private, public, staff only, other, and circulation. Each category was defined on the basis of the pattern of access and control, and perceived 'ownership' of the spaces:

- Private: accessed by residents only, others require permission for access, individual ownership permanent , e.g. Self-contained flats
- Semi-public: accessed by residents and staff, but on an individual basis, individual ownership temporary, e.g. Assisted Bathrooms, Guest rooms, Communal laundry
- Public: accessed by residents, staff, and visitors, collective or institutional ownership, e. g. lounges, entrance halls, circulation routes, dining rooms, hairdresser's room, Treatment rooms, buggy store.
- Staff only: accessed by staff only, institutional ownership, e.g. sleepover room, scheme manager's and carers' office, commercial kitchen, staff laundry.
- Other: institutional ownership: accessed by staff only, e.g. service areas, mechanical rooms.
- Circulation: accessed by residents, staff, and visitors. Institutional ownership. e.g. circulation routes

Once all the plans have been colour coded, and the net areas of various categories have been calculated and statistical analysis was conducted to determine the weight of importance placed on each category and how that might begin to inform ethos of the scheme in terms of domesticity and institutionalisation.

Syntactical Analysis

Justified graphs

This method provided a basis for comparing the depth of various schemes. The justified graphs proved most useful in depicting the number of steps that separate different zones within a scheme, and for visualising the depth of the scheme from various parts of the scheme.

Axial Analysis

In the initial pilot study of one of the schemes, three different sets of axial maps were drawn. The first one was the 'classical' map that covers all of the convex spaces within a building with the fewest and the longest lines of sight and access, regardless of the function and the programme of each space.

The second version of the axial map distinguished between private dwellings and the rest of the spaces. Since in extra care housing flats are self-contained dwelling that serve as the private sphere of the residents, and their entrances define a clear boundary between the public and the private, the axial lines that would normally cover individual flats were not extended into the flats, but were terminated at the threshold between the circulation spaces and the private flats. This reflects more precisely how the movement flow inside an extra care housing scheme works, in the sense that whereas every one within the scheme – residents, staff, and visitors – might be able to freely access the communal facilities and move around the circulation spaces, control over the access into private dwellings lies with individual residents themselves. Even the care and support staff need permission to gain entry into the flats. Despite this fact, it was necessary to mark the number of flats that constituted each circulation corridor, and the only way to do this was to register each flat door with a short line that connected the dwelling to the closest axial line of the circulation spaces.

In the third version of the maps, axial lines are drawn only through communal spaces that are open to the residents. These maps, which are the final version bring the focus back to the potential implications of configuration on the social life of the scheme, and eliminate possible distortions caused by the existence of such necessary functions as storage spaces and mechanical rooms. After comparing the results from the three axial maps, the third version which depicted the communal spaces of the scheme seemed the most fruitful and best suited method. As a result it was adopted for analysis of all of the four cases presented here.

Convex analysis:

In the pilot study, results of axial analysis were compared to those of the convex analysis. In both methods the local integration seemed to most accurately picture the scheme as far as the author's limited experience from visiting the schemes could confirm. However, comparison between axial and convex methodologies highlighted some differences. The analysed low resolution convex maps seemed to depict specific communal spaces more distinctly than the axial maps. On the other hand, the results of Visual Graph Analysis proved to be less fruitful, as the level of detail in different plans varied greatly and distorted the results to such an extent that no comparison could be drawn between different cases.

Case Studies

Existing Case Study 1

Remodelled Case Study 1

Existing Case Study 2

Remodelled Case Study 2

Existing Case Study 3

Remodelled Case Study 3

Existing Case Study 4

Main entrance

Remodelled Case Study 3
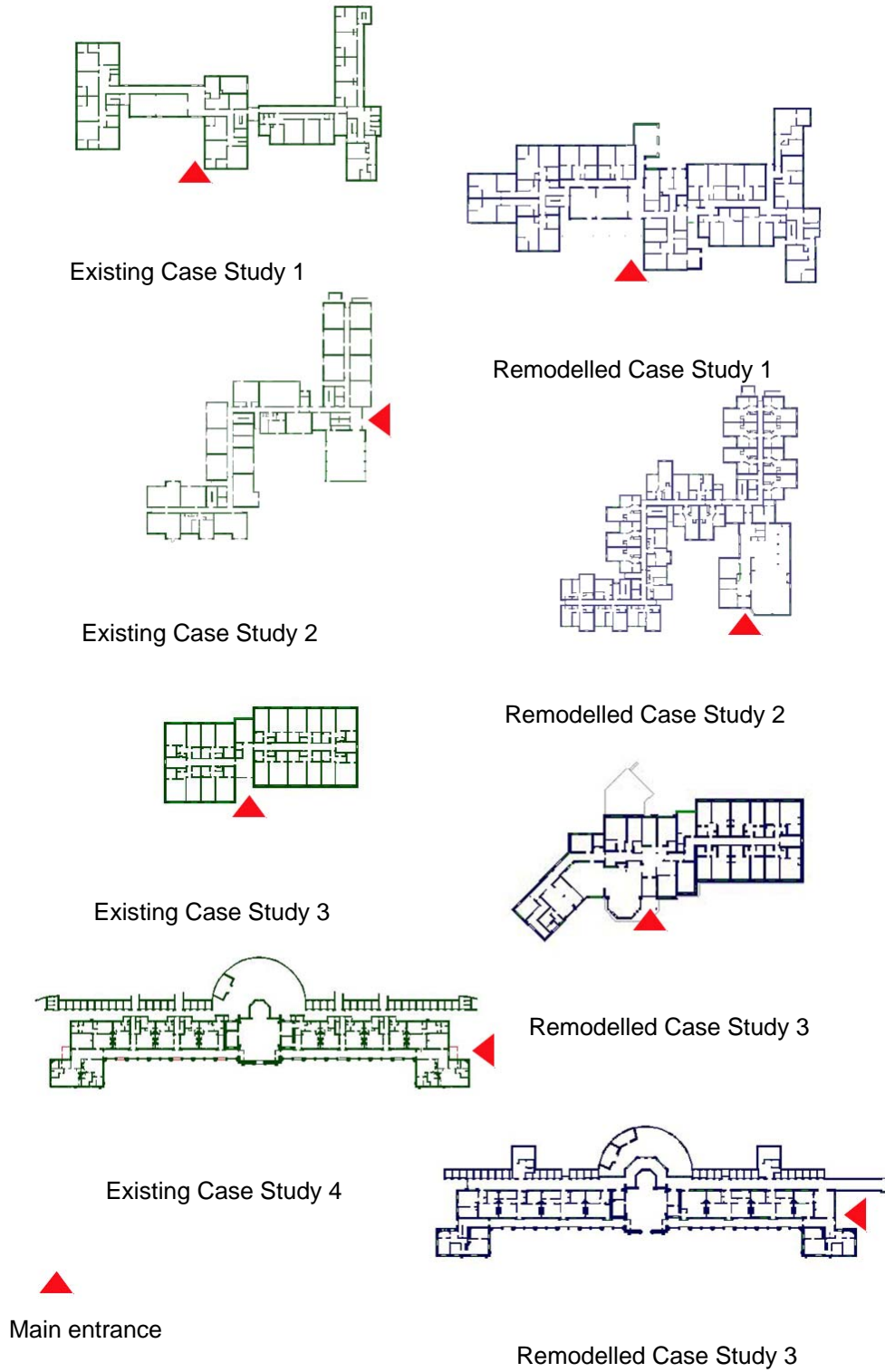
Figure 2: Plans of the existing and remodelled case studies

Case Studies – an overview

The literature review has revealed, that despite a plethora of good practice guidelines produced in the past decade by various stakeholders ranging from housing and health authorities to academic experts, the questions of what the precise definition and defining characteristics of extra care housing are, remain open. The reader can find a more comprehensive explanation of the issues at hand and some preliminary attempts to define extra care housing based on its underpinning core values, elsewhere. (Wojgani et al, 2006) The primary focus of this report, however, remains how these core values relate to notions of domesticity and privacy on the one hand, and the institutional and public aspects of life in extra care schemes on the other. Needless to say that hitting the right balance between promoting independence and providing opportunities for social inclusion, have significant relevance on how institutional or domestic the atmosphere of a scheme becomes.

To explore the interrelationship between the social, organisational, and physical environments which constitute extra care housing, four remodelled extra care schemes from four corners of England have been selected as case studies. In particular, the report seeks to examine how the interface between the public, the semi-public, and the private in extra care housing work, and to what extent it might begin to define a type that is different from other types of housing for older people (e.g. sheltered housing or residential care homes). Care has been given to select a variety of different plan forms (Figure 2) that provide a range of spatial standards and densities. Two of the case studies (2 and 4) remain Local Authority schemes, while the other two have been handed over to Housing Associations, as part the privatisation movement. Prior to their conversions within the past four years, all four schemes used to function as sheltered housing schemes and provided between 30 to 39 dwelling units – some of them bed-sits – to 30 to 49 residents.

In two of the cases (1 and 2) the remodelling which has involved extensions and substantial upgrading, has meant a drop in the total capacity of the scheme, despite the fact that in one of the cases (2) the number of units

remained the same. Table 1 provides a quick glimpse into the variety of the case studies.

Table 1: Summary of the basic data of the four case studies

	Case study 1		Case study 2		Case study 3		Case study 4	
	Exist.	Remo.	Exist.	Remo.	Exist.	Remo.	Exist.	Remod.
No. of stories	2	2	2	2	5	5	2	3
No. of units	34	29	39	39	33	32	30	30
One-person units	31	25	29	38	33	25	30	21
Two-person units	3	4	10	1	0	7	0	9
Total capacity	37	33	49	40	33	39	30	39
Footprint	715 m²	1223 m²	1190 m²	1534 m²	554 m²	765 m²	1287 m²	1959 m²
Total net area	1367 m²	2185 m²	2107 m²	2570m²	2112 m²	2578 m²	2567 m²	4131 m²

A preliminary analysis of the data provided in Table … reveals case study 4 as the largest in terms of total net area (4131 m²) of the scheme followed by case studies 3 (2578 m²), 2 (2570m²), and 1 (2185 m²) in descending order. In terms of total capacity, case study 2 is the scheme with the largest capacity (40) followed by case studies 3 and 4 on equal ranking (39) and case study 1 as the smallest (33) of all four schemes. Considering the sizes of the building foot prints, this make case study 3 the densest scheme with 20 m² per person and case study 4 the sparsest with 50 m² per resident. In terms of the overall net area of the building, case study 2 with 64.3 m² per resident is the scheme with the least generous spatial standards and case study 4 the scheme with the most generous with an average of 106 m² per resident.

Remodelling from Sheltered Housing to Extra Care Housing: an introduction to four case studies

Figure 3: Case Study 1- Noli

Case Study 1		
Zones	**Existing**	**Remodelled**
Communal	48 m²	135 m²
Ancillary	94 m²	63 m²
Flats	740 m²	1500 m²
Staff Facilities	101 m²	58 m²
Other	32 m²	27 m²
Circulation	352 m²	402 m²
Total	1367 m²	2185 m²

Table 2: Case Study 1 - net areas

Case study 1[5] is located in a large council housing estate in a seaside town. The original building, which was built in the late 1950s, had a total net area of 1367 m² and provided dwellings for a maximum of 37 residents in bed-sits and self contained flats. The dwelling units were arranged on two floors along single loaded corridors. The bed-sits included a small kitchen but lacked bathroom facilities. Clusters of shared bathroom and lavatory facilities were provided in various wings of the building for the residents' use. Other amenities provided in the scheme were a guest room, a communal laundry room, a communal kitchen, and a communal lounge, and a large enclosed garden with lawn. The resident warden who had a two bedroom self-contained flat, also had an office on site.

At the communal level the remodelling has involved the inclusion of a lift, a conservatory/ communal lounge, a communal dining hall, a commercial kitchen for staff use only, a residents' shop, a buggy store room, assisted bathrooms, a hair dresser's room, a treatment room, scheme manager's as well as carers' office, a sluice room, a sleep-over room for night staff, and an enlarged communal laundry.

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[5] In order to protect the anonymity of the case studies, none of them can be named and nothing can be shown that would enable the reader to identify the schemes.

At the level of individual dwellings the remodelled scheme provides a total of 29 self-contained flats along double loaded corridors, for a maximum of 33 residents. In addition to the elimination of the resident warden's flat, 818 m² have been added to the total net area of the building to house the added facilities. Despite an increase of 60% to the total net area of the original building from 1367 m² to 2185 m², the total capacity of the building has dropped slightly. This is due the fact that in the original sheltered housing most of the flats were small bed-sits (19.1 m²), and the remodelled scheme not only had to increase the size of the dwelling unit drastically to make them self-contained, but it also had to house other essential facilities such as a communal dining hall, assisted bathrooms, etc that characterise extra care housing.

Case Study 2

Case Study 2		
Zones	**Existing**	**Remodelled**
Communal	171 m²	252 m²
Ancillary	78 m²	73 m²
Flats	1310 m²	1639 m²
Staff Facilities	109 m²	75 m²
Other	62 m²	96 m²
Circulation	377 m²	438 m²
Total	2107 m²	2570 m²
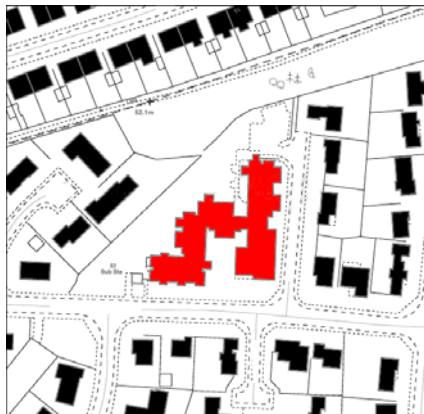
Figure 4: Case Study 2- Noli   **Table 3:** Case study 2 - net areas

Case study 2 was originally built as a sheltered housing scheme in 1973 and is located in a pleasant housing estate in a city in the north of England. Before remodelling it had a total net area of 2107 m² on two floors which provided 39 flat units arranged along double loaded corridors on two floors, as well as a lift, communal bathrooms, a guest room, a communal laundry room, an enclosed back garden with lawn, a common room, a TV room, and a communal kitchen. Like case study 1, this scheme had a warden that resided in a three-bedroom flat in the scheme with a separate office space.

The remodelled building, which remains a Local Authority scheme, has a 22% (463 m²) increase in area compared with the original sheltered housing scheme. The 2570 m² contains 39 self-contained dwelling units, an assisted bathroom, a communal bathroom, a guest room , a buggy store, a hairdresser's / treatment room, two assisted lavatories, a communal kitchen, a communal sitting room , a communal lounge/dining room, as well as scheme manager's office and staff and sleep over rooms.

There are 38 single-occupancy units and one double-bedroom flat, which bring the total capacity of the scheme to 40. Despite a 22% increase in the total net area of the remodelled building there, is a 20% drop (from 49 to 40) in the total capacity from that of the sheltered housing. This is partly due to the fact that individual flat sizes have increased from an average of 33.6 m² in the existing scheme to an average of 43 m² in the remodelled scheme and partly because of the additional care and communal facilities of the extra care housing.

Case Study 3

Figure 5: Case Study 3- Noli

Case Study 3		
Zones	**Existing**	**Remodelled**
Communal	124 m²	257 m²
Ancillary	27 m²	85 m²
Flats	1425 m²	1545 m²
Staff Facilities	32 m²	126 m²
Other	105 m²	88 m²
Circulation	300 m²	477 m²
Total	2012 m²	2578 m²

Table 4: Case study 3 - net areas

Case Study 3 is situated on a side road off a busy main road in a portal city in the south of England. It is within walking distance to most basic amenities and some other older people's homes. The original building was built on very steep terrain in the 1970s. In its 2012 m² net area provided

self-contained accommodation for 33 residents and housed other communal facilities such as a main communal lounge and two smaller lounges, a library, a communal laundry room, and a guest room. As a sheltered scheme it also provided an office and a small flat for a resident warden. The dwelling units were arranged along double loaded corridors on four floors, and although the main access to the building was at ground level, the largest communal lounge was located on the lower ground floor.

The remodelled scheme, which has a total net are of 2578 m², houses 32 units for a maximum capacity of 39 residents. The remodelling has involved a three storey extension to one wing of the building, the addition of the lower ground level communal lounge to protrude into the back garden, and the building out of the ground floor entry area to provide room for a day centre and communal dinning hall. Other changes in the remodelling scheme include the installation of a second lift, and the provision of a buggy store room, a hairdresser's room, a treatment room, an assisted bathroom, a commercial kitchen, a staff laundry room, a communal laundry room for the residents, an IT room, a carers' office, a staff room, and a scheme manager's office.

Case Study 4

Case Study 4		
Zones	Existing	Remodelled
Communal	227 m²	342 m²
Ancillary	42 m²	55 m²
Flats	1142 m²	1911 m²
Staff Facilities	92 m²	92 m²
Other	162 m²	447 m²
Circulation	902 m²	1284 m²
Total	2567 m²	4131 m²

Figure 6: Case Study 4- Noli   **Table 5:** Case study 4 - net areas

This case study is a located on steep terrain on the edge of a very small town in south-east of England, but because the town is so small it still is

very close to the centre. This scheme is set in a larger complex that includes sheltered housing bungalows, as well as a residential care unit with a day-centre that can also be used by residents of the extra care scheme.

The original building was an old listed hospital originating from the middle of the 19th century. It housed 28 one-person self-contained bed-sits, and 2 one-bedroom flats, as well as a warden's flat, two communal rooms, two communal laundry rooms and a private chapel on a total net area of 2567m² on two floors. Each dwelling unit had its own independent access from an outdoor portico.

The remodelling, which involved the English Heritage and the Conservation body as well as local authority committees, entailed the conversion of the bed-sits into 14 self-contained flats and the addition of 16 new-build flats to the back of the building, bringing the total number of the dwelling units provided in the remodelled scheme to 30. Some of the new facilities provided to the residents in the new scheme include, two lifts, two communal lounges, a dining room, a library, two assisted bathrooms, a residents' laundry room, a hairdresser's room, a residents' shop, an en-suite guest room, and two accessible lavatories. Some of the staff facilities include a scheme manager's office, a carers' office, a self-contained staff flat, and a staff laundry room.

On the whole, the remodelling has meant an addition of 1564 m² to the total net area of the building, by far the largest proportion of which has been used on private dwellings. One of the special features of this scheme is the very wide partly double-height corridor that runs between the converted and the newly built flats. (Figures 7 and 8) In fact, the corridor is so wide that the residents and staff refer to it as the 'thoroughfare'.

Figure 7: 'The thoroughfare' on the main (first) floor

Figure 8: 'The thoroughfare' with views to the upper and lower floor circulation

Public, semi-public and private distribution of space
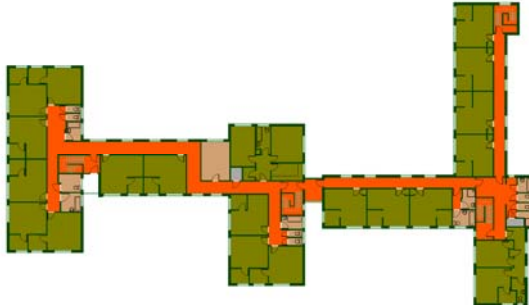
Existing Case Study 1 – First Floor Plan

Existing Case study 1 – Ground Plan
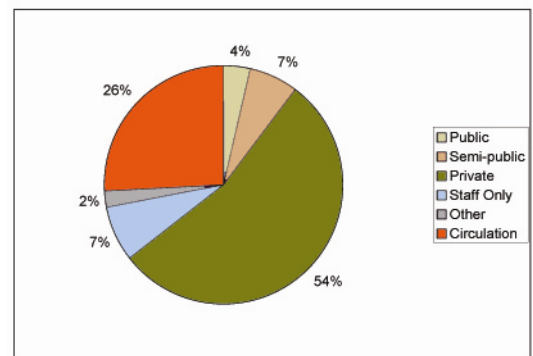
Figure 9:
Existing-Case Study 1 – Total Building
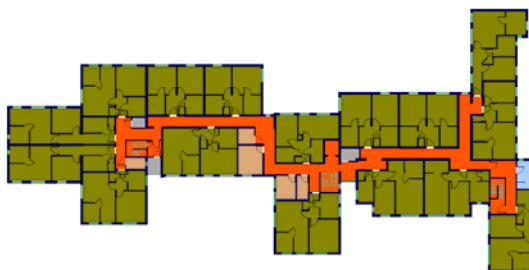
Remodelled Case Study 1 – First Floor Plan

Remodelled Case Study 1 – Ground Floor Plan
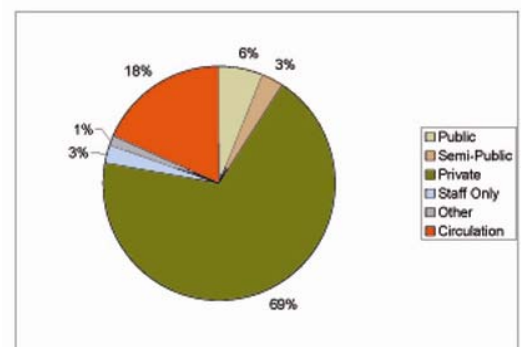
Figure 10:
Remodelled Case Study 1 – Total Building

This section of the report will consider the distribution of public, semi-public and private spaces in each scheme before and after remodelling from sheltered housing to extra care housing.

The pie charts of case study 1 (Figures 9 and 10) indicate that while the percentage of total net area dedicated to the private dwellings, and public facilities have seen a significant increase, those dedicated to the semi-public facilities (e.g. the communal / assisted bathrooms, and laundry rooms), circulation and staff facilities have in fact decreased. A breakdown of different categories of use in terms of public, semi-public, and private is presented in the Table 6.

Case study 1			
Zones	Existing	Remodelled	Increase
Public	48	135	112%
Semi-Public	94	63	-33%
Private	740	1500	103%
Staff only	101	58	-43%
Other	32	27	-15%
Circulation	352	402	14%
Total	1367	2185	60%

Table 6: Case study 1 – Existing and Remodelled net areas

It is important to note that although the percentage of the total net area dedicated to the dwellings has increased from 54% to 69% from the existing scheme to the remodelled one, and although the actual net area devoted to the flat has increased by 103%, the total capacity and the number of flat units has dropped from 37 and 34 to 33 and 29 respectively. Bearing this in mind, it is important to note that other programmatic categories like the semi-public ancillary facilities and the staff facilities have not only seen a decrease in the overall percentage of the total net area of the building, but also have had their real total areas reduced by 33% and 43% respectively.

Existing Case Study 2 – First Floor
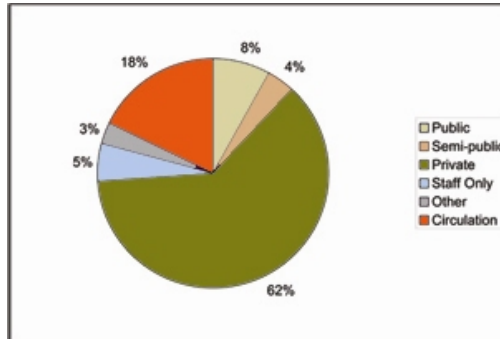
Figure 11:
Existing Case Study 2 – Total Building

Existing Case Study 2 – Ground Floor

Remodelled Case Study 2 – First Floor
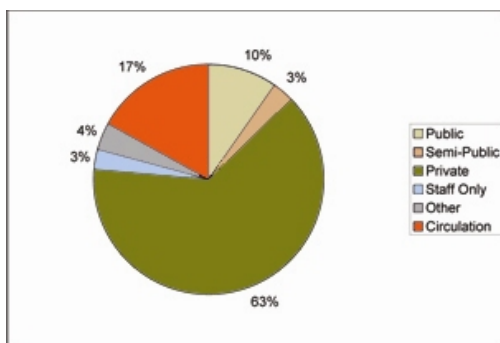
Figure 12:
Remodelled Case Study 2 – Total Building
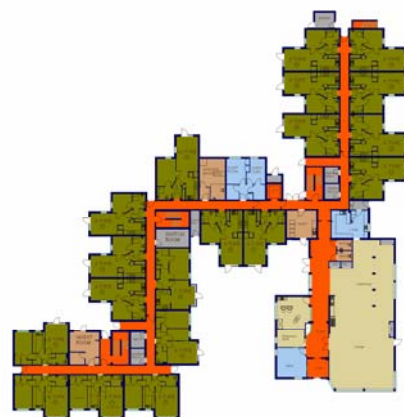
Remodelled Case Study 2 – Ground Floor

At the level of spatial distribution of various categories of space, the pie charts of case study 2 (Figures 11 and 12) show slight decreases in percentages of circulation, semi-public and staff facilities, while displaying slight increases in those of public and private categories. However, Table 7 below helps shed some light on what these percentages mean in terms of actual square metres. The 1% increase from 62% to 63% in terms of total net area dedicated for flats, in actuality means a 25% increase from the original square meterage allotted to flats. Given the fact that the total number of units remains the same between the pre-remodelled and remodelled scheme, this means that the size of the dwelling units are increased on average by 25%. The average flat size pre-remodelling was 33.6 m², the remodelled flats are on average 42 m².

Case study 2			
Zones:	**Existing**	**Remodelled**	**Increase**
Public	171	252	47%
Semi-Public	78	73	-6%
Private	1310	1639	25%
Staff only	109	75	-31%
Other	62	96	55%
Circulation	377	438	16%
Total	2107	2570	22%

Table 7: Case study 2 – Existing and Remodelled net areas

Another point to note is the decrease in the percentages of net area that are devoted to the semi-public and staff facilities. In the case of the staff facilities, the fact that the scheme no longer has a resident warden, and hence does not need a warden's flat, plays a major role in this decrease in the overall percentage. As for the semi-public facilities, it can be suggested that as the flat sizes increase some of these facilities can be provided inside individual flats, so less space is required for them outside individual dwellings. However, this scheme is one of the two case studies that allots more square metres to other facilities, like communal storage for the residents outside their flats. In this case it is actually the category with the highest increase (55%) in percentage compared to the pre-remodelled scheme.
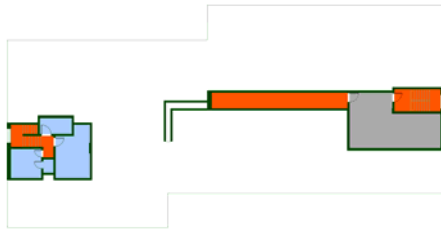
Existing Case Study 3- Third Floor
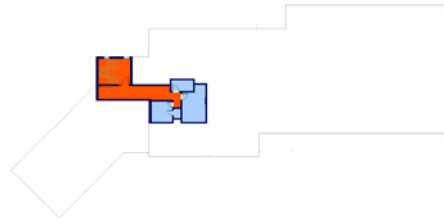
Remodelled Case Study 3- Third Floor
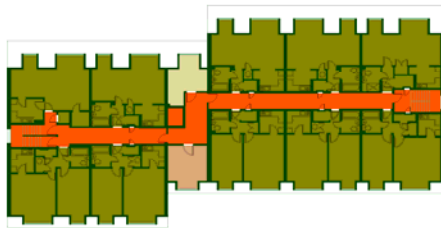
Existing Case Study 3- Second Floor

Remodelled Case Study 3- Second Floor
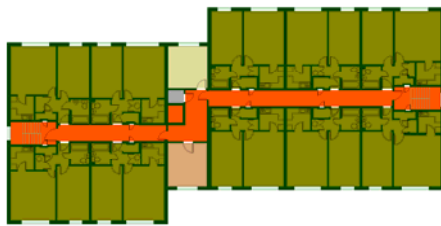
Existing Case Study 3- First Floor

Remodelled Case Study 3- First Floor
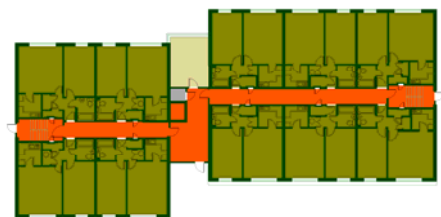
Existing Case Study 3- Ground Floor

Remodelled Case Study 3- Ground Floor

Existing Case Study 3- Lower Ground Floor
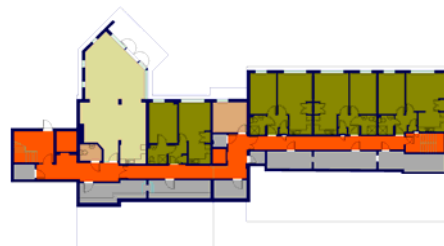
Remodelled Case Study 3- Lower Ground Floor
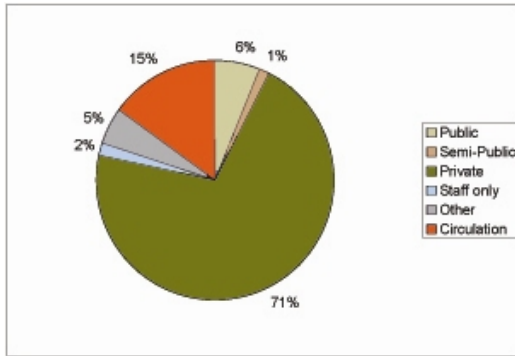
Figure 13:
Existing Case Study 3 - Total Building
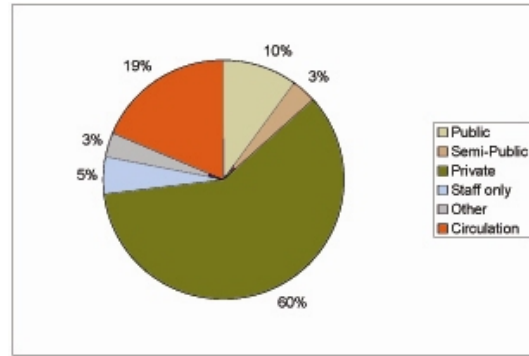
Figure 14:
Remodelled Case Study 3 – Total Building

Comparing the pie charts for case study 3 (Figure 14) of the proportion of various programmatic categories in the remodelled extra care scheme to that of the sheltered scheme (Figure 13), one thing that stands out is that all categories except for Private and Other have seen an increase in their percentage of floor area from the sheltered to the extra care scheme. However, unlike the Other category, which has actually had not only its percentage, but also its actual net area reduced, the actual net area dedicated to private dwelling has increased by 8%. On the other hand, the 8% compared to the 28% increase of total net area from the sheltered scheme to the extra care scheme, means that most of the addition to the net area of the building has been spent on other facilities.

Case study 3			
Zones:	**Existing**	**Remodelled**	**Increase**
Public	124	257	107%
Semi-Public	27	85	215%
Private	1425	1545	8%
Staff only	32	126	294%
Other	105	88	-16%
Circulation	300	477	59%
Total	2012	2578	28%

Table 7: Case study 3 – Existing and Remodelled net areas

In fact, Table 8 shows that the area allotted to the public facilities has seen a 107% increase, while those dedicated to the semi-public have been increased by a staggering 215%. This is in fact the only scheme where the total percentage of the semi-public and staff facilities has increased. While the increase in the staff facilities can be explained by the fact that the staff in this scheme also provide care and support services to the larger community of senior citizens in the area, the reason why the semi public facilities have increased is slightly more elusive. Of all the four case studies selected, case study 3 is the only one that had provided relatively generous flat sizes to the sheltered housing residents. In other words the average flat size of the sheltered scheme (43.2 m²) is closest to that of the extra care scheme (48.3 m²). This explains why the sheltered scheme provided comparatively little by way of semi-public ancillary facilities, because the self contained flats already satisfied the resident's needs.
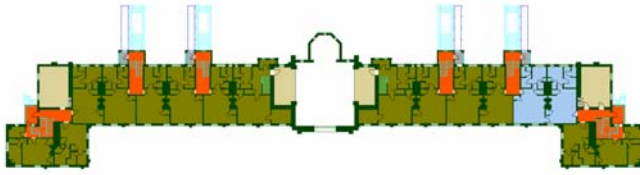
Existing Case Study 4 – First Floor
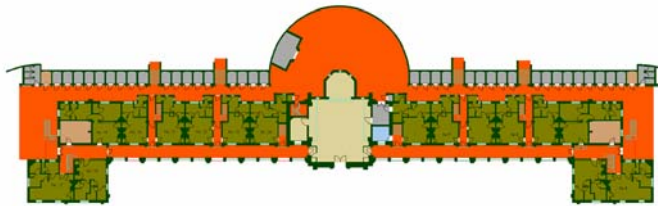
Existing Case Study 4 – Ground Floor
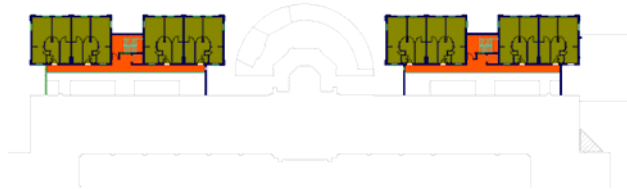
Existing Case Study 4 – Second Floor
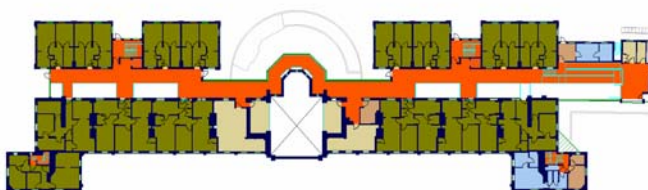
Remodelled Case Study 4 – First Floor
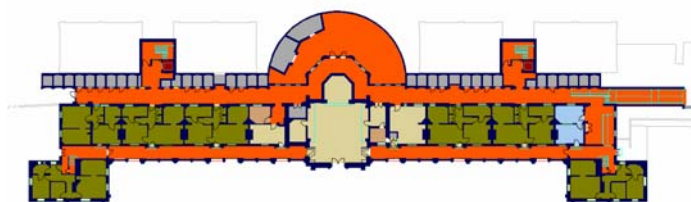
Remodelled Case Study 4 – Ground Floor
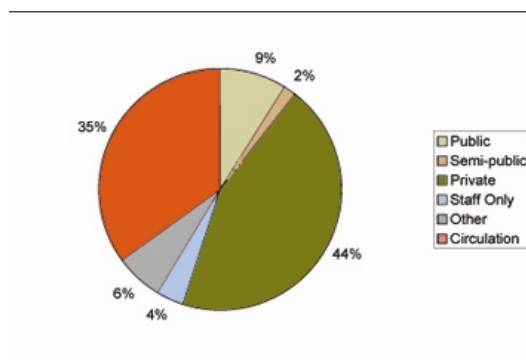
Figure 15:
Existing Case Study 4 – Total Building
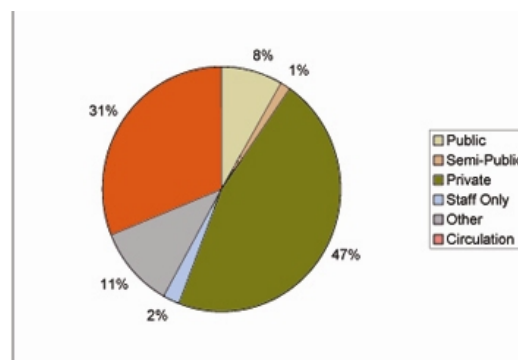
Figure 16:
Remodelled Case Study 4 – Total Building

The pie charts of case study 4 (Figures 15 and 16) show that the only two categories that have seen an increase from the sheltered to the extra care scheme are Other and Private, whereas all the other categories have seen their proportion decrease to various degrees. However, considering the fact that the total number of units provided remains the same, the seemingly slight increase in the proportion of the private dwellings, means that the increase in the actual sizes of the flats must be at a significant level. In fact when comparing the average flat size of the sheltered housing scheme (38.1 m²) to that of the extra care (63.7 m²) one can see a staggering increase of 67% in size. This is the second largest increase in flat size after the 137% in case study 1.

Case study 4			
Zones:	**Existing**	**Remodelled**	**Increase**
Public	227	342	51%
Semi-Public	42	55	31%
Private	1142	1911	67%
Staff only	92	92	0
Other	162	447	176%
Circulation	902	1284	42%
Total	2567	4131	61%

Table 9: Case study 4 – Existing and Remodelled net areas

Table 9 shows that despite the fact the overall percentage of various categories seem to have dropped, of the three categories of public, semi-public and the private, the category with the lowest percentage of increase

(31%) in actual net area is semi-public. Compared to the 67% increase in the total net area of the building as a result of the remodeling, this makes the significance given to this category recede even further.

To briefly sum up, all case studies, except for one (case 3), have seen an increase in the percentages of their private and public facilities, whereas the percentage of their semi-public facilities of the whole has decreased from the pre-remodelled to the remodelled scheme. In case 3 the reason for the increase in the semi- public facilities seem to be due to the fact that for the most part the original scheme provided self-contained dwellings and hence lacked the basic semi-public facilities that were provided in most sheltered housing schemes.

Justified Graphs Analysis
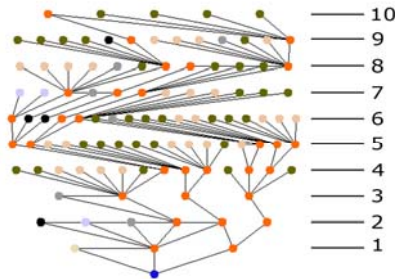
Figure 17:
Existing - Justified from the main entrance
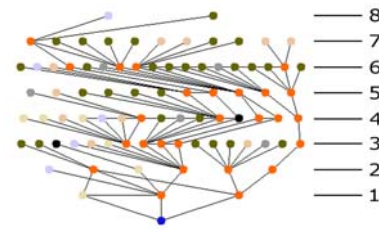
Figure 18:
Remodelled -Justified from the main entrance

Public   Semi-Public   Private   Circulation   Other
Staff   Area immediately outside the entrance

A justified graph analysis of the remodelled building of case study 1 reveals a total of 8 steps from the main entrance of the building to the deepest private dwellings in the scheme. Comparing the pre-remodelled (Figure 17) to the remodelled scheme (Figure 18) the depth of the building from the main entrance has been reduced by two from 10 steps. In the remodelled scheme, for example, the public spaces can be reached anywhere between 1and 4 steps from the main entrance, and the semi-public, anywhere between 3 and 7 steps away. By the same token and as a point of comparison, the public spaces in the pre-remodelled scheme were only one step away from the main entrance, but the semi-public were between 4 and 9 steps away. The graph also shows that in the remodelled scheme the private dwellings have become shallower and 97% of the individual flats are within 3 to 7 steps away from the main entrance compared to the 4-10 steps of the pre-remodelled scheme. This means that not only have they been pushed one step closer to the main entrance, but that as a whole they have become closer in terms of the number of steps they require to reach each other. This might have an impact on the community formation in the scheme.
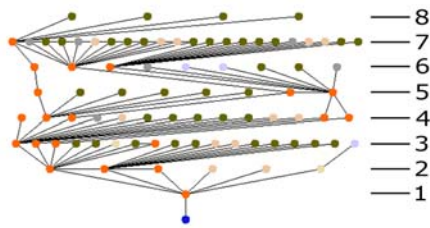
Figure 19:
Existing – Justified from the main entrance
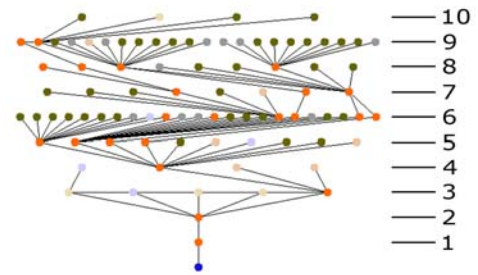
Figure 20:
Remodelled – Justified from the main entrance

○ Public ○ Semi-Public ● Private ● Circulation ● Other
○ Staff ● Area immediately outside the entrance

A look at the J-graphs of case study 2 before and after remodelling, justified from the main entrance (Figure 19 and 20), reveals that in the pre-remodelled scheme the public spaces are between 2 to 3 steps away from main entrance, and the semi-public are between 2 and 7 steps away, whereas those numbers of steps change to 3-10 steps for the public and 4-9 steps for the semi-public in the remodelled scheme. At this point it is important to mention that there is an upper floor sitting-room in the remodelled scheme, but it is extremely underused and it has been admitted by the decision-makers that it was a mistake to have put it there. However, the most significant difference between the two versions of the scheme is the number of steps required to reach the private dwellings. While in the pre-remodelled scheme the private flats could be reached between 3 to 8 steps away from the main entrance, in the remodelled scheme they are pushed deeper into building to about 5 to 10 steps away from the main entrance. In fact 92% of flats are more than 6 steps away from the main entrance. This is a significant increase in the number of steps required to transcend from the public to the private zone. This also means that the interface among the dwellings and between the private and public spaces has moved in the opposite direction to the previous case study towards greater segregation as opposed to integration.
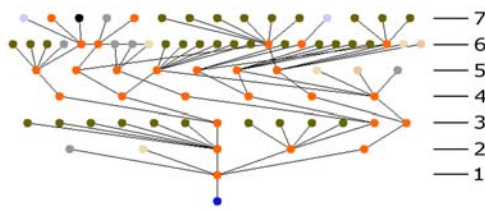
Figure 21:
Existing Case Study 3- Justified from the
main entrance
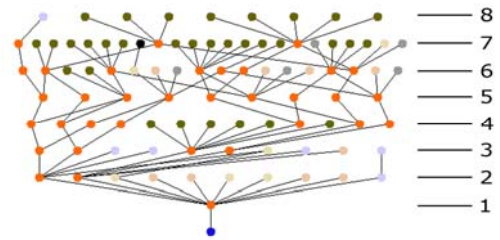
Figure 22:
Remodelled Case Study 3 – Justified from
the main entrance

Public   Semi-Public   Private   Circulation   Other
Staff   Area immediately outside the entrance

The comparable J-graphs of case study 3, justified from the main entrance
(Figure 21 and 22), reveal that in the pre-remodelled scheme the public
spaces were 2 to 6 steps from the main entrance, while the semi-public
were much deeper namely 5 to 6 steps away. In the remodelled scheme
while the public spaces remained at the same depth (2 to 7 steps), the
semi-public were made much shallower a 2 to 6 steps. The private
dwellings, however, were pushed slightly deeper into the building from 3 to
7 steps in the case of the pre-remodelled scheme to 4 to 8 steps in the
remodelled version.
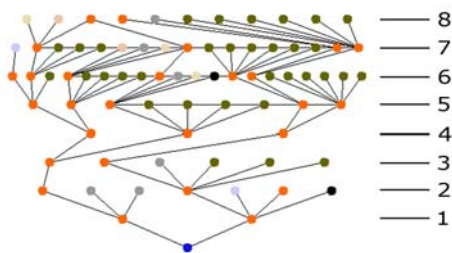
Figure 23:
Existing Case Study 3- Justified from the
main communal lounge
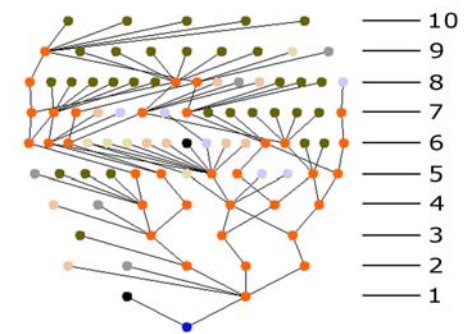
Figure 24:
Existing Case Study 3- Justified from the
main communal lounge

When viewing the whole system from the main communal lounge (Figure 23
and 24) in each scheme, the one thing that stands out is that whereas in
the pre-remodelled scheme most of the other public/ communal facilities
were at least 6 to steps away from the communal lounge in the remodelled
version this distance has been reduced significantly to 1 to 5 steps.

Case Study 4
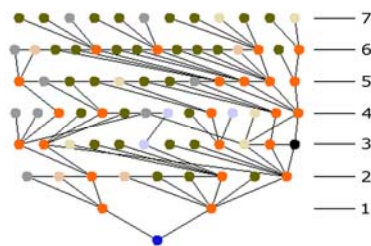
Figure 25:
Existing – Justified from the main entrance
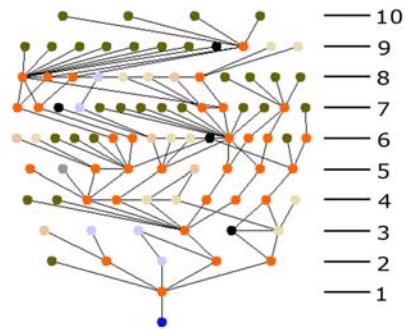
Figure 26:
Remodelled – Justified from the main entrance

The J-graphs in case study 4 (Figures 25 and 26)reveal that the depth of the building from the main entrance has increased by three steps from the existing scheme to the remodelled one. In terms of the number of steps required to reach the public and semi-public facilities, in the existing building the public facilities lie between 3 and 7 steps away from the main entrance, and the semi-public between 2 and 6 steps, while in the remodelled scheme the public facilities can be reached anywhere between 3 to 9 steps and the private facilities between 3 to 8 steps.

In the pre-remodelled scheme the number of steps required to reach the private dwellings lay anywhere between 2 and 7. In the remodelled scheme, however, even though one unit is within one step away and two within 4 steps away from the main entrance, the majority of the flats (90%) are pushed deep into the scheme to 6 to 10 steps away.

The j-graphs in this section have shown that whereas in general the private facilities tend to be located in the deeper parts of the schemes and overlap-in terms of steps with the semi-public facilities, the way the public facilities are distributed around the schemes, seem to be create two distinct groups amongst the four selected cases. Case 1 and 2 have kept their public facilities rather shallow and there is no overlap between the public domain and the private and semi-public domain, whereas in cases 3 and 4 the public facilities reach deep into the schemes and create a large overlap between all three domains.

Axial Analysis

Case Study 1

The axial analysis of the both the sheltered housing scheme (Figures 27 and 28)and the remodelled extra care housing scheme (Figures 29 and 30)show a significant increase both in the local and the global integration of case study 1. One of the most pronounced differences between the pre-remodelled and the remodelled scenario is that the remodelled scheme seems to have created an integration core area around the main entrance and the communal facilities of the ground floor, whereas the integration cores of the pre-remodelled scheme both locally and globally were not only comparatively much smaller, but they also were very linear. Co-incidentally, both scenarios picked the main entrance access into the building as one of the higher integrated lines in the map, although in the remodelled version it is slightly better integrated.

When comparing the step depth axial map from the most locally integrated line (Figure 32) with the local integration map (Figure 30) of the remodelled scheme there seems to be a high correspondence between the two. However, the same cannot be said about the pre-remodelled map (Figures 28 and 31). In the case of the latter, one of the most strongly constituted upper floor corridors, which also happens to be one of the shortest corridors in the scheme tips the balance of the whole axial map.

The connectivity maps (Figures 33 and 34) indicate that in the remodelled scheme the best connected lines correspond with the main public and communal spaces, and the well connected lines form a continuity, whereas in the existing scheme they are more fragmented and at various depths in relation to the main entrance. It is important to note that unlike in the remodelled scheme, in the pre-remodelled scheme the most connected lines always coincide with circulation routes and connect individual flats with each other or to the communal bathrooms.
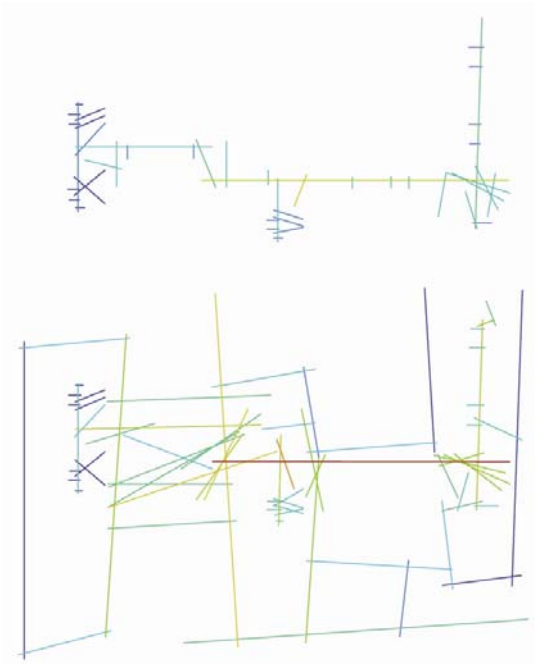
Figure 27:
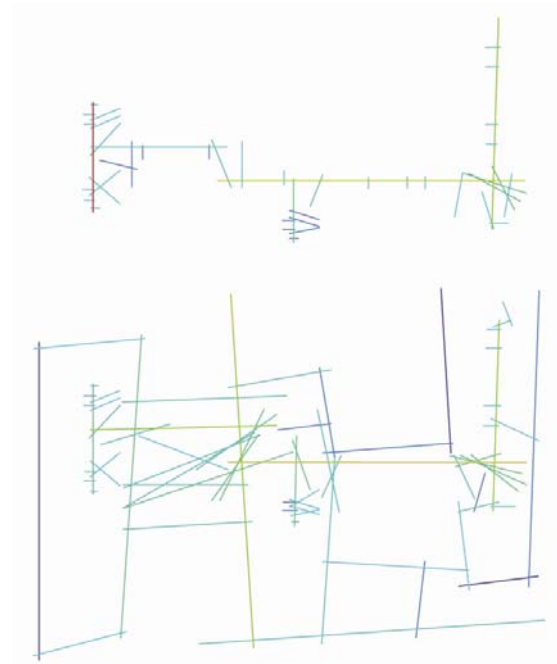Existing Case Study 1- Global Integration
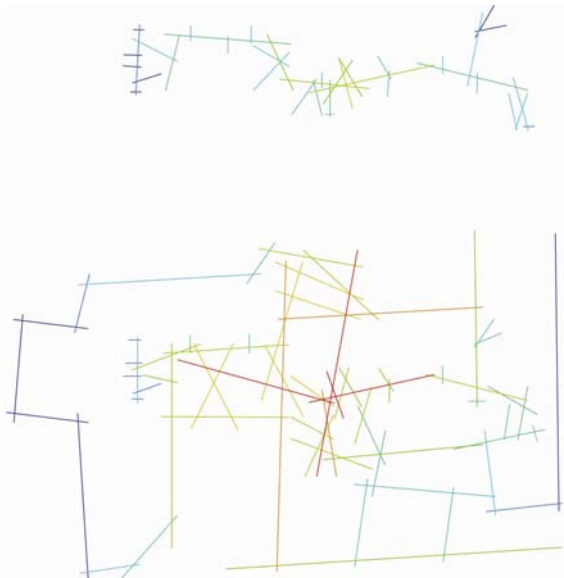

Figure 28:
Existing Case study 1- Local Integration

Figure 29:
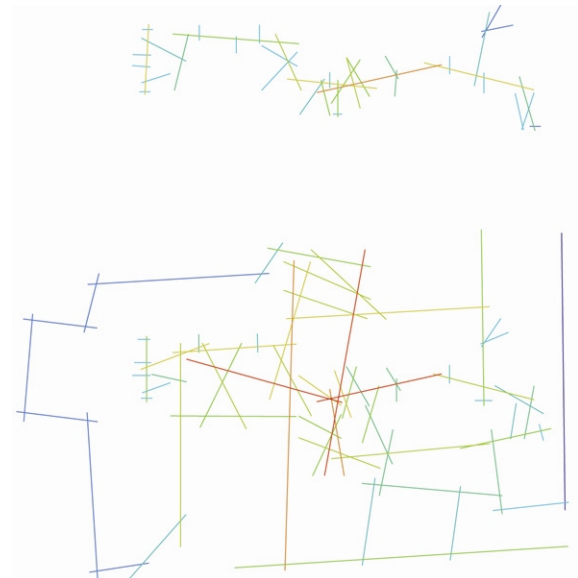Remodelled Case Study 1- Global Integration

Figure 30:
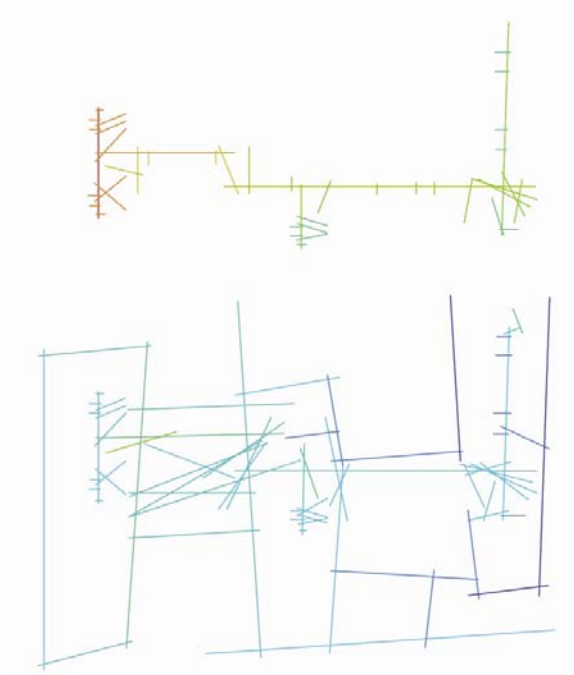Remodelled Case Study 1- local Integration

Figure 31:
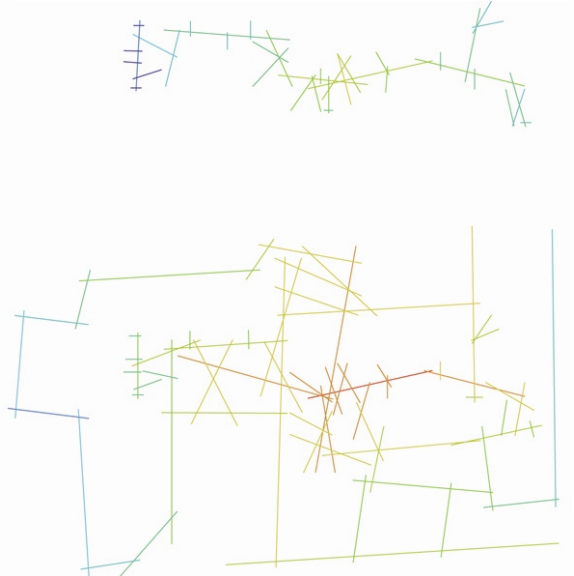Existing Case Study 1- Step Depth from the line with the highest local integration value

Figure 32:
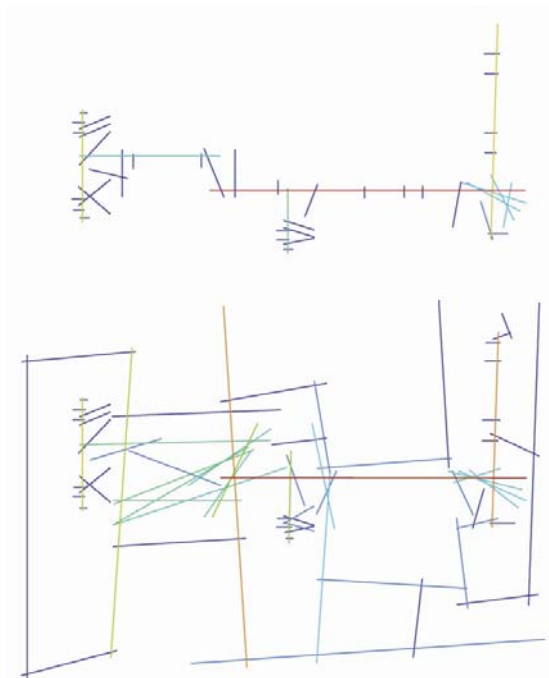Remodelled Case Study 1- Step Depth from the line with the highest local integration value

Figure 33:
Existing Case Study 1- Connectivity
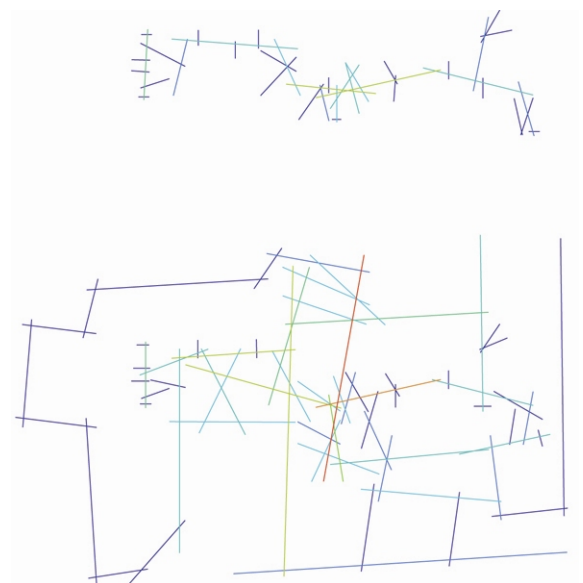
Figure 34:
Remodelled Case Study 1- Connectivity
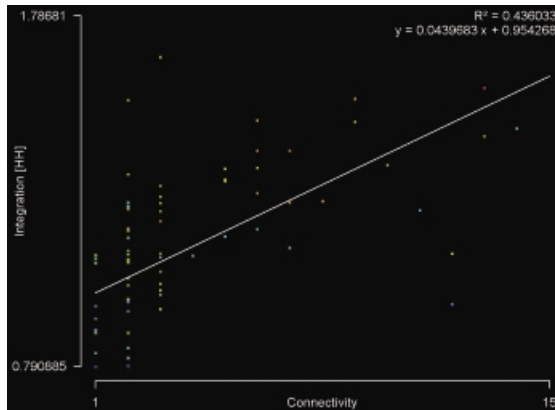
Figure 35:
Existing Case Study 1 – Intelligibility R²= 0.44
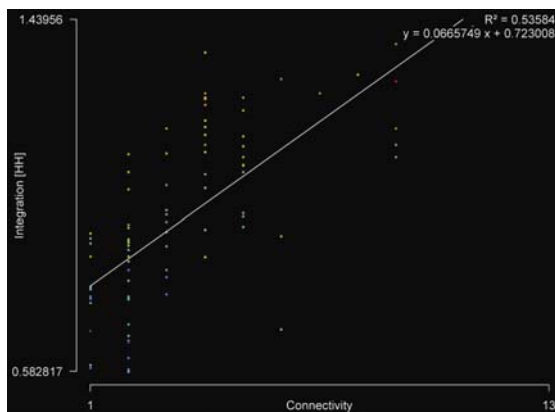
Figure 36:
Remodelled Case Study 1 – Intelligibility R²= 0.54

Comparing the correlation between connectivity with global integration which measures the intelligibility[6] of a configuration, one can detect an increase in the overall intelligibility of the remodelled scheme. (Figure 35 and 36)

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[6] The notion of intelligibility in space syntax (Hillier and Hanson, 1984) relates to the idea of how much one's local understanding of a spatial configuration, informs one's understanding of the global structure of the system.

Integration analysis of the axial maps of remodelled scheme (Figure 41) shows that compared to that of the sheltered housing (Figure 39), in the extra care scheme the integration core of case study 2 has moved inside the building and is beginning to define a partly enclosed area at the front of the scheme. This area, which also partly serves as a parking lot, is not only one of the main points of arrival for visitors into the scheme, but also serves as an informal court-yard that can be accessed directly through patio doors from some of the ground floor flats. (Figures 37 and 38) It is interesting to note that in the local integration map (Figure 42) of the remodelled scheme the most integrated line corresponds with the corridor where the lift and some of the semi-communal facilities such as the communal laundry and assisted bathroom are located. In the pre-remodelled scheme (Figure 40) the line with the highest local integration value connects an interior corridor constituted by individual flats to the area in front of the main entrance to the scheme, hence half of the most integrated line falls outside the building envelope.

Figure 37: Patio door opening into the open court yard

Figure 38: Case study 2 open court yard

The step depth analysis of the axial maps from the main entrance of the schemes highlights a significant difference between the remodelled and the pre-remodelled versions. Whereas in the remodelled scheme (Figure 44) the area covered by the second steps from the main entrance still largely overlap with the communal and semi-communal area of the scheme, in the existing scheme (Figure 43) the second steps penetrate deep into the semi-private corridors where some of the private dwellings are located.
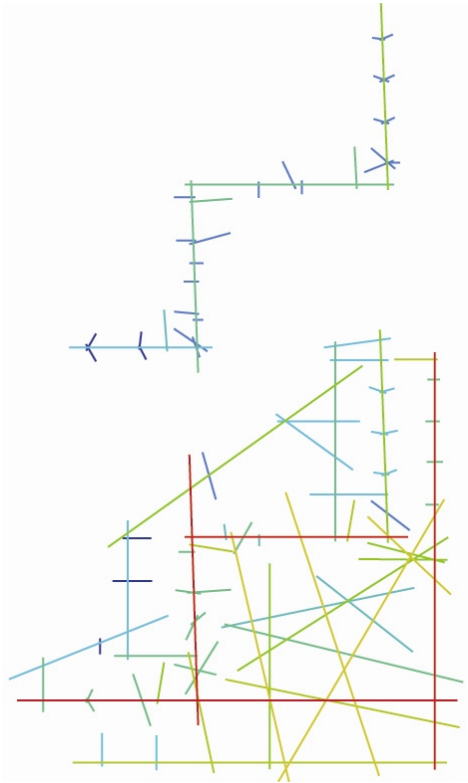
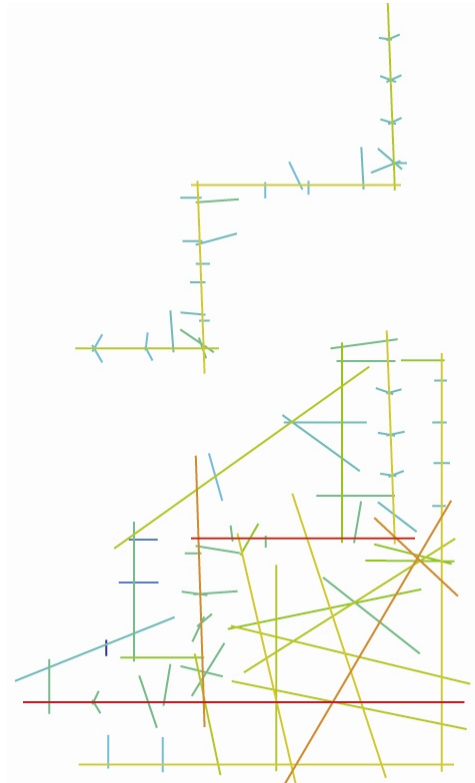**Figure 39:**
Existing Case Study 2- Global Integration

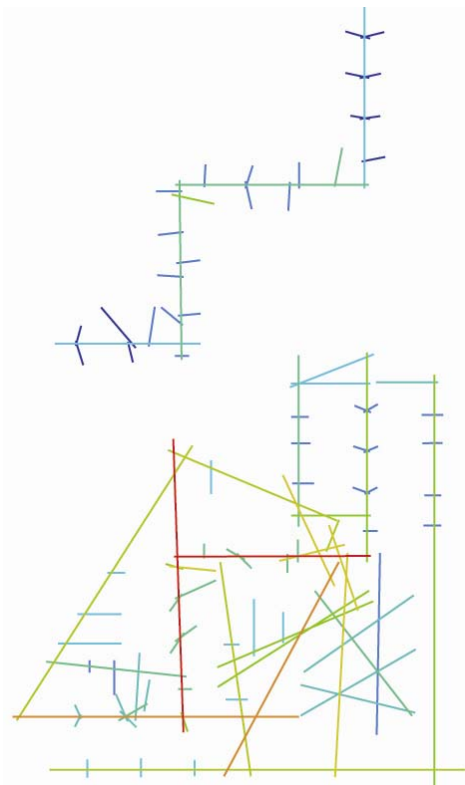**Figure 40:**
Existing Case study 2- Local Integration

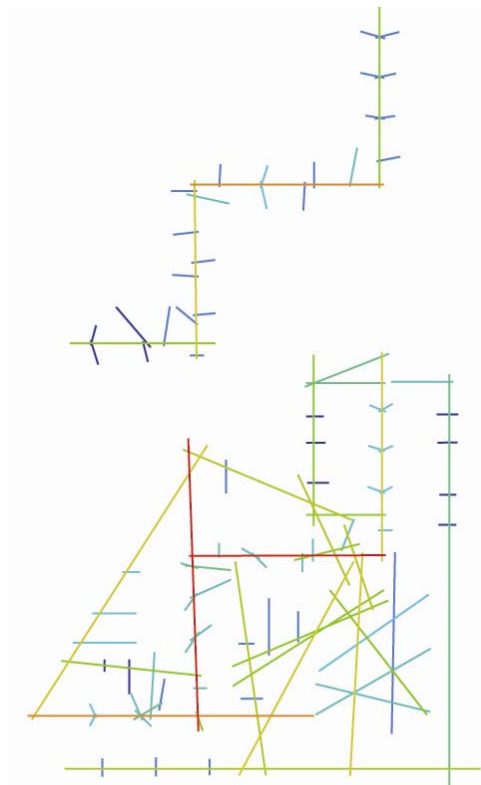**Figure 41:**
Remodelled Case Study 2- Global Integration

Figure 42:
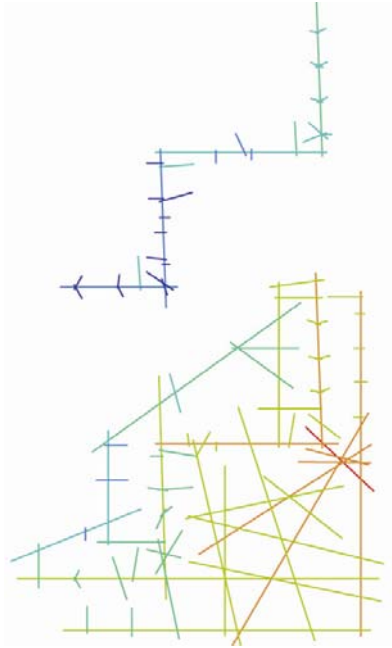Remodelled Case Study 2- local Integration

Figure 43:
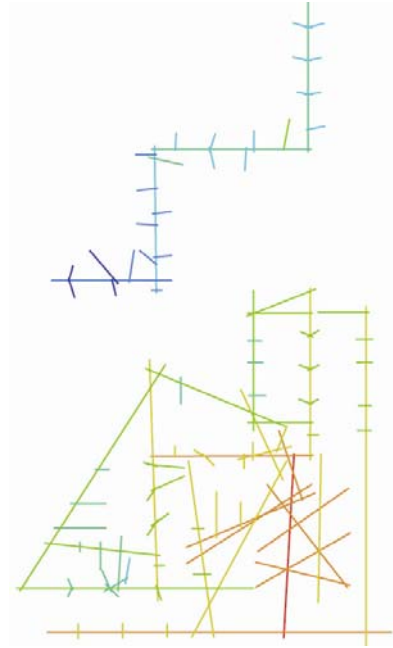Existing Case Study 2- Step depth from the main entrance

Figure 44:
Remodelled Case study 2- Step depth from the main entrance

The axial map of the extra care scheme (Fig….) weighted by connectivity measure begins to expose the main interior corridors that connect individual flats with each other as the most well connected, while the pre-remodelled map shows that the connectivity was shifted to the outside of the building envelope, making the building seemingly better connected externally than internally.
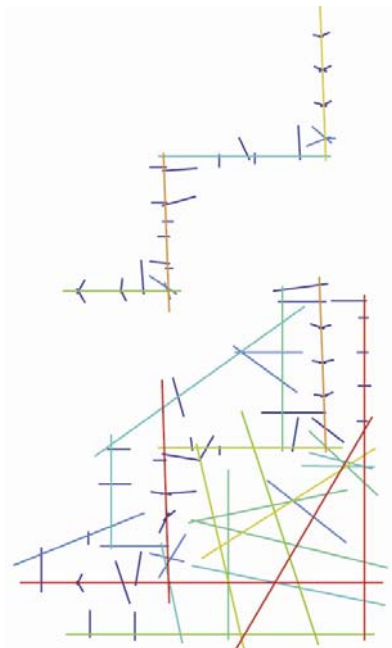

Figure 45:
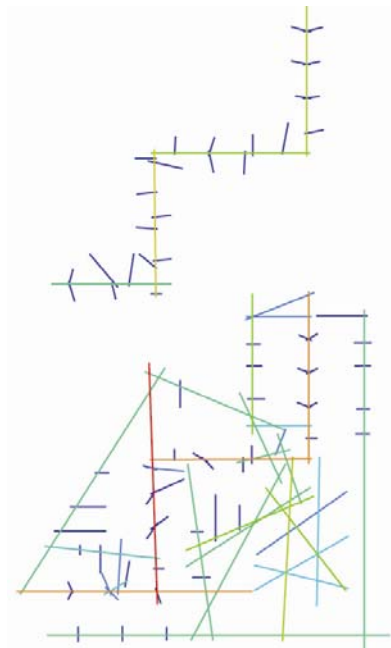Existing Case Study 2- Connectivity
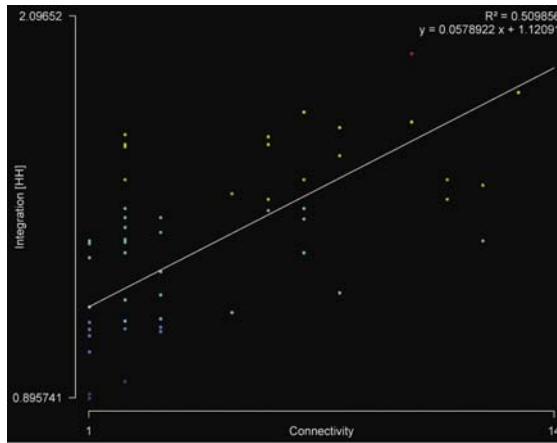

Figure 46:
Remodelled Case study 2- Connectivity

Figure 47:
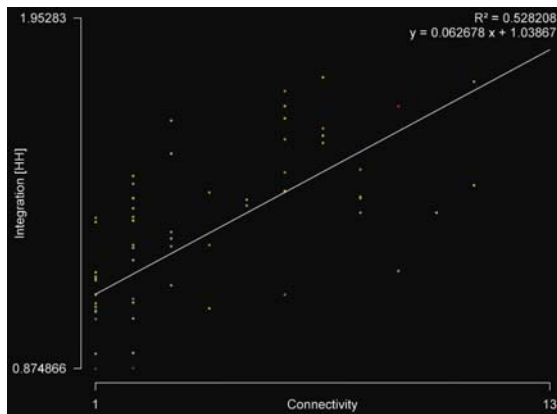Existing Case Study 2 – Intelligibility R²= 0.51

Figure 48:
Remodelled Case Study 2 – Intelligibility R²= 0.53

Like in case study 1, in this case study the intelligibility of the scheme is slightly increased from R²= 0.51 in the sheltered scheme to R²= 0.53 in the extra care unit. (Figure 47 and 48)

After conducting axial analysis of the spatial layout of case study 3, one immediate thing that stands out is the drastic increase in the total number of axial lines in the remodelled scheme compared to those of the pre-remodelled building, especially in ground floor main entrance area (from 17 to 29). On the level of local integration (Figures 49 and 50) the two versions of the scheme depict widely different types of integration cores. Whereas in the pre-remodelled version for the most part the interior corridors display the highest integration values, with the one on the lower ground floor close to the communal lounge having the highest value, in the remodelled scheme the integration core covers an area around the main entrance, where most of the public and communal facilities are located.
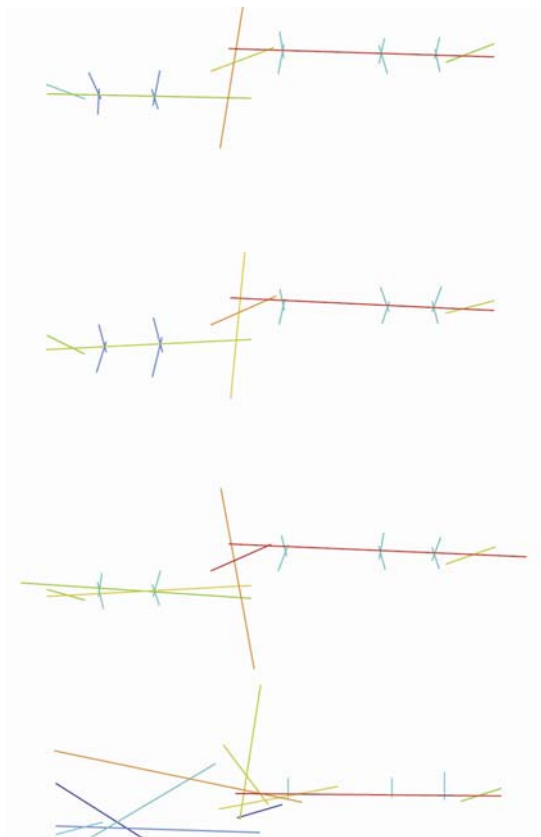

Figure 49:
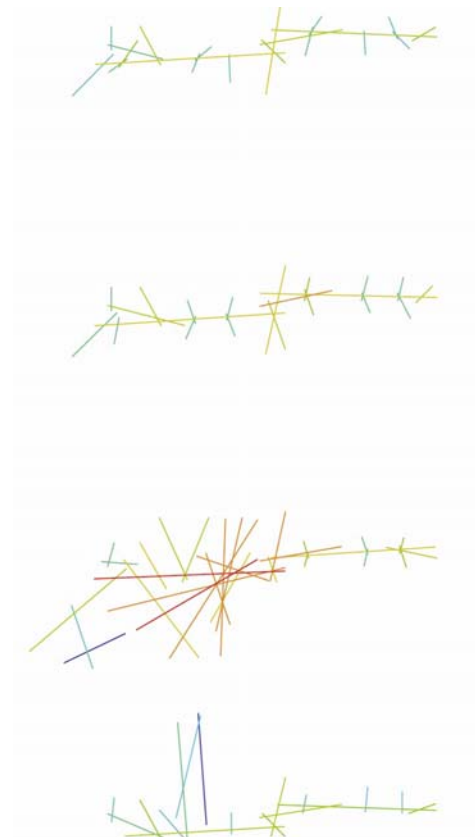Existing Case Study 3 – Local integration

Figure 50:
Remodelled Case Study 3 – Local integration

At the same time, a step depth analysis from the ground floor's main entrance (Figures 51 and 52) points out how deep and segregated the lower ground residents' communal lounge is. While in the pre-remodelled scheme, where it served as the main lounge, this might not have been a good thing, in the remodelled scheme this placement of the lounge has been intentional. During the visits to the scheme it was stated that in addition to the main communal lounge on the ground floor, the residents had specifically requested to have quieter private lounge which would not be open to people outside the scheme. In this case, having a separate communal lounge for the residents of the scheme only, seems to be particularly important, because the main lounge on the ground floor also serves as a day centre which is open to other senior citizens from the area.
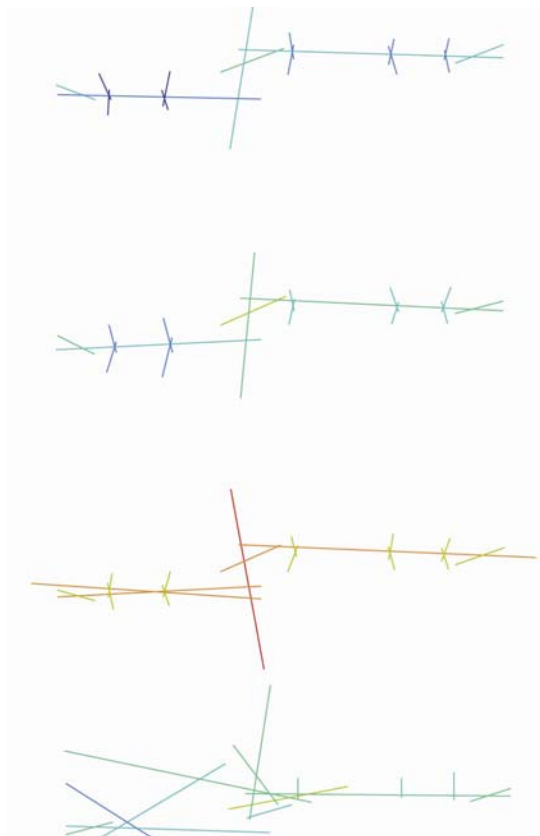

Figure 51:
Existing Case Study 3 – Step depth from the main entrance
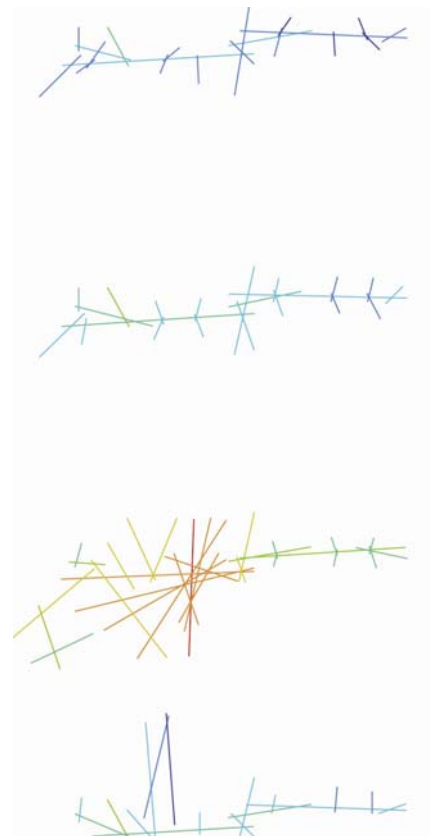
Figure 52:
Remodelled Case Study 3 – Step depth from the main entrance

The connectivity map of the remodelled scheme (Figure 54) again highlights the area where most of the public facilities are located, while the pre-remodelled scheme (Figure 53) depicts the domestic corridors as the best connected. The remodelling has increased the intelligibility of the scheme from R^2= 0.28 (Figure 55) in the sheltered scheme to R^2= 0.38 (Figure 56) in the remodelled extra care scheme.
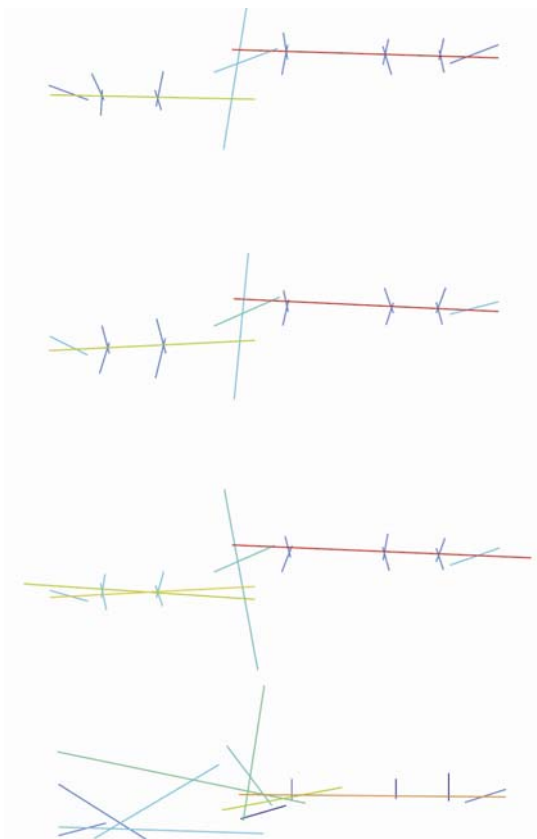
Figure 53:
Existing Case Study 3 – Connectivity
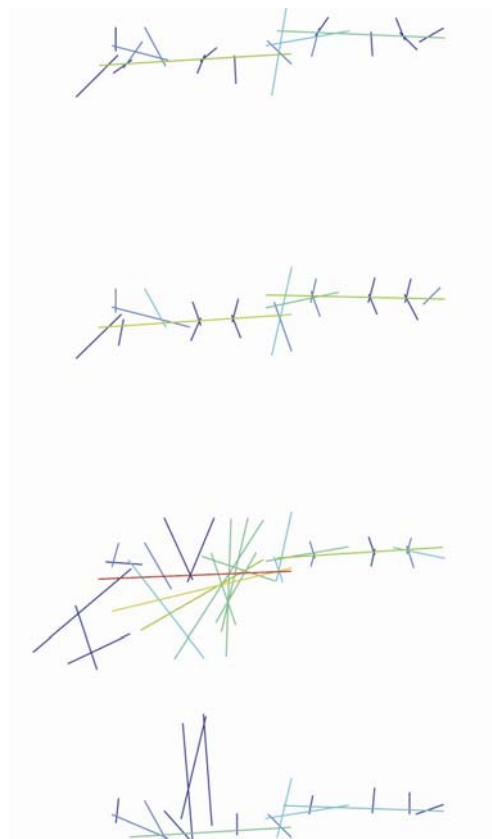
Figure 54:
Remodelled Case Study 3 – Connectivity
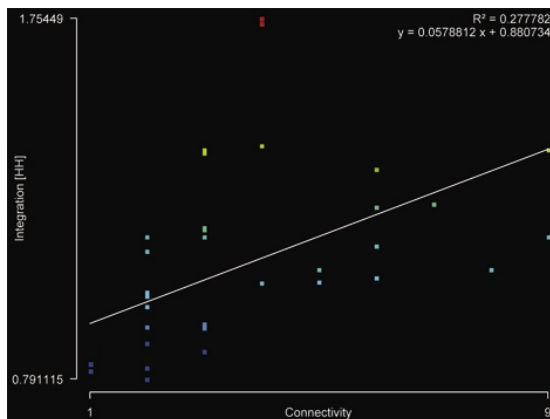
Figure 55:
Existing Case Study 3 – Intelligibility R^2= 0.28
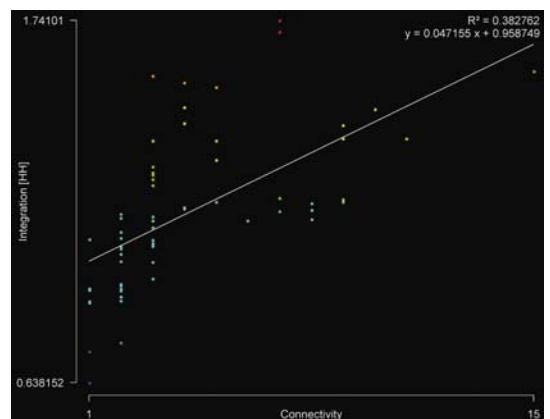
Figure 56:
Remodelled Case Study 3 – Intelligibility R^2= 0.38

The local integration axial analysis of both the pre-remodelled (Figure 57) and the remodelled (Figure 58) version of case study 4 show that in the remodelled scheme the integration core – the main corridor - is pushed into the building envelop, whereas in the pre-remodelled map the exterior portico is highlighted.
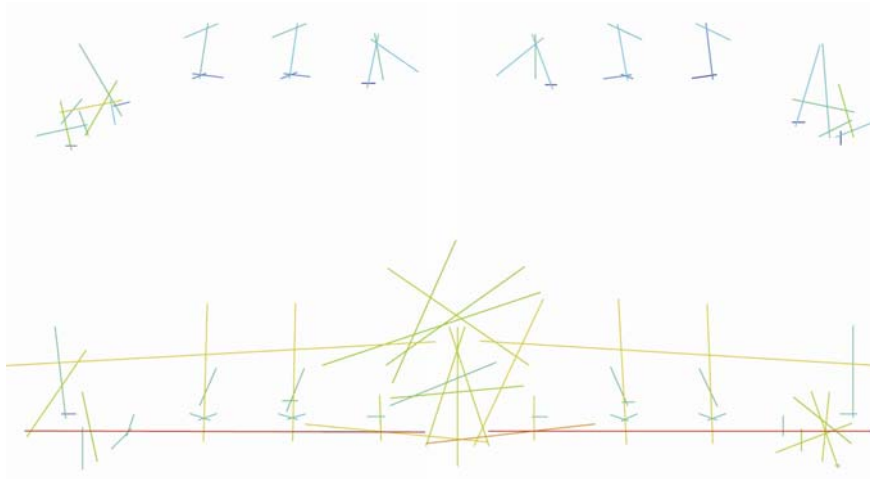
Figure 57:
Existing Case Study 4 – Local Integration
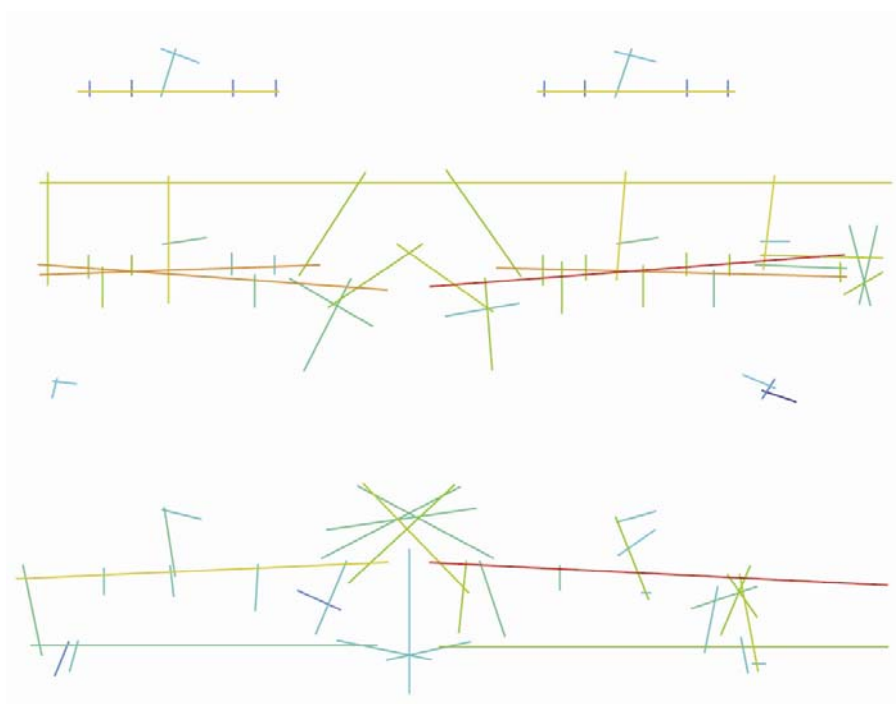
Figure 58:
Remodelled Case Study 4 – Local Integration

Unlike all the other case studies the integration core remains very linear in both cases. This seems to be due to the fact that the building has an elongated linear form which affects the length and distribution of axial lines. The remodelled map depicts the line that represents half of the main 'thorough fare' – the half that is closest to the main entrance – as the most integrated line. This line stands for the part of the 'thoroughfare' that connects to most of the communal facilities and is only broken down by the mass of the chapel in the middle of the building.
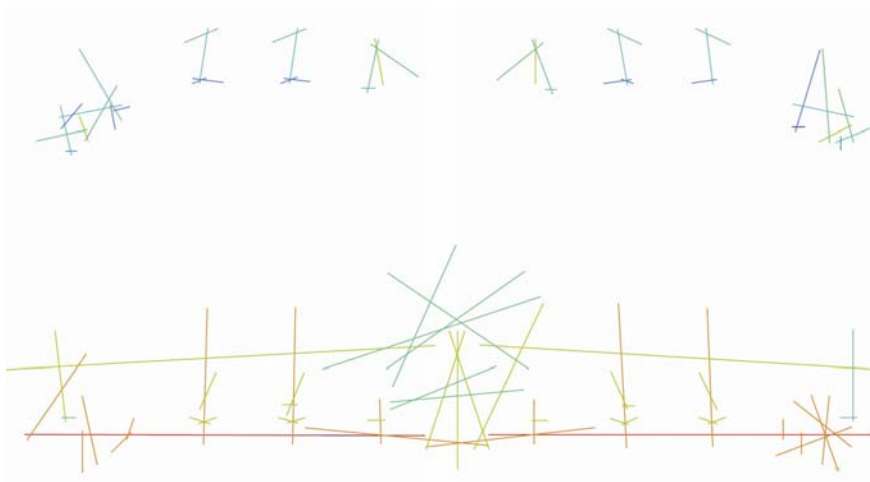
Figure 59:
Existing Case Study 4 – Step Depth from the main entrance
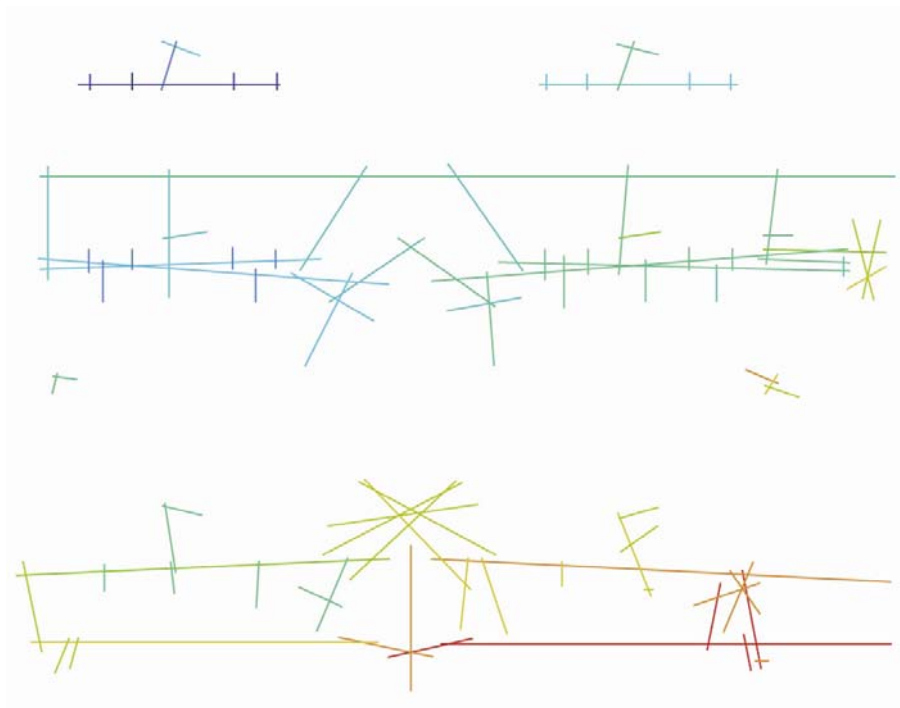
Figure 60:
Remodelled Case Study 4 – Step Depth from the main entrance

The step depth analysis from the main entrance shows a significant difference between the before and after remodelling version. (Figures 59 and 60) In the sheltered housing scheme the local integration map and the step depth from the main entrance seem to correspond better with each other than the local integration map of the extra care scheme with the step depth from its main entrance. In other words, in the remodelled scheme, despite the fact that the ground floor corridor is shallower in relation to the main entrance, the integration core is pushed deeper to the first floor corridor. This is also the level where the scheme connects to the adjacent residential care unit.
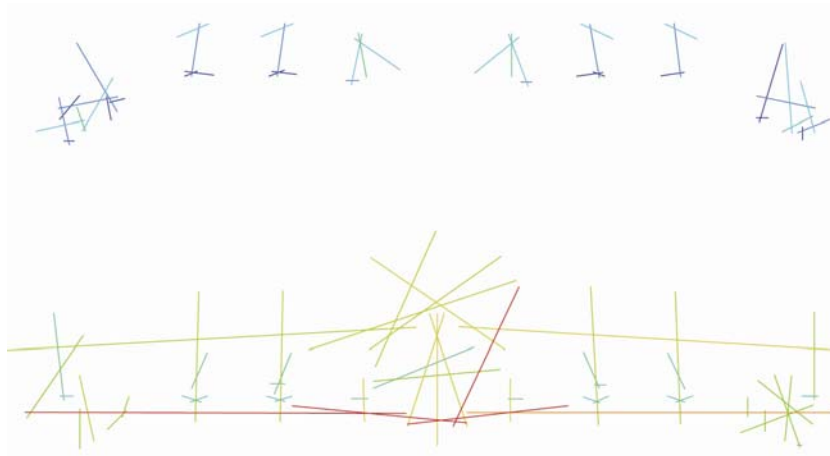
Figure 61:
Existing Case Study 4 –Global Integration
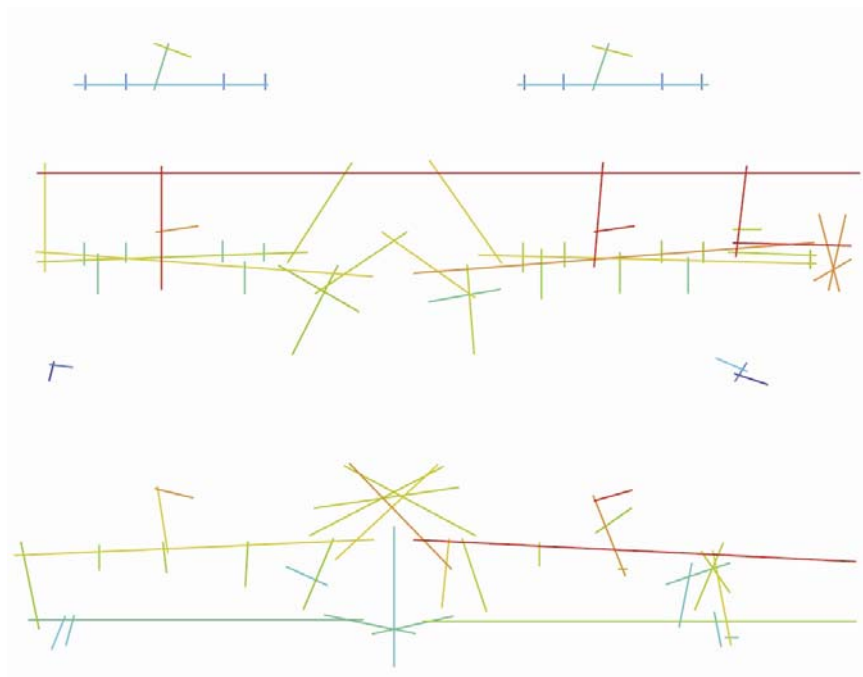
Figure 62:
Remodelled Case Study 4 – Global Integration
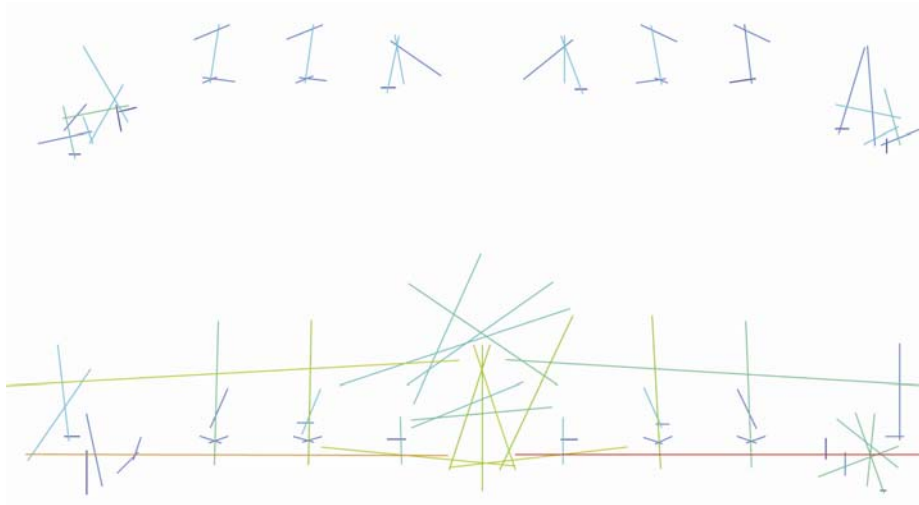
Figure 63:
Existing Case Study 4 – Connectivity
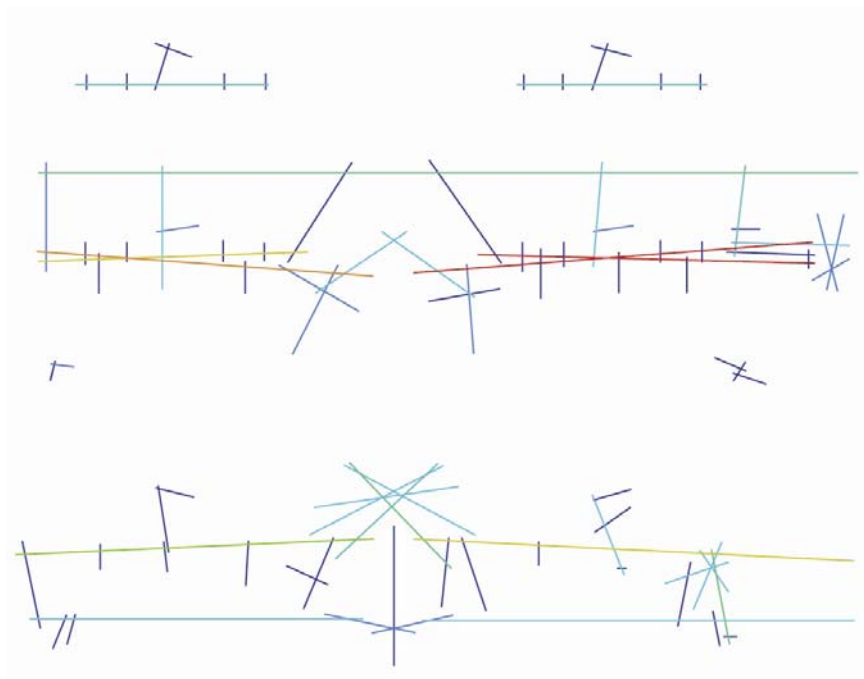
Figure 64:
Remodelled Case Study 4 – Connectivity

This is the only case study out of the four where the intelligibility has not only dropped but dropped by nearly 50% from the original building (R^2 = 0.52) to remodelled scheme (R^2 = 0.24) (Figures 65 and 66). This is hardly a surprise when one compares very low correspondence of the connectivity map (Figure 64) to the global integration (Figures 62) of the remodelled scheme. This seem to be due to the fact that because of the remodelling, a

number of shorter corridors that connected two main long circulation spaces at regular intervals which were thus responsible for creating 'ringyness' and increased choice, have been eliminated. Theoretically, by eliminating the interconnecting shorter corridors one's understanding of where one is in relation to the global configuration of the scheme is greatly reduced, because one's local position does not prove clues about one's global position, as reflected in the concept of intelligibility.
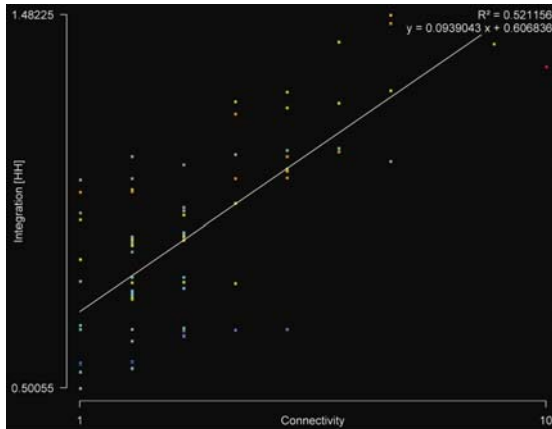
Figure 65:
Existing Case Study 4 – Intelligibility R²= 0.52
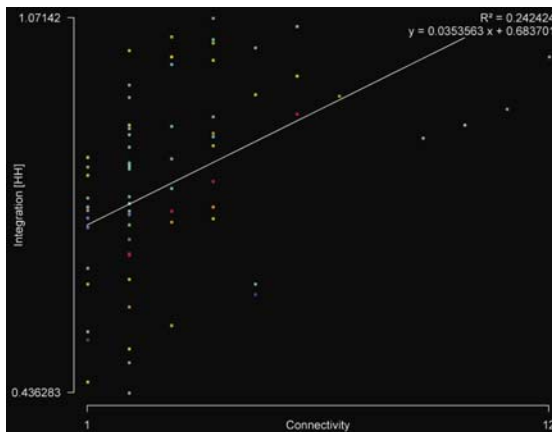
Figure 66:
Remodelled Case Study 4 – Intelligibility R²= 0.24

In this particular scheme, however, the special feature of the main corridor can explain why this is not the case. The 'thoroughfare' is basically a three story high corridor space, which provides views through multiple levels. So if in addition to access one takes the visibility into account one begins to get a more accurate understanding of how this scheme works.
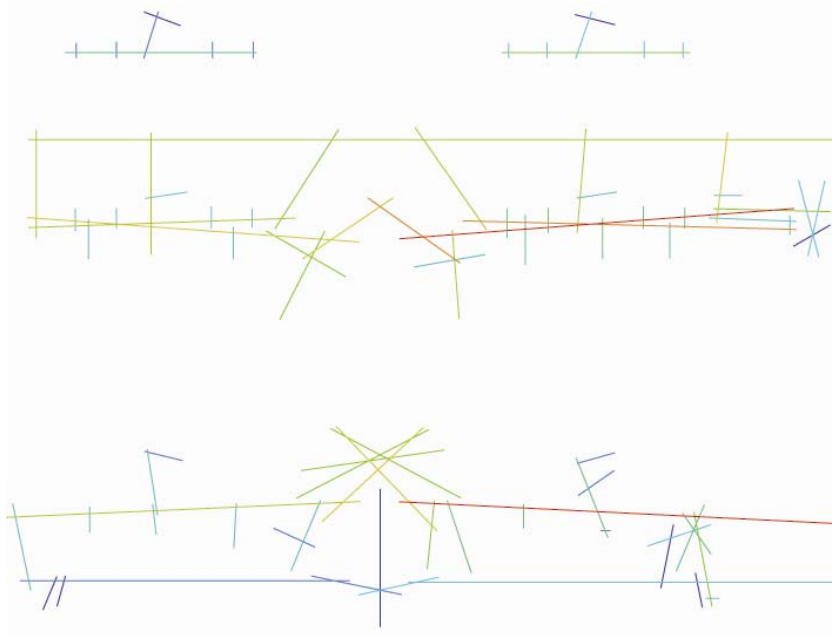
Figure 67:
Remodelled Case Study 4 – Global Visual Integration
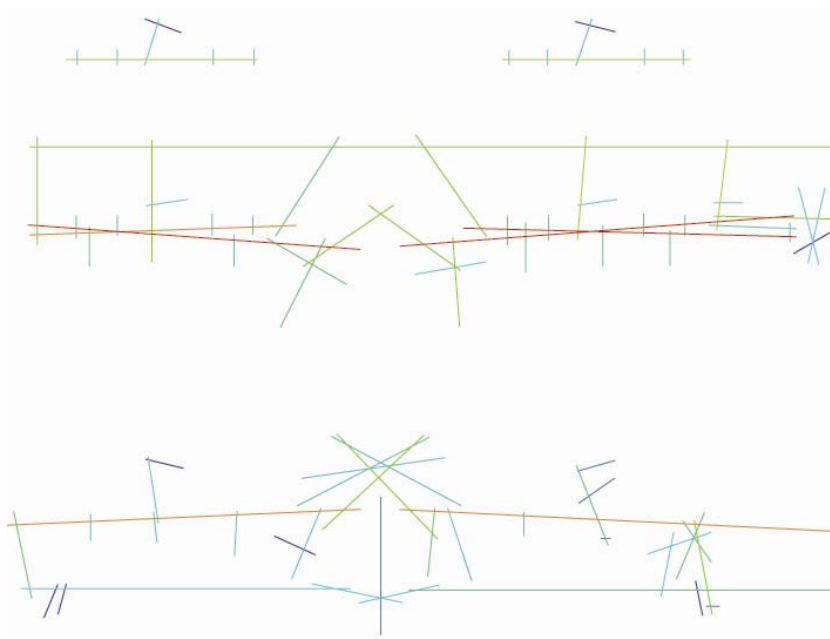
Figure 68:
Remodelled Case Study 4 – Local Visual Integration
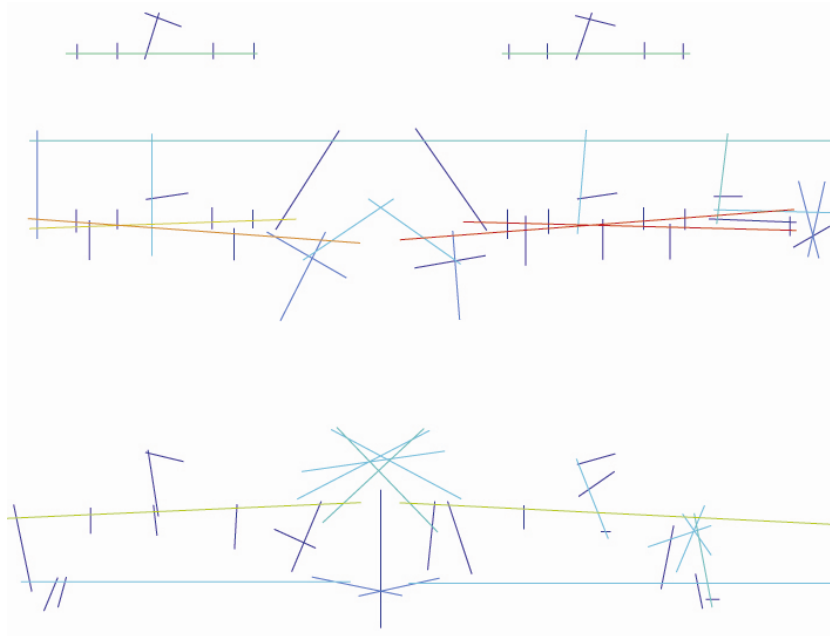
Figure 69:
Remodelled Case Study 4 – Visual Connectivity
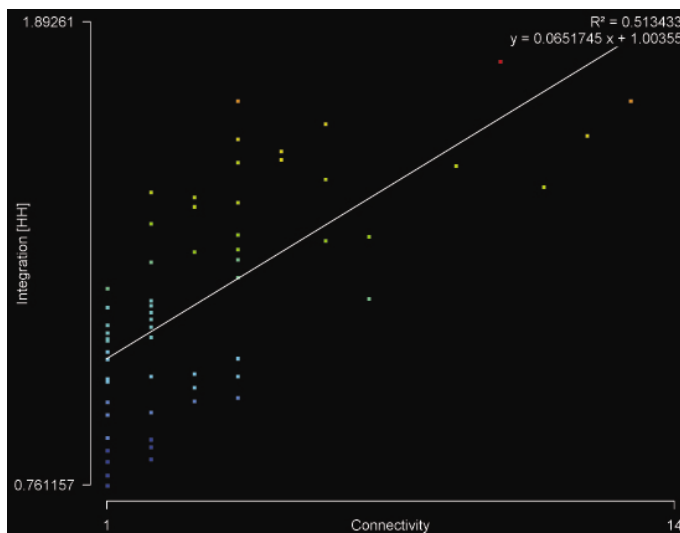
Figure 70:
Remodelled Case Study 4 – Visual Intelligibility R²= 0.51

The visual analysis of the axial map shows a very high level of integration of the 'thoroughfare' at multiple levels both locally and globally. However, it is the visual intelligibility of the scheme (R² = 0.51), which is double that of the permeable intelligibility, that allows one to understand why despite the

elimination of the shorter interconnecting corridors navigation one still can easily navigate and orientated oneself throughout the scheme.

Across the board, the axial analysis of the cases has highlighted the public and communal facilities as most integrated and the private dwellings as the most segregated parts of the scheme. However, the nature of the integration core in various schemes highlighted differences. While in three case studies (1, 2 and 3) the integration core defined an area and was immediately in the vicinity of the main entrance of the scheme, in case study 4 the integration core remained linear and was set deeper into the scheme.

Convex Analysis

The local integration analysis of the convex map case study 1 (Figures71 and 72)[7] depicts the circulation spaces as more integrated than other convex spaces both in the existing and in the remodelled building. Furthermore, in both scenarios the range of integration values of different parts of the circulation routes varies greatly.

The local integration map of the existing scheme highlights a rather short highly constituted corridor as the most integrated space. This corridor, which also has the highest connectivity and control, is constituted by a cluster of 5 shared bathrooms and 6 individual bed-sits as well as a stair well. This could have had implications on the issues of privacy and control for the residents in that wing of the building.

11.07 to 11.77	(1)
6.84 to 7.54	(1)
3.32 to 4.02	(4)
2.61 to 3.32	(8)
1.91 to 2.61	(5)
1.2 to 1.91	(31)
0.5 to 1.2	(52)

5.41 to 5.76	(1)
4.37 to 4.72	(1)
3.68 to 4.03	(1)
3.33 to 3.68	(3)
2.98 to 3.33	(1)
2.29 to 2.64	(5)
1.94 to 2.29	(6)
1.6 to 1.94	(10)
1.25 to 1.6	(21)
0.9 to 1.25	(10)
0.56 to 0.9	(12)
0.21 to 0.56	(7)
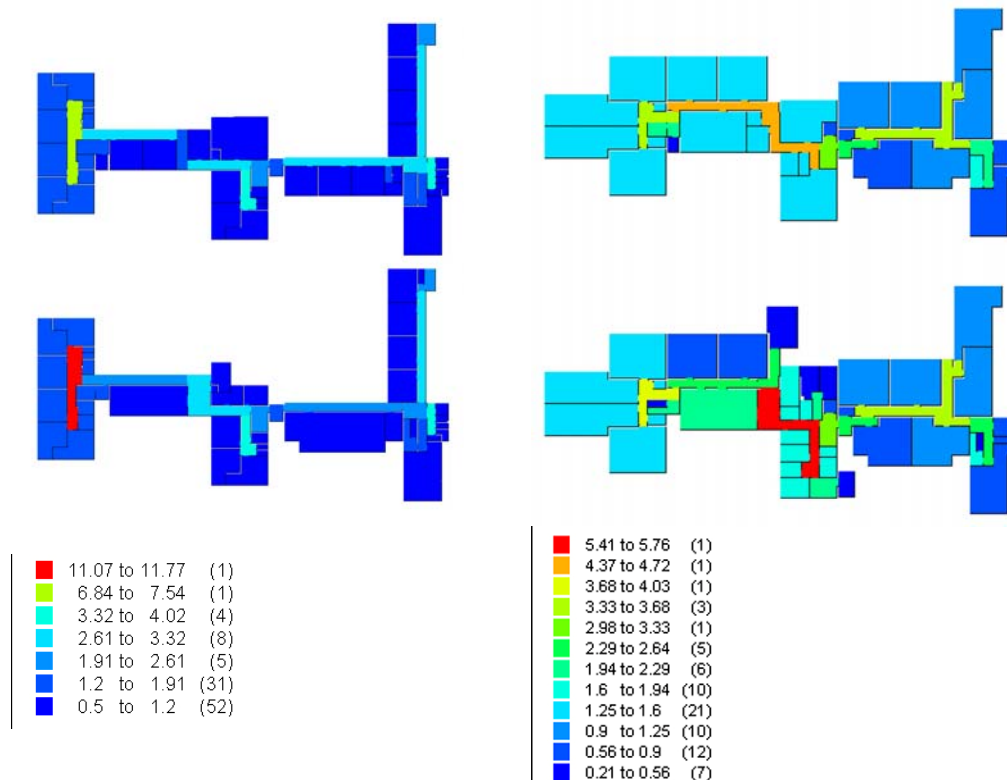
Figure 71:
Existing Case Study 1- Local Integration

Figure 72:
Remodelled Case Study 1- Local Integration

[7] All legends are created at inflection point 8 with natural break.
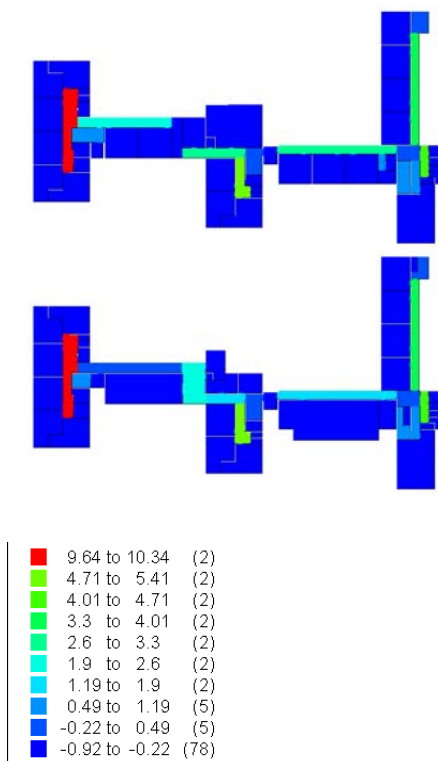
Figure 73:
Existing Case Study 1- Control
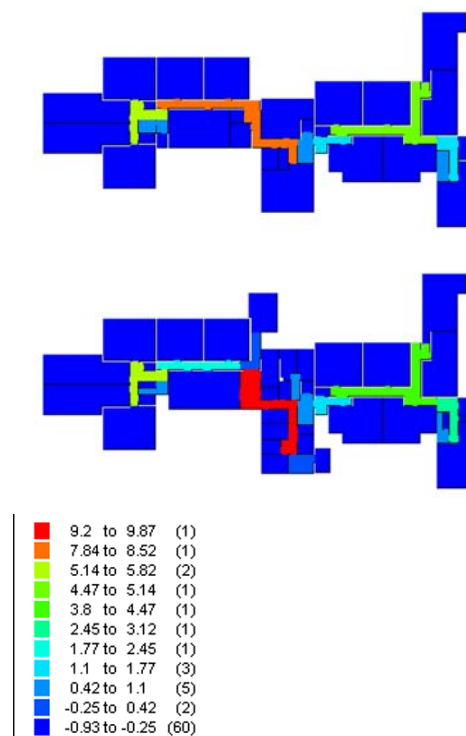
Figure 74:
Remodelled Case Study 1- Control

The local integration analysis of the convex maps of the remodelled scheme clearly separate the individual dwelling units as the most segregated and the circulation and communal spaces as the more integrated areas. It depicts the main entrance lobby of the building and the adjacent corridors that connect to the more communal facilities such as the hairdresser's room, the assisted bathroom, the treatment room, and the buggy store, as the most locally integrated space. However, the observatory, which serves as a communal lounge and is directly on axis with the main entrance remains rather segregated. In general, in terms of integration the remodelled scheme draws a clear boundary between the private and public domains.

When comparing the convex local integration maps of the two versions of case study 2, one notices that, whereas in the pre-remodelled version (Figure 75) a deep first floor corridor is highlighted as the most integrated space in the scheme, in the remodelled version (Figure 76) the integration core is shifted to one of the shallowest elements of the scheme, namely the communal lounge close to the main entrance. Coincidentally this is also the space with the highest control in the scheme (Figure 78).

7.37 to 7.85 (1)	6.07 to 6.46 (1)
5.46 to 5.94 (1)	4.12 to 4.51 (1)
4.51 to 4.99 (1)	3.34 to 3.73 (5)
3.55 to 4.03 (2)	2.94 to 3.34 (5)
3.08 to 3.55 (2)	2.55 to 2.94 (2)
2.6 to 3.08 (4)	2.16 to 2.55 (3)
2.12 to 2.6 (4)	1.77 to 2.16 (6)
1.64 to 2.12 (13)	1.38 to 1.77 (17)
1.16 to 1.64 (35)	0.99 to 1.38 (51)
0.69 to 1.16 (19)	0.6 to 0.99 (3)
0.21 to 0.69 (5)	0.21 to 0.6 (3)
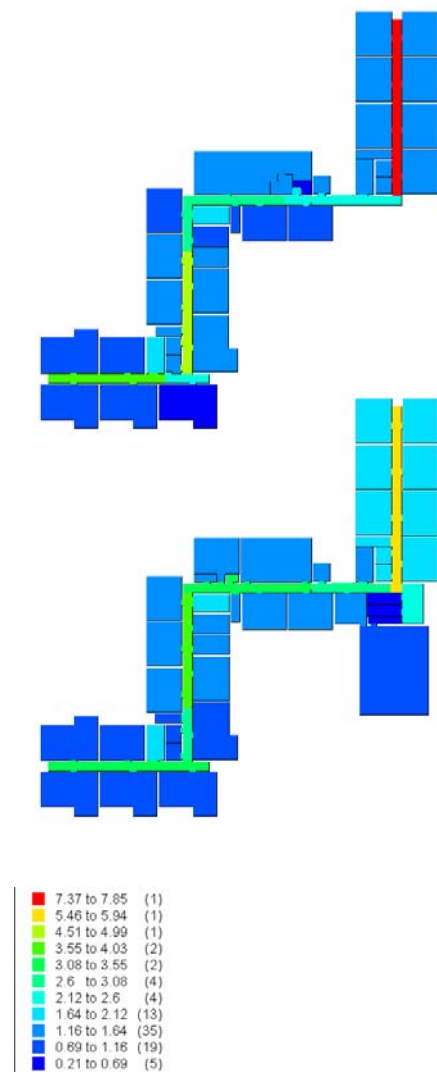
Figure 75:
Existing Case Study 2- Local Integration
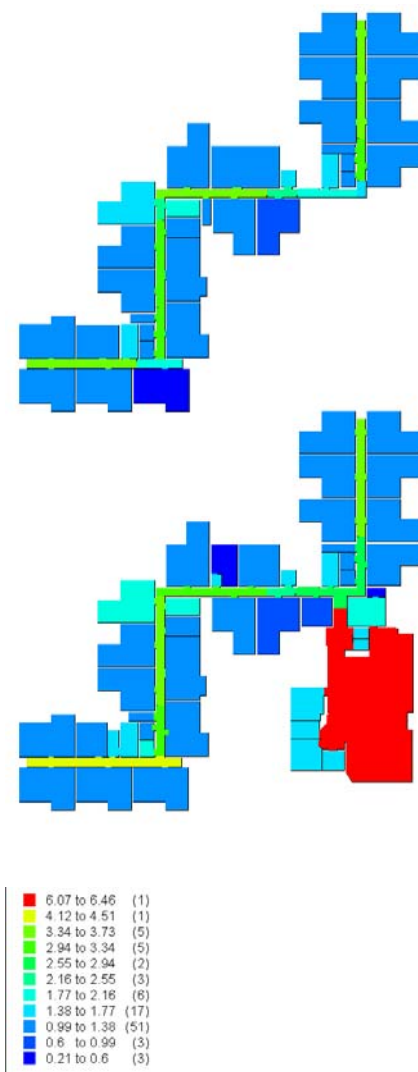
Figure 76:
Remodelled Case study 2- Local Integration

In the pre-remodelled scheme, however, not only are the integration and control values strongest in the corridors (Figure 77), but it is interesting to note that the communal and public areas are depicted as practically segregated. In fact they are partly as segregated as individual private dwellings.

■ 8.89 to 9.54 (2)	■ 9.05 to 9.71 (1)
■ 6.93 to 7.58 (1)	■ 5.06 to 5.72 (3)
■ 5.62 to 6.27 (1)	■ 3.73 to 4.4 (3)
■ 4.96 to 5.62 (1)	■ 3.07 to 3.73 (5)
■ 4.31 to 4.96 (1)	■ 2.4 to 3.07 (1)
■ 3.66 to 4.31 (1)	■ 0.41 to 1.07 (3)
■ 3 to 3.66 (1)	■ -0.26 to 0.41 (5)
■ 1.7 to 2.35 (2)	■ -0.92 to -0.26 (76)
■ 1.04 to 1.7 (1)	
■ 0.39 to 1.04 (4)	
■ -0.27 to 0.39 (3)	
■ -0.92 to -0.27 (69)	
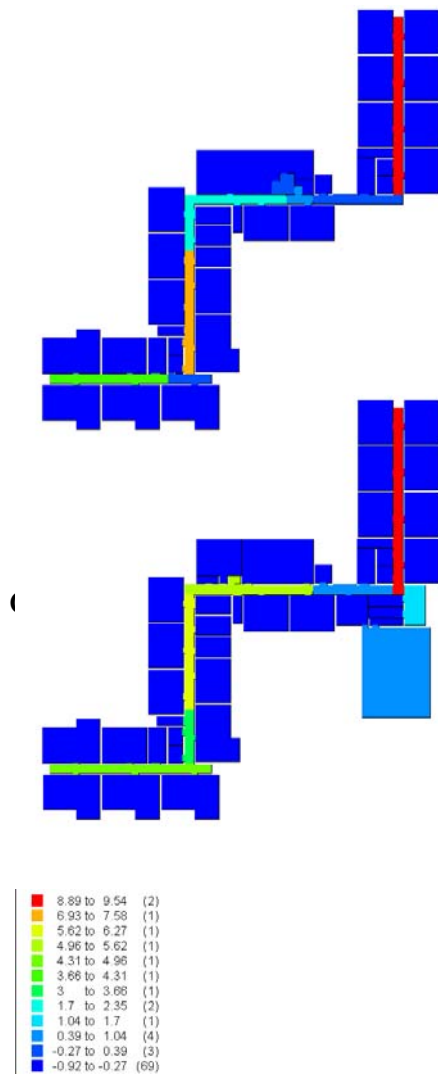
Figure 77:
Existing Case Study 2 - Control
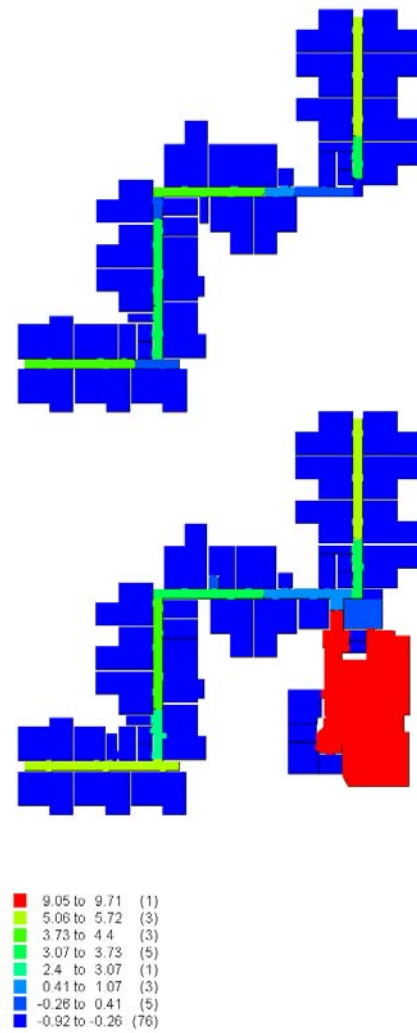
Figure 78:
Remodelled Case study 2 - Control

This is the only scheme where global integration (Figures 79 and 81) - as opposed to local integration - seems to be giving a more accurate picture of how the scheme works. The local integration of the remodelled scheme (Figure 82) in particular seems to suggest that the ground floor lobby space is a rather segregated area. In reality however that is not the way the scheme is experienced.

Figure 79:
Existing Case Study 3 - Global Integration

Figure 80:
Remodelled Case Study 3 - Global Integration

■	3.44 to 3.66	(3)
■	3.23 to 3.44	(1)
■	3.01 to 3.23	(1)
■	2.8 to 3.01	(5)
■	2.58 to 2.8	(4)
■	1.93 to 2.15	(1)
■	1.72 to 1.93	(3)
■	1.29 to 1.5	(2)
■	1.07 to 1.29	(21)
■	0.86 to 1.07	(25)
■	0.43 to 0.64	(4)
■	0.21 to 0.43	(4)

■	8.38 to 8.92	(1)
■	7.29 to 7.83	(1)
■	4.02 to 4.56	(1)
■	3.48 to 4.02	(6)
■	2.93 to 3.48	(3)
■	1.84 to 2.39	(32)
■	1.3 to 1.84	(26)
■	0.75 to 1.3	(9)
■	0.21 to 0.75	(9)
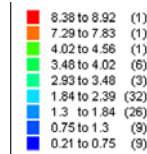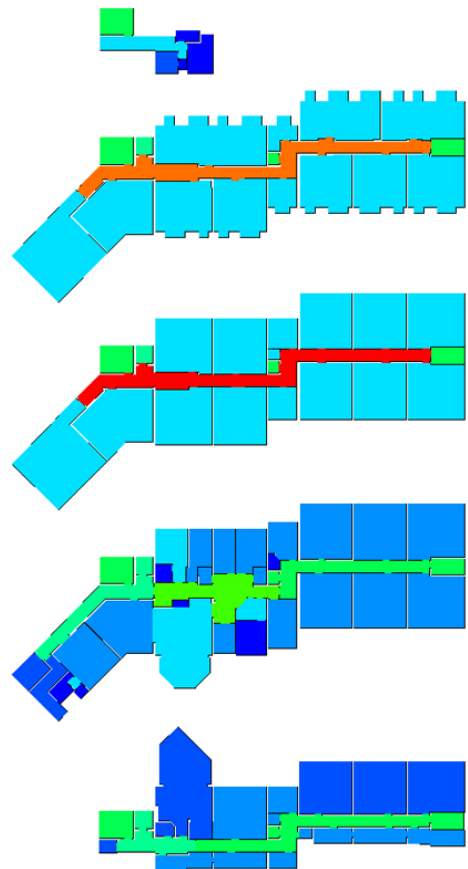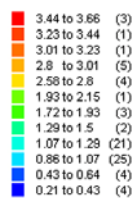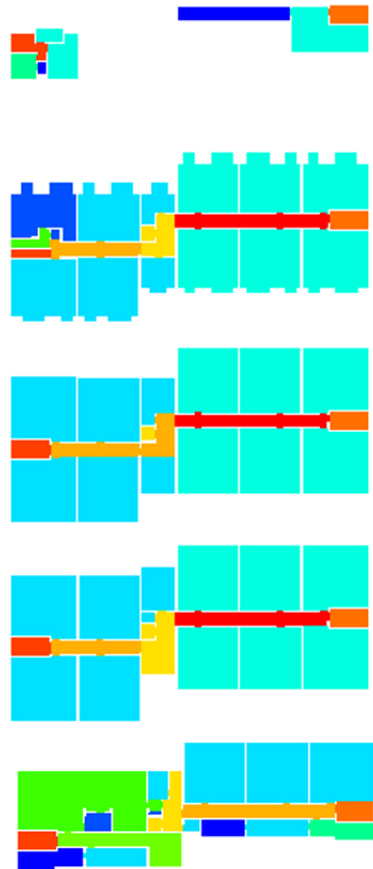
Figure 81:
Existing Case Study 3 - Global Integration

Figure 82:
Remodelled Case Study 3 – Local
Integration

Furthermore, unlike the two previous case studies, the convex maps reveal
a very low correspondence between the local integration (Figure 80 and 82)
and control (Figure 83 and 84) and, unlike the axial analysis, the convex
analysis does not highlight the communal and public spaces in the
remodelled scheme. The pre-remodelled map, on the other hand begins to
discern some of the better integrated convex elements.

5.02 to 5.41   (3)
3.05 to 3.44   (2)
2.66 to 3.05   (2)
2.27 to 2.66   (2)
1.48 to 1.87   (3)
1.09 to 1.48   (1)
0.3 to 0.69   (4)
-0.09 to 0.3   (4)
-0.49 to -0.09 (2)
-0.88 to -0.49 (51)
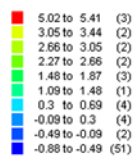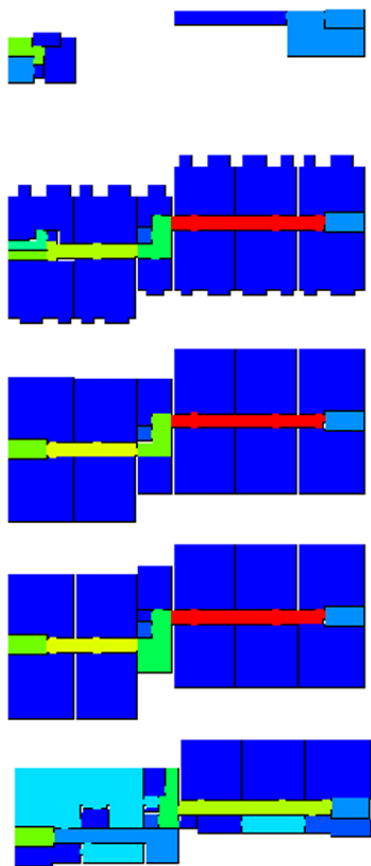
Figure 83:
Existing Case Study 3 – Control

13.97 to 14.96 (1)
10.98 to 11.98 (1)
7   to 8   (1)
6.01 to 7   (1)
4.02 to 5.02   (1)
3.03 to 4.02   (2)
2.03 to 3.03   (1)
1.04 to 2.03   (2)
0.04 to 1.04   (6)
-0.95 to 0.04   (72)
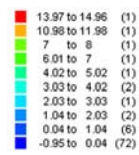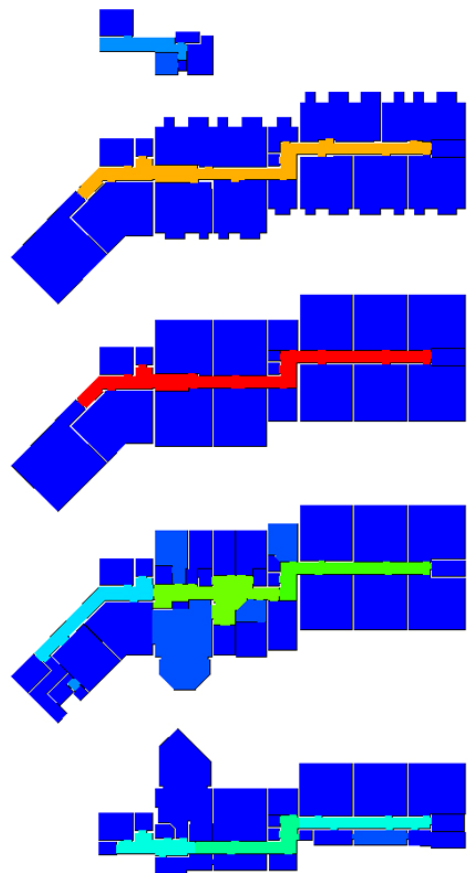
Figure 84:
Remodelled Case Study 3 – Control

The convex analysis of the before and after remodelled schemes, for the most part, confirm the findings of the axial maps. In particular the local integration of the remodelled scheme brings the significance of the first floor 'thoroughfare' to light. And a comparison of before and after situation (Figures 85 and 86) shows how the extension to the building has caused the integration core of the scheme to fall inside the building envelope.
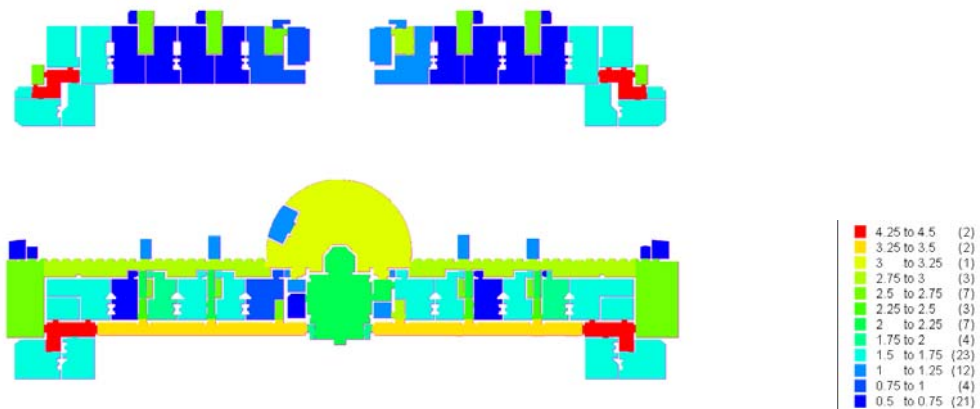
Figure 85:
Exiting Case Study 4- Local Integration
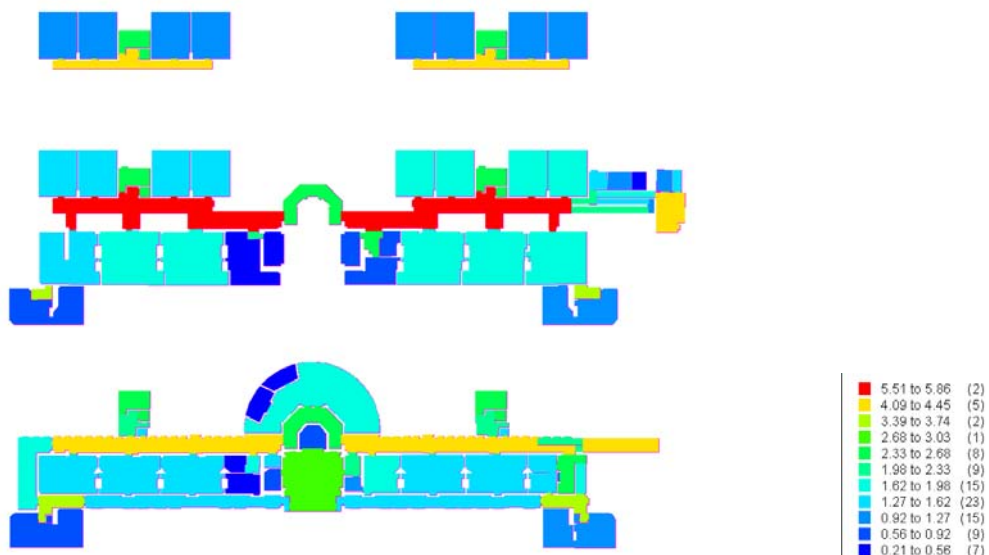
Figure 86:
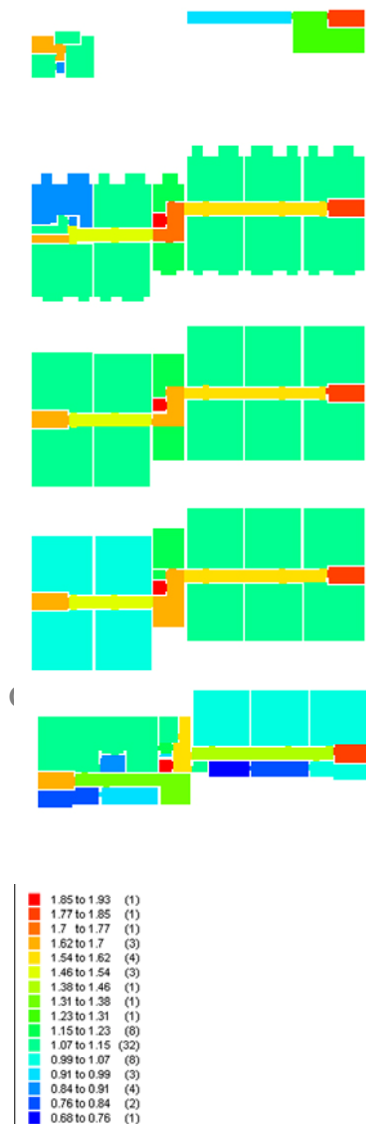Remodelled Case Study 4- Local Integration
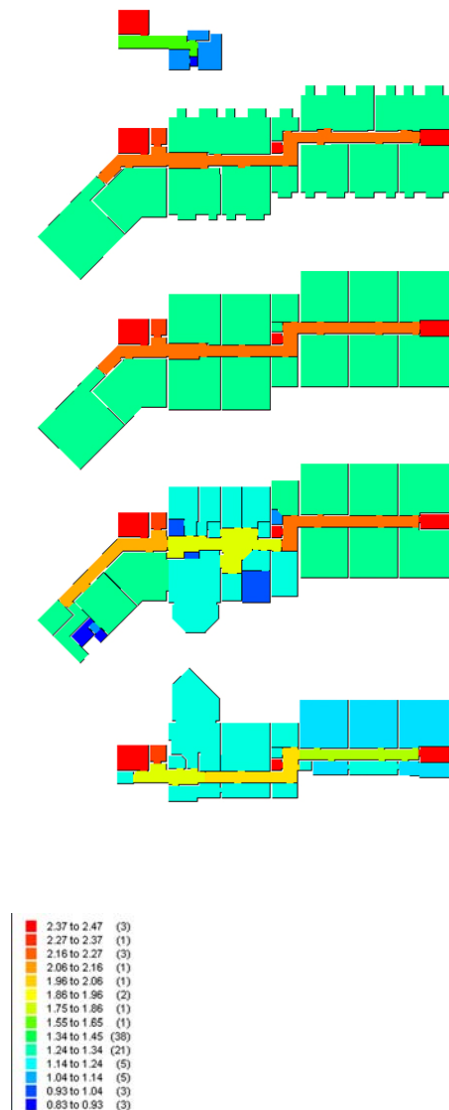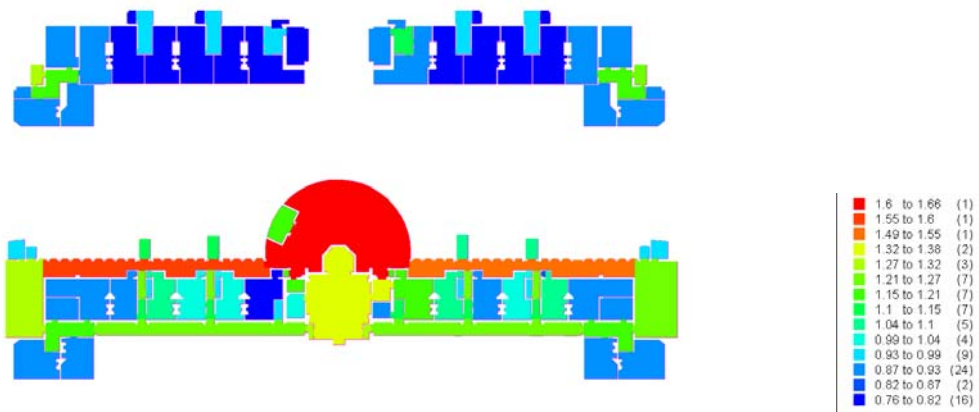
Figure 87:
Exiting Case Study 4- Global Integration
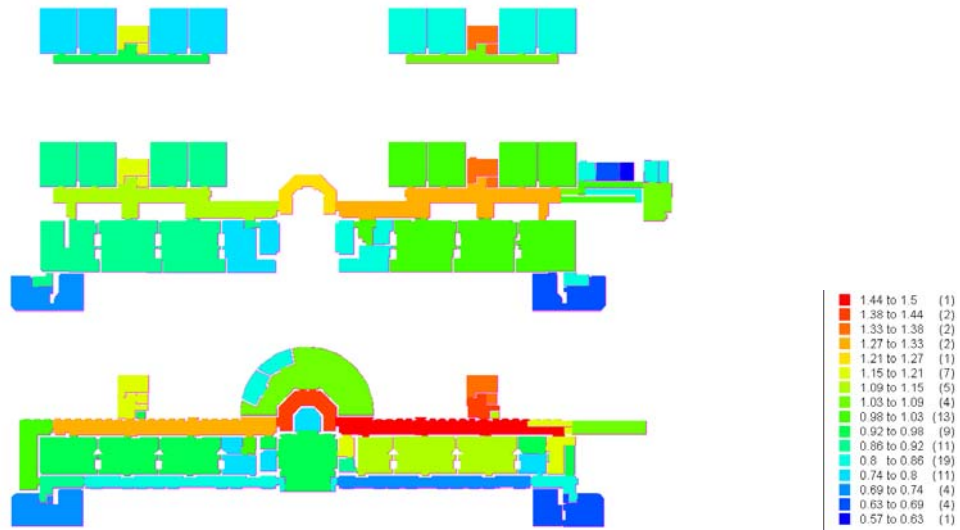
Figure 88:
Remodelled Case Study 4- Global Integration

Like in case studies 1 and 2 the convex space that has the highest control value is not only one of the most integrated spaces in the scheme, but it also is the circulation element that brings a large number of public and semi-public as well as staff facilities together. However, unlike those two case studies the convex space with highest control is not immediately at the main entrance into the schemes but is set slightly deeper into the scheme.
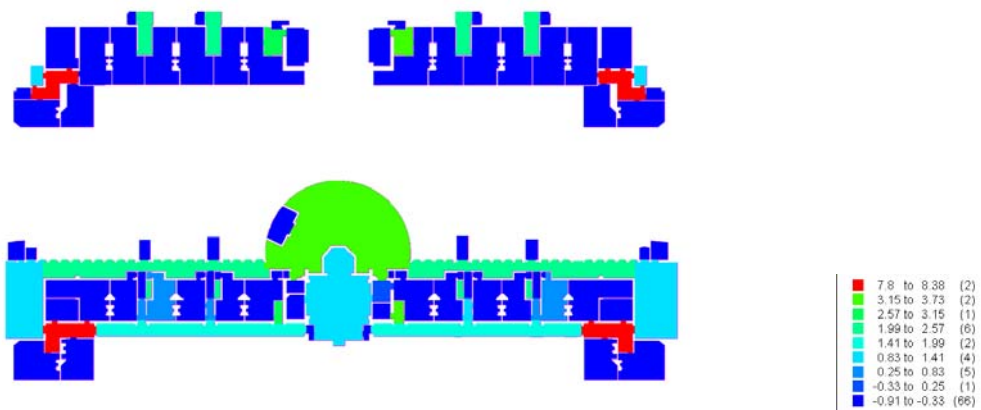
Figure 89:
Exiting Case Study 4- Control
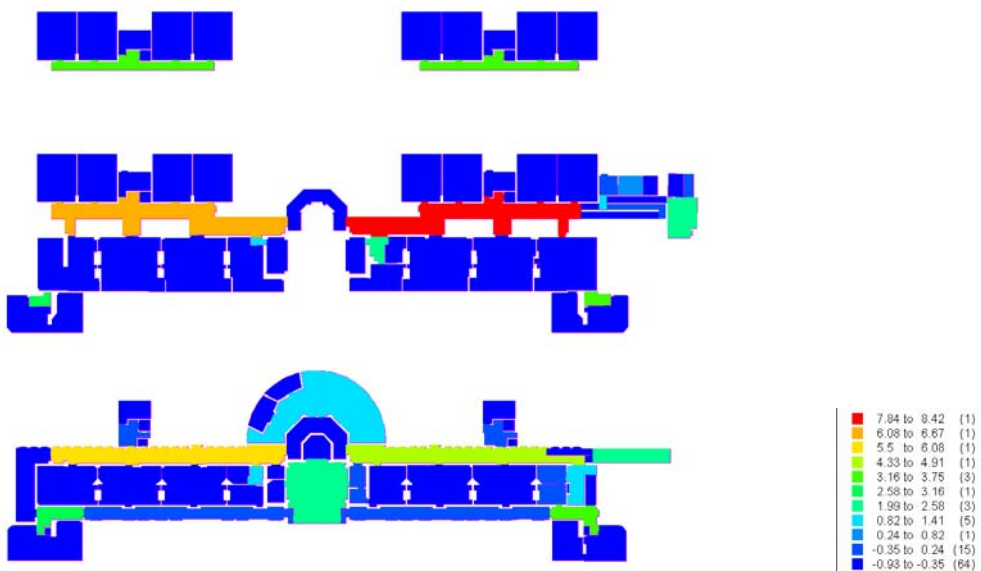
Figure 90:
Exiting Case Study 4- Control

In general, the convex analysis of the four schemes highlight the circulation areas of the scheme, however the when considering the convex spaces with the highest control value, the cases can be divided into two groups again. Where as in case studies 1 and 2, the paces with the highest control value are the entrance lobby and the communal lounge adjactent to it, in case studies 3 and 4 one of the upper floor circulation corridor has the highest control value. In case study 4, this upper floor corridor also coresponds with the main circulation space in the scheme.

Chapter 6

Discussion

The literature review had suggested that a key difference between extra care housing and other types of group housing for older - especially residential care homes - lies not only in the way care and support services are delivered, but also in its underlying core values of promoting independence and social inclusion, and in moving away from an institutional model of care provision. The literature review further led to the hypothesis that in order for extra care housing to fulfill its aspirations of domesticity, because of issues of privacy and control among other things, it needed to function more as a settlement than as a building. The findings from this study seem to support this hypothesis to various degrees.

The analysis of the before and after remodelling of each case study shows that while in all sheltered schemes the integration core lay outside the building proper, in the remodeled schemes it has been pushed inside the building envelope. At the same time in all cases the public facilities tend to be situated in close proximity to each other and to the main entrance of the scheme. Furthermore, the local integration axial maps of the majority of the case studies have highlighted that the communal facilities form an integration core that corresponds with the public domain of the scheme, much like a public square in a settlement. On the other hand, all residential dwellings are for the most part in the more segregated parts of the scheme. In his 2001 paper on 'The Theory of the City as an Object', Hillier showed that in settlements where the cultural sensitivities required a clear separation between the commercial (public) and the residential (private), this was achieved through the inherent structure of the axial configuration of the settlement space. This seems to correspond with the findings of this study in this report.

The literature review also highlighted the difference between the way buildings and settlement spaces achieve control and create segregation. It was shown that in institutional buildings order and control were imposed

top-down, whereas in settlement space the methods of directing the flow of movement and hence achieving control are much more subtle. In fact in settlement space one is normally not aware of a sense of control. The next issue then to follow is to examine how all four case studies exert control in differentiating between various public and private domains.

The j-graph analysis shows that in all cases, but one (case study 1), the number of total steps required to cover the whole scheme has increased as a result of remodelling. Table … shows the range of steps from the main entrance, where elements of public, and semi-public facilities, as well as private flats can be encountered.

	Case study 1		Case study 2		Case study 3		Case study 4	
	Exist.	Remo.	Exist.	Remo.	Exist.	Remo.	Exist.	Remo.
Public	1	1-4	2 -3	3 *	2-6	2-7	3-7	3-9
Semi-Public	4-9	3-7	2-7	4-9	5-6	2-6	2-6	3-8
Private	4-10	3-8	3-8	5-10	3-7	4-8	2-7	3-10 *
Total no. of steps	10	8	8	10	7	8	7	10

*[8]

Table 10: Comparison Chart of the Justified Graphs

The table allows one to distinguish between two groups amongst the remodeled case studies. While the private dwellings in all cases are 3 to 4 steps from the main entrance and reach deep into the scheme, the depth of semi-public and public elements vary.

In case of the semi-public, while in all cases they are between 3 to 5 steps away from the main entrance, in case studies 1 and 2 they reach relatively deep into the scheme and the number of steps (5 out of 8, and 5 out of 10) where both semi-public and private elements can be encountered is higher. In case studies 3 and 4 the semi-public zone stops at a slightly shallower point and the overlap of the semi-public and private zone, in terms of number of steps, is much smaller (3 out of 8, and 3 out of 10). Another distinction between the two groups is that the overlap of the public zone with the other two categories is much smaller or non-existent in case

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[8] * In cases where only one element from the category is separated from the rest of the group, to avoid distortion that would skew the actual picture of the scheme, that element has been left out. In case study 4 for example there are only 1 flat out of 30 that is within one step reach from the main entrance, whereas 97% of the dwelling units are 3-10 steps away.

studies 1 and 2, whereas in case studies 3 and 4 it reaches very deep into the building.

One way these data can be interpreted is that in case studies 3 and 4 where the potential for variety is higher at each step into the scheme, the boundaries between the various zones seem to be more relaxed. On the other hand the clear separation of the public from the private and the semi-private zones in case studies 1 and 2 seem to have a stronger controlling effect in the sense that it reduces variety of spatial choice at various steps of the scheme.

In other words, whereas in cases 1 and 2 control and the definition of each zone is dictated by their situation within the scheme - this is also confirmed by the findings of the local integration analysis of the axial maps, in cases 3 and 4 there seems to be a more relaxed boundary between the various zones. This can also be very clearly sensed as one visits the schemes, and is most pronounced in case study 4, where almost all different programmatic entities open onto the 'thoroughfare' at one level or another. In other words, control over what is regarded as public or private seems to be handed over to the individuals occupying the scheme, and is bolstered by the configurational properties of the space. The 'thoroughfare', which is a very public element has at the same time the highest potential for co-presence and movement, both of which are employed as control mechanisms. In order to deal with the issue of privacy on the other hand, sections of the circulation space serve as buffer zones between various programmatic elements. Despite the fact that many transitional areas and changes of direction are provided in order to increase depth in terms of access, visibility is for the most part retained and much improved compared to the sheltered scheme. (Figures 7 and 8) These subtle transition zones help ameliorate the move from one zone to another, and create soft boundaries that help relax the sense of imposed control.

The fact that in case study 4, which seems to be one of the more successful examples of how an extra care scheme should work, the arrangements of various programmatic elements seem to be casual and effortless is not just accidental. A walk down the main circulation core in case 4 can to a certain

degree be compared to walking down a street where one can encounter a library, a corner shop, and a residential unit all in one block. Of all the cases it is the only one where the central circulation route works almost like a town square. It is not only lined with a mix of various programmatic elements, communal lounge, library, assisted bathroom, private flats, and so forth, but it can also be accessed and approached from multiple directions at various levels. The fact that this space is partly two or three stories high and as wide as a local street, might be the reason why residents and staff refer to it as the 'thoroughfare'.

Another aspect that can influence perceived notions of control is the placement of the scheme manager's office. Case study 4 stands apart from the other three schemes, because it is the only one where the scheme manager's office is not placed directly at the entrance, but two steps deeper into the scheme. In contrast, in the other three cases, the scheme manager's office is clearly visible not only for people approaching the scheme from the outside, but from the main entry hall and parts of the communal lounge. This model of 'scheme-manager-as-concierge' creates a sense of overt surveillance and hierarchy. In case study 4, although the scheme manager's office is not readily visible from outside, the view from the manager's office allows for complete control over the entrance area of the scheme. There is, however, no direct access or views to the communal lounge from the manager's office. As the public facilities tend to be located in the area of the main entrance to the building where the scheme manager's office is usually located, and since the public facilities tend be the most integrated parts of the building, the integration core can simultaneously act as a domain of probabilistic encounter and as a domain of surveillance, especially by the scheme manager. The strategic placement of the scheme manager's office seems to have a great impact on one's perception of control and thus has a direct effect on how institutional a scheme comes across.

The concept of 'progressive privacy' seems to suggest that programmes which require similar levels of privacy should be grouped together and be clearly separated from groups whose privacy requirements differ. However,

the application of 'progressive privacy' has to be far from formulaic, as drawing a clear line between various privacy zones may contribute to a sense of institutionalization where order and control are exerted from top down. Analysis of the more successful examples in this study seem to suggest that a mix of different programmatic entities at each step into the building not only offers variety and change, but can also make a scheme feel less institutional. On the other hand in such settings control can be achieved through the inherent structure of the configuration, more like in a settlement.

All remodelled cases have highlighted the circulation corridors where such facilities as the laundry room or the assisted bathrooms are situated, as one of the most integrated spaces in the schemes. This suggests that, as semi-public facilities that require a level of privacy, having them on a corridor where the potential for chance encounter co-presence is highest, might not always be a good thing. However, in all cases the assisted bathrooms, that were located on the ground floor, had a transitional (recessed) zone to act as a separator from the public corridor to ensure some degree of privacy to the bathroom users. This still does not seem to be an optimal situation, because it is not unrealistic to assume that given the option, the residents would prefer to undertake such private activities like bathing and laundering in a more private (segregated) area of the building or even optimally in their own flats.

Another finding seems to indicate that although in all cases the private dwellings are found to be the most segregated spaces in the scheme, the relative integration levels of the corridors immediately leading to them seem to vary from scheme to scheme. This confirms the findings of the report conducted by Peace et al (1982) in relation to the role of circulation spaces in residential care home. The fact that circulation spaces display a range of integration values suggest that potentially parts of the circulation space might be more suitable for linking the more private parts of the programme, while others might better serve the public facilities. So in the cases where the corridors are most segregated, the privacy of the residents can be much better secured than in the corridors with higher integration

values. Put in a different way, the chances that outside visitors would find their way to the more segregated corridors are lower. This could be a good thing in a setting where vulnerable older people would like to avoid unwanted visitors that might seek to take advantage of them or disturb their peace and quiet. On the other hand, as in case studies 1 and 4, it might be advantageous to have a range of public, semi-public, and semi-private circulation routes with varying degrees of integration values to create a smooth transition from the more public spaces to the more private. At the same time this type of arrangement would provide the more sociable residents with an opportunity to talk to passers by as in a normal street.

In terms of intelligibility, two of the case studies (1 and 3) show a discernable improvement (0.1) after remodelling, while in the others the intelligibility has hardly changed. However, in the cases where there was not much change, the intelligibility of the original scheme was already relatively high at around 0.5. The scheme with the highest improvement (35%) remains case study 3.

	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Exit. Intel.	0.44	0.51	0.28	0.52
Remod. Intel.	0.54	0.53	0.38	0.24 (0.51 Visual)
Increase (in %)	22 %	4 %	35%	-54%

Table 11: Comparison Charts of the intelligibility values

It is important to note that although intelligibility in terms of access in case 4 has decreased by 54% from 0.52 to 0.28, in terms of visibility, the intelligibility has remained more or less the same. This means that although in terms of access one might not always know how best to get from one part of the building to the other, but visually one can almost always tell one's position in relation the overall layout of the building.

On the level of spatial standards while the average flat sizes have increased as a general trend, closer examination of the spatial distribution of various programmatic categories have revealed some enlightening results. Table 12 sums up the percentage of increase or decrease in the average net area dedicated to each person for each category of program in each case study. (For details see Appendix) As the figures indicate, the only two categories

that have seen an increase across the board are 'Public facilities' and 'Circulation'. This trend falls in line with the aim of bringing communal and social programs into the scheme. Since extra care housing acquires a partially public or communal face and because it is mainly geared towards a vulnerable older clientele, it is not surprising to detect a move towards more generous circulation spaces and possibly complying with wheelchair accessibility standards.

	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Public	215%	80%	74%	16%
Semi-Public	-24%	13%	175%	0%
Private	128%	54%	8%	29%
Staff only	22%	14%	220%	-22%
Other	-11%	85%	28%	113%
Circulation	28%	43%	34%	10%
Total	79%	50%	8%	24%

Table 12: Comparison Charts of the spatial distribution

At the level of private dwellings the trend also seems to be a general increase in size in order to provide self-contained flats. However, it is more useful to view this in combination with the category of semi-public, because enlargement of flats tends to allow for the inclusion of at least some of the previously semi-public functions. In case study 1 for example, where the increase in percentage of private net area is highest, the net area of the semi-private spaces has dropped by 24%. This is one of the cases where the sheltered housing scheme had the highest number of bed-sits, most of which had shared bathroom facilities. As a result, the average flat size in the pre-remodeled scheme was a meagre 21.8 m². In order to bring the flats to the required standard of self-contained units and to bring some of the functions of the semi-public facilities into the flats, there had to be a relatively high increase in their net area.

By the same token, in order to strike the right balance between the private and the semi-public facilities, the net area of the semi-public facilities had to be reduced in size. The fact that there is a wide range of increase or decrease in the percentage of semi-public facilities is a reflection of the standard flat sizes of the pre-remodelled schemes. In case study 3 for

example the sheltered flats were already rather self-contained. On the other hand the scheme did not have many or adequate semi-public facilities to fulfill the requirements of extra care housing. In general though, this shift of emphasis from the semi-public communal facilities to the private dwellings is part of the overarching move away from the institutional towards a model of care that provides services within the domestic setting of older people.

Chapter 7

Conclusion

As a housing type with flexible care and support requirements, extra care housing has a comprehensive list of architectural constituents that are meant to help bolster an ethos of independence and social inclusion in a flexible care and inclusive environment. In other words, while promoting 'neighbourliness', and encouraging ties with the wider community, as a housing type, extra care housing seeks to integrate all the required programmes necessary to deliver various care and support services, as well as social and well-being programmes that help improve the quality of life of its residents on site.

The findings of this report seem to confirm the hypothesis that in order for extra care housing to achieve its goals and objectives it needs to work as a settlement at multiple levels. The central findings of this study are two-fold. Firstly it is important that the public facilities are situated in the integration core where the potential for through movement and co-presence is high. This automatically lends control to the circulation space that connects various public elements in a subtle way. Through co-presence and encounter the residents can police the space and one-another and hence create a 'virtual community' in the same way as one gets in a local street.

Secondly, it seems crucial that the control of various programmatic requirements is achieved through subtle means e.g. buffer zones, rather than hard boundaries and abrupt transition. This implies that defining clear zones between various public and semi-public is not necessarily something to strive for. Furthermore, programmes of a semi-public nature such as assisted bathroom and the laundry room should be provided inside the individual private flats. Doing this allows the circulation spaces to become more of a public space much like a street, without impinging on the privacy of the residents. Simultaneously, it emphasizes meaning of the front door of the flats as a clear boundary between the public and the private domains.

At the same time it can help reduce the level of formality and imposed order in the circulation spaces.

The paradigm shift from building to settlement seems to be crucial in distinguishing between how control is achieved and privacy protected. This has indirect impact on notions of domesticity and control, and even perceived 'ownership'. In other words once the circulation spaces become a public zone where control and access is granted to an equal degree to the residents, the staff and the visitors, the scheme can become more like a retirement village with a sense of community where people come together, rather than a home where people are brought together because they all have similar care needs.

This mix of variety and the self-sufficiency of the programmatic requirements of extra care housing in combination with the different degrees of privacy brought under one roof, make it an easy target for institutionalization. This report suggests that the degree to which an extra care housing scheme manages to function as a settlement as opposed to a building is key to achieving its aspirations and objectives of empowering its residents by bolstering their social inclusion and improving their quality of life.

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Appendix I

Case Study 1		
Categories	Exiting	Remodelled
Public	1.3 m²/resident	4.1 m²/resident
Semi-Public	2.5 m²/resident	1.9 m²/resident
Private	20 m²/resident	45.5 m²/resident
Staff only	2.7 m²/resident	1.8 m²/resident
Other	0.9 m²/resident	0.8 m²/resident
Circulation	9.5 m²/resident	12.2 m²/resident
Total	37 m²/resident	66.2 m²/resident

Case Study 2		
	Exiting	Remodelled
Public	3.5 m²/resident	6.3 m²/resident
Semi-Public	1.6 m²/resident	1.8 m²/resident
Private	26.7 m²/resident	41 m²/resident
Staff only	2.2 m²/resident	1.9 m²/resident
Other	1.3 m²/resident	2.4 m²/resident
Circulation	7.7 m²/resident	11 m²/resident
Total	43 m²/resident	64.3 m²/resident

Case Study3		
	Exiting	Remodelled
Public	3.8 m²/resident	6.6 m²/resident
Semi-Public	0.8 m²/resident	2.2 m²/resident
Private	43.2 m²/resident	39.6 m²/resident
Staff only	1 m²/resident	3.2 m²/resident
Other	3.2 m²/resident	2.3 m²/resident
Circulation	9.1 m²/resident	12.2 m²/resident
Total	61 m²/resident	66.1 m²/resident

Case Study 4		
	Exiting	Remodelled
Public	7.6 m²/resident	8.8 m²/resident
Semi-Public	1.4 m²/resident	1.4 m²/resident
Private	38.1 m²/resident	49 m²/resident
Staff only	3.1 m²/resident	2.4 m²/resident
Other	5.4 m²/resident	11.5 m²/resident
Circulation	30.1 m²/resident	33 m²/resident
Total	85.6 m²/resident	106 m²/resident

Exiting	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Public	1.3 m²/resident	3.5 m²/resident	3.8 m²/resident	7.6 m²/resident
Semi-Public	2.5 m²/resident	1.6 m²/resident	0.8 m²/resident	1.4 m²/resident
Private	20 m²/resident	26.7 m²/resident	43.2 m²/resident	38.1 m²/resident
Staff only	2.7 m²/resident	2.2 m²/resident	1 m²/resident	3.1 m²/resident
Other	0.9 m²/resident	1.3 m²/resident	3.2 m²/resident	5.4 m²/resident
Circulation	9.5 m²/resident	7.7 m²/resident	9.1 m²/resident	30.1 m²/resident
Total	37 m²/resident	43 m²/resident	61 m²/resident	85.6 m²/resident

Remodelled	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Public	4.1 m²/resident	6.3 m²/resident	6.6 m²/resident	8.8 m²/resident
Semi-Public	1.9 m²/resident	1.8 m²/resident	2.2 m²/resident	1.4 m²/resident
Private	45.5 m²/resident	41 m²/resident	39.6 m²/resident	49 m²/resident
Staff only	1.8 m²/resident	1.9 m²/resident	3.2 m²/resident	2.4 m²/resident
Other	0.8 m²/resident	2.4 m²/resident	2.3 m²/resident	11.5 m²/resident
Circulation	12.2 m²/resident	11 m²/resident	12.2 m²/resident	33 m²/resident
Total	66.2 m²/resident	64.3 m²/resident	66.1 m²/resident	106 m²/resident

Average Flat sizes:

	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Exiting	21.8 m²	33.6 m²	43.2 m²	38.1 m²
Remodelled	51.7 m²	42 m²	48.3 m²	63.7 m²
Increase (in %)	29.9 m² (137%)	8.4 m² (25%)	5.1m² (12%)	25.6 m² (67%)

Total net areas:

	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Exiting	1367 m²	2107 m²	2112 m²	2567 m²
Remodelled	2185 m²	2570 m²	2578 m²	4131 m²
Increase (in %)	818 m² (60%)	463 m² (22%)	566 m² (28%)	1564 m² (61%)