

Article

# Understanding the importance of front yard accessibility for community building: a case study of Subiaco, Western Australia

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**Abstract:** The residential built form, including open space, provides the physical environment for social interaction. Understanding urban open space, including semi-public and public domains, through the lens of physical accessibility and visual permeability can potentially facilitate the building of a sense of community contributing to a better quality of life. Using an inner-city suburb in Perth, Western Australia as a case study, this research explores the importance of physical accessibility patterns and visual permeability for socialising in semi-public and public domains, such as the front yard and the residential streets. It argues that maintaining a balance between public and private inter-relationship in inner city residential neighbourhoods is important for creating and maintaining a sense of community.

**Keywords:** Community building; quality of life; built form typology; front-yard; physical accessibility; visual permeability; human behaviour.

## 1. Introduction

A major aspect of social sustainability is the ability to foster resilient communities through the development of a sense of community and encouragement of social interactions. The role of public places as a prime component of the physical living environment in contributing towards community building has been the subject of many studies. Public places within a commercial setup, such as shopping areas, markets, arts districts, entertainment areas, cafe and restaurant precincts, have been of a particular interest. The main assumption is that a well-designed physical environment can stimulate social mixing as well as easy contact between people. Studies of such social interactions however are rare. As the sense of identity is often lost in a commercial public space, measuring interaction can also be difficult [1].

Social interactions within inner-city residential areas and neighbourhoods have been particularly unexplored. A lot of potential for community building lies beneath the soft edges of residential streets, including the house fronts [2]. In fact, house fronts are the ground which accommodates various activities promoting socializing between neighbours. Their physical characteristics shape the streetscape and the social interactions define the entire community. Despite the relative importance of house fronts, there is limited knowledge about the front yards in residential streets of inner-city suburbs. This potential built form and its typology require better understanding in terms of social interaction and physical articulation. Hence, a focus of this paper is the contribution

of the front yard towards community building and sense of community through its characteristics of physical accessibility and visual permeability.

## 2. Background

Advocates of mixed-use, high-density development, such as Jane Jacobs [3] assert the necessity of mixed urban layout and design for vibrant urban communities while acknowledging the importance of the relationship between design and human behaviour. There are also implicit suppositions that "... such an urban form will lead to a better quality of life" [4, 5, 6].

The visual appearance of the urban form has been overlooked by planning processes, activities and intentions [7] with 'physical characteristics' seen as individual preferences rather than a 'theory' that informs design [8]. In reality, the physical characteristics of cities have a significant impact on travel behaviour and patterns of movement, along with economic viability, real estate market dynamics, social equity, energy use and overall sustainability [9]. Many urban planning guidelines for urban design since the 1990s have aimed at optimal density, mix of use and better access to local facilities [10], but have not focused on the importance of how the built environment is perceived [6]. Whilst differences in residential density influence the establishment of social networks and relationships, physical factors such as public space location, urban form types and physical forms are important design elements which shape neighbourhoods, the way people relate to them [6] and the presence of a sense of community [11, 12]. The house fronts contribute to the physical appearance of residential streets and are the interface between the public and private spaces providing a distinctive neighbourhood identities.

### 2.1. Semi-private-public space

If the house front includes a front yard, front garden, entrance deck, plinth, veranda, porch or forecourt, this space becomes the main area of public-private interface. The front portion of the house in all its different forms is something in between indoor and outdoor, leading from inward to outward to pedestrian walkways, such as sidewalks or footpaths, and ending in the street (or vice versa). This range of built form typologies describing the house front are termed as "semi-private-public" in this research as they represent the interface that interacts between the private and public domain of the inner city residential living environment. The potential the semi-private-public interface has to enhance social interaction between neighbours is evident in older traditional suburbs and is also important for any community building.

In the field of planning, urban design and architectural theory, the urban interface between public and private has become an important concern. Interface types, such as access, setback, transparency or mode of access, are evident in Australian inner-city contexts [13]. The transitory or interstitial spaces between private and public welcome friends and business; create identity at the foyer, front door and front garden; encourage socializing at the front porch and al fresco dining; establish boundary and natural surveillance ensuring the feeling of safety [3, 13]; offer transparency through gardens and front setbacks facilitating social activities [14]. This interface balances power relations at access where privacy acts as a stabilizer between private and public [15]. Simmel [16] equivocated interface as separating and connecting device where strangers are greeted or excluded [17], where exposure and confidentiality coexist. It provides opportunities for prolonged outdoor stays therefore increasing social interaction among community members and providing important opportunities for participating in public life [2]. The semi-public-private spaces shape commercial as well as residential streets contributing to a sense of place.

### 2.2. Residential streets

The street nowadays is perceived as a "quintessential social public space" in the urban environment [18]. While there have been studies of mix-used streets in residential neighbourhoods, the emphasis has been mainly on the commercial functions, such as retail, work, cultural and light industrial uses [19]. Plazas and squares have also attracted a lot of research attention

[20,21,22,23,24,25,26,27,28,29]. There is however limited research on purely residential streets and spaces [30,31,32,33,34] and very little is known about people's behaviour in the semi-private-public areas of the house fronts. While urban designers and planners realize that "it remains difficult to isolate physical features from social... activities that bring value to our experiences" [35] (p. 270), not much effort exists in bringing the two together within the residential street. Understanding the daily life activities within the physical settings does have the potential to facilitate community building but so far remains largely unexplored.

### 2.3. Studying semi-private-public spaces

The relationship between the built form typology characteristics of residential streets and the behaviours and activities that take place can provide insights as to what extent the physical settings are able to support building sense of community [36]. Barker [37] refers to this relationship as "behaviour settings" and the better they are, the more positive feelings, needs and interactions are likely to develop [19]. The house fronts, and the front yards in particular, offer unique surroundings for people to establish contact, share activities and spend time interacting with others. Observation can be used to register and analyse human behaviour in these semi-private-public spaces [38] (pp.24-25), [39,40,41], including measuring of social interactions.

Although so far the front yard has attracted very limited attention, there have been other neighbourhood-based studies. For example, Appleyard [42] measured the frequency of social interaction by analysing familiarity, home territory and environmental awareness in different streets of the same neighbourhood. Gehl [43] measured social interaction by counting daily life activities in the 'soft edges' between buildings. Raman [6] emphasised that the physical environment can mediate social behaviour and neighbourhood membership while Groat and Wang [44] argued that there is no need to show causal relationships between such variables as they are mutually reinforced. Hence, observation is a good method to track human behaviour in a city, neighbourhood [45] and in the semi-private-public spaces of the front yards.

Furthermore, people's perceptions also play an important role in shaping human behaviour. Residents' perceptions can influence how the built environment is used [46] and the development of sense of community. In general, the physical qualities, social environment and residential satisfaction are interrelated [47,48,49]. Hence, in addition to observation, surveying people and collecting information based on their perceptions can be a useful tool to study semi-private-public spaces, such as the front yards.

There is one main characteristic of the semi-private-public places in residential neighbourhoods which is crucial for social interactions, impacts on behaviour patterns and needs to be analysed. It is their accessibility described as physical accessibility or ease of access – that is how easy it is to enter and use the semi-private-public space, and visual accessibility or permeability – that is ability of human sight to pass through and observe the material features located there. Easy accessibility to a physical space can ensure smooth social interaction. A frequently accessible space generates familiarity, intimacy, attachment and thus encourages residents to get involved in community related activities [50,51]. Visual permeability of the semi-private-public spaces ensures psychological connection to the street and other public areas.

The social connectivity between the front yard and the street can be seen as directly proportionate to the degree of physical accessibility and visual permeability. Observation and perception studies can potentially measure and evaluate these two accessibility aspects of the semi-private-public spaces as well as contribute towards understanding their role in building sense of community.

### 2.4. The front yard

As an integral part of a dwelling, the front yard is considered as a common land between the street and the house front often found in residential suburbs in Australia [52], United States [53], Canada [54,55,56], and Europe [57,58,59,60,61,]. Front yards vary in size, shape, and style according to geographical position, local planning regulations and design [62,63]. Generally, the front yard is

used for different social, economic or climatic [64] purposes, such as vegetable growing, household works, beautification, gardening and recreation [65].

The front yard is privately-owned but has high potential to act as a public space. Although the front yard is legally private, if visible from the street, it is considered as part of the public realm [66,67]. Thus, it is termed as 'semi-private-public' for its omnipotence ownership character. This means front yards can accommodate mixed activities which involve users with the space and are able to contribute towards enhanced socialising. Moreover, residents' perception [66,67] about the front yard's usability has keen influence on social activity patterns. The physical condition – physical accessibility and visual permeability, of the front yard is directly related to creating sense of community.

The aspects of physical accessibility and visual permeability have been considered seriously in the local planning scheme of Australia [63,68], United States [53,65], Canada [54,56], and all over Europe [58,59,69]. Back in 1829, the front yard was regularised in Australia by a mandate as a buffer space between the house and the street [62,]. Front yard is also a widely accepted suburban built form type in North America [70]. Influenced by the trend in USA [71,72], many Australian houses adopted the fenceless open front yard to increase social interaction between neighbours and decrease anti-social activities [63].

Identity or personalisation makes a place unique, attractive and recognisable, determines what it is and how it differs from others. Personalisation of the physical environment can fulfil needs to participate in desired activities [36] (pp. 148-149). It creates sense of occupancy and control over the space which encourages people to maintain the physical environment in a distinctive manner, often involving design professionals [73]. For visitors, personalisation creates interest [2], generates comfort [19] and promotes casual leisure behaviour [74,75].

Front yard ornamentation (including gardening and planting) is a common practice that engages neighbours in social interaction [76] and thus helps to build a strong visual language for visitors. Neighbours not only apprehend through compliments, but also actively socializing during gardening in the front yard [77]. Active participation in the front yard promotes strong social interaction without the need to be a member of local clubs [78]. This 'simultaneous visual diversity' [76,79] is a 'common symbol system' [80,81] which is a prime component of sense of community.

Front yards vary in relation to physical accessibility – pedestrian or vehicular [82] (pp.11-12), and visual connectivity which controls the level of social interaction between household residents, neighbours and pedestrian users. Use of fence, boundary wall, gates, vegetation, hedges and screening are common practice in the front yard to provide identity, privacy and control access. These devices serve both physical and visual purposes in terms of the public-private relationship between indoor and outdoor spaces.

Pollan [71], [78] (p.6) identified the front yard as a 'vehicle of consensus', that is collective identity, rather than an 'area of self-expression', that is privacy, which indicates its semi-private-public nature. Newman's [83,84] study shows that physical design of a space can promote better social phenomenon and thus is able to enhance the sense of security which is an element of sense of community. According to him, the front yard is a "socio-physical" place, but understanding the sense of security only is not enough to enhance community building as social interaction, attachment and identity also need to be explored. Physical accessibility, visual permeability and personalisation are important features of the front yard which this research intends to investigate as they determine the intensity of socialisation between neighbours. A case study example from a residential neighbourhood in Perth, Western Australia is used for this purpose.

The reminder of the paper first examines the connection between accessibility and sense of community from a theoretical point of view. It then presents the methodological framework for the case study based around accessibility of front yards. Subiaco – a residential area in Perth and the case study for this analysis, is described in terms of physical accessibility and visual permeability using observation and survey of people's perceptions. The concluding section emphasises the importance of the front yard as a vehicle for social interaction and community building.

2.5. Accessibility And Sense Of Community

This research explores the scope of user oriented physical environment to facilitate social interaction and promote community building within a residential neighbourhood context. Neighbourhood streets represent a behaviour setting which shapes potential behaviour patterns, physical articulation and design. Physical accessibility to a space, such as a front yard or veranda, varies and depends on the actual design. For instance, a fence, wall or vegetation can work to a different degree as a physical barrier [84]. Maximum physical access is ensured when there is no boundary wall between a front yard and sidewalk or pedestrian pathway. Similarly, maximum visual permeability is established when the semi-private-public spaces, e.g. the front yard, are seen from the public area, e.g. the sidewalk or street [78]. According to Chua Beng Huat [85], community building tends to develop where familiarisation through seeing, meeting and greeting takes place in common areas, such as walkways [86] or the front yard.

Hence, the physical design regulates the degree of accessibility – physical and visual, into semi-private-public domains which in turn influences social interaction [35,36,45]. The relationship between the built form as represented by the front yard and social interaction directly influencing the sense of community, is mediated through accessibility (in its physical and visual form) which is the prime concern of this study (see Figure 1).

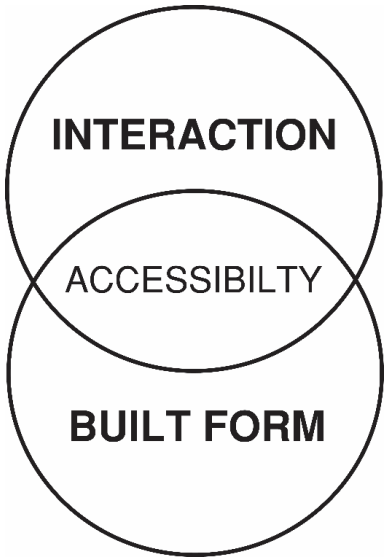


Figure 1. Relationship between built form and social interaction

Social interaction is ultimately aimed at establishing sense of community. David W. McMillan and David W. Chavis [81] and McMillan [87,88] define sense of community through four elements, namely: (1) membership or later described as spirit; (2) influence or trust; (3) reinforcement or trade; and (4) shared emotional connection or art. The factors which influence the sense of community include: interaction with neighbours, feeling of safety and desire to participate in neighbourhood affairs or localism [89,90] (p.215).

*Membership* means the feeling of belonging or being part [91] as a member [92,93] of a body, group or organization. Elements defining membership are boundaries, emotional safety, sense of belonging and identification, personal investment and a common symbol system [88]. They help develop a particular spirit or “spark of friendship” which allows people to connect to others and express their personality [87] (p. 315). Examples of the common symbol system may include maintaining lawns, keeping front yards and sidewalks tidy [94]. In contrast, an untidy front yard affects the sense of attachment and discourages people to associate with this particular place [95]. There might also be negative impacts on the sense of safety as well as social interaction [96].

*Influence* is described as the ability of a community to influence its members and vice versa which is based on the trust they have in each other [87]. Related to the urban built form and semi-private-



public spaces, influence is expressed by the adopted designs, norms and expectations about appearance and social behaviour. *Reinforcement* or trade represents the bargaining process through which community needs are fulfilled and resources are met based on shared values, fairness and ultimately through giving [87,88]. The front yard offers a space where such reinforcement can occur. When people compete to make their front yard distinct, they “gravitate” towards a group [81] and this is termed as “person–environment” fit [97]. *Shared emotional connection* is expressed by spending time together and these interactions have to be high quality making the collective experience become art [87]. When people take part in common events (e.g. rituals, festivals or simply doing something together), the sense of community increases. The more the interaction (contact), the closer the relationship [98,99,100,101]; the more the successful positive interaction, the more the social cohesion [50].

Sense of community is a crucial element of quality of life which has been missing in developments taking place since the late 1990s. The current trend of extended building footprint is creating architectural, social and cultural problems [74] which results in disappearing of space types such as front yard, sidewalk, verge, parking and even street. By encouraging privacy, recent planning policy does not promote socialising and sustainable community building [74,102]. By definition, sense of community is a ‘feeling’ [103] of belonging and of individuals being important to each other; a shared faith that community members’ needs will be valued with commitment [81]. Access to appropriate residential outdoor spaces [104] is required to develop such a feeling and promote better socialising at a neighbourhood scale. Table 1 summarises key theories which link physical space with sense of community. This study investigates the front yard as such a space through its accessibility.

**Table 1.** Key theories

Theorist	Theory	Method used
William Hollingsworth Whyte [105]	Improved physical space can promote better social cohesion to achieve economic gain.	Observation Interview Filming
Jan Gehl [106]	Prolonged outdoor stay can promote enhanced social interaction. Various social dimensions affect human perceptions during socialization.	Observation Survey
Joo Hwa Bay [107]	Social interaction in residential semi-open spaces promotes community building.	Observation Survey
Matthew Carmona [67] (pp.165-167), [108]	Space typology is an important planning measure for better management of urban outdoor spaces.	Literature review
David W. McMillan and David W. Chavis [81]; David W. McMillan [87,88]	Sense of community is defined through social interaction, community attachment, community identity and sense of ownership/belonging.	Literature review

Urban designers, such as Gehl [2] and Whyte [26] have worked on access to public open spaces in commercial areas while other studies segregate the physical environment and avoid the accessibility relationship between interaction and the built form [1,35,109]. Local laws are similarly focused on commercial public place to promote social mixing [110]. Bay’s [107,111] work on residential semi-open spaces is rare and in this vein, the current study focuses on the front yard as a built form type in inner-city neighbourhoods which fosters mixed activities and acts as an interactive zone for private and public interactions.

The front yard and its functions as a semi-private-public space is a new frontier in studies about sense of community. It is an intermediate buffer space that helps maintaining public-private inter-relationship between indoor and outdoor. However, there are no proper guidelines on understanding the typological categorisation of this semi-private-public space in the planning scheme. On the other hand, this built form type has tremendous quality to foster social interaction and the current study aims at filling in the gap in knowledge around the front yard. Understanding daily life activities in

this physical setting potentially contributes to community building and needs further development in academic knowledge and application to practice.

### 3. Methodology

This study uses a mixed method approach [44,112] which includes:

- Case study [113]
- Resident survey through interviews [114,115] and
- Detailed observation [1,2,9].

#### 3.1. Case study

The case study method is appropriate for complex social investigations [113] and is used to understand what is happening within the residential streets of one particular inner-city area. Once the area of study is defined, different approaches to data collection can be used to describe social behaviour. William W. Whyte [26] and Jan Gehl [2] observed behaviour of ordinary people on the streets mainly as a result of chance encounters. Meeting a familiar face in a public place through chance encounter is rare; on the other hand, residential public places such as streets, sidewalks and passages are common meeting places for the residents. People are meeting each other while participating in daily life activities involving taking children to school, going and coming back to work, regular trips to the grocery shop/mall, walking dogs, bringing children to the park/playground, cleaning the front yard/sidewalk, rolling the rubbish and recycling bins out to the verge and so on. Regular daily life activities are predictable and thus have higher organising potentiality to be considered by urban designers, planners and policy makers [85]. It is possible to regulate these known routes based on resident behaviour patterns to reflect the planning codes. However, it is quite difficult to do it in public places with commercial enterprises. Predictable residential public streets and semi-public sidewalks [85] are integral part of residential areas and intensely interact with semi-private-public front yards.

The chosen case study for analysing social interaction in residential streets and adjacent front yards is Subiaco. Available built form types in Subiaco are veranda, front yard, sidewalk, verge, parking, back-lane and street. These are common shared spaces where various activities take place. Neighbours are meeting each other in those spaces to fulfil their daily life routines or for recreational purposes. Recognising the built form condition of these space types in terms of physical accessibility (pedestrian or vehicular) and visual permeability is required to achieve a set of typology. This typological setup can become a useful tool to identify the intensity of social interaction in the Subiaco neighbourhood.

#### 3.2. Interviews

Interviews are based on individual perception by local residents as a way to inform the study of the residential neighbourhood of Subiaco. A semi-structured interview design was adopted which contains questions related to demographic informations (age, profession and use hours of front-yards, etc.), opinion (based on a Likert scale) and open-ended questions (allowing local residents share comments, suggestions and recommendations). The survey which had approval by the Curtin University Research Ethics Committee was conducted door to door in different suitable locations only on residential streets in Subiaco (refer to Figure 4) excluding any commercial or public enterprises and at convenient times. Residents were informed about the purpose and aim of the survey, ensured about their anonymity and requested to sign a written consent form. The survey was conducted during the spring and summer seasons of 2016 and 2017 in different daytimes of weekdays and weekends.

A total of 61 residents responded to the survey which took at least 15 minutes on average and no more than 25 minutes to complete. Most respondents found it easy to visualise the answer to the questions while standing in their front yard, front deck or stoop (a small porch with few stairs ending with a platform prior to house entrance). Jane Jacobs mentioned stoop [3] (p. 363) as a space for

natural surveillance which is able to prevent crime on the street. A few residents were comfortable to respond in the nearby sidewalk, park and corner of the street.

3.3. Observation

Observation was carried out of: (a) the front yards and (b) the street in a small area (see Figure 4) covering seven different streets. The physical and visual accessibility patterns in the front yards of these streets was recorded. Creating a new typology that enhances socialising in the front yard and the concepts of accessibility [82] (pp.11-12), such as level of physical accessibility and visual connectivity, is crucial in influencing the level of social interaction which is directly related to sense of community.

3.4. Subiaco as a case study

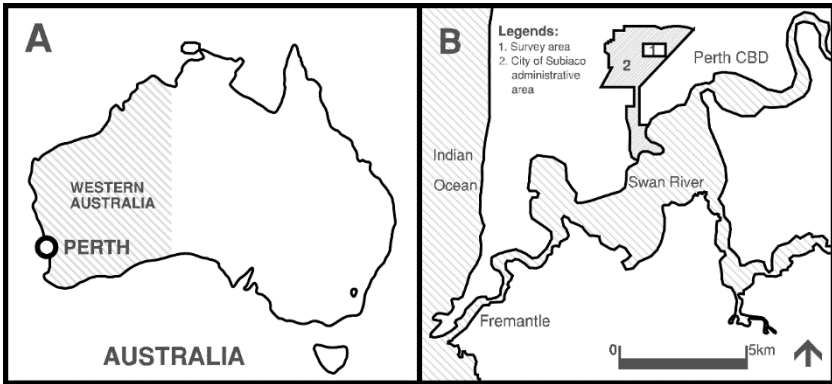
Subiaco is situated at the immediate west of the Perth central business district (CBD), five kilometres east of the Indian Ocean, 12 km north-east of the port of Fremantle and north of the Swan river (see Figure 2). It is one of the traditional inner-city suburbs of Perth, which was subdivided in 1880 as part of the development process [116]. In the early 20<sup>th</sup> century, Subiaco emerged as a working-class neighbourhood and by 1950s ranked as the most declined suburb [103,117,118,]. In 1970s, dilapidated dwellings attracted families and students from the University of Western Australia and high schools to live in the cheaper rental properties (50%), and thus by 1990s, Subiaco became a culturally vibrant community [103]. It hosts the landmark Regal Theatre, an arts centre, several hospitals, parks, shops, cafes and restaurants, community centres and community markets. This leafy green suburb has good connectivity through public transport, including train and bus services, and is considered a stylish and attractive place. Subiaco has numerous outdoor and commercial places for local residents and visitors (see Figure 3).

3.5. Subiaco demographic profile

According to the Australian Bureau of Statistics, the total land area of Subiaco is 558 hectares (6 square kilometres) and its population was 17,401 in 2016 (Estimated Resident Population for 2016), with a density of 31.17 persons per hectare. The average resident wages and salary income for Subiaco was AUS\$ 68,931 in 2009 with an annual growth rate of 6.7% (ABS, 2008-2009).

Figure 2. Maps of Australia and Perth

(A) Australia (B) Subiaco

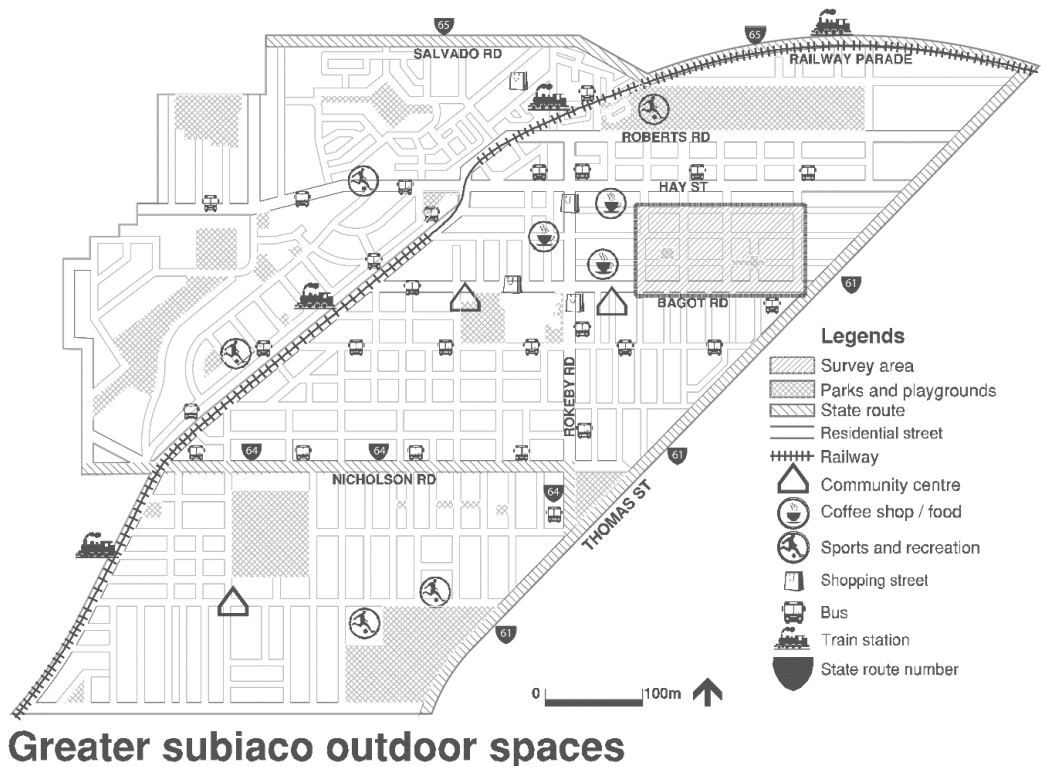


3.6. Analysed neighbourhood within Subiaco

The surveyed area in Subiaco was narrowed down to a manageable size for a detailed analysis (see Figure 4). It excludes commercial areas or industrial enterprises and public open spaces and



includes several residential streets, namely Axon Street, Townshend Road, Olive Street, Bedford Avenue, Barker Road, Park Street and Bagot Road (see Figure 4). All streets have house front yards in a face to face and side by side manner, that is each house has a front yard and is surrounded by other houses in the same street and across the street. Such physical settings ensure ultimate probabilities for social interaction between neighbours within their immediate vicinity. As already indicated, the frequency of social interaction is directly related to the sense of community. The study of this neighbourhood analyses the physical and visual accessibility of the different space types on the seven residential streets.



**Figure 3.** Subiaco outdoor destinations around the surveyed neighbourhood for local residents and visitors

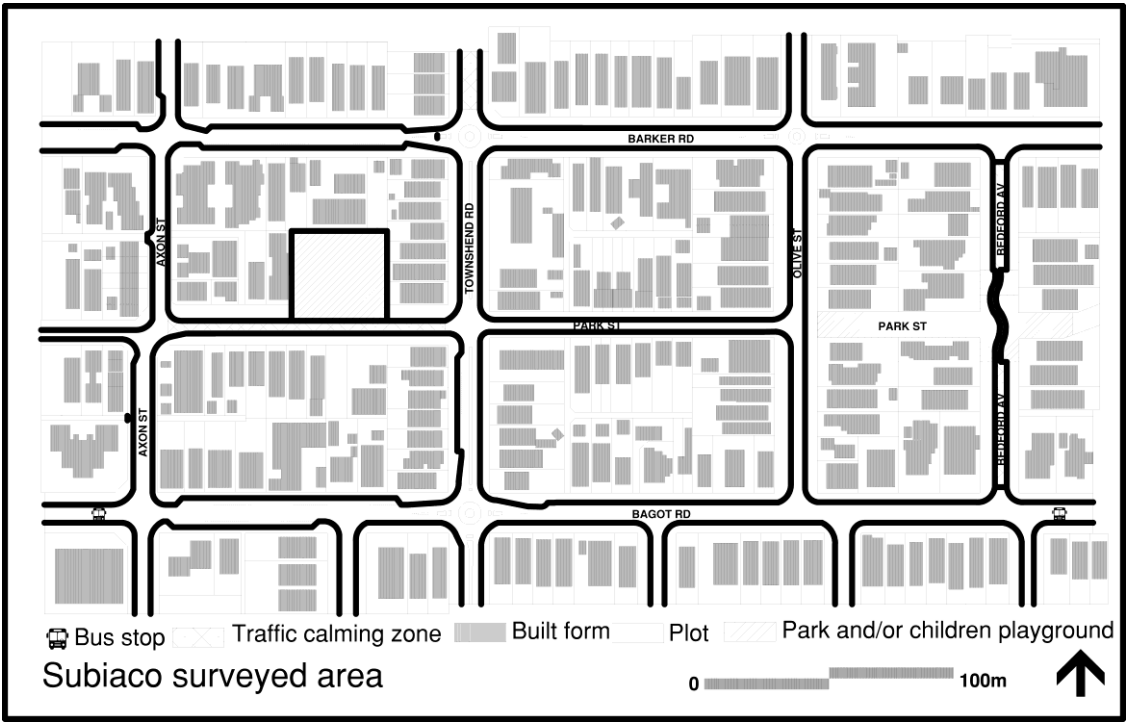


Figure 4. Analysed neighbourhood in Subiaco (Source: Author)

3.7. Neighbourhood front yard taxonomy in Subiaco

For the Subiaco neighbourhood, three types of front yards were identified in relation to physical accessibility, namely A1 – highly accessible, A2 – accessible or somehow accessible, and A3 – not accessible (see Table 2); and visual permeability, namely V1 – highly visible; V2 – visible or somewhat visible, and V3 – not visible (see Table 3).

Physical accessibility through boundary walls, gates, hedges and other features, is a factor influencing social interaction in a residential area. Jan Gehl [2] identified walls as a factor influencing contacts and intensity of interaction between people. A boundary wall resembles the owner’s attitude towards public. Open front yards without any boundary walls give an inviting impression while gated and locked front yards are just the opposite. The degree of openness is a factor that allows neighbours to get into the semi-private-public realm of the front yards. When a postal or pizza delivery person can get access to the front door’s bell, it is considered welcoming. Some front yards have unlocked gates and are considered as ‘somehow accessible’ as outsiders are still allowed access to the front yard. Closed gates with or without an intercom are considered ‘not accessible’. A solid boundary wall higher than 6 feet is considered a complete barrier between residents and visitors and the front yard is not suitable for social interaction.

The human being has a 180-degree front-facing horizontal visual field [119]. Both downward and upward visions are narrower than the horizontal one. Upward vision is much narrower as humans have a tendency of looking downward while walking which makes the axis of vision 10 degrees further downward. Such a walking person practically can see only activities at ground level, streets, sidewalks and front yards. The level of perception about visibility depends on the visual permeability of the front yard. Walls, fences, vegetation and screens control the visual permeability level between the street and front yard as outlined in the three categories.

385 **Table 2.** Types of physical accessibility

Boundary features	Boundary height	Intensity scale	Code
No boundary			
	0'0"	Highly accessible	A1
Low wall/fence/hedge (usually without any gate/control; anyone can get into the front yard; low wall is just a sense of boundary and means of sitting and easy to tip over even for a child)			
	3'0" maximum	Accessible	A2
Gate closed but unlocked, so that meter reader can enter to reach the front door at the veranda			
	4'0" maximum	Somehow accessible	
Gated/with intercom or calling bell/without any option to knock on the door.			
	4'0" to 6'0" or more	Not accessible	A3

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390 **Table 3.** Types of visual permeability

Visibility features	Boundary height	Intensity/Scale	Code
No visual barrier/screen/plant/tree			
	0'0"	Highly visible	V1
Low height visual barrier (wall/fence/hedge)			
	3'0" maximum	Visible	V2
Medium height visual barrier (wall/fence/hedge)			
	4'0" maximum	Somewhat visible	V3
Very high visual barrier (wall/fence/hedge)			
	4'0" to 6'0" or more	Not visible	V3

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392 **3.8. Case study results**

393 Out of the seven neighbourhood streets included in the accessibility analysis, four – namely  
394 Axon Street, Townshend Road, Olive Street and Bedford Avenue, have a north-south orientation  
395 while the remaining three – namely Barker Road, Park Street and Bagot Road are along the east-west  
396 direction. The houses included for each street are based on their front yard orientation rather than  
397 physical address. For instance, in this research the front yard orientation of a corner plot works as a  
398 decisive factor for a street even if it falls under the other street according to postal address. Moreover,  
399 the front yard orientation is important to observe the face-to-face (houses opposite to each other) or



side-by-side (houses adjacent to each other) interaction level among immediate neighbours. Table 4 shows the number of houses analysed in each street.

3.9. Physical design and accessibility

The link between the physical design and accessibility of the front yard was assessed based on a complete observation of all houses in this neighbourhood. None of the houses on Axon street have high physical or visual accessibility. Nevertheless, 56% are physically accessible and 67% of the front yards are visible (see Table 4). The remainder are not accessible at all. When the physical and visual accessibility percentages are averaged for each category to represent the overall accessibility, just over 60% of the houses in this street have potential for socialising. Although there are houses with high accessibility in Park Street, the majority have medium accessibility and with the overall percentage for socialising at 70%, there is potential for social interactions (see Table 4).

By comparison, Townshend Road is very different as it has a much smaller number of houses with no accessibility at all and 79% of all houses are overall accessible (see Table 4). Thus, it can be concluded that this street has a high potential for socialising. Olive Street, Bedford Avenue, Barker Road and Bagot Road similarly have high potentials for socialising with the respective overall values being 83%, 93%, 87% and 84% (see Table 4). The value for the entire neighbourhood is also high at 82%.

Hence, the majority of front yards on the residential streets of the analysed Subiaco neighbourhood have potential for social interactions based on accessibility to this semi-private-public space. In six of these inner-city residential streets, the potential for socialising is high. Such a typology of the front yards can contribute to planning policy in its efforts to create sense of community. As far as the physical design of this Subiaco neighbourhood is concerned, it encourages social mixing and easy contact between people boosting membership, influence, reinforcement and shared emotional connections. Were the physical design deprived of front yards or were there to be an overwhelming share of houses with not accessible semi-private-public places, the conditions for developing a sense of community would have been very different.

**Table 4.** Accessibility patterns in the analysed Subiaco neighbourhood

Street	Number of houses	Physical Accessibility			Visual accessibility			Overall accessibility		
		High	Mediu	Lo	Hig	Mediu	Lo	High	Mediu	Low
		A1	A2	A3	V1	V2	V3			
		%	%	%	%	%	%	%	%	%
Axon	9	0	56	44	0	67	33	0	61.5	38.5
Townshend	30	8	71	21	67	12	21	37.5	41.5	21
Olive	27	29	54	17	25	58	17	27	56	17
Bedford	17	21	72	7	50	43	7	35.5	57.5	7
Barker	50	10	77	13	58	29	13	34	53	13
Park	34	18	49	33	30	43	27	24	46	30
Bagot	52	17	67	16	27	58	15	22	62.5	15.5
<b>All streets</b>	<b>219</b>	<b>16</b>	<b>65</b>	<b>19</b>	<b>40</b>	<b>42</b>	<b>18</b>	<b>28</b>	<b>53.5</b>	<b>18.5</b>

<sup>1</sup>Overall accessibility is the average of Physical and Visual accessibility.

However, it is interesting to compare the findings about social interactions based on the physical design of the front yards with the actual perceptions people have about the place of this semi-private-public space in their lives.



3.10. Perception and accessibility

The results from the perception survey of the Subiaco neighbourhood are presented in Table 5. According to the majority of people (67%), the physical condition of their front yard helps them socialising. About 60% of the residents think that the front yard works as an extension of their living area for socialising with neighbours. Most residents (80%) are very conscious about the visual accessibility of their front yards, which helps to communicate with their neighbours in public spaces like sidewalks and streets. Front yards are visible enough (67%) from the streets and sidewalks with their distinct ‘personal expression’ (64%). These visual and physical characteristics of the front yards are helping create sense of community.

Most of the respondents (64%) actively maintain an interactive public-private relationship while communicating with their neighbours. Just under half of people (48%) spend at least 1 hour a day during weekdays and 52% use it 2 to 5 hours a day during weekends. That means the front yard is a frequently used immediate semi-private-public space which maintains a balance between public and private interactions. A significant number of residents (77%) feel a strong sense of ownership and belonging in relation to their front yard; almost all (97%) feel safe during daytime and a large majority (74%) also after dark.

**Table 5.** Perception survey of Subiaco neighbourhood

Statement	Agree	Aspects
1. The overall physical condition of my front yard helps me socialising.	67%	Physical accessibility
2. The front yard is an extended living area for socialising with neighbours or guests.	60%	Physical accessibility
3. Front yard visibility from the street to communicate with neighbours in adjacent walkways or streets helps residents engage with neighbours for socialising.	67%	Visual permeability
4. The visibility of the front yard from the street allows natural surveillance and the feeling of safety.	80%	Visual permeability
5. The front yard has its own distinct ‘personal expression’ which contributes to the physical or visual characteristics of the street.	64%	Visual permeability
6. The front yard works as part of the street which helps me maintain a good relationship between public and private domains.	64%	Interaction and communication
7. I like to spend at least 1 hour during weekdays in my front yard.	48%	Activity
8. I like to spend 2 to 5 hours during weekends in my front yard.	52%	Activity
9. I feel a strong sense of ownership and sense of belonging in the front yard of my house that help me engage with my neighbourhood community.	77%	Sense of belonging
10. I feel safe using the front yard while participating in activities during daytime.	97%	Sense of safety
11. I feel safe using the front yard while participating in activities after dark.	74%	Sense of safety

Overall, there seems to be a good match between how people feel about the front yard and its physical design in the context of socialising, establishing relationships and community building. Understanding the social mixing potential of the physical environment is vital, but it would not be put into good use unless residents also perceive these opportunities.

#### 4. Discussion

Urban public place is most essential to make a city liveable. Quality urban spaces foster sense of safety, sense of belonging, increased consciousness, diverse activities, self-esteem and interest in the living environment [120]. People's experiences in an urban environment are reinforced by symbols, myths, customs, faiths, conventions, ceremonies, vacations [81], stories, music and various symbolic expressions [88] which create a sense of community and provide deep intense links and strong integration.

Residential streets represent quintessential public space which can be extended with the opportunities for socialising provided by the semi-private-public place represented by the front yard. From the observation of Subiaco residential streets, it is evident that the boundary design (high wall–low wall), fencing style (material, design, transparency), front yard orientation, veranda design are clear symbols that can be attributed to various activities and behaviours of the local residents. The majority (64%) of Subiaco residents (see Table 5) think that the 'personal expression' of their front yard is able to contribute to the physical and visual characteristics of their streets and thus contributing to the community. Architecturally, the front yard – a small scale built form type with distinct characteristics, is contributing to the overall streetscape and thus helps maintaining the entire street typology through a process of continuous evolution [121,122,123]. This study is one of the few to shed light on the present-day importance of residential streets and the annex between the public and private spaces in them.

Shared emotional connections related to history, common place, time together and similar experience help build sense of community. The front yard is the new frontier in this research as it allows enhanced social interaction which brings people closer [98,99,100,101]; quality experiences with positive interaction and stronger relationships and bonding [50]; investment in time spent together which increases the importance of neighbours and their value to the neighbourhood [92,124]; and generating a spiritual bond expressed through the sense of community. When community are forming, members search for others to share issues and then bonding forms as they explore similarity among themselves and reach out for "consensual validation" [88]. The front yard offers such a valuable safe and intimate place [125].

Methodologically, this study showed coherent positive outcomes in two tiers of analysis. First, the selected case study Subiaco neighbourhood sorted out the significance of the physical typology and second, the perception study of the front yard validated the importance of sense of community. As social elements are more suitable to measure sense of community than environmental ones [126], this study endorses the quality of the front yard as a high potential socially interactive outdoor space type to promote community building and community resilience [127].

#### 5. Conclusion

Researchers and planners consistently acknowledge the importance of fostering sense of community [12,128,129,130,131,132,133.] Putnam, 2001). In contrast, anti-suburban critique [134] condemns Australian suburbs for being isolated from real life, lack of community and one-dimensional consumer culture.

Most of the available studies looking at the relationship between built form and sense of community are focused on public spaces and plazas in commercial areas. There is very limited research on residential streets. This research helps fill this gap by looking at the relationship between physical settings and potential for socialising in residential areas. It emphasises the importance of the front yard as a semi-private-public space for community building and adds to an area that has been neglected in academic research and planning practice.

Perceptions of built environment on sense of community needs further development [135]. Gehl's 'soft edge' [106] addressed private-public interrelationship but this knowledge needs further understanding in terms of sense of community. The lack of research on physical issues in social science might limit the transfer of academic knowledge into practice [81]. This research can add value to this existing gap in knowledge and practice by adding to the knowledge about the relationships between physical form and sense of community within the context of residential environment. The

research can bridge these gaps of understanding while the new knowledge can help guide designers, developers, consumers and policy makers for making more attractive city living environments.

Advocates of public place [2,66,67,136] have realized that the front yard is a high potential private space which can perform publicly. It provides the connection between the private and public realm and is categorised as a semi-private-public place. The analysis of the Subiaco neighbourhood confirmed this nature of the front yards as well as the role of accessibility in fostering social interactions.

In local laws, the importance of the front yard typology is neglected, except for some setback rules. It is important to understand the front yard types to maintain the homogeneity reflected in local planning policy objectives adopted by the City of Subiaco (Planning Policy No. 4.8). The desire for residential privacy is reflected in local building regulations (see clause 7.1 Visual Privacy, in R-Codes, Residential Design Codes of Western Australia, p.59) which could be fulfilled in back yards and outdoor private domains. However, the front yard should be understood as a focused device to maintain interactive relationship between the private and public domain [104]. In architecture, a buffer space is required to ensure gradual and smooth transformation between private and public which is termed semi-public [136] (p.76,104,231), [137] (p.12), [138] (pp.110-111). In a similar vein, the front yard can be defined as semi-private-public space which is capable to equally satisfy both private and public needs [139]. Thus, this magnificent space has tremendous potential to enhance the quality of sense of community and promote community building in the neighbourhood.

Public spaces are often impersonal and it is hard for a person to maintain individual identity while in the crowd [140] (p.50). Front yards work as a public space [67] where people do not lose their personal identity. Moreover, activities in and around the semi-private-public place can contribute to community building. This is the beauty of this amazing intermediate space where people can enjoy their full freedom of choice to participate in activities. The semi-private-public front yard thus accommodates various social activities without losing its distinct physical identity. Users do not feel inferior in this socially interactive physical setup. It is hoped that this research can not only bridge the existing gaps of understanding the front yard but that this new knowledge can help guide designers, developers, consumers and policy makers for making more attractive and resilient residential city.

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