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# The forgotten and the future: reclaiming back alleys for a sustainable city

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**Abstract.** Alleys are enigmatic, neglected features of the urban fabric. In this paper we explore the distribution, physical features, activity patterns, and resident perceptions of alleys in one major US city, Los Angeles, California. We do so through an integrated mixed-methods strategy involving participatory research with community-based organizations, spatial analysis, physical audits and behavioral observation of alleys, and focus groups. Results show that most alleys in Los Angeles are underutilized and walkable, quiet, and clean, although they can be, and are often perceived as, dirty and unsafe. Alley density is greatest in park-poor, low-income Latino and African-American neighborhoods. Alleys represent unrealized community assets that could be transformed by urban planners and managers into 'green infrastructure' to simultaneously offer multiple ecological, economic, and social benefits—including urban walkability and mobility, play space and green cover, biodiversity conservation, and urban runoff infiltration—and thereby to contribute to a more sustainable urbanism.

## Introduction

Alleys are common features of many North American cities. For example, in Los Angeles, California, alleys run more than 930 linear miles. Yet as elements of urban form they have rarely been investigated by geographers or other social scientists. Unlike city streets, alleys usually go unnamed and are ignored by city policy. They are enigmatic, liminal spaces whose identity is blurred: simultaneously public and private, at times threatening but nonetheless places of great possibility.

In this paper we explore alleys—their distribution, context, physical features, activity patterns, and resident perceptions—in the City of Los Angeles. We begin by noting gaps in existing literature on alleys, and suggest a direction for research that may highlight their potential benefits for the environment, for community, and for the economy. In the next section we describe our methodology, which combines

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participatory action research, urban fieldwork, and qualitative and quantitative analysis. In collaboration with community-based nonprofit partners we designed a spatial analysis of alley distribution in the city, used three field-based audit techniques to inventory alley characteristics and activity patterns, organized focus groups with residents living adjacent to alleys to assess local attitudes toward alleys, and performed a detailed alley mapping for one particular neighborhood to better understand how alleys might serve as catalysts for urban change. Understanding alleys from the standpoint of community-based organizations and residents, combined with detailed observation and audits of the alleys themselves, also provided practical insights into how they might be repurposed to support urban sustainability goals.

In the subsequent sections of this paper we focus on the results of these linked assessments, showing the uneven distribution of alley networks and their sociodemographic and land-use contexts, physical characteristics, types of human and wildlife activity we observed, and the significant contrasts between our field-based findings and resident perceptions. On the basis of these results we contemplate the possibilities for adaptive reuse of alleys as green infrastructure—pedestrian thoroughfares, intermittent playgrounds, connecting islands of native vegetation, and sinks for air pollution and urban runoff—illustrating this potential through an exploratory case study of one of the most alley-rich, park-poor inner-city neighborhoods of Los Angeles.

## 'Cracks in the city': alleys, community, and environment

Alleys have been a key architectural component of urban areas since at least 432 BC. Excavations of ancient Greek cities from that time reveal alleys behind rows of dwellings, with streets lining the fronts (Martin, 2001; 2002). During the medieval period fortress towns or *bastides* were typically built in an orthogonal grid-like pattern, with an ordered hierarchy of streets (24 – 30 ft wide), lesser streets or 'lanes' (18 ft) and alleys (6 ft) (Robinson, 1911). Martin (2001) notes that early American towns were often patterned after this bastide grid design.

The etymological roots of alleys provide insight into their functions. The term 'alley' itself is believed to be a contraction of the Latin, *ambulare*, meaning to walk, while street is believed to stem from *sternere* (to pave). A reference dated 1510 defines alley as a "passage between buildings".[1] A modern dictionary definition defines an alley as a passage "through a continuous row of houses, permitting access from the street to backyards, garages, etc" or as "a narrow back street".[2]

Outside of North America alleys may be known as lanes in the UK and are related to what the Dutch call *woonerfs* (roughly translated as 'living gardens') in the Netherlands. Form and function can differ somewhat; woonerfs may perhaps best be described as cul-de-sacs with highly restricted automobile access that privileges activities such as biking and walking; in this sense they are similar to the shared street concept (Ben-Joseph, 1995). Woonerfs became popular in the Netherlands in the 1970s, particularly as a way to augment play space for children in low-income communities, and the concept spread quickly to other countries: *wohnstrasse* ('living street') in Germany, *community doro* ('community street') in Japan, and *rehov meshulav* ('integrated street') in Israel.

In the US by around 1825 the term alley referred to a "back alley, street of poor people".[3] 19th-century exposés linked alleys with stigmas of race and class, helping

[1] From the Online Etymological Dictionary by D Harper, 2009, http://www.etymonline.com/

[2] From Dictionary.com Unabridged v 1.1, Random House Inc, 2009, http://dictionary.reference.com/browse/alley

[3] See footnote 1.

to forge negative perceptions of alleys as dangerous and unhealthy places (Ford, 2001). Throughout the late 19th century, hundreds of thousands of poor urban migrants of all races dwelt in substandard alley housing in US cities (Abbott, 1936; Clay, 1978; Matthews, 1913). By the 1930s federal housing policy officially disallowed alleys; the 1934 Federal Housing Act created the 'Alley Dwelling Authority' targeting the elimination of poor African-American alley neighborhoods in Washington, DC (Frankel and Goldstein, 1995). In other cities the primary strategy to 'clean up' urban alleys—what one critic called "breeding places of disease"—was to pave them (*American City* 1937). By 1937, according to a survey of 292 municipalities, alley paving was a nationwide trend, thanks in part to advancements in methods of concrete paving.[4]

Popularization of the automobile led to changes in how alleys were used. Beasley (1996) traced the evolution of alley use in Galveston, Texas from 1839 to the late 20th century, comparing archival Sanborn Fire Insurance Company maps and an 1885 bird's eye view of the city with contemporary maps and photos. Results showed how alleys transitioned from pathways to housing (primarily for servants working in the front house) into roadways offering access to garages for automobiles, although residential use did persist. Despite changing uses, however, public perceptions of alleys as problem spaces remained largely unchanged.

Alleys have long been spaces for congregation, bringing neighbors together. Borchert (1980, page 220) found that alleys were "commons where children could play safely [and] adults could lounge and talk." Alleys have served as network capillaries, connecting nodes of the city by bringing services and goods to and from residences and businesses. In the 19th century coal was delivered and in the 21st century water meters are still checked and trash is often collected via alley access. Alleys can be pathways between destinations (schools, parks, churches, and neighboring houses) and, until recently, have been the domain of foot traffic, in line with their etymological roots. Residential back alleys are thus complex cultural landscapes, existing on both the *back side* and the *inside* of the neighborhood (Martin, 1996; 2002).

Recently, alleys have enjoyed a rebirth within urban design. City planners recognize the potential of alleys to revitalize and enrich the fabric of residential communities and commercial districts. 'Green' alley programs and projects have been initiated in Chicago, Vancouver, Baltimore, Los Angeles, and cities in Europe (Cassidy et al, 2008). The late Jane Jacobs (1961) recognized the value of alleys as network connectors, claiming they would make for healthier urban tissue. Like other public space, alleys may be useful to community building and organizing efforts in the inner city (Cassidy et al, 2008). And New Urbanists such as Duany et al (2001) advocated for alleys in new residential developments "so that garage doors do not overwhelm the street facades", claiming that alleys would encourage pedestrian activity and neighborly interaction (Halper, 2001; Katz, 1994; Swaney, 2001).

Empirical support for such assertions is slim. An exception is Ford (2001), whose geographical research in San Diego demonstrated that residents living along alleys in four older working-class and middle-class neighborhoods valued these features of their environment. Through survey techniques, as well as interviews, participant observation, and photodocumentation, Ford concluded that most residents living on an alley viewed them as important activity spaces for parking and garage access but also for walking, playing, and socializing. The most common problems people identified with their local alley were related to maintenance: paving, poor lighting, overgrown vegetation, illegal dumping, or lack of police presence.

[4] Paving alleys is a practice that continues to this day, ostensibly to improve the city's appearance, reduce maintenance costs, facilitate garbage removal, and allow for ease of ingress and egress.

There has been some research on the relationship between alleys, connectivity, and crime. In the UK, for example, studies indicate that some residents associated lanes with crime, litter, and antisocial behavior (Johnson and Loxley, 2001; Tilley et al, 1999). Other research suggests that reducing connectivity reduces crime (Beavon et al, 1994; Bevis and Nutter, 1977; Wagner, 1997); isolated cul-de-sacs generally have lower rates of burglary than more permeable grid layouts (Newman, 1995), while most minor nuisance crimes (street drinking, buying and selling drugs, etc) occur in areas with large amounts of pedestrian traffic (Loukaitou-Sideris, 1999). However, as Cozens and Hillier (2008) point out in their review of these studies, such research by and large did not control for place-specific variables such as ethnicity, demography, income levels, or social class.

Other research hints at the potential role of urban alleys in public health. Research on physical activity and the built environment suggests that access to parks and walkable neighborhoods encourages physical activity. Improving access can promote health and prevent disease, especially obesity and related chronic health conditions (Frank et al, 2005; Saelens et al, 2003; Sallis et al, 1990; 2002; Shafer et al, 1999). Similarly, the design and configuration of neighborhood streets and the inclusion of vegetation encourage walking (Craig et al, 2002; de Vries, 2001; de Vries et al, 2001; Macdonald, 2003) as do pathways between residential neighborhoods and destinations such as schools, parks, libraries, and workplaces (Kwan, 1998). Growing evidence supports a positive correlation between the perceived safety of a neighborhood and physical activity (Brownson et al, 2000; Evenson et al, 2002; Gavarry et al, 2003; Hearn et al, 1998), as well as links between the extent of vegetation and obesity, public safety (Kuo and Sullivan, 2001), and reduction of health inequalities related to income (Mitchell and Popham, 2008). Finally, people-oriented street designs have been linked with increased interaction between residents and level of play among children (Bossleman et al, 1999). Thus, if alleys were reclaimed in a manner that prioritized vegetation, connectivity, and safety, they could encourage physical activity and health.

While not considering alleys explicitly, urban ecological research indicates that greening urban infrastructure could provide valuable ecosystem services (Longcore et al, 2004; Tratalos et al, 2007). Like most urban streets, paved alleys exacerbate stormwater runoff problems, becoming conduits for trash and toxic chemicals that wash directly into the storm drain system, to be transported to local streams, rivers, and coastal oceans. Even in dry weather, polluted runoff occurs as local residents water lawns, clean sidewalks, and wash cars. But repurposing alleys could reduce urban runoff pollution. Several researchers have recommended design solutions, emphasizing depaving, use of porous paving, and integrating native vegetation to remove pollutants and absorb the runoff (Hough, 1995; Lyle, 1994; Spirn, 1984). Though wetlands are not viable in most alley spaces, certain unpaved alleys could serve as storage and percolation basins during rain events.

Colding (2007) proposes the concept of 'ecological land-use complementation' to increase ecosystem resilience and enhance biodiversity in urban areas. Drawing on principles of landscape ecology and island biogeography theory, this concept maintains that biodiversity in urban areas is maximized by clustering a range of heterogeneous (rather than similar) green patches together. Colding cites the example of insects with their different habitat requirements depending on the stages of their life cycles. As larvae they may forage in domestic gardens, while as adults they may forage in the open grasslands of city parks. More research is needed, but greened alleys, owing to their spatial extent in many cities, could potentially enhance biodiversity by acting as network connectors, effectively linking up previously heterogeneous green area patches (parks, private gardens, university campuses, etc).

In sum, despite their prevalence in many major cities, and potential beneficial uses, alleys remain vague terrain among social scientists and urban planners. Nor have urban geographers sought to theorize alleys as amorphous, quasi-public spaces similar to vacant lots or spaces in between buildings—or what Loukaitou-Sideris (1996) termed "cracks in the city". Aside from Ford (2001), little research has been conducted to assess the spatial distribution of alleys, their physical characteristics, the types of activities that occur in them, or perceptions of alleys among nearby residents. To our knowledge no comprehensive inventory of alleys has been done to date for any US city—all the more remarkable given that, for instance, the City of Los Angeles has more than 900 linear miles of alleys, while Chicago, far smaller, has over 1500 alley miles.

**An integrated methodology for analyzing back alleys**

We constructed an integrated methodological apparatus to explore back alleys in Los Angeles. Following precepts of participatory action research (Reason and Bradbury, 2008), we involved four community-based nonprofit organizations—TreePeople, Trust for Public Land, Pacoima Beautiful, and the Los Angeles Neighborhood Land Trust—focused on urban forestry, parks, and environmental justice to assist in project design and implementation. To understand the alley distribution we built a spatial database in ArcGIS (version 9.2) composed of layers specifically related to alleys as well as demographics and land use. Mapping exercises stimulated discussions within the research team about the role of alleys in urban life and helped us chart a plan for detailed fieldwork. Drawing on public health research on the built environment we developed detailed physical audit instruments to characterize alleys, and a team of doctoral students and undergraduates conducted the audit fieldwork between April and August 2007. Two audit teams, each composed of two undergraduate students, completed physical audits of 300 alleys, selected by random stratified sample. We inventoried and rated their physical characteristics, location attributes, aesthetic qualities, and safety-related features and used quantitative metrics to understand how the instrument performed in the field.

In tandem with the audit we conducted behavioral observations of the same 300 alleys, followed by in-depth observations of a 30-alley subset. Results formed a picture of how alleys are used, enabling us to answer questions about activity patterns and environmental features. With our community-based research partners we also conducted five focus groups to understand how residents perceive alleys as urban space, and their ideas about the potential uses of alleys. Last, we explored one specific part of the city with the densest concentration of alleys, as a case study, to visualize how alley transformation could reshape quality of life and foster sustainability in a particular urban place. In what follows we detail the design of our methods, along with their use in the field.

**Physical and behavioral observations of alleys**

*Selecting alleys for audit.* To select the alleys to be audited we used maps of alley distribution from the Engineering Department and the boundaries of the city's thirty-six Community Planning Areas (CPAs) from the Planning Department of the City of Los Angeles. We calculated the number of alley segments (or blocks) in each CPA (ranging from 11 alleys in the CPA of Bel Air – Beverly Crest to 1558 alleys in Southeast Los Angeles). On the basis of these totals the percentage of the city's total alleys in each CPA was determined; the fourteen CPAs with fewer than 2% of the city's alleys were excluded from the sampling process. We then drew a stratified sample and used the statistical program JMP6 (SAS Institute, Cary, NC) to randomly select the alleys to

be audited. To ensure that we also audited our focus group alleys we substituted them for the randomly selected alleys nearest to the alleys that served as bases for our focus groups.

The result was a final sample of 300 alleys within the City of Los Angeles to be studied by the audit teams. We also selected a subset of thirty alleys for intensive behavioral observations, based on their proximity to focus group neighborhoods. Each focus group alley and five alleys clustered adjacent to or near this focus group alley were also included. We then aggregated these CPAs into the city's five subregions: San Fernando, West, Metro, South, and South Bay.

*Physical audit instrument.* The physical audit instrument—Systematic Pedestrian and Cycling Environmental Scan for Alleys [SPACES for Alleys (Seymour et al, 2007a)]—was modeled after environmental audit instruments developed for use in urban public health research (Byrne, 2004; Byrne et al, 2005; Pikora et al, 2000), and augmented on the basis of field visits to alleys across the city. SPACES for Alleys, which includes dichotomous, ordinal, and continuous response items, is divided into three sections. Section I, alley surroundings, has questions ($n = 55$) that pertain to adjacent land-use types and alley access. Section II, substrate ($n = 4$), inquires about surface permeability, slope, and drainage. Section III—use, condition, and safety—has questions ($n = 37$) regarding the presence of objects that suggest alley use, attributes that affect alley condition and aesthetics, and levels of visibility that may affect perceived or objective alley safety. The appendix A provides a list of the instrument questions.

SPACES for Alleys was tested for reliability. Both audit teams independently audited the same twenty-nine city alleys, and interteam reliability was calculated with Cohen's and prevalence-adjusted, bias-adjusted kappa (PABAK) statistics; intraclass correlation coefficients (ICCs); and percentage observed agreement. The instrument had acceptable reliability for most items. Some 89% of the dichotomous items demonstrated PABAK values $\geqslant 0.61$ ('substantial agreement') and 70% of ordinal and continuous response items demonstrated ICC values $\geqslant 0.61$ (Seymour et al, 2010a).

*Audit fieldwork.* Auditors were trained to use SPACES for Alleys during the first week of fieldwork. Over the subsequent data collection period the teams averaged eight alley audits per day. An audit began with a team circling each alley at least once to determine land uses, and then parking and auditing the alley on foot. In a small number of alleys, for safety reasons, audits were conducted by vehicle. The two members of a team discussed each question until an answer was mutually agreed upon.

*Behavioral observational audit tool.* A basic observational audit instrument (Seymour et al, 2007b) was also developed through field research. We based the tool on all behaviors observed during preliminary reconnaissance, also including activities noted in the literature on behavior in parks and city streets. The tool includes a list of fifty behaviors, grouped into seven categories: active or passive recreation, transportation, domestic use, illegal or illicit activities, municipal or utility access, business activities, and an 'other' option. We created a rough alley diagram and a page for notes to use along with the audit tool in the field. Auditors recorded the type and duration of the behavior observed and any discernable information about the users (number of participants; gender, age, race and ethnicity of human users; presence and types of animals) into the notes section, and recorded the location of the behavior in the diagram.

*Making behavioral observations.* We developed two behavioral observations protocols. The first was for a 10 minute observation, just prior to each of the 300 alley audits, when teams would observe alley behaviors from their vehicle. The second involved intensive behavioral observation of 30 alleys over a period of three weeks, after the audits and initial observations of the 300 alleys. Each week auditors visited a

group of ten alleys at two-hour intervals for 5 – 10 minute observation periods, between dawn and dusk on Sundays (six times), during the morning and early afternoon on Mondays (three times), and during the afternoon and evening on Tuesdays (three times), thus collecting data on both weekends and weekdays. This intensive observation allowed us to document how alley use varies depending on the time of day and day of the week and the CPA where the alley is located. To minimize the possible 'chilling' effect our observations might have on alley behavior, the teams were careful not to drive through the alleys and, if parked near the entrance or exit of the alleys, to be as unobtrusive as possible. We should acknowledge that, for safety reasons, the teams did not observe alleys after nightfall or before dawn when illicit activity might occur. Future research should consider how to conduct observations during this period to obtain a complete picture of alley behavior.

**Focus groups**

We held all of the focus groups in low-income residential neighborhoods, adjacent to one or more alleys ('focus group alleys'). In these neighborhoods, which our community-based nonprofit partners identified as priority areas of need and appropriate for revitalization, we selected five conventional alleys for focus group studies, one each in the neighborhoods of Pacoima, Sun Valley, Wilmington, South Los Angeles, and Hollywood. These alleys suffered from trash, drainage, or safety issues but offered potential neighborhood benefits from redesign. A sixth alley in Hollywood—a redesigned alley, now called Gower Gulch Community Park—was preselected for study to learn about resident responses to alley conversion. For comparative purposes we selected the alley segment across the street from Gower Gulch Community Park to serve as our 'control' Hollywood focus group alley. This allowed us to facilitate a single Hollywood focus group in which participants could reflect on both alleys.

Individuals over the age of 18 living or working within a quarter-mile radius of these alleys were targeted for participation. One youth focus group, ages 14 – 17, was recruited in lieu of an adult group. Both nonprofit and project staff undertook recruitment, using tactics including door-to-door soliciting, leaving fliers at residences, phone calls, and announcements at a community youth program. The five focus groups were held between April and June 2007. Attendance ranged from five participants at the Sun Valley and South Los Angeles groups, eight in Hollywood, nine in Pacoima, and thirteen in Wilmington. Most participants were female. The Hollywood, Pacoima, and South Los Angeles focus groups were held in English, while Sun Valley and Wilmington focus groups were held in Spanish. Trained moderators included project team leaders and experienced bilingual community meeting moderators. Participants were paid US $25 for their time.

We first asked groups to discuss alley use, including types and frequency of personal use, use by family members, and use by others they have observed, followed by questions about perceived benefits and safety. Then participants were asked to suggest ways in which alleys could be improved. We showed participants posters containing images of converted alleys, such as depaved alleys, alleys with permeable pavement schemes, alleys lined with ornamental vegetation or native vegetation, and alleys converted into parkspace. Participants were asked which changes they might support, why, and whether they would participate in maintaining a revitalized alley. Additionally, Hollywood participants were asked to share memories about the converted Hollywood alley, Gower Gulch Community Park, the extent to which they now use it, and whether they support its current design or had suggestions for alternative designs.

## The geographic context of alleys

SPACES for Alleys data were entered into data sheets that were scanned, scored, and compiled in Microsoft Excel, and then imported into and analyzed in ArcGIS. Alleys were grouped by major geographic subregion (for example, West Los Angeles, South Los Angeles) and CPA. We characterized alleys, on the basis of the audit items, by subregion and overall for the entire city sample. The 300 one-time behavioral observations were also grouped by subregion and analyzed. We compiled and analyzed data from the thirty in-depth observations separately.

To understand the sociospatial context of alleys, data layers capturing demographic, socioeconomic, housing, and land-use characteristics were added to the geographic information system (GIS) project based on 2000 US Census data, Southern California Association of Governments land-use data (SCAG, 2000), and information on park, recreation center, school, and church locations derived from ancillary projects.[5] We also collected data on the spatial prevalence of obesity and related chronic health conditions, flood risk, and pedestrian traffic safety problems from a variety of sources as a way to further understand the need for redesigned alleys to promote public and ecological health. The proximity of all alleys in the City of Los Angeles to several community features was calculated using buffer analysis, to assess the utility of alleys as neighborhood connectors. Parks, recreation centers, schools, and churches in the city were buffered using a quarter mile radius, a benchmark considered by planners to be an easy walking distance (Wolch et al, 2005). We then calculated the numbers of alleys fully or partially contained within this buffer. Lastly, we zeroed in on an area of South Los Angeles as a case study to help us understand local geographic relationships with alleys with greater granularity.

### The geography of alleys in Los Angeles

The City of Los Angeles has 12 309 alley segments that stretch more than 930 linear miles (figure 1). Assuming an average alley width of 18 ft, these alleys constitute 3.12 square miles—roughly half the size of the nation's largest municipal park, Los Angeles's Griffith Park. Between 1993 and 2004 the city allowed residents to petition to gate alleys (approximately 1100 alleys were ultimately gated) and eliminate public access—later deemed illegal by the state on the grounds that gating restricted ingress and egress.

**Table 1.** Alley density and park poverty, by subregion.

| Subregion | Size (square miles) | Population | Number of alleys | Alley density (alleys per square mile) | Total alley network (linear miles) | Number of park parcels | Total park acreage | Park poverty (persons per park acre) | Park space (percentage of total land use) |
|---|---|---|---|---|---|---|---|---|---|
| South | 40.5 | 620 818 | 3 315 | 81.9 | 239 | 60 | 783 | 793 | 3.0 |
| South Bay | 23.3 | 193 052 | 1 491 | 63.9 | 88 | 33 | 855 | 226 | 5.7 |
| Metro | 91.2 | 1 114 697 | 2 564 | 28.1 | 179 | 120 | 5 977 | 188 | 10.2 |
| West | 91.8 | 405 128 | 1 653 | 18.0 | 118 | 73 | 16 497 | 25 | 11.2 |
| San Fernando | 231.1 | 1 367 754 | 3 286 | 14.2 | 306 | 163 | 15 322 | 90 | 26.1 |
| All subregions | 478.0 | 3 721 063 | 12 309 | 25.8 | 930 | 449 | 39 434 | 94 | 13.0 |

[5] These data were obtained from the Green Visions Plan project (http://www.greenvisionsplan.net) and a Robert Wood Johnson Foundation project (grant 57279) focused on disparities in access to parks and recreation in southern California.

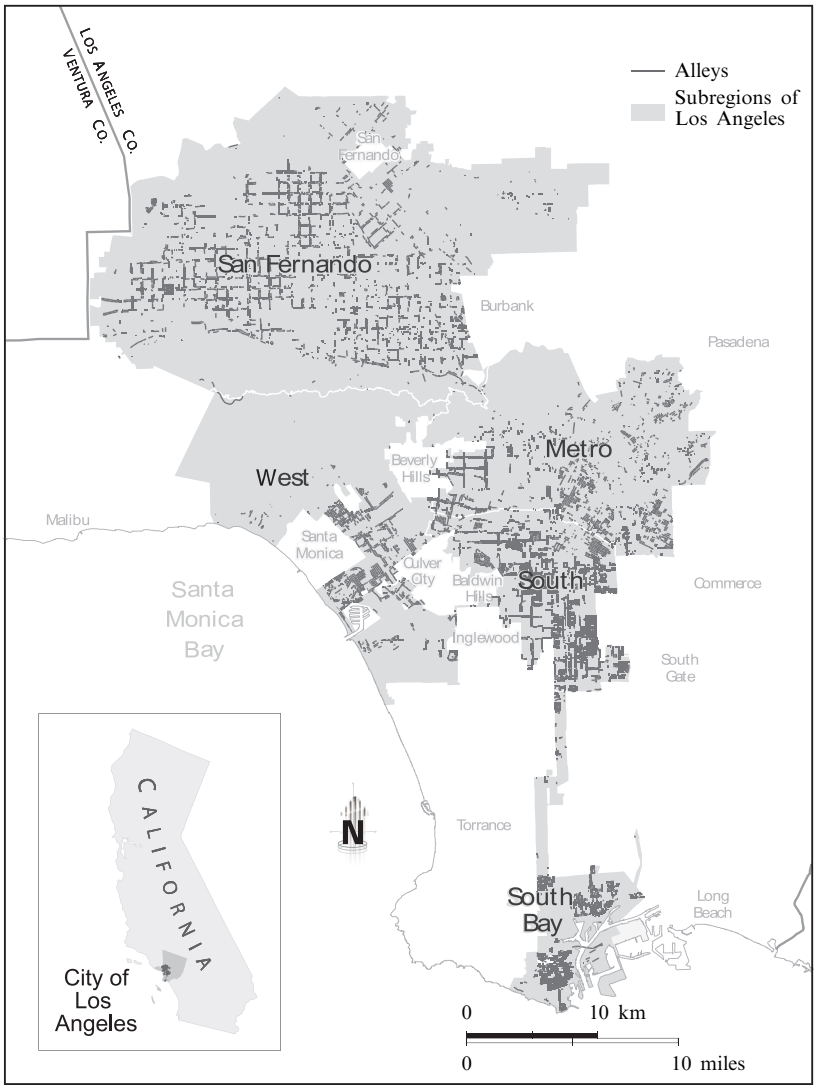
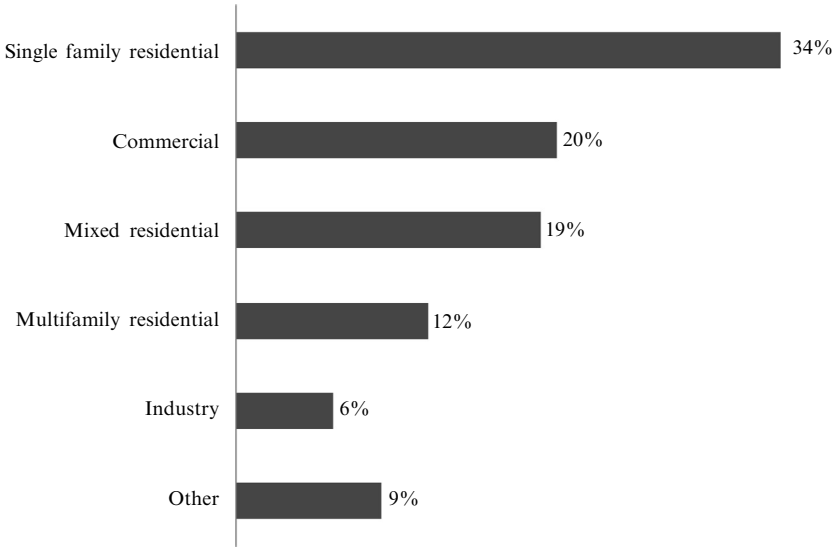



**Figure 1.** Alley density in the city of Los Angeles, by subregion.

Otherwise, there has never been a coherent public policy toward alley design or use (personal communication P Racs, Director, Office of Community Beautification, 2006). Rather, alleys have been treated essentially as streets by city departments such as public works, transportation, police, and fire.

Alleys are widely but unevenly distributed across the city. Alley density (alleys per square mile) is much higher in the South (81.9) and South Bay (63.9) subregions than in the West (18.0) and San Fernando (14.2) subregions (table 1).

The uneven distribution can be attributed to two major factors: type of land use and age of development. The majority of alleys are located in residential sections of the city. Over a third of all alleys (34%) are situated within single family residential areas with more than two units per acre, while almost a fifth are located in mixed residential zones, and another 12% are within low-rise apartment, condominium, and townhouse districts. Roughly 20% are located in commercial districts—older strip development (14%) and modern strip development (6%)—followed by industrial zones (6%; figure 2).




Notes: 'Other' includes schools, universities, and religious facilities, among others.

**Figure 2.** Alley distribution in the City of Los Angeles, by landuse category (sources: land-use categories adapted from Southern California Association of Governors, SCAG, 2000; data on alley distribution from the Engineering Department of the City of Los Angeles).

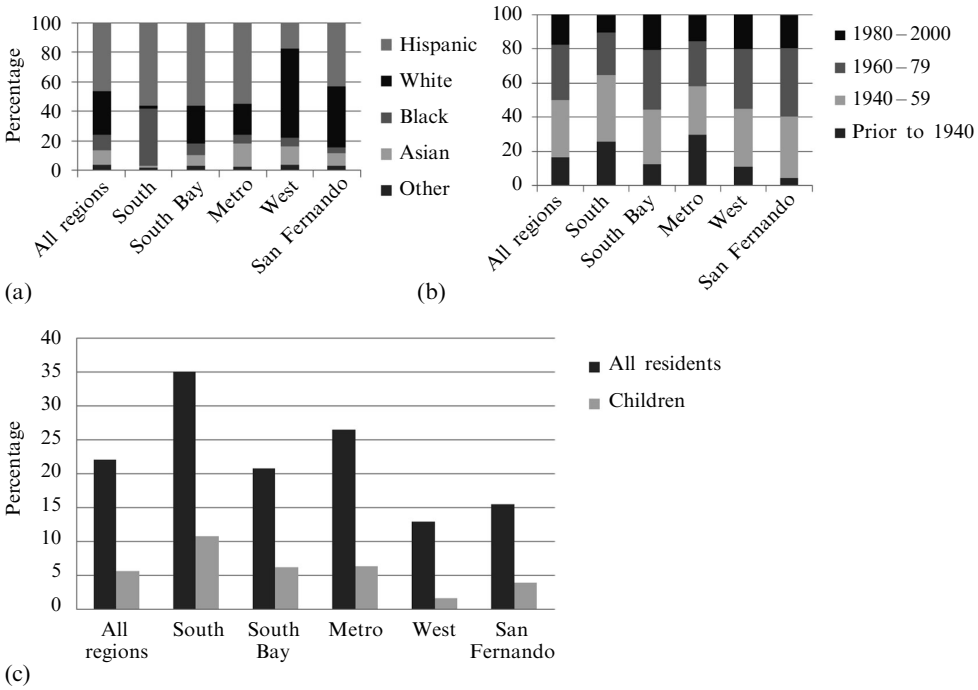



**Figure 3.** Selected demographic and economic variables in the City of Los Angeles, by subregion: (a) ethnicity; (b) age of development; (c) level of poverty.

Older areas of the city generally have more alleys. In the subregion with the highest alley density, the South, more than a quarter of all housing units were built before 1940 and 65% were constructed before 1960. This contrasts markedly to the subregion having the lowest alley density, the suburban San Fernando Valley, where just 3% of housing was built before 1940 and less than 40% was built before 1960 (figure 3).

Alleys are heavily concentrated in low-income Latino and (to a lesser degree) African-American communities (figure 4). In subregions with the highest alley densities


**Figure 4.** [In color online, see http://dx.doi.org/10.1068/a42259] (a) An alley in Wilmington (South Bay subregion) targeted for conversion that connects a primarily Latino residential neighborhood to a local primary school; (b) an alley in the South subregion used as a dump site; (c) Susanne Simmons, a local community leader, showing off a reclaimed alley space; (d) urban alley off of Selma Avenue, Hollywood, West subregion; (e) design prototype for the Selma urban alley; (f) fitness zones—easy to use, isometric, outdoor gym equipment—can be installed in reclaimed alleys.

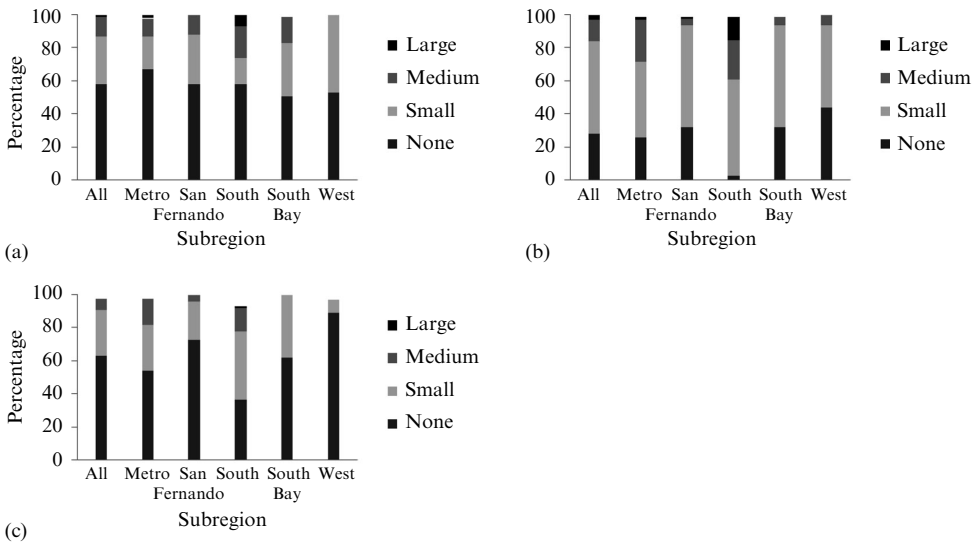
(South, South Bay, and Metro) Latinos make up more than half of the total population. The South subregion is particularly notable because just 2% of the population is white, the remainder being Latino (56%) and African-American (38%). More than one third of the population in this subregion lives below the federal poverty line, including 11% of all children (17 years and under). Over half of all households had an annual income in 1999 of less than US $25 000 (figure 3).

In contrast, subregions with low alley density, West and San Fernando, have large White populations, 61% and 41%, respectively, and are comparatively affluent. Just 13% of the West subregion population, for example, lives in poverty, and only 2% of all children live below the poverty line (figure 3). More than one quarter of households in the West subregion made more than US $100 000 per year in 1999.

**Alleys as sociophysical environments**

Surprisingly, given the history and images of urban alleys, results of the 300 physical audits revealed that alleys in Los Angeles are generally walkable, quiet, and clean. Three quarters of the alleys were rated by auditors as average in terms of attractiveness and ease of passage on foot. An 'average-looking' alley is one that may have small to medium amounts of litter, garbage, and graffiti, unkempt fences and buildings, and some weedy vegetation or no vegetation, but overall is not unpleasant to pass through. In more than 80% of the alleys no odor could be detected, and 85% of alleys were quiet places. Only minor amounts of small litter—or no litter at all—typified 84% of the alleys. Over half (58%) had no large garbage items, and a majority (63%) were free of 'risky litter' (eg alcohol containers, beer caps, condoms, and drug paraphernalia) (figure 5). Most alleys had little or no graffiti (85%).

Alleys are key access routes. Virtually all the alleys audited (97%) had either one or two street access points—where alleys connect to the street. Alleys also provide access to property. This includes from garages or parking structures to residences but auditors also noted many small gates where residential properties can be accessed by foot. In some alleys the number of access points can be high: 17% of




Note: 'Risky litter' indicates that risky behavior took place in alley; items include alcohol containers, beer caps, condoms, and drug paraphernalia.

**Figure 5.** Selected characteristics of alleys in the City of Los Angeles. (a) Large garbage; (b) small litter; (c) risky litter.

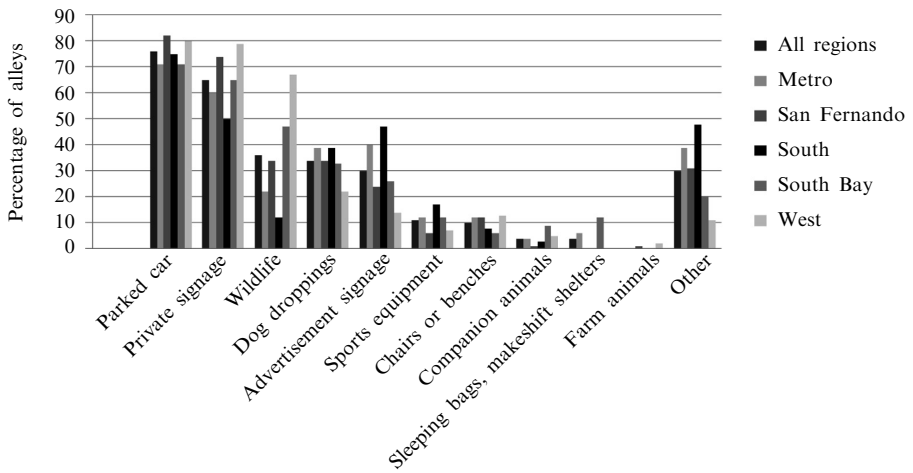



**Figure 6.** 'Signs of life' in alleys, by subregion.

the audited alleys had thirty-one or more property access points, and 55% had more than ten.

A variety of 'signs of life' discovered by auditors provide insight into how alleys are used. Note that for this descriptor we deliberately incorporate both human and nonhuman activity, as well as other activity metrics, since emergent research on 'urban ecologies' advocates integrating human and biophysical patterns and processes (Alberti et al, 2003). Not surprisingly, alleys routinely accommodate vehicular traffic and provide parking space; parked cars were the most commonly sighted sign of life (75%; figure 6).

Such use left clear traces: significant oil spillage was found in 72% of the alleys. Oil spills are a result of not only a history of parked cars that leak oil, but also the use of alleys as a common place for performing do-it-yourself oil changes. Less expected were the private signs posted along alleys. Such signage was found in 65% of alleys. Signs concerned parking, dumping, dog waste, and trespassing. Such signs were most common in more affluent areas.

Other signs of life point to use of alleys by both people and animals. Animal presence was indicated by the sighting of companion animals such as dogs and cats, but much more common was evidence of past use, in the form of dog droppings—the result of people walking their pets but also the use of alleys by stray dogs as a refuge. In addition, various species of wildlife—birds, snakes, raccoons—were observed by auditors. Human use was indicated by the discovery of chairs and benches, sports equipment, and makeshift shelters. This evidence suggests that, while residents are clearly using alleys to park their cars and access homes, apartments, offices, and stores, they are also walking their dogs, playing sports, and congregating. In some cases alleys are also used by homeless people seeking an out-of-the-way place to sleep.

The audit revealed alley conditions varied by region. Alleys in older communities, poor or working-class areas, and communities of color, were clearly more problematic than in more affluent districts. This was confirmed by difference-in-proportions tests [95% confidence interval (CI)] of the subregions. In the South subregion 38% of the alleys had medium to large amounts of small litter, 15% had medium to large amounts of risky litter, and 34% had medium to large amounts of graffiti. The Metro subregion also had higher than average percentages for these indicators, including the most risky litter—not surprising given that this subregion includes some of the poorest parts of the city, including the Skid Row and MacArthur Park neighborhoods, where problems of gangs, drugs, and homelessness are prevalent. Problems with garbage dumping in

alleys in these areas boiled over in 2008 [figure 4(b)], leading to a renewed city effort in response to resident complaints (Lopez, 2008a; 2008b). In the most affluent subregion, the West, neither litter nor graffiti were sizable problems.

Private signage was the most common sign of life in the West subregion, and its presence was significantly higher (95% CI) than the Metro and South subregions, but not so for the other subregions. Signage was followed closely by wildlife, in the West subregion. The difference between the presence of wildlife in the West and South Bay subregions and the other subregions was statistically significant (95% CI). In contrast, there was no significant variation between the two subregions (Metro and South) with the lowest presence of wildlife. There are a number of possible explanations for such variation. One explanation might be the larger amounts of park space. As noted, the West subregion has almost 30% of its land devoted to parks, compared with less than 3% in the South subregion. In addition, the West subregion has closer proximity to large open spaces such as the Santa Monica Mountains and the Ballona wetlands, more single family housing with landscaped yards (often with fruit trees that attract wildlife), and, as is typical in more affluent areas, more street trees and shrubbery providing wildlife habitat. These findings suggest that wild animals may use alleys as green movement corridors to connect to large habitat patches.

**Alleys as activity spaces**

The most striking revelation from our behavioral observations was how infrequently alleys were used. Most of the time no activity at all was observed, and this was true during both the initial observations of our sample of 300 alleys as well as the in-depth observations of 30 alleys. The activity level was essentially the same on weekends and weekdays. Activity of any type occurred only 22% of the time during the weekdays and 20% of the time during the weekend.

The physical audits indicated that access by vehicles was a prominent use of alleys, and this premise was confirmed by the behavioral observations. Driving to access or leave a property was the most commonly observed activity in all parts of the city (figure 7).

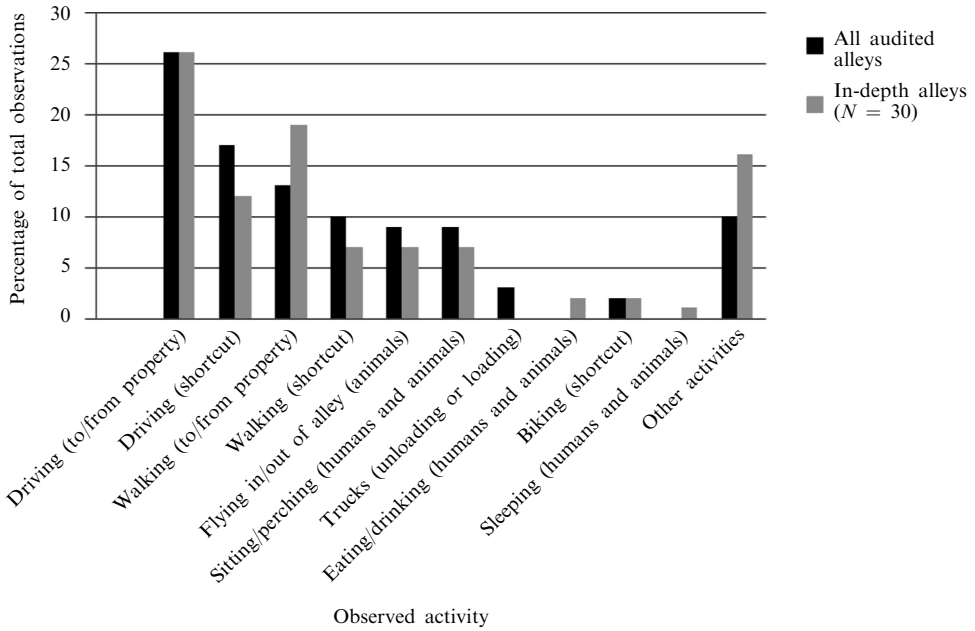



**Figure 7.** Activities observed in alleys in the City of Los Angeles.

Driving through alleys as a shortcut was the second most common activity observed in the 300 observations, while this activity ranked third during our in-depth observations. However, the observations also show that people walk through alleys and leave or access properties via alleys on foot. 'Other' activities observed included use of alleys to maintain sewer pipes, to access overhead power lines, and to check utility meters.

There were some regional differences. As expected from the physical audits, in the West subregion wildlife activity was significantly different (95% CI) from the other subregions, with birds flying within, into, or out of the alley being the second most frequent observation. Avian activity was also fairly common in the Metro and West subregions, and the third most frequent observation in the South subregion. Perching animals and people sitting in alleys were also frequently observed. In some parts of the city, especially Metro and South, trash dumping and people sleeping or simply sheltering in the alley were observed with greater regularity.

**Alleys as lived spaces**

There was a marked contrast between the findings of the physical and behavioral audits, and the perceptions of alleys revealed by the focus group participants. While rates of nuisances (such as garbage or risky litter) and observations of homeless individuals were higher in some focus group neighborhoods, participants had some extremely strong negative opinions of their local alleyways. Participants provided a long list of nuisances, hazards, and illegal activities associated with alleys. At all of the focus groups participants mentioned the dumping of garbage, while in four of the five groups participants noted that they had observed drug dealing and use, homeless occupants, tagging, graffiti, and use of the alley as a restroom. Three of the five focus groups included discussions of observed drinking and sexual activity. Fear of alleys was common, arising from the presence of gang members, loitering men, and visibly homeless people, especially those with signs of mental disability. This fear appears to be a variant on the well-known phenomenon of 'stranger danger' now common across many types of neighborhoods, inhibiting the use of public space for walking, physical activity, or play (Scott, 2003). In the low-income communities where focus group residents live, these dangers are often part of everyday life.

For example, one woman from South Los Angeles shared a frightening experience she had while cutting through an alley with her children:

> "we were [rushing] to school ... so I took that alley, but it just scared me so bad, it looked like in the movies where you see all those gang members ... I was in the middle of it when I realized you know I had my kids with me: I was so scared, even though it was the morning."

Along a similar vein, a woman from the Sun Valley focus group described her concern for her teenaged granddaughter when no one is available to meet her at the bus stop:

> "She walks, and it's a torment for me, knowing that I'm not home and my girl has to cross past that corner and sometimes there are many drunk men [at the mouth of the alley]."

Garbage and tagging emerged as major factors that informed perceptions of alleys as dirty and unkempt. Participants recalled incidents where neighbors, homeless people, and strangers used their alleys to dump garbage and furniture. Garbage was a continual problem, despite efforts to confront offenders and undertake clean-up efforts themselves. As one teen from Pacoima pointed out,

> "The trash, it's only making our community look dirtier and ... it's not really giving [people who pass by] a good impression of the community. The same thing with the tagging—it makes our community look ugly."

Such problems are aggravated by a lack of attention to alley aesthetics; unlike street facades that are often regulated under design guidelines, alleys are not subject to such scrutiny, reinforcing their murky status. The consensus was that back alleys were often threatening, unsafe, and dirty places that lacked clear functions or jurisdiction.

Nonetheless, participants did use alleys, in just the ways highlighted by the behavioral audits: as shortcuts, as a means to access residences, and to park vehicles. Apart from their utility on a day-to-day basis, however, the majority of focus group participants felt that alleys did not benefit their communities.

Participants were quick to suggest measures—mostly pertaining to safety, security, aesthetics, and use—that could improve local alleys. Moreover, they generally responded favorably to images of alleys that had been landscaped with plants, trees, and flowers. Ecological improvements and opportunities for physical activity were also portrayed via a series of images. These included bioswales, permeable paving, small garden plots, and walking and bike paths. Response to these ideas among participants was enthusiastic, with the proviso that such retrofitting would also make their alleys more convenient and safe (Seymour et al, 2010b).

**Alleys as sustainable spaces**

What if alleys were transformed from ambiguous spaces into valued places? Our analysis suggests that several significant benefits related to access to open space, neighborhood walkability, and local environmental quality would accrue. To highlight possibilities we explore a 3.6 square mile polygon in the South subregion where the alley network is particularly dense (figure 8). This hypothetical planning scenario illustrates the potential for how alley 'greening' could transform quality of local life and make the region more sustainable.

Composed of twelve contiguous census tracts and primarily single family and multifamily housing, this area had a total population of 57 976 in 2000. About one third of the houses in these census tracts were built prior to 1939 and more than 70% before 1960. The socioeconomic characteristics for this polygon are similar to the South subregion as a whole: slightly more than one third of the population is living in poverty, about half of all households earn less than US $25 000 annually, and just 4% earn more than US $100 000. Virtually all residents are either Latino (54%) or African-American (42%).

*Access to parks and playspace.* In Los Angeles there is a direct correlation between alley-rich, low-income subregions and 'park poverty' or persons per park acre (Sister et al, 2007), and park poverty is most severe in the South subregion, with an average of 809 people per park acre (table 1). The scenario community itself has just three parks (22 acres), roughly one park acre for every 2593 persons. Yet this park-starved area is alley rich, with 577 alley segments or 160 alleys per square mile, almost eight times the city average. With 40.12 linear miles, the area of this network is approximately 87.5 acres, or more than four times the polygon's existing parkland. Converting these alleys into green space would dramatically reduce park congestion or 'pressure' to roughly 528 people per park acre. Although this is still much higher than the citywide average, and not all alley space could literally become parkland, an alley conversion strategy would still entail a radical reduction in park poverty. In this context the alley network is a significant untapped public resource.

*Physical activity and health.* The County of Los Angeles' South Service Planning Area, which includes the city's South subregion and our scenario neighborhood, has the county's highest rates of adult obesity, diagnosed diabetes, and coronary heart disease (LA County Department of Public Health, 2007). This is not surprising, since this is a poor community of color where rates of chronic disease tend to be high.

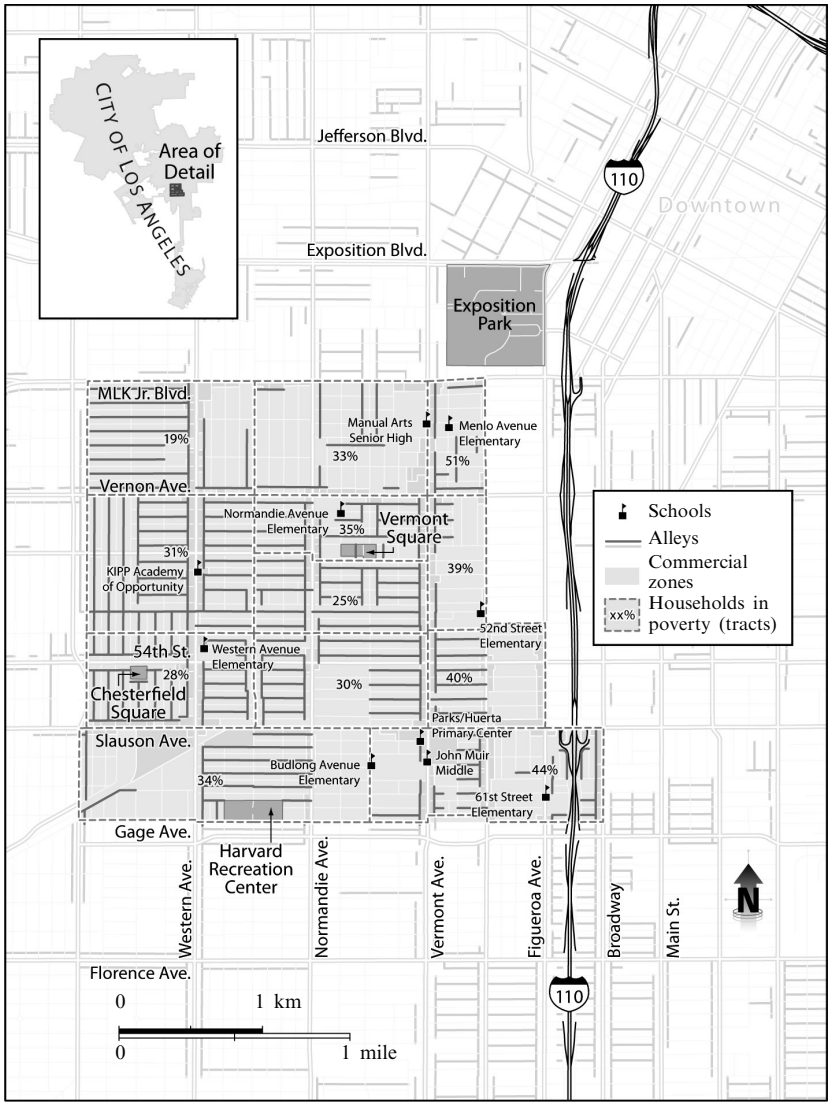



**Figure 8.** Alleys in the South Los Angeles case study neighborhood.

Tellingly, this subregion also has the City's highest rates of failure (44%) in the State of California body composition test of school children in grades 5 – 12,[6] highlighting the future health risks facing this community's children and youth. Safe, clean, and green alleys could facilitate walking and informal recreational use via the provision of micro-exercise equipment sites, park benches, swings, and other infrastructure for local residents [figure 4(f)].

*Urban walkability and mobility.* Because most alleys in Los Angeles weave through residential areas, they can also connect residences and key destinations, such as schools, parks, recreation centers, and churches. Our proximity analysis using GIS buffer tools revealed that a third of Los Angeles's alleys are within easy walking distance (defined as a quarter mile or less) of a school and 37% were within walking

[6] Fitnessgram data were compiled by zip code as part of the Green Visions Plan (see http://www.greenvisionsplan.net for metadata).

distance of a park. In some areas of the city, proximity was even greater. In our South Los Angeles case-study community, for example, the figures were 42% for schools and, like the citywide average, 37% for parks. Redesigning alley networks in these types of neighborhoods could facilitate walking and bicycling to frequently visited destinations.

More than one quarter of the households in the South subregion lack access to a vehicle, far higher than elsewhere in the city. In our scenario community, transportation disadvantage was similar (26%, but 34% among renters) leaving them reliant on an overburdened and inadequate public transportation system. Los Angeles County, after San Francisco, has the highest pedestrian incident rate of any county in the state (Surface Transportation Policy Project, 2002). Young Latinos and African-Americans were at highest risk of being hit, killed, or injured. If alleys could become safe walking and biking corridors between destinations in alley-rich communities, they might serve also to mitigate transportation disadvantages by allowing residents to walk, bike, or skateboard safely to a wide variety of destinations.

*Environmental benefits.* Some areas of Los Angeles with high alley density are also close to urban waterways, have inadequate storm drain capacity, and are surrounded by impervious surfaces. For example, the South subregion has the highest alley density, and is 66% impervious. Some subregions are subject to routine flooding with polluted urban runoff; the South subregion in particular has experienced massive sewerage overflows (Madigan, 2004). As a measure of flood risk we used the number of phone calls to the Los Angeles Department of Public Works over a twenty-nine year period (12 May 1969 – 17 June 2008) reporting incidents of flooding and/or inadequate drainage. GIS analysis of 'flood complaint density' revealed that the South subregion had the second highest density (10.4 calls), after Metro (11.8 calls per square mile); this compares with the West, at just 3.3 calls per square mile. The San Fernando subregion had almost half of total calls, in part because it is the largest subregion but also because the valley is subject to frequent floods.

The potential beneficial role of alleys in watershed managed is already recognized and other cities have embraced alley greening to reduce urban runoff, recharge groundwater aquifers, and improve groundwater quality. Rather than invest in hard infrastructure such as new or resized storm drains, urban watershed managers are beginning to seek out ways to redesign streets and neighborhoods to increase infiltration. Thus alleys in areas subject to inundation could play a useful ecosystem service role.

In sum, our scenario analysis of a South Los Angeles community illustrates that redesigning alleys could deliver ecosystem services, improve watershed health, improve local quality of life and health status for residents, and help the city transition to a more sustainable urban design and pattern of use. In places like South Los Angeles an alley greening program could have an especially transformational impact [figure 4(c)]. There are barriers (primarily fiscal) to mobilizing large-scale alley redesign and greening. But pressures to make cities healthier, protect ecosystem services, and mitigate climate change are mounting. In Los Angeles and elsewhere these concerns are leading to a reconsideration of the role of such long-neglected urban spaces.

## Conclusions

The goal of our research was to understand alleys as elements of urban form. Whether cherished or feared, alleys form a significant part of the urban landscape and image for many residents. They could constitute a vanguard strategy in the design of more sustainable cities—human settlement patterns that promote social and ecological justice, economic vitality, and ecosystem integrity, while minimizing resource consumption and waste generation. Our participatory mixed-methods research strategy

uncovered novel aspects of Los Angeles's 930 miles of back alleys and revealed the interconnections between aspects of sustainability. The physical audits reveal that, taken as a whole, the alleys of Los Angeles are reasonably attractive, walkable, quiet, and mostly clean, though, in less-affluent regions of the city, litter and graffiti were common. Behavioral audits suggested that alleys are not activity hubs, though consistently used for ingress, egress, and short cuts.

Focus group findings highlighted a less benign aspect of alleys. The discrepancies between observations and resident reports might indicate that our audit methodology did not capture some of these frightening or unpleasant events, especially those occurring at night. Yet residents' strong negative feelings about alleys tied to the muggings and gang presence they described may also reflect lasting fear from exposure to criminal activity, no matter how frequent or isolated the events. However, fear of alleys based on experiences, along with broader societal perceptions of alleys as dangerous disorderly spaces, present challenges for planning useable (and used) alleyways. Resident perceptions must be seriously considered in revitalization plans meant to enhance alleys as social and physical activity spaces.

However, changes in public space design have been linked with reduced fear of crime and increased use of places such as pedestrian footpaths, streets, and public green spaces (Painter, 1996; Whitley and Prince, 2005). Alley redesign and increased use of these spaces by residents may in turn increase surveillance and deter crime (Kuo, 2003; Kuo and Sullivan, 2001).

Because alleys are generally underutilized, their status as ambiguous urban spaces is reinforced. The recent movement for 'complete streets' (Laplante and McCann, 2008; McCann, 2005) and the ongoing expansion of the woonerf-inspired shared streets in Europe and the Middle East indicates that urban streets can be multiuse and multiuser public spaces that support pedestrian use, catalyze resident interaction, offer spaces for informal play, and provide ecosystem services. So too could alleys be reimagined and redesigned (even more easily, given their ultralow traffic volumes) as places offering such multiple public benefits [figures (4(e) and 4(f)].

In response to both need and potential, alley conversion programs have been developed to date in cities such as Chicago, Baltimore, Pasadena, and Santa Cruz. However, they tend to be single purpose (Cassidy et al, 2008). In Chicago, for example, that purpose is urban runoff management; in Baltimore an alley leasing program allows adjacent residents to gate their alley and use it safely as communal space. Pasadena, like Santa Cruz, has focused on pedestrianizing alleys located adjacent to retail hubs, where s› they offer addition space for dining, strolling, and shopping. Multiple use strategies help address the challenge of funding for conversion and maintenance by leveraging resources from community organizations, business improvement districts, and a variety of government agencies.

Our research makes us hopeful that alleys will be redesigned to incorporate multiple benefits—ecological, economic, and social. Our findings galvanized such a strategy for alleys in the City of Los Angeles, which established in 2008 a cross-departmental Green Alley Subcommittee of the city's larger Green Streets initiative and directed city staff to create a Green Alleys Program. Through the incorporation of 'green' alley principles in urban design guidelines and community planning, the city's goal is to transform alleys into valued urban places. Demonstration projects that redesign alleys with bioswales and permeable paving as a way to mitigate polluted runoff and plant alleys with native vegetation to support birds, butterflies, and other small animals are in development. The city's planners also seek to create commercial district alley zones—in downtown's Fashion District, for example, as well as in Hollywood—and to links schools and parks with residential neighborhoods in South Los Angeles.

In park-poor areas a major goal is to encourage designs that permit auto access but also allow walking and bicycling, and promote informal physical activity by offering 'fitness zones' or outdoor microgyms, swings, or basketball hoops [figure 4(f)].

Certainly, more research on alleys as elements of urban structure and dynamics is warranted. Given the current study, research on 24-hour activity patterns in alleys, representative surveys of neighbor uses and perceptions, and planning studies designed to estimate impacts of alley redesign on urban heat islands, habitat value, and other ecosystem services would be useful. So too would be network analysis models that reveal the increase in connectivity provided by useable alleys and facilitate the incorporation of alleys into nonmotorized transportation plans, and park equity studies that include greened alleys and estimate their impact on park congestion and access.

Cities are durable and many features of urban form outlive their utility and become obsolete. Alleys have been a component of urban design for millennia, periodically changing their function in conjunction with changing patterns of settlement and transport. In US cities, alleys historically had clear functions—as access to servant housing, barns and stables, and eventually utilities and garages—but they sometimes inspired fear and loathing. Negative perceptions only increased as the functions of alleys (and their use) dwindled. The imperative to reweave aging urban infrastructure and rethink the design of cities to enhance their sustainability offers an opportunity to reimagine alleys as a vital part of the city's green matrix that can help restore ecological functioning, and enhance public health and the quality of life for many urban residents.

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## Appendix

**Part A. Alley surroundings**

1 – 5. What types of land uses border the north or west side of the alley?
6 – 10. Which of the above is the dominant land use on the north or west side of the alley?
11 – 15. What types of land uses border the south or east side of the alley?
16 – 20. Which of the above is the dominant land use on the south or east side of the alley?
21. How many street access points are there?
22. How many alley access points are there?
23. How many minor access points are there?
24. How many property access points are there?
25. How many unofficial access points are there?
26. How wide is the alley strip?
27. What is the dominant height of structures bordering the alley?

**Part B. Substrate**

28. What percentage of the alley is covered by impermeable surfaces?
29. What percentage of the alley is covered by permeable pavement?
30. How steep is the slope?
31. Is there a culvert or drainage ditch in the alley?

**Part C. Use, condition, and safety**

32 – 33. What types of city, county, or federal or maintenance-related facilities are found within the alley?
34 – 36. What types of 'signs of life' are observable in the alley?
37. How many cars are parked in the alley strip itself?
38. What amount of small litter items is found in the alley?
39. What amount of large garbage objects is found in the alley?
40. What amount of risky litter is found in the alley?
41. What amount of graffiti is found in the alley?
42. Has any graffiti been painted over?
43. How many chemical storage barrels are in the alley?
44. What amount of oil spillage is found in the alley?
45. What level of noise exists in the alley?
46. What level of odor exists in the alley?
47. How aesthetically pleasing is the alley?
48. What level of walkability characterizes the alley?
49. What level of visibility into the alley exists for residents, business employees, and patrons in yards and buildings along the alley?
50. To what degree do objects in the alley impair an individual's view of the entire alley?
51. Is there curvature in the alley to what degree is one's line of sight compromised?
52. How many municipal lighting fixtures are in the alley?