

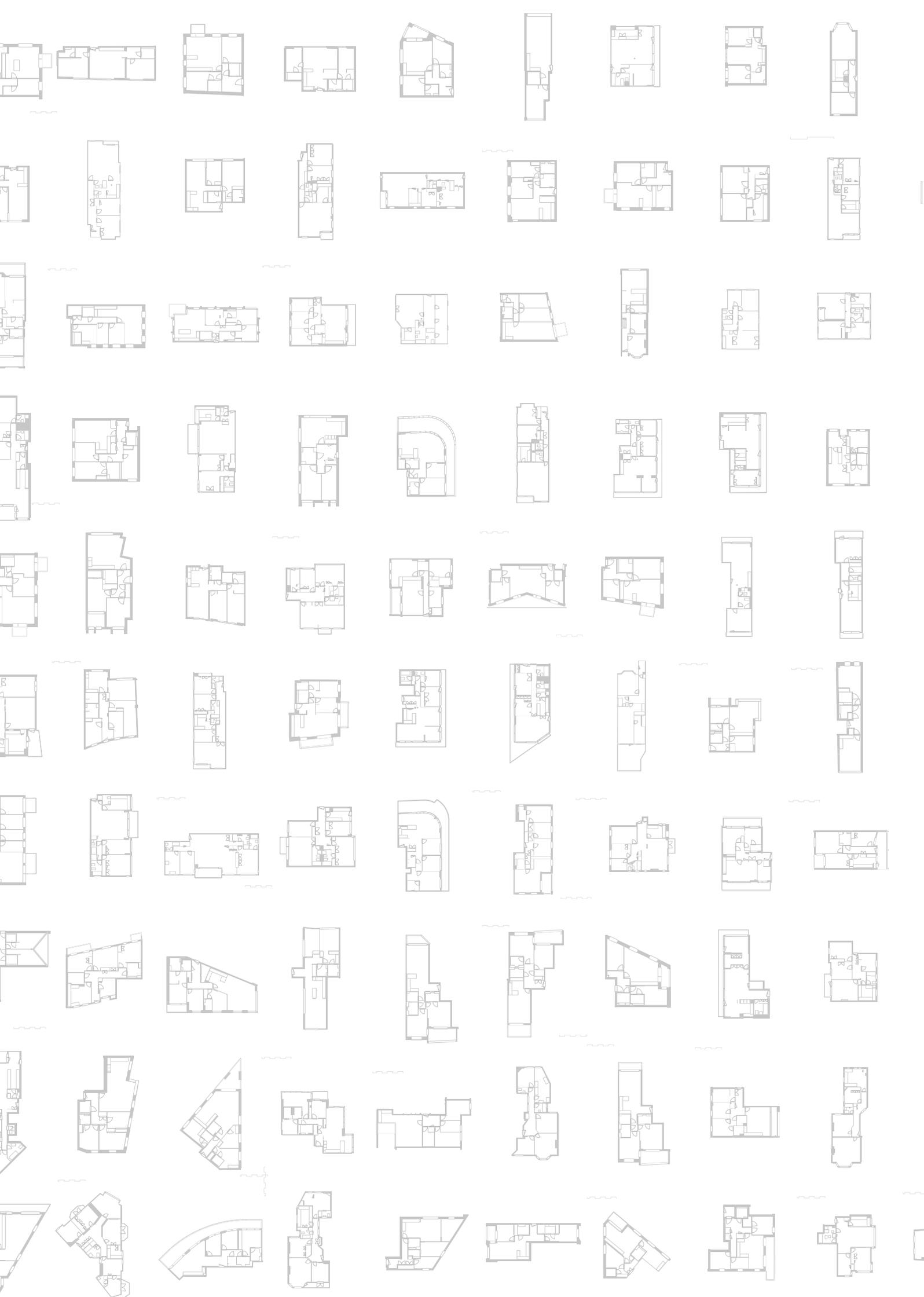
Interior Complex

Design Standardization in
London's Housing

Seyithan Özer

A thesis submitted to the School of Architecture of the Royal
College of Art for the degree of Doctor of Philosophy

London, June 2021



Interior Complex

Design Standardization in
London's Housing

Seyithan Özer

A thesis submitted to the School of Architecture of the Royal
College of Art for the degree of Doctor of Philosophy

London, June 2021



This thesis represents partial submission for the degree of Doctor of Philosophy at the Royal College of Art. I confirm that the work presented here is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

During the period of registered study in which this thesis was prepared the author has not been registered for any other academic award or qualification. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Abstract

This thesis studies design standardization in London's housing, understood as an interrelated set of standards and conventions that shape design outcomes towards specific forms. Working iteratively between theory and data, the thesis threads broader issues in housing – housing design, design governance, design quality – with an empirical study of housing designs in London at the dwelling unit scale.

Integrating literatures on housing policy and regulation, real estate, state-market relationships, architectural practice, standards and conventions, the thesis conceptualizes design standardization. The empirical focus of the thesis is London's housing stock and its residents' experiences and practices of home. To this end, the thesis draws from a mixed methods research that consists of a descriptive statistical analysis of the spatial patterns in a sample of unit plans from inner London's housing stock (n=3,438), visual analysis of comparative floor plan matrices, an online survey with people living in London on their experience and use of their homes (n=234) and follow-up semi-structured interviews with some survey participants (n=22).

Built largely over the last two hundred years, London's housing stock contains a variety of housing typologies. While new housing typologies designed for changing needs have emerged, older housing stock has been modified, subdivided, and converted. The research shows that existing housing interiors, in aggregate form evidence processes of standardization. Dwellings built in the past forty years, since the 1980s, show a high level of repetition in their dimensions and interior layouts. I argue this as the result of on the one hand a high-pressure housing market, a perpetual housing shortage and high land prices that all lead the market to function with strict design conventions, and on the other legislations, regulations, codes, and guidelines central and local governments introduce to sustain quality, affordability, and access. Dwellings from the older housing stock – terraced houses – show a wide variety of interior layouts. Despite this, however, there are spatial and organizational directions that emerge at the intersection of the architectural affordances of terraced houses, social change, asset-based welfare and permitted development.

Based on a study of residents' experiences and domestic practices in relation to design patterns observed in London's housing, the research also found that existing housing does not sufficiently meet current needs, preferences and occupancy

patterns. The assumptions of use and home underlying standards and conventions fail to acknowledge changing domestic needs.

The thesis, studying London's housing at their intersection, makes original contributions to architectural design, housing studies, infrastructure studies, and material geographies by developing a design standardization framework that incorporates standards and conventions, by constructing a novel dataset of existing housing stock and providing up-to-date data on the housing designs, by analysing residents' domestic experiences and practices in London, and by analysing home alterations from a socio-technical perspective.

Acknowledgements

This research brings together many of my research interests, including the ones I had before starting my PhD studies as well as the ones I developed while I find my way forward. I have, therefore, accrued many debts of gratitude along the way. I am deeply indebted to my supervisors Prof Sam Jacoby and Dr Alasdair Jones, especially for their tenacity in listening to my confusing and long-winded answers to their questions. Sam has provided me with support, guidance and feedback in the past six years beyond this thesis. He gave me many opportunities to expand my research and learn through research assistantships. Alasdair, encouraged me to explore methodologies, provided me with new research skills and valuable feedback, always with enthusiasm. I have learnt a great deal from our exchanges, not least from the methodological ones.

I also would like to thank the examiners Prof Philip Hubbard and Prof Peter Bishop for their invaluable feedback and mentorship. The viva voce exam turned out to be a really enjoyable experience thanks to them and Dr Catherine Dormor, who chaired the exam.

Dr Adrian Lahoud always posed challenging questions and showed me other directions. He also put me in contact with Archilogic and Archilyse, who have offered their tools that are used to generate the data used in this research. I would like to extend my sincere thanks to Mathias Standfest and Tino Baechtold for their continuous help in generating the floor plan data.

I would like to thank all of the participants in the study, the interview participants, who agreed to another video call in the pandemic, and the anonymous survey participants. Without their participation, this research would not have been possible.

I have presented my initial ideas in different conferences and colloquiums: parts of the discussions in Chapter 2 and Chapter 3 were presented as 'A Hybrid Form of Type' in Think.Design.Build 2 Conference at TU Berlin (2018), 'Design Governance' in Spatialised Governmentality: China and the Global Context Conference (2018) at the Royal College of Art and 'Design Standardization in London', Comparative Models of Housing International Symposium (2019) at Pontificia Universidad Católica de Chile. I have also greatly benefited from the workshop 'Housing Standardization: Design Guidelines, Regulatory Frameworks, and Policy' (2019)

and the 'Methodological Exchanges' (2020) we organized with my colleagues at the Royal College of Art.

My PhD studies were funded by the Republic of Turkey, and I am grateful to the Education Counsellor's Office for their continuous support. I also would like to thank Royal College of Art Research Office for the conference funds they provided.

I also would like to thank Harriet Harris for her support both academically and personally. I must also thank other academic staff at the Royal College of Art, where I received questions about my research from very different angles. Adam Kaasa, Mark Campbell, Tarsha Finney, Maria Giudici, Ines Weizman for their feedback in my reviews and presentations. I would like to thank my friends and colleagues Guillermo Ruiz and Rosa Ainley for pointing out new directions.

Even though completing this research took more than three years, in the past year, writing up and the pandemic have become the same. Alican allowed me to occupy the living room as a study and I found support and comfort in Lucia and Ricardo's 'support bubble', in the long cycle rides and Clissold picnics with Guillermo and Lucas, in long video calls with Dilara, Çağrı, Tuğ, Deniz, Erenalp, Dean, in Thursday catch-ups with Rosa, in afternoon meetings with Zeynep at the Shakespeare and in evening catch-ups with Filippo at the Faltering Fullback. I am indebted to all of them for their support. Finally, I am deeply grateful to my parents, Huseyin and Suna, for their encouragement and support.

Contents

Introduction	17
Design Standardization	25
Design Standards	26
Making of Standards	28
Standards and Design Quality	33
Conventions	36
Market Conventions	38
Market Conventions and Design Standards	42
Conventions of Design Professionals	44
Design Standardization and Housing Design Outcomes	47
'Good' Dwelling Design	51
Sanitary and Moral Dwelling	53
Model Dwellings	57
The Role of Publications	63
Cottages in Garden Cities	67
Efficient and Functional Dwelling	74
Efficient and Functional Dwelling in England after WWII	87
Flexible and Adaptable Dwelling	93
Standards in the Past Forty Years	97
Design Standardization at the Unit Scale	99
Studying Design Standardization	103
Studying Design Standardization	104

Floor Plan Analysis	107
Analysis of Use and Experience	111
Theoretical Drive, Pacing, Mixing and Sampling	112
Sampling, Data Collection, Data Modelling, and Analysis	113
Floor Plan Analysis	113
Floor Plan Sampling	113
Floor Plan Data	116
Online Survey of London Residents	121
Follow-up Interviews	122
Form and Extent of Design Standardization in London	127
London's Housing Stock	128
Size of Dwellings	128
Sizes and Types of Habitable Rooms	138
Living Spaces	139
Habitable Rooms	150
Organization of Rooms	161
Grouping of Day and Night Functions	164
Circulation	164
Layouts of Dwellings	168
The Form and Extent of Design Standardization in London	175
Design Standardization in Terraced Houses	183
Back Extensions and Remodelling of Ground Floors	187
Changing Kitchens and Living Areas	191
New Facilities for Contemporary Living	197
Re-designing Homes	198
Converted Flats in Terraced Houses	200
Design Standardization and the Owner-occupier	203
At Standard, Below Standard and Non-standard Homes	207
From Dwelling to Home	208
Online Survey	211
Shared Bedrooms and Spare Rooms	213

Measuring Dwelling Size by Bedrooms, but not the Size of Bedrooms	216
Open Kitchens	217
Bedrooms and Living Rooms	222
The Impact of 'Stay-at-Home' Restrictions on Residents' Experience	223
Residents and Design Standardization	225
Conclusion	229
A Mixed-Method Approach to Housing Design	233
Housing Design	235
Housing Design Standardization	237
Housing Design Studies	238
Appendices	241
A: Analyzed LSOAs	242
B: Online Questionnaire	244
C: Informed Consent	248
D: Interview Schedule	250
E: Survey Results	252
Bibliography	255

List of Figures

List of Figures

Figure 2.01—‘Zone of conflict and compromise’ as defined by Matthew Carmona.	37
Figure 2.02—Standards and conventions that make up design standardization.	39
Figure 2.03—‘Designer’s opportunity space’ as defined by Steven Tiesdell and David Adams.	45
Figure 3.01—Ground and first floor plan of a third-rate terraced house.	54
Figure 3.02—Dwellings designed by Henry Roberts.(a) Floor plan of ground floor flat, Prince Albert’s model houses for families (1851), (b) Typical floor plan of a unit, Streatham Street model houses for families.	60
Figure 3.03—Typical floor plan of Peabody Square, Blackfriars Road (1871).	62
Figure 3.04—Comparative mortality rates of London and model dwellings as shown in statistical publications.	64
Figure 3.05—Average dimensions of rooms in eight model blocks of flats and four model cottages.	64
Figure 3.06—Typical floor plan of Boundary Estate of London County Council.	66
Figure 3.07—Byelaw terraced house.	68
Figure 3.08—The artisan dwellings by Barry Parker and Raymond Unwin.	70
Figure 3.09—Typical five-roomed cottage plan in White Hart Lane estate by London County Council.	71
Figure 3.10— The typical plans proposed by Tudor Walters Committee.	72
Figure 3.11—The typical five-room cottage estate plan used by the London County Council.	73
Figure 3.12—Scientific management in the kitchen and Frankfurt Kitchen.(a)Diagrams showing efficiently and badly grouped kitchen furniture, (b) Frankfurt Kitchen, (c) Application of scientific homemaking to British homes.	76
Figure 3.13—Typical multifamily housing unit plans in Frankfurt.	77

Figure 3.14—Comparative matrix of flat sizes in relation to depth and usable floor area.	80
Figure 3.15—Alexander Klein's graphic evaluation method.	82
Figure 3.16—Drawings from Architect's Data.	84
Figure 3.17—The dimensional fit of furniture, bricks, and space.	85
Figure 3.18—The kitchen types given in Design of Dwellings and 1944 Housing Manual.	87
Figure 3.19—Two- and three-bedroom gallery access flats.(a) Two- and three-bedroom gallery access flats given as examples in 1944 Housing Manual, (b) Typical plans of two- and three-bedroom gallery access flats used by London County Council, (c) Typical two- and three-bedroom unit plans in Churchill Gardens Estate designed by Powell & Moya built between 1946 and 1962.	88
Figure 3.20—Drawings from Space in the Home (cf. Architects' Data).	90
Figure 3.21—(a)The pilot housing project in West Ham by the Ministry of Housing and Local Government.	92
Figure 3.22—Bedroom sizes and activity spaces for different accessibility levels.	95
Figure 3.23—Space standards calculation.	97
Figure 4.01—Dwellings in inner London.	112
Figure 4.02—Selected LSOAs in inner London.	113
Figure 4.03—Decision tree for calculating room function.	120
Figure 5.01—Distribution of net dwelling sizes grouped horizontally by the number of habitable rooms (1R, 2R, 3R, 4R, 5R, 6R), and vertically by the number of storeys (one-storey, two-storey, three-storey).	130
Figure 5.02—Box and whisker plots of net dwelling sizes for different dwellings built in different periods for every dwelling type.	136
Figure 5.03—Dwellings with different sizes.	140
Figure 5.04—Scatter plots showing the sizes of every functional area (bedroom, living area, bathroom, circulation) in relation to dwelling size.	142
Figure 5.05—Scatter plots showing the sizes of total living area and kitchen area (only for working kitchens) in relation to dwelling size.	146
Figure 5.06—The frequency and distribution of dwellings with different living area types.	148
Figure 5.07—Rooms with different width to length and compactness ratios, superposed with the corresponding minimum functional room plans, furniture, and movement areas given in the <i>London Housing Design Guide</i> .	155

Figure 5.08—Scatter plots showing the sizes of the largest, second largest and smallest bedroom areas in relation to dwelling size.	156
Figure 5.09—The frequency and distribution of dwellings with at least one double bedroom (> 12 m ²), with a small room (< 8 m ²) and with only single rooms.	158
Figure 5.10—Dwellings with small rooms (< 8 m ²).	160
Figure 5.11—The frequency and distribution of dwellings with functional grouping.	162
Figure 5.12—Floor plans of one-storey dwellings with different circulation types.	165
Figure 5.13—The frequency and distribution of dwellings with different circulation schemes.	166
Figure 5.14—Floor plan matrix showing different dwelling one-storey dwelling types based on the categories used.	171
Figure 5.15—Standard one-storey dwellings	178
Figure 6.01— Selected floor plans organized by their depth horizontally and by their neighbourhood vertically.	189
Figure 6.02—Distribution of floor area compactness ratio (net floor area / area of minimum bounding rectangle) and its relationship to extension depth (depth-neighbourhood party wall length).	191
Figure 6.03—Selected floor plans organized by their compactness ratio vertically and by their extension depth horizontally.	192
Figure 6.04—Distribution of kitchen sizes and its relationship to extension depth.	193
Figure 6.05—Selected floor plans organized by their kitchen sizes.	194
Figure 6.06—Types of layouts identified in the sample.	196
Figure 6.08—Distribution of dwellings in relation to the type of non-habitable rooms on their ground floor.	197
Figure 6.07—Distribution of dwellings in relation to the number of habitable rooms other than kitchen and living room on their ground floor.	197
Figure 6.09—Converted flats classified by the number of habitable rooms.	202
Figure 6.10—Comparison of dwelling, living area, and first bedroom sizes of converted and purpose built two-room and three-room dwellings.	203

List of Tables

Table 4.01—Methods used.	106
Table 4.02—Previous quantitative studies of housing at dwelling scale.	108
Table 4.03—Collected, provided and calculated data points and their descriptions.	118
Table 4.04—Interview participants.	124
Table 5.01—Dwelling sizes by dwelling types.	132
Table 5.02—Dwelling sizes by dwelling types compared to space standards calculated from the <i>London Housing Design Guide</i> .	133
Table 5.03—Comparison of dwelling sizes in the sample studied to the London sample of <i>English Housing Survey (2014-2018)</i> .	134
Table 5.04—Sizes of kitchens by kitchen and dwelling types.	145
Table 5.05—Frequency of kitchen types by dwelling type and the period they were built in.	150
Table 5.06—Room sizes by dwelling types.	152
Table 5.07—Room sizes in one-storey dwelling by the period they were built in.	153
Table 5.08— The number and frequency of dwellings complying with dimensional and organizational standards and conventions.	177
Table 5.09— The frequency of standard, below-standard, and non-standard one-storey and two-storey dwellings per build period.	180
Table 6.01— LSOAs with terraced houses included in the analysis, their description and their length. Based on the distribution of their length they are grouped into clusters A and B (Hackney 06AC does not fit into any of these groups and has a comparatively low sample size).	190
Table 7.01—Comparison of dwelling types in the floor plan and online surveys.	212

1

Introduction

This is a thesis on design standardization. In this thesis, I seek to offer a multifaceted account of how various forms of standards drive housing designs towards particular housing forms and assess these standards and the housing forms they result in, in relation to the experiences and domestic practices of their inhabitants.

The core empirical component of this research is an exploratory inquiry into the spatial quality of housing units in inner London. Housing quality in the UK, and especially in London, has been perpetually reported as low.¹ However, our knowledge of housing design and quality at the dwelling unit scale remains limited. COVID-19 pandemic, which is still ongoing at the time this thesis is being written, not only made housing quality issues further visible by larger swathes of the population, but also exposed our limited knowledge of housing design and quality at the dwelling scale, where most people had to spend most of their times in their homes.²

1. Barry Goodchild and Robert Furbey, *Housing in Use: A Study of Design and Standards in the Public Sector* (PAVIC Publications Sheffield City Polytechnic Department of Education Services, 1987); Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 1', *Construction Management and Economics* 1, no. 2 (1983): 119–44; Valerie Karn and Linda Sheridan, 'New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing' (Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994); Rebecca Roberts-Hughes, 'The Case for Space: The Size of England's New Homes' (Royal Institute of British Architects, 2011); Malcolm Morgan and Heather Cruickshank, 'Quantifying the Extent of Space Shortages: English Dwellings', *Building Research & Information* 42, no. 6 (2014): 710–24; Mark Crosby, 'Space Standards for Homes' (London: Royal Institute of British Architects, 2015).

2. Patrick Butler, 'Poor housing linked to high Covid-19 death rate in London borough', *Guardian*, 17 August 2020. Philip Hubbard, Jon Reades, and Hendrik Walter, 'Housing: Shrinking Homes, COVID-19 and the Challenge of Homeworking', *Town Planning Review* 92, no. 1 (2021): 3–10.

In the past three decades, growing attention has been paid to design quality and design governance in response to the declining quality of housing developments, decades-long pro-market planning reforms, and the weakening of existing planning frameworks.³ In the past two years alone, four extensive reports on housing quality, especially in new-build housing, have been published by various institutions and research groups.⁴ Parliamentary working groups have also been tackling the issue of design quality in the UK, and indeed, this heightened concern for well-designed housing has been influencing housing policy and regulation.⁵ What is considered well-designed housing is yet to be fully articulated; recent discussions have largely focused on issues of the neighbourhood, development and urban design. This is a result of a renewed orientation of policy towards high-density and large-scale developments that have opened up the discussion from urban design and planning perspectives and the improvement of some of the basic standards at the dwelling unit scale.⁶

Unit design both influences and is influenced by decisions taken in other scales such as the scale of the site such as building morphologies, typologies, densities and site layout. Moreover, there are also many considerations on a smaller scale that determines how dwellings can be used. Despite these, the dwelling unit scale is often overlooked in research.

In the limited research focusing on dwelling unit scale, the attention is often on dwelling size. I understand this focus as the result of how design is governed, how housing design is commonly approached and the methodological limitations in research. Dwelling size is the most easily measurable aspect of dwelling design. It has long been equated to a measure of dwelling quality: in calculating space standards many of which have been established in the past century, usability, albeit having an ambiguous meaning, has been the primary criterion.⁷ In housebuilding, dwelling size equates to the cost. As a result of this attention, unit sizes are often readily available and there are common conventions to measure them that makes them comparable.

3. Andy Thornley, *Urban Planning under Thatcherism: The Challenge of the Market* (London: Routledge, 1991); Tony Travers, *The Politics of London: Governing an Ungovernable City*, Government Beyond the Centre (Basingstoke: Palgrave Macmillan, 2004); Tony Crook, John Henneberry, and Christine Whitehead, *Planning Gain* (Chichester: John Wiley & Sons, 2016); Mike Raco, 'Private Consultants, Planning Reform and the Marketisation of Local Government Finance', in *Planning Practice: Critical Perspectives from the UK*, ed. Jessica Ferm and John Tomaney (New York: Routledge, 2018).

4. Maggie Baddeley and Merlin Tolley, 'Planning and Design Quality: Creating Places Where We Want to Live, Work and Spend Time' (London: Royal Town Planning Institute, 2019); Matthew Carmona et al., 'A Housing Design Audit for England' (London: Place Alliance, 2020); James T. White et al., 'Delivering Design Value: The Housing Design Quality Conundrum' (UK Collaborative Centre for Housing Evidence, 2020); Fanny Blanc, Kath Scanlon, and Tim White, 'Living in a Denser London: How Residents See Their Homes' (London: LSE London and LSE Cities, 2020).

5. Building Better, Building Beautiful Commission, 'Living with Beauty: Promoting Health, Well-Being and Sustainable Growth', 2020; Ministry of Housing, Communities and Local Government, *National Planning Policy Framework: Draft Text for Consultation* (London: HMSO, 2020); Mayor of London, *Housing Design Quality and Standards; Supplementary Planning Guidance, Module C - Pre-Consultation Draft*, 2020. Also see: Matthew Carmona, '78. Design Quality, Have We Reached a Moment of National Change?', <https://matthew-carmona.com>, February 1, 2021.

6. Matthew Carmona, Sarah Carmona, and Nick Gallent, *Delivering New Homes: Processes, Planners and Providers* (London: Routledge, 2003), 6–9.

7. See Chapter 3.

Many surveys that have been conducted since the 1960s, provide good knowledge of dwelling sizes.⁸ However, other than dwelling sizes, our knowledge of the existing housing stock and the housing that is currently being produced is limited and often anecdotal:

The layouts of flats in the new schemes were strikingly similar: most had an open-plan kitchen/living rooms, floor-to-ceiling windows in the main rooms, and small balconies. Window size and floor plans mean there is often only one possible furniture configuration, and it may not be straightforward to move or add walls.⁹

The present dimensional and spatial analysis of the existing housing stock in inner London that is developed by this thesis helps to address this gap and my discussion draws attention to the multi-scalarity of housing design and the inter-scalar relationships.

What started as an inquiry into the spatial quality of housing units in London soon revealed a tension between the two meanings of the word ‘standard’ in the existing housing stock that was worth exploring further: standard as a model to be replicated and standard as a certain level of quality. In this study, I develop a conceptual framework, design standardization, which guide the research theoretically, methodologically and empirically. Design standardization framework speaks to three issues I observe in the discussions of design governance and housing quality: a state-market dichotomy in approaching design governance and design quality, a compartmentalized view of dwelling unit design with a particular focus on dwelling size, and theoretical and practical issues in making standards.

Housing design standardization as the prescription and promotion of particular housing forms is closely related to design governance, which, Matthew Carmona defines as ‘the process of state-sanctioned intervention in the means and processes of designing the built environment in order to shape both processes and outcomes in a defined public interest’.¹⁰ Design governance, by this definition, indicates a state-market dichotomy in the shaping of the built environment. Since the 1980s, new housing developments in the UK and London have been almost exclusively provided by the private sector, who ‘will not want to invest in design quality unless it reduces production costs or increases selling prices by at least enough to justify that

8. W V Hole and J J Attenburrow, *Houses and People: A Review of User Studies at the Building Research Station* (London: Ministry of Technology Building Research Station, 1966); Goodchild and Furbey, *Housing in Use: A Study of Design and Standards in the Public Sector*; Leopold and Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 1'; Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 2', *Construction Management and Economics* 1, no. 3 (1983): 233–68; Karn and Sheridan, 'New Homes in the 1990s'; Roberts-Hughes, 'The Case for Space: The Size of England's New Homes'; Morgan and Cruickshank, 'Quantifying the Extent of Space Shortages: English Dwellings'; Crosby, 'Space Standards for Homes'.

9. Blanc, Scanlon, and White, 'Living in a Denser London', 80.

10. Matthew Carmona, 'Design Governance: Theorizing an Urban Design Sub-Field', *Journal of Urban Design* 21, no. 6 (2016): 1–26.

investment'.¹¹ Design governance refers, then, to the introduction of various types of legislations, codes, guidance, incentives and so on that makes the private sector ensure a minimum level of quality, which has long referred to a dwelling designed to provide comfort, i.e. sufficient sunlight, fresh air and heating, a dwelling suited to the size and type of household, and functional. Design at unit scale is governed, to this end, by various types of standards, e.g., technical standards such as the bedroom and overcrowding standard, 'decent home' standards or Housing Health and Safety Rating, space standards and the Building Regulations.

My use of design standardization, however, extends beyond these formal, state-sanctioned standards and also includes other types of formal and informal standards used by market actors and designers in housing design. A recent report published by the UK Collaborative Centre for Housing Evidence highlights that 'governments, local authorities, housebuilders, and their consultants, are all accountable, in different ways, for allowing poorly designed places to be created'.¹² In particular, the roles that the actors other than the state play are more significant in the design of housing units, as they are greatly complicated by issues associated with the supply and delivery of dwellings. Standards other than the Building Regulations have, in practice, been applied to only a very small part of the housing being developed, i.e. the subsidized housing sector. Moreover, amid a perpetual crisis of housing shortage and affordability, they are not followed thoroughly.¹³ Projected housing needs create pressure on local authorities to increase the housing supply, and the discussions in planning for this often focus on the number of housing units, rather than quality.¹⁴ Related to this, especially in London, residential density is being increased as a result of issues about land cost and development feasibility and how development finance and the planning-gain system work.¹⁵

One example of standardization by non-state actors that is discussed in housing literature is the use of tried, tested, and standardized unit types by private housebuilding companies.¹⁶ Since the 1980s, in particular, in London, the production of housing has mainly been carried out by major housebuilding companies, for whom standardized unit types have increasingly become part and parcel of housebuilding,

11. David Adams and Steve Tiesdell, *Shaping Places: Urban Planning Design and Development* (Oxon: Routledge, 2012), 156.

12. White et al., 'Delivering Design Value', iii.

13. White et al., 73–88.

14. Carmona, Carmona, and Gallent, *Delivering New Homes: Processes, Planners and Providers*, 9–12.

15. David Adams and Steven Tiesdell, 'Planners as Market Actors: Rethinking State–Market Relations in Land and Property', *Planning Theory & Practice* 11, no. 2 (2010): 187–207; Jennifer Robinson and Katia Attuyer, 'Extracting Value, London Style: Revisiting the Role of the State in Urban Development', *International Journal of Urban and Regional Research*, 2020.

16. Leopold and Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 1'; Leopold and Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 2'; Alan Hooper and Chris Nicol, 'Design Practice and Volume Production in Speculative Housebuilding', *Construction Management and Economics* 18, no. 3 (2000): 295–310; Chris Nicol and Alan Hooper, 'Contemporary Change and the Housebuilding Industry: Concentration and Standardisation in Production', *Housing Studies* 14, no. 1 (1999): 57–76; Chris Leishman and Fran Warren, 'Private Housing Design Customization through House Type Substitution', *Construction Management and Economics* 24, no. 2 (2006): 149–58.

again to an extent driven by the processes of land acquisition, valuation and development financing. The use of tried and tested standardized plans minimizes the financial risks that exist in speculative housebuilding. It allows fast and accurate calculation of costs and enables developers to quickly assess viability. It shortens the design and approval process, as the use of standardized unit types is also supported in the planning framework through house type approval schemes.¹⁷ It also minimizes the risk in construction and quality, as the design and construction knowledge and skills developed elsewhere can be used subsequently in many other projects.

Besides these, there are many other types of standards – technical, non-technical, state-sanctioned, voluntary, local, national, and so on, and besides the state and housebuilding companies, there are other actors: local authorities, planners, architects, users, and so on. Drawing boundaries between different types of standards and conventions is a difficult task; there are significant and perpetually evolving overlaps. For instance, while voluntary standards are promoted by regulatory bodies, and standardized unit types are supported by planning frameworks, standardized unit types utilize the technical knowledge produced for regulations. My use of design standardization encompasses all these various forms of standards that pertain to housing design and I use ‘standardization’ to refer to the sum effect of these and others and recognizes the complex and reinforcing relationships between them.

Design standardization also refers to a level of design quality and design value. Standards emerge in response to specific problems, such as structural and fire safety, health and safety, efficiency and long-term housing needs, and therefore embody certain ideas of what a ‘good’ dwelling is. However, there are also social, political and cultural values related to nuclear family, privacy, and the live/work relationship that are embedded in the making of standards. The most explicit example of this is space standards. Space standards, argued for as a measure by which a minimum usable dwelling can be achieved, are developed by studying the minimum furniture dimensions that are necessary and the space required to use and move between them. The questions of what furniture is considered as necessary, for what activities, in what rooms and for whom are imperative to the making of space standards and the social, political and cultural values become embedded in answering these questions. Similar questions can be raised for any standard; standards entail quantification,¹⁸ classification,¹⁹ simplification²⁰ and commensuration,²¹ all of which have a normative dimension.

17. Leishman and Warren.

18. Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995); Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning* (Harvard University Press, 1998).

19. Geoffrey C Bowker and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences* (Cambridge, MA; London: MIT Press, 2000).

20. James C Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

21. Martha Lampland, 'Calculating the Social: Standards and the Reconfiguration of Governing', *Contemporary Sociology: A Journal of Reviews* 41, no. 5 (2012): 640–41; Ian Hacking, 'Making Up People', *London Review of Books* 28, no. 16 (2017).

As I will demonstrate in the following chapters, at the centre of design standardization is the user. In the past 150 years or so, in the United Kingdom, architects, designers, policymakers, and economists, among others, have sought to identify what defines quality housing. These were often responses to specific socio-economic problems. Every definition, category, calculation, model, and method for quality housing has been always proposed in relation to a user. The user, as a category, has been both the embodiment of the problems the standards responded to and what the proposed standards would be assessed against. Spatial and dimensional models, for example, entailed assumptions about the way the house was occupied, and the family was constructed. While most standard house types have been developed and refined through time in response to cost, building technologies, skills and labour, the market, and state-sanctioned standards, the assumptions made about the user have not been abandoned but have grown and developed.²²

Fundamentally, my discussion of design standardization extending between these two meanings is a social and technical one. It is first situated in the social domain constituted by the different stakeholders that are involved in housing design and development, their technical knowledge and rationalities.²³ Second, it is situated in the relationships of ‘the material conditions’ of the housing unit and the user.²⁴ This entails technical problems of translation, measurement, method, evidence, formalization and generalizing daily and social practice, which is bound to change with social, demographic, cultural change. While it is difficult to separate the two meanings that standardization embraces, i.e. the prescription of particular housing forms and the conceptualization of a certain level of quality, their distinction is useful for constructing an analytical framework. My thesis thus explores design standardization by constructing a sequential mixed method approach that focuses on design standards, housing designs and users.

Standardization happens at scale: it is discernible in repeated patterns. Only in aggregate form, the design of London’s housing stock contains evidence of design standardization. Therefore, I first study design standardization quantitatively as it allows the study of a larger sample and the observation of general characteristics. More specifically, I study dimensional and spatial data derived from a sample of housing floor plans collected from inner London (n=3,438) drawn from all types of dwellings, from terraced houses built more than a hundred years ago to recently completed dwellings. I examine the spatial and dimensional commonalities in the existing housing stock through an exploratory data analysis. At the same time, I use

22. Michel Callon, 'Techno-Economic Networks and Irreversibility', *The Sociological Review* 38, no. 1_suppl (1990): 132–61; Alan Hooper and Chris Nicol, 'The Design and Planning of Residential Development: Standard House Types in the Speculative Housebuilding Industry', *Environment and Planning B: Planning and Design* 26, no. 6 (1999): 793–805; Carmona, Carmona, and Gallent, *Delivering New Homes: Processes, Planners and Providers*; Martha Lampland and Susan Leigh Star, *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life* (Ithaca: Cornell University Press, 2009).

23. Nikolas Rose and Peter Miller, 'Political Power beyond the State: Problematics of Government', *The British Journal of Sociology* 61, no. s1 (2010): 271–303.

24. Victor Buchli, *An Anthropology of Architecture* (London: Bloomsbury, 2013); Alison Blunt and Robyn Dowling, *Home* (London: Routledge, 2006).

the commonalities as a benchmark to describe below standard and non-standard dwellings.

My focus is London, where both constituents of my initial definition of design standardization, the state, and the market, have actively promoted specific housing forms. With a high-pressure and globalized housing market, a perpetual housing shortage and high land prices resulted in a market that has developed new design conventions, e.g. minimizing dwelling sizes, increasing density, developing typical unit plans, and prompted governments to introduce new regulations, standards, codes, and guidelines to sustain housing quality, affordability, and access. In fact, both the earliest design standards and the most recent space standards were first developed for London.

In analysing existing housing stock, rather than new-built dwellings, my aim is not to offer a historical account or a diachronic analysis. Rather, I consider built year in relation to distinct combinations of design standardization processes. Since the 1980s, the private sector has dominated housing production while state intervention has weakened. The dwellings built in the post-war period up to the 1980s were designed in the context of large-scale state intervention. A comparison of housing stock built in different periods allows a deeper understanding of various design standardization processes, i.e. market conventions, state-sanctioned standards. In fact, studying terraced houses in the course of my research made visible other standardization processes that I had not envisioned initially – the process of extending, converting, and remodelling that has taken place in terraced houses. The terraced house was originally a repeating and homogenous typology, but in the past century, it has been continuously subdivided, altered, and extended without being subject to state-sanctioned standards that are applied to new-built housing such as space standards.

Following my floor plan analysis is a qualitative study of how London residents use, experience, and practice their homes in relation to the common design patterns identified in the floor plan analysis. More specifically, an online survey of housing use (n=234) and an interview-based study with select survey participants (n=22). My empirical analysis situates the daily practices, uses, and experiences of residents against the standard and non-standard design features identified in the floor plan analysis. It also positions the daily practices of the inhabitants of these dwellings against projected ideas of design quality and in particular, of the use of home. I argue that the users and their needs or behaviours as considered in the discussions of standards differs, in unintended ways, from the lived experiences of residents.

With this thesis, I address three questions that I set out to answer in exploring design standardization: (RQ1) How is housing in London standardized at the dwelling scale? (RQ2) How do users occupy, adapt, or use their standardized dwellings? (RQ3) How do these relate to, and can inform, the broader processes of design standardization?

Following this introductory discussion of design standardization, Chapter 2 brings together a range of literature that relates to the design of housing units from the fields of architecture, housing policy and planning, as well as real estate literature and provides an initial framework for design standardization. In articulating design standardization, I draw from two strands of research and theory: standards and standardization as studied in Science and Technology Studies, in particular Infrastructure Studies, and conventions as articulated in the Economics of Convention. Chapter 3 complements the discussion of design standardization by scrutinizing examples of standards through key documents and texts. It details the processes of standard-making by discussing how design quality at the unit scale has been conceptualized, and how this has been translated into standards. Furthermore, it offers a historical background to my methodology by providing categories of analysis for the floor plan survey and giving a short overview of the development of London's housing stock.

Having presented the design standardization framework and set out the research questions, I discuss my methodology and methods in Chapter 4. Here, I discuss the way in which I operationalize my multi-dimensional framing of design standardization in my research design. I detail how the two strands of the research I developed, both of which use quantitative and qualitative data, fit into the mixed-methods literature. Then I give an overview of my sampling, data modelling, and analysis. I present my main findings in the following three empirical chapters.

Chapters 5, 6 and 7 presents and discusses my empirical findings. Chapter 5 presents the findings of my floor plan analysis. By presenting the dimensional and organizational patterns in the existing housing stock in London, this chapter discusses the form and extent of design standardization (RQ1). Here, I pay particular attention to flats built in the past forty years, in which most commonalities were observed. I discuss these commonalities in relation to market conventions. In Chapter 6, I focus on older housing stock, i.e. terraced houses, which show a high level of variation in their layouts. I analyse these variations in relation to major alterations, i.e. extensions, conversions, and remodelling of interior partitions, also drawing from parts of my online survey and interviews. In this chapter, I define an overlooked actor in design standardization, the owner-occupant. Having discussed standardization processes in relation to design outcomes, in Chapter 7, I present the findings of my analysis of London residents. Here I focus on how the design outcomes resulting from standardization are used and experienced by their inhabitants. I conclude this chapter by discussing the implications of the user's experience for the ways in which design standards are conceptualized.

In Chapter 8, I review my overall findings, outline the research contributions and limitations and make suggestions for future research.

2

Design Standardization

This chapter and the next one together conceptualizes housing design standardization and explores the issues of design standardization. In the broadest sense, design standardization refers to a generalized knowledge and form of housing design. Standardization in housing, here, is used to emphasize two interrelated meanings of standards. First, it refers to generalizable ideas of housing design that may or may not be formalized, and second, it refers to an underpinning understanding of housing design quality against which the generalizations and design outcomes are evaluated. While standards are often embedded within regulations, policy, guidance, and codes, my use of the term standard is to foreground the forms of housing design these tools lead to and result in.

Housing design standardization consists of the conceptualization, production, dissemination, implementation and application of standards in housing design and development. Here, my focus will be on housing units. As architecture operates at multiple scales, it is difficult to define the limit of housing design standardization. However, housing units are directly influenced by other scales, such as those of building morphologies and site layout, at the same time involving many considerations at a very fine scale. Moreover, it is the part of housing design that enters into direct contact with many stakeholders, including the state, the market, and the user. This chapter brings together a range of literature that pertains to the design of housing units from architecture, housing policy and planning, as well as property market literature, to outline the processes of design standardization in the UK and specifically in London. Laying the foundations for a design standardization framework that unfolds through

a variegated pattern of housing, the chapter concludes by outlining the key issues arising from design standardization.

Design Standards

In the context of housing design and delivery, and also in architectural design studies more widely, design standardization is generally understood as the production of industrially standardized building components, the use of typical unit and building plans, and the issuing of formal, dimensional, structural, and aesthetic standards. This remains as the legacy of state-subsidized mass housing projects that created universal solutions to housing in the early and mid-twentieth centuries, especially in the period following the destruction of Europe during the Second World War up to the late 1970s. The flagship project of what David Harvey calls the Fordist-Keynesian framework, this housing model, on the one hand, embodied scientific management, technocracy and logical positivism in its design, production and management, and on the other, it represented the provision of generous government spending and intervention in housing.¹ Centrally issued technical standards including, but not limited to, standardized components, units, and blocks, were fundamental tools of this framework. It was the production capacity that these industrially constructed and uniform housing projects afforded that made mass housing possible. And the technical calculations, and abstract values such as air, space, efficiency and functionality, were forged under the rhetoric of welfare and morality.

However, since the 1980s state subsidies, as well as the design interventions and housing forms that came with it, i.e. mass housing projects, diminished under a new politico-economic framework, and housing production was mostly left to the market. Under these conditions, a new framework of design governance, reconfigured with diverse agencies and actors – state, market, design and construction professionals, non-governmental organizations, owners, and users – has emerged. At the same time, the standards that pertain to housing design have become more numerous, more diverse, and more dispersed. Matthew Carmona in ‘The Formal and Informal Tools of Design Governance’ draws attention to this changing landscape and offers a classification of the types of tools that the state uses to govern design outcomes. In addition to legislation, there are, on the one hand, formal tools of guidance – incentive and control—, and on the other, informal tools – evidence and knowledge production, promotion, evaluation, and assistance.²

The formal tools of design governance are formalized, state-sanctioned, ‘technocratic and reactive’.³ I will use the term ‘standard’ thus as shorthand to refer

1. David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Wiley, 1992).

2. Matthew Carmona, ‘The Formal and Informal Tools of Design Governance’, *Journal of Urban Design* 22, no. 1 (2016): 1–36.

3. Carmona, 15.

to the range of formal tools that prescribe and promote particular forms of housing unit design. Others have distinguished three types of standards: standards about being something, and about having something, about doing something. Even though these classifications were made in other areas, they are also useful for distinguishing standards pertaining to housing design.⁴ There are, first, standards for what dwelling unit designs should have. For example, the UK Building Regulations specify what a minimum dwelling unit should have by defining what constitutes a habitable room and establishing sanitation and ventilation requirements.⁵ Then there are standards that provide specifications for the way housing elements and forms should be designed and built. For example, there are dimensional requirements for accessibility.⁶ There are also standards that stipulate the minimum social, economic, environmental, and functional outcomes the dwelling units should achieve: for example, how dwelling designs should achieve sustainability goals, support local housing needs, and provide safety.⁷ Moreover, there are standards that limit certain actions. For instance, in the Building Regulations, inner rooms, i.e. rooms accessed only from other rooms and internal rooms – rooms without windows – are not desirable, for fire safety and ventilation reasons.⁸ However, not all of these standards are technical in nature. While technical standards provide requirements and specifications for materials, parts, and layouts to be used when designing new housing, there are also non-technical standards that describe characteristics and outcomes, and therefore are open to interpretation.

Not all of these standards are statutory requirements; neither are they all issued by the state. Professional and non-governmental organizations have also developed many standards. These are voluntary standards and do not include regulations, official guidelines, and state-sanctioned standards. In fact, the broader literature on standards often refers to documents published by non-state, non-governmental and private organisations.⁹ How privately published, voluntary rules came to have an impact comparable to that of law and regulation is what makes them an interesting subject to study.¹⁰ In the context of housing in England, we can count the Lifetime Home Standards and the Building for Life standards among the voluntary standards that have an impact on unit designs.

Lifetime Home Standards were a set of sixteen design criteria addressing issues of accessibility for people with mobility impairments. It was first developed by Habinteg Housing Association and the Helen Hamlyn Foundation in 1989 and later promoted

4. Nils Brunsson and Bengt Jacobsson, *A World of Standards* (Oxford University Press, 2002), 4–6.

5. Building Regulations 2010. Approved Document F, *Ventilation* (HM Government, 2015).

6. Building Regulations 2010. Approved Document M, *Access to and use of buildings* (HM Government, 2015).

7. For instance, BRE Daylight and Sunlight Standards, BRE Environmental Assessment Method (BREEAM), Building in Context Toolkit, and Secured by Design.

8. Building Regulations 2010. Approved Document B, *Fire safety* (HM Government, 2015).

9. Brunsson and Jacobsson, *A World of Standards*; Lawrence Busch, *Standards: Recipes for Reality*, Infrastructures Series (MIT Press, 2011).

10. Engineering Rules pays particular attention to the international influence of ISO. JoAnne Yates and Craig N. Murphy, *Engineering Rules : Global Standard Setting since 1880* (Baltimore: Johns Hopkins University Press, 2019).

by the Joseph Rowntree Foundation. Since 1999, these technical standards have influenced Part M of the Building Regulations to include accessibility standards.¹¹ Subsequently, Building for Life standards was developed in 2001 by the Commission for Architecture and the Built Environment (CABE), the House Builders Federation, and the Civic Trust, and promoted by the government, and in its most recent form, it consists of twelve standards relating to neighbourhood, character, and the design of the immediate surroundings.¹²

These standards are produced to improve aspects of quality in housing by filling the gaps in official regulations and standards and to persuade governments to pursue further regulation. However, it is very difficult to regard voluntary standards as completely voluntary. Bowker and Star argue, ‘without a mechanism of enforcement’, whether this is by the state, professional organisations, the market, ‘or a grassroots movement’, standards cannot achieve wide acceptance.¹³ In fact, the voluntary standards mentioned have been actively promoted by central and local authorities in the UK: Built for Life standards were stipulated as part of the requirements for loans and subsidies in 2007 and were encouraged in the London Plan 2015, and Lifetime Home Standards, after a lengthy period of encouragement, were finally incorporated into the Building Regulations Part M.¹⁴

Making of Standards

Standards constitute not only a tool of governance but also a specific form of knowledge. As Aimi Hamraie recognized, ‘[w]hen ideals materialize as laws, knowing and making become contested grounds.’¹⁵ In the literature, as well, standards are approached from both frameworks. Governance and governmentality studies view standards as technologies of governance and focus on their production and role in normalization practices and globalization. They analyse ‘the shaping of conduct in the hope of producing certain desired effects and averting certain undesired events’.¹⁶ In James C Scott’s words, they focus on the specific fields of vision that standards introduce.¹⁷ Scott, draws attention to the role of standardization as a

11. Jo Milner and Ruth Madigan, ‘Regulation and Innovation: Rethinking “Inclusive” Housing Design’, *Housing Studies* 19, no. 5 (2004): 727–44.

12. Ivor Samuels, ‘Building for Life: A Recent British Attempt to Raise the Quality of Housing’, *Focus* 10, no. 1 (2013).

13. Martha Lampland and Susan Leigh Star, *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life* (Ithaca: Cornell University Press, 2009), 14. Also see: James Faulconbridge, Noel Cass, and John Connaughton, ‘How Market Standards Affect Building Design: The Case of Low Energy Design in Commercial Offices’, *Environment and Planning A: Economy and Space* 50, no. 3 (2018): 627–50.

14. Milner and Madigan, ‘Regulation and Innovation: Rethinking “Inclusive” Housing Design’, 734–37.

15. Aimi Hamraie, *Building Access: Universal Design and the Politics of Disability* (University of Minnesota Press, 2017), 131.

16. Nikolas Rose, *Powers of Freedom: Reframing Political Thought* (Cambridge and New York: Cambridge University Press, 1999), 52. Also see: Dieter Kerwer, ‘Rules That Many Use: Standards and Global Regulation’, *Governance* 18, no. 4 (2005): 611–32.

17. James C Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 1–8. Similar arguments can be found in: Ian Hacking, ‘Biopower

practice of simplification, increasing the ability of the state to administer its lands and populations. While governmentality perspectives offer an in-depth understanding of the application of standards symmetrically to things and people, they establish direct links between how standards are made and the standardised outcomes, often neglecting to address how and why standards travel through different social spheres and enter into relationships with them.

However, housing design and construction requires many actors.¹⁸ Science and Technology Studies adopt therefore a broader view of the social life of technical knowledge and technology. There is a growing body of literature that focuses on the built environment from socio-technical perspectives.¹⁹ These writers view standards as phenomena that are perpetually entering into relationships with the social and cultural. They focus on the social meanings and implications of standards in everyday life and in professional communities.²⁰

Among socio-technical perspectives, Infrastructure Studies, in particular, provides a useful foundation for thinking about standards. Infrastructure studies develop a theoretical framework for the analysis not only of bricks-and-mortar infrastructures such as power, communications, and transport networks, but also of less tangible infrastructures such as protocols and standards, and institutions, all of which are central to the functioning of modern life.²¹

Standards and Their Stories, edited by Martha Lampland and Susan Leigh Star, establishes a research agenda for the study of standards as infrastructures by highlighting two major analytical characteristics of standards.²² First, they are ubiquitous and invisible. They are embedded in any activity or object, and even in other standards and infrastructures. As they are developed, they disappear and are

and the Avalanche of Printed Numbers', *Humanities in Society* 5, no. 3–4 (January 1, 1982): 279–95; Ian Hacking, *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science* (Cambridge University Press, 1983); Ian Hacking, *The Taming of Chance*, Ideas in Context (Cambridge University Press, 1990); Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995); Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning* (Harvard University Press, 1998); Jason D Hansen, *Mapping the Germans: Statistical Science, Cartography, and the Visualization of the German Nation, 1848-1914*, Oxford Studies in Modern Europe (Oxford University Press, 2015).

18. Matthew Carmona, 'Design Governance: Theorizing an Urban Design Sub-Field', *Journal of Urban Design* 21, no. 6 (2016): 1–26; Carmona, 'The Formal and Informal Tools of Design Governance'.

19. There is a growing literature that approaches architectural design from a science and technology studies perspective. See special issue of the *Journal of History of Science Osiris*, volume 18, 2003. Also see: Peter Galison, 'Aufbau/Bauhaus: Logical Positivism and Architectural Modernism', *Critical Inquiry* 16, no. 4 (1990): 709–52; Peter Galison and Emily Thompson, *The Architecture of Science* (Cambridge, MA: The MIT Press, 1999); Thomas Gieryn, 'What Buildings Do', *Theory and Society* 31, no. 1 (2002): 35–74; Michelle Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham and London: Duke University Press, 2006).

20. Geoffrey C Bowker and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences* (Cambridge, MA; London: MIT Press, 2000).

21. Susan Leigh Star and Karen Ruhleder, 'Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces', *Information Systems Research* 7, no. 1 (1996): 111–34.

22. Lampland and Star, *Standards and Their Stories*.

taken for granted (as long as they function). Second, they have multiple social and cultural dimensions.

In addition to questions of how standards entail social, moral, and political values, on which governmentality perspectives also focus, Infrastructure Studies highlights the way standards enter into relationships with communities. They argue that standards are central to belonging to a community of practice, and they enter into reciprocal relationships with the conventions of these communities. In this section, I will discuss how each of these analytical characteristics unfolds in housing design standards.

The promise of consistent and predictable outcomes is what allows standards to permeate everyday practices and become ubiquitous. For instance, in an article on building regulations and architects' practices published in 2006, Rob Imrie showed that architects regard building regulations positively, noting that they provide 'predictability of process and outcome', convenience, and 'a basis for good design'.²³ Standards simplify the amount of information that needs to be processed for decision-making. They establish proxies for desired qualities, reducing and condensing the information that is required to assess design solutions and quality.²⁴ This simplification and condensation are most often achieved by making desired qualities commensurate with easily measurable characteristics. In James C Scott's words, they render the illegible legible.²⁵ In a series of interviews James Faulconbridge, Noel Cass, and John Connaughton conducted between 2014 and 2016 with architects involved in the development and design of office buildings in London, one of the architects interviewed said 'you have these standards and those standards are seen to be acceptable and appropriate and adaptable' referring to a set of voluntary standards for office buildings.²⁶ Similarly, a dwelling that complies with space standards is assumed to have adequate usability, a slippery term otherwise difficult to prescribe and communicate. Space standards as a measure of usability are developed by identifying the typical activities of a typical household at home, identifying the minimum necessary furniture and the spaces for these activities, and studying them dimensionally and through architectural drawings (see Chapter 3).

Simplifying the amount of information that needs to be processed for decision-making entails classification, quantification, and formal representation.²⁷ First of all, each standard, ultimately, classifies objects within at least two groups. Lawrence Busch

23. Rob Imrie, 'The Interrelationships between Building Regulations and Architects' Practices', *Environment and Planning B: Planning and Design* 34, no. 5 (2007): 925–43.

24. Wendy Nelson Espeland and Mitchell L Stevens, 'Commensuration as a Social Process', *Annual Review of Sociology* 24, no. 1 (1998): 313–43.

25. Scott, *Seeing Like a State*, 11–83.

26. Faulconbridge, Cass, and Connaughton, 'How Market Standards Affect Building Design'.

27. Bowker and Star, *Sorting Things Out: Classification and Its Consequences*, 13. Timmermans and Epstein provide a more extensive list of concepts, including objectification, formalization, quantification, routinization, classification, commensuration, commodification, evaluation, regulation, rationalization, and the elaboration of standard forms of problem-solving such as policy paradigms, templates, assemblages, and repertoires of contention. Stefan Timmermans and Steven Epstein, 'A World of Standards but Not a Standard World: Toward a Sociology of Standards and Standardization*', *Annual Review of Sociology* 36, no. 1 (2010): 74.

distinguishes a ‘fuzzy set’ of four types of standards: (a) Olympics-type standards, which are used in identifying the best things and people; (b) filter-type standards, which classify things and objects bimodally based on their satisfaction of requirements; (c) rank-type standards, which classify things and objects into hierarchical groups, and (d) division-type standards, which classify things and objects into non-hierarchical groups.²⁸ In the context of housing, we mostly encounter division- and filter-type standards, the latter of which classify housing into groups of those that meet a standard or are below standard. The line that separates these categories from one another is often defined by numbers and other formal representations, such as detail drawings, technical drawings, floor plans, and diagrams. Supporting these are rank-type standards, such as those of energy efficiency ratings.²⁹

Much of the literature on classification, quantification, and other formal representations, therefore, complement the literature of standards. A great number of these works that can be grouped as enquiries into an objective representation of the natural and social worlds have dealt with the histories of issues such as normalcy, statistics, objectivity, diagrams, and architectural drawings.³⁰ These studies provide insight into some of the social, moral, and political judgements inherent to the making of standards, issues which are raised by both governmentality and infrastructure studies. For instance, what values do classifications, measurements, statistical calculations, diagrams, and images promote? And, at the same time, what do they eliminate?

In *Trust in Numbers*, Theodore Porter identifies quantification as ‘a technology of distance’ that enables knowledge to be produced and communicated beyond locality and community.³¹ This also means that quantification standardizes communication and comes at the expense of local knowledge. This view of quantification in public life and the sciences also holds true for urban standards. In *Social Space and Governance in Urban China*, David Bray argues that standardization, coupled with centralization, allowed a limited number of experts to control urban planning, and especially urban housing, in socialist China.³² In *Seeing Like a State*, James C Scott gives the city plans for Algiers, Brasilia and Chandigarh designed by Le Corbusier as examples of cities produced with components standardized at every scale and laid out based on various technical standards such as road dimensions and building heights. Drawing on the analyses of Jane Jacobs, Scott argues that these technically driven designs neglected the local and practical knowledge that satisfied the daily needs of its residents.³³

28. Busch, *Standards: Recipes for Reality*, 42–52.

29. For instance, Energy Performance Certificate (EPC) ratings.

30. Ian Hacking, ‘Biopower and the Avalanche of Printed Numbers’, *Humanities in Society* 5, no. 3–4 (January 1, 1982): 279–95; Hacking, *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*; Hacking, *The Taming of Chance*; Porter, *Trust in Numbers*; Scott, *Seeing Like a State*.

31. Porter, *Trust in Numbers*, ix.

32. David Bray, *Social Space and Governance in Urban China: The Danwei System from Origins to Reform* (Stanford, CA: Stanford University Press, 2005).

33. Scott, *Seeing Like a State*, 103–46.

Similar arguments have also been made in relation to visual representation. Peter Galison and Lorraine Daston, in their critical history of scientific atlases *Objectivity*, identify a range of visual practices. Associating these visual practices with epistemological ones, Galison and Daston emphasise that visual practices have been shaped not only by how, and by using which tools, they were made and used, but also by distinct scientist-selves. These visual practices depict the world through ‘cultivated patterns of attention’ and communicate a different dimension of the same object while eliminating others.³⁴ A similar argument about the visual practices of architecture is made by Hyungmin Pai. In *the Portfolio and the Diagram*, Pai observes a shift in the visual practices of architecture in the United States, from the use of the portfolio, collections of architectural drawings of conventional building types and parts, to the use of functional diagrams. Pai argues that this shift was part of a conscious reinvention of the shared logic of architecture in pursuit of becoming more relevant to society’s values and needs in the aftermath of the First World War. The portfolio was central to the compositional *esquisse* that approached design as a totality, indicating ‘the overall character of the design, the distribution of rooms, the details of its form, and the specifics of entrance, circulation, light, ventilation, and views’. The portfolio was central to composition; it held all the possibility of being traced and reproduced, and therefore also held together the shared values of architecture. The diagram, on the other hand, provided a selective view of design – its functional organisation – rendering inferior the other aspects of design that were central to the compositional *esquisse*.³⁵

The issue of selective lenses raised in these histories of quantification and visual practices pertain to standards of any kind. The making of standards is deeply entangled with classification, quantification, and formal representation. Housing standards are not only formulated by using numbers, diagrams, technical drawings, and floor plans but also developed through these. Ian Hacking, in *Making up People*, describes the processes needed to create categories of people in the human sciences such as social sciences and medicine. The processes that he refers to as the ‘making up of people’ involves counting, quantifying, creating norms, correlating, medicalizing, biologizing, geneticizing, normalizing, and bureaucratizing. The first four processes (counting, quantifying, creating norms and correlating) deal with the general characterisation of these categories and the development of tools of measurement and representation. In the following three processes (medicalizing, biologizing, geneticizing) these categories are problematized within the individual fields of the human sciences. It is after the problematization of these categories in individual disciplines that the treatment, which Hacking refers to as normalizing, and the administrative changes, which Hacking refers to as bureaucratizing, take place.³⁶ This analogy also recasts Carmona’s definition of the informal tools of design governance –evidence and

34. Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2010), 363–418.

35. Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America* (Cambridge, MA: MIT Press, 2002).

36. Ian Hacking, ‘Making Up People’, *London Review of Books* 28, no. 16 (2017).

knowledge production, promotion, evaluation, and assistance – as the processes of standard-making.

A similar pattern holds true for housing design standards. For instance, the earliest design standards emerged in nineteenth-century England. By observing poor living conditions, measuring them with mortality and infectious outbreak statistics and maps, and correlating them to housing conditions, social reformers developed a series of architectural interventions and design principles that enabled the normalizing of housing conditions, making them sanitary and moral. In 1875, the central government, for the first time, intervened in housing conditions by defining a set of standards (all houses were required to accommodate a privy and the occupation of basements was limited) and gave local authorities the power to produce standards regarding new buildings. By 1890, every urban authority could set by-laws regarding the planning of streets, the structure of houses in order to prevent fire spread, the distances between buildings with respect to the ventilation of houses and streets, and the provision of water closets.

Standards and Design Quality

As both governmentality perspectives and Infrastructure Studies emphasize, an ideal of design quality is registered in the processes of making the standards. A high-quality dwelling design has long been taken to mean homes designed to provide comfort, i.e. sufficient sunlight, fresh air and heating, homes suited to the size and type of households, and homes that are functional.³⁷ While in Chapter 2 I will discuss these from a historical perspective, here I would like to point out some of the relationships between the making of standards and design quality, especially in relation to different types of households and the daily lives of people inhabiting them.

A number of works within the long list of studies that deal with the relationship between built form and everyday life from the perspective of social production, such as the work of Pierre Bourdieu and Michel Foucault, emphasize the socio-normative function of housing design standards.³⁸ They refer to both the production of certain social effects and the avoidance of undesired ones through housing design. For instance, the socio-normative key functions of the official housing design guidance published throughout the twentieth century in England, such as the *Manual on the Preparation of State-aided Housing Schemes* (1919), the *Housing Manual 1944*, and *Homes for Today and Tomorrow* (1961) can be found in the discussion of post-war

37. Matthew Carmona, Sarah Carmona, and Nick Gallent, *Delivering New Homes: Processes, Planners and Providers* (London: Routledge, 2003), 7–8.

38. Michel Foucault, *The Order of Things*, Routledge Classics (London and New York: Routledge, 2002); Pierre Bourdieu, *Outline of a Theory of Practice*, trans. Richard Nice (Cambridge University Press, 1977). For an overview of the literature on structuralist and symbolic approaches: Denise L. Lawrence and Setha M. Low, 'The Built Environment and Spatial Form', *Annual Review of Anthropology* 19, no. 1 (1990): 453–505.

housing forms in Britain that these standards and guidelines heralded.³⁹ In particular, these works highlight the construction of working-class families as married younger adults with dependent children and the gendered division of the domestic sphere. In the documents, these roles were discussed explicitly, and the functions, sizes and the relationship of domestic spaces were determined in relation to this.⁴⁰ For instance, Roderick Lawrence, who called this ‘design by legislation’, demonstrated how a specific vision of family was registered in the conceptualisation and representation of domestic life in these standards and guidelines.⁴¹ Indeed, the imagined familial domesticity that can be found in these pattern books and the graphic standards are still relevant. For instance, the *London Housing Design Guide* (2010), which details the calculation of space standards in London and has been in place for the past decade, uses graphic methods of representing typical furniture layouts and activity areas in a similar way to earlier design guidelines.⁴² The listing of household sizes and numbers and the graphic representation of daily activities and furniture layouts make evident that the standard house is informed by a familial idea of domesticity and lacks the consideration of a wider range of household types and spatial requirements. In the private sector, the situation is not very different, as I will discuss in the following chapters.

While these official standards were very explicit in their normative roles, they might as well be hidden under other rhetoric. In *French Modern*, Paul Rabinow identified a change in the rhetoric of standardization in early twentieth-century French urbanism: a transformation from ‘techno-cosmopolitanist’, in which the spatial forms were justified by and mediated with the political, the historical, and the natural, to ‘middling modernist’, in which they were justified and mediated by abstract values such as air, space, efficiency, and functionality.⁴³ In this, the subject of architectural practice no longer operated on a particular society with its cultural codes, but on ‘a universal subject whose needs, potentialities and norms could be

39. Local Government Board, *Manual on the Preparation of State-Aided Housing Schemes* (London: H M Stationery Office, 1919); Ministry of Health, *Housing Manual 1944* (London: HMSO, 1944); Ministry of Housing and Local Government, *Homes for Today and Tomorrow* (H M Stationery Office, 1961).

40. For literature focusing on norms and values, see Graham Crow, ‘Home and Family, Creating the Domestic Sphere’, in *Home and Family*, ed. Graham Crow and Graham Allan (London: Palgrave Macmillan, 1989), 14–32; Darling Elizabeth, ‘Class, Sexuality and Home in Interwar London’, in *Sexuality and Gender at Home: Experience, Politics, Transgression*, ed. Brent Pilkey et al. (London: Bloomsbury Academic, 2017), 19–34. For social histories of housing in the UK, see John Burnett, *A Social History of Housing: 1815-1970* (Newton Abbot: David & Charles, 1978); Alison Ravetz, *Council Housing and Culture: The History of a Social Experiment* (London: Routledge, 2001); Alison Ravetz and Richard Turkington, *The Place of Home: English Domestic Environments, 1914-2000* (Abingdon: Taylor & Francis, 2011).

41. Roderick J. Lawrence, ‘Design by Legislation The Ideological Nature of House Planning in the United Kingdom, 1918–1961’, *Habitat International* 9, no. 2 (1985): 123–40.

42. Design for London, *London Housing Design Guide* (London: London Development Agency, 2010), 92–103.

43. Paul Rabinow, *French Modern: Norms and Forms of the Social Environment* (Chicago: University of Chicago Press, 1989).

discovered, analysed and formalized by science'.⁴⁴ While these abstract values were forged as universal, they were not immutable.⁴⁵

A handful of works in architectural history tells the story of many issues that emerge between this universal subject and the locality in architecture and planning practices.⁴⁶ A number of critical studies of modernity have unpacked the normative roles underlying pattern books such as *Architectural Graphic Standards* by Ramsey and Sleeper (1932), *Time-Saver Standards* by Architectural Record (1942) published in the United States, and *Architects' Data (Bauentwurfslehre, 1936)* by Ernst Neufert, published in Germany. Catalogues of standard building parts, these books were produced for architects, builders, and draughtsmen for educational and training purposes.⁴⁷ And as the title 'time-saver' indicates, their use was advocated in relation to the functional thinking in architectural design derived from scientific management, technocracy, and logical positivism. They were, and have been, used in architectural practice and education as sources of standard types and dimensions. The anthropometric measurements and functional diagrams that underpin these pattern books, especially, have been scrutinised in terms of their relation to the body, gender, and race: as Paul Emmons and Andrea Mihalache put it, 'the idea of function in architecture was understood as an intimate choreography between the body of the user and the building'.⁴⁸ Lance Hosey has argued that the anthropometric measurements of Western white men that make up *Architectural Graphic Standards* inherently excluded racial and gender diversity from architecture's aesthetic and use qualities.⁴⁹ Others have highlighted the role of *Architects' Data*, written by Ernst Neufert, who worked for the Nazi regime in Germany in the 1930s and 1940s, in registering the political issues of a period marked by fascism and racism.⁵⁰

Similarly, universal or accessible design standards, which have become a fundamental part of design guidance and regulation, have been critically analysed

44. Paul Rabinow, 'Colonialism, Modernity. The French in Morocco', in *Forms of Dominance. On the Architecture and Urbanism of the Colonial Enterprise*, ed. Nezar Alsayyad (Aldershot: Avebury, 1992), 167–82.

45. These concepts, however, can be more accurately defined as black-boxed, rather than immutable. Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Harvard University Press, 1987).

46. Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002); Duanfang Lu, *Third World Modernism: Architecture, Development and Identity* (London: Routledge, 2011).

47. Helen Long outlines the extent and role of pattern books in the Victorian periods. Helen C. Long, *Victorian Houses and Their Details: The Role of Publications in Their Building and Decoration* (Oxford: Architectural Press, 2002).

48. Paul Emmons and Andrea Mihalache, 'Architectural Handbooks and the User Experience', in *Use Matters: An Alternative History of Architecture*, ed. Kenny Cupers (Oxon: Routledge, 2013), 35–50.

49. Lance Hosey, 'Hidden Lines: Gender, Race, and the Body in Graphic Standards', *Journal of Architectural Education* 55, no. 2 (2001): 101–12.

50. Nader Vossoughian, 'Standardization Reconsidered: Normierung in and after Ernst Neufert's *Bauentwurfslehre* (1936)', *Grey Room* 54 (2014): 34–55; Nader Vossoughian, 'From A4 Paper to the Octametric Brick: Ernst Neufert and the Geo-Politics of Standardisation in Nazi Germany', *The Journal of Architecture* 20, no. 4 (2015): 675–98; Ines Weizman, 'The Exception to the Norm: Buildings and Skeletons in the Archive of Ernst Neufert', *Perspecta* 49 (2016): 133–46.

by Rob Imrie, Jo Milner, Ruth Madigan, and Malcolm Harrison.⁵¹ One common observation has been the limited definitions of disability that these guidance and regulation rest on.

Conventions

Thus far, I have referred to standards that are formally presented, and in one way or the other integrated with planning and policy. Ian Bentley recognizes the design and development process as a ‘battlefield, [...] in which actors deploy their resources of economic or political power, valued knowledge or cultural capital, in more or less adroit ways, in attempts to make things happen as they want’.⁵² While standards are central to housing design and development, there are also unwritten rules and models that shape design outcomes that are shared among many professional communities.

Matthew Carmona lists sixty-five actors that take part in shaping urban design and development and groups them into three major categories in terms of the ends they take actions for and the values they have. ‘Creative tyrannies’, identified with design and engineering professionals, endeavour to produce the most creative design solutions; ‘market-driven tyrannies’, associated with developers, endeavour to create the most profitable and marketable design solutions, and ‘regulatory tyrannies’ endeavour to produce design solutions that the public can benefit from the most.⁵³ In an increasingly private sector-led housing context, in particular, the professional conventions of developers and designers have become more significant. A recent report published by the UK Collaborative Centre for Housing Evidence highlights that ‘governments, local authorities, housebuilders, and their consultants, are all accountable, in different ways, for allowing poorly designed places to be created’.⁵⁴

While the literature of standards is extensive, conventions are often omitted from the discussions. They distinguish standards from conventions in terms of the way they are formalized: standards are often ‘specified in highly formal ways’, whereas conventions ‘rely on implicit, shared understandings’.⁵⁵ Such division is also methodologically grounded. Formal standards can easily be studied through documents. Conventions, on the other hand, are less amenable to study as they are not formally represented or documented.

51. Ruth Madigan and Joanne Milner, ‘Access for All: Housing Design and the Disability Discrimination Act 1995’, *Critical Social Policy* 19, no. 3 (1999): 396–409; Rob Imrie, ‘Housing Quality, Disability and Domesticity’, *Housing Studies* 19, no. 5 (2004): 685–90; Malcolm Harrison, ‘Defining Housing Quality and Environment: Disability, Standards and Social Factors’, *Housing Studies* 19, no. 5 (2004): 691–708.

52. Ian Bentley, *Urban Transformations: Power, People and Urban Design* (London: Routledge, 1999), 41.

53. Matthew Carmona, ‘Design Coding and the Creative, Market and Regulatory Tyrannies of Practice’, *Urban Studies* 46, no. 12 (2009): 2643–67. Also see: Carmona, ‘Design Governance: Theorizing an Urban Design Sub-Field’; Carmona, ‘The Formal and Informal Tools of Design Governance’.

54. James T. White et al., ‘Delivering Design Value: The Housing Design Quality Conundrum’ (UK Collaborative Centre for Housing Evidence, 2020), iii.

55. Timmermans and Epstein, ‘A World of Standards but Not a Standard World’, 71.

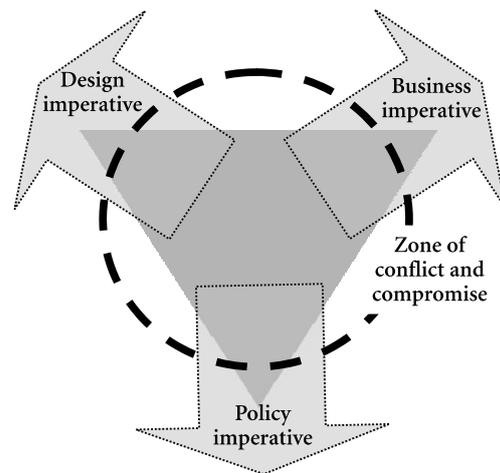


Figure 2.01—‘Zone of conflict and compromise’ as defined by Matthew Carmona.

From: Matthew Carmona, ‘Design Coding and the Creative, Market and Regulatory Tyrannies of Practice’, *Urban Studies* 46, no. 12 (2009): 2647.

This section of the thesis outlines the conventions of market-driven and creative stakeholders and discusses their interaction with standards. Drawing on the empirical studies conducted on different stakeholders involved in housing design, in this section I outline the conventions in housing design and development and their impact on design outcomes. In framing the conventions in housing design and development, studies in the Economics of Convention provide useful methodological approaches by recognizing the plurality of normative values. In particular, the works of sociologist Luc Boltanski and economist Laurent Thévenot on the role of conventions in economic decision-making and justification are of interest. Boltanski and Thévenot study collective cognitive forms that stakeholders use to coordinate, ‘criticize, challenge institutions, argue with one another, or converge toward agreement’.⁵⁶ These collective cognitive forms, conventions, are essential not only because they help the process of coordination when formal standards and other institutionalized arrangements fall short or require interpretation, or where outcomes are uncertain, but also because actors base their critique of standards and institutional arrangements on them.

In their seminal work *On Justification*, published in 2006, Boltanski and Thévenot outline six forms of evaluation, orders of worth, as they call them. The market order of worth ascribes value to that which is desirable, profitable, and marketable, evaluated with monetary measurements such as price, cost, and profit. The industrial order of worth ascribes values to efficiency, functionality, and high performance that are evaluated with technical measurements. The civic order of worth values collective welfare, equality, and solidarity. The inspired order of worth ascribes value to creativity and artistry that are evaluated in terms of originality and innovation. The order of worth of fame ascribes value to popularity, recognition, and singularity that

⁵⁶ Luc Boltanski and Laurent Thévenot, *On Justification: Economies of Worth*, trans. Catherine Porter, Princeton Studies in Cultural Sociology (Princeton University Press, 2006).

are evaluated with public opinion. The domestic order of worth values the traditional and familiar.⁵⁷

Boltanski and Thévenot argue that none of these orders of worth is superior to the others. The confrontation between these orders of worth usually lends itself to compromises, definitions of new common goods that relate to multiple orders of worth at the same time. In fact, most of the time we encounter compromises, dominated by one form of evaluation, rather than singular orders of worth. For instance, the design standards for state-subsidized mass housing projects, the universal solution to housing throughout the twentieth century, were formulated on the basis of concerns such as health ((e.g., houses were designed to be airy and ventilated, damp-free, and with basic sanitary facilities), overcrowding and socio-economic order (e.g., houses were designed for a traditional nuclear family with a bread-winning father, stay-at-home mother, and multiple children), functionality (e.g., houses were designed for daily activities), and efficiency (e.g., houses were designed to minimize construction costs, often by reducing areas of circulation and movement). Therefore, not only were they justified through civic value (a universal standard for all, public health); they also invoked industrial value (an efficient and functional design process and rational, efficient building and unit layouts), and domestic value (unit designs that fostered the modernization of family life).

Market Conventions

What might be considered a market convention is best illustrated by James Faulconbridge, Noel Cass, and John Connaughton in 'How market standards affect building design' that study the role of market standards in the office building sector in London. The authors report that not only standards but also market conventions, such as the term 'Grade A', are regarded as a prerequisite for participating in the market and are often exceeded. Grade A, the authors note, is a 'widely recognised term in the field of commercial office designs', and 'something that is not formally codified or easy to describe'.⁵⁸ Compliance with these standards both ensures marketability, by indicating that the building is of high quality, and gives assurance to the investors regarding its long-term value. This, in return, limits the range and extent of the design decisions and creative solutions are often developed for the excess parts. Among the interviewees, one engineer reports that '[developers] would seal up [...] and put mechanical cooling and mechanical heating in' the buildings that utilize passive

57. Boltanski and Thévenot's six-world framework has been extended by later to include green and project-oriented worlds. Luc Boltanski and Eve Chiapello, *The New Spirit of Capitalism*, trans. Gregory Elliott (London & New York: Verso, 2005); Michael Moody, Laurent Thevenot, and Claudette Lafaye, 'Forms of Valuing Nature: Arguments and Modes of Justification in French and American Environmental Disputes', in *Rethinking Comparative Cultural Sociology: Repertoires of Evaluation in France and the United States*, ed. Michele Lamont and Laurent Thevenot (Cambridge: Cambridge University Press, 2000), 229–72.

58. Faulconbridge, Cass, and Connaughton, 'How Market Standards Affect Building Design', 636.

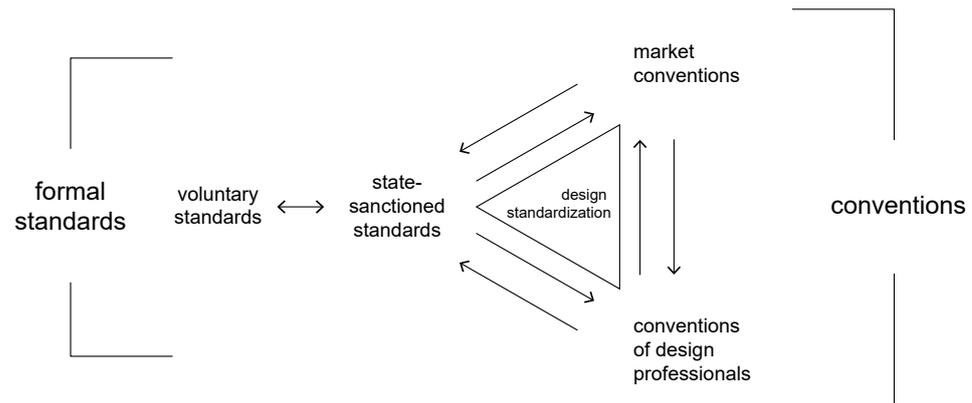


Figure 2.02—Standards and conventions that make up design standardization.

systems, and therefore not necessitate their use. As one architect suggests, ‘there’s a lot of redundancy built in’ for the sake of complying with these conventions.⁵⁹

To my knowledge, there are no studies that apply a similar standards and conventions framework to the housing sector; rather, there is a dispersed knowledge about how housebuilding practices from which the conventions of the market can be drawn. Housebuilding practices have an enormous influence on housing design outcomes. Since the 1980s, new housing developments were provided almost exclusively by the private sector. At the same time, the structure of the private sector has changed: small- and mid-size housebuilders have increasingly given way to volume housebuilders.⁶⁰ Volume housebuilders differ from others in the way that their actions are complicated by their scale and financing.⁶¹ Focusing on the shift from a public sector-dominated housing market to a private sector-dominated one in the late 1970s, Ellen Leopold and Donald Bishop explain that the private housing sector differs greatly from the public housing sector in many ways and that in the private sector-led housing context, housing design outcomes are shaped by market responses to the development process. As one of the key issues in the private sector, they point to the development and use of a standardized unit and block portfolio.⁶² The use of standardized plans minimizes the financial risks that exist in speculative housebuilding. It allows fast and accurate calculation of costs and enables developers to make decisions quickly. It also minimizes the design and construction risks, as

⁵⁹For the interviews, see Noel Cass, ‘Interview Data Demand Project 3.2’, Lancaster University Research Directory, 2016.

⁶⁰Fred Wellings, *British Housebuilders: History and Analysis* (Oxford: Blackwell, 2008).

⁶¹Chris Nicol and Alan Hooper, ‘Contemporary Change and the Housebuilding Industry: Concentration and Standardisation in Production’, *Housing Studies* 14, no. 1 (1999): 57–76; Alan Hooper and Chris Nicol, ‘Design Practice and Volume Production in Speculative Housebuilding’, *Construction Management and Economics* 18, no. 3 (2000): 295–310.

⁶²Ellen Leopold and Donald Bishop, ‘Design Philosophy and Practice in Speculative Housebuilding: Part 1’, *Construction Management and Economics* 1, no. 2 (1983): 119–44; Ellen Leopold and Donald Bishop, ‘Design Philosophy and Practice in Speculative Housebuilding: Part 2’, *Construction Management and Economics* 1, no. 3 (1983): 233–68.

the design and construction knowledge and skills developed elsewhere can be used repeatedly in many projects. The use of standardized unit portfolios is also supported in the planning framework through house type approval schemes.⁶³

Large housebuilders, who ‘will not want to invest in design quality unless it reduces production costs or increases selling prices by at least enough to justify that investment’, generally use tried and tested types.⁶⁴ When looked at in more detail, the standardized plans are often revised versions of traditional housing typologies. Leopold and Bishop argue that ‘modified versions of simple traditional house types [have] an established track record for marketability’.⁶⁵ Michael Ball argues that both the market and the house buyer are very conservative about housing designs; they prefer ‘the two-storey, pitched roofed, semi – but preferably detached – house, in a limited range of styles’.⁶⁶ While Leopold and Bishop and Ball refer to developments of houses, the conservativeness inherent to standardized unit portfolios applies equally to blocks of flats, the main type of new housing being provided in London.

In a more recent study published in 2006, Chris Leishman and Fran Warren found that flat types collected from large housebuilders show a similar extent of standardization.⁶⁷ One aspect that drives house-buyer conservatism is the buyers’ desire to protect the value of their houses. A less conventional style carries the risk of being less sought after in a conservative market.⁶⁸ However, in a series of studies conducted by Chris Leishman, Fran Warren, and associates in the early 2000s, the authors found that, although the type of plans used in new-built housing did not completely meet house buyers’ expectations or requirements, users still preferred house types that they regarded as marketable to those that were more usable.⁶⁹ Therefore, innovation is further restrained in a vicious circle of market considerations.

Recent urban design and planning literature also pays attention to the differences between greenfield and brownfield developments in relation to design processes. Adams and Tiesdell in *Shaping Places* highlight that housebuilders are more likely to turn to architects and design services in brownfield developments where there are more regulatory and site constraints.⁷⁰ Sarah Payne and David Adams, in research conducted with housebuilders operating in Greater Manchester or Central Scotland in 2006, found that companies developing brownfield sites, ‘worked hard to transfer

63. Chris Leishman and Fran Warren, ‘Private Housing Design Customization through House Type Substitution’, *Construction Management and Economics* 24, no. 2 (2006): 149–58.

64. David Adams and Steve Tiesdell, *Shaping Places: Urban Planning Design and Development* (Oxon: Routledge, 2012), 156.

65. Alan Hooper and Chris Nicol, ‘The Design and Planning of Residential Developmet: Standard House Types in the Speculative Housebuilding Industry’, *Environment and Planning B: Planning and Design* 26, no. 6 (1999): 793–805.

66. Michael Ball, ‘Chasing a Snail: Innovation and Housebuilding Firms’ Strategies’, *Housing Studies* 14, no. 1 (1999): 9–22.

67. Leishman and Warren, ‘Private Housing Design Customization through House Type Substitution’.

68. Ball, ‘Chasing a Snail: Innovation and Housebuilding Firms’ Strategies’, 12.

69. Chris Leishman et al., ‘Preferences, Quality and Choice in New-Build Housing’ (York: Joseph Rowntree Foundation, 2004).

70. Adams and Tiesdell, *Shaping Places: Urban Planning Design and Development*, 160.

product standardisation as a key design solution from their greenfield experience to brownfield sites. This was because construction efficiency remained a compelling strategic priority in maintaining an individual housebuilder's competitive edge.⁷¹

Nicol and Hooper, in their survey of housebuilding companies, found that 91% of companies that produced more than 2,000 units in 1995, used standardized unit types.⁷² The same authors in an interview-based study of a national representative sample of housebuilders conducted in the late 1990s found that the number of standardized plans in builder portfolios varied from twenty to over one hundred, with varying degrees of use in actual construction. Among the fourteen large housebuilding companies (producing more than a thousand units per year) they interviewed, three companies employed 20-29 standard house types, five companies 30-36 types, another five 50-61 types, and one company more than a hundred types. In addition to the number of rooms and types, the key factor that differentiated these unit plans from each other was their size and layout. Overall, the standardized unit portfolios consisted of a wide range of standardized sizes, designed for every submarket that each company builds housing for, such as starter, trade-up, and high-end homes. The layouts often follow the property sizes: while smaller units are designed in a way that minimizes the circulation area, larger units are designed to highlight common and circulation areas, e.g., entrance halls. For instance, the size of a two-bedroom flat ranges from 37 m² to 59 m², with an average of 46 m². Similarly, the quality of fittings and materials are also chosen in relation to the build-to-sell sub-sectors targeted.⁷³ In their study, Leishman and Warren confirmed that different builders now have several options for similar dwelling sizes. However, their cluster analysis of 267 standardized unit types collected from large housebuilders showed that standardized unit types can be adequately classified into several groups according to a relatively small number of variables such as size, number of bedrooms, and distribution of floor area to bedrooms and public areas.⁷⁴ Nicol and Hooper also showed that only a very small number of builders offered the option of customization to buyers, and this was often at the level of fixtures and fittings.⁷⁵ Where modifications occurred to the portfolios, these were usually incremental and often in response to construction experiences, new technologies, changing regulations and buyer preferences. However, there are no longitudinal studies that have analysed these changes. There is, however, a growing body of literature on the gap between housebuilders' perception of buyers' needs and the expectations of users, which confirms that these units are based on perceived standard needs, with very little attention to wider user needs.⁷⁶

71. David Adams and Sarah Payne, 'Business as Usual? - Exploring the Design Response of UK Speculative Housebuilders to the Brownfield Development Challenge', in *Urban Design in the Real Estate Development Process*, ed. Steve Tiesdell and David Adams (Oxford: Blackwell, 2011), 199-218; Sarah Payne, 'Pioneers, Pragmatists and Sceptics: Speculative Housebuilders and Brownfield Development in the Early Twenty-First Century', *Town Planning Review* 84, no. 1 (2013): 37-62.

72. Nicol and Hooper, 'Contemporary Change and the Housebuilding Industry', 67.

73. Hooper and Nicol, 'Standard House Types in the Speculative Housebuilding Industry', 797.

74. Leishman and Warren, 'Private Housing Design Customization through House Type Substitution'.

75. Hooper and Nicol, 'Standard House Types in the Speculative Housebuilding Industry', 799-80.

76. James Barlow and Ritsuko Ozaki, 'Achieving "Customer Focus" in Private Housebuilding: Current Practice and Lessons from Other Industries', *Housing Studies* 18, no. 1 (2003): 87-101.

Despite highlighting the use of tried and tested solutions, most of the studies cited so far focus only on the size of units. The empirical part of the present research thus aims to contribute to closing this gap. As noted, in standardized unit plans, floor area is a major concern, as it ‘has implications not only for the relationship between dwelling design and housing layout but also for land acquisition [...] and the management of the residential construction process’.⁷⁷ This is especially true in London. Volume housebuilders need to generate quick viability assessments in order to secure land and finance.⁷⁸ Put simply, viability assessment refers to the calculation of the money that can be generated from the houses sold, minus the costs of land, construction, and consultancy. With the lack of available and affordable land and standard construction costs, housebuilders usually turn to the other variable in the equation: consultancy and the number of houses.

I will discuss consultancy costs and the role of design in the price in the next section. However, the main focus is often the number of units built. One way of managing this is to reduce dwelling sizes to an acceptable minimum, especially at the lower end of the market – i.e. starter homes – to provide more units within the constraints of the total built area. In fact, many studies conducted since the 1980s have found that at the lower end of the private sector, dwelling sizes are small and have been shrinking further.⁷⁹ Another solution to improve viability is to increase density, and this is also encouraged by the planning-gain system, especially in the brownfield developments that make up most new housing in inner London.⁸⁰

Market Conventions and Design Standards

Market and state are often regarded as having conflicting motivations and values. Indeed, as Alex Lehnerer has argued, regulatory tools exist to prevent the profit-driven market from producing inadequately built environments.⁸¹ In fact, the attention paid to space standards in design governance in the last decade is a response to the role unit sizes play in the feasibility calculations of the private sector and the shrinking of dwelling sizes.

77. Hooper and Nicol, 'Design Practice and Volume Production in Speculative Housebuilding', 299.

78. See: Laurence Murphy, 'Performing Calculative Practices: Residual Valuation, the Residential Development Process and Affordable Housing', *Housing Studies* 35, no. 9 (2019): 1–17; Neil Crosby and Peter Wyatt, 'What Is a “Competitive Return” to a Landowner? Parkhurst Road and the New UK Planning Policy Environment', *Journal of Property Research* 36, no. 4 (2019): 1–20.

79. Leopold and Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 2'; Alan W. Evans, "'Rabbit Hutches on Postage Stamps": Planning, Development and Political Economy', *Urban Studies* 28, no. 6 (1991): 853–70; Valerie Karn and Linda Sheridan, 'New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing' (Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994); Andrew Drury and Eleanor Somers, 'Room to Swing A Cat' (HATC Ltd, 2010).

80. Fanny Blanc, Kath Scanlon, and Tim White, 'Living in a Denser London: How Residents See Their Homes' (London: LSE London and LSE Cities, 2020), 10–12.

81. Alex Lehnerer, *Grand Urban Rules* (Rotterdam: 010 Publishers, 2009).

While space standards are yet to be introduced in the legally enforceable Building Regulations, Rob Imrie's analysis of developers' attitudes towards the introduction of accessibility standards in the Building Regulations draws a picture of the conflicts and compromises emerging between state regulation and the housing market. Imrie argues that the introduction of accessibility standards was 'a response to the failures of self-regulation [of the market]'.⁸² In a series of interviews Imrie conducted with housebuilders, it is clear that they also regarded state-sanctioned standards negatively. Most notably, they raised concerns about increasing costs and prices and highlighted the threat they posed to the lower end of the market, starter homes. Some of them noted a decrease in quality; as they tried to satisfy the requirements within the 'standard floor area', other parts of the dwelling became smaller in size.⁸³

It is also commonly observed by practitioners that with space standards prescribe the minimum space provision needed, this often ends up being the exact size targeted for housing at the lower end.⁸⁴ A similar observation is made by Davide Pisu and Giovanni Marco Chiri, who analysed the impact of floor area ratio and built volume ratio (where they form part of a planning regulation): regulations can promote specific forms, even without prescribing them, when combined with other aspirations such as profitability.⁸⁵ For instance, in the late nineteenth century, after the enforcement of the Public Health Act of 1875, a new dwelling typology called 'the by-law house' emerged. While the Act only introduced rules about setbacks, road widths, and some basic amenity requirements, the result was that speculative builders, wanting to squeeze as many houses as possible into their plot of land, constructed houses with a deep plan and narrow frontages.⁸⁶

Similarly, the convergence of housing designs towards what was coined 'a New London Housing Vernacular' is a result of such compromise. New London Vernacular is often used to refer to the formal and material qualities of housing developments: brickwork and portrait windows organized within a strict grid. However, it also refers to a set of design choices, which ultimately also affects the unit portfolios of housebuilders. In David Birkbeck and Julian Hart's pamphlet *A New London Housing Vernacular*, published by Urban Design London, the authors outline fourteen characteristics of this new way of developing housing, including more homes with front doors at street level, 'often through the use of maisonettes at lower levels', with fewer homes sharing internal access and the allocation of top floors for larger

82. Rob Imrie, 'The Role of the Building Regulations in Achieving Housing Quality', *Environment and Planning B: Planning and Design* 31, no. 3 (2003): 419–37.

83. Rob Imrie, 'Housing Quality and the Provision of Accessible Homes', *Housing Studies* 18, no. 3 (2010): 393–401.

84. Conversations with Julia Park, Jamie Dean, and Bilge Serin at Housing Standardisation Workshop at the Royal College of Art, London. 21 October 2019.

85. Davide Pisu and Giovanni Marco Chiri, 'Rules and the Production of Built Space: An Investigation on Compliant Nomotopism', *City, Territory and Architecture* 6, no. 1 (2019): 5.

86. Harold James Dyos, 'The Speculative Builders and Developers of Victorian London', *Victorian Studies*, Supplement: Symposium on the Victorian City (2), 11 (1968): 641–90.

units.⁸⁷ This is partly driven by aesthetic requirements set by the planning framework, i.e. that buildings should be in harmony with existing development patterns; housing should be tenure blind – the differently tenured dwellings should not be evident from the exterior – and circulation requirements, i.e. access from the street and reduced unit access per core. But New Vernacular is also desired by housebuilders, as it reduces risk and costs in the selling process – New Vernacular architecture is still the preferred option for many buyers – but only achieves low-rise density.⁸⁸

Market values generally override the conflict between the state and the market. For instance, permitted development rights have been a less regulated area in which significant problems of design quality have emerged as a result of market conventions.⁸⁹ However, there are other frameworks in which state-market relationships are variably constituted.⁹⁰ In London, especially since 2008, local authorities have increasingly relied on planning gain, formalized in England as Community Infrastructure Levy and Section 106 agreements. Planning gain negotiation provides an opportunity for local authorities to obtain wider benefits, e.g. affordable housing and infrastructure, from market activities.⁹¹ While planning gain is ideally a tool through which the state can negotiate better design outcomes, design quality is often undermined in the mutual desire to increase the number of housing units provided.⁹²

Conventions of Design Professionals

For most of the twentieth century, the mainstream architectural practice adopted and actively promoted the principles of functionalism that entailed scientific management, technocracy, and logical positivism. Central to such an approach was a social responsibility adopted by architects for progress and the betterment of life.⁹³ Housing was the primary tool for achieving these socio-political aims. The various standards developed within the architectural practice (as well as the state-sanctioned standards and regulations) supported this. In *Drafting Culture*, George Barnett Johnston demonstrates how the *Architectural Graphic Standards* by Ramsey and

87. David Birkbeck and Julian Hart, *A New London Housing Vernacular* (Urban Design London, 2012), 10–11.

88. Birkbeck and Hart, 11–21.

89. Jessica Ferm et al., 'Emerging Problematics of Deregulating the Urban: The Case of Permitted Development in England', *Urban Studies*, 2020, 004209802093696; Ben Clifford, 'British Local Authority Planners, Planning Reform and Everyday Practices within the State', *Public Policy and Administration*, no. Decentred State (2020): 1–21.

90. Jamie Peck, 'Neoliberalizing States: Thin Policies/Hard Outcomes', *Progress in Human Geography* 25, no. 3 (2001): 445–55; Saskia Sassen, *A Sociology of Globalization* (New York, NY: W W Norton & Co, 2007); Jamie Peck, Nik Theodore, and Neil Brenner, 'Neoliberal Urbanism: Models, Moments, Mutations', *SAIS Review of International Affairs* 29, no. 1 (2009): 49–66.

91. Jennifer Robinson and Katia Attuyer, 'Extracting Value, London Style: Revisiting the Role of the State in Urban Development', *International Journal of Urban and Regional Research*, 2020; Tony Crook, John Henneberry, and Christine Whitehead, *Planning Gain* (Chichester: John Wiley & Sons, 2016). Also see:

92. White et al., 'Delivering Design Value'.

93. Barbara Miller Lane, *Architecture and Politics in Germany, 1918-1945* (Cambridge; London: Harvard University Press, 1985); Eve Blau, *The Architecture of Red Vienna, 1919-1934*, The MIT Press (Cambridge & London: MIT Press, 1999).

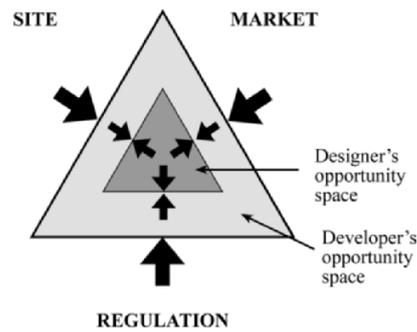


Figure 2.03—'Designer's opportunity space' as defined by Steven Tiesdell and David Adams.

From: Steven Tiesdell and David Adams, 'Design Matters: Major House Builders and the Design Challenge of Brownfield Development Contexts', *Journal of Urban Design* 9, no. 1 (2004): 33.

Sleeper (1932) helped architecture to be transformed from a vocational practice to a professional one in the United States in the early twentieth century, at the cost of its vocational core, the draughtsmen. Offering compendiums of technical drawings and design guidelines, pattern books centralised the knowledge of architectural practice that had previously been the purview of draughtsmen, with knowledge passed on among themselves.⁹⁴

However, in the 1970s, the architectural practice took another turn, if not multiple turns. Widely periodized in architectural history as Postmodernism, in the following decades architects sought new grounds other than functionalism on which to base their practice and experimented with historical and popular forms.⁹⁵ Postmodernism referred, on the one hand, to these formal experiments in the search for new ground, and, on the other, to its relationship to the wider politico-economic turn through which market principles informed governance. Fredric Jameson views Postmodernism as an expression emerging from financial capital, an architecture that is regarded as property – real estate – and built by capital investors.⁹⁶ However, recent scholarship in architectural history is challenging such accounts of a unidirectional relationship between new architecture and the market. In the recent publication *Neoliberalism on the Ground*, Kenny Cupers, Catharina Gabriellson and Helena Mattson suggest that the social values embedded in functionalist modernism have not been 'abandoned in the wake of postmodernity but rather are dislocated, projected, or made integral to the promises of the market'.⁹⁷ This follows Reinhold Martin's reconfiguration of the demolition of Pruitt-Igoe, a high-density housing estate, as a symbolic moment at which the social values of architectural design were absorbed into the market. He points out that the discussions surrounding housing design and the case of Pruitt-Igoe

94. George Barnett Johnston, *Drafting Culture: A Social History of Architectural Graphic Standards* (Cambridge & London: The MIT Press, 2008).

95. Robert Venturi, *Complexity and Contradiction in Architecture* (New York: Museum of Modern Art, 1966); Charles Jencks, *The Language of Post-Modern Architecture* (London: Academy Editions, 1977); Reinhold Martin, *Utopia's Ghost: Architecture and Postmodernism, Again* (Minneapolis: University of Minnesota Press, 2010).

96. Frederick Jameson, 'The Brick and the Balloon: Architecture, Idealism and Land Speculation', *New Left Review*, no. Mar/Apr (1998).

97. Kenny Cupers, Catharina Gabriellson, and Helena Mattsson, *Neoliberalism on the Ground: Architecture and Transformation from the 1960s to the Present* (Pittsburgh: University of Pittsburgh Press, 2020).

shifted from the universalist design principles of light, air, and efficiency to those of cost-benefit analysis and risk management.⁹⁸

In housing design and development, the roles architects and designers play are often very small and defined in relation to standards and market demands.⁹⁹ Here, it is useful to turn to Steve Tiesdell and David Adams' 'opportunity space' model in housing design and development. According to this, the designer's space for action is positioned within the developer's opportunity space, which is constrained by three external forces: site, market, and regulations.¹⁰⁰ In housing development, the opportunity space for design is often created in relation to economic value. Adams and Tiesdell also note that housebuilders 'turn to skilled designers only when their services are essential in order to resolve market, site or regulatory constraints'.¹⁰¹ One common benefit of design that is widely acknowledged in housing is to create a 'kerb appeal', the immediate appearance of dwellings that drive property value. Similarly, Claire Harper suggests that architects are given the role of creating a desirable image of high-density developments that maximize profit, but are otherwise stigmatized, accused of 'promoting a lifestyle and image of urban living'.¹⁰²

Operating within a very large set of external forces, the ways architects practise is also shaped by state-sanctioned standards and market values. Rob Imrie also found that while the Building Regulations are often viewed by architects as external to the design process, adherence to them is considered 'as the kernel of responsive and responsible design'.¹⁰³ As well as valuing them, building design practitioners also integrate them into their ways of doing things. The architects Imrie interviewed, noted that the Building Regulations provide convenience: one architect said that 'it does make life easier' and ensures quality design.¹⁰⁴ In another article, published in *European Management Review*, drawing upon the changing practices of architecture, Federico Magni and Beatrice Manzoni suggest that creativity in an architectural firm

98. Martin, *Utopia's Ghost: Architecture and Postmodernism, Again*, 14–20.

99. On how design quality is perceived by housebuilders, see Harry Smith, Soledad Garcia Ferrari, and Paul Jenkins, 'The Role of Planning in Housing Design: Design Implications of Land-Use Management', *Environment and Planning C: Government and Policy* 29, no. 3 (2010): 502–19.

100. Steven Tiesdell and David Adams, 'Design Matters: Major House Builders and the Design Challenge of Brownfield Development Contexts', *Journal of Urban Design* 9, no. 1 (2004): 23–45. Also see: David Adams, Robert Croudace, and Steve Tiesdell, 'Design Codes, Opportunity Space, and the Marketability of New Housing', *Environment and Planning B: Planning and Design* 38, no. 2 (2009): 289–306.

101. Adams and Tiesdell, *Shaping Places: Urban Planning Design and Development*, 160.

102. Claire Harper, 'Density: Objective Measure or Critical Tool of the Neoliberal Agenda?', *Footprint* 13, no. 1 (2019): 40. Also see: Sidney C. H. Cheung and Eric K. W. Ma, 'Advertising Modernity: Home, Space and Privacy 1', *Visual Anthropology* 18, no. 1 (2005): 65–80; Ulrich Kriese and Roland W Scholz, 'Lifestyle Ideas of House Builders and Housing Investors', *Housing, Theory and Society* 29, no. 3 (2012): 288–320; Jacqueline Botterill, 'Property Porn: An Analysis of Online Real Estate Advertising', in *The Routledge Companion to Advertising and Promotional Culture*, ed. Matthew P. McAllister and Emily West (New York: Routledge, 2013), 326–38; Simon Opit and Robin Kearns, 'Selling a Natural Community: Exploring the Role of Representations in Promoting a New Urban Development', *New Zealand Geographer* 70, no. 2 (2014): 91–102; Wing Yee Kimburley Choi, Annie HN Chan, and Anita KW Chan, 'Producing "Luxury" Housing: Developers' Strategies and Housing Advertisements in Hong Kong (1961–2011)', *Urban Studies* 57, no. 16 (2019): 3252–80.

103. Imrie, 'The Interrelationships between Building Regulations and Architects' Practices', 929.

104. Imrie, 933.

now refers less to the ‘novelty’ dimension of creativity and more to the ‘usefulness’ dimension.¹⁰⁵

However, there are also areas in which architects and designers are more likely to have an extended opportunity space. One of these is performance-based (or non-technical) standards that do not prescribe how to design, but rather what a building must achieve. For instance, Jan Fischer and Simon Guy, analysing the implications of the Code for Sustainable Homes, discuss another space in the relationship between regulations and design practices, assigning architects a new role, that of ‘interpretive intermediary’, who interpret standards and develop appropriate design solutions.¹⁰⁶

Architects and planners, as experts, also contribute to the making of policies and regulations, at least historically. Many technical standards that were issued for state-subsidized mass housing projects, for instance, were derived from successful experiments in housing design. This is most explicit in the 1919 *Manual on the Preparation of State-Aided Housing Schemes* that promoted garden city principles and were drafted by architects and planners involved in the first garden city designs in England.¹⁰⁷ Similarly, the *London Housing Design Guide* (that later provided the foundation for the nationally described space standard, issued in 2015) were drafted by practitioners who had been working in the affordable housing sector for many years.¹⁰⁸ However, as the report *Living with Beauty: Promoting Health, Well-Being and Sustainable Growth* of the Building Better, Building Beautiful Commission recognizes, in a housing context which is largely guided by the market, these interventions are not as effective: ‘architects today do not usually write pattern books for the volume builders. As a result, the detraditionalization of architecture affects the quality even of building that remains traditional’.¹⁰⁹ This thesis will study in greater detail how and to what extent design is determined by regulations and the close relationship between regulation and design outcomes produced by the market.

Design Standardization and Housing Design Outcomes

I have thus far summarized some charted areas of design standardization in housing in the UK. Housing design standardization consists of multiple, loosely coordinated and sometimes conflicting standards and conventions introduced by diverse actors. On the one hand, there are standards, a range of formal tools that prescribe and

105. Federico Magni and Beatrice Manzoni, ‘When Thinking inside the Box Is Good: The Nuanced Relationship between Conformity and Creativity’, *European Management Review*, 2020.

106. Jan Fischer and Simon Guy, ‘Re-Interpreting Regulations: Architects as Intermediaries for Low-Carbon Buildings’, *Urban Studies* 46, no. 12 (2009): 2577–94.

107. Local Government Board, *Manual on the Preparation of State-Aided Housing Schemes*.

108. Levitt Bernstein and mae architects were given credit in the consultation draft of Nationally Described Space Standards. Also see: Julia Park, *One Hundred Years of Housing Space Standards: What Now?*, 2017.

109. Building Better, Building Beautiful Commission, ‘Living with Beauty: Promoting Health, Well-Being and Sustainable Growth’, 2020, 18.

promote what a housing unit should and should not be, have, and do. These standards can be produced by the government and professional and non-governmental institutions. However, they are enforced or promoted by the government directly or indirectly. On the other hand, there are shared values and ideas about housing – conventions – shared by the market and design professionals that have a comparable impact on the design of dwellings. These ideas and values are not formalized and can only be discerned by studying these actors and design outcomes. Therefore, I brought together the literature focusing on the stakeholders taking part in housing planning, design, and development to outline what these conventions are.

Design standardization drives housing designs towards particular directions and forms. This does not mean that this results in sameness, but rather a controlled and limited variety of forms towards which various combinations of standards and conventions are directed. The discussion above already hints at some of the broad characteristics of design outcomes. To begin with, the forms that design standardization leads to are clearly historical, or rather, path-dependent.¹¹⁰ This is observed in both the literature on standards and studies on the housing market. The literature on standards notes that standards are nested in and integrated with one another, and therefore have ramifications throughout. For instance, the way space standards are categorised, i.e. per bedroom number and bed space, follows the occupancy standards (also known as bedroom standards) used for defining overcrowding. Their calculation is based on standard furniture dimensions and conventional furniture arrangements. All these dimensions have also become part of market conventions and the conventions of design professionals. For instance, Ernst Neufert's *Architects' Data* is still one of the most widely used guides in architectural education and practice. In addition to these, as multiple studies show, both housebuilders and homebuyers prefer dwelling designs they are accustomed to, especially due to marketability and retaining of property value, and this has led to the use of standardized unit portfolios that only change incrementally. Therefore, the forms of housing design that standardization produces can be best studied from a historical perspective. The next chapter is dedicated to this in relation to the discussion above.

The discussion above has also highlighted that housing design and development is complicated by the dominance of market-driven agendas. I have outlined how the market conventions enter into relationships with the standards and conventions of design professionals. The key issue between standards and the market agenda is the number of units provided in a development. In a number of recent publications, the low design quality in housing is attributed to the prioritization of the number of units provided, which is driven on the one hand by the housing supply targets of local authorities, and on the other by housebuilders' desire to maximise the number of units for sale.¹¹¹ With the pressure to increase the housing supply and the number

110. Busch, *Standards: Recipes for Reality*, 60–66.

111. Carmona, Carmona, and Gallent, *Delivering New Homes: Processes, Planners and Providers*, 9–12.

of units for sale, standards are not applied thoroughly in the review process.¹¹² For instance, in a report published by the Commission for Architecture and the Built Environment (CABE), 22% of the built developments audited in 2007 failed to meet Building for Life standards.¹¹³ Moreover, as most standards are provided as a safety net rather than comprehensive guidance, the minimum possible often becomes the housing unit in the pursuit of fitting in more units into a development.

The key issue between design conventions and market agendas is the desirability of built homes, which has implications for house prices and sales. Housing design is often viewed in relation to ‘kerb appeal’, and housebuilders rely on layouts that people are accustomed to. However, there is little research about the actual design outcomes generated. While ‘mainstream housing’ is used to denote a certain idea of housing – say, ‘rabbit hutches on postage stamps’ – it remains anecdotal rather than empirical beyond the actual size of dwellings.¹¹⁴ This research addresses this gap, and I discuss the existing empirical evidence on dwelling sizes in Chapter 5. Standards are made to achieve certain design quality. I will discuss in more detail what has been considered ‘quality’ design at the unit scale in the next chapter.

Based on the discussion thus far, I would like to reiterate an issue that arises from the making of standards. Standards generalize by making desired qualities commensurate with easily measurable or identifiable characteristics. For instance, we have standards that include bedroom standards, space standards, habitable room definitions, among others, to achieve homes suited to different sizes and types of household, and homes that are functional. While these standards are seemingly rational and acceptable, they also entail certain judgments that have direct implications for people. For instance, Ellen Pader, in a series of ethnographic studies conducted in the United States, showed how the assumptions made about occupancy standards, derived from middle-class notions of familial life and based on ‘outdated scientific knowledge’, similar to those in the United Kingdom, fail to respond to, and even ‘discriminate against’, certain ethnic, racial, and socio-economic backgrounds.¹¹⁵ Most recently, ‘bedroom tax’ that was introduced in Welfare Reform Act 2012, faced such criticism for promoting particular family types as the norm.¹¹⁶

The discussion of ‘desired qualities’ is essential to design standardization. The next chapter extends and details what kind of values and design quality is embedded to

112. White et al., ‘Delivering Design Value’, 71–88.

113. Commission for Architecture and the Built Environment, ‘Housing Audit: Assessing the Design Quality of New Homes Housing in the East Midlands, West Midlands and the South West’ (London: Commission for Architecture and the Built Environment, 2007), 4.

114. Evans, ‘Rabbit Hutches on Postage Stamps’, 868–70.

115. Ellen-J. Pader, ‘Spatial Relations and Housing Policy: Regulations That Discriminate Against Mexican-Origin Households’, *Journal of Planning Education and Research* 13, no. 2 (1994): 119–35; Ellen-J. Pader, ‘Spatiality and Social Change: Domestic Space Use in Mexico and the United States’, *American Ethnologist* 20, no. 1 (1993): 114–37; Ellen Pader, ‘Housing Occupancy Standards: Inscribing Ethnicity and Family Relations on the Land’, *Journal of Architectural and Planning Research* 19, no. 4 (2002): 300–318.

116. Anat Greenstein et al., ‘Construction and Deconstruction of “Family” by the “Bedroom Tax”’, *British Politics* 11, no. 4 (2016): 508–25.

design standardization in the UK. However, based on my discussion thus far, I pose the first one of my three research question: (RQ1) How is housing design in London standardized at the unit scale? While I have discussed how design standardization operates and how housing designs are drawn to particular forms at the intersection of formal standards, market conventions and design conventions, there is a lack of empirical ground to precisely articulate design standardization in relation to housing design outcomes. By posing this research question, my aim is to provide a comprehensive and empirical account of design standardization in London.

As is typical in exploratory research, my research questions were devised by working iteratively between theory and data – design standardization and the dimensional, organizational, and spatial patterns in the existing housing stock in London. In the following chapter, I continue my discussion of design standardization by focusing on London, the historical contingencies of design standardization, and its ‘desired qualities’.

3

'Good' Dwelling Design

Concepts, Methods, and Issues in History

This chapter extends my discussion of design standardization with a focus on how design quality at the scale of dwelling unit has been conceptualized and how this was translated into standards.

In the United Kingdom, in the past two centuries, architects, designers, policymakers, and economists, among others, have frequently turned their attention to the question of what type of housing is 'good'. Affordable dwelling, sanitary dwelling, moral dwelling, functional dwelling, efficient dwelling, flexible dwelling, family dwelling, dwelling fit for purpose, lifetime dwelling: these were all concepts that have been suggested for 'good' housing, often together with new definitions, categories, calculations, models, and design methods. In this regard, it focuses on a review of historical review of a series of key standards.

Different ideas on what constitutes quality in housing design are not mutually exclusive. On the contrary, they were often built upon each other. This is what makes a historical review relevant to a study of the spatial patterns of housing today. Moreover, the concepts that were offered as an answer to what 'good' housing is were rarely discussed on their own, but together with others in response to specific economic, social, and political issues. In the period between the 1830s and the 1890s, the discussion focused on establishing an affordable model for a sanitary and moral dwelling. This was in response to the problems of urbanization in large cities resulting from industrialization and championed by philanthropist housing organizations. Ideas on housing design were widely disseminated in the public domain, through experimental housing prototypes, exhibitions, and publications. In the period

between the 1890s and World War II, similar concerns were formulated, yet for wider geographies beyond the urbanized centres. This period witnessed more engagement from the state; there were both new regulations and subsidies for housing construction that brought along new housing types.

After World War I, concepts such as functionality started to be articulated more often and in relation to previous ones such as sanitary and moral ones. In this period, housing construction was largely concentrated in the public sector and the ideas disseminated through official channels had significant effects on the type of housing being developed. This period ended in the early 1980s with the introduction of a new politico-economic model leaving much of the design of dwelling units to the market. At the same time, the discussions of 'good' housing shifted to different scales such as that of the building and neighbourhood scale,

This is a selective review. The focus of this section is on concepts that had an influence on the way housing design was understood, applied, and assessed in Britain and London. The ideas, principles, and models in these texts were directed at professional audiences. They developed systematic reviews, methodical design approaches, spatial and organizational rules, and dimensional standards. They occupied mainstream housing debates, were applied to exemplary housing designs, and were institutionalized, either within the profession or in official design standards. These texts Based on their institutional ties, the selected texts form two groups. In the first group are three reports submitted to the UK government agencies responsible for making legislation and regulations for housing; these reviewed the existing literature, trends, problems, public and expert opinions. They are the reports of the Tudor Walters Committee the Earl of Dudley Committee and the Parker Morris Committee. In the second group are individuals who offered comprehensive definitions of the debates they were part of and methodological approaches that built upon and reflected the ideas of these. In this group are the writings of Henry Roberts, Henri Darbishire, Raymond Unwin, Alexander Klein, and Ernst Neufert.

Certainly, concepts of 'good' housing are inextricably linked to the social, economic, and institutional contexts within which they were developed. However, this does not mean that they were necessarily developed in or for London. The early twentieth-century discussions on minimum housing in continental Europe, in particular, that later spread across the world, also deserve attention and they are discussed through the works of Alexander Klein and Ernst Neufert. However, they are understood in relation to London and Britain, where different political, economic, and institutional priorities led to specific refinement of these concepts and housing outcomes.

This history could certainly be written solely by looking at common housing types, instead of texts. However, the aim of this section is not to provide an overview of historical housing types or to promote an evolutionary perspective. To discuss 'good' housing also meant to discuss the 'bad' sort – existing housing and its

problems. Textual sources provide answers to the question of what housing forms were perceived as 'good' and 'bad', in what ways they were assessed, and what kind of values they entailed. But textual sources also have their limitations. Their ideal definitions, categories, calculations, and design methods have to be translated into the built environment, which is not always successful. The opposite is also true; some of the ideas and successful cases developed in design practices were not registered in these documents. A complete understanding of these ideas, therefore, necessitates a complementary study of the actual housing designs. This historical review, in addition to extending my discussion of design standardization, serves two purposes: First, it provides a background to the development of London's housing stock, which is my research object and helps to establish the categories of analysis used in the empirical part of this research.

Sanitary and Moral Dwelling

In 1842, the Poor Law Commissioners presented their *Report on the Sanitary Condition of the Labouring Population*, which was prepared at Queen Victoria's request to inquire into the causes of diseases reported to be common amongst the working classes across Britain.¹ The Report was one among the many inquiries to attempt to understand the causes underlying the outbreaks of fatal diseases such as cholera and to develop measures to prevent them. Edited and summarized by Edwin Chadwick, the Report presented the evidence surveyors collected between 1839 and 1841: sanitary reports of commissioners, observations by medical officers and first-person inspections of working-class areas. By comparing different towns, neighbourhoods, social classes, workplaces and housing areas in terms of their mortality rates, the report concluded that these diseases were more commonly found in places of 'atmospheric impurities', aggravated by a lack of infrastructure, insufficient hygiene and insufficient ventilation.² Chadwick's report was a key document in placing the physical environment in a direct relationship with the social and the moral environments in the public discourse.³

In the early nineteenth century, London went through drastic geographic and demographic changes. With industrialization and the internal immigration of labourers from rural areas to town centres for employment, the population of London rose from 1.6 million in 1801 to three million in 1841.⁴ Such a steep increase in the population created new problems and aggravated the existing ones. One of the major problems

1. Edwin Chadwick, Report to Her Majesty's Principal Secretary of State for the Home Department from the Poor Law Commissioners, on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain (London: HMSO, 1842).

2. Chadwick, 4.

3. Mary Poovey sees the methods used in Chadwick's Report as 'technologies associated with the sanitary idea'. Mary Poovey, *Making a Social Body: British Cultural Formation, 1830-1864* (Chicago & London: University of Chicago Press, 1995), 115.

4. Helen C. Long, *Victorian Houses and Their Details: The Role of Publications in Their Building and Decoration* (Oxford: Architectural Press, 2002), 2.

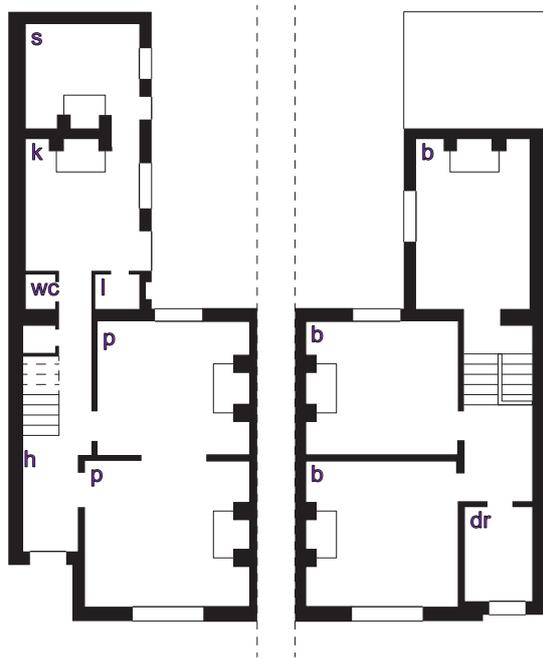


Figure 3.01—Ground and first floor plan of a third-rate terraced house.

h—hall, p—parlour, k—kitchen, l—larder, s—scullery, b—bedroom, dr—dressing room. Redrawn by author from *The Builder's Practical Director* (London: J Hagger, 1855), Plate 28.

to be solved was the housing provision for the working classes. With high land prices and little interest from the private sector in building affordable dwellings, the working classes faced a severe shortage of affordable housing, and many consequently lived in slums. The middle classes perceived the city to be congested and morally and physically contaminated and found a solution in moving to newly developing suburban areas, which made up most of today's inner London. The houses they vacated were taken over by artisans or subdivided and converted to working-class housing. The result was a geographically and demographically segregated London.⁵

The lower end of working-class dwellings, mostly in the East End, were slums – or rookeries, as they were called. These were often dilapidated, filthy, and badly ventilated houses with small rooms, each of which were occupied by single and multiple families and sharers.⁶ Some of them were subdivided from dwellings that the middle classes had vacated and were rented, often as a single room, others were converted from stables, and some others were erected densely in courts and backyards and were of cheap quality.⁷ Chadwick noted: 'immediately behind rows of the best-constructed houses in the fashionable districts of London are some of the worst dwellings, into which the working classes are crowded'.⁸ Harold James Dyos noted that there was no single definition for what was called a slum: the term was used for different social and

5. Richard Roger, *Housing in Urban Britain 1780-1914*, *New Studies in Economic and Social History* (Basingstoke: Macmillan, 1989), 1–3.

6. Harold James Dyos, 'The Slums of Victorian London', *Victorian Studies* 11, no. 1 (1967): 5–40.

7. Robin Evans, 'Rookeries and Model Dwellings: English Housing Reform and the Moralities of Private Space', in *Translations from Drawing to Building and Other Essays*, by Robin Evans (London: Architectural Association, 1997), 93–118.

8. Chadwick, *The Sanitary Condition of the Labouring Population*, 166.

political purposes, and was used in relation to 'neighbouring affluence', and 'what is intolerable or accepted by those living in or near them'.⁹ Slums stood in contrast to the townhouses in the affluent parts of central London, and highly regular and uniform terraced houses of the speculative builder in the suburbs. As Disraeli wrote, 'all those new districts that have sprung up within the last half-century [...] it is impossible to conceive anything more tame, more insipid, more uniform'.¹⁰

Behind the uniformity of middle-class residential areas were the strict regulations introduced in the Building Act of 1774 to prevent the spread of fire. In addition to specifying building materials and wall thicknesses, the Act classified residential buildings into four tax rates based on their ground floor area, frontage, number of floors and value to enable easy taxation and regulation.¹¹ However, it was the market that was responsible for the translation of these regulations and taxes to 'standard' building types. Neil Jackson highlights that the monotonous cityscape was mostly made up of third-rate houses. They offered 'the speculative builder the greatest economy, and the middle-class [house buyer] the greatest value'.¹² The third-rate house was defined as having a ground floor area of 350-500 ft² (32.5-46.5 m²) in the Act. However, it was usually built as 17-18 ft (5-5.5 m²) wide, 28-29 ft (8.5-9 m) deep, and in two to four storeys, with or without a cellar. The ground floor of these houses had two parlour rooms, with a storeroom and a water closet (in urban terraces with basements), or kitchen and scullery (in suburban terraces) at the back, a first-floor drawing room (only in townhouses), and two or three bedrooms per floor on other floors (Figure 3.01).¹³ Several factors contributed to the definition of the exact form of the third-rate house that was built repetitively and with different exterior façade treatments. First, the form and massing of houses, and to an extent, the Act, followed the earliest speculative housing developments of Georgian townhouses, such as those in Red Lion Square and Bedford Row.¹⁴ The cadastral division of London into narrow plots after the Great Fire of 1666 also contributed to the formulation of these types of houses and their use in other areas of the city. However, its institutionalization came about as a result of the availability of ready-made building materials and vocational publications such as construction manuals.¹⁵ Dyos notes:

Getting into this business was not a difficult feat. There was by the 1850s a technical press of great versatility which was supplying what amounted to a complete kit of

9. Dyos, 'The Slums of Victorian London', 9.

10. Benjamin Disraeli, *Tancred or, The New Crusade* (The Project Gutenberg, 2006).

11. A copy of the Act can be found in Kelly's *Practical Builder's Price Book, or Safe Guide to the Valuation of All Kinds of Artificer's Work: With the Modern Practice of Measuring, and a Copious Abstract of the New Building Act, for Regulating the Construction of Buildings* (Paternoster Row: Thomas Kelly, 1852), sec. A *Copious Abstract of the New Building Act*.

12. Neil Jackson, 'Views with a Room: Taxation and the Return of the Bay Window to the Third Rate Speculative Houses of Nineteenth-Century London', *Construction History* 8 (1992): 55-67.

13. *A Copious Abstract of the New Building Act, Schedule C Part II*.

14. Neil Jackson, *Built to Sell: The Third Rate Speculative House in London* (Architecture and Experience in the Nineteenth Century, St John's College, Oxford, 2016).

15. Harold James Dyos, 'The Speculative Builders and Developers of Victorian London', *Victorian Studies, Supplement: Symposium on the Victorian City* (2), 11 (1968): 641-90.

plans, designs, and bills of quantities for almost any beginner in suburban estate development.¹⁶

For instance, Peter Nicholson's *The Practical Builder and Workman's Companion* (1823) and others were widely used by builders and provided exact dimensions, layouts, and construction techniques for building third-rate houses.¹⁷

Chadwick's report was a view of the slums and rookeries from the perspective of the upper classes. As Mary Poovey notes, Chadwick 'simultaneously condemns members of the working class for failing to live up to middle-class standards [...] and suggests that the poor are [...] fundamentally different from those who write about them'.¹⁸ In Chadwick's report, the relative definition of slums was not limited to urban and architectural differences but also implied a social and moral judgment. In the countless observations he reported, sanitary issues, morality, and the physical environment were entangled. The definition of slums extended from infrastructure to household life. Infrastructural conditions, such as the lack of drainage, road pavement, and water supply, as well as the way people lives in their homes, were part of this definition.

However, these physical conditions and socio-moral conditions were understood to be co-constituted; inadequate housing conditions, especially overcrowding, fostered inadequate moral behaviour, and inadequate habits aggravated the sanitary problems. This relationship was the result of newly developing statistical knowledge. Numerous systematic observations and interviews were organised in relation to morbidity statistics.¹⁹ For instance, in correlating housing conditions to health conditions, Chadwick used morbidity statistics for different neighbourhoods and occupations (mostly as a reflection of social class). By comparing the mortality rates of people of different occupations in the same location, and people of the same occupations in different locations, he demonstrated that diseases were linked to social class. At the same time, by comparing the incidence of disease between men and women – who were 'most in the house [...] and] the most regular and temperate in [their] habits' – he demonstrated that diseases were linked to the home and not to the workplace.²⁰ By cross-referencing vital statistics with the observations on housing conditions, Chadwick concluded that a lack of either ventilation, sewage management or water supply, a lack of education and sanitary habits, overcrowding, and the mixing of different sexes in bedrooms correlated with the spread of contagious diseases.²¹

16. Dyos notes that from the early-nineteenth until the late-nineteenth century, most of the speculative housing was developed and built by small firms. Dyos, 650–52.

17. Peter Nicholson, *The New and Improved Practical Builder* (London: Thomas Kelly, 1837).

18. Poovey, *Making a Social Body*, 117.

19. The Statistical Society of London's journal, in its first issue, framed this newly emerging field as: '[...] neither discussed causes nor reasoned upon probable effects, but sought only to collect, arrange, and compare the class of facts which can alone form the basis of correct conclusions with respect to social and political government'. 'Introduction', *Journal of the Statistical Society of London* 1, no. 1 (1838): 1–5.

20. Chadwick, *The Sanitary Condition of the Labouring Population*, 165.

21. Chadwick, 279–87.

This co-constitutive relationship between ways of living that were considered to be immoral and dangerous to health and the physical conditions of housing placed housing at the centre of the solutions that were developed for disease prevention.²² The improvement of housing could resolve both public health problems and moral problems. This role assigned to the house, however, posed a fundamental problem: How could public health objectives, which required a direct state intervention in housing, be reconciled with the market economy and the management of private property, which had been inviolable since the seventeenth century?²³ Moreover, was it not the private sector that had failed to respond to the need for suitable working-class housing? Already recognizing this conflict in his report, Chadwick's conclusions were framed 'within the recognized province of public administration' and were therefore limited to infrastructural improvements.²⁴ Intervention in housing conditions could not be 'readily made the subject of legislation'; they were 'generally at a cost beyond any return to be expected' and left to the benevolence of the landlords and employers.²⁵ It was within this context that a group of capped-profit companies emerged, responding to two questions: How could investment models in the private sector help to provide affordable housing, and what constituted 'good' housing?²⁶

Model Dwellings

While the housing that model dwelling companies built was very limited, and most of them did not survive, the discussions that took place in the making of model dwellings had profound implications for the design of dwellings from the mid-nineteenth century onwards. One of the most influential among them was the

22. Consequently, housing and its infrastructural design were increasingly regulated by the government. The Public Health Act of 1848 gave local authorities the power to take action on drainage and water supply; the Nuisances Removal and Diseases Prevention Act of 1855 gave local authorities a duty to undertake sanitary inspections in properties containing nuisances; and the Sanitary Act of 1866 gave local authorities a duty to remove any nuisances and made overcrowding illegal and required all houses to be connected to the main sewerage system. The later Public Health Act of 1875 consolidated all previous health measures in relation to sewerage, drains and clean water supply. The act distributed the powers and duties related to the clean and healthy maintenance of houses to all parties – central government, local authorities, homeowners, and occupants. Such distribution was influential in the organisation of the government. Moreover, the central government, for the first time, intervened in housing by defining the first form of standards (all houses were required to have privy accommodation and the occupation of basements were limited) and by giving the local authorities the power to introduce by-laws regarding new buildings. By 1890, every urban authority could set by-laws regarding the planning of streets, the structure of houses for the prevention of fire, the distances between buildings with respect to the ventilation of houses and streets, and water closets.

23. Ursula Ruth Quixano Henriques, *Before the Welfare State: Social Administration in Early Industrial Britain, Themes in British Social History* (New York; London: Longman, 1979). For a discussion of the conflict between the preservation of private property and the free market, and the public health reforms and the restrictions they resulted in see: G Kearns, 'Private Property and Public Health Reform in England 1830-70.', *Social Science & Medicine* (1982), *Social Science & Medicine*, 26, no. 1 (1988): 187–99.

24. Chadwick, *The Sanitary Condition of the Labouring Population*, 369–72.

25. Chadwick, 233–36.

26. John Nelson Tarn, 'The Peabody Donation Fund: The Role of a Housing Society in the Nineteenth Century', *Victorian Studies*, 1966; John Nelson Tarn, 'The Housing Problem a Century Ago', *Urban Studies* 5, no. 3 (1968): 290–300; Richard Dennis, 'The Geography of Victorian Values: Philanthropic Housing in London, 1840–1900', *Journal of Historical Geography* 15, no. 1 (1989): 40–54; Roger, *Housing in Urban Britain 1780–1914*; Pamela K. Gilbert, *Mapping the Victorian Social Body*, 2004.

Metropolitan Association for Improving the Dwellings of the Industrious Classes founded between 1841 and 1845. The Association's stated aim was to provide 'comfortable, cleanly, and healthy habitation, at a less expense than is at present paid for very inferior and unhealthy accommodation, arising from want of ventilation, bad drainage, and the crowded state of apartments'.²⁷ With its focus on affordability, the Association implemented an exemplary investment return model, which capped dividends at four per cent. This economic model was followed in the succeeding years by different organisations and became known as 'five per cent philanthropy'.²⁸ Another such company was the Society for Improving the Condition of Labouring Classes, which was known as the Labourer's Friend Society until 1844. Even though the Labourer's Friend Society had built six pairs of cottages designed by William Bardwell for rural working-class families in Shooters Hill in Kent, its work was mostly confined to publications on themes concerning the 1834 Poor Law.²⁹ Moreover, the solution to the housing problem was not simply a matter of designing high-quality housing, but of designing affordable housing in urban centres. In 1844, the Society was re-established with a sole focus, the improvement of the housing conditions of the working-classes by 'arranging and executing plans as models', rather than providing housing for working-class families.³⁰ This entailed the design, construction, exhibition, and publication of model dwellings, which would set examples of good housing suitable for generations of working-class families.

The driving force behind the design and execution of the Society for Improving the Condition of Labouring Classes' housing projects, and of some of the Metropolitan Association for Improving the Dwellings of the Industrious Classes', was the architect Henry Roberts. Dedicating his career to the design of working-class dwellings, he also published and lectured frequently on how the model dwellings for the working-classes should be designed and built. In the lecture he delivered at the Royal Institute of British Architects in 1862, Roberts summarized 'the essentials of a healthy dwelling' in three points.³¹ The first of these referred to the locality, both in terms of the selection of the area where the housing should be built and the infrastructure that needed to be provided. Accordingly, a healthy dwelling should be built in a dry and well-ventilated area, on hard soil and facing south, and infrastructure for drainage and clean water were to be provided. The second referred to the structure and the design of housing. The structure should be designed to remain dry and warm and be

27. Metropolitan Association, *The Times*, January 17, 1845

28. John Nelson Tarn, *Five per cent Philanthropy: An account of housing in urban areas between 1840 and 1914* (Cambridge: Cambridge University Press, 1973); Susannah Morris, 'Market Solutions for Social Problems: Working-Class Housing in Nineteenth Century London', *The Economic History Review* 54, no. 3 (2001): 525–45.

29. For a description and drawings see: William Bardwell, *Healthy Homes and How to Make Them* (London: S.A. Gilbert, 1854). Also in: J.C. Loudon, *An Encyclopaedia of Cottage, Farm, and Villa Architecture and Furniture* (London: Longman, Brown, Green, and Longmans, 1846).

30. Labourers' Friend: For Disseminating Information on Allotments of Land, the Dwellings of the Poor, Loan Funds, Deferred Annuities, Benefit Societies, and Other Means of Improving the Condition of the Labouring Classes, June 1844, 1–2.

31. Henry Roberts, *The Essentials of a Healthy Dwelling, and the Extension of Its Benefits to the Labouring Population. with a Special Reference to the Promotion of That Object by HRH The Late Prince Consort* (London: J. Ridgway, 1862), 2–18.

well-lit and well-ventilated. To this end, Roberts referred mostly to the construction techniques, such as the construction of foundations, walls, and roofs, which would support the provision of essentials such as keeping the inhabitants dry and warm.³² But he also made remarks on the arrangement of the interiors, such as: 'the relative position of the doors and fireplaces, as well as of the windows and spaces for beds, which should be so contrived that the occupants will not be exposed to draughts'.³³ Most importantly, he underlined that 'the number and dimensions of the apartments [rooms] must be proportionate to the number of its occupants, and suitable provision must be made for all that appertains to a well-ordered domiciliary life'.³⁴ By this, Roberts referred to a minimum space and amenity standard:

A labourer's dwelling in the country should have a small entrance lobby, a living room not less than 150 feet in area, and a scullery of from 60 feet to 80 feet [5.5 m² to 7.5 m²] in area, in which there should be a stove or fireplace for use in summer, as well as a copper and sink; there should also be a small pantry. Above should be a parents' bedroom of not less than 100 feet area [9.3 m²], and two sleeping-rooms for the children averaging from 70 to 80 feet [6.5 m² to 7.5 m²] superficial each, with a distinct and independent access. Two of the sleeping-rooms at least should have fireplaces. There ought also to be a properly lighted, ventilated, and drained closet, as well as suitable enclosed receptacles for fuel and dust. The height of the rooms, in order to their being healthy, should be scarcely less than 8 feet [2.4 m], and even 9 feet [2.75 m] would be desirable but for the extra expense. With a view to ventilation, the windows should reach nearly to the ceiling, and the top be invariably made to open. In windows which have [transoms] as well as mullions, some of the upper compartments may be hung on centres for this purpose.³⁵

While for Roberts the size of a dwelling was of prime importance, a healthy dwelling required as much attention to the organization of the space. This is evident not only in his writings, such as the quote above but also in the designs he produced for the Society for Improving the Condition of Labouring Classes. Besides applying the sanitary 'essentials', he made 'arrangements which are calculated to promote the comfort and moral training of a well-ordered family'.³⁶ This remark also relates to his third point, that adequate sanitary housing could only be maintained by the promotion of hygiene amongst its residents.

Roberts' ideas on the type of housing suitable for the working classes were fully achieved in his design of a multiple-family terraced house for four families financed by Albert, Prince Consort, for the 1851 Great Exhibition (Figure 3.02.a). Roberts

32. It can also be understood as a general education, as Dyos illustrated, most of the cheapest speculative housing were of very low quality. Dyos, 'The Speculative Builders and Developers of Victorian London', 673–77.

33. Roberts, *The Essentials of a Healthy Dwelling*, 8.

34. Roberts, 6.

35. Roberts, 9.

36. Henry Roberts, *The Dwellings of the Labouring Classes, Their Arrangement and Construction, with the Essentials of a Healthy Dwelling* (London: The Society for Improving the Condition of Labouring Classes, 1867), 2.

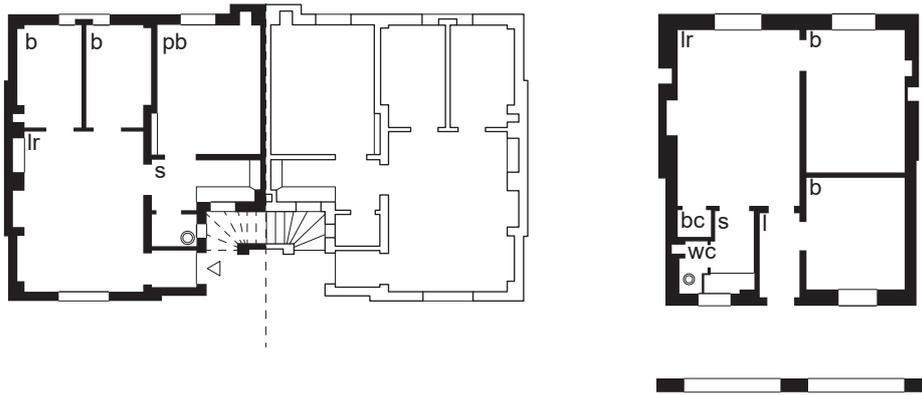


Figure 3.02—Dwellings designed by Henry Roberts.

(a) Floor plan of ground floor flat, Prince Albert's model houses for families (1851).

lr—living room (4.25 x 3.2 m), b—bedroom (1.5 x 2.75 m), s—scullery (1.2 m), pb—parents' bedroom (2.75 x 3.5 m).

Drawn by the author from Henry Roberts, *H. R. H. Prince Albert's Model Houses for Families* (London: The Society for Improving the Condition of Labouring Classes, 1851), 33.

(b) Typical floor plan of a unit, Streatham Street model houses for families.

l—lobby, b—bedroom, lr—living room, bc—bed closet, s—scullery.

Drawn by the author from Henry Roberts, *The Dwellings of the Labouring Classes, Their Arrangement and Construction, with the Essentials of a Healthy Dwelling* (London: The Society for Improving the Condition of Labouring Classes, 1867), 109.

tackled one of the most pressing questions, how to design multiple-family dwellings that would provide the necessary sanitary and moral conditions. Multiple-family dwellings were associated with slum conditions and were considered inappropriate. However, the traditional ideal of one family under a single roof also proved to be impossible in towns, as the cost of a dwelling was far beyond the means of the working classes. The Great Exhibition scheme consisted of four flats over two floors, accessed from an open central staircase gallery, which offered every family a private dwelling and reduced the possibility of conditions that would cause the spread of diseases. The four identical units were entered through a small lobby, which opened to the living room. The lobby was a buffer between the private space and common areas, and inside and outside, that kept the living room free from draughts. Each unit had three bedrooms, two of which were smaller in size (1.75 x 2.75 m) and designed for children of opposite sexes. Opening directly onto the living room, these rooms allowed parents to watch their children from the living room. The third bedroom was larger in size (2.75 x 3.50 m) and was designed for the parents. It was accessed from the scullery, where sanitary facilities such as clean water and the water closet were provided. This not only allowed the separation of parents from their children but also provided a room that could be isolated from the rest of the house in times of sickness.³⁷ As such, the well-ordered family was defined through the space of their home: a 'private family in both its external and internal relationships', organised with

³⁷ Henry Roberts, *H. R. H. Prince Albert's Model Houses for Families* (London: The Society for Improving the Condition of Labouring Classes, 1851), 8.

'the wall as the means of a general sequestration, the door to give specific structure to personal relationships'.³⁸

The model of housing that Henry Roberts imagined, one that was built to provide a sanitary environment and that was arranged to exercise moral training, did not prescribe a specific architectural form, but rather a set of spatial rules which could be applied to different circumstances. His and the Society's portfolio of housing, which included various types of accommodation, for families, single women, and single men, designed for different sites and with different footprint sizes and building heights, aimed to demonstrate this. By 1867, Henry Roberts' and the Society's model dwellings consisted of different types of housing: a housing scheme for 48 families at Streatham Street, a housing scheme for 23 families and 30 single women near Bagnigge Wells, a lodging house for 104 single men at George Street, a lodging house for 54 single men at Hatton Garden, and a model housing scheme for 20 families and 128 single women, including a public washhouse and baths.³⁹ In these designs for the Society, some of the aspects that had been carefully considered in the Great Exhibition scheme were eliminated. For instance, the flats provided at the housing scheme at Streatham Street consisted of two bedrooms, instead of the three that Roberts had argued for. This decision was driven on the one hand by the desire to accommodate the largest possible number of families in order to balance the increasing land costs, and on the other by the need to prevent families from admitting lodgers to a third bedroom.⁴⁰ Therefore, instead of a third bedroom, Roberts provided a bed closet in the living room for boys, to maintain the separation of sexes. The small bedroom, reserved for girls, could also be accessed from the lobby, as having only two bedrooms would prevent the admission of lodgers, albeit precluding the surveillance of children (Figure 3.02.b).

The question of working-class dwellings attracted increasing attention in the second half of the nineteenth century. However, the five per cent philanthropy model of the Society for Improving the Condition of Labouring Classes and Metropolitan Association for Improving the Dwellings of the Industrious Classes could not withstand the inflationary bubble and increasing land prices during the late 1850s. As a result, the only model by which the private sector had responded to the problem of working-class dwellings also proved unsustainable. The Peabody Donation Fund was established in 1862 against this background. With the endowment made by George Peabody, the Fund could develop a three per cent return model.⁴¹

The dwellings constructed by the Peabody Donation Fund established the type of housing that would be provided for the working classes until the early twentieth

38. Evans, 'Rookeries and Model Dwellings: English Housing Reform and the Moralities of Private Space', 109.

39. The Society for Improving the Condition of Labouring Classes, *Plans and Descriptions of Model Dwellings in London* (London: The Society for Improving the Condition of Labouring Classes, 1859).

40. Evans, 109.

41. Tarn, 'The Peabody Donation Fund: The Role of a Housing Society in the Nineteenth Century', 9.

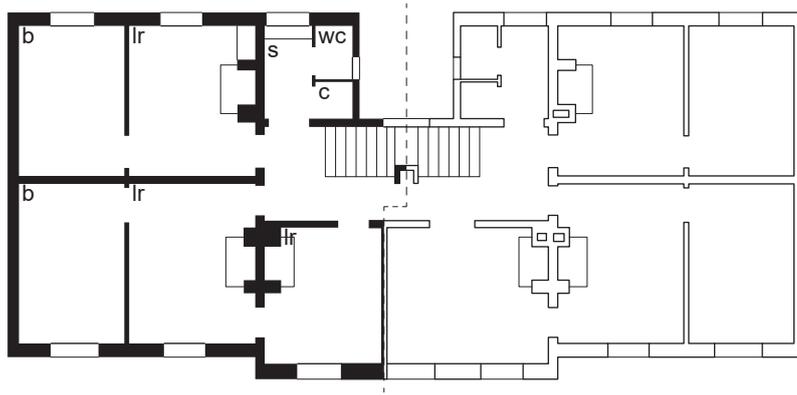


Figure 3.03—Typical floor plan of Peabody Square, Blackfriars Road (1871).

s—scullery, c—cupboard, lr—living room, b—bedroom.

Drawn by the author from 'Peabody-Square, Blackfriars-Road', *The Builder*, 13 Jan 1872.

century. They were provided in 'squares', detached building blocks arranged around a central open space, which allowed all floors to benefit from ventilation and sunlight. The main characteristic of this type of housing, designed by Henry Darbishire, was the provision of wet spaces outside the flats for the common use of all residents living on the same floor (Figure 3.03). The concentration of wet spaces required less plumbing, resulting in lower construction costs. Moreover, the positioning of wet spaces in a semi-public area outside the private space of the house provided easier inspection of the sanitary habits of the residents in a building.

In this way, Darbishire's dwellings differed fundamentally from Roberts' designs (cf. Figure 3.02). Underlying Henry Roberts' self-contained family dwellings was the assumption that providing an environment with adequate sanitary facilities, and with layout arrangements considered necessary for a well-ordered family, would foster physical and moral well-being. It is also worth noting that in a later publication in 1862, Henry Roberts provided a similar example entitled 'plan for dwellings in large towns adapted to families of the *lower-paid class* of working people', highlighting the cost impact of his self-contained dwellings.⁴² Darbishire's dwelling designs, however, did not assume that the provision of adequate spaces was sufficient to discipline working-class families into sanitary and morally appropriate habits. Instead, he designed an environment in which surveillance and inspection became a part. In a lecture at the Parkes Museum in 1884, Darbishire stated:

And as habits are not altered by mere change of dwelling, if the improvement offered by the dwelling is to be acceptable, the accommodation must, to a certain extent, harmonise with the requirements and habits of its occupant. [...] It will hardly do to accept as an axiom that every working man must have a self-contained tenement with a living-room, scullery, [washhouse], closet, and at least

⁴² Roberts, *The Essentials of a Healthy Dwelling*, plan for dwellings in large towns adapted to families of the lower-paid class of working people.

three bedrooms for himself, his elder children, and his babies. Those are luxuries which, were they at his disposal, would in many cases add nothing whatever to the real comforts of his life, unless he were first educated, through custom, to use them without abuse.⁴³

Moreover, his flats varied in size: single-room flats were provided for single men and two-, three-, and four-room flats were provided for families. The guiding principle in diversifying the type of dwellings offered was, first, to respond to the needs of a wider group of the working classes, and second to establish a system whereby a family could be accommodated in the same estate throughout their lives.⁴⁴ One might also argue that placing single men and women in an estate in which the majority of the accommodation is for families exposed single people to 'family values', an improvement on those they experienced in the lodging houses Chadwick and others had referred to as 'morally deformed'.

The Role of Publications

Philanthropist experiments that tackled multiple aspects of the question of good housing – urban form, density, building form, unit layout – laid the foundations for new expertise, the repercussions of which are omnipresent in our housing production today. This expertise was disseminated mainly through publications, one of the defining features of the Victorian era. From the end of the eighteenth century until 1835, more than six dozen books and manuals on housing design were published.⁴⁵ In addition to books, journals, price books, and trade catalogues were also commonly used among the professionals involved in building design and construction.⁴⁶ Most of this literature, however, was devoted to the construction of dwellings for the upper classes and dwellings by the speculative builder.⁴⁷ In his lecture for the Royal Institute of British Architects, Henry Roberts highlighted the lack of knowledge among architects with regard to working-class dwellings and positioned the role of his lecture and publications of the society as a source of this knowledge.⁴⁸ On the one hand, they disseminated knowledge about healthy dwellings that had been generated and the practical knowledge of construction, management, and construction economy that had been gained. The Society for Improving the Condition of Labouring Classes' publications included the architectural drawings of each of their buildings and supported them by publishing Roberts' lectures – in which he discussed these projects

43. Henri Darbshire, 'Artisans' and Labourers' Dwellings: The Buildings of the Peabody Trust', *The Builder*, 1884, 192.

44. Darbshire, 193.

45. Michael McMordie, 'Picturesque Pattern Books and Pre-Victorian Designers', *Architectural History* 18 (1975): 43–59.

46. Long, *Victorian Houses and Their Details: The Role of Publications in Their Building and Decoration*.

47. Loudon, *An Encyclopaedia of Cottage, Farm, and Villa Architecture and Furniture; The Builder's Practical Director* (London: J Hagger, 1855).

48. Roberts, *The Essentials of a Healthy Dwelling*, 20.

TABLE VI.—Mean Annual Death-Rate per 1,000 Inhabitants for Groups of Years.

	Seven Years 1874-80.	Five Years 1881-85.	Four Years 1886-89.
London	22·41	20·66	19·11
Peabody Buildings	20·53	18·59	18·79
Improved Industrial Dwellings	—	—	12·46*
Dwellings of Metropolitan Association	—	—	15·74

* No hospital deaths included.

Figure 3.04—Comparative mortality rates of London and model dwellings as shown in statistical publications. Arthur Newsholme, 'The Vital Statistics of Peabody Buildings and Other Artisans' and Labourers' Block Dwellings', *Journal of the Royal Statistical Society* 54, no. 1 (1891): 77, Table VI.

TABLE B—Contd.

Average Dimensions of Rooms, Dwellings on Flats.	Average Cubical Contents of Rooms.	Average Dimensions of Rooms, in Cottages.	Average Cubical Contents of Rooms.
<i>Four rooms and scullery—</i> ft. in. ft. in. Liv. 14 - x 10 3 B. 10 3 x 10 3 B. 10 3 x 10 3 B. 7 2 x 9 - Sc. 6 - x 9 - Height..... 8 6	ft. 4,013	<i>Five rooms and scullery—</i> ft. in. ft. in. Liv. 12 - x 11 - Kit. 14 - x 11 - B. 12 - x 11 - B. 7 8 x 11 - B. 9 - x 6 6 Sc. 11 - x 5 3 Height..... 8 -	ft. 4,950
<i>Three rooms and scullery—</i> ft. in. ft. in. Liv. 13 9 x 12 3 B. 11 - x 8 9 B. 11 - x 6 6 Sc. 6 - x 9 - Height..... 8 6	ft. 3,316	<i>Four rooms and scullery—</i> ft. in. ft. in. Liv. 12 - x 10 - B. 12 - x 10 - B. 12 - x 10 - Kit. 12 - x 10 - Sc. 10 - x 5 3 Height..... 8 -	ft. 4,260
<i>Two rooms and scullery—</i> ft. in. ft. in. Liv. 10 2 x 11 - B. 10 2 x 9 6 Sc. 5 - x 6 6 Height..... 8 6	ft. 2,048	<i>Three rooms and scullery—</i> ft. in. ft. in. Liv. 15 4 x 10 - B. 13 - x 9 - B. 7 - x 9 - Sc. 8 - x 10 - Lob. 7 - x 6 - Height..... 8 6	ft. 3,870
<i>One room and scullery—</i> ft. in. ft. in. Liv. 14 - x 10 - Sc. 5 6 x 7 - Height..... 8 -	ft. 1,428	<i>Two rooms and scullery—</i> ft. in. ft. in. Liv. 10 - x 13 6 B. 12 - x 9 - Sc. 10 3 x 9 - Height..... 8 6	ft. 2,849

Figure 3.05—Average dimensions of rooms in eight model blocks of flats and four model cottages. Charles Gatliff, 'On Improved Dwellings and Their Beneficial Effect on Health and Morals, with Suggestions for Their Extension', *Journal of the Statistical Society of London* 38, no. 1 (1875): 52, Appendix, Table B.

in terms of their arrangements, details, construction methods, and cost breakdowns.⁴⁹ On the other hand, these publications followed the canons of construction manuals; they were supplemented with alternative exterior treatments, layouts, typologies, and construction techniques adapted to different income levels, locations, budgets, and tastes.

Knowledge about dimensions constituted an essential part of this expertise. For instance, Roberts provided details of the floor areas of different rooms and the ceiling heights in all his publications. The dimensional data was, first, part of the practical knowledge he aimed to convey. Houses for the working classes required standards of space, a sanitary environment, and low building costs for the working classes to be able to afford them. These measurements reflected the experience Roberts had gained in balancing the two. For instance, he argued that 535 cubic feet (15.1 m³) of space per person was adequate to balance the economy of construction with the provision of good air quality.⁵⁰ With this in mind, he suggested that the living room should be not less than 140 ft² (13 m²) and the parents' bedroom should be not less than 100 ft² (9.3 m²), calculated in proportion to the number of people in the room.⁵¹ Moreover, these dimensions were essential to the purpose of 'moral training'; they were also calculated to prevent the rooms from being used in ways other than those which had been prescribed. For instance, he suggested that 60 to 70 ft² (5.5 to 6.5 m²) was 'of sufficient size for ordinary domestic purposes, without offering the temptation to its use as a living-room for the family'.⁵² In contrast, Darbishire advocated for moderately sized bedrooms of an equal size (13 x 9 ft, 4.0 x 2.75 m, 10.9 m²). He argued that dividing flats into smaller rooms would require more windows, and therefore provide better ventilation and daylight. Dust and dirt were also more noticeable in a smaller, well-lit room than a large room with a single window. Moreover, smaller rooms would force the tenants to use the space economically and to be tidy, thus inculcating new habits.⁵³

The second group of publications helped to promote these dwellings to a readership responsible for governing. These were articles measuring the efficacy of model dwellings that appeared in the *Journal of the Royal Statistical Society*. Following Chadwick's demonstration of the unsanitary and immoral conditions of the working-class dwellings with statistics, these articles measured the impact of these new designs

49. Henry Roberts, *H. R. H. Prince Albert's Model Houses for Families*; Henry Roberts, *Home Reform: Or, What the Working Classes May Do to Improve Their Dwellings* (London: The Society for Improving the Condition of the Labouring Classes, 1852); Henry Roberts, *The Dwellings of the Labouring Classes*; Henry Roberts, *The Essentials of a Healthy Dwelling*.

50. 'Observations made at the Model Lodging-house, in George-street, St. Giles's, a confined situation, satisfy me that the cubical space of 535 feet, which is provided in the dormitories of that building for each inmate, is, with proper ventilation, abundantly sufficient to render them healthy; such was proved to be the case, even when the cholera raged in the neighbourhood, and had not a single victim out of the 104 men who lodged within its walls'. Roberts, 11.

51. Roberts, 115.

52. Roberts, 21.

53. However, the dimensions of the bedrooms in his designs were 9 x 13 ft (2.75 x 4.00 m), larger than the parents' bedroom in Henry Roberts' designs.

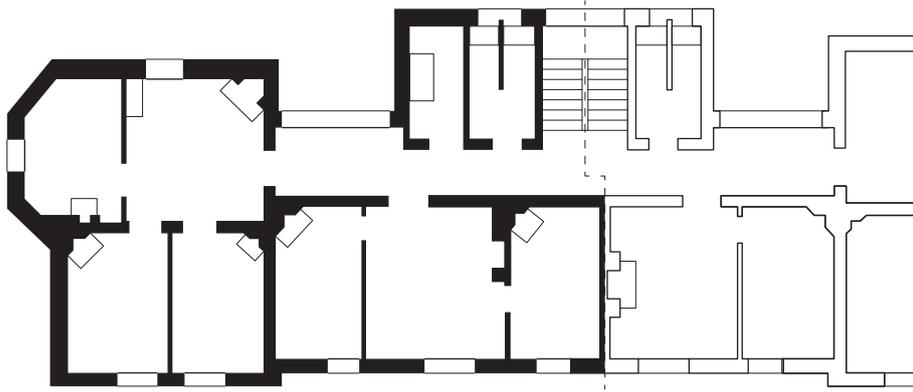


Figure 3.06—Typical floor plan of Boundary Estate of London County Council. Drawn by the author from C J Stewart, *The Housing Question in London: Being an Account of the Housing Work Done by the Metropolitan Board of Works and the London County Council, between the Years 1855 and 1900, with a Summary of the Acts of Parliament under Which They Have Worked* (London: London County Council, 1900).

and arrangements in terms of morbidity and mortality statistics (Figure 3.04). For instance, W H Sykes, in his statistical analysis of the working classes residing at the Metropolitan Buildings in St Pancras Square built by the Metropolitan Association for Improving the Dwellings of the Industrious Classes, compiled the numbers and causes of death between 1848 and 1849. By comparing these numbers to the statistics of London in general, Sykes demonstrated that no diseases threatening public health were encountered in the Metropolitan Buildings, which provided two-bedroom flats with sanitary provision arranged similarly to Roberts' designs.⁵⁴ In another article published in 1875, Charles Gatliff demonstrated the economic return of model dwellings. He constructed numerical tables showing the building costs, together with the size of the plot, the area covered by the building, the areas remaining for recreation and ventilation and the average dimensions of each type of room and flat (Figure 3.05). Despite having four times the density of other areas of London, the dwellings were healthier and provided better arrangements for recreation.⁵⁵

These statistical measurements were a reflection of the nineteenth-century interest in scientific facts and social laws. Could housing quality be measured? Was there a numerical value that could be established as a reference for housing quality? According to a report by William Farr, it was density: there was a positive relationship between the density of a residential area and its mortality rate.⁵⁶ According to this formula, model dwellings, with higher densities, should have resulted in higher mortality rates. However, the statistics collected in model dwellings showed that this was not the case and that mortality rates were in fact lower. Arthur Newsholme argued in 'The Vital

54. W H Sykes, 'Statistical Account of the Labouring Population Inhabiting the Buildings at St. Pancras, Erected by the Metropolitan Society for Improving the Dwellings of the Poor', *Journal of the Statistical Society of London* 13, no. 1 (1850): 46.

55. Charles Gatliff, 'On Improved Dwellings and Their Beneficial Effect on Health and Morals, with Suggestions for Their Extension', *Journal of the Statistical Society of London* 38, no. 1 (1875): 33–63.

56. 'Fifth Annual Report of the Registrar General of Births, Deaths, and Marriages, in England' (London: HMSO, 1843).

Statistics of Peabody Buildings and Other Artisans' and Labourers' Block Dwellings' that the number of rooms occupied by each family was a better indicator of sanitary provision. This meant that the density problems were irrelevant to the assessment of new housing models and that the individual flat was instead the point of reference. This corresponded broadly with the mathematical definition of overcrowding, which is still used to understand housing conditions to date.⁵⁷

These discussions had a wide influence. First of all, the design principles developed by philanthropic organizations became the model for the earliest public sector housing designs when the London County Council founded and given the duty of providing housing for the working classes at the end of the nineteenth century. The internal regulations set up by the London County Council's Working Classes Committee developed rules to be followed when designing housing. These included the following: staircases should not be placed at the centre of the plan: instead, they must be placed on the sides, to create large openings providing ventilation, every block of flats should be provided with a bathhouse and washhouse, every flat should have direct access to a sink and a water closet that are well ventilated, and every flat should contain at least one room with a minimum area of 144 ft² (13 m²), and other rooms should be 96 ft² (9 m²).⁵⁸ These sizes were the exact dimensions that Henry Roberts had recommended.

The Boundary Street Scheme (1900), later the Boundary Estate, was planned accordingly around a central open space in multiple blocks separated by large open areas (Figure 3.06). The blocks followed Darbishire's principles: they contained dwellings with one, two, three, and four rooms and provided water closets and sculleries in the corridors. While some residents shared sanitary facilities, others had their own. Union Buildings (1906) and the Ann Street scheme (1902) were organized as gallery-access flats, an arrangement that had been first demonstrated in Roberts' Great Exhibition scheme.⁵⁹

Cottages in Garden Cities

Philanthropists' efforts to achieving 'good' housing focused essentially on developing housing models that could provide basic sanitary facilities and support family life at a reasonable cost in central London, where the land was limited and expensive. However, the number of housing schemes developed to this principle was small. By the end of the century, most of the working-class housing was still provided

57. Arthur Newsholme, 'The Vital Statistics of Peabody Buildings and Other Artisans' and Labourers' Block Dwellings', *Journal of the Royal Statistical Society* 54, no. 1 (1891): 70–99.

58. I could not access the original document. However, a copy of the document can be found in Carroll D. Wright and E R L Gould, 'The Housing of the Working People' (Washington: Government Printing Office, 1895).

59. R. Vladimir Steffel, 'The Boundary Street Estate: An Example of Urban Redevelopment by the London County Council, 1889-1914', *The Town Planning Review* 47, no. 2 (1976): 161–73; London County Council, *Housing of the Working Classes in London* (London: London County Council, 1913), 63.

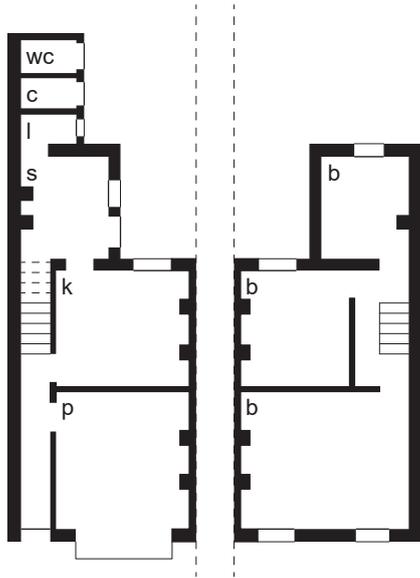


Figure 3.07—Byelaw terraced house. Drawn by the author based on the plan John Burnett, *A Social History of Housing: 1815-1970* (Newton Abbot: David & Charles, 1978), 162, Figure 10.

Burnett's original caption reads: 'Ultimate development of rear annexe projection; an example at Longford Coventry, 1911. Third bedroom reached off landing. Parlour 12ft x 11 ft (3.7 x 3.4m), Kitchen 11ft x 10ft (3.4 x 3.0m), Bedroom 1 14ft x 12 ft (4.3 x 3.7m), Bedroom 2 10ft x 9ft (3.0 x 2.7m), Bedroom 3 8ft 6in x 7ft 6in (2.6 x 2.3m). Drawing by C.G. Powell based on information in *The Houses of the Workers* by A. Sayle, published by Fisher, Unwin in 1928'.

by the private sector, in the form of housing conforming to the minimal urban and architectural requirements set by by-laws, creating vast, monotonous, high-density residential areas outside central London.⁶⁰ In the last two decades of the nineteenth century, a new planning approach that challenged the by-law urban and housing forms and sought an alternative based on the countryside and village, the garden city movement, gained momentum. In fact, some of the earliest developments of this type of housing were supported by the same philanthropists who were working on model dwellings.⁶¹

While this movement was 'a heterogeneous collection of different groups and interests', as Mark Swenarton explains, and entangled with ideas associated with the picturesque, the Arts and Crafts movement, practical socialism, social reform, factory towns, and others, they shared common ground in viewing the existing residential private-sector developments for the working classes in town centres and their immediate suburbs as inadequate.⁶² An influential advocate of low-density planning was Raymond Unwin, whose planning work on the earliest garden city designs, Letchworth Garden City (1903) and Hampstead Garden Suburb (1906), became a model for many housing developments built before and after World War I. In his

60. Roger, *Housing in Urban Britain 1780-1914*, 52–63; Dyos, 'The Speculative Builders and Developers of Victorian London'.

61. Individuals such as Octavia Hill and Henrietta Barnett, who were activists in the model dwellings movement, turned their attention away from the persistent problems of the inner city to become promoters of Hampstead Garden Suburb'. Morris, 'Market Solutions for Social Problems: Working-Class Housing in Nineteenth Century London', 55.

62. Mark Swenarton, *Homes Fit for Heroes: The Politics and Architecture of Early State Housing in Britain* (London: Heinemann Educational Books, 1981), 1–18.

extensive writings and lectures, Unwin developed practical principles of planning and design and these formed the basis for the first extensive official design guidance with the recommendations of the Tudor Walters Committee, which he was part of. Detailed in the pamphlet *Nothing Gained by Overcrowding* dated 1912, Unwin's planning approach was a reaction against the high density the speculative developer sought. To increase the number of houses, hence profit, terraced houses were laid out in parallel streets, with minimum road widths, backyards and house frontages, 'without any proper regard being shown for health, convenience or beauty in the arrangement of the town, without any effort to give that combination of building with open space which is necessary to secure adequate light and fresh air for health, adequate un-built-on ground for convenience, or adequate parks and gardens for the beauty of the city'.⁶³ Moreover, the question of affordability could not be solved in town centres where the issue of land availability was pressing. Unwin's argument was simple: it was possible to achieve lower costs comparable to high-density by-law developments in low-density developments by implementing careful planning – i.e. by decreasing the number of roads and organizing housing around central communal open spaces in places where road building was more costly than the land: the suburbs and the countryside.

However, the problem was not only planning but also the 'by-law house'. The plan of the by-law terraced house was a typical terraced house one, with a narrow frontage ranging from 3 to 5 m. It was two rooms deep, often with an additional projection at the back that allowed daylight to enter the back room. The two rooms on the ground floor were living rooms, and the two rooms on the first floor were bedrooms. Often there was an additional small room above the projection. The water closets were attached to the back projections (Figure 3.07).⁶⁴ In his earlier work, *Cottage Plans and Common Sense* (1902), Unwin had already detailed the problems of the by-law dwelling and the alternatives that must be sought. For Unwin, the by-law house 'with long projections running out behind' was nowhere close to the desired 'cottage all of our own, with its little garden, its healthy air, its clean kitchen, [parlour], and bedrooms'.⁶⁵ Minimizing building frontages to maximize the number of houses had resulted in deep plans that limited air circulation and sunlight. The interior layouts were organized in relation to the street with no respect to the orientation; the parlour was always facing the street, and the scullery was always placed in the small projection at the back. Moreover, the 'desire to imitate the middle-class house', such as having entrance halls and parlours, not only aggravated issues of light and air.⁶⁶ For instance, the division of the living room into front and back rooms unnecessarily also limited the use of space, the circulation of air, and the penetration of sunlight. Similarly, the corridor with the staircase at the entrance of a terraced house limited

63. Raymond Unwin, *Nothing Gained by Overcrowding! How the Garden City Type of Development May Benefit Both Owner and Occupier* (Westminster: Garden Cities & Town Planning Association, 1912), 1.

64. John Burnett, *A Social History of Housing: 1815-1970* (Newton Abbot: David & Charles, 1978), 139–83.

65. Raymond Unwin, *Cottage Plans and Common Sense*, Fabian Tract 109 (London: The Fabian Society, 1908).

66. Unwin, 13.

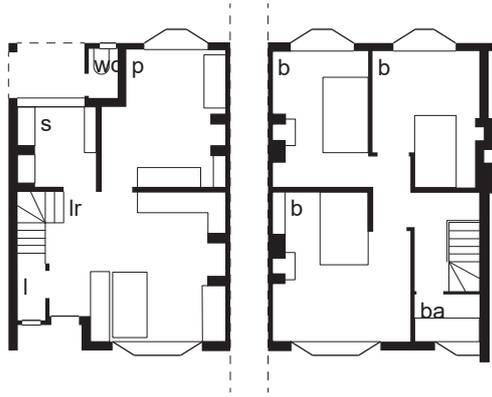


Figure 3.08—The artisan dwellings by Barry Parker and Raymond Unwin. lr—living room, l—larder, s—scullery, p—parlour, ba—bathroom, b—bedroom. Drawn by the author from Raymond Unwin, *Cottage Plans and Common Sense*, Fabian Tract 109 (London: The Fabian Society, 1908), 9, Plate VI.

circulation and created under-utilized spaces. Moreover, it had resulted in dwellings that did not suit the daily lives of their inhabitants. He argued that the parlour was not suitable for working-class dwellings, as it was used rarely and was difficult to heat and clean. Instead of the deep narrow plans, Unwin argued for wide, square plans, designed as semi-detached houses or arranged in short terraces. The artisan dwellings he proposed were 5 to 6 metres wide.⁶⁷ The examples he showed had no projections; instead, the scullery and the third bedroom were now placed in the main volume of the house. The ground floor was (ideally) divided into two main spaces: at the front, a living room running the full width of the cottage and including the staircase, and at the back a scullery with a larder, coal storage and water closet. However, despite his criticism, the parlour was going to remain as a common room until WWII. (Figure 3.08).

Unwin's ideas were influential. Between 1900 and 1914, several estates according to garden city principles had already been built by both the private and public sector in London.⁶⁸ These included four cottage estates, Totterdown Fields, Norbury, Old Oak, and White Hart Lane, built by the London County Council under Part III of the Building Act of 1890 that granted local authorities the right to build outside their constituencies.⁶⁹ In these, some of the planning principles described above, such as common green spaces, a grouping of terraced houses, albeit to varying extents, were adopted. For instance, in White Hart Lane most of the cottages had no projections at the back and had the scullery incorporated into the main plan. However, the house frontages and depths remained largely the same as those of the private developer – i.e. narrower than 5 m (Figure 3.09).

The widespread adoption of Unwin's design principles did not take place until after WWI. In 1919, the Local Government Board introduced state subsidies for post-war housing construction and published the *Manual on the Preparation of State-Aided Housing Schemes*, as a guide for subsidized housing construction after the war.⁷⁰ The

67. The example he gave and New Earswick was 19 feet. Unwin, 9.

68. 'Before the outbreak of the First World War more than fifty schemes 'on garden city lines' had been started in Britain and some 11000 houses completed. Swenarton, *Homes Fit for Heroes*, 23–24.

69. Council, *Housing of the Working Classes in London*, 65–84.

70. Local Government Board, *Manual on the Preparation of State-Aided Housing Schemes* (London: H M Stationery Office, 1919).

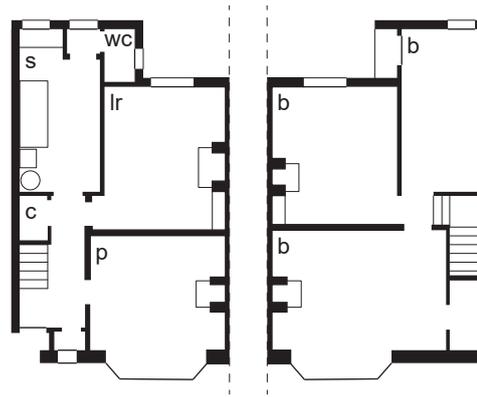


Figure 3.09—Typical five-roomed cottage plan in White Hart Lane estate by London County Council.
p—parlour, lr—living room, c—coals, s—scullery, b—bedroom.
Drawn by the author from London County Council, *Housing of the Working Classes in London* (London: London County Council, 1913), 137.

Manual was based on the suggestions of the Tudor Walters Committee, who prepared a report based on a large evidence base that included the expertise of people who were involved in the delivery of housing and the study of exemplary housing designs. However, the principles and standards it put forward largely belonged to Unwin, who was part of the Committee.⁷¹

The suggestions in the Tudor Walters Report were extensive: it proposed standards and principles for planning, housing design, and construction. The Report recommended that the new state-subsidized schemes should be low-density developments, and listed Unwin's earlier principles for street and building layouts. In terms of housing, the Report developed five housing types, all of which were two-storey three-bedroom houses and provided guidance on the selection of housing types for different locations and orientations. Summarizing and expanding on the comments Unwin had made earlier, the Report emphasized the issues of good design in terms of orientation, ventilation and sunlight, and the appropriate placing of windows and doors in rooms. The Report also paid great attention to the distribution of domestic activities in different rooms, their organisation, and the ways they were supposed to be used. In the models proposed, the two storeys divided day and night use, with the scullery, living room, and an optional parlour on the ground floor and three bedrooms on the upper floor. The ground floor further divided daily activities into different rooms, eliminating 'from the living room the dirty work and particularly the cooking of meals', providing a scullery for domestic chores, a separate bathroom, and a living room.⁷² It further commented on the organisation of rooms to prevent their congestion with activities other than the ones prescribed for them (Figure 3.10). For instance, it recommended that 'the scullery should be planned as a domestic workroom and its arrangement should not be such as to encourage its use as a living

71. 'We have held 26 meetings of the full Committee and have examined 71 witnesses. In addition to the meetings of the full Committee, Sub-Committees have met on 39 occasions, at which informal evidence has been given by 78 witnesses. The names of the witnesses will be found on pages 87 and 88. In addition to such evidence, we have obtained by letters valuable expert information from architects, contractors, engineers, surveyors, and others. Sub-Committees have visited a number of places for the purpose of inspecting various types of lay-outs and new methods of construction.' Parliamentary Papers, Report of the Committee appointed by the President of the Local Government Board and the Secretary for Scotland to consider questions of building construction in connection with the provision of dwellings for the working classes in England and Wales, and Scotland, and report upon methods of securing economy and despatch in the provision of such dwellings, 1918, Cd. 9191.4. Will be referred to as the Tudor Walters Report.

72. Tudor Walters Report, 25.

Figure 3.10— The typical plans proposed by Tudor Walters Committee.

lr—living room, l—larder, s—scullery, p—parlour, ba—bathroom, b—bedroom.

Drawn by the author from Tudor Walters Report, Illustration No. 18, 28, Illustration No.38, 43.



room'.⁷³ Furthermore, the manual adhered strictly to three-bedroom houses in order to prevent lodgers in a fourth room, and the mixing of children of opposite sexes in a single room.

With the *Manual on the Preparation of State-Aided Housing Schemes*, the 'desirable minimum sizes of rooms' derived from Unwin's earlier studies, i.e. his article published in 1905 and the report of the Advisory Committee on Rural Cottages in 1915, were introduced as a requirement for housing subsidies.⁷⁴ A living room of 180 ft² (16.7 m²), bedrooms of 150 ft² (13.9 m²), 100 ft² (9.3 m²), and 65 ft² (6 m²) was desirable for cottages without a parlour. Space standards, introduced for the first time in the *Manual on the Preparation of State-Aided Housing Schemes*, would remain as a key policy tool and be updated throughout the twentieth century. In fact, by 1921 the space standards and requirements for subsidized housing had already been relaxed, as the houses they produced were beyond the means of working-class families.⁷⁵

The type of housing the *Manual* advocated, with small spatial and dimensional modifications, became the blueprint for public and private dwellings built up to WWII. For instance, the standard floor plans the London County Council used from

73. Tudor Walters Report, 80.

74. Mark Swenarton argues that the layouts and space standards first appeared in Raymond Unwin, 'Cottage Building in Garden City', *The Garden City* 1, no. 5 (1906): 107–11. There is also the report provided by the Departmental Committee on Buildings for Small Holdings, in which these standards were further detailed as desirable minimum and absolute minimum. Swenarton, *Homes Fit for Heroes*, 43.

75. Swenarton, 112–35.



Figure 3.11—The typical five-room cottage estate plan used by the London County Council. lr—living room, p—parlour, s—scullery, p—parlour, ba—bathroom, b—bedroom. Drawn by the author from London County Council, *Housing: With Particular Reference to Post-War Housing Schemes*. (London: London County Council, 1928), 45, Type S1.

1925 onwards broadly followed these layouts (Figure 3.11).⁷⁶ When the *Manual* was reassessed in 1944 by the Dudley Committee, its impact on the shaping of residential spaces was evident: ‘The vast majority of the million dwellings built by local authorities between the wars were of the three-bedroom type, providing accommodation for five persons.’⁷⁷

However, the public sector was only partially responsible for the expanding three-bedroom semi-detached suburbs. Even though the *Manual on the Preparation of State-Aided Housing Schemes* did not target private developments, the speculative builder also adopted the semi-detached house as an alternative to the pre-war terraced house. Certainly, there were differences between the two sectors; the private sector provided more heterogeneous housing designs, especially in terms of exterior treatments and sizes.⁷⁸ Still, the layouts were similar: a front sitting room, a rear dining room and kitchen on the ground floor and three bedrooms on the first floor.⁷⁹ The relationship between the speculative semi-detached house and the official guidance has been debated. While some historians argue that the speculative

76. London County Council, *Housing: With Particular Reference to Post-War Housing Schemes*. (London: London County Council, 1928), 44–51.

77. *Design of Dwellings: Report of the Design of Dwelling Sub-Committee of the Central Housing Advisory Committee Appointed by the Minister of Health and Report of a Study Group of the Ministry of Town and Country Planning on Site Planning and Layout in Relation to Housing* (London: HMSO, 1944), 12.

78. Mark Swenarton, ‘Tudor Walters and Tudorbethan: Reassessing Britain’s Inter-War Suburbs’, *Planning Perspectives* 17, no. 3 (2002): 267–86; Deborah Sugg Ryan, ‘Living in a “Half-Baked Pageant”’, *Home Cultures* 8, no. 3 (2011): 217–44.

79. ‘Since [1919] there have been improvements in the equipment of new houses—particularly their bathrooms and kitchens—but their structure and the space allocated to them have changed comparatively little’. David Vernon Donnison, *Housing Policy Since the War* (Welwyn: Codicote Press, 1960), 10.

semi emerged independently, many authors point out the desirability of the higher qualities provided in subsidized housing.⁸⁰ With the amenities it provided, the semi-detached house gained popularity among the middle classes.⁸¹ Moreover, others note that subsidized housing programmes improved material supplies and the way construction logistics were arranged, enabling the private sector to produce housing in the ways the standards suggested.⁸² This adds to the discussion in the previous chapter: standards enter into relationships with the professional communities in many different ways.

Efficient and Functional Dwelling

At the turn of the twentieth century, when western European countries introduced state-sponsored dwellings, either by distributing loans and subsidies to private housebuilders or by establishing government institutions responsible for the delivery of housing, the same question – how to design and construct dwellings for the working-class – was reiterated across Europe.⁸³ In Germany, and more widely in continental Europe, sanitary, social, and moral concerns in housing design shifted to a set of new concerns. Paul Rabinow identifies this in *French Modern: Norms and Forms of the Social Environment* as a transformation in the rationale, from ‘techno-cosmopolitanism’, in which the specificity and locality of the people are recognized, e.g. the middle-class view of the poor and working classes as requiring hygiene and moral training in nineteenth-century Britain, to ‘middling modernism’ in which human needs and welfare are recognized as universal.⁸⁴ The concepts of functionality and efficiency articulated in the analytical models Alexander Klein and Ernst Neufert were part of the discourse that this new form of rationality opened up.⁸⁵ These concepts would be developed first in continental Europe, and later translated to British council housing. I will in the following first outline Klein’s and Neufert’s work and later discuss how these were translated into the planning of council housing.

After WWI, especially in Germany and Austria, architects sought a new architectural approach, that would break with the traditional forms of art and architecture that they did not associate with the post-war lifestyles and values characterised by ‘technological

80. Alison Ravetz argues that they were independently developed. Alison Ravetz, *Council Housing and Culture: The History of a Social Experiment* (London: Routledge, 2001), 90. Peter Scott argues that the ‘speculative developers followed them mainly on account of their popularity with purchasers. Peter Scott, *The Making of the Modern British Home: The Suburban Semi and Family Life Between the Wars* (Oxford: Oxford University Press, 2013), 5.

81. Deborah Sugg Ryan, *Ideal Homes* (Manchester: Manchester University Press, 2020).

82. C. M. H. Carr and J. W. R. Whitehand, *Twentieth-Century Suburbs: A Morphological Approach* (London: Taylor & Francis, 2001).

83. Nicholas Bullock and James Read, *The Movement for Housing Reform in Germany and France, 1840-1914* (Cambridge: Cambridge University Press, 2011).

84. Paul Rabinow, *French Modern: Norms and Forms of the Social Environment* (Chicago: University of Chicago Press, 1989), 277–358.

85. ‘socio-technical environment [regulated] by committed specialists dedicated to the public good’. Rabinow, 320.

advances and industrialization, urbanization and population explosions, the rise of bureaucracy and increasingly powerful national states, an enormous expansion of mass communication systems, democratization, and an expanding (capitalist) world market'.⁸⁶ Stripping it of all its historical and traditional ties left architecture in a position to be seen as a product. As Hannes Meyer in 1928 stated:

this functional, biological interpretation of architecture as giving shape to the functions of life, logically leads to pure construction: this world of constructive forms knows no native country. [...] pure construction is the basis and the characteristic of the new world of forms.⁸⁷

Industrial production and positivist thinking informed this view of architecture as a new ground upon which formal, material, aesthetic, and social values could be constructed. With Taylor's and Ford's contributions, industrial production was reconfigured as a new area of expertise with its analytical methods, principles, and values, such as the optimization of labour and the standardisation of products, as well as the tools and equipment used in production, and the design of interchangeable parts to increase efficiency.⁸⁸ To this end, German design professionals developed close relationships with industry and founded the Deutscher Werkbund to promote 'the idea of standardization as a virtue, and of abstract form as the basis of the aesthetics of product design'.⁸⁹ The formal language of this new architecture developed from this partnership. Materials made available by industry such as iron, steel, reinforced concrete, and glass were already being used for industrial buildings for practical reasons, such as to create larger spans and allow daylight. They often dictated certain forms and were not open to interpretation. These appealed to the new generation of architects as a source to develop their formal language; raw materials, simplified cubic masses, and lack of ornamentation defined this new architecture.

Moreover, German design professionals also established close relationships with the logical positivists of the Vienna Circle. This strengthened not only their scientific and methodical position, but also the broad cultural, social, and political role they assumed.⁹⁰ Architects advocated the use of analytical methods to rationalize construction and architectural design, and the division of labour and specialization. They identified themselves as experts of a different type of management:

the new house is a prefabricated building for site assembly; as such it is an industrial product and the work of a variety of specialists: economists, statisticians, hygienists,

⁸⁶ Hilde Heynen, *Architecture and Modernity: A Critique* (Cambridge: The MIT Press, 1999), 10.

⁸⁷ Hannes Meyer, 'Building (1928)', in *Programs and Manifestoes on 20th-Century Architecture*, ed. Ulrich Conrads (Cambridge: The MIT Press, 1971), 117–20.

⁸⁸ Mauro F. Guillén, *The Taylorized Beauty of the Mechanical: Scientific Management and the Rise of Modernist Architecture* (Princeton; Oxford: Princeton University Press, 2008), 1–7.

⁸⁹ Reyner Banham, *Theory and Design in the First Machine Age* (New York, Washington, DC: Praeger, 1970).

⁹⁰ Peter Galison, 'Aufbau/Bauhaus: Logical Positivism and Architectural Modernism', *Critical Inquiry* 16, no. 4 (1990): 709–52.

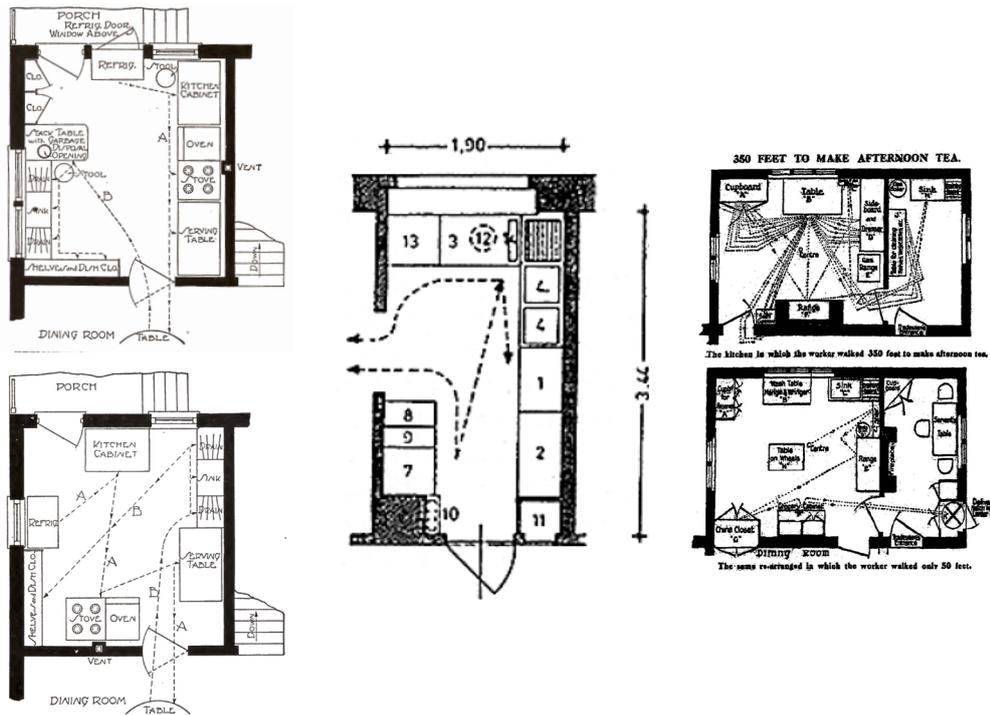


Figure 3.12—Scientific management in the kitchen and Frankfurt Kitchen.

(a) Diagrams showing efficiently and badly grouped kitchen furniture. From Christine Frederick, *Household Engineering: Scientific Management in the Home* (Chicago: American School of Home Economics, 1923), 22–23.

(b) Frankfurt Kitchen. From Joachim Krause: Die Frankfurter Küche in Michael Andritzky (ed) *Oikos, von der Feuerstelle zur Mikrowelle. Haushalt und Wohnen im Wandel* (Gießen: Anabas-Verlag Günter Kampf, 1992), 104.

(c) Application of scientific homemaking to British homes. 'Steps to make afternoon tea', *Daily Mail*, 16 August 1919.

climatologists, industrial engineers, standardization experts, heating engineers ... and the architect?... he was an artist and now becomes a specialist in organization!⁹¹

Clearly aligned with the ideologies of the liberal and left-wing governments in power in Germany, the new architecture gained strong support. However, it was slow in making its way to Britain. In particular, the architectural style these ideas produced was not perceived as appropriate to the British climate and culture.⁹² Other ideas essential to it, such as scientific management, efficiency and functionalism, however, were being promoted as early as 1919, but their impact on housing design was limited.⁹³ It was only after WWII that these ideas were implemented thoroughly in Britain. While design standardization in the interwar period in Britain will be discussed in the next section, an understanding of the general principles that were fully incorporated into design processes in the aftermath of WWII, and are still inherent to design processes today, is useful for this discussion.

91. Meyer, 'Building (1928)'.

92. Ryan, *Ideal Homes*, 82–134.

93. Guillén, *Taylorized Beauty*, 45–110.

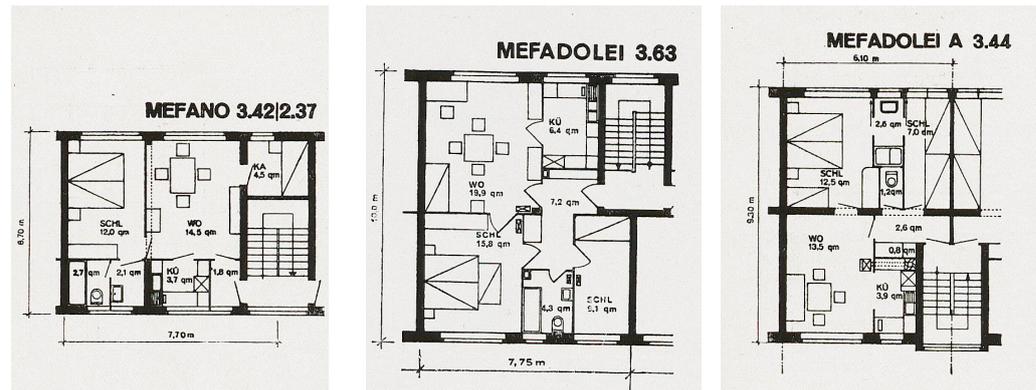


Figure 3.13—Typical multifamily housing unit plans in Frankfurt. From Ernst May, 'Fünf Jahre Wohnungsbautätigkeit In Frankfurt Am Main', *Das Neue Frankfurt: Internationale Monatsschrift Für Die Probleme Kultureller Neugestaltung* 4, no. 2–3 (1930): 38–39, <https://doi.org/10.11588/digit.17292.14>

In Germany, public housing, an area the new government paid increased attention to, constituted the central space in which the objectivity of this new architecture unfolded. First, against the backdrop of a housing shortage that had developed during and after the war, the architects' technocratic approach offered a pragmatic and effective solution. Housing blocks could be rationally planned, standardised, and constructed with prefabricated elements in a shorter period and at higher capacities. Between 1925 and 1933, Ernst May, who was an architect and the head of the central building authority in Frankfurt, could deliver around 15,000 housing units by utilizing standardized housing blocks and units, as well as an industrially produced precast concrete slab construction system.⁹⁴ Second, scientific management and industrial methods promised better living spaces. The principles of this new housing, to a substantial extent, re-articulated the elements of housing quality defined in the mid-to the late nineteenth century in Britain and other European countries.⁹⁵ In the special double-issue edition of *Das Neue Frankfurt*, Ernst May listed the principles of Frankfurt houses as the maximization of daylight, the inclusion of a separate principal living room and a separate kitchen, the separation of children of opposite sexes and the parents to different bedrooms, the assignment of two- and three-bedroom flats as the most suitable housing typology for the working classes, and the provision of sanitary facilities and storage. However, it also included a new approach to housing quality, the rationalisation of space in relation to daily movements: 'The arrangement of the rooms in relation to one another is such that the housekeeping can be done with a minimum of effort, as unnecessary routes are avoided, and the most important parts of the apartment can be designed as thoroughly as possible'.⁹⁶ This principle referred, to a large extent, to the Frankfurt kitchen included in every dwelling (Figure 3.12). The Frankfurt kitchen that was developed in the early 1920s by Margarete

94. Barbara Miller Lane, *Architecture and Politics in Germany, 1918-1945* (Cambridge; London: Harvard University Press, 1985), 102.

95. Bullock and Read, *The Movement for Housing Reform in Germany and France, 1840-1914*.

96. Author's translation. Ernst May, 'Fünf Jahre Wohnungsbautätigkeit In Frankfurt Am Main', *Das Neue Frankfurt: Internationale Monatsschrift Für Die Probleme Kultureller Neugestaltung* 4, no. 2–3 (1930): 38–39.

Lihotzky (later Margarete Schütte-Lihotzky), was the earliest and most canonical example of the translation of standardisation and the scientific management methods to the domestic realm.⁹⁷

However, the ambitious solutions that the architects proposed, despite their interest in the economy of the dwelling, surpassed the budgets the governments had allocated. The type of housing they advocated was not economically viable to resolve the housing shortage. The residents of the first housing estates in Frankfurt 'were highly-paid skilled labourers, lower white-collar workers, and minor city officials', and the families in the most vulnerable conditions could not afford to apply for dwellings in the new housing developments.⁹⁸ May's response was to include several small dwellings, *Kleinstwohnungen*, designed for moderate-income workers. While a three-bedroom single-family terraced house was around 75 m² and a two-bedroom one was 55 m², the size of these small dwellings averaged 41 m² (Figure 3.13). May achieved his small dwellings by implementing different strategies: by combining living rooms with bedrooms, by reducing circulation areas to a minimum and opening rooms to each other, and by introducing the Frankfurt kitchen, movable furniture and built-in storage.

It was within this context that the size of a dwelling, or more precisely, the smallest a dwelling could be, became one of the most debated architectural issues of the early twentieth century. For instance, in 1929, the Congrès Internationaux d'Architecture Moderne (CIAM), an organisation formed of prominent architects from different European countries, devoted its second meeting to the question of *Die Wohnung für das Existenzminimum*, or the dwelling for minimum existence, asking to what extent the size and amenities of housing could be minimized for workers on a basic wage. The meeting aimed to establish a minimum housing quality that needed to be preserved, even if it exceeded the budgets the governments had allocated.⁹⁹

However, it was Alexander Klein who developed the most systematic housing design methodology for subsidized small dwellings, and a set of design evaluation methods. Even though Klein's work was very little discussed in the literature of functional modernism, his graphic evaluation systems became the symbol of functional planning.¹⁰⁰ The economic difficulties faced in subsidized housing was the basis of Klein's discussion of housing design. In one of his earliest articles, Klein

97. Catherine Bauer, *Modern Housing* (Boston; New York: Houghton Mifflin Company, 1934); Nicholas Bullock, 'First the Kitchen Then the Facade', *Journal of Design History* 1, no. 3/4 (1988); Sophie Hochhaeusl, 'From Vienna to Frankfurt Inside Core-House Type 7: A History of Scarcity through the Modern Kitchen', *Architectural Histories* 1, no. 1 (2013): Art. 24.

98. Susan R Henderson, 'Rationalization Takes Command: Zeilenbau and the Politics of CIAM', in *Building Culture: Ernst May and the Frankfurt Initiative, 1926-1931*, by Susan R Henderson (Bern, Frankfurt, London, New York: Peter Lang, 2013), 399.

99. For papers delivered at the conference see: Carlo Aymonino, ed., *L'Abitazione Rationale: Atti Dei Congressi CIAM 1929-1930* (Padova: Marsilio Editori, 1971).

100. The most comprehensive writing on Klein in English is by: Christoph Lueder, 'Evaluator, Choreographer, Ideologue, Catalyst: The Disparate Reception Histories of Alexander Klein's Graphical Method', *Journal of the Society of Architectural Historians* 76, no. 1 (2017): 82-106.

suggested that the rental housing sector, at the time, with its subsidy system, design requirements, and the central role given to developers, resulted in dwellings that were inadequately designed and prioritizing the maximization of profit, creating i.e. as many small flats and bed spaces as possible. This problem persisted even if architects were employed, as they did not have the practical knowledge of the design of small flats. Aligned with the debates and problems of the time, the housing question, for Klein, was both a technical and a cultural question. On the one hand, good housing practice was a matter of the rational planning of housing types and maximizing the use of the technical and scientific knowledge available. On the other hand, it was not possible to achieve a technically and scientifically informed housing design without cultural support; the development of new dwelling types had to involve the development of a new culture of dwelling, *Wohnkultur*.¹⁰¹

Wohnkultur was an ongoing theme in the discussions of housing. The new *Wohnkultur* referred to the organization of a new family lifestyle around rational planning of activities, rethinking the spatial design and the design, selection, and arrangement of furniture and equipment that supported this daily life. Citing Bruno Taut's book *Die neue Wohnung: Die Frau als Schöpferin* (The New Dwelling: The Woman as Creator), Klein argued for the simplification of life through the rational arrangement of rooms and furniture.¹⁰² However, this simplification was gendered. While women were increasingly participating in the industrial economy, homemaking also remained their job. The simplification of domestic work, planning it rationally and turning the home into a 'professional workplace', would ease the burden on women and increase their health and wellbeing. The new culture of dwelling referred to this aspiration and made modernist housing widely desirable.¹⁰³

In 1927, Klein published a diagrammatic methodology for rethinking the design of flats.¹⁰⁴ Klein's methodology consisted of twenty steps, starting with the identification of the environmental and social contexts, collecting statistical data on housing needs, and understanding scientific studies that pertain to housing, e.g. hygiene, psychology, physiology, pedagogy, aesthetics, and social ethics. The essential step in his method was the definition of a number of general principles, against which every design could be evaluated. First, flats should be low cost and affordable; they should provide the maximum number of bed spaces in the minimum possible floor area and utilize simpler construction systems and installations. Second, flats should be healthy; they should have adequate orientation, sufficient lighting, cross-ventilation, bathrooms, and toilets. Third, flats should be functional. Functionality, for Klein, meant planning the dwelling in a way that corresponded to the new kind of family life that was intended

101. Alexander Klein, 'Tagesfragen Der Berliner Wohnungswirtschaft', *Staedtebau*, 1926, 90–104.

102. Klein, 92–93.. For a discussion on *Wohnkultur*: Bullock, 'First the Kitchen Then the Facade'.

103. Susan R. Henderson, *The New Woman's Home*, excerpt from *Building Culture: Ernst May and the New Frankfurt Initiative, 1926-1931* (Bern, Frankfurt, London, New York: Peter Lang, 2013). Also see Christine Frederick, *The New Housekeeping: Efficiency Studies in Home Management* (Garden City: Doubleday, Page & Company, 1914).

104. Alexander Klein, 'Versuch Eines Graphischen Verfahrens Zur Bewertung von Kleinwohnungen', *Wasmuths Monatshefte Für Baukunst* 11 (1927): 296–98.

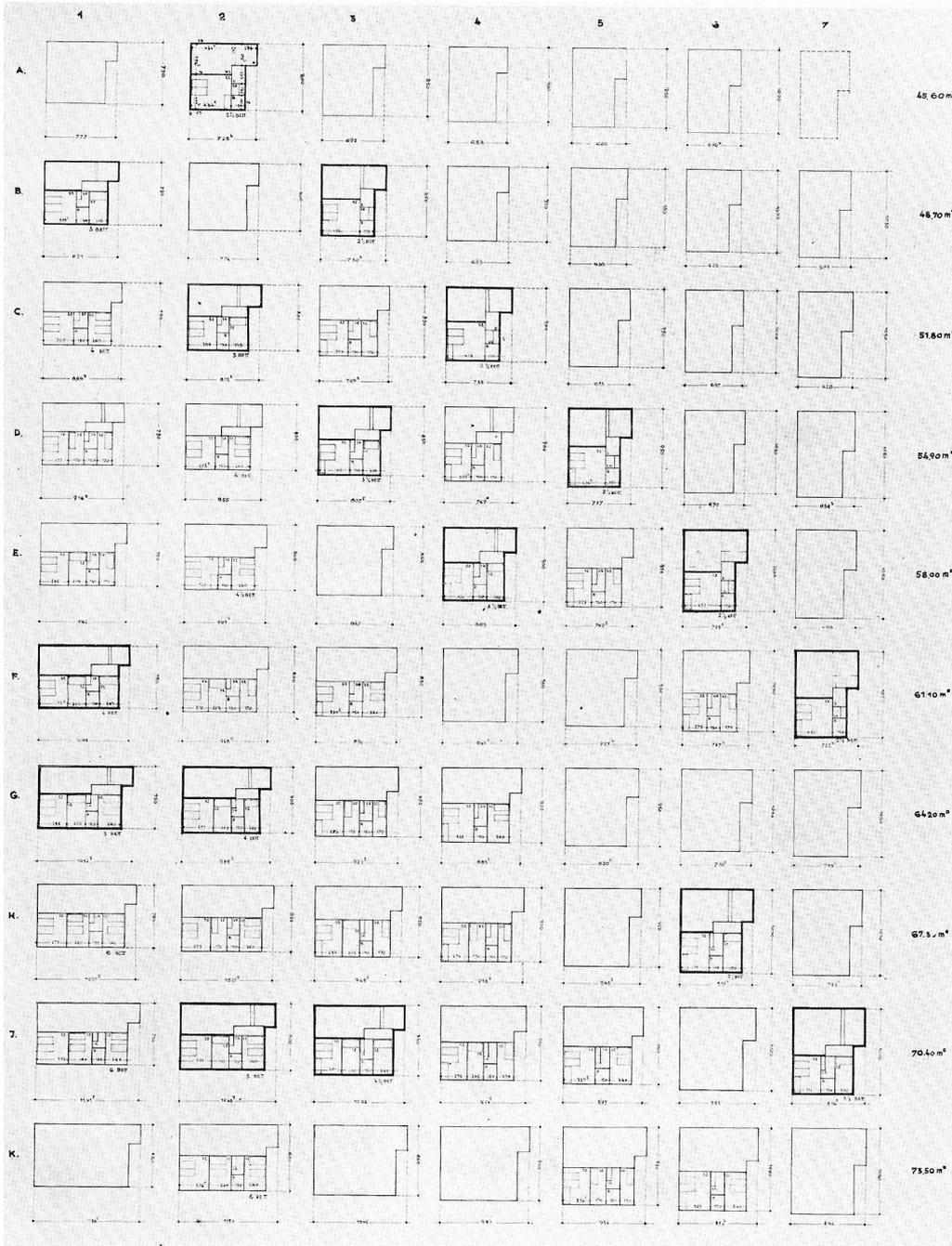


Figure 3.14—Comparative matrix of flat sizes in relation to depth and usable floor area. From Alexander Klein, 'Beiträge Zur Wohnungsfrage Als Praktische Wissenschaft', *Zeitschrift Für Bauwesen*, no. 10 (1930):248.

to be fostered. For instance, flats should have a sufficient number of bedrooms for every member of the household, the parents' and children's bedrooms and the boys' and girls' bedrooms should be separate but grouped together, the flat should have a living room that was separated from the kitchen but grouped together. No room should be accessible only by passing through another room. Fourth, flats should be comfortable, they should have sufficient size, shape, openings, and wall space for their function, and their connections should be clear.

Some of the principles relating to construction and health could be defined in relation to scientific calculations and engineering. For instance, in his article published in *Zeitschrift für Bauwesen* titled 'Beiträge zur Wohnungsfrage als praktische Wissenschaft' (Contributions to the Housing Question as Practical Knowledge), Klein systematically worked out the dimensions of a flat optimized for the maximum number of bed spaces, construction costs, and the depth of the rooms, by constructing a matrix of dwelling designs in terms of their frontage, depth, total floor area, and orientation.¹⁰⁵ He concluded that the requirements of quality (proportional and well-lit rooms) and economy (the same number of bed spaces) can also be met in small dwellings as long as the depth and frontage of the plans follow a certain ratio. This also meant that the floor area was not the most important factor in dwelling design. Rather, it was the organization of the plan that mattered. However, concepts relating to the organization of floor plans, such as 'clarity, economy, spatial form, spatial sequence', were less amenable to calculation. This was the challenge Klein undertook in developing his graphical evaluation method (Figure 3.14):

In the assessment of apartment floor plans that have been customary up to now, be it in competitions, drafts or completed buildings, a number of technical terms such as clarity, economy, spatial form, spatial sequence, traffic routes, space utilization, overall impression, etc. are used repetitively. The quality and value of a floor plan depends on these terms. Most of these terms, however, are rated positively by some and negatively by others, and most laypeople and experts tend to ascribe many of these terms only subjective meanings. It is even difficult to find two experts that judge these terms in the same way, as a universal and objective evaluation has been so far difficult.¹⁰⁶

In establishing an objective graphical evaluation of the organization of the dwelling plan, Klein focused on four primary criteria: 1) the general arrangement of circulation, 2) the organization of furniture and movement, 3) room to room formal relationships, and 4) the height and number of items of furniture. Even though he confirmed that ceiling height, materials, and artificial lighting influence the overall quality of a dwelling, he did not consider them as part of the analysis as they could easily be changed.¹⁰⁷ The graphical method for the analysis of the general arrangement

105. Alexander Klein, 'Beiträge Zur Wohnungsfrage Als Praktische Wissenschaft', *Zeitschrift Für Bauwesen*, no. 10 (1930): 239–52.

106. Author's translation. Klein, 'Bewertung von Kleinwohnungen', 296.

107. Alexander Klein, 'Neues Verfahren Zur Untersuchung Von Kleinwohnungs-Grundrissen', *Städtebau* 23 (1928): 16.

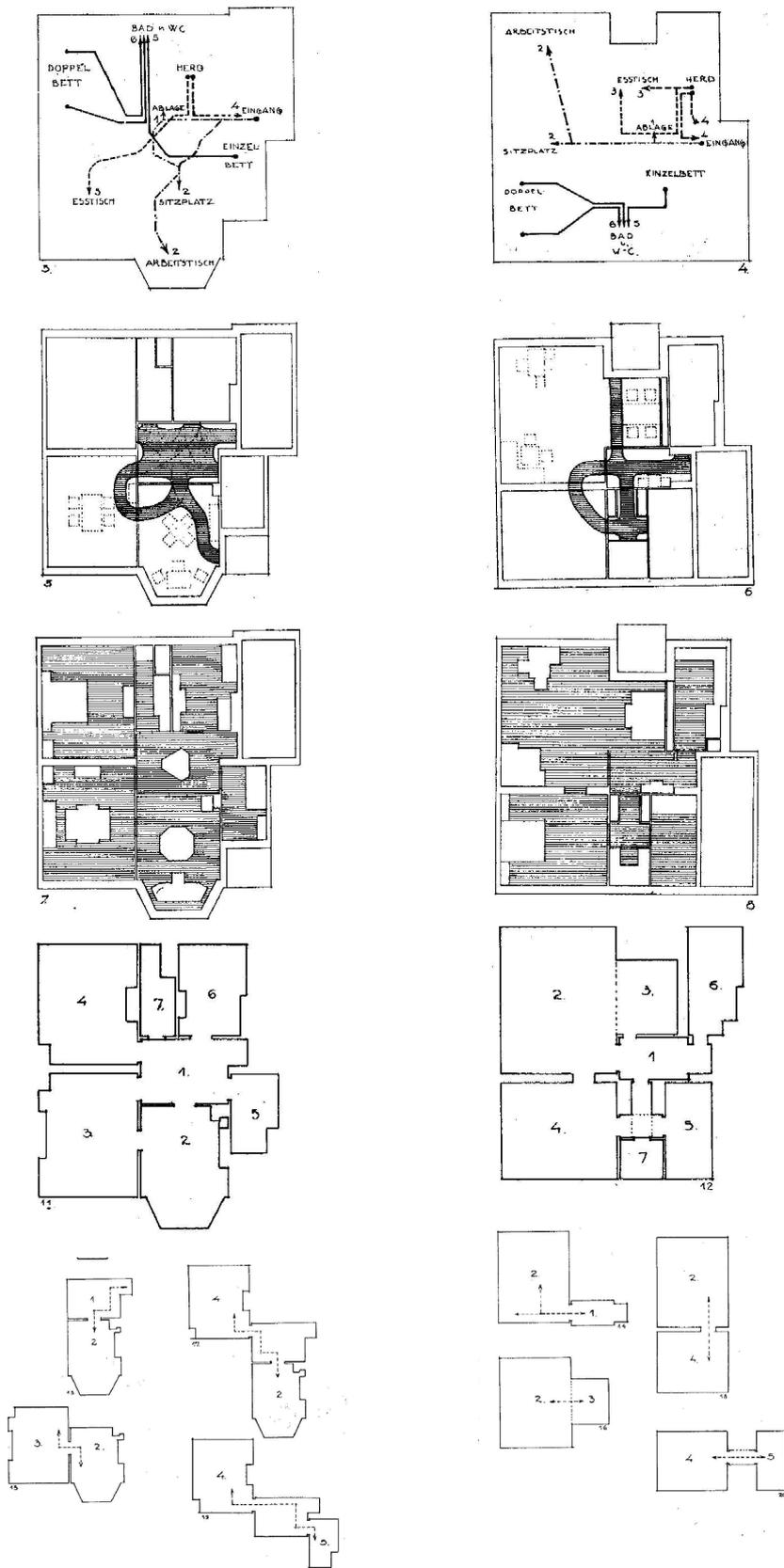


Figure 3.15—Alexander Klein's graphic evaluation method. From Alexander Klein, 'Neues Verfahren Zur Untersuchung Von Kleinwohnungs-Grundrissen', *Städtebau* 23 (1928): 16–21.

of the circulation consisted of lines showing the paths required to move between the centres of one room and another. Whereas the typical floor plan of a newly built dwelling in Berlin he used as a 'bad' example had intersecting and relatively long lines between 1) cooking and eating, 2) living and resting, and 3) sleeping and washing, his counterproposal had no intersecting lines. The groups of functional spaces were organized in close proximity to each other around a clear circulation space. A good design reduced the physical effort required for housekeeping and the routine activities of the new dwelling culture.

While this general view gave a good idea of the arrangement of rooms, for Klein the relationships between functional space groups required more precision and formal character. Supplementing this method, he analysed pairs of rooms with their outlines and the circulation lines drawn between them. This method helped clarify formal room to room relationships such as their sequence, formal differentiation, and spatial hierarchy. Another criterion that distinguished a good floor plan was the organization of furniture and movement. Klein argued that a good plan should have movement areas, i.e. areas that are not occupied by essential furniture, concentrated in order to make the rooms spacious and allow for additional furniture. By using a simple figure-ground analysis, Klein illustrated that a good plan should allow the arrangement of furniture along the walls, leaving a concentrated and compact free space. Moreover, he suggested that low furniture must be used throughout to make the rooms more spacious and prevent them from casting shadows (Figure 3.15).¹⁰⁸

Certainly, the use of diagrammatic studies of scientific management was not novel. It was most famously applied to the kitchen and homemaking in the works of Christine Frederick and Margarete Schütte-Lihotzky.¹⁰⁹ However, Klein's method differed from its predecessors in that it regarded the dwelling unit as the point of reference on both the smaller scale, e.g. rooms and furniture, and the larger scale, e.g. building morphologies, of housing design. Even his dimensional studies were conducted at the scale of the dwelling unit and not at the scale of the room. While Klein's conceptualization of a good dwelling was centred around a set of functional design principles for the housing unit, it was still far from fully exploiting the industrial production principles, including industrial standardization, that functional modernism had been advocating. Moreover, Klein's methodology was too focused on the organization of the layout and did not provide the precise size and dimensions of the room that directly influenced cost. Bridging this gap, if not overriding Klein's principles, was Ernst Neufert, who published the first edition of his *Bauentwurfslehre* (*Architects' Data*) in 1936, which remains one of the most influential reference books for architects.¹¹⁰

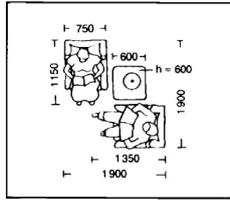
108. Klein, 17–21..

109. Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America* (Cambridge, MA: MIT Press, 2002); Paul Emmons and Andreea Mihalache, 'Architectural Handbooks and the User Experience', in *Use Matters: An Alternative History of Architecture*, ed. Kenny Cupers (Oxon: Routledge, 2013), 35–50.

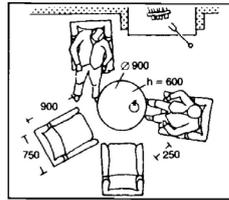
110. Ernst Neufert and Peter Neufert, *Architects' Data*, trans. David Sturge, 4th ed. (Chichester: Wiley-Blackwell, 2012).

PUBLIC ROOMS

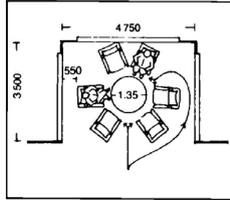
Living rooms



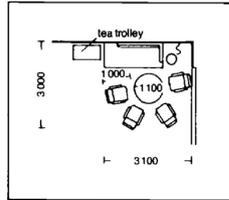
1 Comfortable low easy chairs beside table or standard lamp



2 Table in front of fireplace off centre to allow access to fire

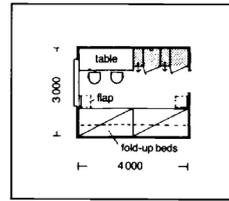


3 Easy chairs 350 h & table 600 h for taking tea in alcove

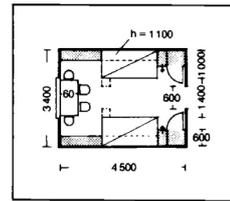


4 Seating group with settee: easy chair 380 h, table 600 h

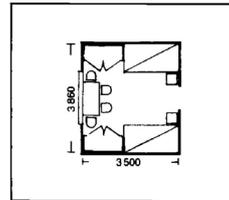
Guest & children's rooms



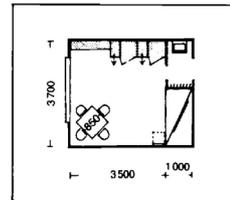
11 Narrow rm for guests or 2 teenage children, with joint work table, separate wa, fold-up beds



12 Similar rm to 11 with fold-up beds & built-in cpd but wider: can be separate work tables on either side of window



13 Short rm with cpd 1500 h & fixed beds, primarily guest rm



14 Large rm with bunk beds in recess, large free ar, & hb & coat hooks near door

Figure 3.16—Drawings from *Architect's Data*. From Ernst Neufert, *Architects' Data*, ed. Vincent Jones et al. (Oxford: Blackwell Science, 1980), 67.

Architects' Data was an extensive handbook of design and construction. It followed the nineteenth-century pattern book tradition, cataloguing design and construction knowledge from the level of site planning and spatial relationships to construction and furniture. It included the dimensions and details of building components, well-designed (i.e. well-dimensioned and efficient) sample floor plans for different building functions and a range of furniture dimensions and layouts with their optimal placement in rooms (Figure 3.16). Furniture dimensions and layouts have been the most influential not only in architects' practices but also in succeeding design standards as they paved the way for thinking about housing from the level of furniture outwards. A catalogue of furniture dimensions meant that rooms and flats could be dimensioned more precisely in relation to increasingly standardized furniture. In this way, a tighter relationship between the room and furniture on the basis of their dimensions could be established and standardized room sizes could be developed.

Moreover, the flat sizes could be further optimized and reduced. It also meant that what Klein and others advocated, that the design of a dwelling should be assessed against the design, selection and arrangement of furniture and equipment, could objectively be analysed if there was a standardized set of dimensions.¹¹¹ Certainly,

111. A detailed study of *Architects' Data*: Gernot Weckherlin, BEL. *Zur Systematik Des Architektonischen Wissens Am Beispiel von Ernst Neuferts Bauentwurfslehre* (Tubingen; Berlin: Ernst Wasmuth Verlag, 2017). Some of Weckherlin's studies on Neufert are published also in English: Gernot Weckherlin, 'Ernst Neufert's *Architects' Data*: Anxiety, Creativity and Authorial Abdication', in *Architecture and Authorship*, ed. Tim Anstey, Katja Grillner, and Rolf Hughes (London: Black Dog Publishing, 2007), 148–55.

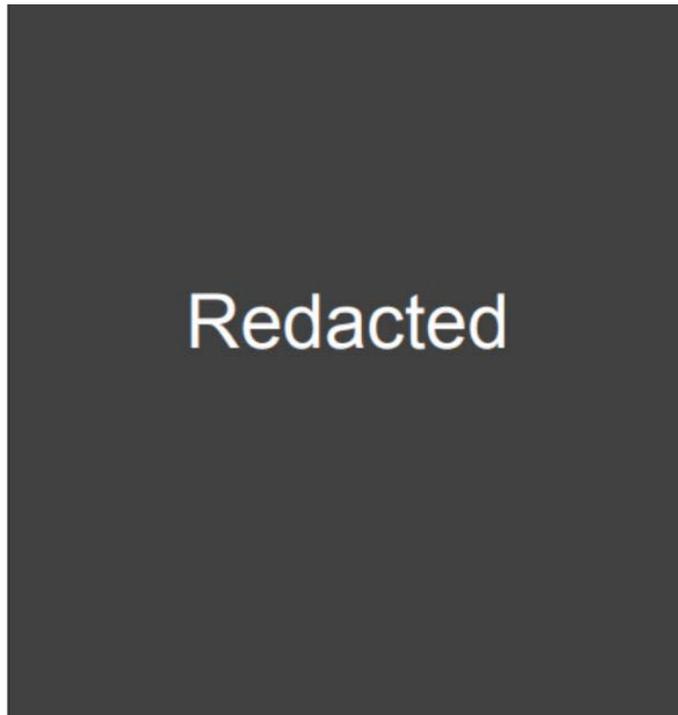


Figure 3.17—The dimensional fit of furniture, bricks, and space. From Ernst Neufert and Albert Speer, *Bauordnungslehre* (Berlin: Volk und Reich Verlag, 1943) as appeared in Nader Vossoughian, 'Qualitätskontrolle', *ARCH+*, no. 233 (2018): 53. **Copyright not obtained.**

whenever possible the furniture dimensions were taken from the industrial standards that the German Institute of Standards (DIN) had published. The reference sizes of other furniture and equipment were derived by Neufert in a systematic manner. For instance, the sizes of storage furniture were determined by the dimensions of things they stored.¹¹² Others were derived from the dimensions of an average 'man'. *Architects' Data* included a catalogue of dimensions that an average man occupied in various positions, and often displayed furniture and furniture layouts with human figures.¹¹³

In *Architects' Data* Neufert arranged the user, furniture, rooms, and flats according to a dimensional order. This was an influential order; as will be seen, many of the succeeding design standards were dimensionally defined in relation to the furniture dimensions and their arrangement. However, it still fell short of total integration between design and construction. In his other works, this dimensional order was extended to construction elements and structure with his modular construction systems: a structural grid system for industrial buildings and the octametric brick system.¹¹⁴ Setting component dimensions as a reference, Neufert aspired to a single dimensional framework to which all the elements, from furniture to construction components,

112. Nader Vossoughian, 'From A4 Paper to the Octametric Brick: Ernst Neufert and the Geo-Politics of Standardisation in Nazi Germany', *The Journal of Architecture* 20, no. 4 (2015): 675–98.

113. For discussions of the dimensions derived from the average man, Nader Vossoughian, 'Qualitätskontrolle', *ARCH+*, no. 233 (2018): 50–59.

114. The original text that explains the octametric system is published in *Soziale Wohnungsbau in Deutschland: Offizielles Organ des Reichskommissars für den Sozialen Wohnungsbau*, No. 1.(1941), 453 – 465. I referred to secondary sources, mainly Jean-Louis Cohen, *Architecture in Uniform: Designing and Building for the Second World War* (Montreal: Canadian Centre for Architecture; Editions Hazan, 2011).

could fit together. Nader Vossoughian, who re-examined the conceptualization and implementation of these two modular systems, notes that the octametric brick system, in particular, had a great influence on housing design. As Vossoughian notes, the brick system, which became a DIN standard, DIN 4172, 'paved the way for standard sheets 18050, 18100, 18011, 18022, 18151, 18152 and 4174' that corresponded to standardized window sizes, door sizes, minimum activity spaces, kitchen and bathroom design standards, other construction material dimensions, and floor heights (Figure 3.17).¹¹⁵

Despite the claim of universality and objectivity, Klein's graphical analysis of floor plans was not devoid of a qualitative agenda; on the contrary, as Klein repeatedly argued, a new dwelling form was only possible by establishing a new culture of dwelling. This new culture of dwelling referred to freeing working-class lifestyles from middle-class assumptions, i.e. their material culture and habits. Thinking of a dwelling as a set of rooms designed and furnished for different activities, separated from each other to provide privacy to every individual, and positioned relative to and connected to each other on the basis of a prescribed routine of daily tasks and maintenance, was a systematic approach to the rethinking of dwelling in relation to the culture of dwelling. Functionality, in this context, came to mean the appropriateness of dwelling design to the new culture of dwelling. Neufert's work, in contrast, was pragmatic: by introducing a dimensional design framework, he aimed to incorporate the essential principle of mass production, interchangeability of parts, to housing design and construction.

Klein's and Neufert's methods were both complementary and contrasting. On the one hand, the catalogue of mass-produced furniture and equipment, their dimensions, and the dimensions required for their use not only allowed the precise dimensioning of the rooms that Klein and others differentiated for domestic activities but also contributed to the new culture of dwelling in replacing middle-class material culture with mass-produced furniture and equipment. On the other hand, the dimensional design framework Neufert suggested was at odds with the design method Klein devised. A design and construction method broken down into construction elements, furniture and rooms meant a design process from the inside out, rather than from the unit up and down. In fact, this duality remained part of design standardization. On the one hand, there are design standards formulated at the scale of dwelling units, represented as exemplary floor plans showing good design practices and as standard plans to be replicated, and on the other hand, there are design standards formulated for different parts of the dwelling units with no regard for the relationships of these parts to each other.

115. Vossoughian, 'Qualitaetskontrolle', 57-59.

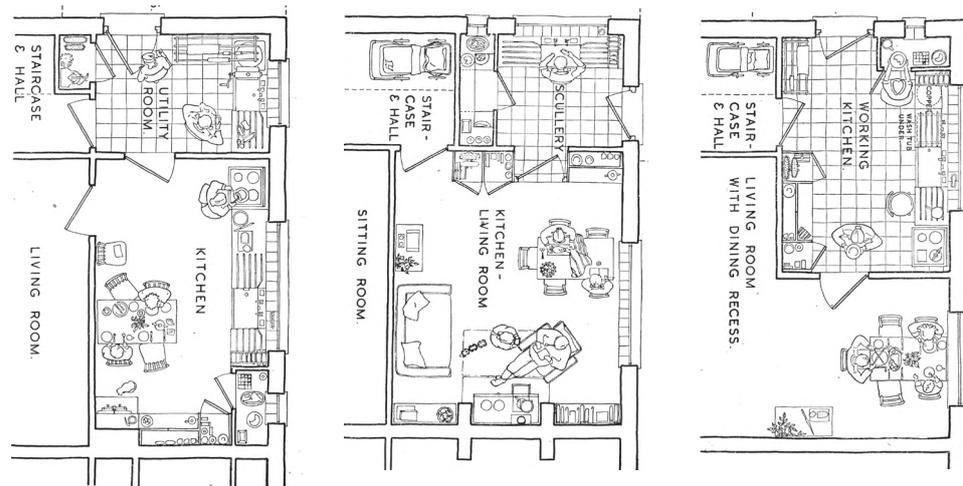


Figure 3.18—The kitchen types given in *Design of Dwellings* and *1944 Housing Manual*. From *Design of Dwellings*, 34-38.

Efficient and Functional Dwelling in England after WWII

Similar discussions on the functionality of dwellings, in the sense of the fitness of design to daily habits, were also taking place in England in the early twentieth century. For instance, before the war, Unwin and others were arguing for the elimination of the parlour from new housing designs, asserting that the rarely used parlour was only about imitating middle-class habits and had negative consequences on the cost, layout, and health aspects of housing.¹¹⁶ However, these concerns were not comprehensively addressed until 1942, when the Ministry of Health Central Housing Advisory Committee set up a new sub-committee to consider the design of dwellings, chaired by the Earl of Dudley, to consider the standards of housing built by local authorities and to set new guidelines for the post-war reconstruction.¹¹⁷ The Dudley Committee invited local authorities, non-governmental agencies, and individuals who engaged in housing provision, including voluntary women's organizations and Mass Observation, a major survey of the lives of Britons.¹¹⁸

The discussions of the Committee can be summarized in three major categories. The first of these was the inadequacy of existing living spaces for the kinds of domestic activities that commonly took place in homes. Social and design histories of the interwar years make clear that during these years, housewives and mothers

116. Unwin, *Cottage Plans and Common Sense*.

117. Central Housing Advisory Committee, 'Design of Dwellings: Report of the Design of Dwellings Subcommittee of the Central Housing Advisory Committee Appointed by the Minister of Health and Report of a Study Group of the Ministry of Town and Country Planning on Site Planning and Layout in Relation to Housing' (London: HMSO, 1944).

118. 53; Caitríona Beaumont, "'Where to Park the Pram'? Voluntary Women's Organisations, Citizenship and the Campaign for Better Housing in England, 1928-1945', *Women's History Review* 22, no. 1 (2013): 75-96.



Figure 3.19—Two- and three-bedroom gallery access flats.

(a) Two- and three-bedroom gallery access flats given as examples in 1944 Housing Manual.

lr—living room, k—kitchen, ba—bathroom, b—bedroom.

Drawn by the author from Ministry of Health, *Housing Manual 1944* (London: HMSO, 1944), 84.

(b) Typical plans of two- and three-bedroom gallery access flats used by London County Council.

lr—living room, k—kitchen, ba—bathroom, b—bedroom.

Drawn by the author from London County Council Housing Division of the Architect's Department, *Housing Type Plans* (London: London County Council, 1956), 5, BA.D4, 6, BA.D3.

(c) Typical two- and three-bedroom unit plans in Churchill Gardens Estate designed by Powell & Moya built between 1946 and 1962.

lr—living room, k—kitchen, ba—bathroom, b—bedroom.

Drawn by the author from RIBA Architecture Image Library, RIBA94350, RIBA94351.

became important drivers of both the market and policy.¹¹⁹ The social surveys of Mass Observation and of different women's organisations, especially, highlighted that the scullery was too small while functioning as both a utility room and cooking area. Moreover, there were technological and infrastructural developments and electrical household equipment – electric and gas cookers were now widely available – but the houses were not designed to accommodate them.¹²⁰ As Caitriona Beaumont notes, the survey conducted by the National Union of Townswomen's Guilds in 1943, expressed a desire for large kitchens, adequate storage, a separate bathroom and toilet, larders and pantries oriented towards the north, simple designs and amenities to prevent dust, and storage space for prams.¹²¹

The second discussion was about the lack of variety of types of accommodation in both the previous manual and the dwellings constructed since its publication:

the vast majority of the million dwellings built by the local authorities between the wars were of the three-bedroom type, providing accommodation for five persons', yet 'inadequate provision had been made for large families, old people, childless couples and single persons – particularly single women.¹²²

Third, the planners argued for higher density in the city centres and highlighted the unsuitability of cottages for this. Flats and high-density block typologies would help to achieve such densities; however, the evidence of the housing demand demonstrated that there was a significant aversion to flats.¹²³

In light of the evidence presented, the issue of domestic activities, especially in the kitchen, became a central issue in relation to the planning of dwelling units in Dudley Committee: the planning of a house was seen to be determined by the arrangements for cooking, serving and eating meals. This also prepared the way for the implementation of design methods to achieve functionality, in the sense of compatibility between spatial design and use. Maintaining the three-bedroom house model, the Committee's recommendations focused on the arrangement of the kitchen and living room. Reinterpreting the multifunctioning scullery as a separate bathroom, utility room, and kitchen, the Committee proposed three arrangements for different lifestyles: separate kitchen-diner, living room, and utility room; a living room with a dining recess and a working kitchen, and a living room with stove (which was found

119. See for example Alison Ravetz (1989) 'A View From the Interior', in J. Attfield & P. Kirkham (eds) *A View From the Interior: Feminism, Women and Design* (London: The Women's Press), 187–205; Judy Giles, *Women, Identity and Private Life in Britain, 1900–1950* (London: Macmillan, 1995); Elizabeth Darling, 'The Star in the Profession She Invented for Herself': a brief biography of Elizabeth Denby, housing consultant, *Planning Perspectives*, 20 (July 2005), 271–300.

120. 'Design of Dwellings', 11–14; Mass Observation, *An Enquiry into People's Homes: A Report Prepared by Mass-Observation for the Advertising Service Guild, the Fourth of the "Change" Wartime Surveys*. (London: J. Murray, 1943).

121. Beaumont, 'Where to Park the Pram?', 86.

122. 'Design of Dwellings', 11–12.

123. N. Bullock, 'Plans for Post war Housing in the UK: The Case for Mixed Development and the Flat', *Planning Perspectives* 2, no. 1 (1987): 71–98.

p.m. Supper for children, 9 p.m. Supper for husband'.¹²⁵ These illustrated the influence of the diagrammatic thinking about use in the Committee's method.

The Dudley Committee also recommended minimum space standards for these arrangements. The space standards were given for a two-storey house. While the Committee called for flats for other types of households and mixed developments, it maintained the preference for houses over flats, especially for families with children. The space standards were given for a house whose ground floor is completely taken up by one of the kitchen-living room arrangements. The minimum floor area prescribed for all these options was 330 ft² (30.6 m²). Adding the staircase, landings, and hall, the dimensions were similar to the three-bedroom houses built by local authorities that had a ground floor area of between 375 and 425 ft² (34.8-39.4 m²).¹²⁶ The three bedroom sizes, again totalling 330 ft² (30.6 m²), were similar to the standards prescribed in the Tudor Walters Report: 135 ft² (12.5 m²) for the 'best bedroom', 110 ft² (10.2 m²) for a double bedroom, and 70 ft² (6.5 m²) for a single bedroom (Figure 3.19.a).¹²⁷ While these dimensions formed the basis of the *Housing Manual 1944*, it was updated soon afterwards, in 1949, to include other types of housing. The 1949 Manual included space standards for houses, maisonettes, and flats built for different sizes of households. Yet, they maintained the kitchen-living room arrangement, as well as the room sizes.¹²⁸ In contrast to the preceding space standards that were provided as a minimum, the mid-century space standards were the exact size that the new housing was imagined to be. For instance, the supplementary documents issued in 1952 and 1953 argued that the recommended size of 900 ft² should be a maximum rather than a minimum, in order to increase the housing supply. This new role assigned to space standards was strengthened when the Housing Cost Yardsticks were introduced in 1963 to regulate housing expenditure; space standards were useful both in calculating the costs and in keeping the housing outputs to a certain standard size.

These manuals also provided a number of typical plans that formed the basis of all the public sector dwellings that were provided (Figure 3.19.b). The space standards and typical plans worked together: space standards were derived from studies of the typical plans anticipated for the new developments, and typical plans provided the extent of possibilities that could be achieved within the space standards that needed to be satisfied for the subsidies. The designs for council houses used these typical plans with only minor modifications (Figure 3.19.c).

125. 'Design of Dwellings', 13.

126. 'Design of Dwellings', 14–15.

127. In Tudor Walters: 150 ft² (13.9 m²), 100 ft² (9.3 m²), and 65 ft² (6 m²)

128. Ministry of Health, *Housing Manual 1949* (London: HMSO, 1949), 11.

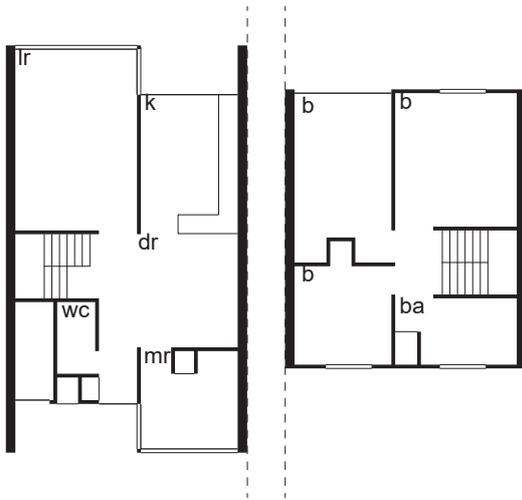


Figure 3.21—
 (a) The pilot housing project in West Ham by the Ministry of Housing and Local Government. lr—living room, k—kitchen, dr—dining room, mr—multipurpose room, ba—bathroom, b—bedroom.
 Redrawn by author from Ministry of Housing and Local Government Research and Development Group, 'Family Houses: Development Project at West Ham: an Appraisal' (London: HMSO, 1965), 25.



(b) One of the typical plans of Whittington Estate designed by Peter Tabori in the 1970s.

lr—living room, k—kitchen, ba—bathroom, b—bedroom.

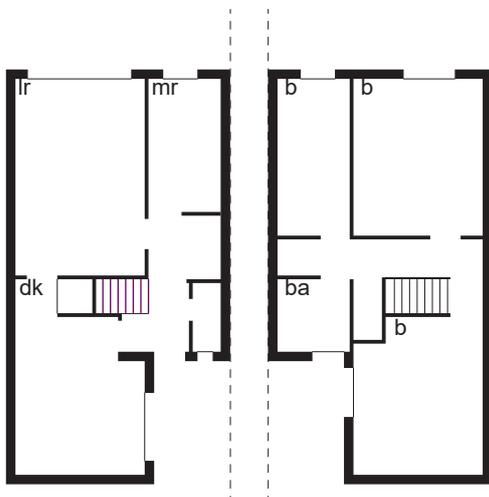
(c) One of the typical plans of Branch Hill Estate designed by Gordon Benson and Alan Forsyth in the 1970s.

lr—living room, k—kitchen, ba—bathroom, b—bedroom.

(d) One of the typical plans used by Greater London Council.

lr—living room, k—kitchen, mr—multipurpose room, ba—bathroom, b—bedroom.

Drawn by the author from Greater London Council, Preferred Dwelling Plans (London: the Architectural Press, 1977), PDP5158.



Flexible and Adaptable Dwelling

The mid-century manuals that determined the exact size of a dwelling unit were based on a 'tight-fit functionalism'.¹²⁹ By studying the dimensions of furniture and areas of movement in typical layouts, they could prescribe an exact size for a dwelling unit. In 1961 the Parker Morris Committee, which was assigned by the government to review the housing programme and design standards, and whose recommendations were going to shape public housing until the 1980s, began their Report by commenting on the issue of tight-fit functionality:

Emphasis on room sizes has focussed undue attention on working out a pattern of room areas which will comply with the standards [...] Furthermore, the specification of standards of space by reference to individual rooms with specific labels, bedrooms, working and dining kitchens, and so on — tends to assume a conventional arrangement of the dwelling and the particular way in which a given room will be used. This inhibits flexibility both in the initial design and in the subsequent use of a dwelling.¹³⁰

Until the 1960s, the quantity of housing output had been of great importance in government standards and guidance and often surpassed issues of quality. They were, to a large extent, successful; council housing programmes could close the gap between housing need and housing outputs with more than 250,000 units per year. It was only then that issues of quality could be brought to the forefront of the discussion. The housing was produced at pace but resulted in bland and monotonous urban environments.¹³¹ This was true for its many aspects, from their style and urban characteristics to the individual dwellings. The critique articulated by the Parker Morris Committee situated flexibility as a concept against the over-prescribed design standards.

Flexibility in architectural design still lacks a coherent definition. It is commonly used to refer to extra space, movable partitions, adaptability, and so on.¹³² For the Parker Morris Committee, flexibility, first of all, meant the flexibility of design schemes in accommodating households other than a family with three children. It was the housing construction programme that was rigid; it provided the same type of dwelling for all types of households, at the same time excluding some others, resulting in an inefficient housing provision system. To overcome this, the report the Committee published in 1961, *Homes for Today and Tomorrow*, provided design guidance for other types of dwellings, such as flats, maisonettes, small dwellings and bungalows,

129. Barry Goodchild and Robert Furbey, 'Standards in Housing Design: A Review of the Main Changes since the Parker Morris Report (1961)', *Land Development Studies* 3, no. 2 (1986): 80.

130. Ministry of Housing and Local Government, *Homes for Today and Tomorrow* (H M Stationery Office, 1961), 3–4.

131. Alastair Parvin et al., *A Right to Build: The next Mass-Housebuilding Industry* (The University of Sheffield School of Architecture and 00, 2011), 10.

132. Jeremy Till and Tatjana Schneider, *Flexible Housing* (London: Routledge, 2016), 3–9.

and provided space standards for the number of occupants, rather than the number of rooms.¹³³

Second, it meant the possibility of using rooms for multiple functions and in different ways. Underlying the sizes and layouts prescribed in earlier manuals was the assumption that the dwellings and rooms were used in the same way by all households and household members. Moreover, all the rooms were assigned a single function. To overcome this, the Report eliminated the space standards for different rooms and instead provided basic guidelines for the needs of different families and household members. For instance, the Report mentioned how the needs and uses of small families differ from larger ones, and how children of different ages have different needs and use rooms differently. By eliminating the number of rooms and the standards for different rooms from their recommendations, the Committee aimed to open the way for different design schemes for the needs of different families. Moreover, in a supplementary bulletin, *Design Bulletin 6: Space in the Home*, the furniture requirements, with sizes and graphics, were detailed to support architects with the technical information (Figure 3.20).¹³⁴ It also provided a potential schedule of activities in a typical day for younger and older families, outlining the activities of different household members that are typically carried out at the same time. This schedule aimed to help architects to determine the number and layout of different rooms. For instance, the series of questions included in the bulletin for the evaluation of plans included 'can some meals be taken in the kitchen and others in the dining space?'; 'will it perhaps be possible sometimes to use the dining space in conjunction with the kitchen, and sometimes with the rest of the living area?'; 'can the garden be used in summer as an extension to the living space?', and 'is there somewhere for activities needing privacy and quiet?'.¹³⁵ Supporting this, third, it meant the possibility of temporary changes in the layout of the dwelling. For instance, it endorsed the planning of small rooms for children that open out to larger rooms with movable partitions.

Fourth, it meant the adaptability of a dwelling throughout the life cycle of a family. *Space in the Home* provided an analysis of an exemplary floor plan, outlining the 'spaces where the use remains the same during family development', such as the kitchen, the bathroom, the toilet, living room, and parents' bedroom, and the 'spaces where the use changes during family development' such as children's bedrooms. In a room-by-room analysis throughout the life cycle of a family, the Report illustrated that well-thought rooms and layouts could be easily modified to accommodate a family throughout their life cycle and respond to their long-term changing needs.

This well-thought-out, exemplary plan was derived from an experimental scheme, Ravenscroft Close, built by the Ministry of Housing and Local Government between

133. Homes for Today and Tomorrow, 55–56.

134. This can be thought of as a selective version of Neufert's Architect's Data. Ministry of Housing and Local Government, *Design Bulletin 6: Space in the Home* (London: HMSO, 1963).

135. Government, 24–25.

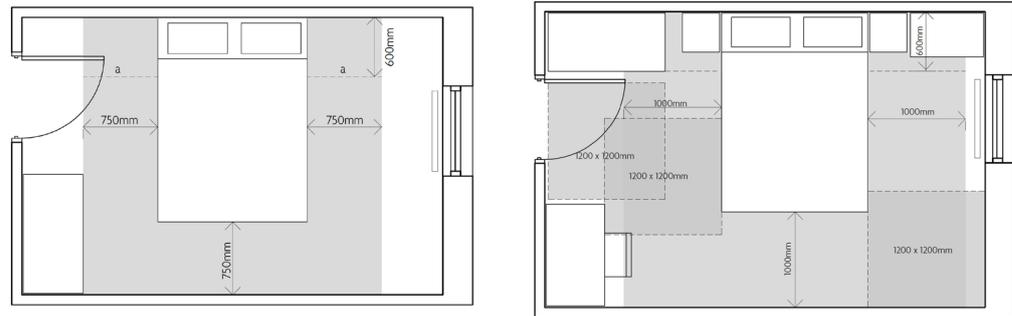


Figure 3.22—Bedroom sizes and activity spaces for different accessibility levels. From Building Regulations 2010. Approved Document M, *Access to and use of buildings* (HM Government, 2015), Diagram 2.4, Clear access zones to principal bedroom, Diagram 3.9 Clear access zones and manoeuvring spaces to principal bedroom.

1961 and 1964 to test standards and ideas about flexibility.¹³⁶ Even though the Parker Morris Committee paid equal attention to flats, this exemplary scheme continued the use of three-bedroom house typology, which had been institutionalized by the previous reports by stating ‘most families live in houses, not flats’.¹³⁷ The ground floor consisted of an open hall with a staircase that was also used as a dining room, a kitchen separated from the hall with a counter, a bedroom separated from the hall with a demountable partition, a separate living room accessed from the hall, and a WC at the entrance. The first floor consisted of three bedrooms, two of which were separated from each other with a demountable partition, and a bathroom. This model differed significantly from what had been recommended in previous manuals, for instance, the definition of strict uses of the rooms and the discouraging of thoroughfares in favour of a corridor-type circulation (Figure 3.21.a).

Ravenscroft Close was published in *Design Bulletin 6* and was a ‘seminal influence on the low-rise, medium-density council housing built in all parts of the country since the mid-sixties’.¹³⁸ The implications of the Report are best observed in the high-density low-rise schemes built by the London Borough of Camden, such as the Whittington Estate and the Alexandra Road Estate (Figure 3.21.b). In these schemes, the kitchen and living spaces were organised as open-plan layouts, usually as split levels, and movable partitions were used to connect study rooms and living rooms.¹³⁹ When the Greater London Council revised its typical plans in 1977, it also adopted these principles, albeit in a simplified manner (Figure 3.21.c).¹⁴⁰ As the Parker Morris

136. Ministry of Housing and Local Government, ‘Family Houses at West Ham: An Account of the Project with an Appraisal’ (London: HMSO, 1969).

137. Ministry of Housing and Local Government, 1.

138. Simon Pepper, ‘Many Found the Faith of Architectural Determinism a Comfort as They Went about the Work of Redevelopment’, *Architectural Review*, 1977.

139. Mark Swenarton, *Cook’s Camden: The Making of Modern Housing* (London: Lund Humphries, 2017).

140. Greater London Council Department of Architecture and Civic Design, *GLC Preferred Dwelling Plans* (London: Architectural Press, n.d.).

	Kitchen	Dining	Living	Combined Living/Dining	Double	Twin	Single	Bathroom	Storage/Utility	Outdoor Amenity Space	Net Internal	Circulation	Partition walls (inc. amenity)	GIA	Circulation Layouts
1-person				21 sqm							33.5 sqm	1 Level Flat + 1.5 sqm	2.4 sqm	37 sqm	
1-bed, 2-persons				23 sqm							41 sqm	1 Level Flat + 6.5 sqm	2.5 sqm	50 sqm	
2-bed, 3-persons				25 sqm							51.5 sqm	1 Level Flat + 6.5 sqm	3.4 sqm	61 sqm	
2-bed, 4-persons				27 sqm							58 sqm	1 Level Flat + 8.5 sqm	3.5 sqm	70 sqm	
3-bed, 5-persons				29 sqm							72 sqm	1 Level Flat + 10.9 sqm	4.5 sqm	86 sqm	

Variations

- 2-bed, 4-persons**
 - 1 level flat: 70*12 (8x2) = 71 sqm
 - 2 storey house: 83*12 (8x2) = 87 sqm
 - 3 storey house: 87*6 = 59 sqm
- 3-bed, 5-persons**
 - 1 level flat: 99*16+12 = 103 sqm
 - 2 storey house: 107*16+12 = 107 sqm
 - 3 storey house: 107*16+12 = 107 sqm
- 4-bed, 5-persons**
 - 1 level flat: 86*12 (8x2) = 70 sqm
 - 2 storey house: 96*12 (8x2) = 100 sqm
 - 3 storey house: 102*12 (8x2) = 106 sqm

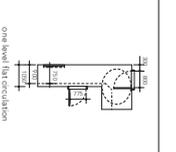
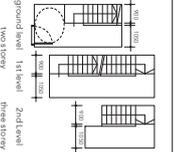
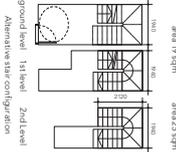


Figure 3.23—Space standards calculation. From Design for London, *London Housing Design Guide* (London: London Development Agency, 2010), Appendix 1 - Space Standards Study, 92-93.

Committee recognized, implementing flexibility in public housing ‘was some way from a practical reality because of the high cost and other difficulties’.¹⁴¹

Standards in the Past Forty Years

Since the end of WWI, the UK has had a dual housing system: the social and private housing sectors have been governed separately and significantly different levels of control have been asserted.¹⁴² Private sector housing has worked exclusively to market principles, whereas the social sector has been extensively regulated. Until the 1970s, even though the standards and guidelines discussed above did not apply to the private housing sector, they were, to a certain extent, either adopted or not needed, by the private housing sector. First, low-income housing needs were tackled within the social housing sector, and therefore there was no need for the private sector to build low-priced housing and little risk of below standards housing. Second, the output of the private housing sector was, for the most part of the post-war years, lower than that of the public housing sector.¹⁴³ Only starting in the 1970s, the state-subsidized mass housing model, as well as state intervention, diminished under a new politico-economic framework, as housing production was mostly left to the market and deregulated.

In the 1980s and 1990s, this had two major consequences for the housing unit. Most importantly, dwelling sizes were shrinking. This was well documented in the 1980s and 1990s. Research published by Leopold and Bishop in 1983, and by Karn and Sheridan in 1994, repeatedly showed that both the market and housing associations were producing housing that was below Parker Morris standards.¹⁴⁴ The attention paid to dwelling sizes was expected: as the previous discussions have shown, an understanding of design quality in terms of dwelling size was institutionalized. The standards issued by the government, as well as those produced for architects, all focused on dwelling sizes and room dimensions.

141. Homes for Today and Tomorrow, 9.

142. Jim Kemeny, *From Public Housing to the Social Market: Rental Policy Strategies in Comparative Perspective* (London: Routledge, 1995).

143. Parvin et al., *A Right to Build: The next Mass-Housebuilding Industry*, 10.

144. Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 1', *Construction Management and Economics* 1, no. 2 (1983): 119–44; Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 2', *Construction Management and Economics* 1, no. 3 (1983): 233–68; Valerie Karn and Linda Sheridan, 'New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing' (Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994).

From the 1990s on, after a decade of deregulation in both sectors, renewed attention was paid to housing quality as a result of the shrinking size of homes. Not only the state but also voluntary and professional organizations published standards to secure housing quality. One of the most significant contributions coming from non-governmental organizations was Lifetime Home Standards, first published by Habinteg Housing Association and Helen Hamlyn Foundation in 1989, and later promoted by Joseph Rowntree Foundation. Jo Milner and Ruth Madigan note that Lifetime Home Standards emerged 'as the new benchmark of housing design quality within the social housing sector' in this context of shrinking dwelling sizes, and especially circulation spaces in the lower end of the market.¹⁴⁵ It consisted of 16 design features that secure a basic usability of dwellings by physically disabled and wheelchair users. These included circulation requirements wide enough for wheelchair access and an accessible toilet, among others. Lifetime Home Standards can be considered as an extension of the discussions of a house for the 'different stages of life' that were raised in Parker Morris standards, as well as an extension to the long discussion of dwelling sizes. While Lifetime Home Standards were first a set of voluntary standards produced by non-government organizations, they were later incorporated into housing subsidies and Building Regulations Part M.

Other standards produced by the government, to a large extent, followed a dualist tradition. While significant regulations were introduced to subsidized housing, the guidelines introduced to market housing were non-prescriptive. The most significant attempt to increase the quality of subsidized housing stock was the introduction of Housing Quality Indicators, whose methods remained part of housing subsidies until very recently. Published in 1999 by the Department for the Environment, Transport, and the Regions, it superseded Total Cost Indicators, the cost-based system used for housing subsidies. Housing Quality Indicators was a questionnaire grouped under ten Quality Indicators, including unit size and unit layout. In its 2008 version, these included not only space standards, the furniture dimensions every room needed to be able to accommodate, zones of activity, and circulation dimensions, but also factors such as the living room being separated from the overall circulation, the kitchen being separated from the living room, and the proximity of bedrooms to bathrooms.¹⁴⁶

The standards developed for private sector housing consisted of guidelines that invited housing design and development professionals to consider issues of housing quality. These included *Places, Streets and Movement*; *By Design: Urban Design in the Planning System*; *Planning Policy Guidance Note 3: Housing*; *By Design: Better Places*

145. They note the research by Walentowicz and Karn & Sheridan.

146. Homes and Communities Agency, 'Housing Quality Indicators', The National Archives Web Archive (18 May 2009).

to Live: A Design Companion to PPG3.¹⁴⁷ However, these were not prescriptive documents like other standards. Analysing the discourses of housing quality at the turn of the millennium, Bridget Franklin posits that the key guidance document, *PPG 3 Housing*, was very unsatisfactory in defining housing quality: 'attributes such as "attractive", "quality", "living environments", "safe", "poor", and "good" design, whilst they convey a positive intention, remain impressionistic, without substance or didactic power'.¹⁴⁸ Franklin continues to note that this was symptomatic of both a reluctance to interfere in the private housing sector, and to see 'itself as in a position to lay claim to any expert knowledge on the subject'.¹⁴⁹ However, the use of non-prescriptive, common terms to define housing quality is visible not only in government guidance but also in voluntary standards such as *Building for Life*. Franklin and others note that the discussion of housing quality has moved from the more normative disciplines of planning and architecture to urban design in recent years.¹⁵⁰ Indeed, the recent discussion of housing quality is often framed at scales larger than housing units, such as place character, unlike the previous housing standards.

Most recently, in 2010, the Mayor of London published the *London Housing Design Guide*, a set of new space standards that later were translated into Nationally Described Space Standards in 2015.¹⁵¹ Like other standards, these were based on a calculation of the minimum floor area required for typical furniture and activities. The space standards, despite being extended to all tenures, remain as part of the policy, and as Julia Park or James White and co-authors note, are less likely to be enforced by planners amid housing delivery targets.¹⁵²

Design Standardization at the Unit Scale

In this chapter, I have discussed some of the key documents, external drivers, and policies that had a strong influence on the way housing units are designed. It examined

147. 'Places Streets Movement: A Companion Guide to Design: Bulletin 32, Residential Roads and Footpaths' (London: Department of the Environment, Transport and the Regions, 1998); 'By Design: Urban Design in the Planning System : Towards Better Practice' (London: Department of the Environment, Transport and the Regions, 2000); 'Planning Policy Guidance, Note 3: Housing', (London: Department of the Environment, Transport and the Regions, 2000); 'By Design: Better Places to Live: A Design Companion to PPG3' (London: Department of the Environment, Transport and the Regions, 2001).

148. Bridget J Franklin, 'Discourses of Design: Perspectives on the Meaning of Housing Quality and? Good? Housing Design', *Housing, Theory and Society* 18, no. 1–2 (2001): 79–92.

149. Franklin, 81.

150. David Adams, Robert Croudace, and Steve Tiesdell, 'Design Codes, Opportunity Space, and the Marketability of New Housing', *Environment and Planning B: Planning and Design* 38, no. 2 (2009): 289–306; Matthew Carmona, Sarah Carmona, and Nick Gallent, *Delivering New Homes: Processes, Planners and Providers* (London: Routledge, 2003); Matthew Carmona, 'Design Governance: Theorizing an Urban Design Sub-Field', *Journal of Urban Design* 21, no. 6 (2016): 1–26.

151. Department for Communities and Local Government, *Technical Housing Standards – Nationally Described Space Standard* (London: HMSO, 2015).

152. Julia Park, *One Hundred Years of Housing Space Standards: What Now?*, 2017; James T. White et al., 'Delivering Design Value: The Housing Design Quality Conundrum' (UK Collaborative Centre for Housing Evidence, 2020).

how ideas of design quality at the unit scale have been conceptualised and translated into standards and models, i.e. examples to follow or imitate, in the past 150 years.

First, I have outlined how design quality was conceptualized in different ways, but always in a dialectical relationship to broader social, economic, and cultural problems such as poverty, public health, public morale, class culture, ageing, family life, and most recently, the market. Above, I have discussed sanitary and moral dwellings, functional dwellings, and adaptable dwellings. These can be grouped under two headings, health and utility, which, in the language of the policy, translates to dwellings fit for human habitation and dwellings fit for purpose. What historically constituted a healthy dwelling has been established, broadly, as dwellings with clean water supply, sanitary equipment, sufficient sunlight, fresh air, and heating, and what constituted a useful dwelling as more or less a dwelling designed with consideration for the routines, relationships, and life cycles of a working family.

Second, I have outlined that despite varying ideas of design quality, in its translation to standards and models the same foci recurred: what a dwelling size should be; what types of rooms it should contain; what size these rooms should be; how bedrooms should be differentiated in terms of size; how these different bedrooms should be placed in relation to each other and other rooms, and how the living space should be arranged. Therefore, any analysis of housing design should take these categories as a basis. In the next chapter, I discuss how these categories inform the methodology and methods of this research, particularly of the analysis of London's existing housing stock.

Among these, dwelling sizes and room dimensions were the most disputed aspects. The interest in maintaining a certain size stemmed mostly from the attitudes of the private sector towards housing at the lower end of the market. Moreover, limited subsidies, the high shortage of affordable housing, and the justification of the use of public money have required that public housing should follow a standard, in the sense of an exact form. As I have discussed, today the high-pressure land acquisition and development processes also require the private sector to develop certain internal standard sizes that could be used to calculate cost and profit at the early stages of development.

While first space standards were derived from specific housing design in the Tudor Walters Report, with the standardization and mass production of furniture, their calculation has shifted to a more versatile form of calculation based on furniture dimensions. In both cases, however, the focus was often assumed and expected use of housing: in what arrangements should, and will, family members sleep, spend their time during the day, in the evenings, and at weekends, and prepare food and serve and eat it? These were then translated, in sequence, into a schedule of furniture, layouts of furniture to allow movement, to rooms whose walls enclose these furniture layouts, and to minimum usable room sizes and dwelling sizes.

Space standards were revised with each changing imagination of family life. The family who would spend all their time together in the living room, in the writings of Henry Roberts and others, including the *Design of Dwellings* (1942), gave way to a family of individuals who would also spend time alone in their rooms in *Space in the Home* (1961), and who have largely remained the same since.

However, the translation of quality into design entailed more than the sizes of rooms and dwellings. More qualitative responses were formulated in architectural drawings, especially the floor plan. If the domestic space has been posited as a means of governing the daily lives of its residents, it does so by defining enclosures, divisions, connections, densities, and proximities. All these spatial strategies are formed through, and represented in, the architectural drawing: 'if anything is described by an architectural plan it is the nature of human relationships, since the elements whose trace it records – walls, doors, windows and stairs – are employed first to divide and then selectively to re-unite inhabited space', states Robin Evans.¹⁵³

The manuals discussed at length what domestic activities should be considered as the minimum, what spaces are appropriate to such activities, how a decent house should be organised, and how these relate to each other. In this, architectural drawings served three interrelated purposes. First, they were projective. Based on an assumption that the way space is occupied is determined solely by the architectural organization, the drawings served as a way to organise and modernise family life. For instance, in the *Design of Dwellings*, the drawings were used to produce a layout that would be suitable for different domestic activities, i.e. furniture and movement. Second, they were analytical. For instance, throughout the Tudor Walters Report, different iterations of the proposed model were compared with respect to building economy, site, and location. And third, they were descriptive. In housing manuals, they were used to illustrate different layouts that can be achieved with the guidance provided.

Based on the theories of standardization and the way the private sector has approached unit designs in the past forty years, I concluded the previous chapter by suggesting that design standardization is path dependent. The history analysed in this chapter provides detail to these processes. What constitutes 'good' housing design has developed subtly and cumulatively. The idea of design quality was not abandoned: rather, aspects of dwelling design were updated with technological, social, and economic change, and extended in scope. Therefore, it is necessary to understand how design responses, made to operate in particular social and economic conditions, are reconfigured and sustained to operate in changing and new conditions.

Here, I would like to pose my other research questions: (RQ2) How do users occupy, adapt, or use their standardized dwellings? (RQ3) How do these uses, practices and relate to, and how might they inform, broader processes of design standardization?

153. Robin Evans, "Figures, Doors and Passages," *Architectural Design* 48, no. 4 (1978): 268.

The most evident conclusion that can be drawn from this history is that ‘good’ design was established in relation to the user, whose definition oscillated between the individual and the collective, i.e. the public. The user was, in fact, essential, embodying both the broad problems that design was addressing and the imaginary or ideal habitation against which design was controlled. For the most part, the user was very specific: in Henry Roberts’ writings, it was a degraded working class, who lacked middle-class morals and values; in *Homes for Today and Tomorrow*, it was a middle-class, consumerist family.¹⁵⁴ But what happens to this historical subject in a historically contingent design standardization? Therefore, asking the question of how users experience, practise, and respond to design standardization is to question how design responses made for these families are being reconfigured for different users. The process via which I answer these questions, the methodology, methods, and data were produced is discussed in detail in the next chapter.

154. Savia Palate, ‘Council Housing in the Age of Property-Owning Democracy and the Parker Morris Standards, 1960s–80s’, in *Architecture and Democracy: 1965-1989 Urban Renewal, Populism and the Welfare State* (Jaap Bakema Study Centre Sixth Annual Conference, Rotterdam: TU Delft and Het Nieuwe Instituut, 2019).

4

Studying Design Standardization Methodology and Methods

This chapter outlines the methodological framework of the research. In the previous chapters, I defined design standardization as a combination of different processes that drive housing towards particular forms and discussed the values underlying these processes. Design standardization is a complex issue that entails many stakeholders and values, and a comprehensive account of it requires a multiplicity of approaches. To this end, this research employs a mixed methods research design. Taking inner London and its housing stock as the object of research, I study first the form and extent of design standardization at unit scale and second the experiences of residents who live in below standard, standard, and non-standard housing.¹ This chapter aims to establish how I sought to answer the research questions raised using a mixed methods research design and to explain the process of collecting, modelling, and analysing data. First, I will provide an overview of the research design, paying specific attention to its relevance to the study of design standardization. I will detail the components that make up the empirical part of this research – the floor plan analysis, and the study of users, and the ways they are individually situated in the literature of housing. Second, I will describe the details of how data is generated, modelled, and analysed.

¹ I define standard, below standard, and non-standard housing in my exploratory data analysis in Chapter 5.

Studying Design Standardization

In the previous chapters, I established a design standardization framework, derived from the historical and contemporary standards, conventions, and practices in the UK. While my conceptual focus is on design standardization, my empirical focus is on the way housing design standardization has occurred and is experienced in inner London.

The selection of inner London for the study of design standardization might seem odd at first for the reader familiar with London. London, compared to many places in the UK has more diverse housing types. While such diversity is favourable to fully see the extents of standardization, London's housing has more specific aspects that make it appropriate for the study of design standardization. London's housing stock is relevant to this study, first of all, as different standardization processes, and the conflicts and compromises between them have historically played and continue to play a significant role in the shaping of design outcomes. A high-pressure housing market, a perpetual housing shortage and high land prices all lead the market to function within strict conventions and central and local governments to introduce new legislations, regulations, codes, and guidelines to sustain quality, affordability, and access.

The historical design standardization contexts are already visible in distinct housing typologies that emerged, to a great extent, in relation to these different contexts: the third-rate terraced house, the by-law terraced house, model flats, the interwar semi, post-war flats and maisonettes in tower and slab blocks and houses, flats, and maisonettes in infills and large developments.² These different contexts can broadly be defined as periods before 1919, 1919-1939, 1945-1980, and 1981-present. While the dwellings built in the post-war period up to the 1980s were designed in the context of standardization that was driven by state-sanctioned standards since the 1980s market conventions have dominated the housing design standardization context. The periods before WWII were marked by an urban and suburban speculative housing expansion in London. What differentiated these two periods were the type of speculative housing, interwar semi replacing pre-war by-law terraced house, again in relation to a change in housing standards.

Still, there are differences in housing typologies within distinct periods, especially in relation to housing sectors. For instance, while the public sector built mostly flats and maisonettes in slab and tower blocks in the post-war period, the private sector built terraced, semi-detached, and detached houses. This meant that the houses evolved according to the standards of the private sector, whereas flats and maisonettes in blocks evolved according to the standards of the public sector, resulting in uneven changes in housing forms within the same typology. Moreover, in periods in which

² Albert J. Mills, Gabrielle Durepos, and Elden Wiebe, eds., 'Naturalistic Generalization', in *Encyclopedia of Case Study Research*, 2010.

preferences for particular housing typologies overlapped, these housing typologies were approached differently, resulting in a variety of housing forms within the same typology. For instance, semi-detached houses, the dominant housing typology during the interwar years, differed significantly in public and private sector developments in terms of dwelling sizes, layouts, and exterior treatments.³ Today, flat sizes and layouts differ between the public and private sectors, even in mixed-tenure developments.

While my conceptual framing of design standardization focused mainly on the processes of design and development, London also has specific standardization processes, i.e. extensions to, and the conversion and remodelling of, terraced houses. In 2018, 35% of the housing stock in inner London were built before 1900 and 51% before 1939, and most of these were terraced houses (see Chapter 2).⁴ Many of these terraced houses have been extended, converted, and remodelled throughout the last century in response to the need for refurbishment, changing user needs, and housing shortage. In these processes, the user, owner, or owner-occupier has a strong influence. Therefore, to a certain extent, users can be regarded as important as regulatory, market-driven, and creative stakeholders in design standardization.

In the previous chapters, I established a design standardization framework that incorporates two meanings of 'standard': a set of processes that drive towards specific housing forms and an understanding of a certain level of quality that takes the user to its centre. In studying design standardization, the research uses a mixed methods design that involves the use and mix of both quantitative and qualitative research methods. Janice Morse and Linda Niehaus define mixed methods design as 'the incorporation of one or more methodological strategies, or techniques drawn from a second method, into a single research study, in order to access some part of the phenomena of interest that cannot be accessed by the use of the first method alone'.⁵

My development of a mixed methods research design is driven by an aspiration to understand design standardization in both its depth and breadth and to be able to capture its different aspects, i.e. its form, extent, use, and experience. First, as discussed, design standardization results in specific housing design patterns. This does not mean a singular housing form applied throughout, or sameness, but a range of forms that various combinations of standardization processes lead to. Standardization thus is discernible only in repeated patterns and from a distance. A quantitative study of housing forms, therefore, is appropriate to the study of design standardization as it enables the study of a larger sample, which, in return, allows the spatial patterns and extent of design standardization to be described. Second design standardization

³ Mark Swenarton, 'Tudor Walters and Tudorbethan: Reassessing Britain's Inter-War Suburbs', *Planning Perspectives* 17, no. 3 (2002): 267–86; Deborah Sugg Ryan, *Ideal Homes* (Manchester: Manchester University Press, 2020).

⁴ Valuation Office Agency, 'CTSOP 3.1: Number of properties by Council Tax band, property build period and region, county, local authority district and lower and middle super output area', in *Council Tax: Stock of Properties*, 2018, <https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2018>.

⁵ Janice M Morse and Linda Niehaus, *Mixed Method Design: Principles and Procedures* (London: Routledge, 2016), 9.

Table 4.01—Methods used.

	CC QUAN	SC1 →qual	SC2 →quan	SC3 +qual
Source	Floor plan sample		Online Survey	Interviews
Data	Data generated from floor plans	Floor plans	Closed survey responses	Open-ended survey responses Semi-structured interviews
Method	Exploratory Data Analysis	Comparative Matrices	Descriptive Statistics	Thematic Analysis
Role(s)	To explore the repetitions and differences in London housing	To enhance the description of housing types and forms To test the reliability of quantitative data	To gain knowledge about the experiences and practices of users To recruit participants for follow-up interviews. To test the representativeness of floor plan sample	To gain in-depth knowledge
Point of Interface		Results of QUAN	Results of QUAN→quan	

entails an understanding of design quality centred around the user. The discussion of design standards at the unit scale has entailed normative ideas on linking unit design to the type, size, and everyday practices of the user. A qualitative analysis of the users' experiences and practices, therefore, provides a reflective lens through which design standardization can be evaluated.

What differentiates a mixed methods design from a multiple methods design is the 'completeness' of the methods, i.e. different methods *systematically* supporting each other rather than each method producing its own results.⁶ Morse and Niehaus define six categories in defining a mixed methods research design: 1) the core component, 2) the supplemental components, 'introduced to expand the scope of the project', 3) the theoretical drive, i.e. inductive or deductive, 4) pacing, i.e. sequential or simultaneous, and 5) the stage in which different components are mixed, i.e. at the analysis stage or in narrating the results.⁷ For mixed methods designs using different paradigms, i.e. qualitative and quantitative, they also highlight the importance of sampling frame and sampling strategies. The research design used here consists of a core quantitative component, a descriptive statistical analysis of the spatial patterns in a sample of

⁶ Morse and Niehaus, 23–38.

⁷ Morse and Niehaus, 23–26.

unit plans from inner London's housing stock, and three supplementary components: visual analysis of comparative floor plan matrices (sc1), quantitative analysis of a survey with people living in London on their experience and use of their homes (sc2), qualitative analysis of semi-structured interviews with some survey participants (sc3). Each of the supplementary methods in this research design, support and relate to the floor plan analysis (Table 4.01). I will now describe the research design with respect to these points and situate them within their respective literature.

Floor Plan Analysis

The core component (cc) that makes up this research is the quantitative study of housing units sampled from inner London neighbourhoods. More specifically, it is an exploratory data analysis of dimensional and spatial data derived from a sample of housing floor plans collected from inner London (n=2,007). Despite my efforts to outline a comprehensive view of design standardization, my definitions remain limited. An analysis of spatial patterns in London's housing provides an empirical ground upon which my discussion of design standardization can be extended and further specified with empirical results (RQ1).

My analysis of floor plans largely follows what John Tukey and his colleagues termed as exploratory data analysis.⁸ This refers to a flexible and inductive approach to data and entails the identification of patterns through iterative processes of examination of data for its distribution, shape, outliers and so on, the representation of data both visually and by using measurements and model building. The inductive ethos of exploratory data analysis is useful to this study that seeks to identify the patterns in the housing stock. Moreover, its focus on the search for multiple ways of describing the data extends the definitions and descriptions of design standardization thus far grounded upon a rather narrow set of analytical categories.

The analysis of a large number of floor plans exploits the newly available tools powered by machine learning. Many start-up companies, targeting the real estate sector, have been developing floor plan digitization tools that allow the extraction of dimensional and vector data.⁹ These tools provide an opportunity to analyse a large number of housing designs, and therefore, to better identify spatial patterns in the housing stock. Therefore, it proposes an alternative to some issues faced in the literature of housing design surveys. Since the second half of the twentieth century, housing outcomes have been studied repeatedly, especially in relation to specific housing policy and programmes in the UK. Most of these studies rely on specifications provided by developers to construct large samples, and others that generate data by

⁸ John W Tukey, *Exploratory Data Analysis* (Reading, MA: Addison-Wesley, 1977); David C Hoaglin, Frederick Mosteller, and John W Tukey, *Understanding Robust and Exploratory Data Analysis* (New York: John Wiley & Sons, 1983); Maria M. Pertl and David Hevey, 'Exploratory Data Analysis', in *Encyclopedia of Research Design*, ed. Neil J Salkind (Thousand Oaks: SAGE, 2012).

⁹ Companies such as Archilyse, Archilogic, XCYDE.

Table 4.02—Previous quantitative studies of housing at dwelling scale.

Study	Sample	Analysis
Hole & Attenburrow (1966)	4,000 people living in local authority dwellings in New Towns	'compare responses of groups of people (usually housewives) to various design alternatives'
Goodchild & Furbey (1987)	4 local authority estates	dwelling size, heating, external environment
Leopold & Bishop (1983)	20 private sector and 11 public sector housing developments built between 1975 and 1980	dwelling size
Karn & Sheridan (1994)	221 private sector units and 136 housing association units built in 1991	dwelling size, room sizes, amenities (storage, bathroom etc.)
Leishman & Warren (2004)	267 standardized house type specifications offered for sale across the UK by six house builders.	clustering dwellings based on internal area specifications.
Drury & Somers (2010)	89 dwelling specifications offered for sale by 17 housebuilders and under The Council Tax Band D	dwelling size, storage, utility, kitchen, 'notional corridor', and habitable floor area.
Roberts-Hughes (2011)	1,159 one-bedroom 3,418 three-bedroom new-built dwelling specifications by 8 major house builders in England.	dwelling size
Crosby (2015)	Three-bedroom new-built dwelling specifications by 10 major house builders in England	dwelling size
English Housing Survey	13,431 randomly selected households in England (2018-2019)	dwelling size, room sizes, amenities (storage, bathroom etc.)
Morgan & Cruickshank (2014)	Based on EHS	dwelling size

measuring plans focus on smaller samples.¹⁰ These tools also provide an opportunity to study housing designs in a novel way, not only dimensionally, but also formally and organizationally. Many of the quantitative studies focus on dwelling size as the main category to assess design quality (Table 4.02). Certainly, this is rational: significant attention has been paid to the size of dwellings in history, and the sizes of dwellings continue to be an important driver of design standardization. However, such a focus leaves the internal arrangement of dwellings and spatial qualities aside. In fact, we have surprisingly little knowledge about the interiors of dwellings on a large scale. Most of our knowledge comes from case study methods, and from smaller samples.¹¹ My analysis goes beyond sizes and dimensions and takes into account the forms and internal organizations of housing designs. This also makes the use of these tools technically and conceptually challenging, as forms and organizations are amenable neither to numerical descriptions nor fully to categorical descriptions.

Certainly, there are established quantitative methods and tools for the analysis of spatial organization such as space syntax. Space syntax encompasses multiple tools for the analysis of spatial organizations, most notably ‘nodes and connections’, which entails the translation of spaces into nodes and connections into lines and their statistical analysis.¹² While the interest of this study is closely related to this type of graphical representation, it also differs in its consideration of room forms and relationships other than connections. Drawing from my historical review and focusing on the relationships of specific rooms, I develop circulation and layout categories. Moreover, I use comparative matrices, organization of floor plans in matrices, in which ‘their relative differences and similarities are generalised’.¹³ Comparative matrices support statistically analysed circulation and layout categories, by helping assess

10 W V Hole and J J Attenburrow, *Houses and People: A Review of User Studies at the Building Research Station* (London: Ministry of Technology Building Research Station, 1966); Barry Goodchild and Robert Furbey, *Housing in Use: A Study of Design and Standards in the Public Sector* (PAVIC Publications Sheffield City Polytechnic Department of Education Services, 1987); Ellen Leopold and Donald Bishop, ‘Design Philosophy and Practice in Speculative Housebuilding: Part 1’, *Construction Management and Economics* 1, no. 2 (1983): 119–44; Ellen Leopold and Donald Bishop, ‘Design Philosophy and Practice in Speculative Housebuilding: Part 2’, *Construction Management and Economics* 1, no. 3 (1983): 233–68; Valerie Karn and Linda Sheridan, ‘New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing’ (Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994); Andrew Drury and Eleanor Somers, ‘Room to Swing A Cat’ (HATC Ltd, 2010); Rebecca Roberts-Hughes, ‘The Case for Space: The Size of England’s New Homes’ (Royal Institute of British Architects, 2011); Malcolm Morgan and Heather Cruickshank, ‘Quantifying the Extent of Space Shortages: English Dwellings’, *Building Research & Information* 42, no. 6 (2014): 710–24; Mark Crosby, ‘Space Standards for Homes’ (London: Royal Institute of British Architects, 2015).

11 Chris Leishman et al., ‘Preferences, Quality and Choice in New-Build Housing’ (York: Joseph Rowntree Foundation, 2004); Chris Leishman and Fran Warren, ‘Private Housing Design Customization through House Type Substitution’, *Construction Management and Economics* 24, no. 2 (2006): 149–58.

12 Sonit Bafna, ‘Space Syntax’, *Environment and Behavior* 35, no. 1 (2003): 17–29. Underlying these studies is that the organization of the space expresses and reproduces social organizations. Julienne Hanson’s seminal work *Decoding Homes and Houses*, based on Hillier and Hanson’s descriptive syntax, established an agenda and methods to analyse and understand the relationships between everyday life and the spatial patterns of domestic space. Following this agenda, Bendik Manum studied 150 Norwegian flats built between 1930 and 2005 to discuss the implications of historical changes in mainstream housing designs in relation to housing needs and preferences analysing the room sizes and room relationships using space syntax. See: Bill Hillier and Julienne Hanson, *The Social Logic of Space* (Cambridge: Cambridge University Press, 1984); Julienne Hanson, *Decoding Homes and Houses* (Cambridge university press, 2003).

13 Sam Jacoby, *Drawing Architecture and the Urban* (Chichester: Wiley, 2016), 228.

the validity of these categories, elicit further formal and organizational qualities to enhance and ground the description of quantitative results. Comparative matrices can also be thought of as different graphical visualizations of the data.

In this manner, my spatial analysis is more closely related to a series of socio-spatial studies of floor plan that focus on specific aspects of dwelling organization in relation to broader social, economic, and cultural aspects. One well-known study in this strand of literature is the study of the typical Kabyle house by Pierre Bourdieu, which focuses on the gendered subdivision of the domestic spaces of the Berbers in Algeria and highlights the way this arrangement strongly represents the gendered societal norms and relationships.¹⁴ In a more contemporary and geographical context, Roderick Lawrence applied a similar methodology in comparing English domestic spaces to Australian ones.¹⁵ Lawrence concluded that the domestic spaces associated with different domestic activities were central to understanding house designs. My approach most closely relates to the research agenda Roderick Lawrence set in the 1980s and 1990s. This was an agenda for the spatial study of housing design through individual domestic spaces such as kitchens, living areas and bedrooms and their relationships to one another.¹⁶

Even though I paid specific attention to the contemporary standards and conventions in conceptualizing design standardization, the sample includes housing built over the last two centuries. However, my aim is not to offer a diachronic analysis. First, as discussed, London's housing stock is a result of different standardization contexts and processes. The inclusion of housing built in different periods, in a controlled manner, provides an insight into these differences in standardization contexts and allows us to make probable conclusions about their differential effects (RQ3). Second, as also discussed, London's older housing stock has been extended, converted, and remodelled in response to the changing user needs as well as to the broader economic conditions. Therefore, they provide insight into other, less registered and less studied aspects of housing design (RQ3). Moreover, they are still in use and the inclusion of different years in the sample allows us to have a holistic view of the spatial condition of London's housing.

¹⁴ Pierre Bourdieu, *Outline of a Theory of Practice*, trans. Richard Nice (Cambridge University Press, 1977).

¹⁵ Roderick J Lawrence, 'The Social Classification of Domestic Space: A Cross-Cultural Case Study', *Anthropos*, January 1, 1981, 649–64; Roderick J. Lawrence, 'Domestic Space and Society: A Cross-Cultural Study', *Comparative Studies in Society and History* 24, no. 1 (1982): 104–30; Roderick J. Lawrence, 'The Comparative Analyses of Homes: Research Method and Application', *Social Science Information* 22, no. 3 (1983): 461–85, <https://doi.org/10.1177/053901883022003006>.

¹⁶ Roderick J Lawrence, 'The Organization of Domestic Space', *Ekistics*, January 1, 1979, 135–39; Roderick J Lawrence, 'Transition Spaces and Dwelling Design', *Journal of Architectural and Planning Research*, 1984, 261–71; Roderick J. Lawrence, 'What Makes a House a Home?', *Environment and Behavior* 19, no. 2 (1987): 154–68, <https://doi.org/10.1177/0013916587192004>; Roderick J Lawrence, 'Translating Anthropological Concepts into Architectural Practice', in *Housing, Culture and Design A Comparative Perspective*, ed. SETHA M LOW and ERVE CHAMBERS, 1989.

Analysis of Use and Experience

Besides the comparative matrices of floor plans (sc1) analysed together with the floor plan analysis, there are two supplementary components that follow the exploratory floor plan analysis. These are an online survey of housing experiences (sc2) and an interview-based study with select survey participants (sc3). Both methods are used to collect data about participants' uses and experiences of their homes and analysed in juxtaposition to the dimensional and spatial patterns identified in the floor plan analysis.

With these two supplementary components, my aim is to extend my approach to design standardization with insight from the user's perspective. In her 2013 review, 'Space as Receptor, Instrument, or Stage', Hilde Heynen provided a typology of the approaches to the relationships between the built environment and the social based on the ways the built form and the social are situated against each other.¹⁷ At the one end are studies that approach the built form as 'receptor', interested in the questions of how cultural norms and social organizations influence the form of the built environment. At the other end are studies that approach the built form as an 'instrument', interested in the ways social organizations and norms are influenced or actively shaped by the built form. My historical review of design standardization in relation to the user focused on the institutional forces and the production of built forms, e.g. how the historical and contemporary practices of housing design and development resulted in specific forms of housing and not others. In this way, it is grounded upon literature that views the built environment as an 'instrument'. The third one in Heynen's classification is the built form as 'stage', in which 'the impact of social forces on architectural and urban patterns is recognized while at the same time spatial patterns are seen as modifying and structuring social phenomena'. With the addition of an analysis of London's residents, my aim is to expand design standardization towards a 'stage'.

In exploring residents' use, experiences, and practices, I use both a quantitative (closed questions in the online survey) and a qualitative (open-ended questions in the online survey and semi-structured follow-up interviews) supplementary method in a sequential manner to achieve further insight into the experiences and practices of the user. While it is useful in obtaining general – and quantifiable – information on the type and layout of the home, household type, the changes made, the use and the availability of rooms, and the overall experience, it is also limiting. Surveys are naturally a result of assumptions and therefore, issues that are not explicitly asked, therefore, are often left aside. Follow-up semi-structured interviews help overcome these limitations and include questions about daily routines, particular uses of rooms, and experiences of individual spaces with participants selected from the online survey.

¹⁷ Hilde Heynen, 'Space as Receptor, Instrument or Stage: Notes on the Interaction Between Spatial and Social Constellations', *International Planning Studies* 18, no. 3–4 (2013): 342–57.

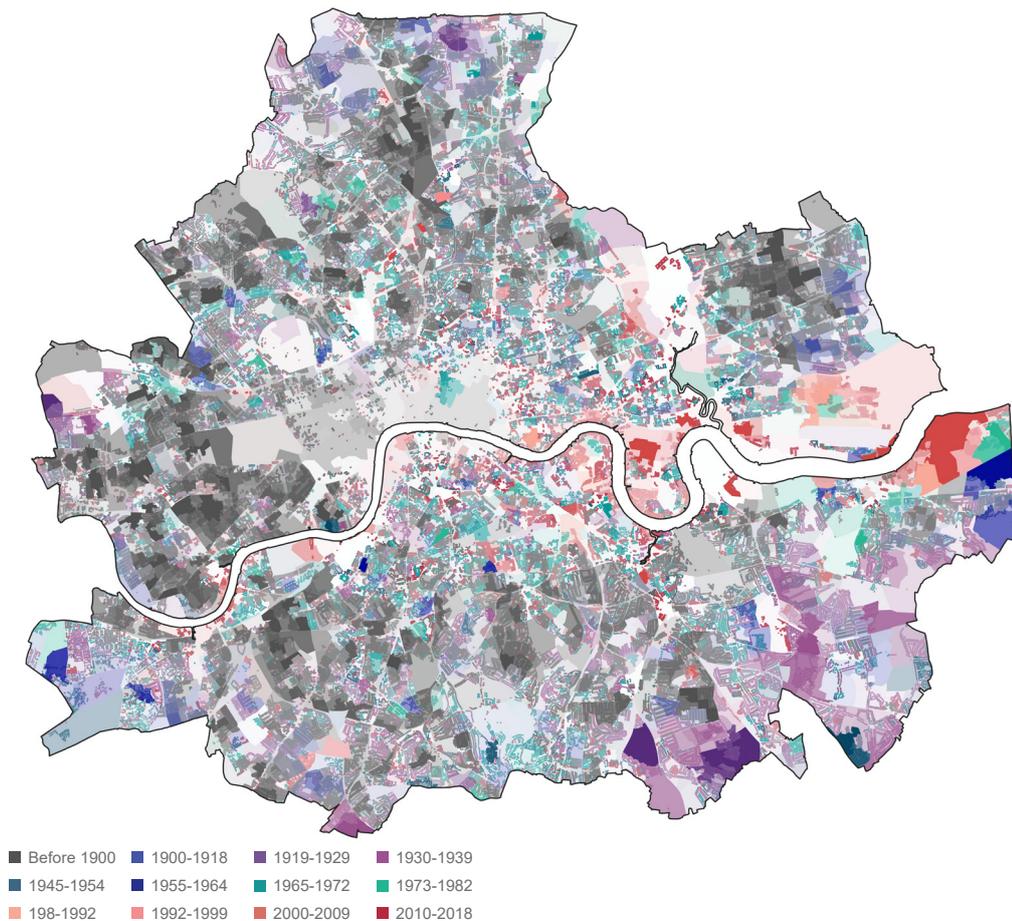


Figure 4.01—Dwellings in inner London. Different colours show the periods they were built in.

Theoretical Drive, Pacing, Mixing and Sampling

The aim of my empirical study is to explore design standardization in two directions: first, to explore its spatial aspects and enhance its description by providing an empirical basis, and second, to explore the issues from the user perspective. The floor plan analysis, including exploratory data analysis (cc) and comparative matrices (sc1), provides descriptions of the spatial patterns in the existing housing stock and serves the first direction. This is followed by the online survey (sc2) and the interview-based study (sc3) that are conducted one after another and written up together provide insight into people's use, experience, and practices of their homes and serves the second direction.

The two directions are connected to each other by their sampling frame. The research uses two separate samples: the floor plan sample and the online survey sample (from which interview participants are drawn). A two-sample strategy was adopted as it was not possible to reach the residents of housing units included in the floor plan sample due to stay-at-home restrictions, a time of one year between the phases of the research, and different needs of the two samples. However, to ascertain validity, both samples were drawn from the same sampling frame: online survey

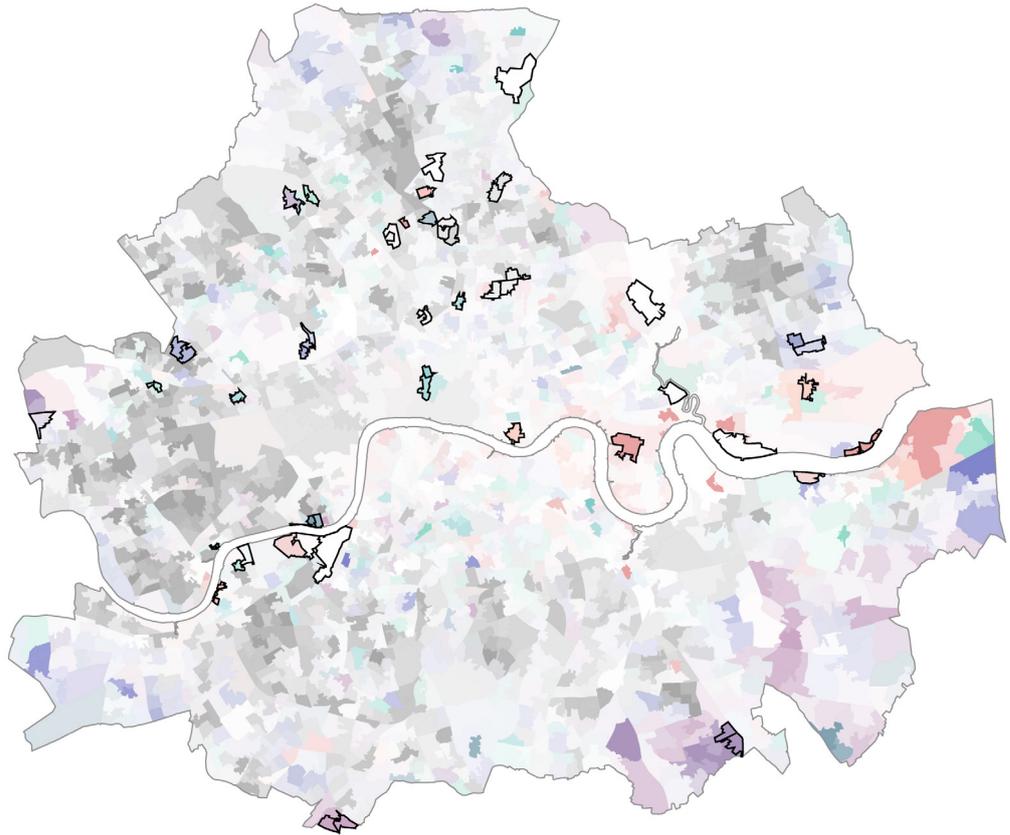


Figure 4.02—Selected LSOAs in inner London.

participants were recruited from neighbourhood groups on social media channels, from areas floor plans were sampled from.

I will now detail the sampling, data collection, modelling, and analysis steps of each method.

Sampling, Data Collection, Data Modelling, and Analysis

Floor Plan Analysis

Floor Plan Sampling

The sample for the floor plan survey was drawn from existing dwellings in twelve inner London boroughs: Camden, City of London, Greenwich, Hackney, Hammersmith and Fulham, Islington, Kensington and Chelsea, Lambeth, Lewisham, Newham, Southwark, Tower Hamlets, Wandsworth, and Westminster. As no building-level data was publicly available and as it was not possible to access the floor plan

of every housing unit, the sample was drawn using a stratified purposive sampling method. In the first step, LSOA-level built period statistics were used to define areas with different housing typologies. In sampling these areas a maximum variation sampling was adopted. A maximum variation sampling enables the identification of the extent and main characteristics of the population by deliberately including differences in the sample.¹⁸ Such a method is appropriate for exploring the spatial patterns in London's housing. In the second step, convenience sampling was adopted. The floor plans were sampled based on their accessibility and availability.

To assess building typologies, the Valuation Office Agency's Stock of Properties statistics, in particular, the property built period statistics given at Lower Layer Super Output Area (LSOA) level, were used.¹⁹ The built periods provided in these statistics are pre-1900, 1900–1919, 1920–1929, 1939–1939, 1945–1954, 1955–1965, 1966–1972, 1973–1982, 1983–1992, 1993–1999, 2000–2009, and 2009–2018. These categories largely overlap with major changes in housing policies and programmes and are therefore convenient proxies for building typologies. Moreover, most of the categories cover only a decade, sufficiently short time periods to observe changes in building typologies.

In the first step, LSOAs in which at least 60% of the buildings were built in the same period were selected. This meant that the selected areas were characterised by a repetition of building typologies: for example, identical rows of terraced housing, large council housing and mid-century estates, or large newer housing developments with limited building typologies and dwelling layouts (Figure 4.01).

The most homogenous 10 LSOAs for every built period were then further analysed. They were first visually analysed using historical Ordnance Survey maps spanning the period from the 1840s to the 1990s²⁰ as well as Google Maps satellite views in order to verify the extent of repetition of building typologies within the chosen areas and to ensure that a diversity of areas with different building typologies within the same built period were included. And second, they were analysed for the availability of floor plans by searching the respective borough planning departments' online services to understand the number and type of planning applications submitted. No set proportion of available floor plans to the number of units in LSOA was used as a cut-off limit; instead, for every built year category a different approach was adopted. For LSOAs in which the majority of dwellings were built after 1982, it is assumed that the original standard unit types have typically not been modified, extended, or changed. Therefore, standard unit types are assumed to be representative of the whole development. In contrast, for LSOAs in which the majority of dwellings were built before 1939, it is assumed that most of the dwellings have been modified, extended,

¹⁸ Lisa M Given, ed., *The SAGE Encyclopedia of Qualitative Research Methods* (Thousand Oaks, CA: SAGE, 2008), 697–98; Howard S Becker, *Tricks of the Trade: How to Think of Your Research While You're Doing It.* (Chicago: Chicago University Press, 1998).

¹⁹ Valuation Office Agency, 'CTSOP 3.1: Number of properties by Council Tax band, property built period and region, county, local authority district and lower and middle super output area', in *Council Tax: Stock of Properties*, 2018, <https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2018>.

²⁰ Digimap Ordnance Survey Collection, <https://digimap.edina.ac.uk/>.

or changed, and therefore are not identical. In these areas, a higher number of floor plans were sought to be sampled. Moreover, for LSOAs in which the majority of dwellings were built before 1939, the visual analysis showed the existence of different variations of terraced houses with a different number of storeys and frontages and these differences were prioritized to diversify the sample.

Based on these, 37 homogenous LSOAs in which the majority of the building were built in the periods up to 1939 and after 1981 and for which a sufficient number of plans could be gathered were identified. For LSOAs largely built between 1945 and 1981, the planning applications returned no results, as not many of them went through modifications that required planning permission, and the original planning documents were not available online. For these LSOAs, the visual analysis was repeated, but the availability of floor plans was checked on the UK's largest online property website, Rightmove (rightmove.co.uk).²¹ Housing built in these periods also varied in their typologies. Inclusion of high-rise, low-rise, gallery-access, core-access buildings, buildings with flats and maisonettes and houses were prioritized to diversify the sample. Moreover, they varied in terms of the alterations they went through. While it was clear that in some LSOAs most buildings remained unchanged, in others changes to the interior had been made. In these LSOAs, a higher number of dwellings were sought to be sampled. As a result, 15 LSOAs were selected.

Finally, 52 LSOAs were identified (Figure 4.02, for a detailed breakdown, see Appendix A). In the second step, every available floor plan was collected. 3,031 dwelling plans for the years before 1939 and 1,418 for those after 1982 were collected from the respective boroughs' planning departments' online services, including the Greater London Authority (in cases of large-scale housing regeneration schemes). For the periods between 1945 and 1981, 829 dwelling plans were collected from rightmove.co.uk.

The floor plan survey, despite all my efforts to construct a representative sample that included all the variety of London's housing stock, remains limited. First, the dwellings built in the past forty years were limited to very large housing developments, as the selection was made at the LSOA level. Many smaller developments were not taken into consideration. We know that the majority of dwellings in London are provided by a few companies who use standardized unit portfolios and these companies often operate on larger sites.²² Second, there is a bias in the dwellings from the older stock towards those that had been remodelled, extended, and converted recently. The data for the older housing stock was drawn from planning applications, and in most boroughs, only applications made in the past fifteen years were available online. Perhaps the most evident result of this is the geographical (and, for the succeeding steps, demographic) bias: most LSOA dwellings are drawn from LSOAs north of the Thames. Certainly, the planning application systems of different boroughs need to

²¹ For the areas built between 1945 and 1982 there were very few planning applications.

²² Leishman, Hughes.

be counted as an additional factor, but this difference largely stems from the flow of gentrification in London.²³ In addition to these, many of the floor plans from the older housing could not be converted into data because of the quality of the original plans.

My floor plan sample is also limited in that it could not access the lower end of the housing market in which the issues with design and dwelling sizes are most felt.²⁴ Similarly, while tenure and financing play important roles in the ways design standardization contexts are constructed, in the construction of the sample, these were not considered thoroughly. Some issues, such as Build to Rent, emerged as the result of the floor plan survey. Additional comparative studies, especially of affordable housing, housing built for sale and housing built to rent, analysed by mixed-tenure and mono-tenure, would be useful to close these gaps.

Recognizing these limitations in my discussion, I remain cautious when making generalizations and highlight the geographical specificity of inner London. When reporting the results, I indicate the areas in which statistical significance might be further sought.

Floor Plan Data

The 5,278 dwelling unit plans were converted into dimensional and numerical data using machine learning algorithms provided by two companies, Archilogic and Archilyse.²⁵ The floor plans were first digitized with the machine learning-based algorithm Archilyse provided, and then the data was extracted from these models with the algorithm Archilogic provided.

For each of the 5,278 floor plans collected, Archilyse provided room-level data including 1) the net floor area, 2) the dimensions of the minimum bounding rectangle (width and length), 3) the circumference, 4) the total window length, 5) the number of doors (including the IDs of rooms the doors open on to) and 6) the number of kitchens, bathroom elements and staircases. A 'room' is defined as a space bounded and separated from others by walls and connected to others by doors. Therefore, rooms that are separated from each other by openings other than doors were counted as only one room. For instance, connected living and dining areas or entrance halls partially separated from living rooms were counted as single rooms. At the same time, built-in storage, which meets the criteria of a 'room' (enclosed by walls and separated by a door), were counted as separate rooms in the raw dataset.

The exploratory data analysis started with room-level data. Through an iterative process – ordering, data visualization, controlling data against original floor plans,

²³ Jonathan Reades, Jordan De Souza, and Phil Hubbard, 'Understanding Urban Gentrification through Machine Learning', *Urban Studies* 56, no. 5 (2018): 934-937. <https://doi.org/10.1177/0042098018789054>.

²⁴ Mariana Schiller and Mike Raco, 'Postcolonial Narratives and the Governance of Informal Housing in London', *International Journal of Housing Policy*, 2020, 1–23.

²⁵ Archilogic, <https://www.archilogic.com>. Archilyse, <https://www.archilyse.com/>.

generating new measurements – the data was further modelled. In this process, attention was paid to generate categories that can be compared to the historical review of standardization.

In modelling the data, first, a number of other data points were calculated. These include 1) compactness that indicates the shape of the room, 2) adjacent and connected rooms that indicate layout, 3) room function, 4) the net floor area calculated together with built-in storage, 5) width and length of the minimum bounding rectangle calculated together with built-in storage. Table 4.03 describes the given and calculated data points and how they were calculated.

A key calculation at room level was the room function. To label the room functions, I developed a step-by-step decision tree (See Figure 4.03). First, any room with bathroom elements (shower, bathtub, WC) was given the label ‘bathroom’ and any room with kitchen elements (kitchen counter with sink) was given the label ‘kitchen’. Second, any room without a window was labelled either as ‘storage’ or ‘circulation’. To distinguish between these two labels, criteria such as the number of doors, room shape (width/length ratio, compactness), and net floor area were used. Any remaining rooms with windows were given the label ‘room’, with the exception of rooms smaller than 4 m² (labelled as ‘storage’) and with the compactness of less than 0.4 (labelled as ‘circulation’).²⁶

Storage areas with a floor area smaller than 1.5 m² that open onto one of the rooms were considered as built-in storage, and they were merged with the room they open onto.²⁷ After this, a composite net floor area and composite width and length of the minimum bounding rectangle were calculated for every room. The rooms were further differentiated into categories based on the composite net floor areas of the rooms and their widths (the width of the minimum bounding rectangle). The rooms with a floor area larger than 12 m² and a width larger than 2.5 m were labelled as double rooms, the remaining rooms with a floor area larger than 8 m² and a width larger than 2.15 were labelled as a single room, and all other remaining rooms were labelled as small rooms.²⁸

To distinguish kitchens that are also used as a living room from those used solely as a kitchen, in the second step a set of criteria, including the number of rooms and the net floor area of kitchens, were used. Accordingly, any ‘kitchen’ in dwellings with no rooms was labelled as ‘studio’, any ‘kitchen’ with a net floor area between 14 and 18 m² in dwellings with one room was labelled as ‘small living-in kitchen’, and any ‘kitchen’ with a net floor area larger than 18 m² in dwellings with more than one room

²⁶ These thresholds were developed through exploratory data analysis.

²⁷ I checked the plans in which this problem occurred and determined that the 1.5 m² threshold is a suitable definition for built-in storage in comparison to other room sizes.

²⁸ This followed the dimensions set in: Design for London, *London Housing Design Guide* (London: London Development Agency, 2010).

Table 4.03—Collected, provided and calculated data points and their descriptions.

Room Level Data Points	
Provided	
Net floor area	
Width of the minimum bounding rectangle	
Length of the minimum bounding rectangle	
Point coordinates of the minimum bounding rectangle	
Circumference,	
Total window length	
Number of doors	also includes the IDs of rooms the doors open to
Number of kitchen elements	
Number of bathroom elements	
Number of staircases	
Calculated	
Compactness	compactness is calculated as: floor area (c) / (width (d) * length (e))
Adjacent Rooms	Adjacent rooms are calculated geometrically based on minimum bounding rectangles. The data includes the number, ID, and type of the adjacent rooms.
Connected Rooms,	Connected rooms are calculated based on room IDs of rooms the doors open to. The data includes the number, ID, and type of connected rooms.
Room Function	see decision tree (Figure 4.02)
Composite net floor area	composite net floor area is the sum of net floor areas of the room and the built-in storage rooms with floor area less than 1.5 m ²
Composite width of the minimum bounding rectangle	composite width of the minimum bounding rectangle is the width of the geometric sum of the minimum bounding rectangles of the room and the built-in storage rooms with floor area less than 1.5 m ²
Composite length of the minimum bounding rectangle	composite length of the minimum bounding rectangle is the length of the geometric sum of the minimum bounding rectangles of the room and the built-in storage rooms with floor area less than 1.5 m ²
Dwelling Level Data Points	
Collected	
Location	Lower Layer Super Output Areas (LSOA)
Built year	VOA statistics are published for the property built periods: pre-1900, 1900–1919, 1920–1929, 1939–1939, 1945–1954, 1955–1965, 1966–1972, 1973–1982, 1983–1992, 1993–1999, 2000–2009, and 2009–2018.
Provided	
Width of the minimum bounding rectangle	
Length of the minimum bounding rectangle	
Calculated	
Number of rooms	The total number of rooms is calculated as the number of habitable rooms, that is the total number of rooms and habitable kitchens, i.e. studio, small living-in kitchens, living-in kitchens, and kitchen floors.
Net floor area	net floor area is calculated as the sum of the floor areas of all rooms except balconies and gardens
Entrance	entrance is the calculated as the room with a door opening to no other room
Circulation	circulation is calculated as the room that has the largest number of connections

was labelled as 'living-in kitchen'.²⁹ In multiple-storey dwellings, the living areas with open kitchens that occupy the whole floor, regardless of their size, were labelled as 'kitchen floor'. The 'kitchens' that did not satisfy these requirements were labelled as 'working kitchens'. In dwellings with 'working kitchens', a potential living room was identified among the rooms. In one-storey dwellings the largest room, and in multiple-storey dwellings the largest room on the ground floor, or the room that is directly connected to the kitchen, were identified as living rooms.

Based on the data at the room level, further data points at the dwelling level were calculated. These were iteratively compared to the original floor plans to verify their validity. These include 1) the number of habitable rooms, 2) the type of rooms, 3) the kitchen type, 4) the entrance, 5) the circulation area, and 6) the grouping of functions. The number of habitable rooms was calculated as the total number of rooms including habitable kitchens, i.e. studio, small living-in kitchens, living-in kitchens, and kitchen floors. The entrance was defined as the room with a door opening to the outside, the circulation area was defined as the room that has the largest number of connected rooms, and the grouping of functions was defined as whether the bedrooms were grouped together.

Assessing the data, some of the floor plans were eliminated from the dataset. First, the required data points could not be fully extracted from all of the floor plans. These were mostly related to the different drawing conventions used in the original floor plans. These were excluded from the analysis. In the case of multi-storey dwellings, whenever a plan was eliminated, the whole set of floor plans that belonged to the same dwelling was excluded. Second, there were a few cases with exceptionally large or small dwelling sizes (total net floor area) compared to other housing in the same LSOA and with the same number of habitable rooms. Comparing the data against the floor plans showed that these anomalies resulted from either an incorrect scaling of floor plans or the inclusion of balconies, gardens, and terraces in the total floor area calculation. In the case of the former, the plans were omitted from further analysis, and in the case of the latter the balconies, gardens, and terraces were removed, and the internal floor areas were recalculated. While these cast doubt on the accuracy of the floor plans, randomly selected 100 plans showed that the dimensions were accurate within a 5 m² margin.

In its final form, a total of 1,840 plans were eliminated from the initial dataset of 5,278 floor plans. It is important to point that most of the eliminations were in houses and maisonettes of the older housing stock (Appendix A).

Other floor plans are eliminated from the analysis presented in this thesis. In its final form, the sample was analysed in relation to the number of habitable rooms (1R, 2R, 3R, 4R, 5R, 6R) and dwelling typology, which, for the purpose of this analysis, were

²⁹ This decision was based on a study of kitchen classifications with different numerical values. In a smaller sample of kitchens, 18 and 14 m² gave the most accurate classification.

Kitchen and Bathroom Elements	Window (wn)	Compactness (c)	Floor Area (A)	Width (w)	Width/Length Ratio (w/l)	Staircase (s)	Doors (d)	No Rooms (r)		
Bathroom Element									Bathroom	
Kitchen Element			$A \geq 18$						Dining Kitchen	
			$14 > A \geq 11.5$					$r = 2$	Small Dining Kitchen	
								$r \neq 2$	Kitchen	
			$A < 11.5$						Kitchen	
None	TRUE	$c \geq 0.4$				$s > 0$			Vertical Circulation	
						$s = 0$		Corridor		
			$c < 0.4$	$A \geq 11.5$	$w \geq 2.55$					Double Room
					$2.55 > w \geq 2.15$		$s > 0$			Vertical Circulation
							$s = 0$			Single Room
					$w < 2.15$		$S > 0$			Vertical Circulation
							$s = 0$			Corridor
				$12 > A \geq 8$	$w \geq 2.15$		$s > 0$			Vertical Circulation
							$s = 0$			Single Room
					$w < 2.15$		$s > 0$			Vertical Circulation
							$s = 0$			Corridor
				$8 > A > 4$	$w > 0.90$	$w/l \geq 0.5$	$S > 0$			Vertical Circulation
							$s = 0$	$d > 2$		Storeroom
								$d \leq 2$		Small Room
						$w/l < 0.5$	$s > 0$			Vertical Circulation
							$s = 0$			Corridor
			$w < 0.90$					Storeroom		
		$A < 4$	$w > 0.90$		$s > 0$			Vertical Circulation		
					$s = 0$			Corridor		
			$w < 0.90$					Storeroom		
	FALSE		$w < 0.90$					Storeroom		
			$w > 0.90$	$w/l < 0.5$	$s > 0$			Vertical Circulation		
					$s = 0$			Corridor		
				$w/l \geq 0.5$	$s > 0$			Vertical Circulation		
					$s = 0$	$d > 2$		Corridor		
						$d \leq 2$		Storeroom		

Figure 4.03—Decision tree for calculating room function.

defined as one-, two-, and three-storey dwellings (1S, 2S, 3S) to make comparisons more consistent and overcome some of the difficulties in labelling room functions. Classifying buildings in terms of the number of habitable rooms in them, calculated as the total number of rooms and habitable kitchens, enabled more consistent comparisons between dwellings with working kitchens and live-in kitchens, as having a working kitchen often means that one of the rooms is designated as a living room. Similarly, classifying dwellings in terms of the number of storeys allowed differences in layouts to be compared. Dwellings with more storeys (40 dwellings) and dwellings with more habitable rooms (51 dwellings) in the dataset were eliminated from the analysis due to their small number. Finally, 3,438 floor plans were used for further analysis. This equals 1139 flats and 868 houses and maisonettes (n=2,007). Most of the sample is made up of dwellings with two (428), three (626), and four (320) habitable rooms. There is a comparatively small number of dwellings with one (57), five (170) or six (86) rooms. Similarly, most of the sample is made up of one-storey dwellings (1,139), and there is a comparatively small number of two- (481) and three-storey (100) dwellings. ReShare, the online repository of the UK Data Service will be used for the long-term preservation and sharing of this final dataset.

Online Survey of London Residents

Participants were recruited from neighbourhood and housing estate groups on Facebook corresponding to the areas floor plans were sampled from. The online survey included questions on 1) the type of dwelling; 2) the layout of dwelling; 3) the arrangement and sizes of the living areas and bedrooms; 4) the availability of space for activities; 5) the changes made in the dwelling; 6) the type of household and occupancy, and 7) the experience of the dwelling size (the full list of survey questions can be found in Appendix B).

In developing survey questions, specific attention was paid to the creation of categories consistent with the categories developed in the floor plan analysis and the historical review of standards, such as the organization of living space and the size of rooms.³⁰ For instance, questions such as ‘To what type of room does the entrance door open?’, ‘Are there any corridors in your flat?’, ‘Do you have to cross the living area to access any bedrooms?’ were used to identify the layouts. As it was unreasonable to expect people to give exact sizes or provide dimensions, the questions that pertain to the size and layout of dwellings were framed in terms of activities and furniture. For instance, the number of people the respondents can comfortably host was used as a proxy for living area size. ‘Are you able to fit a single bed and a desk to the smallest bedroom in your house?’ were used as a proxy for room size.

³⁰ Jolene D Smyth, 'Designing Questions and Questionnaires', in *The SAGE Handbook of Survey Methodology*, ed. Christof Wolf et al. (London: SAGE, 2016).

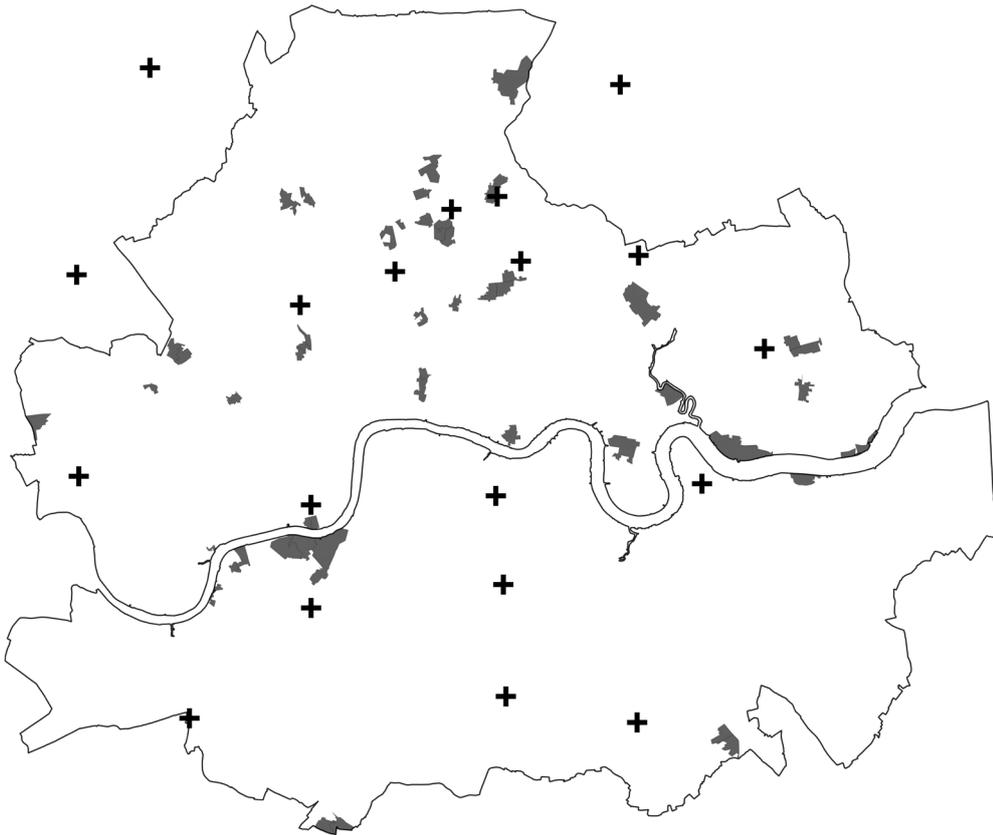


Figure 4.04—The locations mentioned in the names of community groups and the LSOAs from which the floor plans are sampled.

The survey was conducted when the ‘stay-at-home’ restrictions resulting from the coronavirus pandemic were in place. This meant that the experience of homes was quite different from what they would ‘normally’ be. This posed both a challenge and an opportunity to understand residents’ experiences. The questionnaire was organized in such a way as to highlight the changing experiences of the respondents to enable them to reflect on their previous experiences. As such, the questionnaire included questions relating to working from home, self-isolation, the changes made during the pandemic, and the limitations these imposed. Questions regarding such issues were also incorporated into the follow-up interviews. These provided valuable information on the impact of the pandemic and the limitations for the existing household, questions that have been attracting wide attention.

In addition to these, the respondents were asked to rate the size of their dwelling in relation to their needs on a 7-point scale, based on their experiences both before and during the pandemic. This was the only question (except the open-ended questions) that enquired into the residents’ perceptions of their dwellings and was used as a dependent variable in the analysis of the survey. Comparing them to other questions that relate to the size of dwelling and rooms helped to understand how residents rate their dwellings and what criteria most influence their perception of their dwellings.

The questions mentioned above were driven by the aim of identifying interview respondents who live in dwellings with standard and non-standard layouts, and in dwellings of different sizes. These were analysed using paired visualizations and two-way tables. In addition to these, four open-ended questions were included. Two of these questions asked about the changes residents made to their homes when they moved in, and the other two asked about the changes and limitations residents made to their homes during the lockdown. The first group of questions informed the discussion of how users convert and refurbish their dwellings, and the second group of questions were used to give thick descriptions of residents' use and experiences. They were open coded together with the interview data.

A total of 269 people took the survey and 234 of them reported that they live in London. The analysis is based only on the responses of those living in London (Appendix E). The survey responses, in particular, the answers to open-ended questions showed wide diversity in terms of their experiences of home ranging from people, who experienced a significant lack of space to people who had multiple spare rooms. However, those who indicated their willingness to participate in a follow-up interview were people, who mostly had no major problems.

Follow-up Interviews

At the end of the survey, the participants were asked whether they would be willing to participate in a follow-up interview and asked to leave their contact information, if so. A total of 97 people expressed their willingness to do this. Among these, the interview participants were purposely selected for maximum variation to include people living in different types of dwellings (flats, houses, and maisonettes with different numbers of bedrooms), dwellings experienced as small and large, dwellings with standard and non-standard layouts (as determined in the previous chapter), and people who had undertaken major refurbishment (based on their answers to the open-ended questions). For each group identified, a number of people from different demographics were also invited to participate. Maximum variation sampling was appropriate for this, as the aim was to understand the experience of living in both standard and non-standard dwellings and how different households use and experience these home designs. Invitations were sent to 75 participants, in three phases. In each consecutive phase, those who responded were interviewed, and others who either did not respond ($n=44$), expressed reasons for not being able to attend ($n=6$), or scheduled but did not show up for the interview ($n=4$) were replaced with another respondent who had given similar responses in the online survey. The recruitment process stopped after data saturation was reached – no new insights were obtained in the final two interviews – and after all the potential replacements had been contacted. Finally, a total of 22 participants (including one couple) participated in follow-up interviews. A breakdown of the interview respondents is shown in Table 4.04. While the interview participants, in its final composition, show a great variety of

Table 4.04—Interview participants.

Pseudonym	Number of Bedrooms	Dwelling Type	Household Type	Age
Erin	1 bedroom	New-built flat	One-person household	18-25
Filippo	3 bedrooms	Mid-century house	Living with other unrelated adults	26-45
Kelly	3 bedrooms	Converted maisonette	Living with partner/spouse and with dependent children	26-45
Elpida	2 bedrooms	New-built flat	Living with other unrelated adults	26-45
Hannah	1 bedroom	Converted flat	Living with partner/spouse and with no children	26-45
İdil	2 bedrooms	Converted flat	Living with partner/spouse and with no children	26-45
Eylül	1 bedroom	Converted flat	Living with other unrelated adults	26-45
Carrie & Callum	2 bedrooms	Converted flat	Living with partner/spouse and with dependent children	26-45
Marion	2 bedrooms	Converted flat	Living with partner/spouse and with no children	26-45
Roshini	More than 4 bedrooms	Refurbished house	Living with partner/spouse and with dependent children	26-45
Keela	1 bedroom	Converted flat	Living with partner/spouse and with no children	26-45
Vittorio	4 bedrooms	Converted flat	Living with other unrelated adults	26-45
Lola	2 bedrooms	Converted maisonette	Living with partner/spouse and with no children	26-45
Ryan	3 bedrooms	New-built house	Living with partner/spouse and with no children	26-45
Zenan	3 bedrooms	Converted maisonette	Living with other unrelated adults	26-45
Marc	2 bedrooms	New-built flat	One-person household	26-45
Rachel	3 bedrooms	Mid-century house	Living with other unrelated adults	26-45
Jacob	More than 4 bedrooms	Refurbished house	Living with partner/spouse and with dependent children	46-65
Ellen	More than 4 bedrooms	Refurbished house	Partner and lodger	65+
Irini	3 bedrooms	Refurbished house	Living with other unrelated adults	26-45
Fredrik	2 bedrooms	Mid-century house	Living with partner/spouse and with no children	26-45

house and household types, some groups are less represented, especially people who rated their dwelling very low (2) and people aged over 46 (2).

While the online survey received a substantial number of responses, the uptake was significantly low in interviews that were conducted when the restrictions had been relaxed. Three months passed between the online survey and the interviews. In three months, many participants had changed houses, moved out of London or gone back to work; schools had opened, or they had lost interest in taking part in interviews. Further research should take the timing of the survey and interviews into account. Moreover, due to the same limitations, demographics hardest hit by the pandemic were not easy to access. Even though some of the interview participants were not born in the UK, the participants were mostly white and gave the impression of being middle class (based on their professions and where they live). While some methods to reach those, who were hardest hit by the pandemic could be developed, these were limited by time constraints and the pandemic restrictions. It is also worth considering that the floor plan sample could not reach the lower end of the housing market. In discussing the analysis of the sample, specific attention was paid to highlight the nature of the sample. One particular aspect that was deliberately not studied is disability, as there are already highly detailed and robust studies focusing on the relationship between accessibility standards and disabled people.

Interviews were held between August and October 2020. Before the interviews a semi-structured interview guide (Appendix D) based on the following topics was created: a) the use of dwellings before and during the pandemic; b) the suitability of dwelling sizes, types, and layouts to household needs; c) the preference for different living area arrangements; d) the changes made. An informed consent form was sent out with the invitation and the interview participants were also asked to provide a floor plan of their dwellings. Except for three participants, they all provided floor plans. This helped to provide an understanding of the experience and practices of the residents in relation to the physical properties of dwellings. Before starting the interview, I introduced myself and the research and went through the key points regarding anonymity and confidentiality mentioned in the consent form. The interviews lasted between 15 and 40 minutes. All interviews were conducted via Zoom, recorded and transcribed.

Aspects relevant for answering the research question were first grouped following the classification of the floor plan survey, such as dwelling size, living area arrangements, bedrooms, layouts, and use before and during the lockdown, and then open-coded starting from the first interview. The codes were later clustered and will be discussed in the following sections.

5

Form and Extent of Design Standardization in London

This chapter, together with the next one, focuses on the dimensional and organizational analysis of the existing housing stock in London in order to explore the form and extent of design standardization. In this first empirical chapter, I outline and discuss the findings of my exploratory floor plan analysis, focusing on the dimensional and organizational repetitions in the designs of existing housing stock.

My discussion here is, first, confirmatory: in what ways do design features in the existing housing stock correspond to the standards and conventions identified? As I have discussed, design standardization has focused primarily on dwelling sizes, room dimensions, and the organization of rooms. However, we have limited empirical ground to relate design standardization to housing design outcomes. While dwelling sizes in the UK, for instance, have been studied repeatedly, our knowledge about its interiors in general, its rooms and its organization is limited.¹ My analysis of dwelling

1. W V Hole and J J Attenburrow, *Houses and People: A Review of User Studies at the Building Research Station* (London: Ministry of Technology Building Research Station, 1966); Barry Goodchild and Robert Furbey, *Housing in Use: A Study of Design and Standards in the Public Sector* (PAVIC Publications Sheffield City Polytechnic Department of Education Services, 1987); Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 1', *Construction Management and Economics* 1, no. 2 (1983): 119–44; Ellen Leopold and Donald Bishop, 'Design Philosophy and Practice in Speculative Housebuilding: Part 2', *Construction Management and Economics* 1, no. 3 (1983): 233–68; Valerie Karn and Linda Sheridan, 'New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing' (Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994); Andrew Drury and Eleanor Somers, 'Room to Swing A Cat' (HATC Ltd, 2010); Rebecca Roberts-Hughes, 'The Case for Space: The Size of England's New Homes' (Royal Institute of British Architects, 2011); Malcolm Morgan and Heather Cruickshank, 'Quantifying the Extent of Space Shortages: English Dwellings', *Building Research & Information* 42, no. 6 (2014): 710–24; Mark Crosby, 'Space Standards for Homes' (London: Royal Institute of British Architects, 2015).

types and sizes, room types and sizes, and the organization of rooms contribute to filling this gap.

Second, it is exploratory: does an analysis of the existing housing stock tell us more about the standardization processes? Despite my efforts to outline a comprehensive view of design standardization, my definitions remain limited. Much of the existing literature situate housing outcomes within a state-market dichotomy, drawing attention to shrinking dwelling sizes and standardized units used in the private sector and non-thorough application of formal standards, and the complications in design. While these certainly shape the housing outcomes in general, can differences, outliers, and residuals tell us about other standardization processes?

This chapter is ordered according to the design standardization categories that emerged in the introductory chapters: the size of dwellings, the sizes and dimensions of living areas (kitchens and living rooms), and the layouts of dwellings. I discuss each of them in relation to data visualizations that make up my exploratory floor plan analysis and support them with floor plan matrices. I conclude this chapter by outlining the commonalities and differences observed in the sample.

London's Housing Stock

Size of Dwellings

In the sample, overall, the distributions of dwelling sizes are consistent with a sampling approach that seeks maximum variation: the range of dwelling sizes is significantly wide and generally increases with the number of rooms and storeys (Figure 5.01). Generally, the largest dwellings have more than double the floor area of the smallest dwellings with the same number of floors and habitable rooms; the difference between the largest and smallest dwellings is 48 m² in one-storey one-room and 117 m² in two-storey four-room dwellings (Table 5.01).

Despite this, there are also particular dwelling sizes that occur significantly more frequently. Especially in those dwelling types for which the sample size is comparatively higher, dwelling sizes have a distinct peak, i.e. clustered, near the median and decline rapidly. The distributions are skewed to the right, i.e. most dwelling sizes are in the lower end of these ranges. This means that the differences between dwellings in the upper end of the housing market are *quantitatively* larger than the differences between those in the lower end. For instance, in one-storey three-room dwellings, the middle fifty per cent of dwelling sizes are spread in a range of 14 m², between 62 m² and 76 m², whereas the overall sizes are spread within a range of 75 m², between 38 m² and 113 m². Such distributions are expected. While a trade-off between cost (which entails the minimization of dwelling sizes) and an acceptable size is central to the

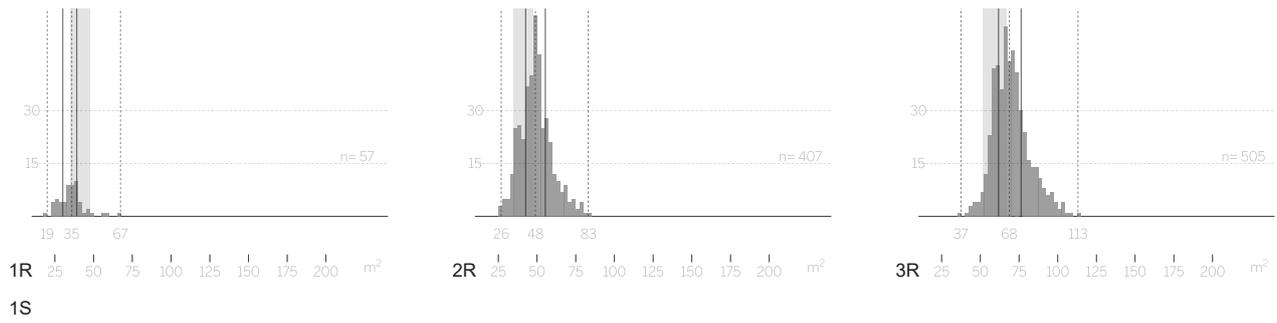
lower end and middle part of the housing market, at the upper end of the market cost becomes less important.

In analysing the sizes of dwellings, I will take interquartile range, the middle fifty per cent on both sides of the median, as an approximation of an agreed-upon, common size range, dividing the dwelling sizes into those that are below (lower quartile, Q1) and those that are above it (upper quartile, Q3). This type of clustering fit a standardization model for reasons that will become clearer below.² Certainly, the interquartile ranges are still wide and increase with the number of habitable rooms and number of storeys. The interquartile range of dwelling sizes is 22 m² in one-storey four-room dwellings, 26 m² in two-storey three-room dwellings, and 32 m² in two-storey four-room dwellings. Considering the recommended minimum size of a double bedroom, 12 m² in the *London Housing Design Guide*, these ranges indicate that the agreed-upon dwelling sizes might vary to a significant degree.³ Here, it is important to note two things that might explain these variations. First, in the analysis, the dwellings are grouped by habitable rooms without considering the number of occupants they are designed for. Second, the sample is drawn from different building typologies that were built in different periods and standardization contexts. Before exploring these two issues, it is useful to understand what these ranges mean by comparing them to the existing calculated minimum dwelling size standards.

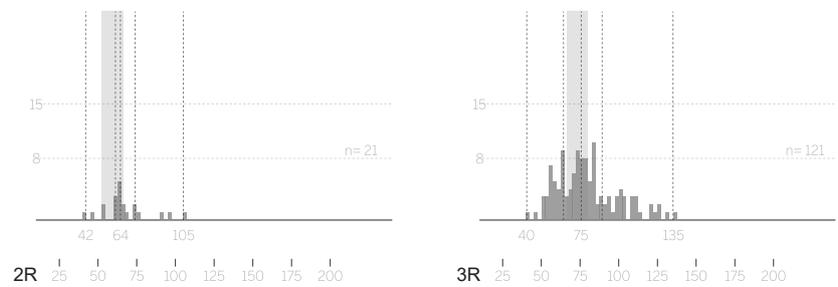
The interquartile range in each dwelling type overlap with and exceed, to different extents, the minimum recommended dwelling sizes calculated from the *London Housing Design Guide* (Table 5.02). In one-storey dwellings, except one-room dwellings, the median sizes often correspond to the higher end of the space standards. In multiple-storey dwellings, the median often corresponds to the middle of the space standards range. It is no surprise that dwellings with a greater number of habitable rooms are, in general, larger than the minimum recommended space standards as they tend to be for a sector of the housing market in which dwelling sizes are determined by factors other than a functional necessity. Moreover, one-storey one-room and two-storey two-room dwellings have different relationships from other dwellings with a greater number of rooms. Neither of these dwelling types is registered in current or historical space standards. One-storey, one-room dwellings in our sample refers to dwellings with only one habitable room, used as a kitchen, living room, and bedroom at the same time. The *London Housing Design Guide* does not differentiate between one-room (studio) and two-room (one-bedroom) one-storey dwellings, the smallest dwelling size being 37 m². While in principle they might have smaller floor areas, as the different functional spaces overlap more, the difference between the functional minimum dwelling sizes and the distribution of dwelling sizes in the sample cannot

2. The interquartile clustering is compared to Jenks algorithm and the results showed more skew to right. Interquartile clustering is preferred as the resulting clusters fit better to the properties of standardization. George F Jenks. 'The Data Model Concept in Statistical Mapping', *International Yearbook of Cartography* 7(1967): 186 – 190.

3. Design for London, *London Housing Design Guide* (London: London Development Agency, 2010), 92–103.

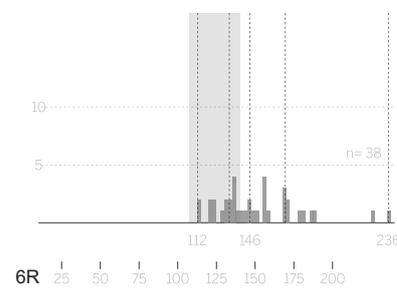
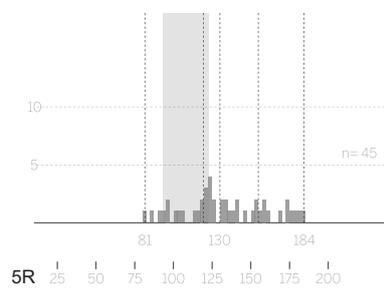
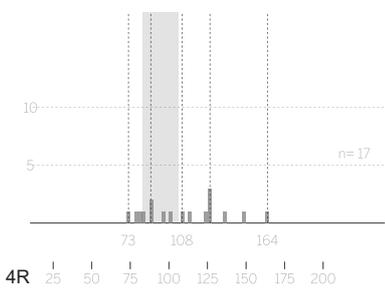
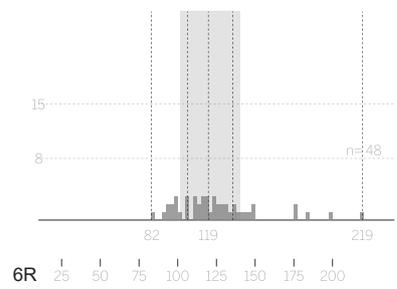
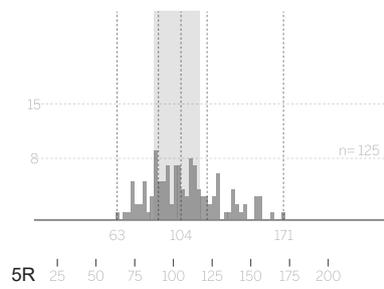
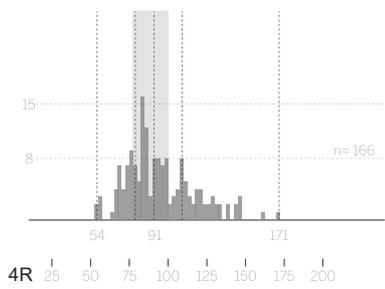
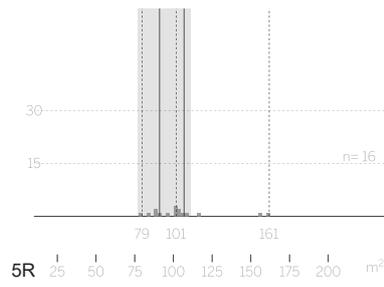
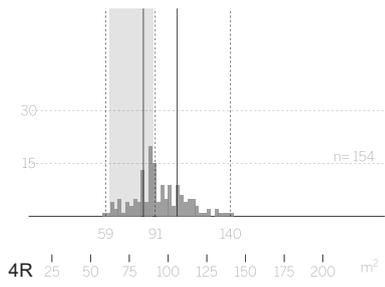


1S



2S

Figure 5.01—Distribution of net dwelling sizes grouped horizontally by the number of habitable rooms (1R, 2R, 3R, 4R, 5R, 6R), and vertically by the number of storeys (one-storey, two-storey, three-storey). Dashed vertical lines correspond to minimum, lower quartile, median, upper quartile, and maximum values. Solid grey areas show to the corresponding space standards ranges calculated from the *London Housing Design Guide*. Number of observations are given individually (n).



3S

Table 5.01—Dwelling sizes by dwelling types.

	N	Mean	Min	Q1	Median	Q3	Max	IQR	Range
1S 1R	57	35.7	19.9	30.1	35.9	39.1	67.3	9.0	47.4
1S 2R	407	49.5	26.9	42.7	49.0	55.4	83.1	12.7	56.2
1S 3R	505	70.1	37.5	61.8	68.8	76.3	113.1	14.6	75.6
1S 4R	154	94.7	59.7	84.0	91.7	105.8	140.3	21.8	80.7
1S 5R	16	105.5	79.8	91.1	101.9	106.9	161.9	15.8	82.1
2S 2R	21	67.4	42.0	61.3	64.5	74.0	105.1	12.8	63.1
2S 3R	121	79.4	40.6	64.4	75.7	89.3	135.1	24.9	94.5
2S 4R	166	95.0	54.1	78.9	91.0	109.0	171.7	30.1	117.6
2S 5R	125	108.0	63.7	90.4	104.9	121.7	171.1	31.4	107.4
2S 6R	48	125.6	82.9	106.4	119.8	135.6	219.4	29.2	136.5
3S 4R	17	109.9	73.8	88.2	108.6	126.6	164.1	38.4	90.3
3S 5R	45	133.4	81.6	119.5	130.0	154.8	184.3	35.4	102.7
3S 6R	38	151.6	113.0	133.3	146.7	169.5	236.2	36.1	123.3

be explained by this, as the difference is higher than the floor area that might be potentially gained by overlapping areas of activity while retaining the space required for the dimensions of the furniture. Two-room, two-storey dwellings are larger than the functional minimum, and this is to an extent expected, as they are most likely to have one room of comparable size on every floor.

The fact that dwelling sizes are commonly above the space standards stands in contrast to the small and ever-shrinking size of dwellings in London that has been highlighted by others. According to the 2018 *English Housing Survey*, the average usable floor area in London was 84 m²; this figure was 96 m² in England, excluding London.⁴ Here it is important to highlight the specificity of the sample. High housing prices, the cost of land and the financialization of housing in London are well known. But these also have implications for the density and typology of buildings. For instance, dwelling typologies in inner London differ significantly from those in the rest of England and Wales. While flats and maisonettes make up most of London's housing stock (75%), they make up only 22% of the housing stock in the rest of England and Wales.⁵

4. Extracted from Ministry of Housing, Communities and Local Government, *English Housing Survey, 2018: Housing Stock Data*. [data collection] (UK Data Service, 2020) SN: 8670, <http://doi.org/10.5255/UKDA-SN-8670-1>

5. Valuation Office Agency, 'Table CTSOP3.0: Number of properties by Council Tax band, property type and region, county and local authority district', in *Council Tax: Stock of Properties*, 2018. <https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2018>.

Table 5.02—Dwelling sizes by dwelling types compared to space standards calculated from the *London Housing Design Guide*.

	N	Below Standards		Within Standards		Above Standards		Reference Standards
		N	%	N	%	N	%	
1S 1R	57	27	47%	26	46%	4	7%	35-47.5
1S 2R	407	25	6%	150	37%	232	57%	35-47.5
1S 3R	505	16	3%	192	38%	297	59%	51.5-66.5
1S 4R	154	1	1%	66	43%	87	56%	62-90
1S 5R	16	0	0%	13	81%	3	19%	77-111
2S 2R	21	2	10%	11	52%	8	38%	52.5-66.5
2S 3R	121	36	30%	34	28%	51	42%	66.5-79.5
2S 4R	166	35	21%	76	46%	55	33%	77-100
2S 5R	125	21	17%	68	54%	36	29%	87.5-117
2S 6R	48	10	21%	28	58%	10	21%	101.5-140
3S 4R	17	3	18%	5	29%	9	53%	83-106
3S 5R	45	4	9%	12	27%	29	64%	93.5-123
3S 6R	38	0	0%	16	42%	22	58%	107.5-140

Moreover, the household types to which the housing industry responds are also different. *The Case for Space*, published in 2012, showed that one-bedroom (two-room) dwellings are more common in London than in other areas of England.⁶ Karn and Sheridan, in their 1994 study 'New Homes in the 1990s: A Study of Design, Space, and Amenities' covering England and Wales, also noted that in London smaller dwellings (in terms of the number of rooms) and flats were the preferred dwelling types being constructed.⁷ Drury and Somers' 2010 study of dwelling sizes in London, *Room to Swing A Cat*, mentions that three-bedroom flats are very unusual outside London.⁸ Considering that the number of rooms was not a criterion in constructing the sample, the higher number of observations made for one-storey dwellings with a smaller number of rooms also support this.

In fact, a more systematic comparison with the *English Housing Survey* data, which is drawn randomly from the existing housing stock, shows similar results. An accurate comparison is difficult, as the measurements and classifications used in the *English Housing Survey* are different. While the dwelling types in this research are identified from the number of floors a dwelling has, in the *English Housing Survey* flats and maisonettes are grouped together and all houses are included in a single category regardless of the number of floors they have.⁹ Still, in comparing one-storey dwellings to flats and maisonettes, and two-storey dwellings to two-storey houses, large overlaps are visible. Except for one-storey four-room, two-storey two- and five-

6. Roberts-Hughes, 'The Case for Space: The Size of England's New Homes', 23.

7. Karn and Sheridan, 'New Homes in the 1990s', 26.

8. Drury and Somers, 'Room to Swing A Cat'.

9. *English Housing Survey, 2018*.

Table 5.03—Comparison of dwelling sizes in the sample studied to the London sample of *English Housing Survey* (2014-2018).

	Sample Studied			English Housing Survey (2014-2018)			Difference	
	Q1	Median	Q3	Q1	Median	Q3		
1S 1R	30.1	35.9	39.1					
1S 2R	42.7	49.0	55.4	F&M 1B	40.2	46.9	51.6	2.1
1S 3R	61.8	68.8	76.3	F&M 2B	57.6	64.9	73.0	3.9
1S 4R	84.0	91.7	105.8	F&M 3B	70.6	78.6	88.5	13.1
1S 5R	91.1	101.9	106.9	F&M 4B	86.1	106.6	116.1	-4.7
2S 2R	61.3	64.5	74.0	H(2S) 1B	45.7	74.1	96.1	-9.6
2S 3R	64.4	75.7	89.3	H(2S) 2B	61.6	71.4	79.0	4.3
2S 4R	78.9	91.0	109.0	H(2S) 3B	77.2	86.4	100.0	4.6
2S 5R	90.4	104.9	121.7	H(2S) 4B	100.3	119.4	137.9	-14.5
2S 6R	106.4	119.8	135.6	H(2S) 5B+	134.3	160.1	177.7	-40.3
3S 4R	88.2	108.6	126.6	H(3S) 3B	93.3	104.5	118.9	4.1
3S 5R	119.5	130.0	154.8	H(3S) 4B	110.4	128.4	146.8	1.6
3S 6R	133.3	146.7	169.5	H(3S) 5B	135.7	166.5	207.8	-19.8

room, and three-storey six-room dwellings, the interquartile ranges of the sample largely overlap with the interquartile ranges in the *English Housing Survey* data, within a 5 m² margin (Table 5.03).

Having established the specificity of the sample and certain types of dwellings, I will now turn to the two points I made in relation to the variation in the common dwelling sizes. First, thus far, the dwellings are grouped by habitable rooms without considering the number of occupants they are designed for. Similarly, I compared them to space standards that were originally classified by the number of bedrooms and occupants but translated to ranges to make comparisons consistent. Looked in detail, the range of common dwelling sizes are consistent with the minimum dwelling size ranges. For instance, in the sample, the interquartile range of one-storey three-room dwellings (two-bedroom flats) is 14 m², and the difference in the minimum dwelling size between two-bedroom flats designed for two persons and for four persons is also 15 m². However, while the dwellings in the sample are spread from 62 to 76 m², the minimum dwelling sizes are calculated as 51 m² for two persons, and 66 m² for four persons. This means that the two-bedroom dwellings in the sample are, more or less, 10 m² larger than the minimum space standards, as already observed above.

Second, the sample is drawn from different building typologies that were built in different periods and within different standardization contexts. To understand their impact on the wide variations observed in agreed-upon sizes and also to contextualize the housing stock historically, in Figure 5.02, dwelling sizes are classified into three groups based on the year they were built and compared to the available space

standards. Dwellings built before 1939 are compared to the space standards stated in the 1919 *Housing Manual*, dwellings built between 1945 and 1982 to the space standards stated in the 1961 *Homes for Today and Tomorrow*, and dwellings built in the past forty years to those in the 2010 *London Housing Design Guide*.¹⁰ The dates these publications were published correspond to the later years of the periods analysed and demonstrate a reaction against the housing that was being produced at the time.

In the sample, while most one-storey dwellings were built after the 1980s, most of the multiple-storey dwellings were built before 1939. Historically, there is a strong overlap between space standards and dwelling sizes in all instances a space standard exists. One-storey dwelling sizes show a similar distribution during different periods. In particular, the interquartile ranges of the one-storey three-room (two-bedroom flat) and the two-storey four-room (three-bedroom house) fully overlap with space standards. As discussed in the previous chapters, these dwelling types were favoured throughout the twentieth century, both in design guidelines and by developers. This suggests that the agreed size for a flat has a historical trajectory and has not changed with changing space standards. In multiple-storey dwellings, the distributions vary.

Overall, multiple-storey dwellings built since the 1980s are larger than those built earlier. One reason for this is the changing market for multiple-storey dwellings; in the past forty years, in London, houses and maisonettes have been built in a different sector. Research into home sizes by the Royal Institute of British Architects (RIBA) found that three-bedroom dwellings built in London in 2011 and 2015 were, on average, larger than those being built elsewhere in England. While in Greater London the average size was 119m² in 2011 and 108.5m² in 2015, the figure for England was 88 m² and 91 m² respectively (the space standard prescribed for a three-bedroom five-person dwelling in the *London Housing Design Guide* is 86 m²).¹¹

Classifying dwelling sizes by the year that they were built allows further comparison with space standards. In the study by Drury and Somers, an interquartile range of about 55 to 70 m² was observed for two-bedroom dwellings, for which a sample of 12 dwellings that went on sale in London in 2009 was drawn. In this sample, the interquartile range of one-storey three-room dwellings built after 1980 was 63 to 78 m². This 8 m² difference can be explained by the price limit used in their sample. While it included only Council Tax bands A to D, this corresponds to the lowest 60% of house prices in inner London built since 2000: 80% of the dwellings are within the higher range, bands C to F.¹² Even though our knowledge of the relationship between price and size is too limited to make an accurate judgment, we expect more expensive dwellings to be larger.

10. Local Government Board, *Manual on the Preparation of State-Aided Housing Schemes* (London: H M Stationery Office, 1919); Ministry of Housing and Local Government, *Homes for Today and Tomorrow* (H M Stationery Office, 1961); Design for London, *London Housing Design Guide*.

11. Crosby, 'Space Standards for Homes', 16.

12. Valuation Office Agency, 2018.

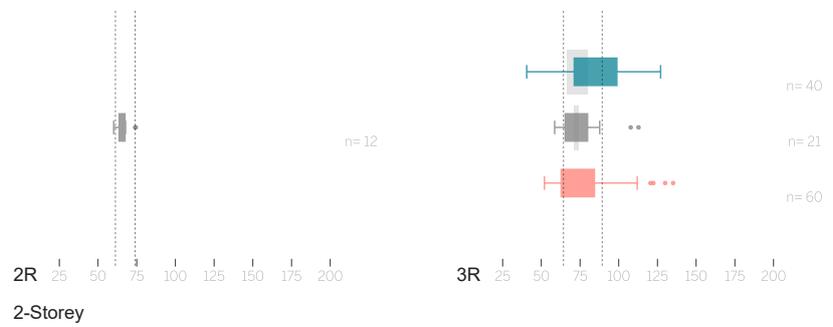
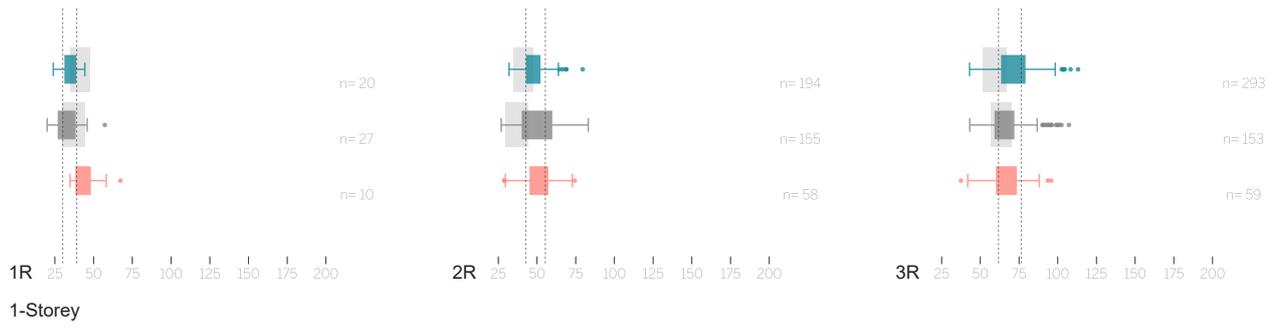
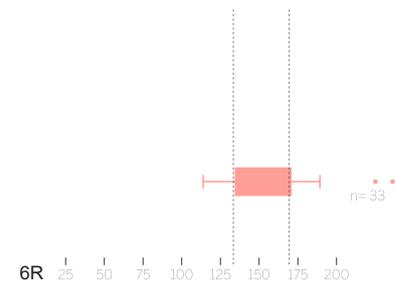
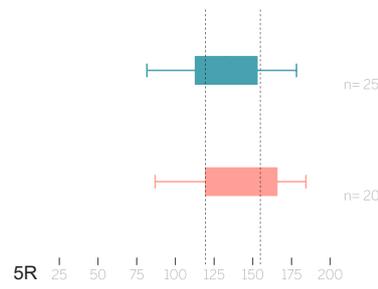
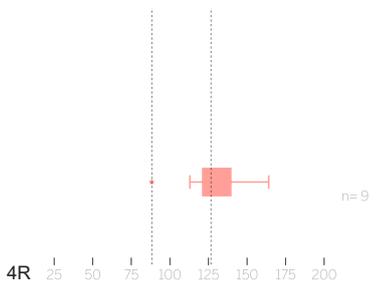
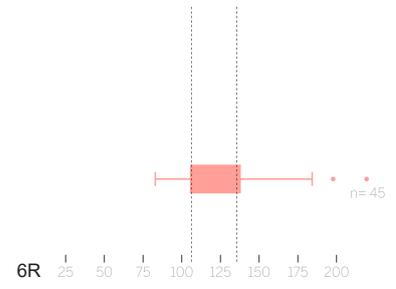
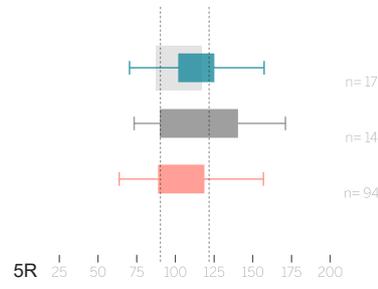
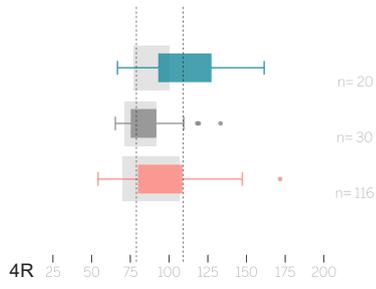
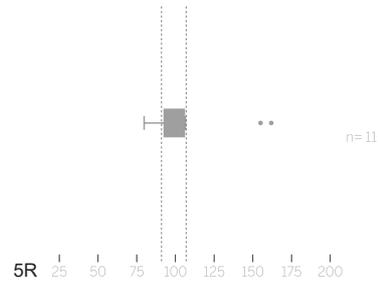
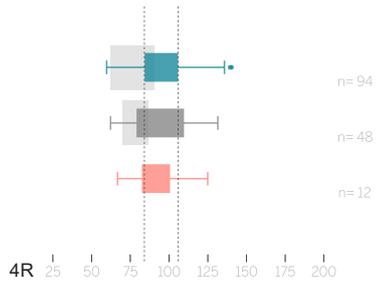


Figure 5.02—Box and whisker plots of net dwelling sizes for different dwellings built in different periods for every dwelling type. Dashed vertical lines correspond to interquartile range. Solid grey areas correspond to the space standards range calculated from historical space standards.

■ 1983-2018 ■ Before 1939 ■ 1945-1982



3-Storey

Hooper and Nichol, in their study of a representative survey of housebuilders conducted nationally in the late 1990s, found that there were standardized portfolios for each market in which dwelling sizes increased with the price. Another comparable study is RIBA's research into home sizes that used a sample of unit portfolios gathered from volume housebuilders and found that one-bedroom flats built in England in 2011 had a range of floor areas between 34 and 65 m², with an interquartile range of 43 to 48 m².¹³ In this sample, one-storey two-room dwellings built after 1980 have a floor area ranging between 31 and 80 m² (wider on both ends), with an interquartile range of 43 to 51 m² (wider towards the larger end).

These historical comparisons both verify the representativeness of the sample, to a certain extent, and the existence of agreed-upon dwelling sizes that correspond to just above the minimum space standards prescribed. While no causality can be argued, as these standards were, to a large extent, not obligatory in the period or the sector within which these dwellings were designed and built, it is telling that the agreed dwelling sizes correspond to the most up-to-date sizes calculated for basic usability. This suggests that different actors involved in housing design and development have similar ideas about what constitutes a usable dwelling. To what extent can this be verified? These observations raise a number of other questions, too. First of all, what do these agreed-upon dwelling sizes mean? In other words, are these dwellings of similar sizes also similar in terms of the spaces they provide? Second, despite the existence of agreed-upon sizes, there are many dwellings in the sample that fall significantly below the minimum dwelling sizes deemed to be necessary. For instance, while the minimum requirement for a two-bedroom, two-person flat is 52 m² in the *London Housing Design Guide*, in the sample the minimum one-storey, three-room dwelling is 38 m², a 14 m² difference. *The Case for Space* calculates 14 m² as 'a living room with a dining area or a double bedroom with all its contents and in addition a single bed and a bedside table, or a dining table for [six] people, a [three-seat] sofa and a writing desk'.¹⁴ How are below standard dwellings designed? I will now turn to these questions.

Sizes and Types of Habitable Rooms

The following sections present the findings on the allocation of space to rooms and discuss them in relation to the previous observations made about dwelling sizes. Figure 5.03 shows a selection of floor plans, organized in a matrix by the size of the dwelling, the number of habitable rooms and the dwelling type. These include dwellings within, below, and above the agreed-upon dwelling size ranges. From now on, I will refer to the agreed-upon dwelling sizes identified in the sample as the standard dwelling size. Compared to the rest, the living rooms of some below standard dwellings are only as big as the bedrooms of standard dwellings. As the dwelling size increases, living areas

13. Roberts-Hughes, 'The Case for Space: The Size of England's New Homes', 21.

14. Roberts-Hughes, 28.

increase noticeably. Some of the bedrooms in below standard dwellings, especially the second bedrooms, are significantly smaller than those in the rest of the dwellings shown. As the dwelling size increases, the spaces allocated for circulation and storage, as well as the number of bathrooms, also increases.

To quantify these, in Figure 5.04 the sizes of living areas, bedrooms, circulation areas and bathrooms are visualized in relation to dwelling sizes, and simple regression lines are given where appropriate. In one-storey dwellings, there is a clear positive relationship between dwelling size and every functional area. In particular, in one-storey two- and three-room dwellings the variations conform to a linear pattern, indicating an almost formulaic distribution of floor areas. The size of living areas changes more than bedrooms and bathrooms with dwelling size. In multiple-storey dwellings, however, while there is a general increase in the floor area, the relationships between dwelling size and different functional areas are not as clear.

Living Spaces

In analysing the living areas in the floor plan survey, dwellings are first classified in terms of the habitability of their kitchens: the first group consists of non-habitable kitchens with living rooms and the second group consists of habitable kitchens that are differentiated as living room-kitchens (combined kitchen, dining, and sitting room), kitchen floors (living areas with kitchens that occupy the whole floor in multiple-storey dwellings), small living-kitchens (small living room kitchens that are found in two-room dwellings), and studios. In this classification, both the size and the layout of kitchens are considered (see Data Modelling in Chapter 4 for more details).

There is a linear relationship between dwelling and living area sizes in one-storey dwellings (Figure 5.05). This is consistent with the market conventions mentioned; as Hooper and Nicol noted, in the upper sectors of the market, in which dwellings are larger, more spaces are allocated for public areas, including living areas.¹⁵ In multiple-storey dwellings, while a generally positive relationship between the size of the dwelling and its living area is visible, it is not as strong as that identified in one-storey dwellings. Moreover, two-storey and three-storey dwellings have habitable and non-habitable kitchen sizes that fluctuate in a similar range regardless of the number of rooms in the dwelling (Table 5.04). This stands in contrast to one-storey dwellings, in which both habitable and non-habitable living area sizes change with the number of habitable rooms. For instance, while the median size of working kitchens in one-storey two-room dwellings is 7 (6-9) m², in one-storey four-room dwellings it is 11 (8-14) m². Similarly, while the median size of kitchen-diners in one-storey two-room dwellings is 26 (23-32) m², it is 39 (30-47) m² in one-storey five-room dwellings.¹⁶

15. Alan Hooper and Chris Nicol, 'The Design and Planning of Residential Development: Standard House Types in the Speculative Housebuilding Industry', *Environment and Planning B: Planning and Design* 26, no. 6 (1999): 797.

16. Median (Q1, Q3)

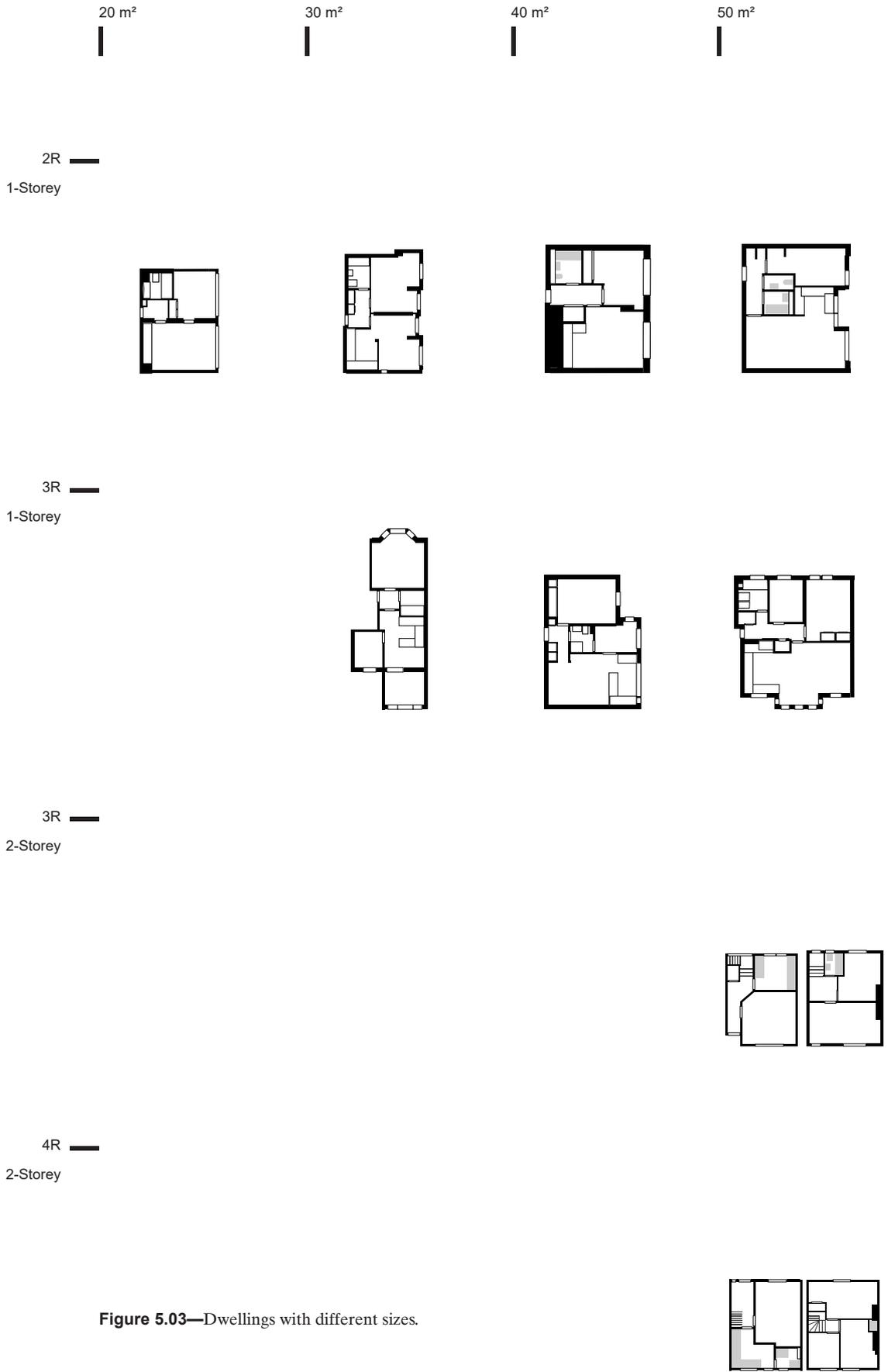


Figure 5.03—Dwellings with different sizes.

60 m²



70 m²



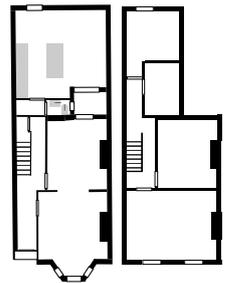
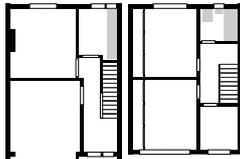
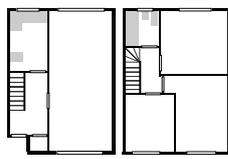
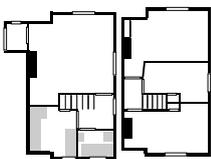
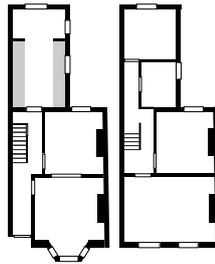
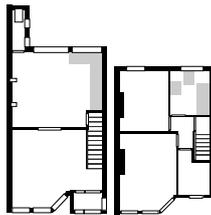
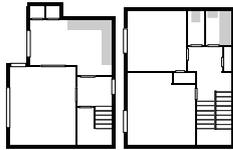
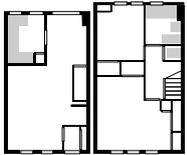
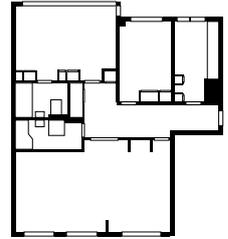
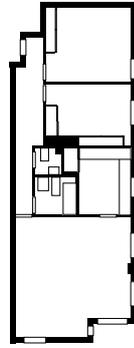
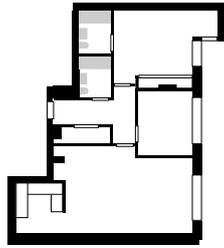
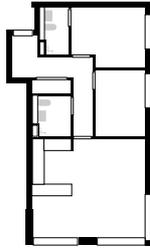
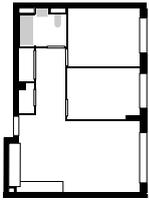
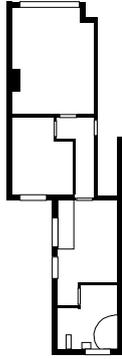
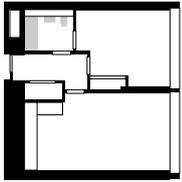
80 m²



90 m²



100 m²



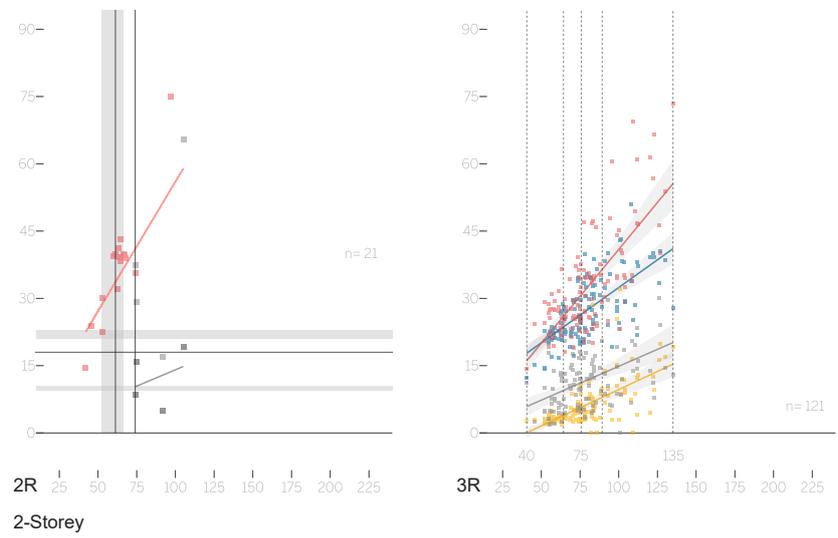
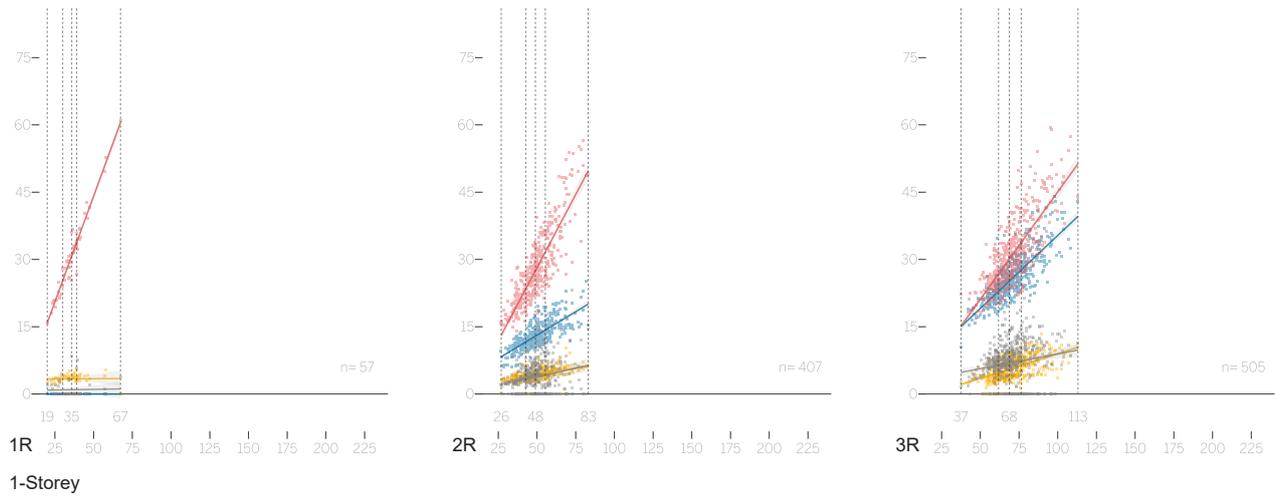
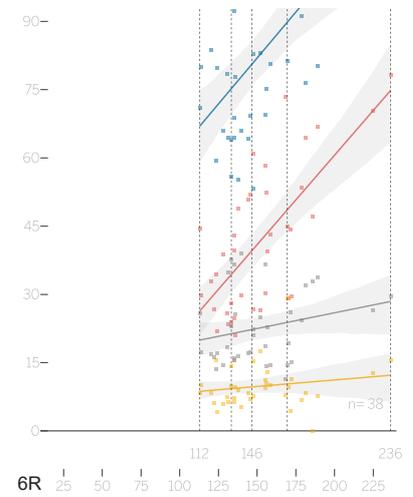
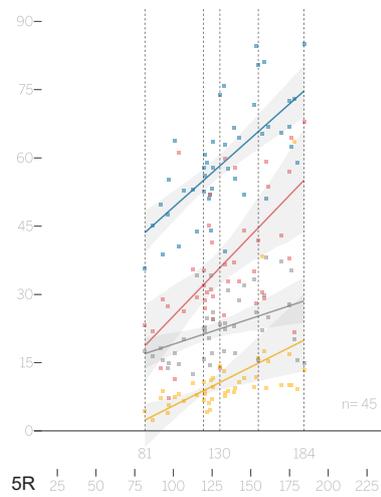
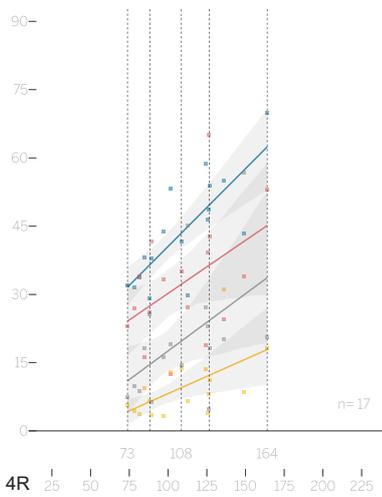
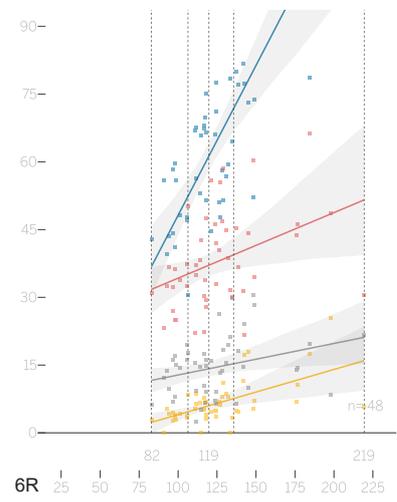
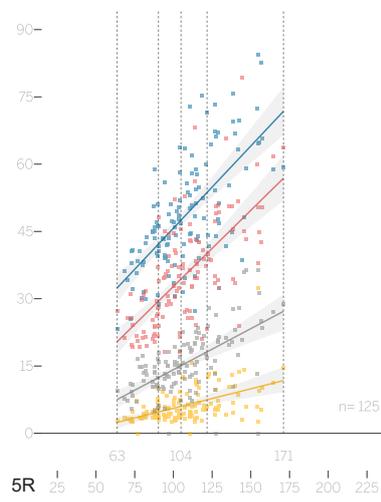
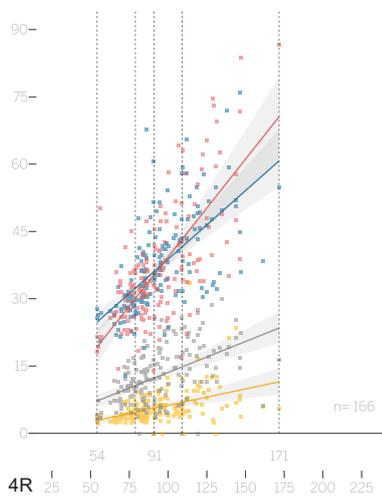
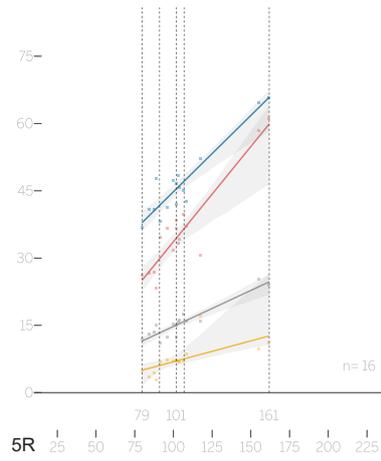
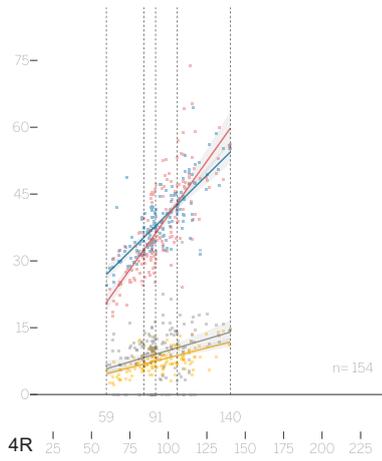


Figure 5.04—Scatter plots showing the sizes of every functional area (bedroom, living area, bathroom, circulation) in relation to dwelling size. Simple linear regression lines and 95% confidence intervals are also shown for every dwelling type.

■ Bedrooms ■ Living Areas ■ Bathrooms
■ Circulation



3-Storey

Multiple-storey dwellings are often designed to separate day and night functions, i.e. living areas and bedrooms, on different floors. Therefore, the living areas are largely determined by footprint size, regardless of the number of rooms or occupants. In fact, a linear relationship between the distribution of the total living area and the footprint area supports this. Consequently, the living rooms of below standard one-storey and two-storey dwellings also differ in size. In one-storey two- and three-room dwellings, all below standard dwellings have below standard living areas. However, most below standard two-storey two-, three-, and four-room dwellings below standard have living areas above the space standards (Figure 5.06).

In one-storey dwellings, non-habitable kitchens are in general below the standard for working kitchens prescribed in the *London Housing Design Guide*. In multiple-storey dwellings, more non-habitable kitchens exceed the working kitchen standards. Strikingly, habitable kitchens are, overall, larger than the average size of working kitchens and living rooms combined (Table 5.04). This contradicts the common assumption that combining the kitchen, dining, and living room is a space-saving strategy. The data further supports this: in many groups of dwellings there is no clear relationship between kitchen types and dwelling size, and the habitable and non-habitable kitchen types are distributed evenly across different dwelling sizes (Figure 5.06). Moreover, in one-storey three- and four-room dwellings, where a difference in distribution can be observed, living room-kitchens are more likely to be found in larger dwellings. However, the data also shows that habitable kitchens are more common in dwellings with a smaller number of rooms and in one-storey dwellings. In one-storey dwellings, except for one-room dwellings, most living areas are habitable kitchens, whereas in multiple-storey dwellings, except for two-storey two-room and three-storey four-room dwellings, most living areas are organized into two rooms, working kitchens, and living rooms (Figure 5.06). These suggest that the preference for kitchen-diners is connected less to dwelling size than dwelling typology and the preferences and design approaches associated with them.

Given that most one-storey dwellings in the sample were built after the 1980s, the differences in the type and organization of living areas might simply be a result of the changing preferences of the market (and, in a functioning market, of people) in favour of combined kitchen, dining, and sitting areas. The manuals published between 1945 and 1953 promoted the idea of living areas organized into two rooms, mostly a kitchen-diner and a sitting room, but also working kitchens and living rooms with a dining recess. Also, according to *Houses and People*, many people preferred to have kitchen-diners in the 1960s. In fact, while 83% of one-storey dwellings built since 1983 have habitable kitchens, only 37% of one-storey dwellings built between 1945 and 1982 do (Table 5.05).

At the same time, most multiple-storey dwellings in the sample are from the older housing stock, i.e. housing built before 1939. Terraced houses originally had a small scullery and pantry at the back of the house, often in a rear building projection.

Table 5.04—Sizes of kitchens by kitchen and dwelling types.

	Non-habitable kitchen						Habitable kitchen		
	Q1	Kitchen Median	Q3	Q1	Living Area Median	Q3	Q1	Median	Q3
1S 1R							29.4	32.9	35.9
1S 2R	5.6	6.9	9	22.7	27	32	22.1	26.1	31
1S 3R	7.3	8.3	9.8	25.2	27.6	32	25.9	30.4	34.4
1S 4R	8.3	10.5	14.2	29.3	33.3	37.5	30.4	38.6	47.2
1S 5R	9.4	12.3	14	26.8	33.3	34.7	33.6	37.1	39.1
2S 2R	7.6	12.2	16.7	26.2	32.9	43.8	32.1	39.1	39.8
2S 3R	6.6	8.2	11.5	23.9	27.6	34.5	26	34.4	39.4
2S 4R	7.9	11.4	16.3	25.9	31.4	36.4	32.5	39.9	49.8
2S 5R	7.1	12.8	19	24	30.5	36.2	25.2	30.3	35.7
2S 6R	7.5	10.5	18	24.3	30.4	41.4	31	35	43.6
3S 4R	8.4	12	13.5	21.8	26	30.1	28.7	34.5	42.5
3S 5R	11.5	14.6	17.2	26.8	32	37.9	22.8	37.3	57.5
3S 6R	9.2	14.6	16.4	26.5	31.3	44.4	29.2	41.3	54.5

These might not easily enable the creation of a habitable kitchen unless it is majorly remodelled. In fact, 81% of two-storey dwellings built before 1939 have non-habitable kitchens. However, there is a significant number of combined living areas in the older housing stock, suggesting that many terraced houses were remodelled to have combined living area arrangements. This contributes further to the observed changing preferences in favour of a combined kitchen, dining, and living arrangement.

In addition to these, the limitations of the data should also be noted. First, in this classification, no specific size is stipulated for non-habitable kitchens. Kitchens that only open to large living rooms are counted as non-habitable kitchens, regardless of their size. As can be seen in Figure 5.05, there are many multi-storey dwellings with non-habitable kitchens larger than 18 m², a sufficient size for seven to eight people to use as a working kitchen and dining area, according to the *London Housing Design Guide*. Second, a combined kitchen might have clearly defined and separate areas, such as an L-shaped plan, or a partition, such as a half-wall. Still, this would count as a single room, specifically a habitable kitchen, in the data. I will return the preferences of users in relation to kitchen types with the help of data collected from the online survey and interviews with occupants in Chapter 6. I will also discuss the living floor layouts of remodelled older housing stock.

In Figure 5.06, the relationships between working kitchens and living rooms are also given. While most working kitchens and living rooms are placed adjacent and connected to each other, there are also dwellings in which working kitchens and living rooms are placed apart from each other. While there are few one-storey dwellings in

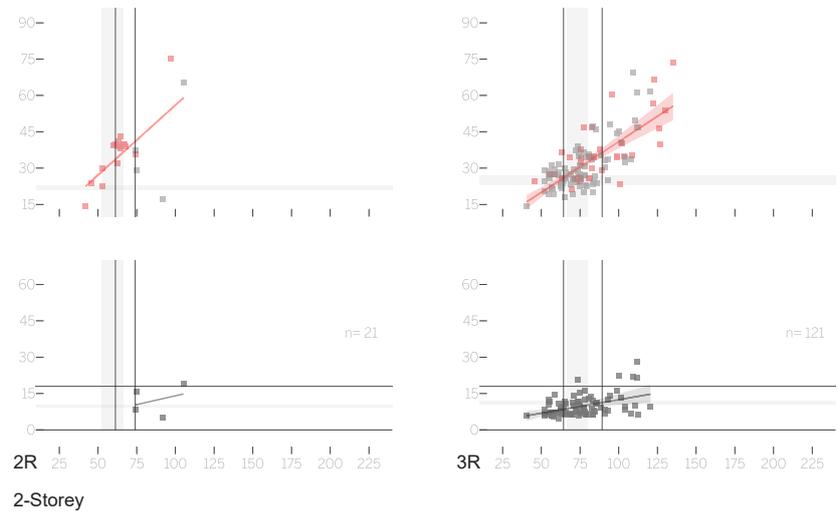
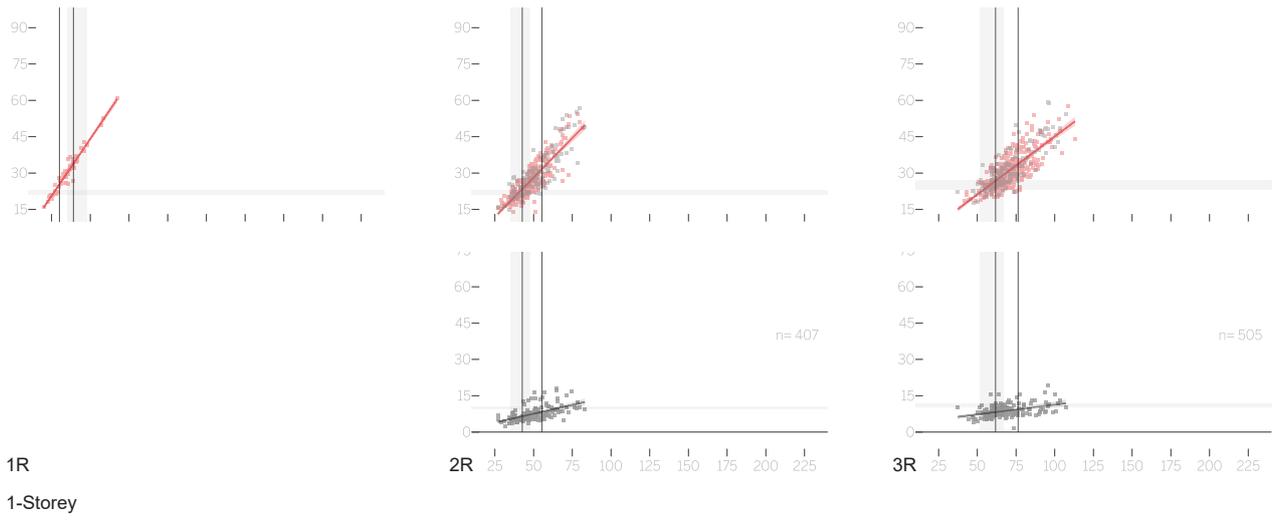
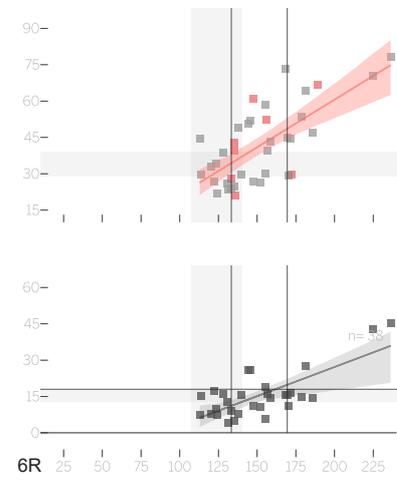
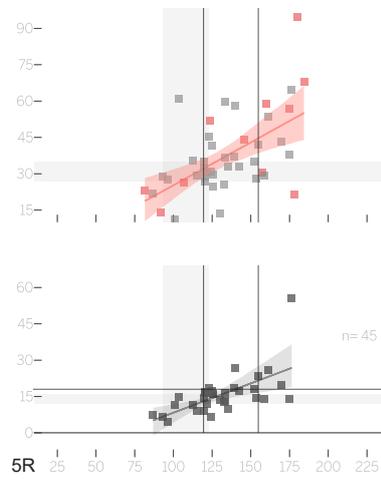
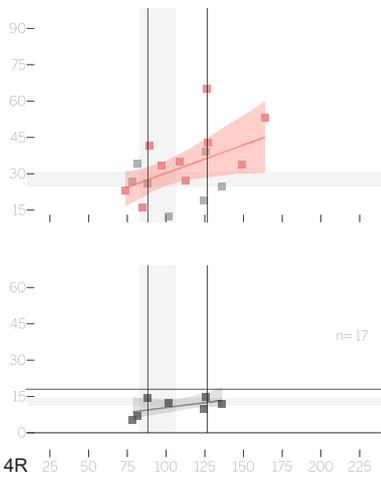
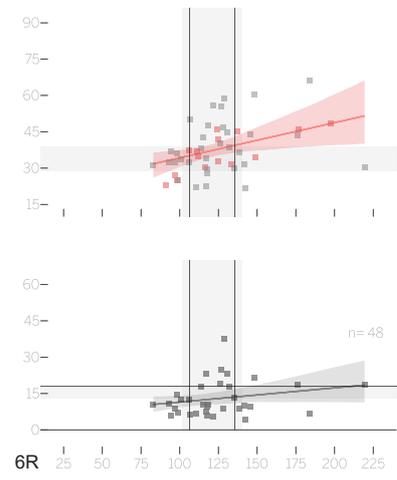
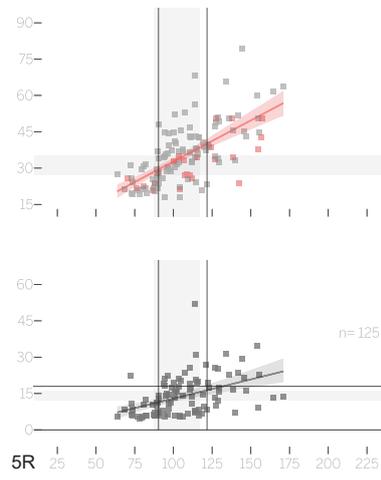
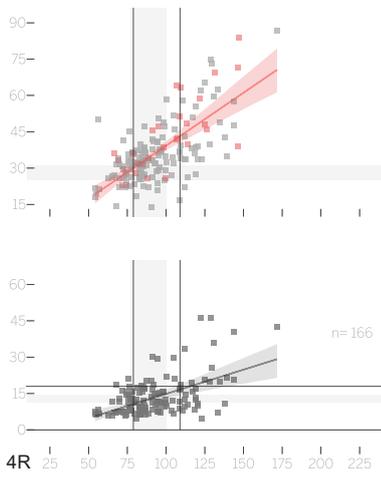
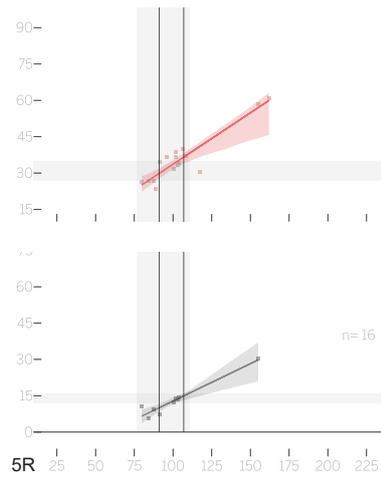
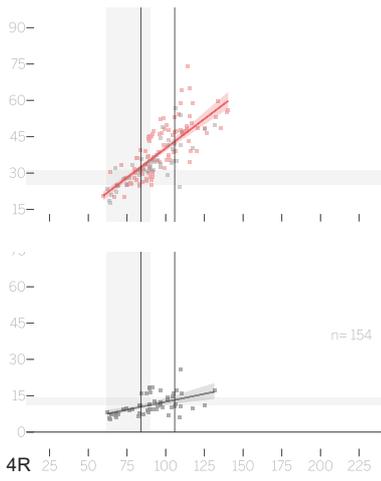


Figure 5.05—Scatter plots showing the sizes of total living area and kitchen area (only for working kitchens) in relation to dwelling size. Simple linear regression lines are also given.

■ Non-habitable Kitchen ■ Habitable Kitchen
 ■ Working Kitchen



3-Storey

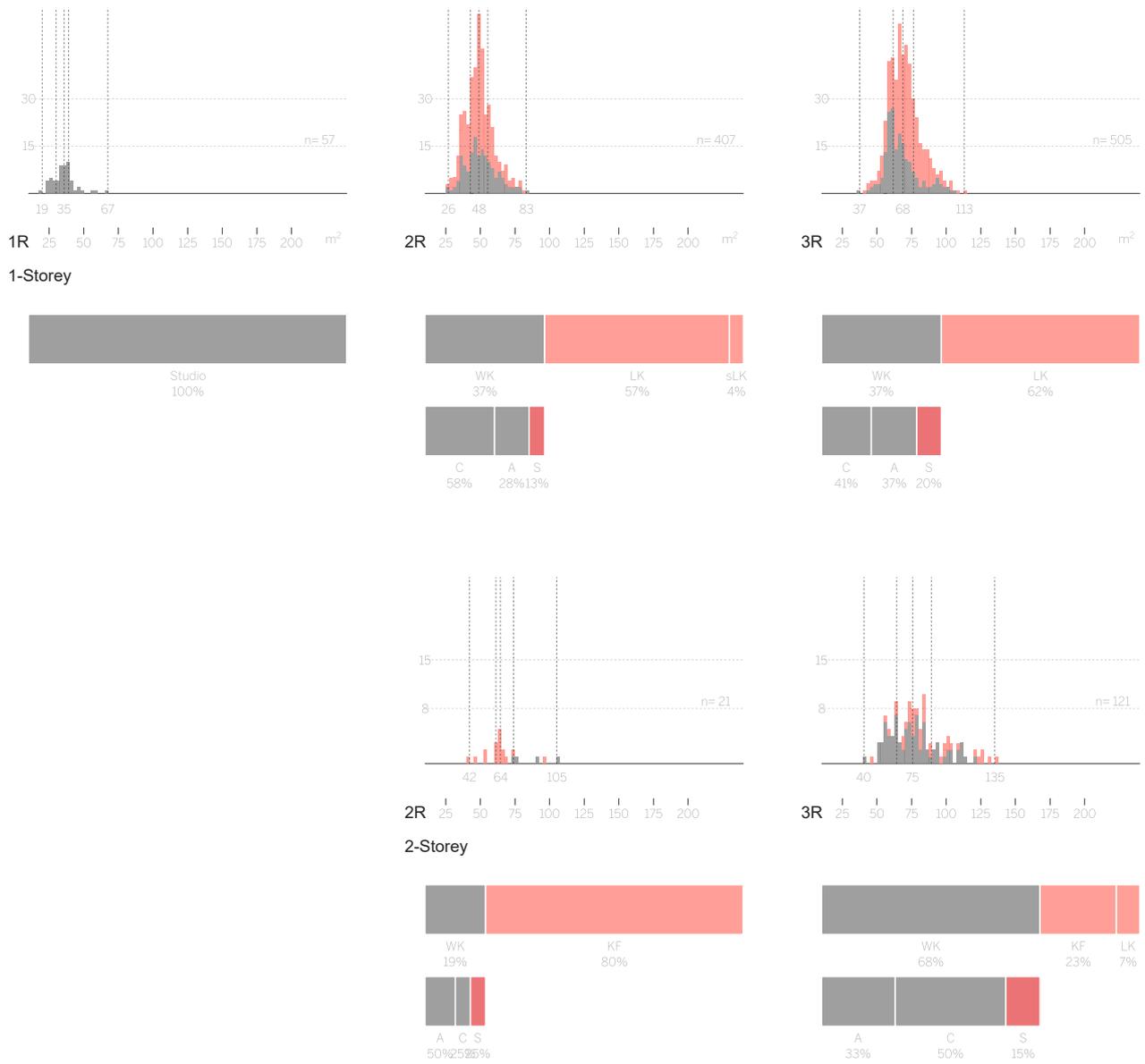
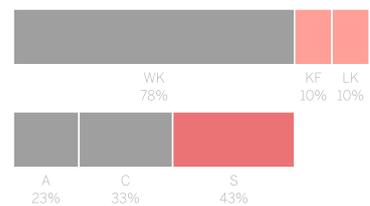
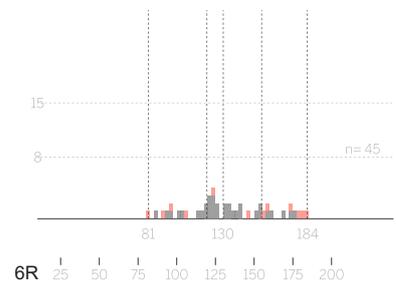
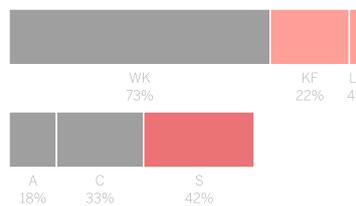
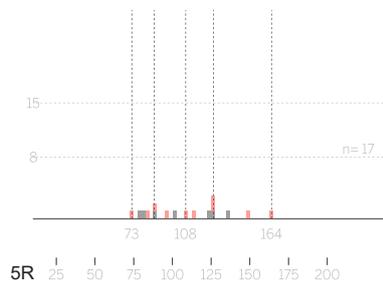
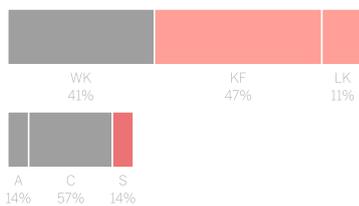
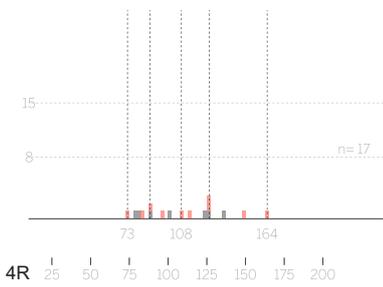
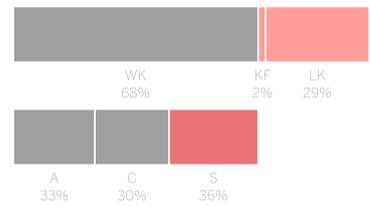
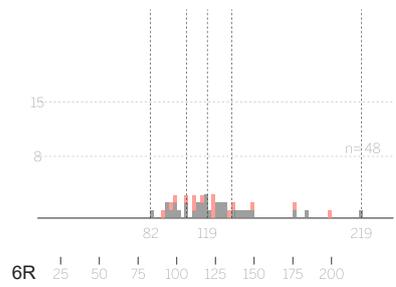
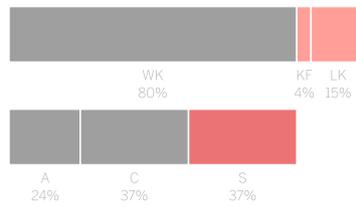
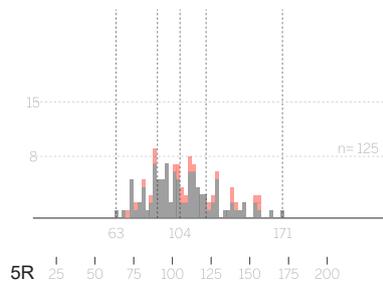
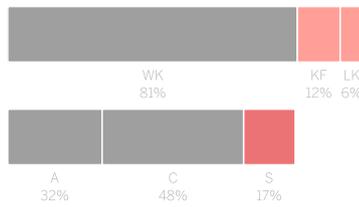
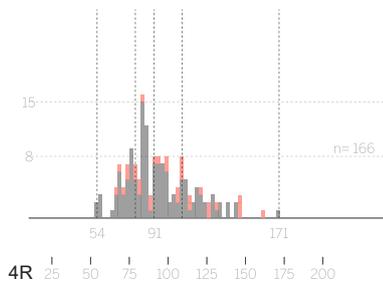
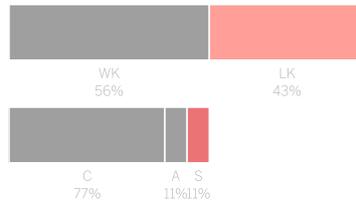
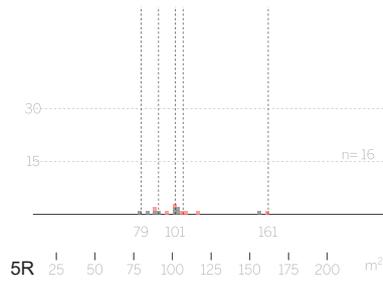
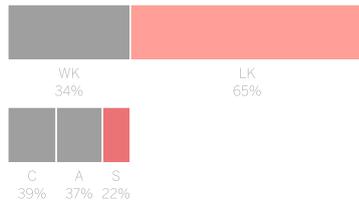
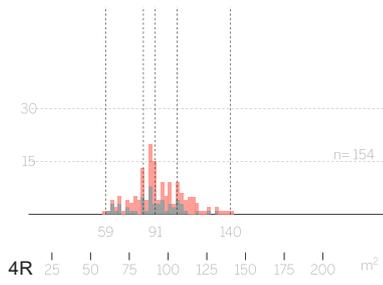


Figure 5.06—The frequency and distribution of dwellings with different living area types.

Studio, WK—working kitchen-living room, LK—combined kitchen and living room, sLK—small living-kitchen, KF—kitchen floor.



3-Storey

Table 5.05—Frequency of kitchen types by dwelling type and the period they were built in.

	One-storey Dwellings			Multiple-storey Dwellings		
	Before 1939	1945-1983	1983-2018	Before 1939	1945-1983	1983-2018
Studio	7%	7%	3%	-	-	-
LR	54%	63%	13%	81%	66%	56%
S-DK	3%	2%	1%	-	-	-
DK	36%	28%	82%	12%	3%	15%
DK-WF	-	-	-	8%	31%	29%

which the working kitchens and living rooms are placed apart, in multiple-storey such dwellings are more common.

Again, in the older housing stock the organization of living areas into three or more rooms – e.g. separate kitchen, dining, and sitting room – might be more common. Terraced houses were originally designed in this way, with three rooms on the ground floor: the front room, the back room and the scullery or kitchen, all accessed from the hall with the staircase. In the modelled data, the front room, usually being the largest, would be labelled as a living room in this layout. The back room would be labelled as an additional habitable room. The kitchen and living room would thus be labelled as separate. This habitable back room might be used as a second sitting room, a dining room or a bedroom, as it is of sufficient size, has enough windows, and is self-contained (those connected to the kitchen and living room are counted as part of the living room). This might be the reason for the higher proportion of multiple-storey dwellings in which living rooms and kitchens are placed far apart. This is supported by the data shown in Figure 5.11; the majority of two-storey five- and six-room dwellings have one or two additional habitable rooms larger than 8 m² on the ground floor.

Habitable Rooms

In Table 5.06, the descriptive statistics of the largest (first) and smallest (last) room sizes are given per dwelling type. As the number of habitable rooms and the number of storeys increase, the average size of the first room increases. While the median size of the largest non-living rooms in one-storey three-room dwellings is 14 (12-16) m², this figure rises to 15 (13-18) m² in one-storey four-room dwellings and 15 (13-19) m² in two-storey three-room dwellings. The median size of the smallest rooms, however, decreases as the number of rooms increases, yet there is no notable change in their size in relation to the number of storeys the dwelling has.

Overall, the first rooms are larger than the minimum double bedroom size prescribed in the *London Housing Design Guide*, 12 m², and the last rooms are larger than the minimum single bedroom size, 8 m². The statistics presented in previous studies are not directly comparable to these, as they are reported in relation to standards. Karn and Sheridan found that in 1991, 24.4% of the first bedrooms in dwellings built by the private sector, and 25.4% of the main bedrooms in dwellings built by housing associations, were larger than 11 m².¹⁷ Chris Leishman and his colleagues found that more than 80% of first bedrooms were larger than 9 m².¹⁸ The *English Housing Survey*, however, in its 2018-2019 edition, found that the average first bedroom size in London was 12 m².¹⁹ The sample studied here has larger bedroom sizes than these studies have shown, and this difference cannot be explained by the way the sample is constructed; in one-storey dwellings, all three building period categories (before 1939, 1945-1982, and after 1983) show a similar distribution (Table 5.07).

The first bedroom size is determined by factors other than functionality. For instance, Karn and Sheridan note that it 'tends to be a major feature of show homes'.²⁰ Second bedrooms, therefore, offer a more robust picture of the changes in bedroom sizes in relation to design standardization. While they also increase with the number of rooms and storeys, as can be seen, the interquartile range is significantly narrower than that of first bedrooms, 3m² in one-storey and 5 m² in multiple-storey dwellings. The median size of the second-largest non-living rooms in one-storey three-room dwellings is 11 (9-12) m²; this figure is 12 (10-14) m² in one-storey four-room dwellings and 12 (10-15) m² in two-storey four-room dwellings.

Karn and Sheridan also mention the 'phenomenon of the very small third bedroom' in the private sector: 'in the private sector it is commonly remarked that this does not matter since low occupancy rates allow it to be used as a guest room or for storage'.²¹ They found that 92.6% of the third bedrooms in housing association sector dwellings and 79.8% of the third bedrooms in private sector dwellings were below 8 m². Leishman and his colleagues also note the significantly smaller sizes of third bedrooms (7.2 m² on average). In the sample, only 15% of the smallest rooms in one-storey dwellings and 40% of the smallest rooms in multiple-storey dwellings are below 8 m². Here it must be noted that Karn and Sheridan's study oversampled the lower end of the housing market, whereas in the construction of this sample the sub-markets were not taken into consideration. However, below standard one-storey dwellings in the sample are more likely to have multiple small rooms of 8 m² rather than smaller rooms in addition to a larger room. It is thus possible to suggest that in the lower end of the market small rooms are common (Figure 5.08, see discussion below).

17. Karn and Sheridan, 'New Homes in the 1990s', 65.

18. Chris Leishman et al., 'Preferences, Quality and Choice in New-Build Housing' (York: Joseph Rowntree Foundation, 2004), 15.

19. *English Housing Survey, 2018*.

20. Karn and Sheridan, 'New Homes in the 1990s', 64.

21. Karn and Sheridan, 65.

Table 5.06—Room sizes by dwelling types.

	Largest Room						Second Largest Room						Smallest Room					
	m	Min	Q1	M	Q3	Max	m	Min	Q1	M	Q3	Max	m	Min	Q1	M	Q3	Max
1S 1R																		
1S 2R	12.5	5.7	10.7	12.2	14.0	23.0												
1S 3R	14.1	5.9	12.0	13.5	15.8	27.2	10.8	4.6	9.2	10.5	12.2	20.8						
1S 4R	15.8	8.9	12.9	15.3	18.3	27.4	12.1	7.9	10.0	12.0	13.7	20.4	10.0	5.5	8.6	9.6	11.3	17.1
1S 5R	15.4	11.5	13.2	14.8	16.1	23.0	10.4	7.0	8.8	9.6	11.9	13.8	8.9	6.6	7.7	8.3	9.4	12.9
2S 2R	14.9	7.5	10.0	12.1	18.7	37.8												
2S 3R	15.5	7.6	12.5	14.8	18.9	26.4	11.1	4.8	8.8	10.4	13.3	25.5						
2S 4R	16.5	6.9	12.4	15.3	20.1	36.8	12.4	5.9	9.5	11.6	14.5	28.9	8.3	4.0	6.4	7.9	9.8	17.0
2S 5R	18.3	10.3	14.0	16.8	21.4	36.0	13.5	5.6	11.3	12.9	15.0	28.9	7.6	4.1	5.4	7.8	9.1	12.4
2S 6R	21.5	10.4	15.4	18.9	23.2	36.5	15.7	8.0	12.9	14.8	17.3	27.1	7.5	4.0	5.4	7.1	8.7	15.6
3S 4R	18.7	11.0	14.1	18.0	22.1	34.1	13.1	7.9	10.2	12.9	14.4	20.8	10.7	5.2	8.2	11.5	13.0	14.9
3S 5R	22.4	12.6	18.0	21.6	25.5	34.7	15.7	8.6	13.1	14.9	17.6	23.9	9.3	5.3	7.4	9.1	11.2	14.3
3S 6R	26.0	14.0	19.6	24.7	31.4	40.4	20.3	11.8	15.4	17.6	25.3	38.0	9.1	4.1	6.4	9.1	11.7	16.0

This difference in the proportion of the smallest rooms supports the earlier suggestion that there are distinct design differences between one-storey and multiple-storey dwellings that were also largely built in different periods. For instance, in many terraced houses, the room above the entrance hall was a box room, and in others, the projection at the back included small storage rooms. Moreover, as can be seen in Figure 5.10, which shows a selection of one-storey dwellings with small rooms, most of these are also in the older housing stock, in converted dwellings. Furthermore, dwellings with small rooms are distributed evenly across the dwelling size range, indicating that the existence of smaller rooms is not associated with the dwelling size (Figure 5.09).²² The floor plans also show this: they might be part of below standard dwellings (first row), or they might be part of larger dwellings (fourth row). It is difficult to understand how they are used just by looking at the plans; they might be used as utility rooms, studies, children's bedrooms, or adult bedrooms. While some of them are in close proximity to or connected to, the kitchen, some others are accessed from the main corridor. In the following chapters, small rooms will be discussed further in relation to an online survey and interviews with residents.

Regarding room sizes, one issue must be noted: larger rooms do not necessarily offer more space for use or adaptability. The dimensional thresholds in space standards are calculated with a tight-fitting rectangular plan. However, in the sample, not all rooms are rectangular or have the same proportions. In Figure 5.07, common room

²² In comparing dwelling sizes to space standards, rooms larger than 4 m² are counted as habitable rooms compared to the minimum size of 8 m² prescribed for a single bedroom in the *London Housing Design Guide*. The even distribution of dwellings with small rooms suggests that counting small rooms as habitable has no significant impact on the results.

Table 5.07—Room sizes in one-storey dwelling by the period they were built in.

		Mean	Min	Q1	Median	Q3	Max
	Before 1939	12.5	6.0	10.8	12.3	14.4	20.6
1S 2R	1945-1983	12.5	5.7	10.5	12.2	14.2	22.5
	1983-2018	12.6	7.0	10.9	12.3	13.7	23.0
	Before 1939	9.7	4.6	7.0	8.7	13.0	15.3
1S 3R	1945-1983	9.9	5.4	9.2	9.8	10.5	17.1
	1983-2018	11.5	5.8	9.9	11.4	12.9	20.8
	Before 1939	12.3	10.0	11.0	11.4	13.5	16.4
1S 4R	1945-1983	11.6	7.9	9.6	11.2	13.2	18.8
	1983-2018	12.3	8.0	10.4	12.2	14.1	20.4
	Before 1939	11.2	9.4	10.3	11.2	12.2	13.1
1S 5R	1945-1983	9.8	7.0	8.6	9.3	10.3	13.8
	1983-2018	12.2	11.3	11.4	11.6	12.7	13.8

sizes in various shapes are shown with the basic furniture that is used to calculate the thresholds. As can be seen, some rooms that have larger floor areas do not have the capacity to fit more furniture, as they are either too narrow or have fragmented shapes or additional doors, e.g. a bathroom or balcony door. The recent space standards, also the literature, sought to address this by defining room dimensions.²³ For instance, based on an analysis of European room size standards, Anna Yunitsyna has suggested that a room is universal, i.e. it ‘may host any of the basic living actions – cooking, getting together, dining, sleeping, working’, if it is wider than 3.1 m. A room with a width less than 2.2 m can host only one of these activities.²⁴ Similarly, based on a review of archetypal housing forms, Gérald Ledent proposed a 4 m by 4 m room as a flexible room.²⁵

Figure 5.08 shows non-living habitable room types and their distribution in relation to dwelling sizes. Dwellings are classified as a) dwellings with at least one habitable room smaller than 8 m² (w/O), b) dwellings with at least one double room, a room larger than 12 m² (w/D), and c) dwellings with only single rooms, rooms that have a

23. Anna Yunitsyna, 'Universal Space in Dwelling—the Room for All Living Needs', in *Proceedings of ICUAD 2014, 2nd International Conference on Architecture and Urban Design* (Tirana, 2014); Gérald Ledent, 'Permanence to Allow Change. The Archetypal Room', in *Architectural Research Addressing Societal Challenges: Proceedings of the EAAE ARCC 10th International Conference* (EAAE ARCC 2016), 15-18 June 2016, Lisbon, Portugal, ed. Manuel Couceiro da Costa et al. (London: CRC Press, 2017), 339–44.

24. Anna Yunitsyna, 'Universal Space in Dwelling—the Room for All Living Needs', in *Proceedings of ICUAD 2014, 2nd International Conference on Architecture and Urban Design* (Tirana, 2014).

25. Gérald Ledent, 'Permanence to Allow Change. The Archetypal Room', in *Architectural Research Addressing Societal Challenges: Proceedings of the EAAE ARCC 10th International Conference* (EAAE ARCC 2016), 15-18 June 2016, Lisbon, Portugal, ed. Manuel Couceiro da Costa et al. (London: CRC Press, 2017), 339–44.



Figure 5.07—Rooms with different width to length and compactness ratios, superposed with the corresponding minimum functional room plans, furniture, and movement areas given in the *London Housing Design Guide*.

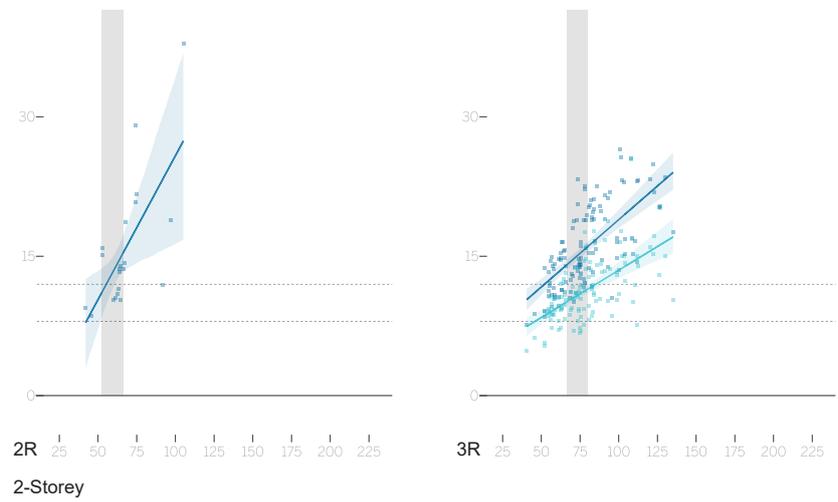
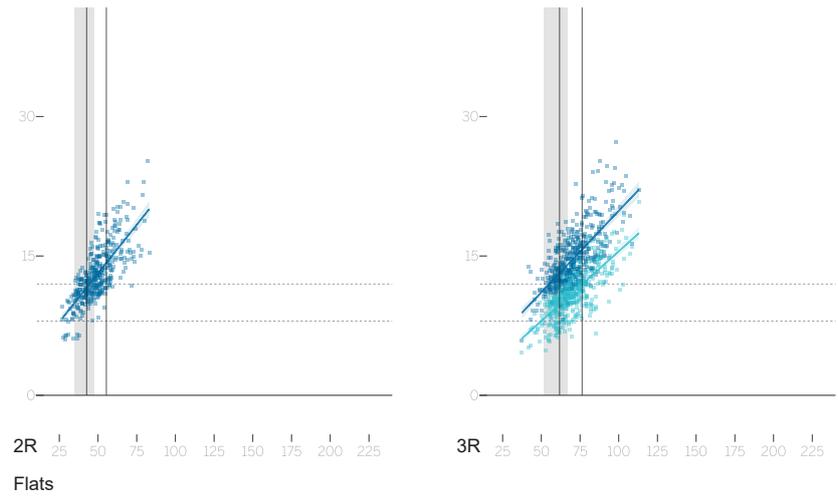
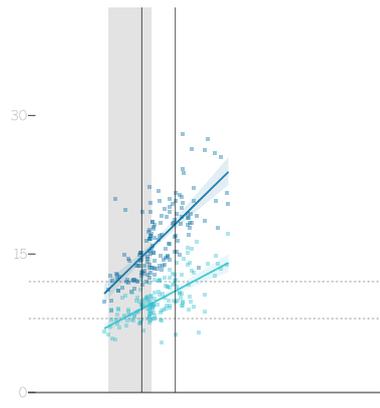
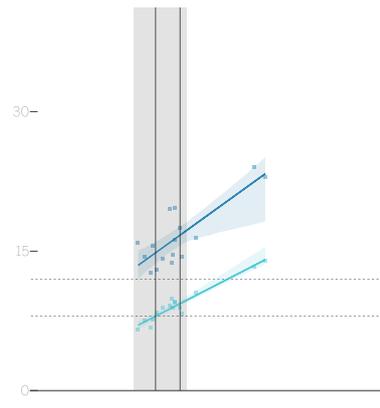


Figure 5.08—Scatter plots showing the sizes of the largest, second largest and smallest bedroom areas in relation to dwelling size. Simple linear regression lines are also given.

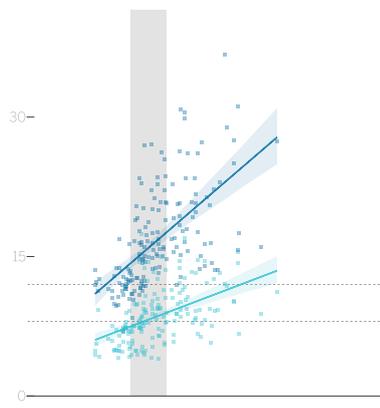
- Largest Room
- Smallest Room
- Other Rooms



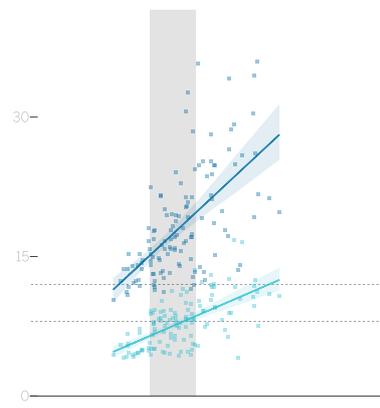
4R 25 50 75 100 125 150 175 200 225



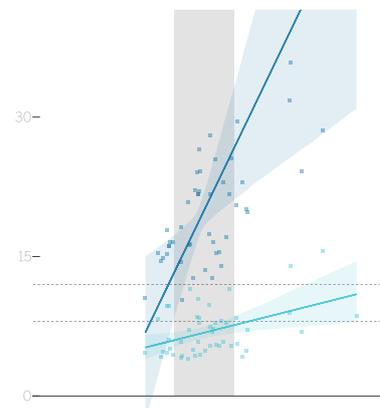
5R 25 50 75 100 125 150 175 200 225



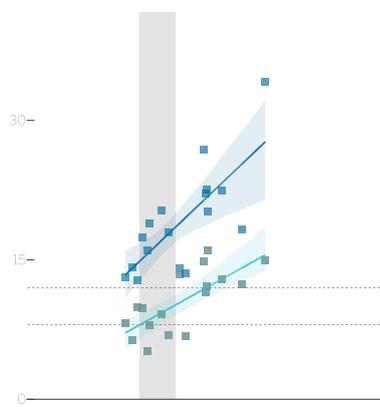
4R 25 50 75 100 125 150 175 200 225



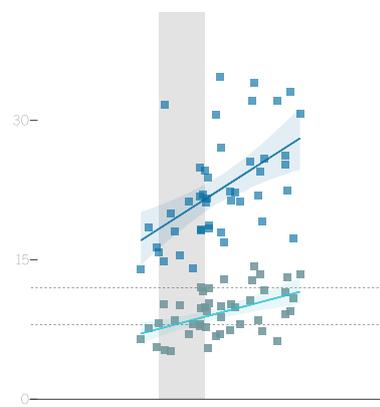
5R 25 50 75 100 125 150 175 200 225



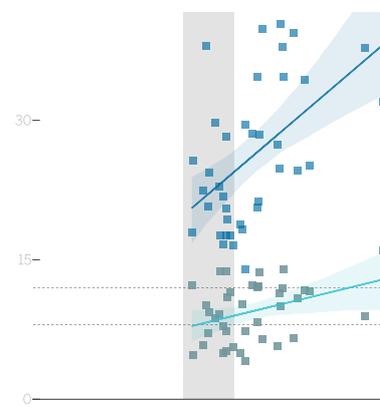
6R 25 50 75 100 125 150 175 200 225



4R 25 50 75 100 125 150 175 200 225

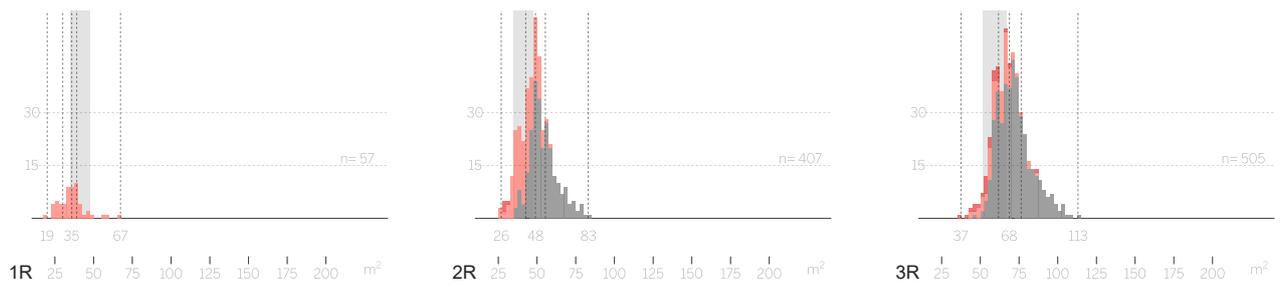


5R 25 50 75 100 125 150 175 200 225

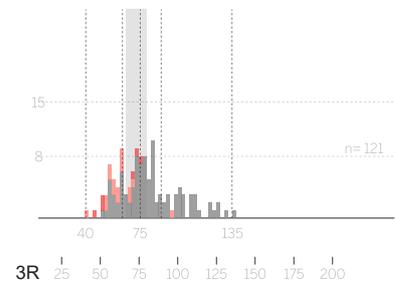
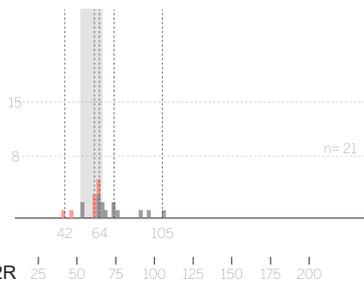
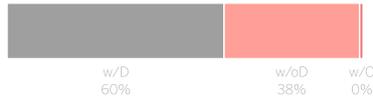
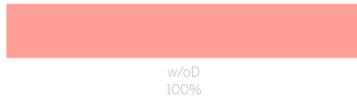


6R 25 50 75 100 125 150 175 200 225

3-Storey



Flats

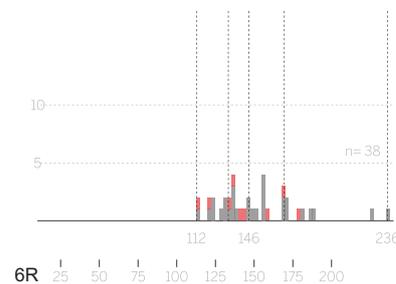
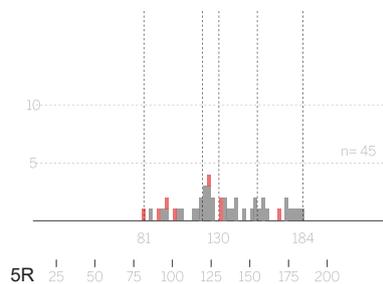
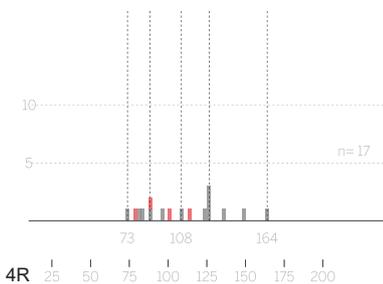
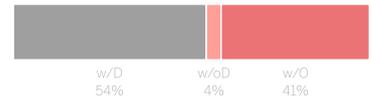
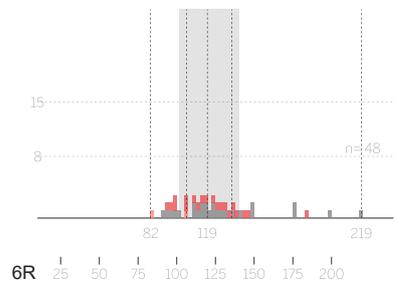
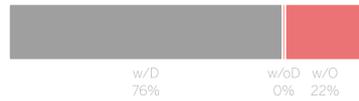
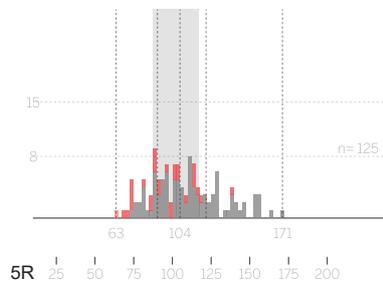
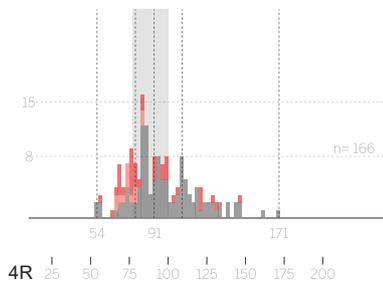
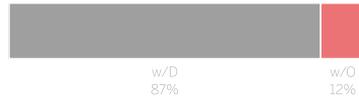
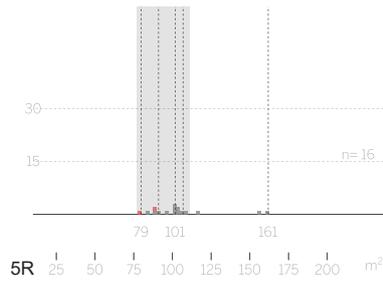
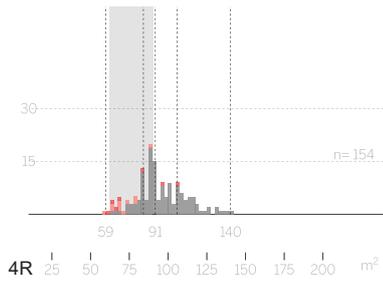


2-Storey



Figure 5.09—The frequency and distribution of dwellings with at least one double bedroom (> 12 m²), with a small room (< 8 m²) and with only single rooms.

w/O—dwellings with at least one habitable room smaller than 8 m², w/D—dwellings with at least one double room, w/oD—dwellings with no double room and no small room.



3-Storey



Figure 5.10—Dwellings with small rooms (<math>< 8 \text{ m}^2</math>).

floor area of between 8 and 12 m² (w/oD). These room size thresholds are taken from the *London Housing Design Guide*.²⁶ In every dwelling type, most dwellings have at least one double room and no small rooms. This is consistent with design standards and the historical familial and functional norms that have driven them. Historically, a minimum of one double bedroom has been recommended and small rooms were discouraged. Most dwellings with single rooms only are small dwellings in terms of both the number of rooms – i.e. one-storey two- and three-room, two-storey three-room – and dwelling size. They are often in the first quartile of dwelling sizes. This suggests that houses with single rooms are, in fact, below standard dwellings provided at the bottom end of the housing market. This can be seen in particular in the case of one-storey two-room dwellings, in which dwellings with no double rooms are at the lower end.

In the sample, 35% of two-bedroom flats (one-storey three-room dwellings) have two rooms larger than 11.5 m² with an average difference of 3 m² between the first and second rooms. In their study, Karn and Sheridan found the increasing proportion of two-bedroom four-person dwellings ‘worrying’.²⁷ They observed this trend in the housing association sector, in which the allocation of dwellings is made on the basis of full occupancy. Taking a family with two young children as a case, they argued that allocation of two-bedroom four-person dwelling will limit the use of dwelling in the long term as this family will need a three-bedroom four-person dwelling when the children grow up. However, this is an issue that needs to be resolved in the system of allocation rather than in dwelling design. In fact, having two similar-sized rooms may accommodate household types other than families with two children, and in some cases contribute to the dwellings’ adaptability. For instance, Agatangelo Soler Montellano has shown that dwellings with rooms of similar size that share a wall allow more potential adaptability.²⁸

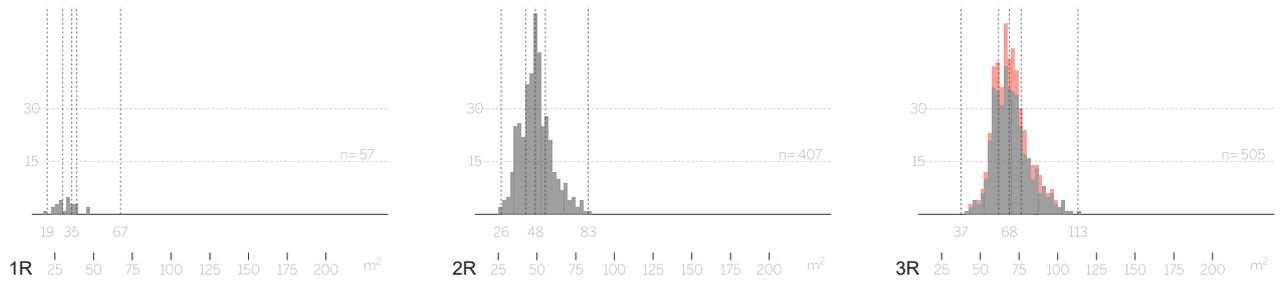
Organization of Rooms

As discussed in the previous chapters, design standardization is not only about dimensions and functionality, but also about the way rooms are organized in dwellings. The dimensional requirements are also derived from certain layouts. As already outlined, in calculating minimum room sizes, it is assumed that the room has only one door and that all space in a room is usable. In calculating minimum dwelling sizes, a separate circulation area that gives access to rooms is assumed. Therefore, it is important to see to what extent there is also a standardization in layouts.

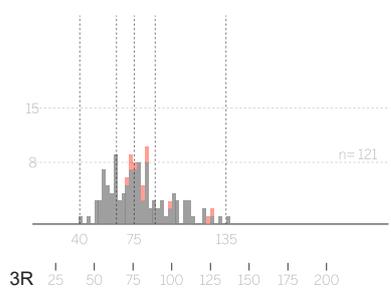
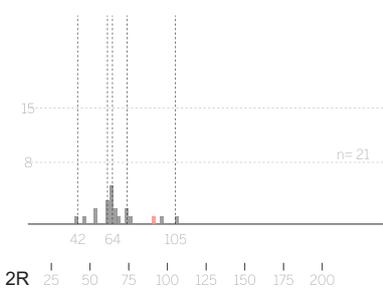
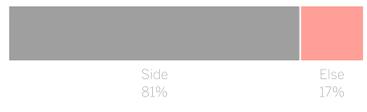
26. Design for London, *London Housing Design Guide*, 92–93.

27. Karn and Sheridan, 'New Homes in the 1990s', 30.

28. Agatangelo Soler Montellano, 'Housing Flexibility by Spatial Indeterminacy: The Case of the Casa de Las Flores in Madrid', *International Journal of Architectural Research: ArchNet-IJAR* 9, no. 2 (2015): 4–19.



Flats



2-Storey

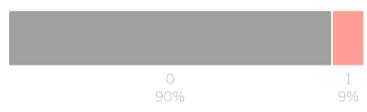
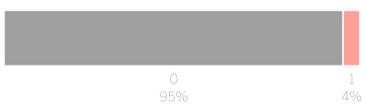
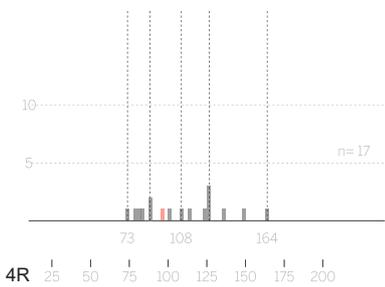
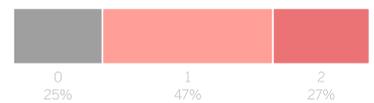
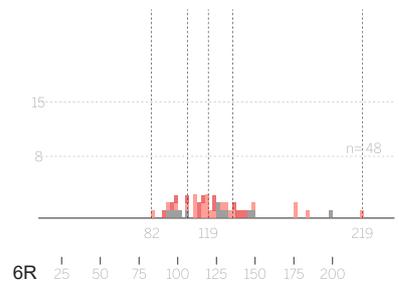
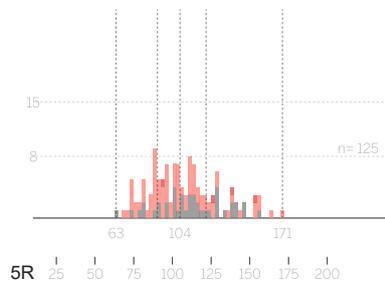
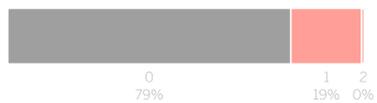
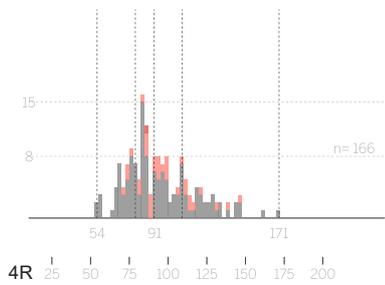
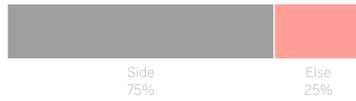
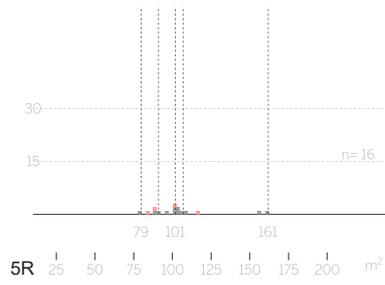
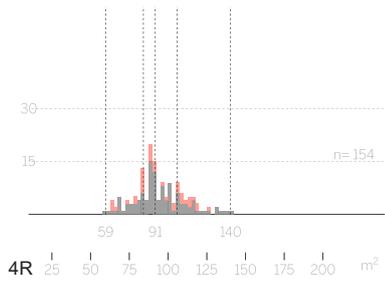
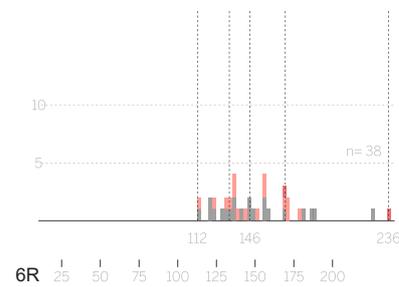
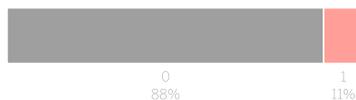
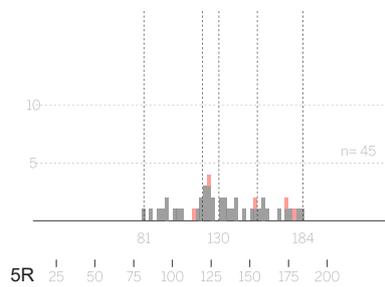
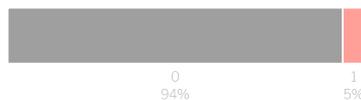


Figure 5.11—The frequency and distribution of dwellings with functional grouping. For multiple-storey dwellings, functional grouping refers to the existence of a self-contained room not counted towards living on the ground floor.



3-Storey



Grouping of Day and Night Functions

Figure 5.11 shows the grouping of functional areas and their distribution in relation to dwelling sizes. In one-storey dwellings, 'dwellings with functional grouping' refers to dwellings in which living areas and other rooms are grouped together and are positioned at different ends of the floor plan.²⁹ In all one-storey dwelling groups, most dwellings show functional grouping, which is consistent with efficient and functional layout planning. However, there is also a significant proportion of dwellings in which functional grouping is not observed. Yet, there is no clear relationship between the grouping of functions and dwelling sizes; the dwellings without functional grouping are distributed evenly across dwelling sizes.

In multiple-storey dwellings, as living areas and other rooms are often distributed to different floors, dwellings with a functional grouping refer to dwellings in which the kitchen floor has no additional habitable room larger than 8 m² other than living rooms.³⁰ In smaller multiple-storey dwellings, i.e. three- and four-room dwellings, there are no additional habitable rooms on the ground floor. However, most two-storey five- and six-room and three-storey six-room dwellings have one or two additional habitable rooms on the ground floor. As mentioned, larger multiple-storey dwellings might have living areas extending to other rooms in addition to the kitchen and living room. For instance, they might have a separate dining room or multiple sitting rooms. Terraced houses, which make up most of these dwellings, were originally designed in this way, with two sitting rooms. Here, additional rooms refer to rooms that can comfortably be used as a bedroom, as they are of sufficient size, have windows and are self-contained (the ones connected to the kitchen and living room are counted as part of the living room). The online survey and interviews will give more detail about the use of these dwellings.

Circulation

Figure 5.13 shows circulation areas and types of entrances and their distribution in relation to dwelling sizes. Circulation is coded as the room with the greatest number of connections to other rooms. For simplification, all circulation area categories, i.e. a corridor, a hall with a staircase, are coded as circulation areas (C) and all living areas as habitable rooms (R).

Most one-storey dwellings have a central circulation scheme, mostly through a specified circulation area such as a corridor or hall, and in some cases through a habitable room such as the living room or kitchen-diner. In one-storey dwellings non-central circulation schemes are not very common; only a small number of one-storey dwellings have non-central circulation schemes, such as inner corridors accessed from

29. See my discussion of Alexander Klein in Chapter 3.

30. While there are dwellings in which different living areas are distributed to different floors, the model does not take these into account as these dwellings usually have a living room on another floor in addition to the living area floor.

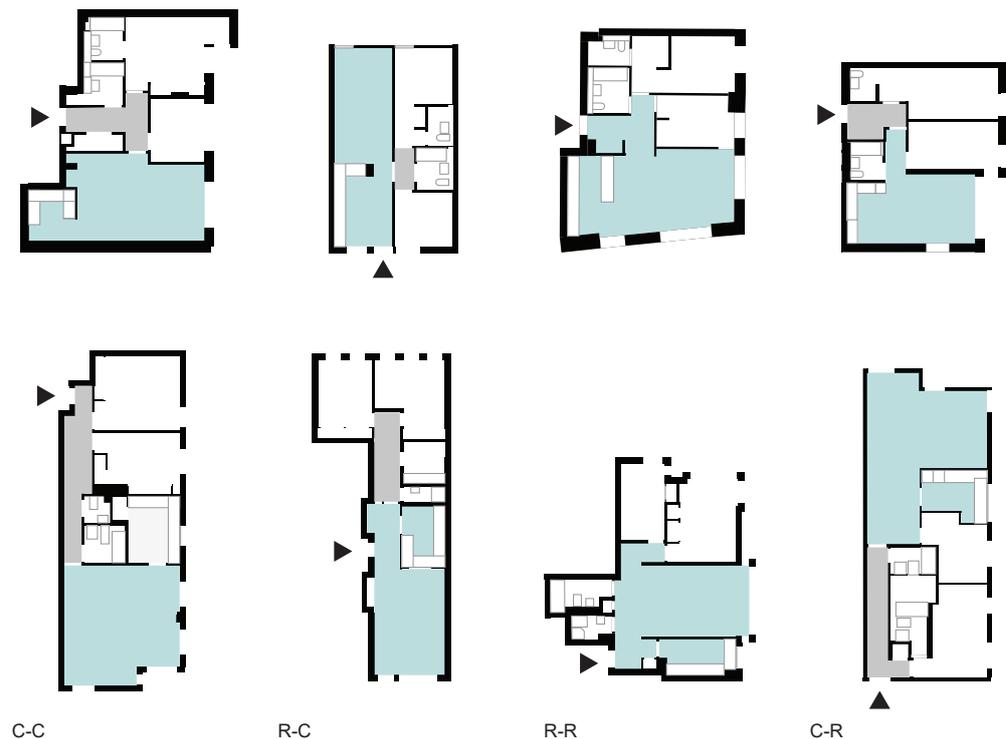
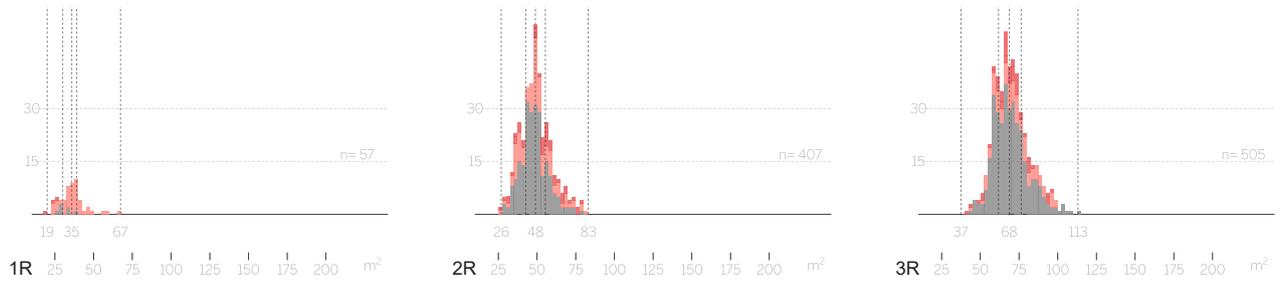


Figure 5.12—Floor plans of one-storey dwellings with different circulation types.

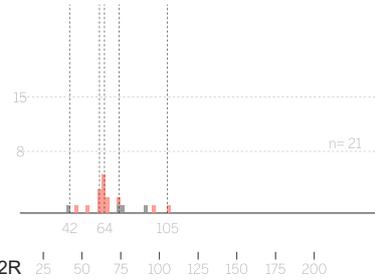
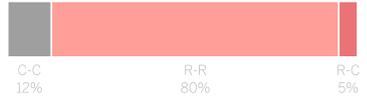
the main room (R-C) or enfilade-like schemes where rooms are accessed from other rooms (C-R) (Figure 5.13). Central circulation schemes through corridors and halls were historically regarded as efficient and a functional way of designing dwellings. In recent literature, they have been linked to adaptability, in the sense that they allow different activities to take place without interfering with each other.³¹ Central circulation schemes through living spaces can also be considered efficient, albeit in a different sense of the word. The efficiency of the corridor layout derives from the maximum use of room areas, as no space needs to be allocated for circulation, and the overlapping of all through areas in a single space, e.g. a corridor. In central circulation schemes, however, the area of the room which doubles as circulation cannot be fully used. In some instances, circulation space is counted as living space, resulting in less usable floor area, but in most cases, circulation space is added to living space, giving the impression of a more spacious area. In all cases, they provide less adaptable layouts, as their potential for use for other activities is limited.³²

31. Bernard Leupen, 'Polyvalence, a Concept for the Sustainable Dwelling', *Nordic Journal of Architectural Research* 19, no. 3 (2006): 23–31.

32. Paula Femenias and Faustine Geromel, 'Adaptable Housing? A Quantitative Study of Contemporary Apartment Layouts That Have Been Rearranged by End-Users', *Journal of Housing and the Built Environment* 35, no. 2 (2020): 500.



Flats



2-Storey

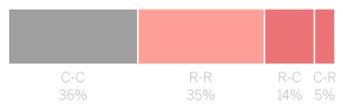
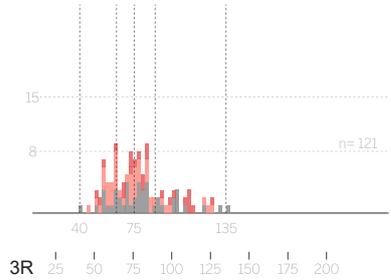
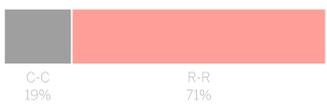
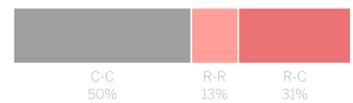
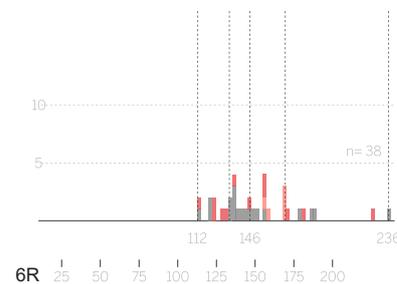
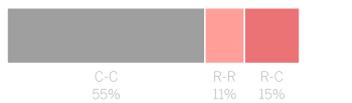
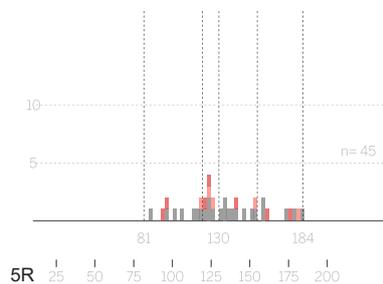
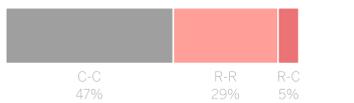
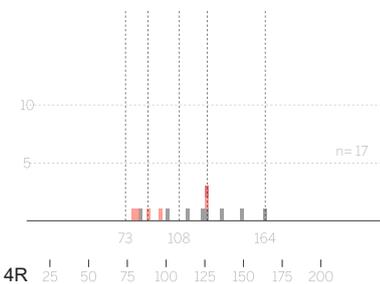
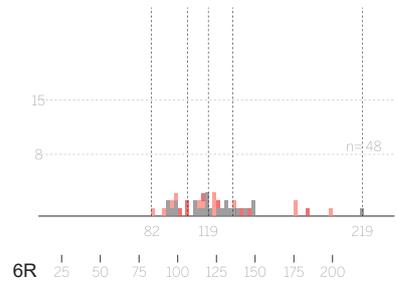
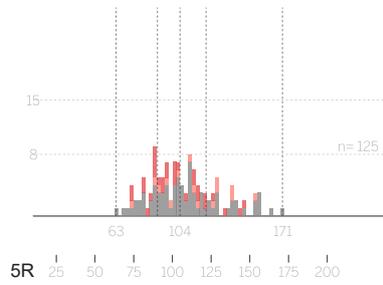
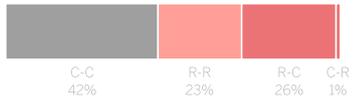
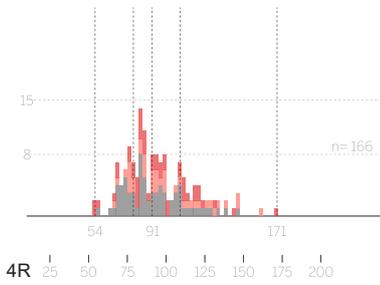
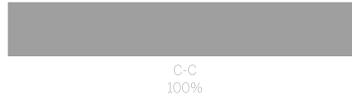
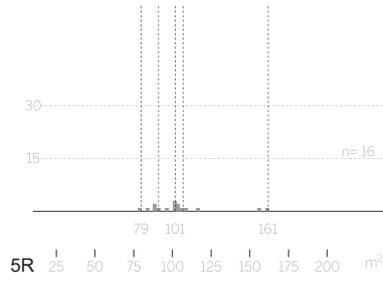
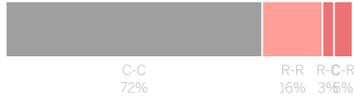
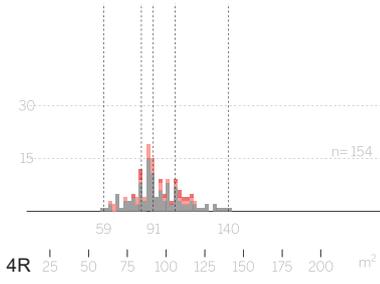


Figure 5.13—The frequency and distribution of dwellings with different circulation schemes.

C-C—central corridor, C-R—central room with entrance corridor, R-R—central room, R-C—inner corridor.



3-Storey

In multiple-storey dwellings, instead of entrance and circulation areas, the categories are based on horizontal and vertical circulation. Horizontal circulation is defined as the room with the greatest number of connections to other rooms, and vertical circulation means the room where the staircase is. In the majority of multiple-storey dwellings, the horizontal and vertical circulation is from the same room, a hall with a staircase or the living area. Terraced houses, which make up most of the multiple storey dwellings in the sample, originally had a front room, a back room, and the scullery or kitchen, all accessed from the hall with a staircase. Even though a significant portion of multiple-storey dwellings have C-C circulation, there is an equally large portion of multiple-storey dwellings with R-R circulation, dwellings in which both vertical and horizontal circulation is from the living area, and with R-C circulation, dwellings in which the vertical circulation is from a hall, whereas the horizontal circulation is from the living area. They are distributed evenly across the range of dwelling sizes and there is no significant relationship between dwelling sizes and circulation types. This shows that the interiors of terraced houses have been significantly remodelled from the historically typical terraced house layout. I will discuss the remodelling of older housing stock in Chapter 6.

Layouts of Dwellings

Together with the previous ones, these analyses show that design standardization extends beyond dimensional standardization. In one-storey dwellings, in particular, there are narrow standard dwelling size ranges and a narrow range of layouts. Figure 5.14 shows floor plans randomly selected for one-storey, two-, three-, and four-room dwellings organized in a matrix of layout features: circulation, the grouping of functions and living area arrangements. Here, all the different types of layouts identified in the sample through the categories analysed and the number of dwellings in each category can be seen.

Most of the one-storey dwellings have a central circulation area (C-C, R-R), functional grouping (Gr-), and grouped living areas (DK, LR-G). However, among R-R circulation schemes, where the entrance and main circulation is from the living area, there are different spatial arrangements. While some of them have clearly defined (but not separated) entrance and circulation areas (R-R: Gr-DK: 4R), in others the entrance and circulation areas are not defined (R-R: Gr-DK: 2R). This is one of the limitations of the classification method used in this study: the notional corridors and halls, unless clearly defined by walls, are not registered. Another limitation of the method lies in the classification of separate living arrangements in one-storey dwellings. For instance, while the plans for C-C: Gr-LR-S:2R show the living area as separate, with a bedroom in between, other plans with separate living arrangements have kitchens separated from the living room by a corridor. The latter, in fact, can function in the same way as a dwelling with a grouped living area arrangement. Looking at all the plans that have this arrangement in the sample, however, the ones separated by a corridor were built between 1945 and 1982 and the ones separated by

other habitable rooms were converted from dwellings built before 1939. Variations that are not captured in the layout categories, but have a significant impact on use, can also be observed among the inner corridor-type (C-R) and enfilade-type (R-C) circulation schemes. For instance, in the plan shown for C-R: Gr-LR-G:2R no part of the living area is used as part of the main circulation area, whereas in the plan shown for C-R: Gr-LR-G:4R only a small part of the living room can be used to place furniture in, in order to allow free circulation from the entrance to the bedrooms.

Despite variations, however, the layouts in the sample are mostly consistent with the standard models. Some of these variations could be the result of fitting standard organizational models to flat forms (shape, location of windows, location of mechanical installation, e.g. supply and waste pipes). As can be seen in the plans, uncommon circulation schemes, i.e. inner corridor-type (C-R) and enfilade-type (R-C) are mostly in terraced houses that have been remodelled. While they are rational responses to the common narrow typologies, they also take up much of the usable floor area. In the following chapters, I will discuss further how these types of layouts come into existence and what trade-offs are made when designing these layouts in Chapter 6. Further support for organizational standardization in the sample are the gaps in the matrix; not all layouts possible on paper can be found in the sample.

Still, however, there are non-standard layouts. The major differences are observed in dwellings in which functional grouping is not observed. These can potentially have different use patterns, as the units can be divided into zones that are not associated with functions but with users. One type that can be observed is the dwellings with enfilade-type circulation (R-C) with no functional grouping. This type of layout is called a 'dumb-bell' layout, in which the bedrooms are placed at opposite ends of the dwelling in which the central living area doubles as a circulation area.³³

The emergence of the dumb-bell layout can be directly linked to market preferences. These types of flats in the sample are from the recently built neighbourhoods. Moreover, there are regulations that prevent enfilade layouts in flats. Under the current fire safety regulations, inner bedrooms, i.e. bedrooms that can be accessed only through another room, can be built only if fire suppression systems are installed.³⁴ These systems create additional costs, compared to a layout in which all the rooms are accessed from a central corridor. Considering the high land and construction costs in London, the cost of these might not have a significant impact. But at the same time, it demonstrates that these have been designed intentionally. Dumb-bell layouts have been widely referred to in property publications and have been promoted as a viable unit typology for the Build to Rent sector. For instance, an article entitled 'Maximising Yield in Build to Rent Properties' that appeared on the blog of Fixflo, a company supporting letting agents, suggests that dumb-bell layouts are 'perfectly

33. Cf. Oliver Heckmann and Friederike Schneider, eds., *Floor Plan Manual: Housing* (Boston: Birkhäuser, 2017).

34. Building Regulations 2010. Approved Document B, *Fire safety* (HM Government, 2015), 21.



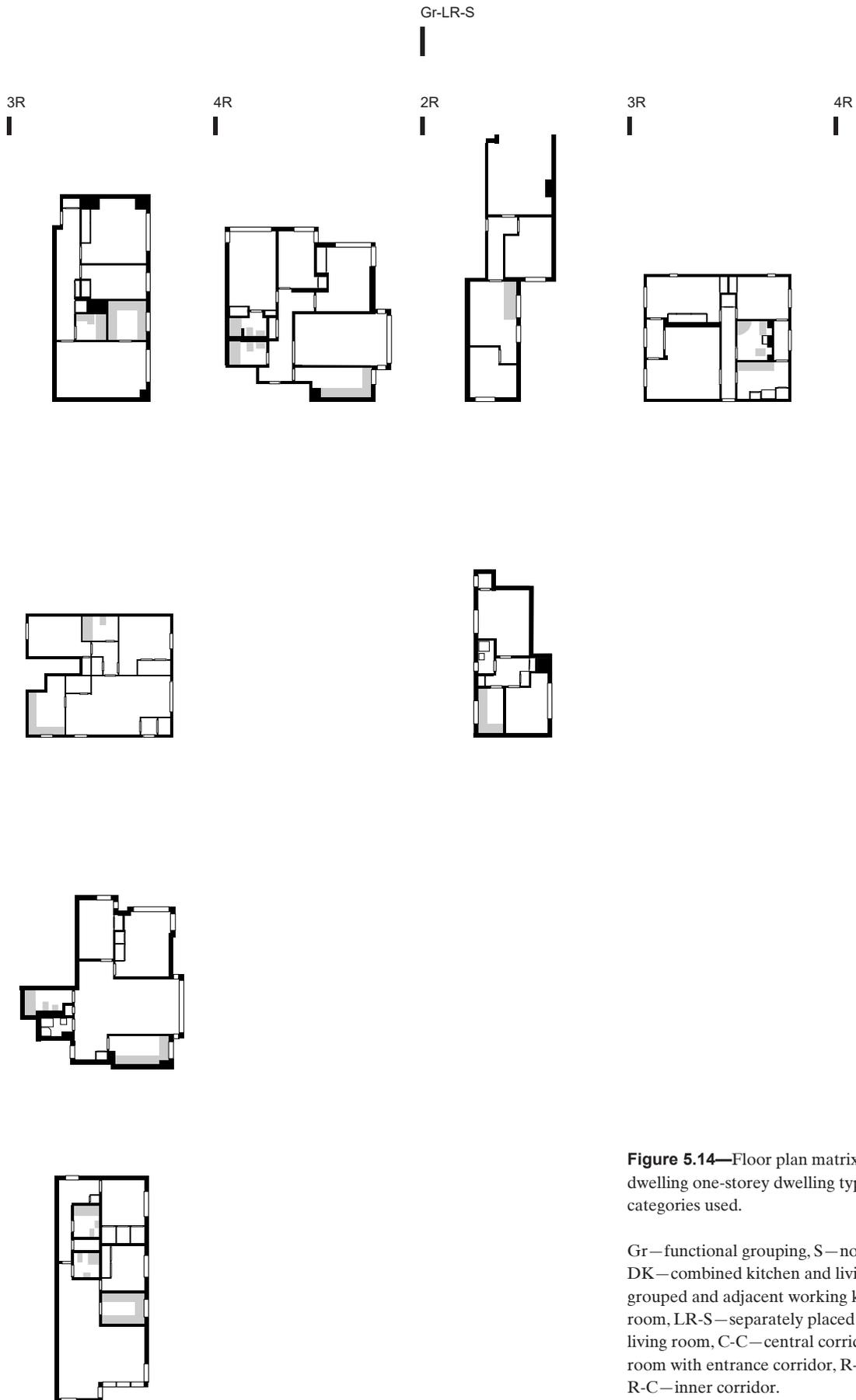


Figure 5.14—Floor plan matrix showing different dwelling one-storey dwelling types based on the categories used.

Gr—functional grouping, S—no functional grouping, DK—combined kitchen and living room, LR-G—grouped and adjacent working kitchen and living room, LR-S—separately placed working kitchen and living room, C-C—central corridor, C-R—central room with entrance corridor, R-R—central room, R-C—inner corridor.

Figure 5.14 Cont



S-LR-S



3R



4R



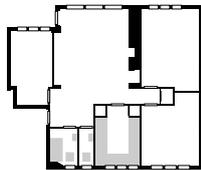
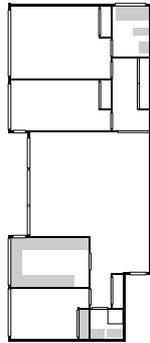
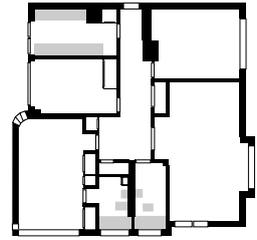
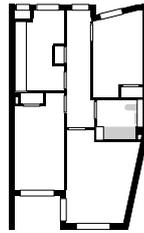
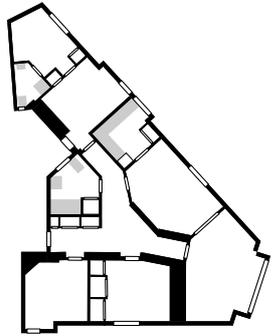
2R



3R



4R



designed for sharers': the rooms can be let individually, and therefore more easily, and return a higher net rent than letting the whole unit at once.³⁵ Similarly, Frances Brill and Daniel Durrant, in their very recent paper on the Build to Rent sector in London, posit that these types of dwellings are designed with 'two professionals sharing' in mind.³⁶ They note that this layout has been imported from multi-family housing designs common in the United States, where the investors in Build to Rent properties in London are based, highlighting how the financial relationships also contribute to the shaping of designs.³⁷

Such division into zones is observed in other dwellings with enfilade-type circulation (R-C). The plans for both R-C: Gr-DK:3R and R-C: Gr-LR-G:3R offer the possibility of isolating one bedroom from the rest of the dwelling. On the contrary, this does not hold true for the flats in which the living areas are grouped together. For instance, in the flat shown for C-C: Sr-LR-S:3R and C-C: Sr-LR-S:4R such a division is not possible. I will call the type of dwellings in which one en-suite bedroom is placed at the entrance and separated from the rest of the unit (a bathroom, living space, and bedrooms) with a door in the corridor satellite layouts, which have not attracted much scrutiny so far.³⁸ One explanation could be that these are designed for people who require care at home. A more plausible explanation, however, is that they are designed for people who let one of their bedrooms. A combination of shared ownership and the 'Rent a Room' scheme is a particularly common way to 'step on to the property ladder'.³⁹ However, this requires further research.

Despite the variations, in most one-storey dwellings, layouts consistent with 'good' housing models, i.e. efficient and functional layouts, are observed. However, in multiple-storey dwellings, there are neither quantitative nor qualitative repetitions. Similar limitations in the classification, e.g. notional corridors, semi-partitioned entrances are also true for the analysis of multiple-storey dwellings. What is striking in multiple-storey dwellings is the range of circulation patterns in terraced houses, which have a very similar disposition of rooms: a room at the front, another room at the back, and a kitchen organized in a linear fashion. While the original layouts are still recognizable, their circulation schemes and layouts have been highly modified with extensions and remodelling of interior partitions. I will discuss these in Chapter 6.

35. Jo Green, 'Maximising Yield in Build to Rent Properties', Fixflo, 2019.

36. Frances Brill and Daniel Durrant, 'The Emergence of a Build to Rent Model: The Role of Narratives and Discourses', *Environment and Planning A: Economy and Space*, 2021, 10.

37. Brill and Durrant, 10–11.

38. To my knowledge there is no assigned terminology.

39. UK Government, 'Rent a Room in Your Home: The Rent a Room Scheme', gov.uk, n.d.; Sophia Imeson, 'Let Your Spare Room Pay the Bills', *Financial Times*, April 8, 2016.

The Form and Extent of Design Standardization in London

Thus far, I have outlined the dimensional and organizational patterns in the data, focusing on the size and type of dwellings, the size and type of rooms, and the organization of rooms. I have also compared these patterns to contemporary and historical design standards and to the earlier housing design surveys. Moreover, I also looked into these in relation to the built year categories. I now turn to the question I have set at the beginning of this chapter: In what ways do design features in the existing housing stock correspond to the standards and conventions identified?

The floor plan survey has shown that London's dwellings come in a wide range of sizes. While a range is the expected result of sampling, the difference is worth noting: the largest dwellings generally have more than double the floor area of the smallest dwellings with the same number of rooms and floors. Despite this, however, the distributions are skewed to the right and most dwellings are clustered in a narrow range closer to the smaller end of dwelling sizes. I have referred to these as agreed-upon dwelling sizes, distinguishing the observed standard dwelling sizes from the prescribed ones (space standards). While these overall wide variations echo the issues of housing inequality in London, the clustered dwelling sizes at the lower end support design standardization.⁴⁰ As I have already discussed, in London, where land and construction prices are higher, housing development practices endeavour to minimize the floor area and increase density. There is a constant reimagining of what constitutes a usable (and sellable, rentable) dwelling and compromise of dwelling sizes with standards, conventions, and norms.

The agreed-upon sizes of mainstream dwelling types, the most common dwelling types in both the sample and the actual housing stock, one-storey two-, three- and four-room and two-storey three-, four- and five-room dwellings, overlap with the minimum dwelling sizes in the *London Housing Design Guide*; they are clustered within and immediately above the space standards. However, it is difficult to talk about such overlaps in dwellings with a smaller and greater number of rooms. These dwellings cater to less common housing needs and, as the data has shown, are determined less by common functional requirements. This difference is consistent also with the historical standards. In the making of standards, contemporary and historical, two- and three-bedroom dwellings have been preferred. From model dwellings to the post-war period three-bedroom flats and houses were advocated as the only type of working-class housing, later expanding into two-bedroom flats. Certainly, it is difficult to argue for a causal relationship between functional minimums calculated in space standards and the common dwelling sizes observed in mainstream dwellings, as these standards were not obligatory when the dwellings in the sample were designed, and

40. See 'Special Feature: London's Housing Crisis and Activisms' *City* 20, no. 2 (2016). Paul Watt and Anna Minton, 'London's Housing Crisis and Its Activisms', *City* 20, no. 2 (2016): 204–21.

to a large extent are still not. Regardless, it points to a standardization process that closely follows the careful calculations of minimum usable dwelling size.

While it is possible to classify dwellings as mainstream and uncommon based on their relationship to minimum dwelling size standards, further analysis has shown that there are significant differences between dwelling typologies, i.e. one-storey and multiple-storey dwellings. In general, one-storey dwellings, especially mainstream types, show significant overlaps, dimensionally and organizationally, with housing models presented historically as 'good'.

First, it has shown that in the allocation of dwelling size to different rooms and functions, there is a strict formula: total floor area is distributed according to a strict formula: the sizes of living spaces and main bedrooms change almost linearly with dwelling size. This finding overlaps with the market approaches identified in the literature. For instance, Hooper and Nicol noted that in the upper sectors of the market, in which dwellings are larger, more spaces are allocated for public areas, including living areas and halls.⁴¹ In a similar vein, Karn and Sheridan noted that large first bedrooms were a common marketing strategy.⁴² Second, most one-storey dwellings have layouts that correspond to standard housing models: a grouped or combined living area, grouped day and night functions, i.e. living and bedroom areas grouped together and placed at the different ends of the dwelling, and central circulation provision, whether through a dedicated circulation space, such as a more common corridor or a hall or through the living areas.

To quantify, 49% of mainstream one-storey dwellings meet all the dimensional requirements of the current space standards and have layouts consistent with the standard housing models, i.e. they have at least one double bedroom larger than 12 m², a living space larger than the minimum prescribed, have their functional areas grouped, have a central circulation, and a grouped living space. 70% meet the dimensional standards, and 73% meet the organizational ones (Table 5.08).

However, unlike one-storey dwellings, multiple-storey dwellings do not show dimensional and organizational patterns as coherent with housing models presented historically as 'good'. While a strict pattern is observed in one-storey dwellings in terms of the allocation of net floor area to rooms, in multiple-storey dwellings there are wide variations. The relationships between dwelling size and bedroom sizes were also less clear and bedrooms smaller than 8 m² were more common. Moreover, multiple-storey dwellings have shown an even wider range of layouts than those found in one-storey dwellings. To quantify, only 26% of mainstream multiple-storey dwellings are consistent with a standard housing model. Even though 61% meet dimensional standards, only 38% meet the dimensional ones (Table 5.09).

41. Hooper and Nicol, 'Standard House Types in the Speculative Housebuilding Industry'.

42. Karn and Sheridan, 'New Homes in the 1990s', 16.

Table 5.08— The number and frequency of dwellings complying with dimensional and organizational standards and conventions.

	All Standards		Dimensional		Organizational			
	n	%	n	%	n	%		
1S 2R	407	38%	168	41%	226	56%	319	78%
1S 3R	505	47%	258	51%	385	76%	345	68%
1S 4R	154	14%	97	63%	131	85%	110	71%
	1066		523	49%	742	70%	774	73%

Considering the dimensional and organization patterns in one-storey dwellings we can conclude that different actors involved in housing design and development have agreed-upon ideas about (or conventions of) flats that are consistent with the contemporary space standards and the ‘good’ housing models in history. As I have shown in Chapter 3, the discussions of housing design have focused largely on blocks of flats. Both in the mid-nineteenth century and in the post-war period, blocks of flats were regarded as the ways to address issues of affordability, density, land, and urban growth.⁴³ One task of the standard-makers was to develop flat as a convenient, desired, and functional housing typology, and hence their focus on dimensions and organization. While it is not surprising to observe that the form of a flat is highly predetermined after more than a century-long *investment* in its form, an outstanding question remains: how and why are these forms sustained?⁴⁴

In Table 5.09, the previous table showing the standard, below standard and non-standard, is broken down into three periods based on when they were built. Most mainstream one-storey dwellings in the sample were built after the 1980s (55%), in a period marked by little state intervention in housing. The proportion of dwellings that meet all dimensional and organizational standards is highest in dwellings built in the past forty years, and lowest in dwellings from the older housing stock. I have already shown that the agreed-upon dwelling sizes do not vary significantly between different periods (Figure 5.02). Therefore, the proportion of substandard dwellings does not show much difference between periods. However, more dwellings built in the past forty years comply with the layouts historically regarded as ‘good’.

The adoption of efficient and functional planning principles in unit design is closely related to the renewed regard for high-density development in London.⁴⁵ This interest is a shared one: while the government and local authorities regard it as a viable way to address the housing shortage, the financing of development, planning

43. Nicholas Bullock, 'Plans for Post war Housing in the UK: The Case for Mixed Development and the Flat', *Planning Perspectives* 2, no. 1 (1987): 71–98.

44. See: Laurent Thévenot, 'Rules and Implements; Investment in Forms', *Social Science Information* 23, no. 1 (1984): 1–45.

45. Jennifer Robinson and Katia Attuyer, 'Extracting Value, London Style: Revisiting the Role of the State in Urban Development', *International Journal of Urban and Regional Research*, 2020; Fanny Blanc and Tim White, 'Life in London's Changing Densities', *Urban Geography* 41, no. 10 (2020): 1–8.



Figure 5.15—Standard one-storey dwellings

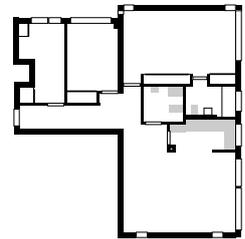
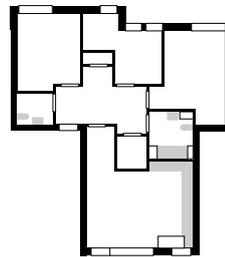
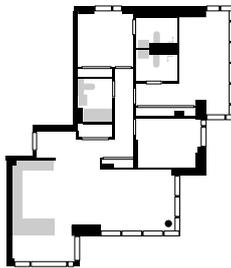
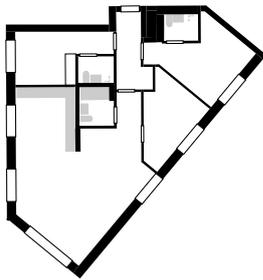
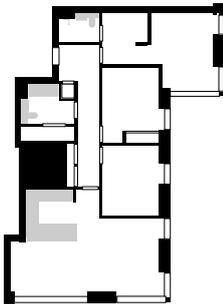
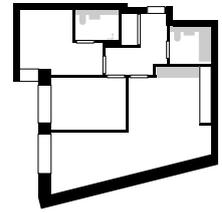
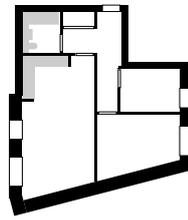
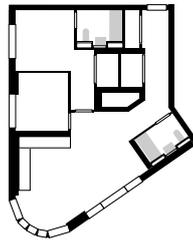
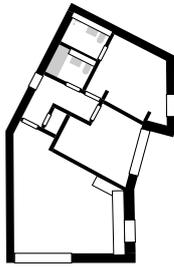
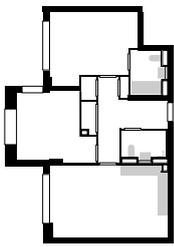
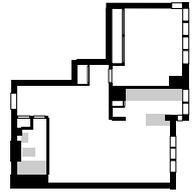
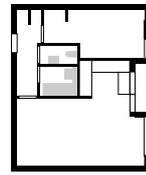
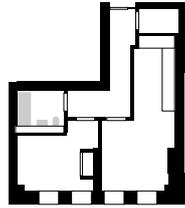
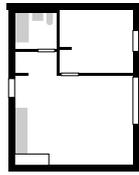
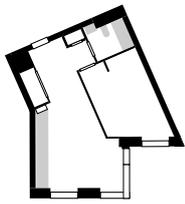


Table 5.09— The frequency of standard, below-standard, and non-standard one-storey and two-storey dwellings per build period.

		All Standards		Dimensional		Organizational			
		n	%	n	%	n	%		
	Before 1939	129	12%	33	26%	86	67%	51	40%
1S	1945-1982	356	33%	154	43%	230	65%	248	70%
	1983-2018	581	55%	336	58%	426	73%	475	82%
	Before 1939	336	68%	70	21%	197	59%	100	30%
2S	1945-1982	71	14%	25	35%	42	59%	43	61%
	1983-2018	90	18%	32	36%	63	70%	48	53%

obligations, and the way land is valued make developers seek to increase density.⁴⁶ In the past decades, estate regeneration schemes to luxury housing, the high-density residential tower has become London's 'new housing typology'.⁴⁷ The efficient and functional planning of dwelling units is essential to density. Efficient and functional planning helps achieve usable dwellings while minimizing floor area. While I have pointed their regulatory and historical aspects, the preferences for central circulation, the grouping of functions, and the combined kitchen-diners should also be seen as a desired design for the density.

The dominant block typology is this density is the single aspect flats with a central, double-loaded circulation.⁴⁸ Single aspect flats are limited in terms of their organization as the rooms have to be placed side by side to have windows. Moreover, in buildings organized in this way, the width of a flat has to be optimized. This often results in having the kitchen, bathrooms, storage, and circulation at the back and the rooms at the front. Combined entrance halls (regulations permitting) and combined kitchen diners should also be regarded as the result of this typology. For instance, the preference for combined living space, observed in 83% of one-storey dwellings built in the past forty years, is despite the calls for designing the living room and kitchen separately in various contemporary planning documents.⁴⁹ The impact of a combined kitchen and living arrangement is greater than not requiring as much circulation

46. David Adams and Steve Tiesdell, *Shaping Places: Urban Planning Design and Development* (Oxon: Routledge, 2012); Fanny Blanc, Kath Scanlon, and Tim White, 'Living in a Denser London: How Residents See Their Homes' (London: LSE London and LSE Cities, 2020).

47. Certainly, this raises questions about, then, how these differences are materialized in the built space. Stephen Graham, 'Luxified Skies: How Vertical Urban Housing Became an Elite Preserve', *City* 19, no. 5 (2015): 618–45; Hilary Osborne, 'Poor Doors: The Segregation of London's Inner-City Flat Dwellers', *The Guardian*, June 25, 2014.

48. Cf. case studies in: Simos Yannas and Jorge Rodríguez-Álvarez, 'Domestic Overheating in a Temperate Climate: Feedback from London Residential Schemes', *Sustainable Cities and Society* 59 (2020): 102189.

49. 'London Borough of Tower Hamlets Report of the Scrutiny Review Working Group on Affordable Homeownership', 2009; Mayor of London, *Housing Design Quality and Standards; Supplementary Planning Guidance, Module C - Pre-Consultation Draft*, 2020.

space. As it combines two large rooms that require windows, a combined kitchen and dining arrangement also design deeper single-aspect flats possible.

In contrast, most mainstream two-storey dwellings in the sample are from the older housing stock, i.e. housing built before 1939 (68%). I have already noted that multiple-storey dwellings built in the past forty years are generally larger than dwellings built before the 1980s. More dwellings built in the past forty years meet the most recent space standards and have the layouts historically regarded as 'good'. I have also noted there are wide variations in the layouts of older housing stock resulting from extensions and the remodelling of interior partitions. In the next chapter, I focus solely on the older stock, also integrating the online survey and interview data.

6

Design Standardization in Terraced Houses

In the previous chapter, I have shown that the dimensional and organizational repetitions, especially in flats (one-storey dwellings), are consistent with the contemporary space standards and the ‘good’ housing models in the history, supporting my discussion of design standardization, i.e. a controlled variety of dwelling designs. However, in the sample studied, some differences were also observed. One of these were related to the differences in standardization contexts: the dwellings built before 1939 showed differences in their sizes and wider variations in their layouts. This was true both for a small number of flats converted from terraced houses built before 1939 and for houses and maisonettes that make up most of the multiple-storey dwellings in the floor plan sample. In this chapter, my focus is these dwellings and the design practices that have shaped these variations: does an analysis of differences and variations tell us more about the standardization processes and the housing design in London?

Older terraced houses were originally highly standardized in their dimensions and layouts (see Chapter 3). However, throughout the past century, they have been extended, their interiors have been remodelled and they have been converted into flats and maisonettes. These practices are highly tied to the original terraced house typology: they can only be extended backwards (back extensions) and upwards (loft extensions) and their deep and narrow plan with staircase can accommodate only a small number of rooms. However, as shown, different layouts (circulation and organization of rooms), combinations of rooms, and room sizes have been achieved within these limitations.

The ubiquity of both terraced houses and the extensions, conversions and alterations are evident to anyone who lives in London. In 2018, 35% of the dwelling units in London were built before 1900 and 51% before 1939, and most of these were houses.¹ While there is no clear figure specific to London, according to the 2011 edition of the *English Housing Survey*, in the UK, 73.5% of dwellings built before 1919 and 58.9% of dwellings built between 1919 and 1944 had at least one major alteration.² Around 45% of dwellings built before 1944 had a major alteration that resulted in an increase in dwelling size, i.e. extensions and loft conversions.

English Housing Survey lists the type of alterations (from the most common to least in dwellings built before 1919) as extensions added for amenities, rearrangement of internal space, complete refurbishment, extensions added for living space, conversion to more than one dwelling, alteration of external appearance, loft conversion, conversion from a non-residential use, and combination of two or more dwellings.³ The older stock was built for a different type of society, technologies, and domestic practices, and therefore, their continuing use for a century requires maintenance and change.⁴ The addition of a bathroom on the ground floor, a larger kitchen, a new bedroom, to make use of what would have previously been the parlour, and so on reflect these.⁵ The conversion of terraced houses into smaller units reflect the changing household sizes and structures and increasing demand for smaller housing units.

While the changes made to existing dwellings might seem outside the policy and regulation these alterations have also been and continuing to be supported by policies. The conversion of older houses into self-contained flats has been considered as a potential solution to the housing shortage in the UK since the early twentieth century. By 1919, the British Ministry of Health published its *Manual on the Conversion of Houses into Flats for the Working Classes*, endorsing the subdivision of houses into self-contained flats and maisonettes, and this was followed by a pilot programme in

1. Valuation Office Agency, 'CTSOP 3.1: Number of properties by Council Tax band, property build period and region, county, local authority district and lower and middle super output area', in Council tax: stock of properties, 2018, <https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2018>. See also: Chapter 2.

2. Department for Communities & Local Government, 'English Housing Survey: HOMES - Annual Report on England's Housing Stock, 2011' (London: Department for Communities and Local Government, 2013), Annex Table AT1.21: Dwellings with any major modifications since built by dwelling age, 2011.

3. Department for Communities & Local Government, Figure 1.19: Percentage of dwellings with different types of major modifications since built by dwelling age, 2011.

4. Stewart Brand, *How Buildings Learn: What Happens after They're Built* (London: Phoenix Illustrated, 1997).

5. Martin Hand and Elizabeth Shove, 'Orchestrating Concepts: Kitchen Dynamics and Regime Change in Good Housekeeping and Ideal Home, 1922–2002', *Home Cultures* 1, no. 3 (2004): 235–56; Maj Britt Quitzau and Inge Røpke, 'The Construction of Normal Expectations: Consumption Drivers for the Danish Bathroom Boom', *Journal of Industrial Ecology* 12, no. 2 (2008): 186–206.

Islington in the 1920s.⁶ A similar manual was also published in 1946.⁷ In the post-war period conversions of older housing into self-contained flats were promoted as a way to meet the housing demand, supporting council housing and urban renewal projects.⁸ However, it was only in the 1980s, with house price booms and increasing access to a mortgage that conversions became popular. Chris Hamnett notes that ‘by the end of the 1980s, conversions were the single largest source of new dwellings in London’.⁹ While the housing demand, especially for smaller units, is still high in London, the policy support has shifted from house to flat conversions to non-residential to residential conversions, as many terraced houses have been converted into self-contained housing units in the second half of the twentieth century.¹⁰

Building extensions, since the post-war period, have been further promoted and also regulated with permitted development rights that allow extensions to dwellings without the need for planning permission. Permitted development rights that pertain to dwellings, control the extension volume and depth, which have changed frequently. In 1995, permitted development rights were granted if the extension was less than 50 m³ or 10% of the existing dwelling volume, whichever was the greater, and up to 2 m from the plot boundary.¹¹ In 2015, permitted development rights were granted if the additions covered less than 50% of the plot area not covered by the dwelling, and extended no more than 3 m from the original rear wall.¹² Permitted development only applies to houses, and not to converted flats and maisonettes. Permitted development rules are also comparatively more restrictive than planning policies, which are open to interpretation and negotiation.

There are also different market and design conventions that surround extensions, conversions, and the remodelling of interiors. There is a design, construction and planning knowledge embedded in architectural practices focusing solely on terraced house alterations. There is also a dispersed knowledge in popular media.¹³ It is widely acknowledged that home interiors and homemaking have been influenced by printed

6. Ministry of Health, 'Manual on the Conversion of Houses into Flats for the Working Classes' (London: H M Stationery Office, 1919). For the details of the pilot project see: Tanis Hinchcliffe, "‘This Rather Foolish Piece of Panic Administration’ The Government’s Flat Conversion Programme in London 1919", *The London Journal* 19, no. 2 (2013): 168–82.

7. Central Housing Advisory Committee (Silkin Committee), *Report on the Conversion of Existing Houses* (London, 1945). I could not access this document. It is mentioned in 'Conversion of Existing Houses' in *The Times*, January 26, 1946; Jim Yelling, 'Public Policy, Urban Renewal and Property Ownership, 1945-55', *Urban History* 22, no. 1 (1995): 48–62.

8. Yelling; R.J. Allerton, 'The Reconditioning of Housing Property', *Journal of the Royal Sanitary Institute* 74, no. 9 (1954): 827–35.

9. Chris Hamnett, 'Gentrification and the Middle-Class Remaking of Inner London, 1961-2001', *Urban Studies* 40, no. 12 (2003): 2412–13.

10. Jessica Ferm et al., 'Emerging Problematics of Deregulating the Urban: The Case of Permitted Development in England', *Urban Studies*, 2020, 004209802093696. See also: Chris Hamnett and Drew Whitelegg, 'Loft Conversion and Gentrification in London: From Industrial to Postindustrial Land Use', *Environment and Planning A* 39 (2007): 106–24.

11. The Town and Country Planning (General Permitted Development) Order 1995, No. 418

12. The Town and Country Planning (General Permitted Development) (England) Order 2015, No. 596

13. Aneta Podkalicka and Esther Milne, 'Diverse Media Practices and Economies of Australian Home Renovators: Budgeting, Self-Education and Documentation', *Continuum* 31, no. 5 (2017): 694–705..

and new media.¹⁴ For instance, popular among those who want to extend, convert, and redecorate their homes, magazines and websites such as houzz.co.uk, compile visual catalogues of home renovations.¹⁵ Consisting of images and information put up by those who had renovated their homes, as well as by architects and builders, home renovation media function as a ‘complex, multi-purpose, and networked communication process and cultural context’, influencing client choices and promoting certain design solutions.¹⁶

Despite their unquity, their conceptualization from social and geographical perspectives, and their coverage in printed and new media, we have very little knowledge of the spatial consequences of extensions, conversions, and the remodelling of interior partitions.¹⁷ In this chapter, my focus is exclusively on terraced and semi-detached houses built before 1939, including houses, converted flats, split-floor flats and maisonnettes.

My discussion here is two-fold. First, I expand my exploratory floor plan analysis, focusing on a part of the sample, dwellings from seven neighbourhoods largely built in the period before 1939 (n=480).¹⁸ I outline the design of extensions, interior modifications, and converted flats. Here, I make use of comparative floor plan matrices more, as Chapter 5 already includes graphs showing the general characteristics. Comparative matrices are also more useful; as terraced houses were originally very similar, organizing them in matrices allows compelling visualizations of the variations that alterations have resulted in. Second, drawing from the online survey and interviews I outline the motivations, considerations, and spatial issues. I focus on a part of the online survey and interviews, i.e. the open-ended questions in the online

14. Lorraine Leonard, Harvey Perkins, and David Thorns, 'Presenting and Creating Home: The Influence of Popular and Building Trade Print Media in the Construction of Home', *Housing, Theory and Society* 21, no. 3 (2004): 97–110; Grace Lees-Maffei, *Design at Home: Domestic Advice Books in Britain and the USA since 1945*, Directions in Cultural History (Oxon: Routledge, 2014); Patricia Lara-Betancourt and Emma Hardy, 'Seductive Discourses: Design Advice for the Home – An Introduction', *Interiors: Design, Architecture and Culture* 5, no. 2 (2014): 131–39.

15. www.houzz.co.uk. See also: Caroline Scott, 'Houzz Quiz Reveals the Way We Live', *The Sunday Times*, July 27, 2014.

16. Aneta Podkalicka, 'Actor, Intermediary, and Context: Media in Home Renovation and Consumption Practice', *Communication Research and Practice* 5, no. 3 (July 2019): 210–25. See also: Kath Hulse, Aneta Podkalicka, Esther Milne, Tomi Winfree, Gavin Melles, 'RP3021: Report Media/Home Renovations: 'I'd just Google it': media and home renovation practices in Australia' (CRC for Low Carbon Living, 2015); Hilde Bouchez, 'Pimp Your Home: Or Why Design Cannot Remain Exclusive – From a Consumer Perspective', *The Design Journal* 15, no. 4 (2012): 461–77.

17. J W R Whitehand, N J Morton, and C M H Carr, 'Urban Morphogenesis at the Microscale: How Houses Change', *Environment and Planning B: Planning and Design* 26, no. 4 (1998): 503–15; J.W.R. Whitehand and Christine M. H. Carr, 'The Changing Fabrics of Ordinary Residential Areas', *Urban Studies* 36, no. 10 (1999): 1661–77; J.W.R. Whitehand, 'Changing Suburban Landscapes at the Microscale', *Tijdschrift Voor Economische En Sociale Geografie* 92, no. 2 (2001): 164–84; Martin Hand, Elizabeth Shove, and Dale Southerton, 'Home Extensions in the United Kingdom: Space, Time, and Practice', *Environment and Planning D: Society and Space* 25, no. 4 (2005): 668–81.

18. A significant proportion of the floor plan survey, especially of two- and three-storey dwellings, focuses on terraced houses built before 1939. However, there are also a few neighbourhoods in the survey that consist of purpose-built flats. In this analysis, only the neighbourhoods that consist of terraced houses are taken into account. Having a frontage of less than 7 m was also added as a secondary criterion in narrowing down the sample, as there were a few wider detached housing.

survey about the changes participants have made to their homes, and interviews with participants who undertook extensions or interior remodelling projects.

I first discuss back extensions and remodelling of ground floors in terraced houses and then focus on converted flats. The chapter is structured according to the observations made in the floor plan analysis and themes generated from the online survey and interviews.

Back Extensions and Remodelling of Ground Floors

To understand the back extensions of terraced houses, I first focus on the width and depth of the ground floors that are taken as the deepest floor of the houses. In the terraced house sample, the width of dwellings varies between 4 and 7 m, and the plan depth varies between 6 and 20 m. Some of these variations originate from the way houses were built. Even though dwellings built before 1939 were highly repetitive in their interior organization, there were also differences especially in their width (frontage), and to some extent, their depth. For instance, while the scullery (kitchen) was in a rear projection, in others, it was integrated into the main part of the building, often behind the staircase. However, the variation in the depth of buildings is also a result of the extensions, which is my focus here.

To disentangle these, in Table 6.01, the floor plan depths are given for the seven neighbourhoods included in the analysis. Housing in these neighbourhoods, as mentioned, was built in the same period and includes significant similarities and repetition. Here, first of all, two distinct groups can be observed: neighbourhoods in which most plan depths are between 12 m and 15 m (Group A), and neighbourhoods in which most plan depths are between 7 and 12 m (Group B). There is also one neighbourhood, which does not fit into any of these groups and offers a comparatively low sample size. This neighbourhood will be omitted in the following parts of the discussion to focus on the remodelling of the most prevalent terraced house types. Visualizing dwellings of various building depths from the same neighbourhood enables the identification of the original repeated building forms in each of the sampled areas. For instance, in Lewisham 37A26B, the original buildings appear to be approximately 7 m deep and have no projections, whereas, in Hackney 012BCD, the original buildings appear to be 11 m deep, including a projection at the back and a bay window at the front. The dwellings in Group A have an original depth of 8-9 m and extension depths of an additional 4 to 6 m. The dwellings in Group B have an original depth of 6-8 m and extension depths of an additional 0-3 m, meaning many of them have not been extended beyond the party wall (Figure 6.01).

However, extensions are not only defined by their depth. While some extensions are approximately half the width of the building frontage, others are full width. The former type of extension, commonly called a rear extension, refers to both these

7.5 m



8.5 m



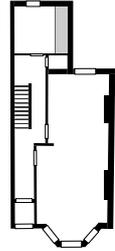
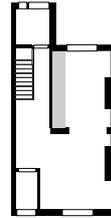
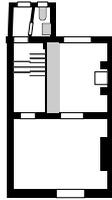
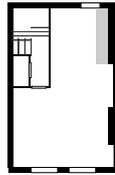
9.5 m



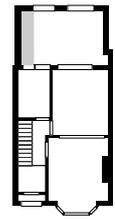
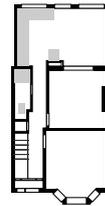
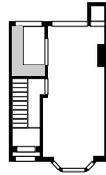
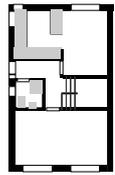
10.5 m



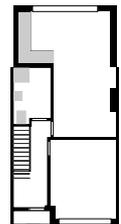
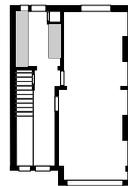
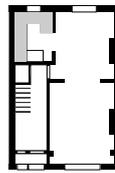
Hackney 012BCD



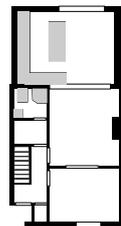
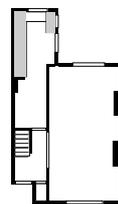
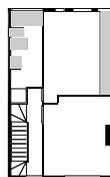
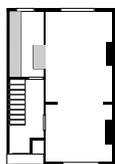
Newham 24C25D



Lambeth 035BC



Lewisham 37A26B



11.5 m



12.5 m



13.5 m



14.5 m



15.5 m

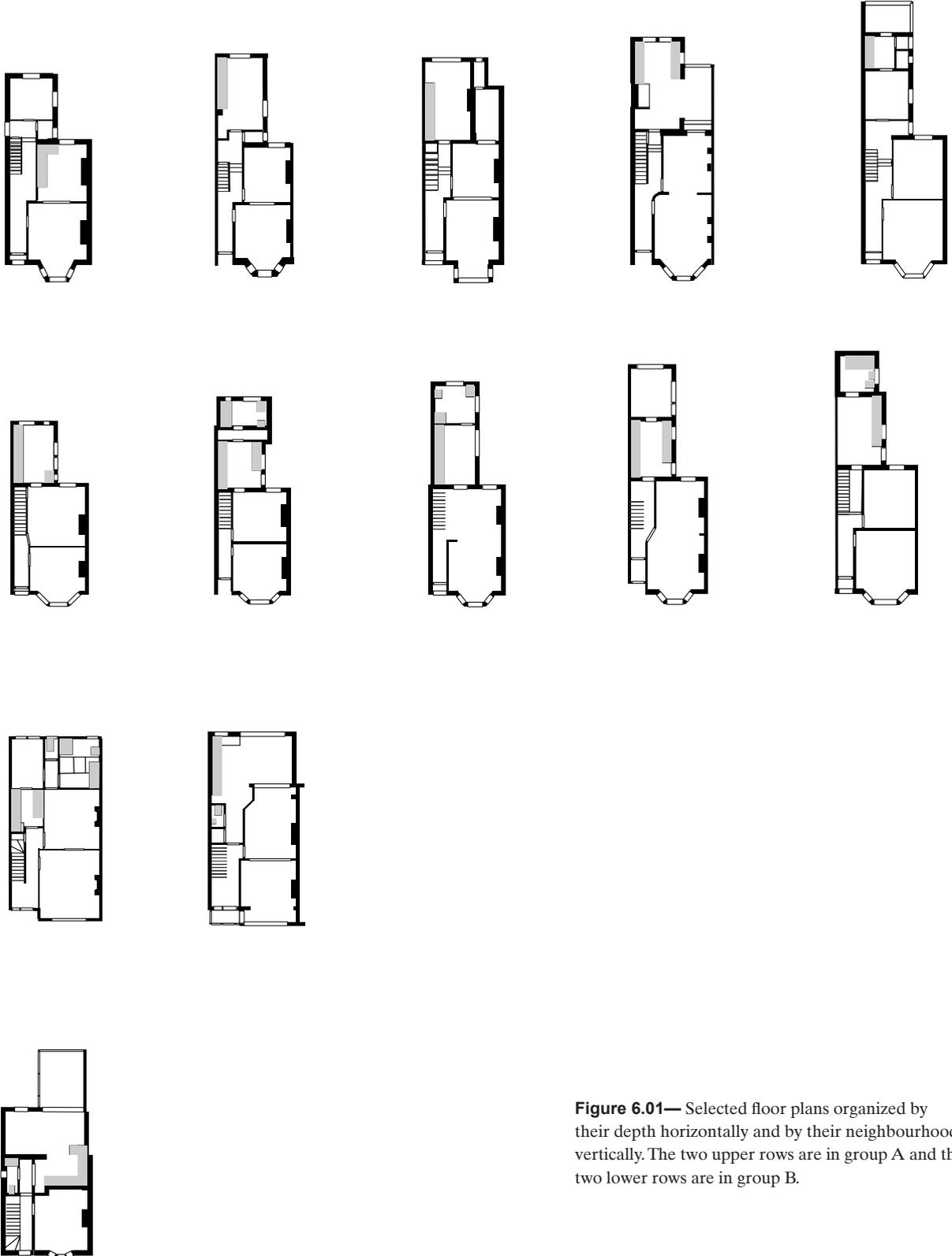


Figure 6.01— Selected floor plans organized by their depth horizontally and by their neighbourhood vertically. The two upper rows are in group A and the two lower rows are in group B.

Table 6.01— LSOAs with terraced houses included in the analysis, their description and their length. Based on the distribution of their length they are grouped into clusters A and B (Hackney 06AC does not fit into any of these groups and has a comparatively low sample size).

LSOA	Period Built	Description	N		Length
Hackney 012BCD	-1900	2, 3, 4 storey terraced houses, various frontages, in long terraces, private sector built	94	A	
Hackney 020CDE	-1900	3 storey terraced houses, similar frontages, short terraces, private sector built	55	A	
Newham 24C25D	1900-1918	2 storey terraced houses, narrow frontages, in long terraces, private sector built	118	A	
Hackney 06AC	-1900	2, 3, 4 storey terraced houses, various frontages, in long terraces, private sector built	26		
Lambeth 035BC	1930-1939	2 storey terraced houses, wide frontages, private sector built	54	B	
Lewisham 37A26B	1919-1929	2 storey terraced houses, narrow frontages, public sector built	74	B	
Hammersmith and Fulham 003C	1919-1929	2 storey terraced houses, narrow frontages, public sector built	59	B	

original back projections and later extensions added to them. While rear projections were common in the original versions of the terraced houses dating from before 1900 and contained kitchens, the ones built after 1919 often did not have these projections and had the kitchen incorporated into the main part of the house (see Chapter 3). The latter type of extension commonly called a side return extension, is often an addition to the side of the original back projection in terraced houses with back projections.

In Figure 6.02, the compactness of the floor area and extension depth¹⁹ are given. The compactness ratio is a good indicator of the shape of the extension, as the part of the original building that is taken as a point of reference has a rectangular form (except for bay windows and porches). A higher compactness ratio (closer to 1) means a rectangular floor plan shape, and therefore full-width extensions. As the compactness ratio decreases, it is more likely that the floor plan has projections or courtyards. Based on the examples plotted in Figure 6.03, 0.85 is taken as a reference value to differentiate more rectangular plans from those with projections. In general, the dwellings in Group B have compactness ratios that are mostly above 0.85, with a median of 0.9 and a mean of 0.85. Dwellings in Group A, however, have compactness ratios mostly below 0.85, with a mean and median of 0.8. In general, the deeper a

19. Extension depth refers to floor plan depth normalized by subtracting the party wall length.

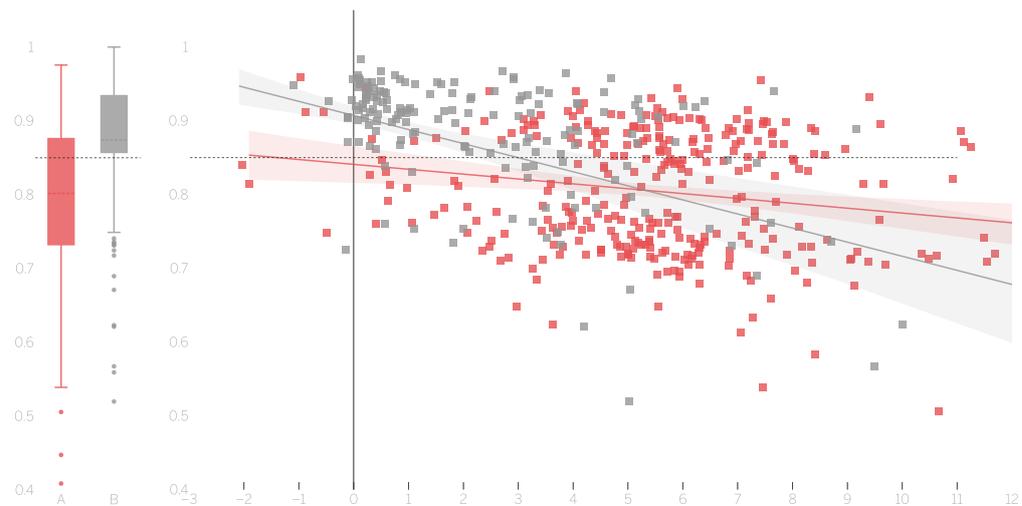


Figure 6.02—Distribution of floor area compactness ratio (net floor area / area of minimum bounding rectangle) and its relationship to extension depth (depth-neighbourhood party wall length).

building is when extended, the more likely that it includes projections or courtyards. This is not surprising, as a dwelling with projections allows more natural light to penetrate the middle rooms. Certainly, a side return extension with a glazed roof is another option to bring in natural light, as side windows are not permitted, but they are comparatively more expensive.²⁰

Changing Kitchens and Living Areas

Originally, the kitchen and its infrastructure, e.g. piping, were originally placed at the back of a projection, or at the end of the entrance hall. Therefore extensions have direct consequences for kitchens. In the terraced house sample, kitchen sizes are distributed in a significantly wide range, between 5 m² and 90 m² with a median of 14 m² (Figure 6.04). Moreover, the dwellings in Group A, which have deeper extensions than those in Group B, also have deeper and have larger kitchens. However, the plans show that kitchens have not only been extended further but also connected to or merged with one of the original rooms in the main part of the original plan (Figure 6.05). This suggests that kitchens are not merely by-products of extensions but are the focus of extensions.

This is supported by survey responses. In the online survey, the respondents were asked whether they use their home as laid out when they moved into their homes and list the changes they have made.²¹ Changes to the kitchen were the most common response in the online survey. However, none of them referred to it as the

²⁰ Architecture for London, 'How Much Does a House Extension Cost in London in 2019?', Architecture for London, February 21, 2017.

²¹ 76 respondents (out of 239, 32%) said they had made some changes and 13 respondents (out of 36 who listed these changes, 36%) listed extensions and major remodelling of interiors. Moreover, 5 out of 21 interview participants discussed extensions they had made to their homes. 15 survey participants listed extensions and major remodelling of interiors as the changes they have made, and 11 of them mentioned kitchens.



Figure 6.03—Selected floor plans organized by their compactness ratio vertically and by their extension depth horizontally.

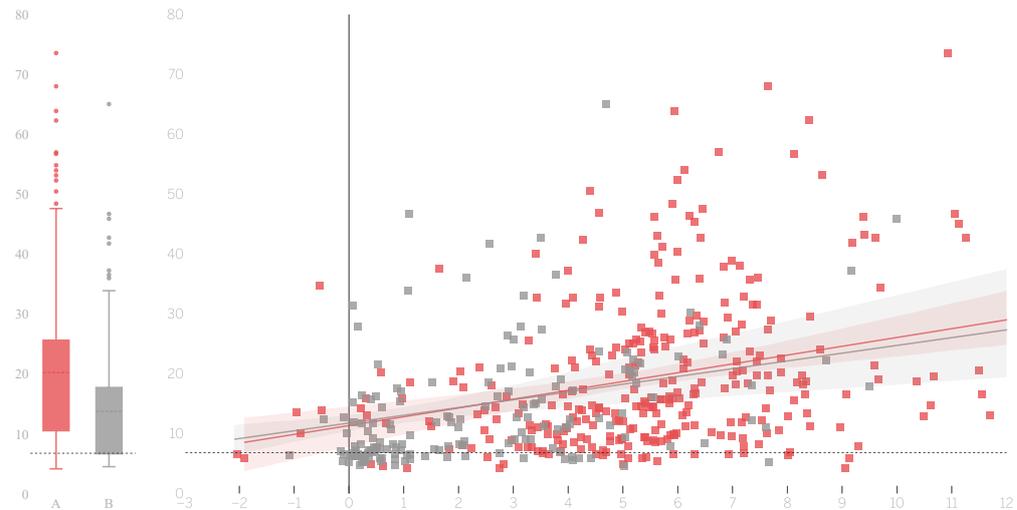


Figure 6.04—Distribution of kitchen sizes and its relationship to extension depth.

enlargement or extension of the kitchen. Rather, they mentioned that they rearranged the hierarchies between the kitchen, dining, and living areas: ‘extension added, to make the kitchen, dining and sitting area all one’, ‘filling in the side return, knocked the dining and kitchen into one room’, ‘rear and side return extension creating an extra living room zone in the new kitchen’.

Seen together with the previous observation in new flats, i.e. the increasing preference (83%) for combining kitchen, dining, and living areas, this suggests a wider interest in larger, open plan, combined living areas. Irene Cieraad has observed a similar wave of reorganization of ground floors into open living spaces in middle-class houses in the Netherlands from the late 1960s to the 1980s.²² The original middle-class Dutch house was similar to the British terraced house: a parlour and a dining room, and a scullery at the back of the entrance hall with a staircase. Cieraad sees this as the result of the changing status of women: while the original floor plan reflected and sustained the gendered division of domestic spaces, the open plan reflected the ‘social equality between men and women, between parents and children’.²³ The UK presents a similar history.²⁴ I have noted in Chapter 3, from the 1960s on, open plan arrangements were promoted as functional, modern, and flexible in the public housing sector.²⁵ Analysing the longest-running and most popular home magazines

22. Irene Cieraad, ‘“Out of My Kitchen!” Architecture, Gender and Domestic Efficiency’, *The Journal of Architecture* 7, no. 3 (2002): 263–79; Irene Cieraad, ‘The Family Living Room: A Child’s Playpen?’, *Home Cultures* 10, no. 3 (2013): 287–314. For the meanings of open plan in Australia see: Robyn Dowling, ‘Accommodating Open Plan: Children, Clutter, and Containment in Suburban Houses in Sydney, Australia’, *Environment and Planning A* 40, no. 3 (2006): 536–49.

23. Cieraad, ‘“Out of My Kitchen!” Architecture, Gender and Domestic Efficiency’, 276.

24. Ritsuko Ozaki, ‘The ‘front’ and ‘back’ Regions of the English House: Changing Values and Lifestyles’, *Journal of Housing and the Built Environment* 18, no. 2 (2003): 105–27; Alison Ravetz and Richard Turkington, *The Place of Home: English Domestic Environments, 1914–2000* (Abingdon: Taylor & Francis, 2011).

25. For a more detailed account of combined living arrangements in British homes see: Judy Attfield, ‘Bringing Modernity Home: Open Plan in the British Domestic Interior’, in *At Home: An Anthropology of Domestic Space*, ed. Irene Cieraad (Syracuse, NY: Syracuse University Press, 1999). Attfield notes that ‘open plan in Britain was not generally adopted in the private speculative housing sector until central heating became common during the 1960s’. See also: Savia Palate, ‘Council Housing in the Age of Property-Owning



Figure 6.05—Selected floor plans organized by their kitchen sizes.

in the UK, *Good Housekeeping* and *Ideal Home*, Martin Hand and Elizabeth Shove observed already in the early 2000s that the kitchen has been 'redefined as a space for living as leisure' with 'cooking and eating [...] as sociable lifestyle activities': kitchens were no longer rooms in which food was prepared, but 'places the whole family thinks of as home'.²⁶ The interview participants acknowledged and referred to this kind of change. For instance, Roshini, a working mum, who had recently built a side return extension notes that the older separation of living area into kitchen, dining room and living room did not work for them:

[prior to the extension] it wasn't great spending time in the kitchen [...] it was a bit more awkward because the kitchen was a much more functional space [...] the middle room was a dining room, but it never got used [...] having the extension meant that the dining area has moved into the kitchen and there is also a play area and a bit of extra living space [...] now the front room, the middle room and the dining area of the kitchen [side extension] are all connected.

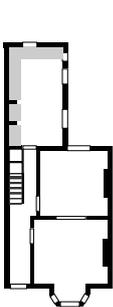
Another respondent, Jacob, who had just completed the planning application process and was about to start construction, said: 'we don't use the dining room [...] we have enough space next to the kitchen, which is much easier to use. We're doing a little bit of rearrangement [...] an extension so that you can have the kitchen in the dining room.'

While the enlargement of the kitchen is at the forefront of these transformations, the ground floors are made open plan also in various other ways: 'knocked together two reception rooms to make one large space', 'took down the wall separating the dining room & kitchen', 'took out the door and knocked through part of the wall separating the living space from the stairs down to the flat's front door and up to the bedroom, opening up the flat for light and space'. The original terraced house had two habitable rooms in addition to an entrance hall with a staircase, a scullery, and sometimes a separate toilet. While this still holds true for many dwellings in the sample, most dwellings have fewer habitable rooms resulting from merging rooms, kitchens, and circulation spaces (Figure 6.07).

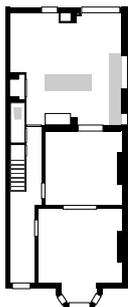
Despite a tendency for combining rooms and creating larger living areas, the entrance hall with a staircase remains. Only in 19% of terraced houses in the sample, the staircase is merged with the kitchen or living room; in the remaining 81%, the entrance hall with a staircase remains separate from the rest. However, the prominence of the hall, which originally functioned both as horizontal and vertical circulation, is lost. In 37% of the dwellings, the horizontal circulation is through a living room, kitchen, or a combined living area. Based on the location of the staircase and the rooms with a maximum number of connections, nine major groups are

Democracy and the Parker Morris Standards, 1960s–80s', in *Architecture and Democracy: 1965–1989 Urban Renewal, Populism and the Welfare State* (Jaap Bakema Study Centre Sixth Annual Conference, Rotterdam: TU Delft and Het Nieuwe Instituut, 2019).

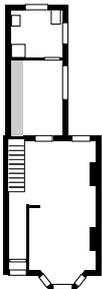
26. Hand and Shove, 'Kitchen Dynamics and Regime Change', 245–47.



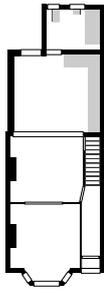
1
The hall with staircase exists and the main circulation is through here.



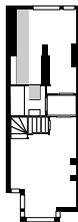
2
The hall with staircase exists, while some of the circulation is through here, some rooms are accessed through other rooms.



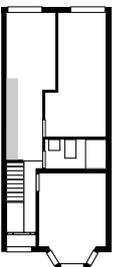
3
The staircase is in the living room and the main circulation is through living room.



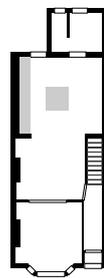
4
The hall with staircase exists. While some of the circulation is through here, most of the rooms are accessed from the living room.



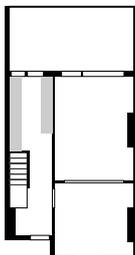
5
The staircase is in the living room, however the main circulation is through an inner corridor reached from this room.



6
The staircase is in the kitchen/ dining kitchen and the main circulation is through kitchen/ dining kitchen.



7
The hall with staircase exists. While some of the circulation is through here, most of the rooms are accessed from the kitchen/ dining kitchen.



8
The staircase is in the kitchen. While some of the circulation is through here, most of the rooms are accessed from the living room.

Figure 6.06—Types of layouts identified in the sample.

Terraced Houses

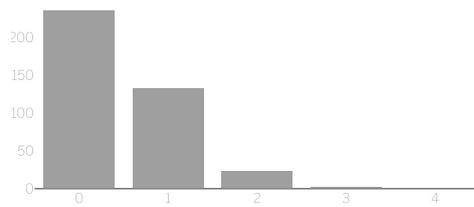


Figure 6.07—Distribution of dwellings in relation to the number of habitable rooms other than kitchen and living room on their ground floor.

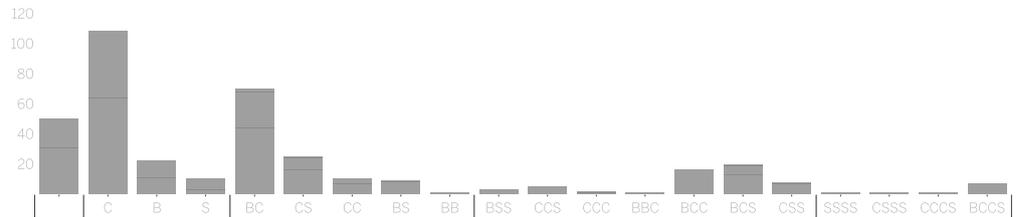


Figure 6.08—Distribution of dwellings in relation to the type of non-habitable rooms on their ground floor.

C—circulation, B—bathroom, S—storage

identified in the sample (Figure 6.06). In many of the plans, even though the main circulation exists, rooms are often interconnected to one another, creating more open living floors.

New Facilities for Contemporary Living

In addition to the tendency to create larger, open, combined living areas on ground floors, there is also a tendency to add a number of amenities, i.e. bathrooms, toilets, storage, and utility rooms (Figure 6.08). In the terraced house sample, 20% of houses have storage spaces and utility rooms on their ground floor.

It is not surprising to see that some of the extension and remodelling projects have included additional storage. Lack of storage in British homes has been a voiced concern and an important aspect of design standards issued in the UK.²⁷ Since the 1960s, the increasing number of domestic gadgetries, changing consumption practices, accumulation of things has challenged the older housing stock the most.²⁸

Bathrooms, together with kitchens, are recognized as the most invested areas of homes.²⁹ In the floor plan sample, 30% of dwellings have a toilet or bathroom on the ground floor. Bathrooms in terraced houses follow a particular history. Terraced houses precede the modern bathroom: in most terraced houses there were no

27. Malcolm Morgan and Heather Cruickshank, 'Quantifying the Extent of Space Shortages: English Dwellings', *Building Research & Information* 42, no. 6 (2014): 710–24.

28. There is a wide literature of social studies of consumption in relation to home that makes this visible. In particular see: Rachel Hurdley, 'Dismantling Mantelpieces: Narrating Identities and Materializing Culture in the Home', *Sociology* 40, no. 4 (2006): 717–33; Nicky Gregson, *Living with Things: Ridding, Accommodation, Dwelling* (Wantage: Sean Kingston Publishing, 2007); Sophie Woodward, 'The Hidden Lives of Domestic Things: Accumulations in Cupboards, Lofts, and Shelves', in *Intimacies, Critical Consumption and Diverse Economies*, ed. Emma Casey and Yvette Taylor (Basingstoke: Palgrave Macmillan, 2015), 216–31.

29. Hand, Shove, and Southerton, 'Home Extensions in the United Kingdom', 675–76; Quitzau and Røpke, 'Construction of Normal Expectations', 188–89.

bathrooms. Instead, there was an outside toilet.³⁰ As having bathrooms have become more common, houses were extended back to have a bathroom, or the existing coal storage and toilet were transformed into a bathroom accessed from the kitchen, which was originally the scullery. While this was logical in terms of the infrastructure, from the early twentieth century bathrooms were associated with night areas of the house, i.e. upper floors.³¹ Most recently, Martin Hand and co-authors, observed that the number of bathrooms has been multiplying. In their interview-based study, they explained this in relation to the changing patterns and needs of living, e.g. the necessity for multiple bathrooms in the morning in large families and guest toilets and bathrooms.³² The interview participants also referred to this kind of change. For instance, Jacob, who lives with his wife and three children in a terraced house, is undertaking a remodelling project for adding more bathrooms:

we are losing one bedroom to put more bathrooms in because a modern house with grown-up children needs more than one bathroom [...] the kitchen has currently got a toilet in it and we're taking the toilet out [and] putting a downstairs toilet that's not off the kitchen [...] again, not big changes, but sort of making it more usable for modern life.

Re-designing Homes

Thus far I have discussed two patterns in the extensions and remodelling of interiors: the creation of larger, open, combined living areas on ground floors, and the addition of a number of amenities, i.e. bathrooms, toilets, storage, and utility rooms. While these patterns are visible in the repetitions and from a distance, the interviews reveal that the alterations made to each plan entail prioritization of needs and desires as well as spatial, financial, and governmental considerations.

Interview participants mentioned a number of limitations that determined their projects. For instance, for Roshini the side return extension was to create a more open ground floor. With her husband and child, she lived in a 'three-and-a-half-bedroom' terraced house and therefore issues of storage were not a priority:

currently [...] when you're going down the corridor to the kitchen from the front door [...] under the stairs, there's some storage and there's a toilet under there. And on the other side, there's kind of a little block that has got a door to it and that's got our washing machine boiler in. [...] We could have extended that cupboard and made it more of a utility room. But we decided against that because it would have meant less light into the living room [...] and we wouldn't have had that kind of semi open plan feeling between the two.

30. John Burnett, *A Social History of Housing: 1815-1970* (Newton Abbot: David & Charles, 1978), 138–83.

31. See: Tudor Walters Report.

32. Hand, Shove, and Southerton, 'Home Extensions in the United Kingdom', 675–76.

Roshini's answer points to the contradictory relationship between the desire to achieve an open plan while adding more enclosed amenities. Terraced houses, with their narrow plan, requires a careful calculation of partitions. Working with an existing boundary and structure turns it into a geometrical problem of finding the right shapes and intersections.

Similarly, rear and side return extensions require the consideration of daylight. A deeper extension restricts the amount of natural light available for inner rooms, which are already limited on ground floors. Jacob, who created only a very short extension (~1 m) says: 'what we have done is, is try and make an extension so that you can have the kitchen in the dining room. You could square it off [side return extension] but that becomes light and the bit in the middle of the house becomes dark again'. These considerations, in fact, resemble the discussions of the early twentieth century, i.e. the problems of deep and narrow typologies. Connecting and opening the rooms to each other, to an extent, relieves the problem of air circulation and daylight, and it is what provides the possibility to further extend. Moreover, building materials and technologies help: the use of skylights and wide glazed windows and doors in rear extensions are very common.³³ However, these work only for people creating more open rooms. For Carrie and Callum, who lived with their two young children, the priority was to convert their one-bedroom ground floor flat to a two-bedroom flat. They built a full-width extension, which contains the living area, and converted the existing rooms into bedrooms. To overcome the issues of light and air, they created a small courtyard between the original back wall and extension to enable the original back room to have daylight and air.

Besides the issues of narrow the most important aspect is the space available. Carrie and Callum: 'we did design our own space, inserting a utility room in [...] we are quite happy with it [...] an extra room would have been nice [...] another toilet would have been lovely if we could squeeze that in somewhere.' When asked about why they did not extend further: 'we wanted it bigger, but that's as far as we could extend for planning purposes.' Here, Carrie and Callum refer to planning permission rather than permitted development rights, as permitted development rights do not apply to flats. However, both pathways restrict the volume and depth (or distance to the plot boundary) of extensions, and therefore the space that can be added.

Another determinant of the extension depth is the cost of construction. Cost considerations are twofold. First, the financial capacity of the owners compared to the considerably high costs of extensions. According to Architecture for London, an architecture firm experienced in house extensions, a single-storey extension in London often costs between £2,000 and £3,000 per square metre.³⁴ This can easily amount to more than £50,000 for a project. Second is the projected increase in the

33. Chantel Carr, Chris Gibson, and Carol Farbotko, 'Of Bricks And Glass: Learning to Accommodate the Everyday Rhythms of Home', *Home Cultures* 14, no. 3 (2018): 1–17.

34. Architecture for London, 'How Much Does a House Extension Cost in London in 2019?'.
 https://www.architectureforlondon.com/2019/04/11/how-much-does-a-house-extension-cost-in-london-in-2019/

value of the house after the completion of the extension against the resale price, which is limited by other factors such as type and location. One of the interview respondents, Marion, explained: '[We wanted to extend the kitchen] but again, it was financial [...] you wouldn't be able to actually increase the value of the property because there is a ceiling price on those two-bedroom properties, whatever you do. [A kitchen extension] would be nice, but I think this is not my forever home and there is only so much money we want to spend.'

These examples give an account of the dynamics of home alterations. While they differ from new builds in the way that the user needs are at the forefront of discussion, they are not completely external to standards and conventions.³⁵ Residents trade off their needs and desires with planning requirements and the market processes. Permitted development rights restrict the depth of extensions. The market further contributes to this: as home extensions require financial investment additional to homeownership, their viability in market terms also become a consideration.³⁶

Converted Flats in Terraced Houses

Thus far, I have focused on the back extensions and remodelling of ground floors in terraced houses that are still in use. Here, I focus on flats converted from terraced houses. In the terraced house sample, the number of flats was comparatively low (n=80). In the online survey, 53 respondents (out of 239, 22%) said they live in a flat converted from a terraced, detached, or semi-detached house, and I interviewed 7 of them.

While extensions and alterations have the needs and desires of the owner-occupier at their centre, conversions into flats are closer to speculative housing, i.e. they are not designed for a specific user. Conversions have more to do with the question of how to fit than functional and relational aspects of rooms. Conversions happen in strict boundaries defined by party walls in material, ownership, and legal terms. Permitted development rights cover neither upper floors nor converted dwellings. The design has to work around predetermined sizes of the floors, fixed window positions, and infrastructure (staircase, piping).

The greater number of non-standard design features already observed in converted flats attests to how issues of functionality are only secondary to the issues of pre-existing building envelope and infrastructure (pipes, staircases). While converted flats make up only 10% of the flats in the floor plan sample, 54% of the flats that have the living room and kitchen placed far apart are converted flats (n=39) and 24% of the

35. Here I refer to speculative housing, i.e. housing that is designed and sold before the buyer or end user is known.

36. Nicole Cook, Susan J. Smith, and Beverley A. Searle, 'Debted Objects: Homemaking in an Era of Mortgage-Enabled Consumption', *Housing, Theory and Society* 30, no. 3 (2013): 1–19.

flats that do not have functional grouping (n=32) are converted flats. One interview participant, Ryan, who moved to a new build house from a converted flat, summarizes: '[in older houses] rooms are a bit small, or the bathroom is at the wrong end of the house. And with a new build house, I think, you know, fundamentally, there's been an architect involved at some point: she's giving some thought to it'. Ryan's comment on converted dwellings shows how 'good' design features are often failed to be achieved in converted dwellings.

In Figure 6.09, floor plans randomly selected from the terraced house sample are classified according to the number of habitable rooms. Here, the variation in interior organizations is evident. In ground floor flats, the kitchen and the bathroom are commonly at the back, where they would be in the original terraced house; only in a few cases the kitchen has been moved to the middle and front of the house. As I have already discussed, in many terraced houses the bathroom is on the ground floor, unless moved to the first floor in a previous house alteration. While most kitchens and bathrooms are still at the back, connecting to the existing infrastructure, there are also many dwellings in which the kitchens and bathrooms are placed in the middle of the flat, freeing the front and back rooms to be used as living rooms and bedrooms.

Predetermined sizes of the floors and fixed window positions are also observable in the number of rooms. Most flats in the sample have two or three habitable rooms (one-bedroom and two-bedroom flats, 50% and 40%, respectively). While it is possible to find flats with more habitable rooms in the sample, they are exclusively ground floor flats with extensions, as they provide additional space. The average floor area of upper floors of a terraced house is larger than an average one-bedroom purpose-built flat and smaller than an average two-bedroom purpose-built flat. Consequently, while the majority of one-bedroom converted dwellings are above the minimum standard, the minimum usable floor area calculated from *London Housing Design Guide*, more two-bedroom dwellings fail the standards in terms of dwelling size, living area size, and bedroom size (Figure 6.10).

The issue of fitting is mostly felt in narrow and restricted circulation spaces. While in terraced houses the staircase functions also as the main circulation, giving access to rooms from its landings, in converted dwellings, there is a necessity to introduce additional horizontal circulation as the staircase is now shared between flats for communal access. In already narrow terraced houses, the horizontal circulation running along the flat is usually kept to a minimum width to give rooms some more space. One interview participant, Keela, who lives in a converted ground floor flat, says: 'Honestly the worst moment of having guests is to get everybody in from the door... it's like a game of Tetris, especially if somebody has a suitcase.' Marion, who also lives in a converted ground floor flat, said the first decision they made when buying the converted ground floor flat they live in was to knock down the internal wall separating the living area from the hallway.

1R

2R

3R

4R

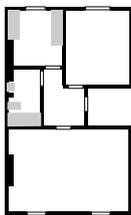
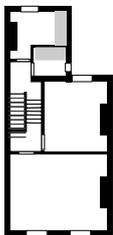
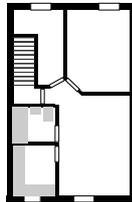
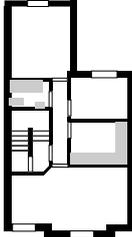
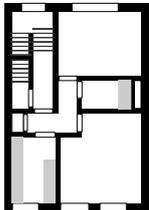
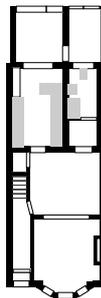
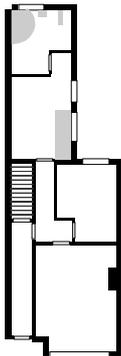
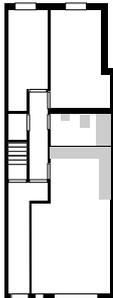
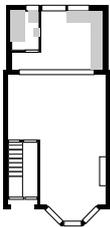
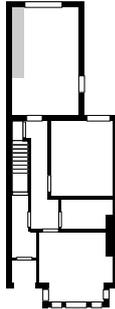
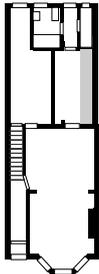
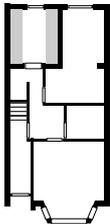
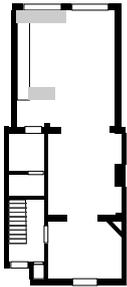


Figure 6.09—Converted flats classified by the number of habitable rooms.

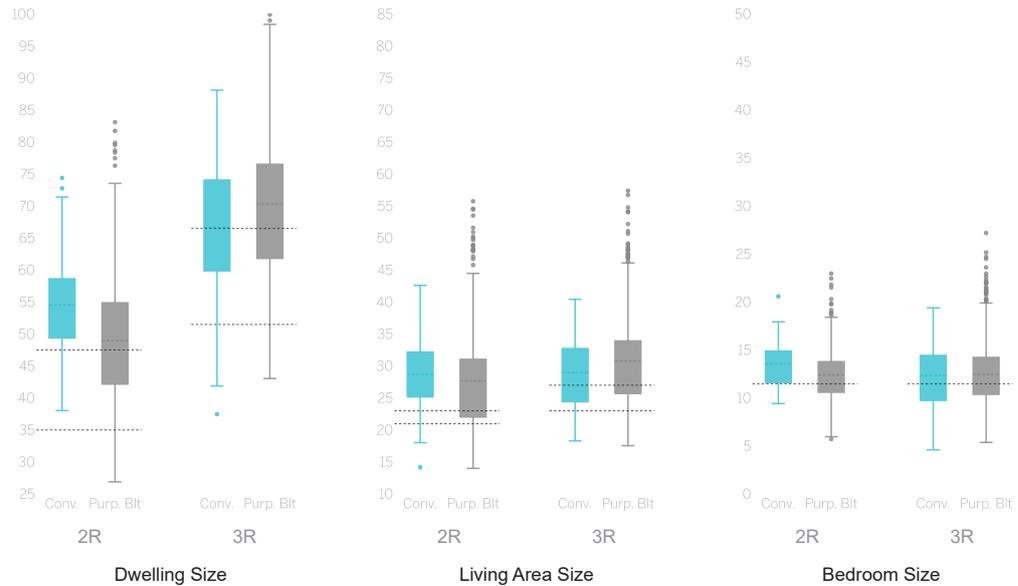


Figure 6.10—Comparison of dwelling, living area, and first bedroom sizes of converted and purpose built two-room and three-room dwellings.

Design Standardization and the Owner-occupier

In this chapter, my focus was terraced houses and alterations such as extensions, interior remodelling, and conversions into flats. In the previous chapter, I had shown that in purpose-built flats (one-storey dwellings), there were dimensional and organizational repetitions that were consistent with the design standards and market conventions I have identified earlier. On the contrary, older terraced houses and flats converted from older terraced houses had no clear dimensional and organizational patterns and most of them diverged from the dimensional and organizational standards and conventions. To better understand these differences, in this chapter, I focused on terraced houses in the floor plan sample and online survey and interviews with terraced house owners and residents. Now I turn to the question I posed an exploratory question: can these differences tell us about other standardization processes?

I have argued that there are some common design intentions that drive these practices. The floor plan analysis has shown that kitchens are enlarged, connected to and merged with dining and living areas, and new facilities such as storage, utility rooms, bathrooms, and toilets are added. The interview and survey responses have shown that these repetitions reflect the contemporary domestic spatial needs and desires that are absent in terraced houses designed for the family of the late nineteenth century. For instance, interview participants did not find separate dining areas usable, wanted living areas that worked with the kitchen, and wanted more bathrooms and storage. However, these were achieved in different ways: by simply

enlarging kitchens, by knocking down walls and merging existing rooms, by designing semi-open spaces, by adding utility rooms, guest toilets, by eliminating entrance halls. These have resulted in a variety of layouts that are far from being standardized, in the sense of a formal repetition. Still, these changes fall into my definition of design standardization, standards and conventions that drive housing towards particular forms.

The variety of extensions, conversions, and remodelling in the older housing stock suggests that older typologies are flexible.³⁷ As the examples have shown, they can accommodate new living space arrangements, an extra bedroom, new facilities, and more space. This adaptability rests on multiple aspects of terraced houses: the availability of space to extend backwards, double aspect design, and particularly, the disposition of entrance hall, staircase, and scullery on one side, and habitable rooms on the other.³⁸ However, as found in the analysis, they are also restrictive in accommodating more partitions, as the deep and narrow floor plan limits natural light. This is especially problematic in conversions as it requires more partitions than the ground floors of houses, which have increasingly been merged to an open plan.

While my discussion of design standardization thus far focused on formal standards issued by governments, and the conventions of housebuilding companies, the analysis of alterations point to a different type of actor in the design standardization process: owner-occupier.³⁹ In a context in which housing has been highly financialized and homeownership has been institutionalized as welfare, the investment to alterations has financial motivations beyond the changing social practices.⁴⁰ On the one hand, extensions and alterations have been regarded as a cheaper alternative to upsizing by homeowners amid high property prices and limited housing options.⁴¹ On the other hand, recent research has highlighted how alterations and repairs extend the logic of

37. 'flexible housing is housing that can adjust to changing needs and patterns, both social and technological. These changing needs may be personal (say an expanding family), practical (i.e. the onset of old age) or technological (i.e. the updating of old services). The changing patterns might be demographic (say the rise of the single person household), economic (i.e. the rise of the rental market) or environmental (i.e. the need to update housing to respond to climate change).' Jeremy Till and Tatjana Schneider, *Flexible Housing* (London: Routledge, 2016), 4.

38. For flexibility in relation to the organization of non-habitable and habitable rooms see: Agatangelo Soler Montellano, 'Housing Flexibility by Spatial Indeterminacy: The Case of the Casa de Las Flores in Madrid', *International Journal of Architectural Research: ArchNet-IJAR* 9, no. 2 (2015): 4–19.

39. On the economic, material, and cultural status of homeownership see: Rob Rowlands and Craig M. Gurney, 'Young Peoples? Perceptions of Housing Tenure: A Case Study in the Socialization of Tenure Prejudice', *Housing, Theory and Society* 17, no. 3 (2000): 121–30; Susan J Smith, 'Owner-Occupation: At Home with a Hybrid of Money and Materials', *Environment and Planning A* 40, no. 3 (2005): 520–35; Fiona Allon and Guy Redden, 'The Global Financial Crisis And The Culture Of Continual Growth', *Journal of Cultural Economy* 5, no. 4 (2012): 375–90; Michelle Buckley, 'Between House and Home: Renovations Labor and the Production of Residential Value', *Economic Geography* 95, no. 3 (2018): 209–30.

40. For the institutionalization of homeownership see: Craig M. Gurney, 'Pride and Prejudice: Discourses of Normalisation in Public and Private Accounts of Home Ownership', *Housing Studies* 14, no. 2 (1999): 163–83; Guy Ortolano, *Thatcher's Progress: From Social Democracy to Market Liberalism through an English New Town* (Cambridge: Cambridge University Press, 2019).

41. Sandra Haurant, 'Is It Better to Move or Extend Your Home?', *The Guardian*, February 15, 2013. On residential mobility in London see: William A V Clark and Youqin Huang, 'The Life Course and Residential Mobility in British Housing Markets', *Environment and Planning A* 35, no. 2 (2002): 323–39.

homeownership.⁴² Buying houses in bad repair with the intention to renovate and increase in value, ‘doer-upper’, has become a common practice. However, alterations are also essential for those who already own their house and have already invested their savings (as well as entered into debt) in order to maintain home value. Many real estate websites list adding a bathroom, creating open living space, extending the loft space for additional bedrooms, and even obtaining the planning permission for an extension as the ways to maintain and increase property value.⁴³

Owner-occupier is different from the homeowner, who owns and rents houses.⁴⁴ The actions of owner-occupiers rest on both homeownership and homemaking that entail two different forms of valuation.⁴⁵ The extensions add new meanings and practices to the home, use value, while also increasing its exchange value. Charles Gillon and Chris Gibson offer an alternative term, ‘investor-occupier’.⁴⁶ Nicole Cook, Susan J. Smith, and Beverley A. Searle have recognized this as paradoxical, ‘simultaneously alienating through over borrowing and endearing through the meanings they add to home’.⁴⁷ The specificity of owner-occupier is, to an extent, also visible in the differences between extensions and conversions: while the user is central to the decisions taken in extensions, in conversions, they are made for an unknown user, which makes it closer to the logic of speculative housing.

The owner-occupier discussed here is tied to a specific typology, i.e. terraced house, to a specific institution, i.e. asset-based welfare, and to a specific social class and community.⁴⁸ The design decisions observed, e.g. open plans and more storage, are also a combination of ownership, terraced house typology, and middle-class.⁴⁹ It is the difficulty of disentangling social, typological and economic dimensions of these practices that warrants alterations of terraced house as a process of design standardization, and owner-occupier as a key actor in design standardization in London.

42. Smith, ‘Owner-Occupation: At Home with a Hybrid of Money and Materials’; Cook, Smith, and Searle, ‘Debted Objects’. For an overview F Allon, ‘Home as Investment’ in *International Encyclopedia of Housing and Home*, ed. Susan J Smith (Amsterdam: Elsevier, 2012), 404–9.

43. NAEA PropertyMark, ‘“Doer-Uppers” Spent £48 Billion on Improvements’, April 1, 2019.

44. Richard Ronald and Justin Kadi, ‘The Revival of Private Landlords in Britain’s Post-Homeownership Society’, *New Political Economy* 23, no. 6 (2017): 1–18.

45. For different conceptualizations of value I have thus referred to see: Luc Boltanski and Laurent Thévenot, *On Justification: Economies of Worth*, trans. Catherine Porter, Princeton Studies in Cultural Sociology (Princeton University Press, 2006); Jane M Jacobs and Susan J Smith, ‘Living Room: Rematerialising Home’, *Environment and Planning A* 40, no. 3 (2008): 515–19.

46. Charles Gillon and Chris Gibson, ‘Calculated Homes, Stretched Emotions: Unmasking “Rational” Investor-Occupier Subjects in Large Family Homes in a Coastal Sydney Development’, *Emotion, Space and Society* 26 (2018): 23–30.

47. Cook, Smith, and Searle, ‘Debted Objects’, 309.

48. John Doling and Richard Ronald, ‘Home Ownership and Asset-Based Welfare’, *Journal of Housing and the Built Environment* 25, no. 2 (2010): 165–73.

49. Ruth Madigan and Moira Munro, ‘“The More We Are Together”: Domestic Space, Gender and Privacy’, in *Ideal Homes?: Social Change and the Experience of the Home*, ed. Tony Chapman and Jenny Hockey (London: Routledge, 1999).

While owner-occupier adds to my initial framing of design standardization that extended between regulatory, market, and design actors, it requires further attention. Understanding how two forms of valuation, homeowner and user, come together is necessary to define owner-occupier more precisely as an actor in the design standardization framework. Thus far, I have only drawn from the survey and interview responses of participants who have undertaken alterations in their homes and live in extended and converted houses. In the next chapter, I will discuss the online survey and interview results in relation to use and experience. This can help us disentangle further the changing domestic preferences and market.

7

At Standard, Below Standard and Non-standard Homes

In the previous two empirical chapters, I have outlined spatial patterns of design standardization in London's housing stock, drawing from floor plan analysis. London's dwellings come in all sizes and layouts. However, despite this diversity, it is still possible to talk about dominant spatial features in both older and new dwellings: dwelling sizes within and right above the minimum functional dwelling sizes, combined living areas, standardized bedroom sizes, central circulation schemes, separation of bedrooms and living areas. In this chapter, I explore these spatial features from the perspective of their current residents.

I have already discussed how standard housing forms emerged in relation to specific visions of the user – a family that has been perpetually recast in relation to the social, economic, and moral norms. From the calculation of a minimum dwelling size to the vision of efficiency, a vision of family living has underlined formal standards. Here, my aim is to place the homemaking practices of London's residents against these norms. How do contemporary ways of living disrupt and reconfigure these underlying norms? And how are contemporary ways of living disrupted and reconfigured by these spatial features? In the previous chapter, I have focused on major interventions owner-occupiers make in their dwellings and already shown that how some aspects of older dwellings were brought up to the needs and desires of the residents. Bronwyn Bate has shown that tenure, especially rental homes, have a significant impact on the experience of home and in homemaking.¹ Here my focus is not the identity of

1. Bronwyn Bate, 'Understanding the Influence Tenure Has on Meanings of Home and Homemaking Practices', *Geography Compass* 12, no. 1 (2018): e12354; Bronwyn Bate, 'Making a Home in the Private Rental Sector', *International Journal of Housing Policy*, 2020, 1–23; Dave Cowan, Helen Carr, and Alison Wallace, *Ownership, Narrative, Things* (London: Palgrave Macmillan, 2018); Caroline Barratt and Gill Green, 'Making

the owner-occupier but the user, not major alterations but the use, experience, and making of homes.²

From Dwelling to Home

The interaction between people and the built space is a vast research area, which has attracted attention from many disciplines ranging from anthropology, geography, sociology, and psychology to architectural history and theory.³ In framing design standardization in relation to the user in the introductory chapters, I have drawn from a particular part of this literature that regard home as an ‘instrument’ in the shaping of social organizations and norms.⁴ In their 1990 review ‘the Built Environment and Spatial Form’, Denise Lawrence and Setha Low define this literature as social production perspectives, which focus on the question, ‘how have the history and evolution of our designed world resulted in some kinds of built forms and not others?’⁵

Relying on this literature, I situated dwelling form as a political technology that organizes the movement of bodies and the social relationships between those who occupy them with its enclosures, divisions, connections, and proximities.⁶ I argued that underlying design standardization was specific notions of household types, relationships, and daily activities: in all the discussions of housing, from mid-nineteenth century model dwellings to the 1961 report *Homes for Today and Tomorrow*, the imagined user was a family consisting of a breadwinning father, a stay-at-home mother, and multiple children of different sexes.⁷

a House in Multiple Occupation a Home: Using Visual Ethnography to Explore Issues of Identity and Well-Being in the Experience of Creating a Home Amongst HMO Tenants’, *Sociological Research Online* 22, no. 1 (2017): 95–112.

2. Also see Arjun Appadurai, *The Social Life of Things: Commodities in a Cultural Perspective* (Cambridge: Cambridge University Press, 1986).

3. Denise L. Lawrence and Setha M. Low, ‘The Built Environment and Spatial Form’, *Annual Review of Anthropology* 19, no. 1 (1990): 453–505; Thomas F. Gieryn, ‘A Space for Place in Sociology’, *Annual Review of Sociology* 26, no. 1 (2000): 463–96; Setha M. Low and Denise Lawrence-Zúñiga, eds., *The Anthropology of Space and Place: Locating Culture* (Malden, MA: Blackwell, 2003); Hilde Heynen, ‘Space as Receptor, Instrument or Stage: Notes on the Interaction Between Spatial and Social Constellations’, *International Planning Studies* 18, no. 3–4 (2013): 342–57.

4. Heynen, 346–49.

5. Lawrence and Low, in their extensive review of the literature published in 1990, defined four broader methodological perspectives on the relationship between the built form and everyday life. These were social organization perspectives that focus on the correspondences between the built form and the ‘specific features of social organization’ that occupies it, symbolic perspectives that focus on the ways in which the built form represents social processes and orders, psychological perspectives that focus on how the built form relates to individuals’ cognition and behaviour, and social production perspectives that focus on the ‘social, political and economic forces that produce the built environment, and conversely, the impact of the socially produced built environment on social action’. Lawrence and Low, ‘The Built Environment and Spatial Form’.

6. Paul Rabinow, *French Modern: Norms and Forms of the Social Environment* (Chicago: University of Chicago Press, 1989); James Holston, *The Modernist City: An Anthropological Critique of Brasilia* (Chicago and London: The University of Chicago Press, 1989); Nikolas Rose, *Powers of Freedom: Reframing Political Thought* (Cambridge and New York: Cambridge University Press, 1999); Leif Jerram, ‘Kitchen Sink Dramas: Women, Modernity and Space in Weimar Germany’, *Cultural Geographies* 13, no. 4 (2006): 538–56.

7. Ministry of Housing and Local Government, *Homes for Today and Tomorrow* (H M Stationery Office, 1961). On the relationship between nuclear family and home see: Shelley Mallett, ‘Understanding Home: A Critical Review of the Literature’, *The Sociological Review* 52, no. 1 (2003): 62–89.

Housing design standardization is historically contingent; however, in recent history society has changed at a pace much faster than that of the built environment. The nuclear family at the centre of these standards has become much smaller and has also given way to a variety of new household types.⁸ This is especially significant in London, where household types, housing expectations and housing needs can be assumed to be much more diverse than in other places.⁹ One question that arises from this is how, then, do houses produced with design features that are expected to work well for this specific notion of the nuclear family work for others – for both the contemporary family and non-family households? Conversely, what values and problems do non-standard or below standard design features have?

My discussion is located in an already rich cluster of literature on homemaking and the appropriation, personalization, and transformation of dwellings by their residents in the literature of ‘home’. This entails negotiations and practices at different levels. In the previous chapter, my focus was major alterations.¹⁰ However, the materiality of the home is transformed and appropriated in many ways. Olivia Stevenson and Alan Prout note the use of studies and dining rooms for toy storage and play, in Scotland: ‘an improvised adaptation of the house created to cope with [children and their toys] – the best that may be possible given the standard twentieth-century house form is relatively difficult (and expensive) to modify substantially.’¹¹ Similarly, Robyn Dowling has shown that the transformations and appropriations involve not only objects but also people. In a study of open plan living areas in suburban Australia, Dowling has shown how open plan was appropriated in relation to children. Some of her interview participants found ways to accommodate children and toys in this open space and made open plan into ‘family room’, some others excluded children to ‘kids’ rooms’ to have living rooms without any mess.¹² Judy Attfield, in various publications, has shown how the residents of Harlow New Town appropriated the architects’ vision of a modern, minimal open plan not only by closing it off but also by placing traditional furniture, filling it with display objects, and putting up net curtains to front-facing kitchens.¹³

8. Brent Pilkey, Rachael M. Scicluna, and Andrew Gorman-Murray, ‘Alternative Domesticities’, *Home Cultures* 12, no. 2 (2015): 127–38.

9. Steven Vertovec, ‘Super-Diversity and Its Implications’, *Ethnic and Racial Studies* 30, no. 6 (2007): 1024–54.

10. Also see: Irene Cieraad, ‘“Out of My Kitchen!” Architecture, Gender and Domestic Efficiency’, *The Journal of Architecture* 7, no. 3 (2002): 263–79; Martin Hand, Elizabeth Shove, and Dale Southerton, ‘Home Extensions in the United Kingdom: Space, Time, and Practice’, *Environment and Planning D: Society and Space* 25, no. 4 (2005): 668–81.

11. Olivia Stevenson and Alan Prout, ‘Space for Play?’, *Home Cultures* 10, no. 2 (2013): 135–57.

12. Robyn Dowling, ‘Accommodating Open Plan: Children, Clutter, and Containment in Suburban Houses in Sydney, Australia’, *Environment and Planning A* 40, no. 3 (2006): 547.

13. Judy Attfield, ‘Bringing Modernity Home: Open Plan in the British Domestic Interior’, in *At Home: An Anthropology of Domestic Space*, ed. Irene Cieraad (Syracuse, NY: Syracuse University Press, 1999); Judith Attfield, ‘Moving Home: Changing Attitudes to Residence and Identity’, *The Journal of Architecture* 7, no. 3 (2002): 249–62. Also see Daniel Miller, ‘Appropriating the State on the Council Estate’, *Man* 23, no. 2 (1988): 353–72; Rachel Hurdley, ‘Dismantling Mantelpieces: Narrating Identities and Materializing Culture in the Home’, *Sociology* 40, no. 4 (2006): 717–33; Annemarie Money, ‘Material Culture and the Living Room’, *Journal of Consumer Culture* 7, no. 3 (2007): 355–77; Barratt and Green, ‘Making a House in Multiple Occupation a Home: Using Visual Ethnography to Explore Issues of Identity and Well-Being in the Experience of Creating a Home Amongst HMO Tenants’.

Each of these practices entails a negotiation with the existing space, not only materially but also ideally. For instance, Saulo Cwerner and Alan Metcalfe have shown how residents' modes of living with clutter are different from the better use of storage – using space efficiently – that modern housing is based on.¹⁴ Similarly, Sandra Costa Santos and Nadia Bertolino's analysis of the residents of Claremont Court in Edinburgh, Mark Llewellyn's historical analysis of life in Kensal House in London, Alison Blunt's analysis of the residents of Christodora House in New York show that residents not only negotiate with modernist spaces by transforming and appropriating them but also negotiate their domestic practices with norms that underlie these spaces.¹⁵

Here I focus on standard, below standard and non-standard dwellings and how they are used, appropriated and made into homes. I situate the norms of use inherent to design standardization against homemaking practices through standard and non-standard homes.¹⁶ More specifically, I focus on issues such as spare rooms, shared bedrooms, small rooms, open kitchens, storage and uncommon layouts.

My focus here is the relationships of the spatiality and architecture of the home with everyday life, occupation and the existing spaces.¹⁷ I explore dwelling as a 'stage' in which social life and the materiality of dwelling shape each other.¹⁸ In this manner, Elizabeth Shove, Kirsten Gram-Hanssen and others' socio-material approach that highlight the 'coevolution' of household objects and the routines and practices, is useful.¹⁹ For instance, Hand and Shove, in 'Home Extensions in the United Kingdom' shows how additional bathrooms not only reflect changing cultural norms around bathrooms, e.g. daily showering, separation of guest bathrooms, but are also 'domesticated' in new routines and practices, such as guest bathrooms, children's bathrooms.²⁰ Such approaches are useful in outlining how residents 'domesticate' standard and non-standard dwellings, e.g. lack of space and different spaces.²¹

14. Saulo B Cwerner and Alan Metcalfe, 'Storage and Clutter: Discourses and Practices of Order in the Domestic World', *Journal of Design History* 16, no. 3 (2003): 229–39.

15. Also see Ayona Datta, 'Building Differences: Material Geographies of Home(s) among Polish Builders in London', *Transactions of the Institute of British Geographers* 33, no. 4 (2008): 518–31; Jane M. Jacobs, Stephen Cairns, and Ignaz Strebel, 'Doing Building Work: Methods at the Interface of Geography and Architecture', *Geographical Research* 50, no. 2 (2012): 126–40.

16. Dave Cowan and Barbara Hardy, 'Regulating Home: A Case Study', *Housing, Theory and Society* 37, no. 5 (2019): 1–18.

17. Alison Blunt and Robyn Dowling, *Home* (London: Routledge, 2006).

18. Heynen, 'Space as Receptor, Instrument or Stage', 349–55.

19. Elizabeth Shove, 'Converging Conventions of Comfort, Cleanliness and Convenience', *Journal of Consumer Policy* 26, no. 4 (2003): 395–418; Kirsten Gram Hanssen and Claus Bech Danielsen, 'House, Home and Identity from a Consumption Perspective', *Housing, Theory and Society* 21, no. 1 (2004): 17–26; Kirsten Gram-Hanssen, 'Consuming Technologies – Developing Routines', *Journal of Cleaner Production* 16, no. 11 (2008): 1181–89; Elizabeth Shove, Gordon Walker, and Sam Brown, 'Material Culture, Room Temperature and the Social Organisation of Thermal Energy', *Journal of Material Culture* 19, no. 2 (2014): 113–24.

20. Hand, Shove, and Southerton, 'Home Extensions in the United Kingdom'.

21. Also see Lousie Crewe, Nicky Gregson, and Alan Metcalfe, 'The Screen and the Drum: On Form, Function, Fit and Failure in Contemporary Home Consumption', *Design and Culture* 1, no. 3 (2015): 307–28; Jenny Rinkinen and Mikko Jalas, 'Moving Home: Houses, New Occupants and the Formation of Heating Practices', *Building Research & Information* 45, no. 3 (2016): 1–10; Chantel Carr, Chris Gibson, and Carol Farbotko, 'Of Bricks And Glass: Learning to Accommodate the Everyday Rhythms of Home', *Home Cultures* 14, no. 3 (2018): 1–17; Charles Gillon and Chris Gibson, 'Calculated Homes, Stretched Emotions: Unmasking

Online Survey

My exploration of residents' practices of standard, non-standard and below standard dwellings largely rely on the interviews and open-ended answers from the online survey. The survey is limited in understanding the perceptions of residents. As the dwellings the survey respondents lived in cannot be precisely identified, it is not possible to relate residents' experiences to standard, non-standard and below standard dwellings. Still, some inferences can be made in relation to the spaces in their homes, which were enquired about in the survey. In fact, these inferences formed the focus of my follow up interviews.

The survey included questions about dwelling layouts. The results overlap with the floor plan survey (Table 7.01). The majority of flats have a central circulation area (78%) and functional grouping (60%). However, the proportion of dwellings with inner corridors in the online survey (20%) is considerably higher than indicated in the floor plan survey (5%). In terms of the types of living areas, the results largely overlap. There is no major difference in the proportion of dwellings with a combined dining kitchen and a kitchen and a living room. Houses and maisonettes are less amenable to comparison, as the questions were simplified for brevity. However, it is possible to say that there are large similarities. The majority of houses and maisonettes have a main entrance hall and corridor (79%), have bedrooms grouped together on a floor (56%), and have their living areas organized as separate living rooms and kitchens.

In the online survey, respondents were asked to rate the size of their dwellings in relation to their needs on a 7-point-scale (1 corresponding to small, 7 to large, and 4 to adequate), both before and during the stay-at-home pandemic restrictions. This was the only question that enquired into the residents' perceptions of their dwellings; other questions asked the respondents about the spaces in their homes and the way they use them. In relation to their needs before the restrictions, most respondents who lived in flats (one-storey dwellings) rated the size of their dwellings between 3 and 5 (77%) and most respondents who lived in houses and maisonettes (multiple-storey dwellings) between 4 and 6 (77%).

The survey results suggest that there are demographic differences between people living in flats and houses. While the three main types of households who live in flats are couples (51%), sharers (19%) and one-person households (12%), the three main types of households who live in houses and maisonettes were families with children (38%), couples (30%), and sharers (10%). This is, to some extent, a result of preference. In particular, new high-density residential developments in inner London are promoted, as Claire Harper notes, with an image of 'urban living – coffee on

"Rational" Investor-Occupier Subjects in Large Family Homes in a Coastal Sydney Development', *Emotion, Space and Society* 26 (2018): 23–30; Jessica K. Breadsell and Gregory M. Morrison, 'Changes to Household Practices Pre- and Post-Occupancy in an Australian Low-Carbon Development', *Sustainable Production and Consumption* 22 (2020): 147–61; Chen Liu, 'Rethinking the Timescape of Home: Domestic Practices in Time and Space', *Progress in Human Geography*, 2020, 030913252092313.

Table 7.01—Comparison of dwelling types in the floor plan and online surveys.

Floor Plan Survey			Online Survey		
	1734	100%		234	100%
One-storey Dwellings	1131	65%	Flats	139	59%
1S1R	57	5%	Studio	4	3%
1S2R	406	36%	1 Bedroom	56	40%
1S3R	499	44%	2 Bedrooms	54	39%
1S4R	153	14%	3 Bedrooms	21	15%
1S5R	16	1%	4 Bedrooms	3	2%
1S5+R		0%	More than 4 bedrooms	1	1%
Multiple-storey Dwellings	603	35%	Houses and Maisonettes	95	41%
MS2R	22	4%	1 Bedroom	4	4%
MS3R	124	21%	2 Bedrooms	20	21%
MS4R	194	32%	3 Bedrooms	33	35%
MS5R	174	29%	4 Bedrooms	21	22%
MS5+R	89	15%	More than 4 bedrooms	17	18%

the balcony, speedy connections to the city centre, a view from above on the chaotic street below'.²² It is also a result of design standardization and affordability.²³ As discussed, for almost a century flats were regarded as suitable for smaller households. However, it might as well be a result of spatial differences. In the previous chapters, I have highlighted the differences in their sizes, rooms, and layouts. This is one of the questions that I explored with the interviews.

In survey responses can be observed that the availability of storage²⁴, larger kitchens²⁵, and extra rooms²⁶ have a positive impact on dwelling size rating (Appendix D). For instance, 63% of respondents who lived in flats and rated the size of their dwelling as below adequate indicated that they had a small kitchen, whereas only 28% of those who rated it as adequate and above had small kitchens. While 81% of the respondents who lived in flats and rated the size of their dwelling as below adequate could host less than 4 people, which is assumed to indicate a small living area, only

22. Claire Harper, 'Density: Objective Measure or Critical Tool of the Neoliberal Agenda?', *Footprint* 13, no. 1 (2019). Also see Ulrich Kriese and Roland W Scholz, 'Lifestyle Ideas of House Builders and Housing Investors', *Housing, Theory and Society* 29, no. 3 (2012): 288–320.

23. Fanny Blanc, Kath Scanlon, and Tim White, 'Living in a Denser London: How Residents See Their Homes' (London: LSE London and LSE Cities, 2020).

24. A Mann-Whitney test indicated that the dwelling size rating was greater for survey respondents who had enough storage than for those who did not, $U(N_{yes} = 146, N_{no} = 88) = 3681.0, z = 5.46746, p < .00001$.

25. Mann-Whitney tests indicated that the dwelling size rating was smaller for survey respondents who reported to have small kitchens than for those who did not, $U(N_{yes} = 66, N_{no} = 168) = 4074.0, z = 3.15355, p = .00008$.

26. Mann-Whitney tests indicated that the dwelling size rating was greater for survey respondents who reported to have at least one extra room than for those who did not, $U(N_{yes} = 94, N_{no} = 123) = 3089.5, z = -5.87164, p < .00001$.

16% of those who rated it adequate and above had small living areas. Moreover, 65% of the respondents who lived in flats and rated their dwellings adequate and above had enough storage space, whereas only 25% of those who rated their dwellings less than adequate had enough storage. Considering the observations made in the previous chapter, these are, to an extent, expected. As shown, owner-occupants living in terraced houses alter their homes to have larger kitchens combined with dining and living areas and to add more storage and utility rooms. With in-depth interviews, I explored this question further.

In the online survey, having a shared bedroom has no significant impact on the dwelling size rating. This stands in contrast to design standardization and historical standards I discussed in Chapter 3. I explored this issue further with the interviews.

Moreover, almost half of the survey respondents' ratings of their dwellings, compared before the stay-at-home restrictions came into force and during the restrictions, changed in a negative direction (50% in flats, 41% in houses and maisonettes). In the interviews, I also explored how residents' daily practices were disrupted and homes have changed during stay-at-home restrictions.

Shared Bedrooms and Spare Rooms

Spare rooms and shared bedrooms occupy a key place in design standardization and broader norms surrounding housing. Bedroom standard, for instance, allows bedrooms to be shared only by two persons 'aged less than 10 years' and 'of the same sex aged 10 years to 20 years' excluding couples.²⁷ Otherwise, a house is considered 'overcrowded'. Space standards and 'good' housing models are built upon bedroom standards. Spare bedrooms, on the other hand, are considered 'extra'. For instance, recently introduced 'bedroom tax', cuts the benefits of public sector tenants who 'under-occupy', i.e. have a spare room. It has been argued that this legislation not only constructs binaries of deserving and wasteful households but also reinstates particular forms of families as the norm.²⁸

In the online survey, while having a spare bedroom seems to have a positive impact, having a shared bedroom does not have a negative impact on the dwelling size rating. This stands in contrast to design standardization and the broader norms that surround housing. It also stands in contrast to interview responses. When asked about the size of their dwelling, interview participants discussed the number of rooms in relation to the type and size of their households. For them, dwelling size alone did not have much meaning.²⁹ For instance, Hannah, who lived in a standard range one-

27. Housing Act 1985, Section 325-326.

28. Anat Greenstein et al., 'Construction and Deconstruction of "Family" by the "Bedroom Tax"', *British Politics* 11, no. 4 (2016): 508-25.

29. Maria Sandberg, 'Downsizing of Housing', *Journal of Macromarketing* 38, no. 2 (2018): 154-67; Robyn Dowling and Emma Power, 'Sizing Home, Doing Family in Sydney, Australia', *Housing Studies* 27, no. 5 (2012):

bedroom flat of (45 m², Q2)³⁰ with her husband, said: ‘before lockdown, I think we were at the point where we thought it would be nice to move somewhere bigger. But does it meet our needs? Yes. There are only two of us. Obviously, we share a room. So, we have one bedroom, there is enough space, but it would be nice maybe to have a second room.’

Further analysis, however, shows that spare bedrooms, as well as shared bedrooms, matter greatly for residents, albeit neither in the way standards are constructed nor in the way I assumed when designing the survey. Looking in more detail into household types, the survey respondents who said they had shared bedrooms were all households with dependent children. Therefore, a shared room might not directly translate into overcrowding. In fact, one of the households with shared bedrooms participated in the interviews, and their answers corroborated this. Carrie and Callum, who lived in a two-bedroom flat and had their second child last year, said their flat is ‘just enough’ for them now, ‘I suppose having only one bedroom and having two children, for them, has been interesting [...] but it’s quite normal for children to share a room.’

Interview responses make clear that spare bedrooms were not considered as ‘extra’ space. In most dwellings, even though they were not allocated for use as bedrooms, spare rooms were part of the domestic practices and were considered by the participants as essential. Only in a few of the dwellings did these rooms remained unused for most of the time. For instance, the second bedrooms of three participants were mainly used as a guest bedroom (until the stay-at-home restrictions) and therefore only occasionally. Others, Ryan and dil, for example, used their smallest room as an overspill room: a place for extra storage, a study, a place to dry clothes, a bedroom for guests. Many, however, used these rooms for specific functions, e.g. a study, a room that was essential for their work. Rachel, who lived in a house-share with a couple in a three-bedroom house, used the 5 m² room as her study and she spent most of her time at home in this room. Similarly, Zenan, who lived in a house-share with another housemate in a three-bedroom maisonette, used the 6 m² room as her study and she spent most of her time at home in this room. Both Rachel and Zenan have jobs that require them to work from home, and both of them used their smallest room, which is the box room immediately above the entrance hall in a typical house arrangement, for this. Other interview participants used normal-sized bedrooms as a study. Marc, who lives alone in a two-bedroom flat, started using the largest bedroom as a home office for his practice. Ellen, whose children had moved out, had a hobby room, and her husband had an office in their five-bedroom house, where they live with a lodger:

Ellen: When we downsize, we will get rid of all the stuff.

605–19.

30. All dwelling sizes are reported with the dwelling size calculated from the plans interview participants have provided and the quantile they fit in the floor plan analysis. The homes of interview participants had floor areas ranging from 45 m² to 120 m², falling in the below standard (Q1, n=3), standard (Q2, Q3, n=13), and above standard (Q4, n=4) ranges calculated in the floor plan analysis.

Seyithan: Do you think downsizing will affect your hobbies?

Ellen: No, because we won't downsize that much.

When designing the survey, it was assumed that evidence of shared and spare bedrooms would give a good measure of occupancy levels. However, these different ways of occupying homes show that, in various ways, the number of rooms and domestic practices co-evolve. On the one hand, spare bedrooms fill the gap between residents' daily practices and the physical space needed for them.³¹ Changing needs of households that are not accounted for in design standards or market housing, e.g. study, storage, make households opt for dwellings with a greater number of rooms. On the other hand, domestic practices are restructured with the space available, until space is no longer seen as available, but integrated into domestic practices.³²

In the examples above, what constitutes available is often a room too small to be a single bedroom and sometimes an additional bedroom that is not set aside for use by a household member. However, there are also examples, in which rooms that would 'normally' be considered as essential are made available. In the open-ended questions in the online survey, some survey respondents, all living in shared households, wrote that they used the rooms intended to be living rooms as bedrooms: 'my room used to be the living room of the flat' (four-bedroom flat, rated 4), 'the living room is used as a bedroom' (two-bedroom flat, rated 1), 'originally, I think the biggest bedroom was a living room but no longer' (three-bedroom flat, rated 2).

Another interview participant, Eylül, who lived in a one-bedroom flat (two-room one-storey) of 53 m² (Q3), used the living room as her own bedroom and rented out the smaller bedroom for short and long periods: 'the kitchen is relatively big [14 m²] I fitted a sofa and a small table [...] I don't let my Airbnb guests use my kitchen, the kitchen belongs to me'. Eylül could make her room available for extra money, but she also mentioned that the location of her flat also made this possible: 'it is enough because it is very central [...] I wouldn't complain about living in a smaller home, because I'm spending most of my time out and because being in the centre enables me to do that.'

The examples above show that space is made available for financial reasons. These can be understood as what Ella Harris termed as 'compensatory cultures' that emerges as results of crises.³³ Making space available emerges as an answer to the high prices of accommodation in London.³⁴ William Clarke and Youqin Huang note that room-related stress has little impact on residential mobility in London: people

31. Stevenson and Prout, 'Space for Play?', 151.

32. Hand, Shove, and Southerton, 'Home Extensions in the United Kingdom', 677.

33. Ella Harris, 'Compensatory Cultures: Post -2008 Climate Mechanisms for Crisis Times', *New Formations* 99, no. 99 (2019): 66–87.

34. David Clapham et al., 'The Housing Pathways of Young People in the UK', *Environment and Planning A* 46, no. 8 (2013): 2016–31.

tolerate not having enough rooms.³⁵ Neither does it offer a wide range of choices; as the floor plan survey found, the common dwelling types are highly standardized.

Measuring Dwelling Size by Bedrooms, but not the Size of Bedrooms

While the number of rooms greatly mattered, the respondents did not discuss their bedrooms much: 'it's not too small, but if I was to move tomorrow, I would actually prioritise, you know, an office space or a bigger living-dining area than a large bedroom [...] it's not top of my priorities.' As Hannah put it, what mattered was the number of rooms not the sizes of bedrooms.

In the floor plan survey, it was found that the sizes of bedrooms, except main bedrooms (first rooms), were highly standardized, varying only within a narrow range. Many respondents used 'good-sized' and 'decent-sized' to describe their bedrooms, suggesting that there is a consensus on what size a bedroom should be. For instance, Lola said: 'there is one bedroom that is a bit too large and one that's a bit too small': the larger room is 14 m² and the smaller one is 9 m². However, these adjectives do not correspond to a single number. Interview participants evaluated the bedroom size and defined them as small and large based on a functional perspective, i.e. what furniture they needed to fit in the bedroom. While the bed and clothes storages were common requirements for all, for some respondents, especially those who lived in shared houses, desk spaces were also considered to be an essential piece of furniture that a bedroom should be able to accommodate.

'Well-sized', 'decent-sized', 'good-sized' and 'fine' are used for bedrooms measuring 11 m², as well as 20 m². Kelly, who lived with her husband and two children had a 12 m² bedroom: 'we have big bedrooms. I have a super king bed in my bedroom'. Eylül, refers to her 14 m² bedroom, which she used alone: 'my room is a very decent size by London standards. I have my double bed; I have my sofa. And I have a desk space'. Interview participants used 'small' to describe bedrooms measuring 5 m², as well as 12 m². Filippo said his housemates had very small bedrooms (5 and 8 m²) and noted that they did not have desks in their rooms and had to use the built-in storage in the corridor as wardrobes. Elpida, who lived with one other housemate, could only fit her bed and wardrobe into her small bedroom (8 m²). Her desk, where she spent most of her time, was in the living room: 'when you're working, you can't have people coming in to watch TV, or make a lot of noise in the kitchen... so that is very restrictive'. Kelly, who lived with her husband and their two children in a three-bedroom maisonette, used the 5 m² room as the youngest child's bedroom. Irini, who described her room of 12 m² as small, clarified: 'it is an old house and there are recesses on both sides [of the fireplace] It's quite difficult to fit furniture that I had before because it has to be

35. William A V Clark and Youqin Huang, 'The Life Course and Residential Mobility in British Housing Markets', *Environment and Planning A* 35, no. 2 (2002): 323–39, <https://doi.org/10.1068/a3542>.

custom cut [...] There is a lot of unused space'. By 'small', Irini's response supports my earlier discussion. As I have noted, in the floor plan analysis there were many rooms, which satisfy the minimum room size but are not able to accommodate even basic furniture.

The observation that number of rooms matter greatly for residents, yet the bedroom sizes less, echoes Chris Leishman and co-authors' observation: 'they like space but they pay for bedrooms'. In the surveys Leishman and his colleagues conducted, they found even though buyers wanted larger bedrooms, they opted for dwellings with a greater number of smaller rooms. The authors argue that having a greater number of rooms allow maintaining the value of a house as properties are often valued by the number of bedrooms, rather than net floor area.³⁶ This overlap between how the market describes dwellings and how residents assess their dwellings, however, should be approached with caution. In an article published in 2008, Andrew Drury, who has been actively engaged with the making and assessment of space standards, argued that the market's use of the number of bedrooms as a common property descriptor is problematic: the number of bedrooms 'can be increased without enlarging the overall property size', but at the cost of 'less functional or adaptable [properties]'.³⁷ What constitutes a functional or adaptable dwelling when approached from a purely normative perspective, relates to room dimensions. However, interview responses show that residents find ways to appropriate and adapt room regardless of their sizes. We must approach this with caution: such appropriation exists only when basic needs are satisfied.

Open Kitchens

The kitchen, and living spaces in general, has been the most intervened part of housing design as well as the one most discussed. The accounts of interview participants show that living areas are central to how homes are made and remade. For all interview participants, including those who live in shared households, living areas were the rooms that were used most before and during the stay-at-home restrictions. Routine domestic activities such as cooking, eating, and watching TV after work, childcare responsibilities such as play and education took place in living areas, working from home; wider social activities such as hosting, entertaining, hosting guests overnight as well as the display of belongings took place in the living rooms. Weaved with domestic and social meanings, the issues of design pertain to living areas the most.³⁸ In particular, the arrangement of living areas and household types.

36. Leishman et al., *Preferences, Quality and Choice in New-Build Housing*, 14.

37. 'This article was published in the *Town & Country Planning Association Journal*, August 2008 and is a longer version of a 'Comment' piece published in *Inside Housing* (4 July 2008). I consulted the version on: <https://www.hatc.co.uk/>

38. Angela Meah, 'Extending the Contested Spaces of the Modern Kitchen', *Geography Compass* 10, no. 2 (2016): 41–55.

The online survey showed that the size of the living area and kitchen had a positive influence on the dwelling size rating. The interview responses corroborate this. The sizes of living area experienced by the interview participants ranged from 14 m² to 55 m². Participants who lived in dwellings with living areas at the lower end of this range mentioned physical limitations. Fredrik, who lives in a two-bedroom house with a separate working kitchen (4.5 m², Q1), said: 'it's so small, we have just a very small fridge, which is not the regular depth [...] I have to consider [what I can cook] and make plans to optimize the use of the space'; Elpida, who lived in a two-bedroom flat with a combined living room (17 m², Q1) reported that: 'for two people, it is great [...] more people, it's a bit difficult [...] an armchair wouldn't really fit'. For some others, the problems were related more to room shape than room size. For instance, despite having a large living area arranged in three zones, one interview respondent said the area designated for dining was not usable as it was too narrow (2 m) to fit the dining table they already had. Others did not experience a lack of space but desired larger living areas: 'of course you would want something bigger and better, but it is absolutely fine' (two-bedroom flat with separate living room and dining kitchen, 15 m², 16 m², Q1), 'I would love to have a bigger sofa in the living room, but we [have already] put a working desk there. It is a generous living room' (four-bedroom flat with separate living room and dining kitchen, 24 m², 24 m², Q4).

While, overall, the physical limitations are felt in below standard kitchens, domestic routines and social relationships were the most important. For instance, Kelly, who lived in a three-bedroom maisonette and Irini, who lived in a three-bedroom house, both had similar living area arrangements and sizes. They were arranged in two rooms, a working kitchen (10 and 8 m²) and a living room. While Kelly did not mention that she experienced any problems with the size of her kitchen, Irini, said: '[the kitchen is] too small. It's a bit uncomfortable [...] to have just one space [for cooking]'. Irini shared her home with two housemates, and they cooked their meals separately. Kelly lived with her husband and two children. While one of them, she or her husband, cooked meals for the whole family, the other one looked after children.

Besides the size, the differences in domestic routines and household relationships most pertained to the arrangement of living areas. I have already shown that the majority of new flats have combined kitchen and living arrangements. Moreover, owner-occupants living in terraced houses alter their homes to have larger kitchens combined with dining and living areas.³⁹ However, the attitudes to combined living arrangements seemed to vary the most.

Combined arrangements provide minimum functional separation and make social and visual interaction between the household members inevitable. As one interview participant said, 'you can see and hear everything that's going on'. They not only create problems of privacy but also of noise and smell: 'we have a film of fat over everywhere', 'food smell', 'seeing pans and washing up while eating'. Marion, who

39. Also see Attfield, 'Bringing Modernity Home: Open Plan in the British Domestic Interior'.

lives in a flat with a separate dining kitchen and sitting room (15 m², 16 m², Q1), summarized:

I always wanted to have that [a living-in kitchen]. And we discussed that with [my boyfriend]. I really like open-plan areas where I can see what people are doing. I like having people around me and see what everybody's doing. He prefers to have a haven and go somewhere separate. He is the cook in the house. I do not really cook. He likes to have those two things separate; I am in the kitchen, I'm doing something, and he can watch TV or listen to his vinyl and there is no one interrupting banging their coffee cups.

Most interview participants from family households who had combined living room arrangements said that it suited their way of living: 'if I'm cooking and my husband's watching TV, it's nice for it to be more social', 'when my kids come down, we spend a lot of time just doing the cooking and chatting.' References such as this acknowledge the changing visions of kitchens in relation to sociability and family life, which were alluded to in Chapter 6. In the history of design standardization, the kitchen has been excluded from leisure and sociability and was established as a working space for the mother.⁴⁰ This was not independent of the cultural norms; many women preferred to have the kitchen separate.⁴¹ However, as recent research has argued, the kitchen has become a space for leisure and sociability in contemporary domestic life.⁴²

Participants from family households, who lived in dwellings with separate living areas also desired larger and combined living areas. But they valued the multiple uses they allow. For instance, Keela lived in a converted flat in which the living room and dining kitchen were at the opposite ends of the flat. Noting that his boyfriend has a workspace in the living room, she said 'with a setup where the living room doubles as somebody's office it's convenient that it's very separate [...] I can do all the noisy cooking in the kitchen and nobody would be disturbed.' However, it was difficult to use it when they had people over: 'somehow everything tends to gravitate towards the kitchen [...] it's not very convenient [the corridor is] horribly narrow [...] but [other times we use] the kitchen only when we are actually doing something in the kitchen'. Another interview respondent found the separation between the dining kitchen and the living room in their home unnecessary, but he also mentioned that he came to realize that it was very convenient as the living room could be used as a bedroom to host guests.

40. Central Housing Advisory Committee, 'Design of Dwellings: Report of the Design of Dwellings Subcommittee of the Central Housing Advisory Committee Appointed by the Minister of Health and Report of a Study Group of the Ministry of Town and Country Planning on Site Planning and Layout in Relation to Housing' (London: HMSO, 1944).

41. W V Hole and J J Attenburrow, *Houses and People: A Review of User Studies at the Building Research Station* (London: Ministry of Technology Building Research Station, 1966). Also see Cairtriona Beaumont, '“Where to Park the Pram”? Voluntary Women's Organisations, Citizenship and the Campaign for Better Housing in England, 1928–1945', *Women's History Review* 22, no. 1 (2013): 75–96.

42. Martin Hand and Elizabeth Shove, 'Orchestrating Concepts: Kitchen Dynamics and Regime Change in Good Housekeeping and Ideal Home, 1922–2002', *Home Cultures* 1, no. 3 (2004): 235–56.

Those who had young children had a very strong preference for combined living room arrangements. Kelly, who lived with her husband and two young children in a maisonette in which the living area was arranged as a working kitchen and a separate sitting and dining room, was about to move to a new house: 'I just think actually the separate kitchen and living room is difficult with the children. It is nice to be able to close the doors of the kitchen if you're cooking but you really want to be able to see them as well. So, the new place will have it all opened up, which I think will be better for family living.'

Studying a similar context in which most houses are provided as open plan, suburban Australia, Robyn Dowling notes that such change from separate rooms for cooking, dining, leisure, and entertaining, and the changing boundaries of clutter and order give way to an 'anxiety and complexity' of habitation at the intersection of the ideals of family living, homemaking, and children and clutter and different domestic practices.⁴³ Similar concerns have emerged in the interviews. For instance, Carrie and Callum, who have a combined living area:

There is a lot of stuff in one space, and I think certainly people without children probably come around and go 'How can you live like this?' But it's not like it's dirty. It's just messy [...] toys out and right now it looks messy but that's not going to stay there [...] we'll put that away and then we'll get something else out.

In the previous chapter, I have shown that owner-occupants opened their kitchens up and added more storage. These show that they are not independent of each other, but a solution to the anxieties resulting from open plan living.⁴⁴ Another interview respondent who had just refurbished their living area resolved these tensions in the semi-separate dining kitchen and living room was the most suitable arrangement for them:

I like that they're half separated [...] it feels like you're moving to a separate space [...] But actually, my little girl can run backwards and forwards between the two and I can still hear what she's doing and keep an eye on her [...] it just doesn't feel like all the chaos of the kitchen is spilling over into those other spaces when you're going away to relax.

On the contrary of family households, interview participants who lived in shared houses were vocal about the problems such an arrangement creates. While there are shared routines, divisions of labour and dynamics of care in family households, in sharing households, household members often have different routines.⁴⁵ Interview

43. Dowling, 'Accommodating Open Plan: Children, Clutter, and Containment in Suburban Houses in Sydney, Australia'.

44. Dowling; Stevenson and Prout, 'Space for Play?'; Irene Cieraad, 'The Family Living Room: A Child's Playpen?', *Home Cultures* 10, no. 3 (2013): 287–314.

45. Vicky Clark et al., 'Rosters: Freedom, Responsibility, and Co operation in Young Adult Shared Households', *Australian Journal of Psychology* 71, no. 3 (2019): 232–40.

participants from sharing households had varying compositions, e.g. all singles, mixed singles and couples; friends, peers, strangers, lodgers.⁴⁶ All these combinations entail different dynamics and vary in their social and spatial relationships.⁴⁷ Sue Heath and Elizabeth Cleaver define sharing households in a spectrum with two ends: communal households in which greater sociability between household members exist and daily activities are shared, and stranger households with ‘little sense of commonality beyond sharing the same address’.⁴⁸ Interview participants living in sharing households were between these two ends, closer to stranger households than communal households. For instance, Zenan: ‘we don’t spend a lot of time together at home. Sometimes we have dinner together.’

Zenan lived with one housemate in a maisonette with a combined living area. She noted that they had to make agreements on when to use the living areas. Shared household preferred separate living area arrangements as they allowed household members to use the living areas without interfering with other household members’ activities. Marc, who used to live with a lodger in his two-bedroom flat that also had a combined living room:

When I used to share the flat with somebody else, I really honestly quite disliked that [refers to open kitchen]. Because I was sharing with a lodger, not a partner. And if they were using the kitchen, it really made the rest of the use of the space quite difficult. Not even on the basis of food smells, just the noise that was created. And if I just wanted to watch TV, read or do anything, I just couldn't do that independently. It was very, very annoying. And I hated not having a separate kitchen.

One interview participant, who lived in a house-share with a very large living-in kitchen before his current one with a dining kitchen and living room arrangement, said he preferred the arrangement in his new house:

We can close the doors [...] doing different things at the same time in different rooms [...] especially because the kitchen is quite generous, you can use it as a workshop [...] it's actually good to have spaces that can be used in different ways.

These comments were made by interview respondents who had dining kitchens into which a table can comfortably be fitted. The advantages, therefore, stem not only from having two separate rooms but also from having two large enough rooms. Irini, who found her living area small, lived in a house in which the ground floor was

46. Sue Heath and Liz Kenyon, ‘Single Young Professionals and Shared Household Living’, *Journal of Youth Studies* 4, no. 1 (2010): 83–100; Sophia Maalsen, ‘“Generation Share”: Digitalized Geographies of Shared Housing’, *Social & Cultural Geography* 21, no. 1 (2018): 1–9; Sue Heath and Rachael Scicluna, ‘Putting up (with) the Paying Guest: Negotiating Hospitality and the Boundaries of the Commercial Home in Private Lodging Arrangements’, *Families, Relationships and Societies* 9, no. 3 (2020): 399–415.

47. Vicky Clark et al., ‘Shared Housing among Young Adults: Avoiding Complications in Domestic Relationships’, *Journal of Youth Studies* 20, no. 9 (2017): 1–17.

48. Sue Heath and Elizabeth Cleaver, *Young, Free and Single?: Twenty-Somethings and Household Change* (Basingstoke: Palgrave Macmillan, 2003), 92–93.

arranged as a small working kitchen and a living room, placed at different ends of the ground floor.

Bedrooms and Living Rooms

The floor plan survey has shown that even though there is a wide range of layouts in London dwellings, layouts in which living areas and bedrooms are grouped together and organized around a central circulation scheme are significantly more common in new flats. Historically, functional grouping and the division of day and night functions reflected a certain user, a family, and particular domestic practices such as the strict division of day and night, private and public. In addition to these common layouts, there are also non-standard layouts that have emerged in relation to particular users, e.g. dumb-bell layouts for professional sharers.

Commenting on the relationships between their rooms, interview participants referred to their relationships with the other members of the household and the levels of privacy that these relationships entailed. It has already emerged that the level of desired privacy was highest in sharing households.⁴⁹ Interview participants living in sharing households valued arrangements in which the members could conduct their own activities and routine without being interrupted by other members. Two of three interview respondents sharing flats with others already had dumbbell-like layouts in which the bedrooms were placed at the opposite ends of the flat, and they valued these arrangements. Elpida and her housemate had their bedrooms at opposite corners of the flat. One of them opened onto the living room, and the other to the corridor: ‘the previous flat I was living in, the bedrooms were next to each other [...] we shared a common wall [...] it was quite thin [...] there was a lot of noise [...] having them across from each other gives you a little bit of distance so you do not have the other person all the time next to you. It makes the space also feel a bit larger as if there are different wings.’ Vittorio had his bedroom at the one end of the flat and his three housemates had their bedrooms at the opposite end. The living room and dining kitchen were placed in the middle: ‘for a household like this one, a household of adults sharing the house, it definitely can create different privacy dynamics’. Another participant, who shared a flat with one other person and had the conventional arrangement of grouped bedrooms, says she would have preferred to have the kitchen in the middle: ‘you can separate the rooms and give more privacy to both people’.

While for house sharers living in flats privacy was framed as not sharing a wall, for house sharers living in multiple-storey dwellings privacy was framed as being away from the living and common areas. One respondent, who shared a maisonette with one other person in which the bedrooms and living areas were on different floors, says: ‘when you share with a flatmate, it's good to have different levels because it

49. Zahra Nasreen and Kristian. J. Ruming, 'Shared Room Housing and Home: Unpacking the Home-Making Practices of Shared Room Tenants in Sydney, Australia', *Housing, Theory and Society*, 2020, 1–21.

separates our lives [...] sometimes she has visitors staying over or for dinner [...] and I prefer to have a calm night and watch something privately or work... it provides a silent environment for the people upstairs'. Another respondent, who lives in a shared house with a similar arrangement, agrees:

Before this, I lived in a house where we were four [...] three bedrooms upstairs, and one bedroom downstairs [...] I was using the bedroom downstairs. It was useful if I had to get back home late or if I wanted to feel a bit more private. But it actually was not that useful when my housemates were getting back late; it was annoying for me. And the living room and my bedroom [...] both [looked out onto] a little garden. That was again annoying when I wanted to sleep... I think, if you share, it's better to have the bedrooms upstairs and the living room downstairs.

Respondents who had young children valued arrangements in which children's and parents' routines could work without interfering with one another. Kelly, who lived in a two-storey maisonette in which the baby's room was on the same floor as the kitchen and living room, said:

So I put him in bed and we all have to be quiet [...] much better to have the children upstairs and then the parents can continue partying. We can watch TV, we can play music, we can do the washing up without worrying about the noise.

This is different from many flat layouts, in which the main bedroom is placed at the farthest end. While children's bedrooms are often placed closer to the living area for better surveillance, Carrie and Callum, who lived in a flat with their young child and toddler, mentioned baby monitors as the solution for surveillance:

We knew from having [their first child], we very much wanted the bedrooms and living room to be far apart [...] any noise we make could have woken up the baby, so we wanted to have the bedrooms down that end when we were down this [...] it is almost like the house is split in two.

The Impact of 'Stay-at-Home' Restrictions on Residents' Experience

The interviewees' experience was impacted by the Covid-19 pandemic and the consequent 'stay at home' and 'work from home' orders. The survey and interviews, being conducted amid the pandemic restrictions, show that the experience of home changed significantly. Half of the online survey respondents (55%) indicated that they had made some changes to the arrangement of their homes during the lockdown; a temporary workspace was listed most frequently. Many respondents (40%) were occasionally working from home and some of them had a dedicated workspace already (28%). Even so, in households with multiple working members,

the pandemic caused significant spatial limitations, as multiple rooms and areas had to be turned into workspaces.⁵⁰ While some of them already had space, such as a spare room, and therefore the limitations of setting up a workspace were minimal, others, who were already experiencing a shortage of space before the pandemic and home working, created temporary and often awkward solutions that caused significant and often additional space limitations. Many of those who mentioned these emergency solutions had, before the pandemic and home working, rated their homes as small: ‘[I] bought a chair I can sit on next to my chest of drawers to use it as a table in my room. Even less space in my already small room’; ‘I had to place a desk in front of a double-door, waist-high cupboard that I can now no longer access’; ‘the dining room is now a workspace, and the upstairs landing contains a desk. Difficult to eat meals [...] access to the bathroom is difficult’; ‘The kitchen breakfast bar is now a workstation.’

Equally significant was the number of rooms and areas available to work in. Some interview participants said that the lack of internet signal, lower room temperatures and limited daylight in bedrooms forced them to set up their workspace in their living areas. Many respondents did not have a desk in their homes and used their dining table. This often meant working in the same room as other household members and in the same space that other domestic activities would normally take place. Respondents highlighted the difficulty these have caused. Hannah, who lived with her husband in a one-bedroom flat, said that it was difficult to get used to working in the living room with her husband, even though she used to work in an open-plan office with other people before the pandemic. She added that working from home has expedited their plan to move to another house with two bedrooms, one of which they could use as a study, as she thinks that ‘working from home will be more permanent’, and in the future as a guest bedroom.

Working from home challenged not only the physical space but also the meanings respondents assigned to home. Hannah continues:

A more comfortable chair, a proper office style chair... But then there would just be nowhere to keep it. In theory, we could push it in a corner so it's not in the middle of the floor but then it's permanently there. At least at the moment you can't see all your work things, clear the kitchen table, you know, put everything away, so at least then in the evenings, it feels like it's just a living-dining space. Whereas if you start getting things like office chairs, then all of a sudden, you've got that constant reminder that this is also your workspace.

Despite considering the possibility of creating a more comfortable space for working in, Hannah deliberately resisted setting up a workspace, as this would challenge the non-work meaning of home. She said, ‘We actually go to the bedroom just like [for] an hour to get out of the room that we've been working in all day’. Similar-

50. Philip Hubbard, Jon Reades, and Hendrik Walter, ‘Housing: Shrinking Homes, COVID-19 and the Challenge of Homeworking’, *Town Planning Review* 92, no. 1 (2021): 3–10.

ly, many responses suggested that a workspace and space for relaxation could not coexist in the same room: 'I have no space where I can relax. My desk and bed are right next to each other. I go to sit on the stairs to get some space away for reading and relaxation', 'I had to set up an office in my living room [...] space is always workspace'.

The lack of outdoor spaces, e.g. gardens and balconies, has attracted wide attention in the media, especially because of the way the prices of properties with gardens climbed in the aftermath of the March-May 2020 lockdown.⁵¹ One of the respondents was among those who felt the need for an outdoor space. Kelly, who lived with her husband and two children in a three-bedroom maisonette, decided to move to another house with a garden. However, the experience of the pandemic was not limited to the lack of outdoor space. Kelly, for instance, counted having only one toilet as another factor: 'I think especially with lockdown we realised we needed more space and especially outdoor space for the children and another bathroom with all of us at home. Another toilet especially [...] So it will be [the new house], I think, double the size. So, we're going to have a lot more space, three bathrooms and the garden.'

Residents and Design Standardization

This chapter has discussed the experience and practices of standardized dwelling designs based on an online survey and in-depth interviews. It has sought to outline the uses and practices in standard, below standard, and non-standard dwellings observed in the existing housing stock. The floor plan survey had found that dwellings come in a wide range of sizes and forms. The online survey and interviews added to this finding: household types, occupancy patterns, and lifestyles vary even more. The responses gathered through the online survey and the interviews highlight a complex matrix of household types and occupancy patterns. This wide range of household types and occupancy patterns are especially significant considering the small sample size of interviews and the limited range of social, economic, and cultural backgrounds encountered, in relation to London's multicultural population. Participants in the survey and interviews lived in households ranging from traditional household types, such as nuclear families, to households made up of sharers and couples, and in occupancies ranging from dwellings with spare rooms to dwellings in which the living rooms are also used as bedrooms. This not only prevents generalizations of dwelling uses, daily and homemaking practices; but also makes the wide standardization in the existing housing stock observed thus far problematic.

In discussing the analysis in relation to design standardization, broad generalizations are useful: the optimum home, in the view of residents, has one extra room in addition

51. Molly Blackall, 'Lockdown UK: "There are now two classes, people with gardens and the rest of us"', *Guardian* (23 April 2020).

to a kitchen, a sitting area, and a sufficient number of bedrooms. What constitutes a sufficient number of bedrooms by survey respondents and interview participants is aligned with the ‘bedroom standard’ in Housing Act 1985.⁵²

Despite the wide attention paid to dwelling size in the history of design standardization, in the interviews, the availability of rooms emerged as the most common measure of dwelling size. The interviews showed that many participants, except those living in sharing households for whom storage and desk space in bedrooms mattered more, did not consider their bedrooms to be small, unless they were unable to fit the essential furniture required into them. Even in these cases, additional rooms helped mitigate some of the limitations this caused. While participants tolerated bedroom size, they could not tolerate the number of rooms. Participants felt that the lack of an additional room that is not set aside for use as a bedroom, but for study, work or hobbies. While this was further exacerbated during the stay-at-home restrictions, it was also a concern before the pandemic. Those who already had this type of room considered them integral to their home and did not consider them as ‘spare’ rooms.

The additional room is different from considering sufficient space for different activities. For instance, calculations in *London Housing Design Guide* make allowance for a desk space in the living room and in bedrooms. It is also different from efficient design and planning, which is measured by the extent to which the circulation area, unused spaces, and material used in a dwelling are minimised by overlapping functional spaces. Users prefer rooms that can be used in multiple ways, but not at the cost of the possibility of using them for a single activity at one time.

The additional room that was desired might be of different forms and sizes. They could be very small rooms, of around 5 m². Participants used their small rooms in different ways in relation to their needs. However, as the floor plan survey had also found, small rooms are rare, and they are mostly in the older housing stock. Within the current standardization context, they are not possible. Today, the market produces mostly one- and two-bedroom flats, which offer little adaptability.⁵³ Formal standards prescribe what a bedroom size should be, and therefore, any extra room is also an addition to dwelling size and cost.

Separate living rooms and dining kitchens in which a sitting area can be created, e.g. with a large kitchen table, can also be considered as the additional room. The interview respondents who live in dwellings organized in this way reported that this enables a range of different uses of the space. Such arrangements are preferred by sharing households as they allow independent activities to happen simultaneously. As household members have different routines and there is often no division of labour, the ability to undertake different activities without disturbing others becomes very

52. The bedroom standard is given in the Housing Act 1985, Section 326.

53. Donna Birdwell-Pheasant and Denise Lawrence-Zúñiga, eds., *House Life: Space, Place and Family in Europe* (London: Bloomsbury, 1999), 25.

important. Therefore, sharing households also required larger working kitchens. However, family households, especially those with younger children had a strong preference for a combined kitchen, dining and living area for childcare and surveillance purposes. The interviews conducted for this research are limited in terms of the range of cultural backgrounds they represent; however, it is important to recognise that many local planning documents include a preference for separate kitchen and living areas in the affordable housing sector in order to increase their suitability for diverse cultural backgrounds.⁵⁴ For instance, a report commissioned by the London Borough of Tower Hamlets notes:

There were discussions about whether the design and layout of open plan properties discouraged Asian households [which have a significant presence in the borough] due to lifestyle issues. Separate provision would be much more suited because the lifestyle requires separate seating space for male and female visitors and also the types of food cooked is heavy in oil and spices, which can have strong odours.⁵⁵

At the moment, dining kitchens are also rare, and mostly in the older housing stock. As I have shown in the previous chapter, today the market produces single-aspect combined kitchen and living rooms, that are often merged also with circulation.

The desire for an additional room suggests that design standardization and lifestyles are changing in different directions. Household members have more tasks they do from home, such as work.⁵⁶ While this has certainly been exacerbated by the Covid-19 pandemic, many participants and survey respondents were already working from home before the pandemic. Household members also value their privacy and the time they spend alone. Both of these are related to the changing organizations of domestic life with new technologies. First as being the only room with heating, and then with a TV, the living room has long sustained a specific material, spatial, and temporal organization at home, with increasing technologies, households no longer operate in these principles. Against this, dwelling designs are becoming less adaptable, kitchens, living rooms, and corridors are merged.

My findings in relation to dwelling layouts broadly overlap with Finlay and co-authors' research:

No consensus was reached as to an ideal layout or single design layout that would cater for all households [...] each prioritizing different layouts and qualities that suited their differing lifestyles [...] Nonetheless, some degree of flexibility across the main living area was important to most participants in the research, reflecting

⁵⁴ Also see 2019 London Plan

⁵⁵ London Borough of Tower Hamlets, *Report of the Scrutiny Review Working Group on Affordable Home Ownership* (London: Tower Hamlets Council, 2009)

⁵⁶ Sytze F. Kingma, 'The Constitution of "Third Workspaces" in between the Home and the Corporate Office', *New Technology, Work and Employment* 31, no. 2 (2016): 176–93.

the fact that many activities took place simultaneously, such as eating and relaxing by watching television; entertaining and cooking; preparing meals and supervising children's homework. This suggested that more progressive home layouts may accommodate householders' needs more fully than most current designs.⁵⁷

The market has, in relation to economic activity, started to produce new housing forms that are more convenient for the needs of shared households.⁵⁸ The comments participants living in sharing households made regarding functional grouping align well with expectations in the Build to Rent housing sector. Dumb-bell layouts clearly appeal to the needs of sharing households, especially in sharing arrangements where people have little control over whom they share their houses with. The dumb-bell layout with two double rooms and bathrooms helps to mitigate some of the problems that arise in sharing households. As the Build to Rent sector is also seeking to rent out rooms rather than whole units, these problems are more likely to emerge. Satellite layouts, which allow one en-suite bedroom to be isolated from the rest of the flat, are likely to suit the needs of people like Eylül, who was renting out one bedroom.

These also show that the older housing stock, in fact, assumes a larger responsibility than I have previously assumed. The housing design needs of many different groups of users are catered for by the older housing stock. Certainly, as I have shown there is a great variety of layouts in the older housing stock, which goes against the grain of design standardization. However, some of the design solutions that foster adaptability should be scrutinized and regarded as a valuable source, especially for high-density housing to meet the changing needs of families at different points in their life course.⁵⁹

57. Stephen Finlay et al., 'The Way We Live Now: What People Need and Expect from Their Homes' (Ipsos Mori and RIBA, 2012), 5.

58. Frances Brill and Daniel Durrant, 'The Emergence of a Build to Rent Model: The Role of Narratives and Discourses', *Environment and Planning A: Economy and Space*, 2021, 1–18; Megan Nethercote, 'Build-to-Rent and the Financialization of Rental Housing: Future Research Directions', *Housing Studies* 35, no. 5 (2019): 1–36.

59. Blanc, Scanlon, and White, 'Living in a Denser London'; Sophie-May Kerr, Natascha Klocker, and Chris Gibson, 'From Backyards to Balconies: Cultural Norms and Parents' Experiences of Home in Higher-Density Housing', *Housing Studies*, 2020, 1–23.

8

Conclusion

The aim of this research was to present an account of housing design at the unit scale. In recent decades, a renewed interest in housing design quality and value has been prompted by a series of changes in housing planning and development: a private-led housing sector, smaller dwellings, developments in higher densities, and so on. This renewed interest has produced much valuable work, that this research builds upon.¹ However, housing design quality is often approached at the supra-dwelling scale and from the perspectives of urban design and planning disciplines.² The issues that pertain to unit design often remain anecdotal, and when they are empirically analysed, they largely rely on dwelling sizes.³ There is therefore a gap in our knowledge of housing designs at the dwelling scale. This research contributes to this gap focusing on, on the one hand, the dimensional and organizational patterns of the existing housing stock in London, and on the other the uses, experiences, and practices of residents of dwellings in London. To this end, I developed a design standardization framework that theoretically, methodologically, and empirically guided the research. This allowed

1. David Adams and Steve Tiesdell, *Shaping Places: Urban Planning Design and Development* (Oxon: Routledge, 2012); Matthew Carmona, 'Design Governance: Theorizing an Urban Design Sub-Field', *Journal of Urban Design* 21, no. 6 (2016): 1–26.

2. Maggie Baddeley and Merlin Tolley, 'Planning and Design Quality: Creating Places Where We Want to Live, Work and Spend Time' (London: Royal Town Planning Institute, 2019); Matthew Carmona et al., 'A Housing Design Audit for England' (London: Place Alliance, 2020); James T. White et al., 'Delivering Design Value: The Housing Design Quality Conundrum' (UK Collaborative Centre for Housing Evidence, 2020).

3. Chris Leishman et al., 'Preferences, Quality and Choice in New-Build Housing' (York: Joseph Rowntree Foundation, 2004); Rebecca Roberts-Hughes, 'The Case for Space: The Size of England's New Homes' (Royal Institute of British Architects, 2011); Malcolm Morgan and Heather Cruickshank, 'Quantifying the Extent of Space Shortages: English Dwellings', *Building Research & Information* 42, no. 6 (2014): 710–24; Mark Crosby, 'Space Standards for Homes' (London: Royal Institute of British Architects, 2015).

me to position standards and the underlying assumptions in their making against how the resulting housing designs are experienced and assessed by their inhabitants.

The design standardization framework I established, encompasses different agreed-upon rules in housing design. On the one hand, there are standards, a range of formal tools that prescribe and promote what a housing unit should and should not be, have, and do. On the other hand, there are ideas of housing that are shared by the market and design professionals, and these have had a comparable impact on the design of dwellings, and perhaps more so in the past forty years. Housing design standardization refers to all these multiple, loosely coordinated and sometimes conflicting housing design drivers introduced by diverse actors. Therefore, I brought together the literature studying the stakeholders taking part in housing planning, design, and development to outline what design standardization resemble. In so doing, I moved away from the dichotomous relationship between the state and the market, which often guide the discussions of housing.⁴ My use of design standardization has recognized, on the one hand, the increasingly variably constituted state-market relationships, and on the other, the historical contingency of the ideas of housing design. Underlying these housing forms are ideas of design quality. The development of design ideas at the unit scale has entailed normative ideas, linking unit design to the type, size, and everyday practices of the user.

In concluding this research, I review the main findings of my research, set out the contributions this research makes in addressing the literature of housing and outline directions for future research.

First, I addressed (RQ1) how is housing in London standardized at the dwelling scale? My empirical analysis focused on an analysis of existing dwelling types and sizes, room types and sizes and the organization of rooms in London. In this, my aim was, on the one hand, to provide an empirical basis for design standardization as I initially framed it, and on the other to extend its definition by specifying the housing design outcomes that it has led to in London. Here, I demonstrated that despite a wide range overall, there were commonly observed dwelling sizes and layouts, especially in mainstream flats (one-, two- and three-bedroom flats). I argued that they conformed to a standardization model that, as I initially described, consisted of a market trying to reduce the unit floor area that is still usable and marketable using tried and tested solutions, and state-sanctioned standards trying to keep housing units to a certain dimensional standard. In terms of size, most flats were clustered within and just above historical and contemporary minimum space standards. In terms of layout, they followed the historically grounded rules of ‘good’ design, i.e., a grouped or combined living area, grouped living and bedroom areas that are placed at different ends of the dwelling, a central circulation area and no inner rooms. These analyses provided an

4. David Adams and Steven Tiesdell, 'Planners as Market Actors: Rethinking State–Market Relations in Land and Property', *Planning Theory & Practice* 11, no. 2 (2010): 187–207; David Adams, Robert Croudace, and Steve Tiesdell, 'Exploring the “Notional Property Developer” as a Policy Construct', *Urban Studies* 49, no. 12 (2012): 2577–96.

empirical basis for my discussion of design standardization. Houses and maisonettes, however, showed more dimensional and organizational variation.

Even though most flats featured common spatial and dimensional qualities, there were also many below standard and non-standard dwellings in the sample. My analyses identified that below standard flats were mostly scaled down versions of standard dwellings: while all the rooms in below-standard flats were smaller than the minimum space standards dictated, they were no different from standard dwellings in terms of their organization. This attests my discussion of design standardization: while a particular attention is paid to dwelling size, 'good' housing models persist. Non-standard dwellings, i.e., the ones that did not feature the organizational standards, were mostly in the older housing.

In both the sample, and to a large extent in inner London, dwelling types and built periods are related to each other. While most of the flats in the sample analysed were built in the past forty years, the majority of houses and maisonettes were from the older housing stock, terraced houses that were built before 1919. In the last forty years, in general, dwellings have been built by the private sector and with few state-sanctioned standards. Therefore, it was assumed that their design has been shaped by market conventions. While terraced houses built before 1919 were originally highly repetitive, in the past century, they have been extended, converted, and remodelled in various ways. These opened up a space for articulating how different design standardization processes unfold in London.

I have shown that dwelling designs of the past forty years were most standardized: dimensionally clustered within and right above the minimum calculated dwelling sizes, space standards, and organizationally adhering to the principles of 'good' design, of efficient and functional planning: 70% meet the dimensional standards, and have at least one double bedroom larger than 12 m² and a living space larger than the minimum prescribed, and 73% meet the organizational ones have their functional areas grouped, have a central circulation, and a grouped living space. I have argued that this was closely related to the renewed regard for high-density development in London. While the government and local authorities regard it as a viable way to address housing shortage, the financing of development, planning obligations, and the way land is valued make developers seek to increase density. The efficient and functional planning of dwelling units is an important consideration in this regard. I have observed the single aspect flat with a combined living area, where kitchen is placed at the back and living area at the front as the specific spatial feature of high-density development.

I discussed terraced houses built before 1919 in relation to home alteration practices, extensions, remodelling of interior partitions, and conversions. To this end, I integrated the online survey and interviews to my floor plan analysis. While terraced houses are extended and their interiors are remodelled in various ways, I have shown

that there are two trends: kitchens are enlarged, connected to and merged with dining and living areas, and new facilities such as storage, utility rooms, bathrooms, and toilets are added. I argued that these trends were socially, typologically, and economically driven, while also being impacted by regulations. The kitchen has emerged as a space, in contemporary daily practice, as a space for leisure and socialization, and the older separations of kitchen, dining room, and sitting rooms were no longer regarded as 'usable'. The owner-occupants of terraced houses have increasingly enlarged their kitchens, knocked the walls down and opened their kitchen to living areas. Similarly multiple bathrooms have emerged as a necessity of modern home. Moreover, as kitchens were opened up and owner-occupants accumulated more furniture they required more storage. These were also typologically driven. Much of the extensions and remodelling practices resulted in changes to kitchens as the ground floor was completely dedicated to living areas with kitchen at the back in the original terraced house. These were also economically driven. Extensions and interior remodelling made by homeowners are seen as investments and inevitable responsibility of being a homeowner.

Having identified the extent of design standardization and design standardization processes in London through new flats and altered dwellings, I focused on the experiences and practices of residents in London in relation to design standardization. My analysis focused on the spatial features I identified both in the history of design standardization and in my floor plan analysis. I demonstrated that neither were these spatial features preferred by all residents nor did the domestic lives they were assumed to have corresponded to the complex matrix of household types and occupancy patterns observed. Certainly, any standard entails simplification and generalization that hinders the recognition of diversity. Therefore, in discussing participants' responses I focused on potential generalizations that could relate to the making of standards.

The first generalization was about the number of rooms. In the analysis, it emerged that households value rooms rather than floor area. This does not mean that below standard dwellings or room are acceptable. Neither can they be thought separately. Rather, it is to say that residents' daily practices revolve around, or better, co-evolve with rooms, rather than spaces. Generalizing, the preferred dwelling had one room in addition to a kitchen, a sitting area, and a sufficient number of rooms for sleeping. This might be a spare room, a box room, or a larger kitchen separate from the living room that household members can use in private in addition to their bedroom and living room. In the existing housing design practices of market, kitchen and living areas are merged, and all remaining rooms are designated as bedrooms. Moreover, I also noted that these combined arrangements were designed in ways that were difficult to subdivide and convert into two separate rooms, kitchen and living room. Smaller rooms such as box rooms or separate dining kitchens, which could serve as an additional room were often found in the older housing stock. The current space standards in which additional rooms are calculated for different occupancy rates do

not correspond to what residents need. This is further exacerbated by Covid-19, as activities such as work from home and learning from home has led to the need for more flexibility and more private spaces/additional rooms.

The second observation was about the spatial preferences of two types of households: family households and sharing households. The two households differ in their relationships between household members. While family households have division of labour and dynamics of care, in sharing households there are individual practices. While households with younger children have a strong preference for combined or visually connected kitchen, dining and living areas, for childcare and surveillance purposes, sharing households prefer their living areas arranged as multiple rooms, as they allow independent activities to happen simultaneously. Moreover, sharing households prefer not to have a functional grouping of rooms in flats or bedrooms on living floors, in order to have more privacy. These align well with some of the purpose-built non-standard dwelling layouts such as dumb-bell and satellite layouts, observed in the floor plan analysis.

Based on these observations, I argued that spatial needs of many different groups of users are, in fact, catered for by the older housing stock, with its box rooms, arrangement of sequential and semi-open living areas, different levels of privacy established in different floors, and a wide range of layouts resulting from conversions. While most of the extended and converted dwellings, as I showed in Chapter 6, had dimensional and organizational qualities that went against the principles of 'good' dwelling, such as functionality and efficiency, they are valued by a wide range of inhabitants.

In the context of a perpetual housing quality crisis that has been exacerbated by the Covid-19 pandemic, this dissertation has focused on the tensions and compromises of the housing market, design and construction professionals, non-governmental organisations, property owners and users. Studying policy documents, housing designs and user experiences, I sought to provide a wide-ranging and nuanced understanding of the tensions arising between qualitative and quantitative drivers of housing design, numerical and graphical standards, design and use, and the architectural profession. Now I turn to some reflections on my findings reiterating the limitations and highlighting productive paths for future research.

A Mixed-Method Approach to Housing Design

A particularly original dimension of this research is its mixed-method methodology approach, grounded in a design standardization framework. The use of quantitative analysis, visual analyses of floor plans, an online survey and follow-up interviews allowed a detailed analysis of existing housing designs and design practices, as well as an exploration of the issues from the residents' perspectives. While the use of

qualitative and quantitative data together in housing research is not novel, no large-scale studies of this kind have not been conducted recently.⁵ This has also coincided with the increasingly quantitative orientation – in multiple ways – of housing planning, design, and development processes. Throughout the dissertation, my emphasis has been on the tensions between qualitative and quantitative drivers of housing, or more precisely the user-oriented roots of our measures and rules.

A growing body of literature across the social sciences and humanities have charted the many dimensions through which the social and the material come together at home.⁶ Incorporating these, I focused on the housing models that design standardization leads to and highlighted how these are enmeshed with normative ideas of occupancy, use, and family. My research sought to assess design standardization by analysing how residents used their homes and what issues they faced. Doing this in conjunction with the design of dwellings, the research also contributes to issues in practice, in particular the problem Adams and Tiesdell recognized: ‘housebuilders may claim that what is built reflects what consumers want, but this is a circular argument that cannot really be tested when very similar products are offered by all the main housebuilders.’⁷ My analysis focused on different types of households and dwellings.

The analysis presented here focused on inner London, which differs from the rest of London and the UK in terms of its housing context. As a result, I do not seek to make any claims about the status and experience of housing beyond inner London. The results of my analyses should be viewed as the representative of standard housing in inner London, rather than a thorough analysis of housing conditions in London. The picture of housing stock drawn here, i.e. largely above the minimum housing stock and residents with very few major housing problems, is a highly positive one compared to other evidence on the very poor quality of housing stock.⁸ Even though all efforts were made to generate a representative sample of London’s housing stock and its residents, there are few areas that my research fails to reflect with confidence. First, the lower end of the housing market and most vulnerable communities are not captured well in the samples due to issues including, but not limited to, data availability, methodological decisions, and the scope of work. Most floor plans are sampled from

5. W V Hole and J J Attenburrow, *Houses and People: A Review of User Studies at the Building Research Station* (London: Ministry of Technology Building Research Station, 1966); Leishman et al., 'Preferences, Quality and Choice in New-Build Housing'.

6. Donna Birdwell-Pheasant and Denise Lawrence-Zúñiga, eds., *House Life: Space, Place and Family in Europe* (London: Bloomsbury, 1999); Tony Chapman and Jenny Hockey, eds., *Ideal Homes?: Social Change and the Experience of the Home* (London: Routledge, 1999); Tony Chapman, 'There's No Place Like Home', *Theory, Culture & Society* 18, no. 6 (2001): 135–46; Shelley Mallett, 'Understanding Home: A Critical Review of the Literature', *The Sociological Review* 52, no. 1 (2003): 62–89; Alison Blunt and Robyn Dowling, *Home* (London: Routledge, 2006); Hazel Easthope, 'A Place Called Home', *Housing, Theory and Society* 21, no. 3 (2004): 128–38.

7. David Adams and Steve Tiesdell, *Shaping Places: Urban Planning Design and Development* (Oxon: Routledge, 2012), 107.

8. Mariana Schiller and Mike Raco, 'Postcolonial Narratives and the Governance of Informal Housing in London', *International Journal of Housing Policy*, 2020, 1–23; Philip Hubbard, Jon Reades, and Hendrik Walter, 'Housing: Shrinking Homes, COVID-19 and the Challenge of Homeworking', *Town Planning Review* 92, no. 1 (2021): 3–10.

planning applications that were mostly submitted after 2005, as planning applications submitted before were not digitized and uploaded to planning application archives. This meant, first, that the housing sampled here had been built or modified since then and therefore is more likely to be housing sold and let at market prices. Second, planning applications are not always representative of housing as built. The research and other evidence have shown that, in London, there are often differences between the drawings submitted as part of planning applications and dwellings as built.⁹ However, as comparisons to previous studies made in Chapter 5 illustrate, the results are not significantly skewed.

However, these limitations are useful considerations for future research. More innovative and qualitatively driven methodologies are required to access the lower end of the housing market in which the issues of housing are drastically different. Some of these issues have been identified in my analysis, especially in the online survey and interviews. However, none of the interview participants had overcrowding or housing much below the standard. The ones, who lived in comparatively smaller houses and larger occupancy rates make do with some spatial limitations. This also has implications for making standards, as housing standards, historically, relied on large scale data. Any evidence produced for design standards should integrate innovative and qualitatively driven methodologies that specifically focus on the lower end of the market to which intervention is most needed.

Housing Design

Dwelling size has been institutionalized as the way to measure, assess and intervene in housing design. This research has shown that dwelling size falls short of giving an indication of design quality in relation to use. There is a need to support standards of dwelling size with other standards that are qualitatively driven and that pertain to housing layouts. Echoing Finlay and co-authors, my analysis has shown that standard designs did not cater to all households in the same manner.¹⁰ However, there are some lessons to be learned for housing design and standards. First, there is a need to shift the focus away from dwelling size to increase variation in dwelling layouts. There is a need to develop and adopt different layouts with different living areas and bedroom-living room relationships. Participants from different types of households have shown that there are different priorities and considerations in the arrangement of living areas. Thus, there is an importance to better understand household transformations and different demands/preferences - as currently homes are still designed assuming

9. Guy Adams, “Scumdog millionaire” and shanty town Britain: Shameful “beds in sheds” that make fortunes for slum landlords “housing” countless desperate migrants in squalid outbuildings’, *The Daily Mail*, 6 October 2017; Schiller and Raco, ‘Postcolonial Narratives and the Governance of Informal Housing in London’; Jessica Ferm et al., ‘Emerging Problematics of Deregulating the Urban: The Case of Permitted Development in England’, *Urban Studies*, 2020, 004209802093696.

10. Stephen Finlay et al., ‘The Way We Live Now: What People Need and Expect from Their Homes’ (Ipsos Mori and RIBA, 2012).

that they are for families which comes with conventional unit layouts. The market has already developed new layouts two on which I focused: dumb-bell and satellite layouts. I showed that these layouts are valued by sharing households of different types. However, my floor plan analysis has shown that non-standard dwellings are mostly found in converted dwellings and showed that these homes were regarded more positively by their residents.

Another way of framing this is flexibility.¹¹ However, this does not necessarily mean movable partition walls, as it has often been understood. Neither is it always bound to providing extra space or decreasing efficiency. In fact the lessons about spatial flexibility can be learned from the older housing stock. As shown, they can accommodate new living space arrangements, an extra bedroom, new facilities, and more space, therefore allowing dwellings to adapt the changes in the lifecycles of users. This adaptability rests on multiple aspects of terraced houses: the availability of space, double aspect design, and particularly, the disposition of entrance hall, staircase, and scullery on one side, and habitable rooms on the other.¹² As I have pointed out, the single aspect flat with combined living area does not allow such changes, even though it has a clear front and back separation of services.

I have thus far framed design standardization as a set of formal solutions that, in practice, persist independent of dwelling sizes around which regulatory standards and market processes are centred. For instance, most below standard dwellings were scaled down versions of conventional layouts. In my analysis, it emerges that there is a need for a better targeted discussion of how to create smaller designs. While they are also historically grounded, the existing calculations of a minimum dwelling size focus on how to fit a 'good' design into a smaller size. There is also a need to re-imagine what constitutes 'good' design. This is, however, different from the recent discussions of 'micro-living' or the 'co-housing' developments in London that are criticised as 'normalizing and naturalizing housing crisis conditions.'¹³ Such developments are driven by a desire to minimize dwelling size. I refer to the establishment of more nuanced norms of 'good' housing that is driven by social research into homes, i.e. in-depth understanding of how people use their homes¹⁴

11. Jeremy Till and Tatjana Schneider, *Flexible Housing* (London: Routledge, 2016); Paula Femenias and Faustine Geromel, 'Adaptable Housing? A Quantitative Study of Contemporary Apartment Layouts That Have Been Rearranged by End-Users', *Journal of Housing and the Built Environment* 35, no. 2 (2020): 481–505.

12. Agatangelo Soler Montellano, 'Housing Flexibility by Spatial Indeterminacy: The Case of the Casa de Las Flores in Madrid', *International Journal of Architectural Research: ArchNet-IJAR* 9, no. 2 (2015): 4–19.

13. Ella Harris and Mel Nowicki, "'GET SMALLER"? Emerging Geographies of Micro living', *Area* 52, no. 3 (2020): 593.

14. Sara Brysch, 'Reinterpreting Existenzminimum in Contemporary Affordable Housing Solutions', *Urban Planning* 4, no. 3 (2019): 326–45.

Housing Design Standardization

In the introductory chapters, I developed a design standardization framework that expand on Ian Bentley's 'battlefield', Adam Tiesdell and Stephen Adams' 'opportunity space', and Matthew Carmona's 'design governance' frameworks to the unit scale.¹⁵ Drawing also from Infrastructure Studies and Economics of convention, this framework consisted of formal standards of regulatory stakeholders, and conventions of market and design professionals. The particular housing forms design standardization leads to, I argued, were a result of challenges and compromises between these three actors, their standards and conventions, and their values.

My exploratory analysis of new-built flats reveals how these challenges and compromises materialize in standardized forms. In particular, the single aspect flat of minimum usable dwelling size with combined living area epitomize market and state relationships: a market that is carefully calibrating dwelling sizes and typologies in relation to density, cost, and house prices, while maintaining a level of usability and marketability, and a government highly tied to a market in providing housing, trying to maintain a minimum design standard while tackling issues of housing shortage and affordability.¹⁶ In this manner, design standardization framework proves to be a useful addition to the literature in extending the analysis of housing design practice in multiple ways. It allows reframing unit design beyond dimensional standards and standardized unit types that are to be repeated, as a set of formal solutions that emerge from the variegated historical, cultural, and pragmatic contingencies between the state and the market. In doing so, it also opens up potential research avenues at the intersection of housing studies and architectural design, which remains a surprisingly limited research field.

I constructed my views of market conventions based on older literature published between the 1970s and the 2000s. While this research is still widely cited by experts in the area, this should be recognized as a limitation. Interviews with developers and consultants working in the private sector would have been a good addition but were difficult to achieve due to time constraints and the pandemic.¹⁷

15. Ian Bentley, *Urban Transformations: Power, People and Urban Design* (London: Routledge, 1999); Steven Tiesdell and David Adams, 'Design Matters: Major House Builders and the Design Challenge of Brownfield Development Contexts', *Journal of Urban Design* 9, no. 1 (2004): 23–45; Carmona, 'Design Governance: Theorizing an Urban Design Sub-Field'.

16. Fanny Blanc and Tim White, 'Life in London's Changing Densities', *Urban Geography* 41, no. 10 (2020): 1–8.

17. Rob Imrie, 'The Role of the Building Regulations in Achieving Housing Quality', *Environment and Planning B: Planning and Design* 31, no. 3 (2003): 419–37; Rob Imrie, 'The Interrelationships between Building Regulations and Architects' Practices', *Environment and Planning B: Planning and Design* 34, no. 5 (2007): 925–43. In particular, an application of James Faulconbridge, Noel Cass, and John Connaughton's study of office design to housebuilders would further substantiate my discussion of market conventions: James Faulconbridge, Noel Cass, and John Connaughton, 'How Market Standards Affect Building Design: The Case of Low Energy Design in Commercial Offices', *Environment and Planning A: Economy and Space* 50, no. 3 (2018): 627–50.

Even though technical environmental standards have a significant impact on the quality, they were not discussed in this research. The interviews have shown that, especially in converted dwellings issues of heating, lighting, and noise were present. Accessibility standards are another area that my research has not focused on even though they have immediate impact on the size and layout of homes.¹⁸ I contend that my research would benefit significantly from a more thorough articulation of design standardization with environmental standards, one which could offer important insights into the kinds of relationships between environmental comfort and layout.

The discussion of alterations in terraced houses, reveals further limitations of my design standardization framework. In London's housing, owner-occupier emerges as a key actor in design standardization and major alterations as a design standardization process. While, owner-occupiers operate within the broader market conventions and formal standards, my analysis suggests that they also have distinct design conventions that are socially, typologically, and economically determined. This indicates an immediate productive avenue for further research into home alterations bridging the 'material geographies' and housing studies.¹⁹

Housing Design Studies

In the past decades, the problems observed in housing design has led to the publication of large-scale studies of housing.²⁰ However, as I discussed, housing design is approached from the neighbourhood, development, and regional scales. While these studies expand the intersection of housing studies and housing design, unit design is often excluded. The floor plan analysis and the dataset I constructed, with its large sample size, geographical specificity, and focus on multiple typologies makes a significant contribution to this literature at the unit scale. As I discussed throughout, it provides up-to-date and more detailed evidence regarding housing designs in London, at a time when the UK Government is more engaged with issues of design.²¹ It both extends quantitative studies with a specific attention to layouts and incorporates qualitative evidence collected from actual users.

In a more limited literature that has focused on the unit scale, the focus has been the sizes of dwellings. The floor plan analysis provides detailed insight into the spatial

18. Rob Imrie, 'Housing Quality, Disability and Domesticity', *Housing Studies* 19, no. 5 (2004): 685–90; Imrie, 'The Interrelationships between Building Regulations and Architects' Practices'.

19. Andrew Gorman-Murray and Ruth Lane, eds., *Material Geographies of Household Sustainability* (London: Routledge, 2011); Ben Anderson and John Wylie, 'On Geography and Materiality', *Environment and Planning A* 41, no. 2 (2006): 318–35.

20. Baddeley and Tolley, 'Planning and Design Quality: Creating Places Where We Want to Live, Work and Spend Time'; Carmona et al., 'A Housing Design Audit for England'; White et al., 'Delivering Design Value'; Fanny Blanc, Kath Scanlon, and Tim White, 'Living in a Denser London: How Residents See Their Homes' (London: LSE London and LSE Cities, 2020).

21. Matthew Carmona, '78. Design Quality, Have We Reached a Moment of National Change?', <https://matthew-carmona.com>, February 1, 2021.

and organizational features of dwellings that have thus far remained anecdotal and suggests that they cannot and should not be thought independently. Moreover, most of these studies rely on specifications provided by developers to construct large samples, and others that generate data by measuring plans focus on smaller samples. A particularly novel dimension of this research is the use of new algorithms that allow data to be digitized and extracted from floor plans at scale. These tools provide an opportunity to analyse a large number of housing designs, both dimensionally and organizationally, and therefore, to better identify spatial patterns in the housing stock. Moreover, this has allowed me to assess large quantities of plans and housing that otherwise have seen little analysis - converted homes – as the focus in similar studies has always been on new built. I used planning applications and real estate pages as a data source and showed that, if integrated with the planning system, the methods used here could help local authorities to monitor the types of housing provided better, i.e. taking into consideration the local needs. At the moment, local needs are assessed in terms of number of rooms. These can be extended into layouts.

Appendices

A: Analyzed LSOAs

Year	LSOA	Description	Number of Dwellings for the Year Specified	Number of Plans Collected	Number of Housing Units Analysed	%
-1900	Hackney 012BCD	2, 3, 4 storey terraced houses, various frontages, in long terraces, private sector built	1430	850	109	8%
-1900	Hackney 020CDE	3 storey terraced houses, similar frontages, short terraces, private sector built	1020	431	77	8%
-1900	Hackney 06AC	2, 3, 4 storey terraced houses, various frontages, in long terraces, private sector built	750	324	53	7%
1900-1918	Newham 24C25D	2 storey terraced houses, narrow frontages, in long terraces, private sector built	1110	642	129	12%
1900-1918	Westminster 006BC	Purpose-built mansion flats, private sector built	1380	131	50	4%
1919-1929	Camden 001B	Purpose-built mansion flats, private sector built	660	28	20	3%
1919-1929	Hammersmith and Fulham 003C	2 storey terraced houses, narrow frontages, public sector built	460	163	59	13%
1919-1929	Lewisham 37A26B	2 storey terraced houses, narrow frontages, public sector built	1140	213	79	7%
1930-1939	Lambeth 035BC	2 storey terraced houses, wide frontages, private sector built	920	249	63	7%
1945-1954	Islington 009B	purpose-built flats, core-access, public sector built	520	17	12	2%
1945-1954	Westminster 024AB	purpose-built gallery-access flats, public sector built	1220	96	73	6%
1955-1964	Camden 023ADE	purpose-built mixed-typology flats, public sector built	1210	88	53	4%
1965-1972	City of London 001AC	purpose-built mixed-typology flats and maisonettes, public sector built	1820	267	161	9%
1965-1972	Hackney 025B	purpose-built mixed-typology flats and maisonettes, public sector built	500	16	9	2%
1965-1972	Wandsworth 001C	purpose-built mixed-typology flats and maisonettes, public sector built	380	50	21	6%
1965-1972	Westminster 015C	purpose-built mixed-typology flats, private sector built	760	171	101	13%
1973-1982	Islington 004D	purpose-built mixed-typology maisonettes, public sector built	570	46	19	3%
1973-1982	Kensington and Chelsea 021C	purpose-built flats, private sector built	430	12	8	2%
1973-1982	Wandsworth 003D	purpose-built mixed-typology maisonettes, public sector built	560	25	10	2%
1973-1982	Westminster 010G	purpose-built flats and maisonettes, private sector built	440	41	25	6%

Year	LSOA	Description	Number of Dwellings for the Year Specified	Number of Plans Collected	Number of Housing Units Analysed	%
2000-2009	Wandsworth 002F	purpose-built flats and maisonettes, private sector built	740	86	68	
2000-2009	Wandsworth 004G	purpose-built flats and maisonettes, private sector built	900	44	38	
2000-2009	Newham 037H	purpose-built flats and houses, private sector built	580	24	20	
2000-2009	Islington 006F	purpose-built flats and maisonettes, private sector built	720	68	50	
2000-2009	Islington 011I	purpose-built flats, private sector built	1180	28	28	
2000-2009	Tower Hamlets 033B	purpose-built flats, private sector built	820	48	26	
2010-2018	Wandsworth 002H	purpose-built flats, private sector built	900	40	23	
2010-2018	Wandsworth 002B	purpose-built flats, private sector built	2270	115	76	
2010-2018	Newham 013E	purpose-built flats, private sector built	1200	83	58	
2010-2018	Newham 037E	purpose-built flats, private sector built	870	86	63	
2010-2018	Islington 018E	purpose-built flats and maisonettes, private sector built	600	23	9	
2010-2018	Tower Hamlets 018A	purpose-built flats and maisonettes, private sector built	610	45	35	
2010-2018	Haringey 015D	purpose-built flats, private sector built	990	65	46	
2010-2018	Hackney 002F	purpose-built flats, private sector built	1250	87	65	

B: Online Questionnaire

1. I am Seyithan Ozer, a PhD student in the School of Architecture at the Royal College of Art. As part of my research, titled Interior Complex: Design Standardisation in London's Housing, I am conducting an online survey. You are invited to take part in this research which explores housing design standardisation in London. This survey will ask questions about the design of your home, and the way it has served to your housing needs before and during the lockdown. It will take five to ten minutes.
2. If you consent to participate, this will involve answering few questions about the house you live in and your experiences at home. We will not ask any information that may disclose your identity and location. At no time will any individual be identified in any reports resulting from this study. Participation is entirely voluntary. You can withdraw at any time up to the point of publication and there will be no disadvantage if you decide not to complete the study. All information collected will be confidential. All information gathered will be stored securely and once the information has been analysed all individual information will be destroyed.
If you have any concerns or would like to know the outcome of this project, please contact me or my supervisors.
sevithan.ozero@network.rca.ac.uk
sam.jacoby@rca.ac.uk
a.jones@lse.ac.uk

I have read the information above and all queries have been answered to my satisfaction. I agree to voluntarily participate in this research and give my consent freely. I understand that I can withdraw my participation from the project up to the point of publication, without penalty, and do not have to give any reason for withdrawing.

3. Thank you for your consent. In these first series of questions, I would like to understand the type of dwelling you live in. I am interested in the internal organisation of your home, and therefore the questions do not target the balconies, gardens, and outside rooms.
 - 3.1. Do you live in London?
 - Yes
 - No
 - 3.2. Which of the following best describes your building?
 - a terraced, detached, or semi-detached house
 - a multiple storey building with up to 5 floors
 - a multiple storey building with more than 5 floors
 - 3.3. Which of the following best describes your home? For this research I define 'house' as a multiple-storey unit, which is also a private building, 'maisonette' as a multiple-storey unit found in buildings containing multiple units, 'flat' as a single-storey unit found in buildings containing multiple units.
 - Flat
 - Maisonette / Split-floor flat
 - House
 - 3.4. How many bedrooms are there in your home?
 - Studio
 - 1 bedroom
 - 2 bedrooms
 - 3 bedrooms
 - 4 bedrooms
 - More than 4 bedrooms

4. Now, I would like to ask a few questions to understand the interior of the dwelling you live in.
- 4.1. To what type of room does the entrance door open?
- Houses and maisonettes:
- to an entrance hall without a staircase
 - to an entrance hall with a staircase leading to another floor
 - to the living room / lounge
 - to the kitchen
- Flats
- to a corridor from which all the rooms can be accessed
 - to a corridor from which only some of the rooms can be accessed
 - to the living area / lounge (including open kitchen layouts)
 - to the kitchen
- 4.2. Your house, maisonette, or split-floor flat:
- 4.2.1. Is it designed in a way that all living spaces (kitchen, dining and sitting areas) are on the same floor?
- 4.2.2. Is it designed in a way that all bedrooms are on the same floor?
- 4.2.3. Which one describes your living area(s) best?
- -
- 4.3. Your flat:
- 4.3.1. 'Are there any corridors in your flat?
- 4.3.2. Which of the following best describes this corridor?
- 4.3.3. Do you have to cross the living area to access any bedrooms?
- 4.3.4. Which one describes your living area(s) best?
- 4.3.5. Are the kitchen and living area connected or in a close proximity? For example, are they sharing a wall or positioned right across each other?
- 4.3.6. Are the bedrooms in a close proximity? For example, are they sharing a wall or positioned right across each other?'
- 4.4. Do you use your home as laid out when you moved into the home?
- 4.5. Would you like to share the changes you have made?
- 4.6. Do you use the living room and/or bedrooms as intended in the original design of the home if you are familiar with this? e.g. the living room as a living room and not as a bedroom.
- 4.7. Would you like to share the changes you have made?
5. Now, I will ask a few questions to understand the way you think of your home
- 5.1. You might have done some changes to the way you use your home during the lockdown. Following questions ask about your thoughts and the way you used your home *before the lockdown.
- 5.1.1. Were you working from home regularly?
- 5.1.2. Did you already have a dedicated landing, space or room with a desk for working from home?
- 5.1.3. Before the lockdown, I thought the size of my house was _____ for my needs.
- 5.1.4. Were you able to fit a single bed and a desk to the smallest bedroom in your house?
- 5.1.5. Were you able to have meals on a table in your kitchen?
- 5.1.6. Were you able to have meals on a table in your living room?

- 5.1.7. Did you have enough space to invite friends and family over for dinner or get together?
- 5.1.8. How many people were you able to accommodate comfortably for a meal?
- 5.1.9. Did you have enough storage?
6. Now, I would like to learn more about how your perception has changed *since the lockdown
- 6.1. During the lockdown, I thought the size of my home was:
- 6.2. Did you make any changes to the way you use your home as a result of the lockdown? e.g. placing a desk in your bedroom / living room to be able to work from home, converting a study to bedroom for isolation.
- 6.2.1. You have made changes to the way you use your home as a result of the lockdown:
- 6.2.1.1. Could you list some of the changes you have made?
- 6.2.1.2. Do you consider these changes temporary?
- 6.2.1.3. Do these changes limit the way you use your home?
- 6.2.1.4. Can you provide some information about those limitations?
- 6.2.2. You have not made any changes to the way you use your home:
- 6.2.2.1. Do you / did you have space to keep having some of the activities that you often did outside your home, e.g. having a desk to sit while working, space for hobbies, doing some exercise etc.
- 6.2.2.2. Do you / did you have enough storage for the extra items you need during the lockdown?
- 6.2.2.3. Do you / did you have enough space to isolate yourself from the rest of the household, while carrying on with the daily tasks. e.g. a living room or an extra bedroom to be converted to bedroom, a space for a desk?
7. Lastly, I would like to ask some questions about your household
- 7.1. Which one describes best your household?
- One-person household
 - Lone parent with dependent children
 - Lone parent with non-dependent children
 - Living with partner/spouse and with no children
 - Living with partner/spouse and with dependent children
 - Living with partner/spouse and with non-dependent children
 - Living with other unrelated adults'
- 7.2. What age group do you fall in?
- 15-25
 - 26-45
 - 46-65
 - 65+
- 7.3. Is there anyone in your household who has to share their bedroom with someone other than their partners / spouses?
- 7.4. Do you have a spare bedroom or one that is not set aside for use by a member of your household?
8. Thank you for your answers. As part of my research I would like to better understand how some of the respondents to this survey use their homes. Please could you therefore indicate if you would be willing to take part in a follow-up online / phone interview for my research? Follow-up interviews would take no longer than an hour and would be arranged at your convenience.
9. Thank you for being willing to take part in a follow-up interview. Could you please leave your email address or phone number below so that we can contact you? Participation is entirely voluntary. You can withdraw at any time up to the point of publication and there will be no disadvantage if you decide not to complete the study. All information collected will be confidential. All information gathered will be stored securely and once the information has been analysed all individual information will be destroyed. By leaving your contact information, you confirm that you understand that the contact information gathered will be stored securely, and your opinions will be accurately represented. Any data in which you can be clearly identified will be used in the public domain only with your consent.

10. Thank you for your answers. This project follows the guidelines laid out by the Royal College of Art Research Ethics Policy. If you have any questions, please speak with the researcher. If you have any concerns or a complaint about the manner in which this research is conducted, please contact the RCA Research Ethics Committee by emailing ethics@rca.ac.uk or by sending a letter addressed to:
The Research Ethics Committee
Royal College of Art
Kensington Gore
London
SW7 2EU

C: Informed Consent

Based on the answers you gave, I would like to invite you for a follow-up interview about the design of your house and the way you use your home. If you consent to participate, this will involve answering few questions about the house you live in and your experiences at home. The interview will take 10 to 20 minutes. I will ask questions about the design of your home, following up on the answers you have already given. I will ask questions about the living areas and bedrooms of your home, about your furniture, about how you use and experience your home, and about the changes you made before and during the lockdown. At no time will any individual be identified in any reports resulting from this study.

Following the public health guidance, the interview will be conducted via Zoom and will be recorded. Zoom recordings will be stored and deleted following the research ethics and data protection policy and will not be shared with a third party.

I will also ask for a floor plan of your home prior to the interview, if you are happy to share it with me. I believe this will allow us communicate better and help me understand the design of your home better. Again, this is completely voluntary and will be stored securely and will not be shared with a third party.

If you do not have a floor plan but are happy to share your address, I might be able to find it on rightmove.co.uk searching in past advertisements, on local authority planning applications or by contacting your local authority archives. If you share your address with me, any correspondence and data that contain your address will be deleted immediately after obtaining the floor plan.

Participation is entirely voluntary. You can withdraw at any time up to the point of publication and there will be no disadvantage if you decide not to complete the study. All information collected will be confidential. All information gathered will be stored securely and once the information has been analysed all individual information will be destroyed. Images or floor plans, which may allow you to be identified will only be used with your express permission.

If you have any concerns or would like to know the outcome of this project, please contact me or my supervisors.

seyithan.ozero@network.rca.ac.uk

sam.jacoby@rca.ac.uk

a.jones@lse.ac.uk

This project follows the guidelines laid out by the Royal College of Art Research Ethics Policy. If you have any questions, please speak with the researcher. If you have any concerns or a complaint about the manner in which this research is conducted, please contact the RCA Research Ethics Committee by emailing ethics@rca.ac.uk or by sending a letter addressed to:

The Research Ethics Committee
Royal College of Art
Kensington Gore
London
SW7 2EU

D: Interview Schedule

First of all thank you very much for your time. I am Seyithan, I am an architect and a PhD student at the Royal College of Art. First of all, thank you once more for agreeing to participate in this interview and thank you for your time. To give a bit of a background, I am doing research on housing design and its standardization and I am here to ask a few questions about the design of your house and the way you use your home. Do you have any questions?

Household / User

Before we begin, can you tell me a little bit about your household and your home?	Who do you live with? How long have you been living here? And whether you own the house?
---	--

General / House

Can you tell me a little bit about your experiences at home? Walk me through a typical day?	Do you work from home? Do you have responsibilities of care? So, you don't really spend much time at home / so you spend a lot of time at home.... If a specific event is mentioned: In what ways has this event influenced your use of home? Is there a particular part of the house that you spend most of your time in?
---	--

Living Area

Tell me how you feel about the design of your living area. Are you happy with it?	How is your living area arranged? Is it a single room? What do you think about a combined/ separate kitchen, dining, living area? Would you prefer the otherwise? Could you elaborate on what makes you happy? Are you happy with the size of your living area? Did you have to get rid of furniture when you moved in? Or Has there been any furniture you wanted or needed to have but could not fit? Did you want to get rid of any furniture during the lockdown? Did you think any furniture was inappropriate for your house? Did you buy any furniture during the lockdown? Do you have a desk for instance?
---	---

Layout and Circulation

Could you tell me about the arrangement of rooms? Are you happy with the way your rooms are laid out?	Would you prefer to have another type of arrangement? For instance, the kitchen and living room relationship? Proximity of bedroom to kitchen / bathroom? The way bedrooms are positioned? The wall between the rooms... For instance with the bedroom of children.... Bathroom?
---	--

Bedrooms

Are you happy with the arrangement of your bedrooms?

Could you elaborate on what makes you happy?

Is it well designed, for storage, for baby?

Are you happy with the **size** of your living area?

Did you have to get rid of furniture when you moved in? Or Has there been any furniture you wanted or needed to have but could not fit?

Did you want to get rid of any furniture during the lockdown? Did you think any furniture was inappropriate for your house?

Did you buy any furniture during the lockdown?

Conversions

What was your motivation in undertaking extensions / conversions? Were your needs different?

How were the design decisions taken? Was there a professional involved? Did seeing other people's houses have an impact on your decisions?

Was there anything you wanted to do differently? Why were you not able to do it?

New Built

Your house is new built. Compared to your old home, what kind of benefits have you seen?

E: Survey Results

		n	%		n	%
Type	Flats	139	58%	Houses and Maisonettes	95	40%
	Flats	139	58%	House	68	29%
				Maisonette	25	11%
				Split-floor Flat	2	1%
General	Building Type			Building Type		
	a terraced, detached, or semi-detached house	53	38%	a terraced, detached, or semi-detached house	76	80%
	a multiple-storey building with up to 5 floors	66	48%	a multiple-storey building with up to 5 floors	10	11%
	a multiple-storey building with more than 5 floors	19	14%	a multiple-storey building with more than 5 floors	3	3%
	Other	1	1%	Other	6	6%
Layouts	Circulation			Entrance		
	C-C	97	70%	to an entrance hall with a staircase	75	79%
	C-R	3	2%	to an entrance hall without a staircase	9	10%
	R-C	28	20%	to the living area	11	12%
	R-R	11	8%			
	Functional Grouping	84	60%	Functional Grouping	54	57%
Experience of Dwelling before lockdown	Experience of dwelling size before lockdown			Experience of dwelling size before lockdown		
Size	1 (small)	10	7%	1 (small)	0	0%
	2	8	6%	2	3	3%
	3	14	10%	3	7	7%
	4 (adequate)	65	47%	4 (adequate)	29	31%
	5	29	21%	5	17	18%
	6	8	6%	6	27	28%
	7 (large)	5	4%	7 (large)	12	13%
	Experience of dwelling size during lockdown			Experience of dwelling size during lockdown		
	1 (small)	23	17%	1 (small)	4	4%
	2	24	17%	2	11	12%
	3	26	19%	3	14	15%
	4 (adequate)	39	28%	4 (adequate)	22	23%
	5	20	14%	5	18	19%
	6	5	4%	6	14	15%
	7 (large)	2	1%	7 (large)	12	13%
	Change			Change		
	-4	0	0%	-4	1	1%
	-3	8	6%	-3	6	6%
	-2	31	22%	-2	16	17%
	-1	33	24%	-1	16	17%
	0	58	42%	0	48	51%
	1	6	4%	1	6	6%
	2	3	2%	2	2	2%

		n	%			n	%
Living Areas	Organization			Living Area Arrangement			
	DK	59	42%	DK	20	21%	
	LR+DK	18	13%	LR+D+K	4	4%	
	Grouped	7	5%	Grouped	3	3%	
	Separate	11	8%	Separate	1	1%	
	LR+K	41	30%	LR+DK	50	53%	
	Grouped	29	21%	Grouped	32	34%	
	Separate	12	9%	Separate	18	19%	
	N/A	21	15%	LR+K	18	19%	
				Grouped	13	14%	
			Separate	5	5%		
	Size			Size			
	Small Kitchen	50	36%	Small Kitchen	16	17%	
	Space for Guests			Space for Guests			
Bedrooms	Number of Bedrooms			Number of Bedrooms			
	Studio	4	3%	Studio	0	0%	
	1 Bedroom	56	40%	1 Bedroom	4	4%	
	2 Bedrooms	54	23%	2 Bedrooms	20	21%	
	3 Bedrooms	21	9%	3 Bedrooms	33	35%	
	4 Bedrooms	3	1%	4 Bedrooms	21	22%	
	More than 4 bedrooms	1	0%	More than 4 bedrooms	17	18%	
	Having a Small Room	15	6%	Having a Small Room	15	16%	
Availability of space	Having Enough Storage	78	56%	Having Enough Storage	68	72%	
	Dedicated workspace (before lockdown)	55	40%	Dedicated workspace (before lockdown)	61	64%	
	Shared Bedroom	6	4%	Shared Bedroom	11	12%	
	Extra Room	33	24%	Extra Room	61	64%	
	No Changes in Lockdown	64	46%	No Changes in Lockdown	43	45%	
	Availability of space for activities	48	35%	Availability of space for activities	39	41%	
	Availability for isolation	32	23%	Availability for isolation	33	35%	
	Changes during lockdown	75	54%	Changes during lockdown	52	55%	
	Limiting Changes in Lockdown	44	32%	Limiting Changes in Lockdown	22	23%	
Changes Made	Do you use your home as laid out when you moved into the home?	107	77%	Do you use your home as laid out when you moved into the home?	56	59%	
	Do you use the living room and/or bedrooms as intended in the original design of the home if you are familiar with this?	106	76%	Do you use the living room and/or bedrooms as intended in the original design of the home if you are familiar with this?	70	74%	

	n	%		n	%
Household Living with other unrelated adults	23	17%	Living with other unrelated adults	10	11%
Living with partner/spouse and unrelated adults	3	2%	Living with partner/spouse and unrelated adults	1	1%
Living with partner/spouse and with dependent children	18	13%	Living with partner/spouse and with dependent children	36	38%
Living with partner/spouse and with no children	71	51%	Living with partner/spouse and with no children	28	30%
Living with partner/spouse and with non-dependent children	3	2%	Living with partner/spouse and with non-dependent children	6	6%
Lone parent with dependent children	2	1%	Lone parent with dependent children	5	5%
Lone parent with non-dependent children	2	1%	Lone parent with non-dependent children	3	3%
One-person household	17	12%	One-person household	5	5%

Bibliography

- Adams, David, Robert Croudace, and Steve Tiesdell. 'Design Codes, Opportunity Space, and the Marketability of New Housing'. *Environment and Planning B: Planning and Design* 38, no. 2 (2009): 289–306. <https://doi.org/10.1068/b36055>.
- — —. 'Exploring the “Notional Property Developer” as a Policy Construct'. *Urban Studies* 49, no. 12 (2012): 2577–96. <https://doi.org/10.1177/0042098011431283>.
- Adams, David, and Sarah Payne. 'Business as Usual? - Exploring the Design Response of UK Speculative Housebuilders to the Brownfield Development Challenge'. In *Urban Design in the Real Estate Development Process*, edited by Steve Tiesdell and David Adams, 199–218. Oxford: Blackwell, 2011. <https://doi.org/10.1002/9781444341188.ch10>.
- Adams, David, and Steve Tiesdell. *Shaping Places: Urban Planning Design and Development*. Oxon: Routledge, 2012.
- Adams, David, and Steven Tiesdell. 'Planners as Market Actors: Rethinking State–Market Relations in Land and Property'. *Planning Theory & Practice* 11, no. 2 (2010): 187–207. <https://doi.org/10.1080/14649351003759631>.
- Allerton, R.J. 'The Reconditioning of Housing Property'. *Journal of the Royal Sanitary Institute* 74, no. 9 (1954): 827–35. <https://doi.org/10.1177/146642405407400903>.
- Allon, Fiona, and Guy Redden. 'The Global Financial Crisis And The Culture Of Continual Growth'. *Journal of Cultural Economy* 5, no. 4 (2012): 375–90. <https://doi.org/10.1080/17530350.2012.703143>.
- Anderson, Ben, and John Wylie. 'On Geography and Materiality'. *Environment and Planning A* 41, no. 2 (2006): 318–35. <https://doi.org/10.1068/a3940>.
- Appadurai, Arjun. *The Social Life of Things: Commodities in a Cultural Perspective*. Cambridge: Cambridge University Press, 1986.
- Architecture for London. 'How Much Does a House Extension Cost in London in 2019?'. Architecture for London, February 21, 2017. <https://architectureforlondon.com/news/house-extension-costs-in-london/>.
- Attfield, Judith. 'Moving Home: Changing Attitudes to Residence and Identity'. *The Journal of Architecture* 7, no. 3 (2002): 249–62. <https://doi.org/10.1080/13602360210155447>.
- Attfield, Judy. 'Bringing Modernity Home: Open Plan in the British Domestic Interior'. In *At Home: An Anthropology of Domestic Space*, edited by Irene Cieraad. Syracuse, NY: Syracuse University Press, 1999. https://www.scribd.com/embeds/337492399/content?start_page=1&view_mode=scroll&access_key=key-DXFMtVntRav5tItoCCWR.
- Aymonino, Carlo, ed. *L'Abitazione Rationale: Atti Dei Congressi CIAM 1929-1930*. Padova: Marsilio Editori, 1971.
- Baddeley, Maggie, and Merlin Tolley. 'Planning and Design Quality: Creating Places Where We Want to Live, Work and Spend Time'. London: Royal Town Planning Institute, 2019.

- Bafna, Sonit. 'Space Syntax'. *Environment and Behavior* 35, no. 1 (2003): 17–29. <https://doi.org/10.1177/0013916502238863>.
- Ball, Michael. 'Chasing a Snail: Innovation and Housebuilding Firms' Strategies'. *Housing Studies* 14, no. 1 (1999): 9–22. <https://doi.org/10.1080/02673039982975>.
- — —. 'Spatial Regulation and International Differences in the Housebuilding Industries'. *Journal of Property Research* 30, no. 3 (2013): 189–204. <https://doi.org/10.1080/09599916.2013.791338>.
- Bardwell, William. *Healthy Homes and How to Make Them*. London: S.A. Gilbert, 1854.
- Barlow, James, and Ritsuko Ozaki. 'Achieving “Customer Focus” in Private Housebuilding: Current Practice and Lessons from Other Industries'. *Housing Studies* 18, no. 1 (2003): 87–101. <https://doi.org/10.1080/0267303032000076858>.
- Barratt, Caroline, and Gill Green. 'Making a House in Multiple Occupation a Home: Using Visual Ethnography to Explore Issues of Identity and Well-Being in the Experience of Creating a Home Amongst HMO Tenants'. *Sociological Research Online* 22, no. 1 (2017): 95–112. <https://doi.org/10.5153/sro.4219>.
- Bate, Bronwyn. 'Making a Home in the Private Rental Sector'. *International Journal of Housing Policy*, 2020, 1–23. <https://doi.org/10.1080/19491247.2020.1851633>.
- — —. 'Understanding the Influence Tenure Has on Meanings of Home and Homemaking Practices'. *Geography Compass* 12, no. 1 (2018): e12354. <https://doi.org/10.1111/gec3.12354>.
- Bauer, Catherine. *Modern Housing*. Boston; New York: Houghton Mifflin Company, 1934.
- Beaumont, Caitríona. "'Where to Park the Pram"? Voluntary Women's Organisations, Citizenship and the Campaign for Better Housing in England, 1928–1945'. *Women's History Review* 22, no. 1 (2013): 75–96. <https://doi.org/10.1080/09612025.2012.724915>.
- Becker, Howard S. *Tricks of the Trade: How to Think of Your Research While You're Doing It*. Chicago: Chicago University Press, 1998.
- Benrachi, Bouba, and Samir Lezzar. 'The Impact of Building Modifications on Algerian Social Collective Housing'. *International Journal of Urban Sustainable Development* 6, no. 1 (2013): 123–32. <https://doi.org/10.1080/19463138.2013.780176>.
- Bentley, Ian. *Urban Transformations: Power, People and Urban Design*. London: Routledge, 1999.
- Bergan, Tegan L., Andrew Gorman-Murray, and Emma R. Power. 'Coliving Housing: Home Cultures of Precarity for the New Creative Class'. *Social & Cultural Geography*, 2020, 1–19. <https://doi.org/10.1080/14649365.2020.1734230>.
- Birdwell-Pheasant, Donna, and Denise Lawrence-Zúñiga, eds. *House Life: Space, Place and Family in Europe*. London: Bloomsbury, 1999.
- Birkbeck, David, and Julian Hart. *A New London Housing Vernacular*. Urban Design London, 2012.
- Bishop, Peter, and Lesley Williams, eds. *Design for London: Experiments in Urban Thinking*. London: UCL Press, 2020.
- Blanc, Fanny, Kath Scanlon, and Tim White. 'Living in a Denser London: How Residents See Their Homes'. London: LSE London and LSE Cities, 2020.
- Blanc, Fanny, and Tim White. 'Life in London's Changing Densities'. *Urban Geography* 41, no. 10 (2020): 1–8. <https://doi.org/10.1080/02723638.2020.1850630>.

- Blau, Eve. *The Architecture of Red Vienna, 1919-1934*. The MIT Press. Cambridge & London: MIT Press, 1999.
- Blunt, Alison, and Robyn Dowling. *Home*. London: Routledge, 2006. <https://doi.org/10.4324/9780203401354>.
- Boltanski, Luc, and Eve Chiapello. *The New Spirit of Capitalism*. Translated by Gregory Elliott. London & New York: Verso, 2005.
- Boltanski, Luc, and Laurent Thevenot. *On Justification: Economies of Worth*. Translated by Catherine Porter. Princeton Studies in Cultural Sociology. Princeton University Press, 2006.
- Bourdieu, Pierre. *Outline of a Theory of Practice*. Translated by Richard Nice. Cambridge University Press, 1977.
- Botterill, Jacqueline. 'Property Porn: An Analysis of Online Real Estate Advertising'. In *The Routledge Companion to Advertising and Promotional Culture*, edited by Matthew P. McAllister and Emily West, 326–38. New York: Routledge, 2013. <https://doi.org/10.4324/9780203071434-37>.
- Bouchez, Hilde. 'Pimp Your Home: Or Why Design Cannot Remain Exclusive – From a Consumer Perspective'. *The Design Journal* 15, no. 4 (2012): 461–77. <https://doi.org/10.2752/175630612x13437472804330>.
- Bowker, Geoffrey C, and Susan Leigh Star. *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA; London: MIT Press, 2000.
- Brand, Stewart. *How Buildings Learn: What Happens after They're Built*. London: Phoenix Illustrated, 1997.
- Bray, David. *Social Space and Governance in Urban China: The Danwei System from Origins to Reform*. Stanford, CA: Stanford University Press, 2005.
- Breadsell, Jessica K., and Gregory M. Morrison. 'Changes to Household Practices Pre- and Post-Occupancy in an Australian Low-Carbon Development'. *Sustainable Production and Consumption* 22 (2020): 147–61. <https://doi.org/10.1016/j.spc.2020.03.001>.
- Brill, Frances. 'Complexity and Coordination in London's Silvertown Quays: How Real Estate Developers (Re)Centred Themselves in the Planning Process'. *Environment and Planning A: Economy and Space* 52, no. 2 (2020): 362–82. <https://doi.org/10.1177/0308518x19860159>.
- Brill, Frances, and Daniel Durrant. 'The Emergence of a Build to Rent Model: The Role of Narratives and Discourses'. *Environment and Planning A: Economy and Space*, 2021, 1–18. <https://doi.org/10.1177/0308518x20969417>.
- Brunsson, Nils, and Bengt Jacobsson. *A World of Standards*. Oxford University Press, 2002.
- Brysch, Sara. 'Reinterpreting Existenzminimum in Contemporary Affordable Housing Solutions'. *Urban Planning* 4, no. 3 (2019): 326–45. <https://doi.org/10.17645/up.v4i3.2121>.
- Buchli, Victor. *An Anthropology of Architecture*. London: Bloomsbury, 2013.
- Buckley, Michelle. 'Between House and Home: Renovations Labor and the Production of Residential Value'. *Economic Geography* 95, no. 3 (2018): 209–30. <https://doi.org/10.1080/00130095.2018.1526073>.
- Building Better, Building Beautiful Commission. 'Living with Beauty: Promoting Health, Well-Being and Sustainable Growth', 2020.
- Bullock, Nicholas. 'First the Kitchen Then the Facade'. *Journal of Design History* 1, no. 3/4 (1988).

- — —. 'Plans for Post war Housing in the UK: The Case for Mixed Development and the Flat'. *Planning Perspectives* 2, no. 1 (1987): 71–98. <https://doi.org/10.1080/02665438708725632>.
- Bullock, Nicholas, and James Read. *The Movement for Housing Reform in Germany and France, 1840-1914*. Cambridge: Cambridge University Press, 2011.
- Burnett, John. *A Social History of Housing: 1815-1970*. Newton Abbot: David & Charles, 1978.
- Busch, Lawrence. *Standards: Recipes for Reality*. Infrastructures Series. MIT Press, 2011.
- Callon, Michel. 'Techno-Economic Networks and Irreversibility'. *The Sociological Review* 38, no. 1_suppl (1990): 132–61. <https://doi.org/10.1111/j.1467-954x.1990.tb03351.x>.
- Carmona, M. 'Controlling the Design of Private Sector Residential Development: An Agenda for Improving Practice'. *Environment and Planning B: Planning and Design* 26, no. 6 (1999): 807–33. <https://doi.org/10.1068/b260807>.
- Carmona, Matthew. '78. Design Quality, Have We Reached a Moment of National Change?'. <https://matthew-carmona.com>, February 1, 2021. <https://matthew-carmona.com/2021/02/01/78-design-quality-have-we-reached-a-moment-of-national-change/>.
- — —. 'Design Coding and the Creative, Market and Regulatory Tyrannies of Practice'. *Urban Studies* 46, no. 12 (2009): 2643–67. <https://doi.org/10.1177/0042098009344226>.
- — —. 'Design Governance: Theorizing an Urban Design Sub-Field'. *Journal of Urban Design* 21, no. 6 (2016): 1–26. <https://doi.org/10.1080/13574809.2016.1234337>.
- — —. 'Place Value: Place Quality and Its Impact on Health, Social, Economic and Environmental Outcomes'. *Journal of Urban Design* 24, no. 1 (2018): 1–48. <https://doi.org/10.1080/13574809.2018.1472523>.
- — —. 'The Formal and Informal Tools of Design Governance'. *Journal of Urban Design* 22, no. 1 (2016): 1–36. <https://doi.org/10.1080/13574809.2016.1234338>.
- Carmona, Matthew, Amer Alwarea, Valentina Giordano, Anastassia Gusseinova, and Fola Olaleye. 'A Housing Design Audit for England'. London: Place Alliance, 2020.
- Carmona, Matthew, Sarah Carmona, and Nick Gallent. *Delivering New Homes: Processes, Planners and Providers*. London: Routledge, 2003.
- Carmona, Matthew, Claudio de Magalhães, and Lucy Natarajan. *Design Governance: The CABE Experiment*, n.d.
- Carr, C. M. H., and J. W. R. Whitehand. *Twentieth-Century Suburbs : A Morphological Approach*. London: Taylor & Francis, 2001.
- Carr, Chantel, Chris Gibson, and Carol Farbotko. 'Of Bricks And Glass: Learning to Accommodate the Everyday Rhythms of Home'. *Home Cultures* 14, no. 3 (2018): 1–17. <https://doi.org/10.1080/17406315.2018.1507788>.
- Cass, Noel. 'Interview Data Demand Project 3.2'. Lancaster University Research Directory, 2016. <https://doi.org/10.17635/lancaster/researchdata/108>.
- Cass, Noel, and Elizabeth Shove. 'Standards? Whose Standards?'. *Architectural Science Review* 61, no. 5 (2018): 1–8. <https://doi.org/10.1080/00038628.2018.1502158>.
- Chadwick, Edwin. *Report to Her Majesty's Principal Secretary of State for the Home Department from the Poor Law Commissioners, on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain*. London: HMSO, 1842.

- Chapman, Tony. 'There's No Place Like Home'. *Theory, Culture & Society* 18, no. 6 (2001): 135–46. <https://doi.org/10.1177/02632760122052084>.
- Chapman, Tony, and Jenny Hockey, eds. *Ideal Homes?: Social Change and the Experience of the Home*. London: Routledge, 1999. <https://doi.org/10.4324/9780203029138>.
- Cheung, Sidney C. H., and Eric K. W. Ma. 'Advertising Modernity: Home, Space and Privacy 1'. *Visual Anthropology* 18, no. 1 (2005): 65–80. <https://doi.org/10.1080/08949460590900052>.
- Choi, Wing Yee Kimburley, Annie HN Chan, and Anita KW Chan. 'Producing “Luxury” Housing: Developers' Strategies and Housing Advertisements in Hong Kong (1961–2011)'. *Urban Studies* 57, no. 16 (2019): 3252–80. <https://doi.org/10.1177/0042098019896711>.
- Cieraad, Irene. "'Out of My Kitchen!' Architecture, Gender and Domestic Efficiency'. *The Journal of Architecture* 7, no. 3 (2002): 263–79. <https://doi.org/10.1080/13602360210155456>.
- — —. 'The Family Living Room: A Child's Playpen?'. *Home Cultures* 10, no. 3 (2013): 287–314. <https://doi.org/10.2752/175174213x13712175825557>.
- Clapham, David, Peter Mackie, Scott Orford, Ian Thomas, and Kelly Buckley. 'The Housing Pathways of Young People in the UK'. *Environment and Planning A* 46, no. 8 (2013): 2016–31. <https://doi.org/10.1068/a46273>.
- Clark, Vicky, Keith Tuffin, Natilene Bowker, and Karen Frewin. 'Rosters: Freedom, Responsibility, and Co operation in Young Adult Shared Households'. *Australian Journal of Psychology* 71, no. 3 (2019): 232–40. <https://doi.org/10.1111/ajpy.12238>.
- Clark, Vicky, Keith Tuffin, Karen Frewin, and Natilene Bowker. 'Shared Housing among Young Adults: Avoiding Complications in Domestic Relationships'. *Journal of Youth Studies* 20, no. 9 (2017): 1–17. <https://doi.org/10.1080/13676261.2017.1316834>.
- Clark, William A V, and Youqin Huang. 'The Life Course and Residential Mobility in British Housing Markets'. *Environment and Planning A* 35, no. 2 (2002): 323–39. <https://doi.org/10.1068/a3542>.
- Clifford, Ben. 'British Local Authority Planners, Planning Reform and Everyday Practices within the State'. *Public Policy and Administration*, no. Decentred State (2020): 1–21. <https://doi.org/10.1177/0952076720904995>.
- Cohen, Jean-Louis. *Architecture in Uniform: Designing and Building for the Second World War*. Montreal: Canadian Centre for Architecture; Editions Hazan, 2011.
- Commission for Architecture and the Built Environment. 'Housing Audit: Assessing the Design Quality of New Homes Housing in the East Midlands, West Midlands and the South West'. London: Commission for Architecture and the Built Environment, 2007.
- Committee, Central Housing Advisory. 'Design of Dwellings: Report of the Design of Dwellings Subcommittee of the Central Housing Advisory Committee Appointed by the Minister of Health and Report of a Study Group of the Ministry of Town and Country Planning on Site Planning and Layout in Relation to Housing'. London: HMSO, 1944.
- Cook, Nicole, Susan J. Smith, and Beverley A. Searle. 'Debted Objects: Homemaking in an Era of Mortgage-Enabled Consumption'. *Housing, Theory and Society* 30, no. 3 (2013): 1–19. <https://doi.org/10.1080/14036096.2013.767280>.
- Cooper, Adam Elliott, Phil Hubbard, and Loretta Lees. 'Sold out? The Right-to-Buy, Gentrification and Working-Class Displacements in London'. *The Sociological Review* 68, no. 6 (2020): 1354–69. <https://doi.org/10.1177/0038026120906790>.

- Council, London County. *Housing of the Working Classes in London*. London: London County Council, 1913.
- — —. *Housing: With Particular Reference to Post-War Housing Schemes*. London: London County council, 1928.
- Cowan, Dave, Helen Carr, and Alison Wallace. *Ownership, Narrative, Things*. London: Palgrave Macmillan, 2018.
- Cowan, Dave, and Barbara Hardy. 'Regulating Home: A Case Study'. *Housing, Theory and Society* 37, no. 5 (2019): 1–18. <https://doi.org/10.1080/14036096.2019.1683066>.
- Crewe, Lousie, Nicky Gregson, and Alan Metcalfe. 'The Screen and the Drum: On Form, Function, Fit and Failure in Contemporary Home Consumption'. *Design and Culture* 1, no. 3 (2015): 307–28. <https://doi.org/10.1080/17547075.2009.11643293>.
- Crook, Tony, John Henneberry, and Christine Whitehead. *Planning Gain*. Chichester: John Wiley & Sons, 2016.
- Crosby, Mark. 'Space Standards for Homes'. London: Royal Institute of British Architects, 2015.
- Crosby, Neil, and Peter Wyatt. 'What Is a “Competitive Return” to a Landowner? Parkhurst Road and the New UK Planning Policy Environment'. *Journal of Property Research* 36, no. 4 (2019): 1–20. <https://doi.org/10.1080/09599916.2019.1690028>.
- Crow, Graham. 'Home and Family, Creating the Domestic Sphere'. In *Home and Family*, edited by Graham Crow and Graham Allan, 14–32. London: Palgrave Macmillan, 1989. https://doi.org/10.1007/978-1-349-20386-4_2.
- Cupers, Kenny, Catharina Gabriellsson, and Helena Mattsson. *Neoliberalism on the Ground: Architecture and Transformation from the 1960s to the Present*. Pittsburgh: University of Pittsburgh Press, 2020.
- Cwerner, Saulo B, and Alan Metcalfe. 'Storage and Clutter: Discourses and Practices of Order in the Domestic World'. *Journal of Design History* 16, no. 3 (2003): 229–39. <https://doi.org/10.1093/jdh/16.3.229>.
- Darbishire, Henri. 'Artisans' and Labourers' Dwellings: The Buildings of the Peabody Trust'. *The Builder*, 1884.
- Daston, Lorraine, and Peter Galison. *Objectivity*. New York: Zone Books, 2010.
- Datta, Ayona. 'Building Differences: Material Geographies of Home(s) among Polish Builders in London'. *Transactions of the Institute of British Geographers* 33, no. 4 (2008): 518–31. <https://doi.org/10.1111/j.1475-5661.2008.00320.x>.
- Demortain, David. 'The Politics of Calculation'. *Revue d'anthropologie Des Connaissances* 13,N°4, no. 4 (2019): 973. <https://doi.org/10.3917/rac.045.0973>.
- Dennis, Richard. 'The Geography of Victorian Values: Philanthropic Housing in London, 1840–1900'. *Journal of Historical Geography* 15, no. 1 (1989): 40–54. [https://doi.org/10.1016/s0305-7488\(89\)80063-5](https://doi.org/10.1016/s0305-7488(89)80063-5).
- Department for Communities & Local Government. 'English Housing Survey: HOMES - Annual Report on England's Housing Stock, 2011'. London: Department for Communities and Local Government, 2013.
- Department for Communities and Local Government. *Technical Housing Standards – Nationally Described Space Standard*. London: HMSO, 2015.
- Design for London. *London Housing Design Guide*. London: London Development Agency, 2010.

- Desrosières, Alain. *The Politics of Large Numbers: A History of Statistical Reasoning*. Harvard University Press, 1998.
- Disraeli, Benjamin. *Tancred or, The New Crusade*. The Project Gutenberg, 2006.
- Doling, John, and Richard Ronald. 'Home Ownership and Asset-Based Welfare'. *Journal of Housing and the Built Environment* 25, no. 2 (2010): 165–73. <https://doi.org/10.1007/s10901-009-9177-6>.
- Doucet, Isabelle, and Kenny Cupers. 'Agency in Architecture: Reframing Criticality in Theory and Practice', *Footprint*, no. Spring 2009 (2009): 1–6. <https://doi.org/10.7480/footprint.3.1.694>.
- Dowling, Robyn. 'Accommodating Open Plan: Children, Clutter, and Containment in Suburban Houses in Sydney, Australia'. *Environment and Planning A* 40, no. 3 (2006): 536–49. <https://doi.org/10.1068/a39320>.
- Drury, Andrew, and Eleanor Somers. 'Room to Swing A Cat'. HATC Ltd, 2010. https://www.hatc.co.uk/wp-content/uploads/room_to_swing_a_cat.pdf.
- Dyos, Harold James. 'The Slums of Victorian London'. *Victorian Studies* 11, no. 1 (1967): 5–40.
- — —. 'The Speculative Builders and Developers of Victorian London'. *Victorian Studies*, Supplement: Symposium on the Victorian City (2), 11 (1968): 641–90.
- Easthope, Hazel. 'A Place Called Home'. *Housing, Theory and Society* 21, no. 3 (2004): 128–38. <https://doi.org/10.1080/14036090410021360>.
- Elizabeth, Darling. 'Class, Sexuality and Home in Interwar London'. In *Sexuality and Gender at Home: Experience, Politics, Transgression*, edited by Brent Pilkey, Rachael M. Scicluna, Ben Campkin and Barbara Penner, and Barbara Penner, 19–34. London: Bloomsbury Academic, 2017.
- Emmons, Paul, and Andreea Mihalache. 'Architectural Handbooks and the User Experience'. In *Use Matters: An Alternative History of Architecture*, edited by Kenny Cupers, 35–50. Oxon: Routledge, 2013.
- Espeland, Wendy Nelson, and Mitchell L Stevens. 'Commensuration as a Social Process'. *Annual Review of Sociology* 24, no. 1 (1998): 313–43. <https://doi.org/10.1146/annurev.soc.24.1.313>.
- Evans, Alan W. "'Rabbit Hutches on Postage Stamps": Planning, Development and Political Economy'. *Urban Studies* 28, no. 6 (1991): 853–70. <https://doi.org/10.1080/00420989120081091>.
- Evans, Robin. 'Rookeries and Model Dwellings: English Housing Reform and the Moralities of Private Space'. In *Translations from Drawing to Building and Other Essays*, by Robin Evans, 93–118. London: Architectural Association, 1997.
- Faulconbridge, James, Noel Cass, and John Connaughton. 'How Market Standards Affect Building Design: The Case of Low Energy Design in Commercial Offices'. *Environment and Planning A: Economy and Space* 50, no. 3 (2018): 627–50. <https://doi.org/10.1177/0308518x17752681>.
- Femenias, Paula, and Faustine Geromel. 'Adaptable Housing? A Quantitative Study of Contemporary Apartment Layouts That Have Been Rearranged by End-Users'. *Journal of Housing and the Built Environment* 35, no. 2 (2020): 481–505. <https://doi.org/10.1007/s10901-019-09693-9>.
- Ferm, Jessica, Ben Clifford, Patricia Canelas, and Nicola Livingstone. 'Emerging Problematics of Deregulating the Urban: The Case of Permitted Development in England'. *Urban Studies*, 2020, 004209802093696. <https://doi.org/10.1177/0042098020936966>.

- 'Fifth Annual Report of the Registrar General of Births, Deaths, and Marriages, in England'. London: HMSO, 1843.
- Finlay, Stephen, Isabella Pereira, Ella Fryer-Smith, Anne Charlton, and Rebecca Roberts-Hughes. 'The Way We Live Now: What People Need and Expect from Their Homes'. Ipsos Mori and RIBA, 2012.
- Fischer, Jan, and Simon Guy. 'Re-Interpreting Regulations: Architects as Intermediaries for Low-Carbon Buildings'. *Urban Studies* 46, no. 12 (2009): 2577–94. <https://doi.org/10.1177/0042098009344228>.
- Flint, John. 'Housing and Ethopolitics: Constructing Identities of Active Consumption and Responsible Community'. *Economy and Society* 32, no. 4 (2003): 611–29. <https://doi.org/10.1080/0308514032000107628>.
- Flint, John, and Rob Rowlands. 'Commodification, Normalisation and Intervention: Cultural, Social and Symbolic Capital in Housing Consumption and Governance'. *Journal of Housing and the Built Environment* 18, no. 3 (2003): 213–32. <https://doi.org/10.1023/a:1025113329508>.
- Foucault, Michel. *The Order of Things*. Routledge Classics. London and New York: Routledge, 2002.
- Franklin, Bridget J. 'Discourses of Design: Perspectives on the Meaning of Housing Quality and 'Good' Housing Design'. *Housing, Theory and Society* 18, no. 1–2 (2001): 79–92. <https://doi.org/10.1080/140360901750424789>.
- Frederick, Christine. *Household Engineering: Scientific Management in the Home*. Chicago: American School of Home Economics, 1923.
- — —. *The New Housekeeping: Efficiency Studies in Home Management*. Garden City: Doubleday, Page & Company, 1914.
- Galison, Peter. 'Aufbau/Bauhaus: Logical Positivism and Architectural Modernism'. *Critical Inquiry* 16, no. 4 (1990): 709–52. <https://doi.org/10.1086/448557>.
- Galison, Peter, and Emily Thompson. *The Architecture of Science*. Cambridge, MA: The MIT Press, 1999.
- Gallent, Nick, Dan Durrant, and Neil May. 'Housing Supply, Investment Demand and Money Creation: A Comment on the Drivers of London's Housing Crisis'. *Urban Studies* 54, no. 10 (2017): 2204–16. <https://doi.org/10.1177/0042098017705828>.
- Gallent, Nick, Manuela Madeddu, and Alan Mace. 'Internal Housing Space Standards in Italy and England'. *Progress in Planning* 74, no. 1 (2010): 1–52. <https://doi.org/10.1016/j.progress.2010.04.001>.
- Gatliff, Charles. 'On Improved Dwellings and Their Beneficial Effect on Health and Morals, with Suggestions for Their Extension'. *Journal of the Statistical Society of London* 38, no. 1 (1875): 33–63.
- Gieryn, Thomas. 'What Buildings Do'. *Theory and Society* 31, no. 1 (2002): 35–74.
- Gieryn, Thomas F. 'A Space for Place in Sociology'. *Annual Review of Sociology* 26, no. 1 (2000): 463–96. <https://doi.org/10.1146/annurev.soc.26.1.463>.
- Gilbert, Pamela K. *Mapping the Victorian Social Body*, 2004.
- Gillon, Charles. 'Under Construction: How Home-Making and Underlying Purchase Motivations Surface in a Housing Building Site'. *Housing, Theory and Society*, 2017, 1–19. <https://doi.org/10.1080/14036096.2017.1337650>.

- Gillon, Charles, and Chris Gibson. 'Calculated Homes, Stretched Emotions: Unmasking "Rational" Investor-Occupier Subjects in Large Family Homes in a Coastal Sydney Development'. *Emotion, Space and Society* 26 (2018): 23–30. <https://doi.org/10.1016/j.emospa.2018.01.001>.
- Given, Lisa M, ed. *The SAGE Encyclopedia of Qualitative Research Methods*. Thousand Oaks, CA: SAGE, 2008.
- Goodchild, Barry, and Robert Furbey. *Housing in Use: A Study of Design and Standards in the Public Sector*. PAVIC Publications Sheffield City Polytechnic Department of Education Services, 1987.
- — —. 'Standards in Housing Design: A Review of the Main Changes since the Parker Morris Report (1961)'. *Land Development Studies* 3, no. 2 (1986): 79–99. <https://doi.org/10.1080/02640828608723903>.
- Gorman-Murray, Andrew, and Ruth Lane, eds. *Material Geographies of Household Sustainability*. London: Routledge, 2011.
- Government, Ministry of Housing and Local. *Design Bulletin 6: Space in the Home*. London: HMSO, 1963.
- — —. *Homes for Today and Tomorrow*. H M Stationery Office, 1961.
- Government, UK. 'Rent a Room in Your Home: The Rent a Room Scheme'. gov.uk, n.d. <https://www.gov.uk/rent-room-in-your-home/the-rent-a-room-scheme>.
- Graham, Stephen. 'Luxified Skies: How Vertical Urban Housing Became an Elite Preserve'. *City* 19, no. 5 (2015): 618–45. <https://doi.org/10.1080/13604813.2015.1071113>.
- Gram-Hanssen, Kirsten. 'Consuming Technologies – Developing Routines'. *Journal of Cleaner Production* 16, no. 11 (2008): 1181–89. <https://doi.org/10.1016/j.jclepro.2007.08.006>.
- Gram Hanssen, Kirsten, and Claus Bech Danielsen. 'House, Home and Identity from a Consumption Perspective'. *Housing, Theory and Society* 21, no. 1 (2004): 17–26. <https://doi.org/10.1080/14036090410025816>.
- Greater London Council Department of Architecture and Civic Design. *GLC Preferred Dwelling Plans*. London: Architectural Press, n.d.
- Green, Jo. 'Maximising Yield in Build to Rent Properties'. Fixflo, 2019. <https://www.fixflo.com/blog/maximising-yield-in-build-to-rent-properties>.
- Greenstein, Anat, Erica Burman, Afroditi Kalambouka, and Kate Sapin. 'Construction and Deconstruction of "Family" by the "Bedroom Tax"'. *British Politics* 11, no. 4 (2016): 508–25. <https://doi.org/10.1057/s41293-016-0033-5>.
- Gregson, Nicky. *Living with Things: Ridding, Accommodation, Dwelling*. Wantage: Sean Kingston Publishing, 2007.
- Gromark, Sten, Eli Støa, Mervi Ilmonen, and Katrin Paadam. *Ways of Residing in Transformation*, 2015. <https://doi.org/10.4324/9781315545738>.
- Guillén, Mauro F. *The Taylorized Beauty of the Mechanical: Scientific Management and the Rise of Modernist Architecture*. Princeton; Oxford: Princeton University Press, 2008.
- Gurney, Craig M. 'Pride and Prejudice: Discourses of Normalisation in Public and Private Accounts of Home Ownership'. *Housing Studies* 14, no. 2 (1999): 163–83. <https://doi.org/10.1080/02673039982902>.

- Hacking, Ian. 'Biopower and the Avalanche of Printed Numbers'. *Humanities in Society* 5, no. 3–4 (January 1, 1982): 279–95.
- — —. 'Biopower and the Avalanche of Printed Numbers'. *Humanities in Society* 5, no. 3–4 (January 1, 1982): 279–95.
- — —. 'Making Up People'. *London Review of Books* 28, no. 16 (2017). <https://www.lrb.co.uk/the-paper/v28/n16/ian-hacking/making-up-people>.
- — —. *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge University Press, 1983.
- — —. *The Taming of Chance*. Ideas in Context. Cambridge University Press, 1990.
- Hamnett, Chris. 'Gentrification and the Middle-Class Remaking of Inner London, 1961-2001'. *Urban Studies* 40, no. 12 (2003): 2401–26. <https://doi.org/10.1080/0042098032000136138>.
- Hamnett, Chris, and Jonathan Reades. 'Mind the Gap: Implications of Overseas Investment for Regional House Price Divergence in Britain'. *Housing Studies* 34, no. 3 (2018): 1–19. <https://doi.org/10.1080/02673037.2018.1444151>.
- Hamnett, Chris, and Drew Whitelegg. 'Loft Conversion and Gentrification in London: From Industrial to Postindustrial Land Use'. *Environment and Planning A* 39 (2007): 106–24. <https://doi.org/10.1068/a38474>.
- Hamraie, Aimi. *Building Access: Universal Design and the Politics of Disability*. University of Minnesota Press, 2017.
- Hand, Martin, and Elizabeth Shove. 'Orchestrating Concepts: Kitchen Dynamics and Regime Change in Good Housekeeping and Ideal Home, 1922–2002'. *Home Cultures* 1, no. 3 (2004): 235–56. <https://doi.org/10.2752/174063104778053464>.
- Hand, Martin, Elizabeth Shove, and Dale Southerton. 'Home Extensions in the United Kingdom: Space, Time, and Practice'. *Environment and Planning D: Society and Space* 25, no. 4 (2005): 668–81. <https://doi.org/10.1068/d413t>.
- Hansen, Jason D. *Mapping the Germans: Statistical Science, Cartography, and the Visualization of the German Nation, 1848-1914*. Oxford Studies in Modern Europ. Oxford University Press, 2015.
- Hanson, Julienne. *Decoding Homes and Houses*. Cambridge university press, 2003.
- Harper, Claire. 'Density: Objective Measure or Critical Tool of the Neoliberal Agenda?'. *Footprint* 13, no. 1 (2019).
- Harris, Ella. 'Compensatory Cultures: Post -2008 Climate Mechanisms for Crisis Times'. *New Formations* 99, no. 99 (2019): 66–87. <https://doi.org/10.3898/newf:99.04.2019>.
- Harris, Ella, and Mel Nowicki. "'GET SMALLER"? Emerging Geographies of Micro living'. *Area* 52, no. 3 (2020): 591–99. <https://doi.org/10.1111/area.12625>.
- Harrison, Malcolm. 'Defining Housing Quality and Environment: Disability, Standards and Social Factors'. *Housing Studies* 19, no. 5 (2004): 691–708. <https://doi.org/10.1080/0267303042000249152>.
- Harvey, David. *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change*. Wiley, 1992.
- Haurant, Sandra. 'Is It Better to Move or Extend Your Home?'. *The Guardian*, February 15, 2013. <https://www.theguardian.com/money/2013/feb/15/extending-your-house-moving-2013>.

- Heath, Sue. 'Balancing the Formal and the Informal: The Relational Challenges of Everyday Practices of Co-Operation in Shared Housing Co-Operatives in the UK'. *Social & Cultural Geography*, 2020, 1–18. <https://doi.org/10.1080/14649365.2020.1757138>.
- Heath, Sue, and Elizabeth Cleaver. *Young, Free and Single?: Twenty-Somethings and Household Change*. Basingstoke: Palgrave Macmillan, 2003.
- Heath, Sue, and Liz Kenyon. 'Single Young Professionals and Shared Household Living'. *Journal of Youth Studies* 4, no. 1 (2010): 83–100. <https://doi.org/10.1080/13676260120028565>.
- Heath, Sue, and Rachael Scicluna. 'Putting up (with) the Paying Guest: Negotiating Hospitality and the Boundaries of the Commercial Home in Private Lodging Arrangements'. *Families, Relationships and Societies* 9, no. 3 (2020): 399–415. <https://doi.org/10.1332/204674319x15592181073147>.
- Heckmann, Oliver, and Friederike Schneider, eds. *Floor Plan Manual: Housing*. Boston: Birkhäuser, 2017.
- Henderson, Susan R. 'Rationalization Takes Command: Zeilenbau and the Politics of CIAM'. In *Building Culture: Ernst May and the Frankfurt Initiative, 1926-1931*, by Susan R Henderson, 397–446. Bern, Frankfurt, London, New York: Peter Lang, 2013.
- Henriques, Ursula Ruth Quixano. *Before the Welfare State: Social Administration in Early Industrial Britain*. Themes in British Social History. New York; London: Longman, 1979.
- Heynen, Hilde. *Architecture and Modernity: A Critique*. Cambridge: The MIT Press, 1999.
- — —. 'Space as Receptor, Instrument or Stage: Notes on the Interaction Between Spatial and Social Constellations'. *International Planning Studies* 18, no. 3–4 (2013): 342–57. <https://doi.org/10.1080/13563475.2013.833729>.
- Hillier, Bill, and Julienne Hanson. *The Social Logic of Space*. Cambridge: Cambridge University Press, 1984.
- Hinchcliffe, Tanis. "'This Rather Foolish Piece of Panic Administration" The Government's Flat Conversion Programme in London 1919'. *The London Journal* 19, no. 2 (2013): 168–82. <https://doi.org/10.1179/ldn.1994.19.2.168>.
- Hoaglin, David C, Frederick Mosteller, and John W Tukey. *Understanding Robust and Exploratory Data Analysis*. New York: John Wiley & Sons, 1983.
- Hochhaeusl, Sophie. 'From Vienna to Frankfurt Inside Core-House Type 7: A History of Scarcity through the Modern Kitchen'. *Architectural Histories* 1, no. 1 (2013): Art. 24. <https://doi.org/10.5334/ah.aq>.
- Hole, W V, and J J Attenburrow. *Houses and People: A Review of User Studies at the Building Research Station*. London: Ministry of Technology Building Research Station, 1966.
- Holston, James. *The Modernist City: An Anthropological Critique of Brasilia*. Chicago and London: The University of Chicago Press, 1989.
- Hooper, Alan, and Chris Nicol. 'Design Practice and Volume Production in Speculative Housebuilding'. *Construction Management and Economics* 18, no. 3 (2000): 295–310. <https://doi.org/10.1080/014461900370663>.
- — —. 'The Design and Planning of Residential Developmet: Standard House Types in the Speculative Housebuilding Industry'. *Environment and Planning B: Planning and Design* 26, no. 6 (1999): 793–805. <https://doi.org/10.1068/b260793>.

- Hosey, Lance. 'Hidden Lines: Gender, Race, and the Body in Graphic Standards'. *Journal of Architectural Education* 55, no. 2 (2001): 101–12. <https://doi.org/10.1162/104648801753199527>.
- Hubbard, Philip, Jon Reades, and Hendrik Walter. 'Housing: Shrinking Homes, COVID-19 and the Challenge of Homeworking'. *Town Planning Review* 92, no. 1 (2021): 3–10. <https://doi.org/10.3828/tpr.2020.46>.
- Hui, Allison, Theodore Schatzki, and Elizabeth Shove. 'The Nexus of Practices', 2016. <https://doi.org/10.4324/9781315560816>.
- Hurdley, Rachel. 'Dismantling Mantelpieces: Narrating Identities and Materializing Culture in the Home'. *Sociology* 40, no. 4 (2006): 717–33. <https://doi.org/10.1177/0038038506065157>.
- Huuhka, Satu, and Sini Saarimaa. 'Adaptability of Mass Housing: Size Modification of Flats as a Response to Segregation'. *International Journal of Building Pathology and Adaptation* 36, no. 4 (2018): 408–26. <https://doi.org/10.1108/ijbpa-01-2018-0011>.
- Imeson, Sophia. 'Let Your Spare Room Pay the Bills'. *Financial Times*, April 8, 2016. <https://www.ft.com/content/43efdf1e-fc9f-11e5-b5f5-070dca6d0a0d>.
- Imrie, Rob. 'Housing Quality and the Provision of Accessible Homes'. *Housing Studies* 18, no. 3 (2010): 387–408. <https://doi.org/10.1080/02673030304240>.
- . 'Housing Quality, Disability and Domesticity'. *Housing Studies* 19, no. 5 (2004): 685–90. <https://doi.org/10.1080/0267303042000249143>.
- . 'The Interrelationships between Building Regulations and Architects' Practices'. *Environment and Planning B: Planning and Design* 34, no. 5 (2007): 925–43. <https://doi.org/10.1068/b33024>.
- . 'The Role of the Building Regulations in Achieving Housing Quality'. *Environment and Planning B: Planning and Design* 31, no. 3 (2003): 419–37. <https://doi.org/10.1068/b3056>.
- 'Introduction'. *Journal of the Statistical Society of London* 1, no. 1 (1838): 1–5. <https://doi.org/10.2307/2337849>.
- Jackson, Neil. 'Built to Sell: The Third Rate Speculative House in London'. St John's College, Oxford, 2016.
- . 'Views with a Room: Taxation and the Return of the Bay Window to the Third Rate Speculative Houses of Nineteenth-Century London'. *Construction History* 8 (1992): 55–67.
- Jacobs, Jane M. 'A Geography of Big Things'. *Cultural Geographies* 13, no. 1 (2006): 1–27. <https://doi.org/10.1191/1474474006eu354oa>.
- Jacobs, Jane M., Stephen Cairns, and Ignaz Strebel. 'Doing Building Work: Methods at the Interface of Geography and Architecture'. *Geographical Research* 50, no. 2 (2012): 126–40. <https://doi.org/10.1111/j.1745-5871.2011.00737.x>.
- Jacobs, Jane M, and Susan J Smith. 'Living Room: Rematerialising Home'. *Environment and Planning A* 40, no. 3 (2008): 515–19. <https://doi.org/10.1068/a40357>.
- Jacoby, Sam. *Drawing Architecture and the Urban*. Chichester: Wiley, 2016.
- Jameson, Frederick. 'The Brick and the Balloon: Architecture, Idealism and Land Speculation'. *New Left Review*, no. Mar/Apr (1998).
- Jarvis, Helen. 'Moving to London Time'. *Time & Society* 14, no. 1 (2005): 133–54. <https://doi.org/10.1177/0961463x05050302>.

- — —. 'Saving Space, Sharing Time: Integrated Infrastructures of Daily Life in Cohousing'. *Environment and Planning A* 43, no. 3 (2010): 560–77. <https://doi.org/10.1068/a43296>.
- Jencks, Charles. *The Language of Post-Modern Architecture*. London: Academy Editions, 1977.
- Jerram, Leif. 'Kitchen Sink Dramas: Women, Modernity and Space in Weimar Germany'. *Cultural Geographies* 13, no. 4 (2006): 538–56. <https://doi.org/10.1191/1474474006cgj374oa>.
- Johnston, George Barnett. *Drafting Culture: A Social History of Architectural Graphic Standards*. Cambridge & London: The MIT Press, 2008.
- Jones, Alasdair. 'Everyday without Exception? Making Space for the Exceptional in Contemporary Sociological Studies of Streetlife'. *The Sociological Review* 66, no. 5 (2018): 1000–1016. <https://doi.org/10.1177/0038026118771280>.
- Kaasalainen, Tapio, and Satu Huuhka. 'Existing Apartment Buildings as a Spatial Reserve for Assisted Living'. *International Journal of Building Pathology and Adaptation* 38, no. 5 (2020): 753–69. <https://doi.org/10.1108/ijbpa-02-2020-0015>.
- Karn, Valerie, and Linda Sheridan. 'New Homes in the 1990s: A Study of Design, Space, and Amenities in Housing Association and Private Sector Housing'. Manchester & York: The University of Manchester & Joseph Rowntree Foundation, 1994.
- Kearns, G. 'Private Property and Public Health Reform in England 1830-70.'. *Social Science & Medicine* (1982), *Social Science & Medicine*, 26, no. 1 (1988): 187–99. [https://doi.org/10.1016/0277-9536\(88\)90058-5](https://doi.org/10.1016/0277-9536(88)90058-5).
- Kelly's Practical Builder's Price Book, or Safe Guide to the Valuation of All Kinds of Artificer's Work: With the Modern Practice of Measuring, and a Copious Abstract of the New Building Act, for Regulating the Construction of Buildings*. Paternoster Row: Thomas Kelly, 1852.
- Kemeny, Jim. *From Public Housing to the Social Market: Rental Policy Strategies in Comparative Perspective*. London: Routledge, 1995.
- Kerr, Sophie-May, Natascha Klocker, and Chris Gibson. 'From Backyards to Balconies: Cultural Norms and Parents' Experiences of Home in Higher-Density Housing'. *Housing Studies*, 2020, 1–23. <https://doi.org/10.1080/02673037.2019.1709625>.
- Kerwer, Dieter. 'Rules That Many Use: Standards and Global Regulation'. *Governance* 18, no. 4 (2005): 611–32. <https://doi.org/10.1111/j.1468-0491.2005.00294.x>.
- Kingma, Sytze F. 'The Constitution of "Third Workspaces" in between the Home and the Corporate Office'. *New Technology, Work and Employment* 31, no. 2 (2016): 176–93. <https://doi.org/10.1111/ntwe.12068>.
- Klein, Alexander. 'Beiträge Zur Wohnungsfrage Als Praktische Wissenschaft'. *Zeitschrift Für Bauwesen*, no. 10 (1930): 239–52.
- — —. 'Neues Verfahren Zur Untersuchung Von Kleinwohnungs-Grundrissen'. *Städtebau* 23 (1928): 16–21.
- — —. 'Tagesfragen Der Berliner Wohnungswirtschaft'. *Städtebau*, 1926, 90–104.
- — —. 'Versuch Eines Graphischen Verfahrens Zur Bewertung von Kleinwohnungen'. *Wasmuths Monatshefte Für Baukunst* 11 (1927): 296–98.
- Klocker, Natascha, Chris Gibson, and Erin Borger. 'Living Together but Apart: Material Geographies of Everyday Sustainability in Extended Family Households'. *Environment and Planning A* 44, no. 9 (2011): 2240–59. <https://doi.org/10.1068/a44594>.

- Kriese, Ulrich, and Roland W Scholz. 'Lifestyle Ideas of House Builders and Housing Investors'. *Housing, Theory and Society* 29, no. 3 (2012): 288–320. <https://doi.org/10.1080/14036096.2011.629679>.
- Lampland, Martha. 'Calculating the Social: Standards and the Reconfiguration of Governing'. *Contemporary Sociology: A Journal of Reviews* 41, no. 5 (2012): 640–41. <https://doi.org/10.1177/0094306112457769q>.
- Lampland, Martha, and Susan Leigh Star. *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life*. Ithaca: Cornell University Press, 2009.
- Landriscina, Mirella. "'Seeing the Blessings and Beauty of Real Estate: Examining How Market Professionals' Lived Space Drives Abstract Space Making'". *Social & Cultural Geography* 21, no. 8 (2018): 1–23. <https://doi.org/10.1080/14649365.2018.1535086>.
- Lane, Barbara Miller. *Architecture and Politics in Germany, 1918-1945*. Cambridge; London: Harvard University Press, 1985.
- Lara-Betancourt, Patricia, and Emma Hardy. 'Seductive Discourses: Design Advice for the Home—An Introduction'. *Interiors: Design, Architecture and Culture* 5, no. 2 (2014): 131–39. <https://doi.org/10.2752/204191214x14038639021090>.
- Latour, Bruno. *Science in Action: How to Follow Scientists and Engineers Through Society*. Harvard University Press, 1987.
- Law, John. *After Method: Mess in Social Science Research*, 2004. <https://doi.org/10.4324/9780203481141>.
- Lawrence, Denise L., and Setha M. Low. 'The Built Environment and Spatial Form'. *Annual Review of Anthropology* 19, no. 1 (1990): 453–505. <https://doi.org/10.1146/annurev.an.19.100190.002321>.
- Lawrence, Roderick J. 'Design by Legislation The Ideological Nature of House Planning in the United Kingdom, 1918–1961'. *Habitat International* 9, no. 2 (1985): 123–40. [https://doi.org/10.1016/0197-3975\(85\)90014-1](https://doi.org/10.1016/0197-3975(85)90014-1).
- — —. 'Domestic Space and Society: A Cross-Cultural Study'. *Comparative Studies in Society and History* 24, no. 1 (1982): 104–30.
- — —. 'Housing Quality: An Agenda for Research'. *Urban Studies* 32, no. 10 (January 1, 1995): 1655–64. <https://doi.org/10.1080/00420989550012294>.
- — —. 'The Comparative Analyses of Homes: Research Method and Application'. *Social Science Information* 22, no. 3 (1983): 461–85. <https://doi.org/10.1177/053901883022003006>.
- Lawrence, Roderick J. 'The Organization of Domestic Space'. *Ekistics*, January 1, 1979, 135–39.
- — —. 'The Sanitary House: An Architectural Interpretation of Health and Housing Reforms in England c. 1840–1920'. *Architectural Science Review* 26, no. 2 (1983): 39–49. <https://doi.org/10.1080/00038628.1983.9696512>.
- — —. 'The Social Classification of Domestic Space: A Cross-Cultural Case Study'. *Anthropos*, January 1, 1981, 649–64.
- — —. 'Transition Spaces and Dwelling Design'. *Journal of Architectural and Planning Research*, 1984, 261–71.
- — —. 'Translating Anthropological Concepts into Architectural Practice'. In *Housing, Culture and Design A Comparative Perspective*, edited by Setha M Low and Erve Chambers, 1989.

- Lawrence, Roderick J. 'What Makes a House a Home?'. *Environment and Behavior* 19, no. 2 (1987): 154–68. <https://doi.org/10.1177/0013916587192004>.
- Ledent, Gérald. 'Permanence to Allow Change. The Archetypal Room'. In *Architectural Research Addressing Societal Challenges: Proceedings of the EAAE ARCC 10th International Conference (EAAE ARCC 2016), 15-18 June 2016, Lisbon, Portugal*, edited by Manuel Couceiro da Costa, Filipa Roseta, Joana Pestana Lages, and Susana Couceiro da Costa, 339–44. London: CRC Press, 2017. <https://doi.org/10.1201/9781315226255-54>.
- Lees-Maffei, Grace. *Design at Home: Domestic Advice Books in Britain and the USA since 1945*. Directions in Cultural History. Oxon: Routledge, 2014. <https://doi.org/10.4324/9780203066638>.
- Lehnerer, Alex. *Grand Urban Rules*. Rotterdam: 010 Publishers, 2009.
- Leishman, Chris, Peter Aspinall, Moira Munro, and Fran J Warren. 'Preferences, Quality and Choice in New-Build Housing'. York: Joseph Rowntree Foundation, 2004.
- Leishman, Chris, and Fran Warren. 'Private Housing Design Customization through House Type Substitution'. *Construction Management and Economics* 24, no. 2 (2006): 149–58. <https://doi.org/10.1080/01446190500204754>.
- Leonard, Lorraine, Harvey Perkins, and David Thorns. 'Presenting and Creating Home: The Influence of Popular and Building Trade Print Media in the Construction of Home'. *Housing, Theory and Society* 21, no. 3 (2004): 97–110. <https://doi.org/10.1080/14036090410000480>.
- Leopold, Ellen, and Donald Bishop. 'Design Philosophy and Practice in Speculative Housebuilding: Part 1'. *Construction Management and Economics* 1, no. 2 (1983): 119–44. <https://doi.org/10.1080/01446198300000010>.
- — —. 'Design Philosophy and Practice in Speculative Housebuilding: Part 2'. *Construction Management and Economics* 1, no. 3 (1983): 233–68. <https://doi.org/10.1080/01446198300000018>.
- Leupen, Bernard. 'Polyvalence, a Concept for the Sustainable Dwelling'. *Nordic Journal of Architectural Research* 19, no. 3 (2006): 23–31.
- Liu, Chen. 'Rethinking the Timescape of Home: Domestic Practices in Time and Space'. *Progress in Human Geography*, 2020, 030913252092313. <https://doi.org/10.1177/0309132520923138>.
- Local Government Board. *Manual on the Preparation of State-Aided Housing Schemes*. London: H M Stationery Office, 1919.
- 'London Borough of Tower Hamlets Report of the Scrutiny Review Working Group on Affordable Homeownership', 2009.
- Long, Helen C. *Victorian Houses and Their Details: The Role of Publications in Their Building and Decoration*. Oxford: Architectural Press, 2002.
- Loudon, J.C. *An Encyclopaedia of Cottage, Farm, and Villa Architecture and Furniture*. London: Longman, Brown, Green, and Longmans, 1846.
- Low, Setha M., and Denise Lawrence-Zúñiga, eds. *The Anthropology of Space and Place: Locating Culture*. Malden, MA: Blackwell, 2003.
- Lu, Duanfang. *Third World Modernism: Architecture, Development and Identity*. London: Routledge, 2011.
- Lueder, Christoph. 'Evaluator, Choreographer, Ideologue, Catalyst: The Disparate Reception Histories of Alexander Klein's Graphical Method'. *Journal of the Society of Architectural Historians* 76, no. 1 (2017): 82–106. <https://doi.org/10.1525/jsah.2017.76.1.82>.

- Maalsen, Sophia. "'Generation Share': Digitalized Geographies of Shared Housing'. *Social & Cultural Geography* 21, no. 1 (2018): 1–9. <https://doi.org/10.1080/14649365.2018.1466355>.
- Madeddu, Manuela, Nick Gallent, and Alan Mace. 'Space in New Homes: Delivering Functionality and Liveability through Regulation or Design Innovation?'. *Town Planning Review* 86, no. 1 (2015): 73–95. <https://doi.org/10.3828/tpr.2015.5>.
- Madigan, Ruth, and Joanne Milner. 'Access for All: Housing Design and the Disability Discrimination Act 1995'. *Critical Social Policy* 19, no. 3 (1999): 396–409. <https://doi.org/10.1177/026101839901900307>.
- Madigan, Ruth, and Moira Munro. "'The More We Are Together': Domestic Space, Gender and Privacy'. In *Ideal Homes?: Social Change and the Experience of the Home*, edited by Tony Chapman and Jenny Hockey. London: Routledge, 1999.
- Magni, Federico, and Beatrice Manzoni. 'When Thinking inside the Box Is Good: The Nuanced Relationship between Conformity and Creativity'. *European Management Review*, 2020. <https://doi.org/10.1111/emre.12414>.
- Mallett, Shelley. 'Understanding Home: A Critical Review of the Literature'. *The Sociological Review* 52, no. 1 (2003): 62–89. <https://doi.org/10.1111/j.1467-954x.2004.00442.x>.
- Martin, Reinhold. *Utopia's Ghost: Architecture and Postmodernism, Again*. Minneapolis: University of Minnesota Press, 2010.
- May, Ernst. 'Fünf Jahre Wohnungsbautätigkeit In Frankfurt Am Main'. *Das Neue Frankfurt: Internationale Monatsschrift Für Die Probleme Kultureller Neugestaltung* 4, no. 2–3 (1930): 21–70.
- Mayor of London. *Housing Design Quality and Standards; Supplementary Planning Guidance, Module C - Pre-Consultation Draft*, 2020.
- McAllister, Pat, Edward Shepherd, and Peter Wyatt. 'Policy Shifts, Developer Contributions and Land Value Capture in London 2005–2017'. *Land Use Policy* 78 (2018): 316–26. <https://doi.org/10.1016/j.landusepol.2018.06.047>.
- McDowell, L M. 'The New Service Class: Housing, Consumption, and Lifestyle among London Bankers in the 1990s'. *Environment and Planning A* 29, no. 11 (1996): 2061–78. <https://doi.org/10.1068/a292061>.
- McMordie, Michael. 'Picturesque Pattern Books and Pre-Victorian Designers'. *Architectural History* 18 (1975): 43–59. <https://doi.org/10.2307/1568381>.
- Meah, Angela. 'Extending the Contested Spaces of the Modern Kitchen'. *Geography Compass* 10, no. 2 (2016): 41–55. <https://doi.org/10.1111/gec3.12252>.
- Meyer, Hannes. 'Building (1928)'. In *Programs and Manifestoes on 20th-Century Architecture*, edited by Ulrich Conrads, 117–20. Cambridge: The MIT Press, 1971.
- Miller, Daniel. 'Appropriating the State on the Council Estate'. *Man* 23, no. 2 (1988): 353–72. <https://doi.org/10.2307/2802810>.
- Milner, Jo, and Ruth Madigan. 'Regulation and Innovation: Rethinking "Inclusive" Housing Design'. *Housing Studies* 19, no. 5 (2004): 727–44. <https://doi.org/10.1080/0267303042000249170>.
- Ministry of Health. *Housing Manual 1944*. London: HMSO, 1944.
- — —. *Housing Manual 1949*. London: HMSO, 1949.
- — —. 'Manual on the Conversion of Houses into Flats for the Working Classes'. London: H M Stationery Office, 1919.

- Ministry of Housing and Local Government. 'Family Houses at West Ham: An Account of the Project with an Appraisal'. London: HMSO, 1969.
- Ministry of Housing, Communities & Local Government, and Robert Jenrick. "'Permitted Development' Homes to Meet Space Standards'. GOV.UK, September 30, 2020. <https://www.gov.uk/government/news/permitted-development-homes-to-meet-space-standards>.
- Ministry of Housing, Communities and Local Government. *National Planning Policy Framework: Draft Text for Consultation*. London: HMSO, 2020.
- Mitchell, Timothy. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press, 2002.
- Money, Annemarie. 'Material Culture and the Living Room'. *Journal of Consumer Culture* 7, no. 3 (2007): 355–77. <https://doi.org/10.1177/1469540507081630>.
- Montellano, Agatangelo Soler. 'Housing Flexibility by Spatial Indeterminacy: The Case of the Casa de Las Flores in Madrid'. *International Journal of Architectural Research: ArchNet-IJAR* 9, no. 2 (2015): 4–19. <https://doi.org/10.26687/archnet-ijar.v9i2.661>.
- Moody, Michael, Laurent Thevenot, and Claudette Lafaye. 'Forms of Valuing Nature: Arguments and Modes of Justification in French and American Environmental Disputes'. In *Rethinking Comparative Cultural Sociology: Repertoires of Evaluation in France and the United States*, edited by Michele Lamont and Laurent Thevenot, 229–72. Cambridge: Cambridge University Press, 2000.
- Morgan, Malcolm, and Heather Cruickshank. 'Quantifying the Extent of Space Shortages: English Dwellings'. *Building Research & Information* 42, no. 6 (2014): 710–24. <https://doi.org/10.1080/09613218.2014.922271>.
- Morris, Susannah. 'Market Solutions for Social Problems: Working-Class Housing in Nineteenth Century London'. *The Economic History Review* 54, no. 3 (2001): 525–45. <https://doi.org/10.1111/1468-0289.00202>.
- Morse, Janice M, and Linda Niehaus. *Mixed Method Design: Principles and Procedures*. London: Routledge, 2016. <https://doi.org/10.4324/9781315424538>.
- Mosselson, Aidan. 'Habitus, Spatial Capital and Making Place: Housing Developers and the Spatial Praxis of Johannesburg's Inner-City Regeneration'. *Environment and Planning A: Economy and Space* 52, no. 2 (2020): 277–96. <https://doi.org/10.1177/0308518x19830970>.
- Murphy, Laurence. 'Performing Calculative Practices: Residual Valuation, the Residential Development Process and Affordable Housing'. *Housing Studies* 35, no. 9 (2019): 1–17. <https://doi.org/10.1080/02673037.2019.1594713>.
- Murphy, Michelle. *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers*. Durham and London: Duke University Press, 2006.
- NAEA PropertyMark. "'Doer-Uppers' Spent £48 Billion on Improvements', April 1, 2019. <https://www.naea.co.uk/news/april-2019/doer-uppers-spent-48-billion-on-improvements.aspx>.
- Nasreen, Zahra, and Kristian. J. Ruming. 'Shared Room Housing and Home: Unpacking the Home-Making Practices of Shared Room Tenants in Sydney, Australia'. *Housing, Theory and Society*, 2020, 1–21. <https://doi.org/10.1080/14036096.2020.1717597>.
- Nethercote, Megan. 'Build-to-Rent and the Financialization of Rental Housing: Future Research Directions'. *Housing Studies* 35, no. 5 (2019): 1–36. <https://doi.org/10.1080/02673037.2019.1636938>.

- Neufert, Ernst, and Peter Neufert. *Architects' Data*. Translated by David Sturge. 4th ed. Chichester: Wiley-Blackwell, 2012.
- Newsholme, Arthur. 'The Vital Statistics of Peabody Buildings and Other Artisans' and Labourers' Block Dwellings'. *Journal of the Royal Statistical Society* 54, no. 1 (1891): 70–99. <https://doi.org/10.1111/j.2397-2335.1891.tb02422.x>.
- Nicholson, Peter. *The New and Improved Practical Builder*. London: Thomas Kelly, 1837.
- Nicol, Chris, and Alan Hooper. 'Contemporary Change and the Housebuilding Industry: Concentration and Standardisation in Production'. *Housing Studies* 14, no. 1 (1999): 57–76. <https://doi.org/10.1080/02673039983000>.
- Observation, Mass. *An Enquiry into People's Homes: A Report Prepared by Mass-Observation for the Advertising Service Guild, the Fourth of the "Change" Wartime Surveys*. London: J. Murray, 1943.
- O'Dell, William, Marc T Smith, and Douglas White. 'Weaknesses in Current Measures of Housing Needs'. *Housing and Society* 31, no. 1 (2004): 29–40. <https://doi.org/10.1080/08882746.2004.11430496>.
- Opit, Simon, and Robin Kearns. 'Selling a Natural Community: Exploring the Role of Representations in Promoting a New Urban Development'. *New Zealand Geographer* 70, no. 2 (2014): 91–102. <https://doi.org/10.1111/nzg.12030>.
- Ortolano, Guy. *Thatcher's Progress: From Social Democracy to Market Liberalism through an English New Town*. Cambridge: Cambridge University Press, 2019.
- Osborne, Hilary. 'Poor Doors: The Segregation of London's Inner-City Flat Dwellers'. *The Guardian*, June 25, 2014. <https://www.theguardian.com/society/2014/jul/25/poor-doors-segregation-london-flats>.
- Ozaki, Ritsuko. 'The 'front' and 'back' Regions of the English House: Changing Values and Lifestyles'. *Journal of Housing and the Built Environment* 18, no. 2 (2003): 105–27. <https://doi.org/10.1023/a:1023904826652>.
- Pader, Ellen. 'Housing Occupancy Standards: Inscribing Ethnicity and Family Relations on the Land'. *Journal of Architectural and Planning Research* 19, no. 4 (2002): 300–318.
- Pader, Ellen-J. 'Spatial Relations and Housing Policy: Regulations That Discriminate Against Mexican-Origin Households'. *Journal of Planning Education and Research* 13, no. 2 (1994): 119–35. <https://doi.org/10.1177/0739456x9401300204>.
- — —. 'Spatiality and Social Change: Domestic Space Use in Mexico and the United States'. *American Ethnologist* 20, no. 1 (1993): 114–37. <https://doi.org/10.1525/ae.1993.20.1.02a00060>.
- Pai, Hyungmin. *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America*. Cambridge, MA: MIT Press, 2002.
- Palate, Savia. 'Council Housing in the Age of Property-Owning Democracy and the Parker Morris Standards, 1960s–80s'. In *Architecture and Democracy: 1965-1989 Urban Renewal, Populism and the Welfare State*. Rotterdam: TU Delft and Het Nieuwe Instituut, 2019.
- Park, Julia. *One Hundred Years of Housing Space Standards: What Now?*, 2017. housingstandards.co.uk.
- Parvin, Alastair, David Saxby, Cristina Cerulli, and Tatjana Schneider. *A Right to Build: The next Mass-Housebuilding Industry*. The University of Sheffield School of Architecture and 00, 2011.

- Payne, Sarah. 'Pioneers, Pragmatists and Sceptics: Speculative Housebuilders and Brownfield Development in the Early Twenty-First Century'. *Town Planning Review* 84, no. 1 (2013): 37–62.
- Peck, Jamie. 'Neoliberalizing States: Thin Policies/Hard Outcomes'. *Progress in Human Geography* 25, no. 3 (2001): 445–55. <https://doi.org/10.1191/030913201680191772>.
- Peck, Jamie, Nik Theodore, and Neil Brenner. 'Neoliberal Urbanism: Models, Moments, Mutations'. *SAIS Review of International Affairs* 29, no. 1 (2009): 49–66. <https://doi.org/10.1353/sais.0.0028>.
- Pepper, Simon. 'Many Found the Faith of Architectural Determinism a Comfort as They Went about the Work of Redevelopment'. *Architectural Review*, 1977. <https://www.architectural-review.com/archive/many-found-the-faith-of-architectural-determinism-a-comfort-as-they-went-about-the-work-of-redevelopment>.
- Pertl, Maria M., and David Hevey. 'Exploratory Data Analysis'. In *Encyclopedia of Research Design*, edited by Neil J Salkind. Thousand Oaks: SAGE, 2012.
- Pilkey, Brent, Rachael M. Scicluna, and Andrew Gorman-Murray. 'Alternative Domesticities'. *Home Cultures* 12, no. 2 (2015): 127–38. <https://doi.org/10.1080/17406315.2015.1046294>.
- Pisu, Davide, and Giovanni Marco Chiri. 'Rules and the Production of Built Space: An Investigation on Compliant Nomototropism'. *City, Territory and Architecture* 6, no. 1 (2019): 5. <https://doi.org/10.1186/s40410-019-0104-1>.
- Plaut, Pnina, and Steven Plaut. 'Decisions to Renovate and to Move'. *Journal of Real Estate Research* 32, no. 4 (2020): 461–84. <https://doi.org/10.1080/10835547.2010.12091286>.
- Podkalicka, Aneta. 'Actor, Intermediary, and Context: Media in Home Renovation and Consumption Practice'. *Communication Research and Practice* 5, no. 3 (July 2019): 210–25. <https://doi.org/10.1080/22041451.2018.1507326>.
- Podkalicka, Aneta, and Esther Milne. 'Diverse Media Practices and Economies of Australian Home Renovators: Budgeting, Self-Education and Documentation'. *Continuum* 31, no. 5 (2017): 694–705. <https://doi.org/10.1080/10304312.2017.1281882>.
- Poovey, Mary. *Making a Social Body: British Cultural Formation, 1830-1864*. Chicago & London: University of Chicago Press, 1995.
- Porter, Theodore. *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton, NJ: Princeton University Press, 1995.
- Preece, Jenny, Joe Crawford, Kim McKee, John Flint, and David Robinson. 'Understanding Changing Housing Aspirations: A Review of the Evidence'. *Housing Studies* 35, no. 1 (2019): 1–20. <https://doi.org/10.1080/02673037.2019.1584665>.
- Quitau, Maj Britt, and Inge Røpke. 'The Construction of Normal Expectations: Consumption Drivers for the Danish Bathroom Boom'. *Journal of Industrial Ecology* 12, no. 2 (2008): 186–206. <https://doi.org/10.1111/j.1530-9290.2008.00017.x>.
- Rabinow, Paul. 'Colonialism, Modernity. The French in Morocco'. In *Forms of Dominance. On the Architecture and Urbanism of the Colonial Enterprise*, edited by Nezar Alsayyad, 167–82. Aldershot: Avebury, 1992.
- — —. *French Modern: Norms and Forms of the Social Environment*. Chicago: University of Chicago Press, 1989.

- Raco, Mike. 'Private Consultants, Planning Reform and the Marketisation of Local Government Finance'. In *Planning Practice: Critical Perspectives from the UK*, edited by Jessica Ferm and John Tomaney. New York: Routledge, 2018.
- Raco, Mike, Nicola Livingstone, and Daniel Durrant. 'Seeing like an Investor: Urban Development Planning, Financialisation, and Investors' Perceptions of London as an Investment Space'. *European Planning Studies* 27, no. 6 (2019): 1–19. <https://doi.org/10.1080/09654313.2019.1598019>.
- Ravetz, Alison. *Council Housing and Culture: The History of a Social Experiment*. London: Routledge, 2001.
- Ravetz, Alison, and Richard Turkington. *The Place of Home: English Domestic Environments, 1914-2000*. Abingdon: Taylor & Francis, 2011.
- Ravetz, Joe. 'State of the Stock—What Do We Know about Existing Buildings and Their Future Prospects?'. *Energy Policy* 36, no. 12 (2008): 4462–70. <https://doi.org/10.1016/j.enpol.2008.09.026>.
- Reades, Jonathan, Jordan De Souza, and Phil Hubbard. 'Understanding Urban Gentrification through Machine Learning'. *Urban Studies* 56, no. 5 (2018): 922–42. <https://doi.org/10.1177/0042098018789054>.
- Rinkinen, Jenny, and Mikko Jalas. 'Moving Home: Houses, New Occupants and the Formation of Heating Practices'. *Building Research & Information* 45, no. 3 (2016): 1–10. <https://doi.org/10.1080/09613218.2016.1143299>.
- Roberts, Henry. *H. R. H. Prince Albert's Model Houses for Families*. London: The Society for Improving the Condition of Labouring Classes, 1851.
- — —. *The Dwellings of the Labouring Classes, Their Arrangement and Construction, with the Essentials of a Healthy Dwelling*. London: The Society for Improving the Condition of Labouring Classes, 1867.
- — —. *The Essentials of a Healthy Dwelling, and the Extension of Its Benefits to the Labouring Population. with a Special Reference to the Promotion of That Object by HRH The Late Prince Consort*. London: J. Ridgway, 1862.
- Roberts-Hughes, Rebecca. 'The Case for Space: The Size of England's New Homes'. Royal Institute of British Architects, 2011.
- Robinson, Jennifer, and Katia Attuyer. 'Extracting Value, London Style: Revisiting the Role of the State in Urban Development'. *International Journal of Urban and Regional Research*, 2020. <https://doi.org/10.1111/1468-2427.12962>.
- Roger, Richard. *Housing in Urban Britain 1780-1914*. New Studies in Economic and Social History. Basingstoke: Macmillan, 1989.
- Rogers, Dallas, and Chris Gibson. 'Unsolicited Urbanism: Development Monopolies, Regulatory-Technical Fixes and Planning-as-Deal-Making'. *Environment and Planning A: Economy and Space*, 2020, 0308518X2095242. <https://doi.org/10.1177/0308518x20952421>.
- Ronald, Richard, and Justin Kadi. 'The Revival of Private Landlords in Britain's Post-Homeownership Society'. *New Political Economy* 23, no. 6 (2017): 1–18. <https://doi.org/10.1080/13563467.2017.1401055>.
- Rose, Nikolas. *Powers of Freedom: Reframing Political Thought*. Cambridge and New York: Cambridge University Press, 1999.

- Rose, Nikolas, and Peter Miller. 'Political Power beyond the State: Problematics of Government'. *The British Journal of Sociology* 61, no. s1 (2010): 271–303. <https://doi.org/10.1111/j.1468-4446.2009.01247.x>.
- Rowlands, Rob, and Craig M. Gurney. 'Young Peoples? Perceptions of Housing Tenure: A Case Study in the Socialization of Tenure Prejudice'. *Housing, Theory and Society* 17, no. 3 (2000): 121–30. <https://doi.org/10.1080/14036090051084423>.
- Ryan, Deborah Sugg. *Ideal Homes*. Manchester: Manchester University Press, 2020.
- — —. 'Living in a “Half-Baked Pageant”'. *Home Cultures* 8, no. 3 (2011): 217–44. <https://doi.org/10.2752/175174211x13099693358717>.
- Samuels, Ivor. 'Building for Life: A Recent British Attempt to Raise the Quality of Housing'. *Focus* 10, no. 1 (2013). <https://doi.org/10.15368/focus.2013v10n1.9>.
- Sassen, Saskia. *A Sociology of Globalization*. New York, NY: W W Norton & Co, 2007.
- Schiller, Mariana, and Mike Raco. 'Postcolonial Narratives and the Governance of Informal Housing in London'. *International Journal of Housing Policy*, 2020, 1–23. <https://doi.org/10.1080/019491247.2020.1840907>.
- Scott, Caroline. 'Houzz Quiz Reveals the Way We Live'. *The Sunday Times*, July 27, 2014. <https://www.thetimes.co.uk/article/houzz-quiz-reveals-the-way-we-live-jk9c63gn85s>.
- Scott, James C. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press, 1998.
- Scott, Peter. *The Making of the Modern British Home: The Suburban Semi and Family Life Between the Wars*. Oxford: Oxford University Press, 2013.
- Shove, Elizabeth. 'Converging Conventions of Comfort, Cleanliness and Convenience'. *Journal of Consumer Policy* 26, no. 4 (2003): 395–418. <https://doi.org/10.1023/a:1026362829781>.
- Shove, Elizabeth, Mika Pantzar, and Matt Watson. *The Dynamics of Social Practice: Everyday Life and How It Changes*. London: SAGE, 2012.
- Shove, Elizabeth, Gordon Walker, and Sam Brown. 'Material Culture, Room Temperature and the Social Organisation of Thermal Energy'. *Journal of Material Culture* 19, no. 2 (2014): 113–24. <https://doi.org/10.1177/1359183514525084>.
- Smith, Harry, Soledad Garcia Ferrari, and Paul Jenkins. 'The Role of Planning in Housing Design: Design Implications of Land-Use Management'. *Environment and Planning C: Government and Policy* 29, no. 3 (2010): 502–19. <https://doi.org/10.1068/c1029>.
- Smith, Paul. 'The Contested Geographies of Master Planned Estates: The Role of the Building Design Codes'. *Australian Geographer* 50, no. 2 (2018): 1–22. <https://doi.org/10.1080/00049182.2018.1520436>.
- Smith, Susan J. 'Living Room?'. *Urban Geography* 25, no. 2 (2004): 89–91. <https://doi.org/10.2747/0272-3638.25.2.89>.
- Smith, Susan J. 'Owner-Occupation: At Home with a Hybrid of Money and Materials'. *Environment and Planning A* 40, no. 3 (2005): 520–35. <https://doi.org/10.1068/a38423>.
- Star, Susan Leigh, and Karen Ruhleder. 'Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces'. *Information Systems Research* 7, no. 1 (1996): 111–34. <https://doi.org/10.1287/isre.7.1.111>.
- Steffel, R. Vladimir. 'The Boundary Street Estate: An Example of Urban Redevelopment by the London County Council, 1889-1914'. *The Town Planning Review* 47, no. 2 (1976): 161–73.

- Stevenson, Olivia, and Alan Prout. 'Space for Play?'. *Home Cultures* 10, no. 2 (2013): 135–57. <https://doi.org/10.2752/175174213x13589680718490>.
- Strebel, Ignaz. 'The Living Building: Towards a Geography of Maintenance Work'. *Social & Cultural Geography* 12, no. 3 (2011): 243–62. <https://doi.org/10.1080/14649365.2011.564732>.
- Swenarton, Mark. *Cook's Camden: The Making of Modern Housing*. London: Lund Humphries, 2017.
- — —. *Homes Fit For Heroes: The Politics and Architecture of Early State Housing in Britain*. London: Heinemann Educational Books, 1981.
- — —. 'Tudor Walters and Tudorbethan: Reassessing Britain's Inter-War Suburbs'. *Planning Perspectives* 17, no. 3 (2002): 267–86. <https://doi.org/10.1080/02665430210129324>.
- Sykes, W H. 'Statistical Account of the Labouring Population Inhabiting the Buildings at St. Pancras, Erected by the Metropolitan Society for Improving the Dwellings of the Poor'. *Journal of the Statistical Society of London* 13, no. 1 (1850): 46. <https://doi.org/10.2307/2338364>.
- Tarn, John Nelson. 'The Housing Problem a Century Ago'. *Urban Studies* 5, no. 3 (1968): 290–300. <https://doi.org/10.1080/00420986820080531>.
- — —. 'The Peabody Donation Fund: The Role of a Housing Society in the Nineteenth Century'. *Victorian Studies*, 1966.
- The Builder's Practical Director*. London: J Hagger, 1855.
- Thévenot, Laurent. 'Rules and Implements; Investment in Forms'. *Social Science Information* 23, no. 1 (1984): 1–45.
- Thornley, Andy. *Urban Planning under Thatcherism: The Challenge of the Market*. London: Routledge, 1991.
- Tiesdell, Steven, and David Adams. 'Design Matters: Major House Builders and the Design Challenge of Brownfield Development Contexts'. *Journal of Urban Design* 9, no. 1 (2004): 23–45. <https://doi.org/10.1080/1357480042000187695>.
- Till, Jeremy, and Tatjana Schneider. *Flexible Housing*. London: Routledge, 2016.
- Timmermans, Stefan, and Steven Epstein. 'A World of Standards but Not a Standard World: Toward a Sociology of Standards and Standardization*'. *Annual Review of Sociology* 36, no. 1 (2010): 69–89. <https://doi.org/10.1146/annurev.soc.012809.102629>.
- Tjørring, Lise, and Quentin Gausset. 'Drivers for Retrofit: A Sociocultural Approach to Houses and Inhabitants'. *Building Research & Information* 47, no. 4 (2018): 1–10. <https://doi.org/10.1080/009613218.2018.1423722>.
- Travers, Tony. *The Politics of London: Governing an Ungovernable City*. Government Beyond the Centre. Basingstoke: Palgrave Macmillan, 2004.
- Tukey, John W. *Exploratory Data Analysis*. Reading, MA: Addison-Wesley, 1977.
- Tunstall, Becky. 'Relative Housing Space Inequality in England and Wales, and Its Recent Rapid Resurgence'. *International Journal of Housing Policy* 15, no. 2 (2015): 105–26. <https://doi.org/10.1080/14616718.2014.984826>.
- Unwin, Raymond. 'Cottage Building in Garden City'. *The Garden City* 1, no. 5 (1906): 107–11.
- — —. *Cottage Plans and Common Sense*. Fabian Tract 109. London: The Fabian Society, 1908.

- — —. *Nothing Gained by Overcrowding! How the Garden City Type of Development May Benefit Both Owner and Occupier*. Westminster: Garden Cities & Town Planning Association, 1912.
- Venturi, Robert. *Complexity and Contradiction in Architecture*. New York: Museum of Modern Art, 1966.
- Vertovec, Steven. 'Super-Diversity and Its Implications'. *Ethnic and Racial Studies* 30, no. 6 (2007): 1024–54. <https://doi.org/10.1080/01419870701599465>.
- Vossoughian, Nader. 'From A4 Paper to the Octametric Brick: Ernst Neufert and the Geo-Politics of Standardisation in Nazi Germany'. *The Journal of Architecture* 20, no. 4 (2015): 675–98. <https://doi.org/10.1080/13602365.2015.1072232>.
- — —. 'Qualitaetskontrolle'. *ARCH+*, no. 233 (2018): 50–59.
- — —. 'Standardization Reconsidered: Normierung in and after Ernst Neufert's Bauentwurfslehre (1936)'. *Grey Room* 54 (2014): 34–55. https://doi.org/10.1162/grey_a_00125.
- Watt, Paul. 'Social Stratification and Housing Mobility'. *Sociology* 30, no. 3 (1996): 533–50. <https://doi.org/10.1177/0038038596030003007>.
- — —. '“This pain of moving, moving, moving:” evictions, displacement and logics of expulsion in London'. *L'Année sociologique* 68, no. 1 (January 1, 2018): 67. <https://doi.org/10.3917/anso.181.0067>.
- Watt, Paul, and Anna Minton. 'London's Housing Crisis and Its Activisms'. *City* 20, no. 2 (2016): 204–21. <https://doi.org/10.1080/13604813.2016.1151707>.
- Weckherlin, Gernot. *BEL. Zur Systematik Des Architektonischen Wissens Am Beispiel von Ernst Neuferts Bauentwurfslehre*. Tübingen; Berlin: Ernst Wasmuth Verlag, 2017.
- — —. 'Ernst Neufert's Architects' Data: Anxiety, Creativity and Authorial Abdication'. In *Architecture and Authorship*, edited by Tim Anstey, Katja Grillner, and Rolf Hughes, 148–55. London: Black Dog Publishing, 2007.
- Weizman, Ines. 'The Exception to the Norm: Buildings and Skeletons in the Archive of Ernst Neufert'. *Perspecta* 49 (2016): 133–46.
- Wellings, Fred. *British Housebuilders: History and Analysis*. Oxford: Blackwell, 2008.
- West, Beverley N, and Stephen Emmitt. 'Functional Design? An Analysis of New Speculative House Plans in the UK'. *Design Studies* 25, no. 3 (2004): 275–99. <https://doi.org/10.1016/j.destud.2003.10.002>.
- White, James T., Tom Kenny, Flora Samuel, Chris Foye, Gareth James, and Bilge Serin. 'Delivering Design Value: The Housing Design Quality Conundrum'. UK Collaborative Centre for Housing Evidence, 2020.
- Whitehand, J W R, N J Morton, and C M H Carr. 'Urban Morphogenesis at the Microscale: How Houses Change'. *Environment and Planning B: Planning and Design* 26, no. 4 (1998): 503–15. <https://doi.org/10.1068/b260503>.
- Whitehand, J.W.R. 'Changing Suburban Landscapes at the Microscale'. *Tijdschrift Voor Economische En Sociale Geografie* 92, no. 2 (2001): 164–84. <https://doi.org/10.1111/1467-9663.00148>.
- Whitehand, J.W.R., and Christine M. H. Carr. 'The Changing Fabrics of Ordinary Residential Areas'. *Urban Studies* 36, no. 10 (1999): 1661–77. <https://doi.org/10.1080/0042098992764>.

- Woodward, Sophie. 'The Hidden Lives of Domestic Things: Accumulations in Cupboards, Lofts, and Shelves'. In *Intimacies, Critical Consumption and Diverse Economies*, edited by Emma Casey and Yvette Taylor, 216–31. Basingstoke: Palgrave Macmillan, 2015.
- Wright, Carroll D., and E R L Gould. 'The Housing of the Working People'. Washington: Government Printing Office, 1895.
- Yannas, Simos, and Jorge Rodríguez-Álvarez. 'Domestic Overheating in a Temperate Climate: Feedback from London Residential Schemes'. *Sustainable Cities and Society* 59 (2020): 102189. <https://doi.org/10.1016/j.scs.2020.102189>.
- Yates, JoAnne, and Craig N. Murphy. *Engineering Rules : Global Standard Setting since 1880*. Baltimore: Johns Hopkins University Press, 2019.
- Yelling, Jim. 'Public Policy, Urban Renewal and Property Ownership, 1945-55'. *Urban History* 22, no. 1 (1995): 48–62. <https://doi.org/10.1017/s0963926800011378>.
- Yunitsyna, Anna. 'Universal Space in Dwelling—the Room for All Living Needs'. In *Proceedings of ICUAD 2014, 2nd International Conference on Architecture and Urban Design*. Tirana, 2014.

