

CHILD-FRIENDLY DESIGN IN HIGH DENSITY NEIGHBORHOODS

BY JACOB ACCOLA

Introduction..... 1

Transportation..... 2-6

Built Form..... 7-11

Outdoor Spaces..... 12-16

City Services and Retail..... 17-21

Sources..... 22

High density child-friendly design is the concept of creating sustainable physical environments that insure children's health, well-being, and development in dense neighborhoods and cities. Throughout history, architects, landscape architects, and city planners have focused their pursuits mostly on the demands of adults. Cities have existed for thousands of years, yet the needs of children were largely ignored during their development. Nonetheless, child friendly design does have a small place in history, and today designers and planners are increasingly focused on the needs of children.

This handbook will outline an abundance of various design guidelines that architects, landscape architects, and urban designers should utilize in order to create high density child friendly neighborhoods. It is important to note that every designing guideline in this handbook does not have to be used for a neighborhood to be child-friendly; rather, the guidelines should be employed when doing so would allow for a simple and easy implementation.

The child-friendly design guidelines in this handbook are organized into four different broad topics: transportation, built form, outdoor space, and city services/retail. Moreover, within each of these topics, there are five individual subtopics. Transportation consists of cycling, roads, sidewalks, informal pathways, and public transit. Built form includes size, acoustics, façade, views, and circulation. Outdoor spaces encompass urban agriculture, playgrounds, sport fields/courts, natural landscape, and artificial landscape. And city services/retail involves rescue services, energy use, schooling, stores, and mobile retail.

Amidst the 20 subtopics, there are a range of design guidelines that relate to the respective elements. The cycling topic for instance consists of design guidelines relating to bike paths. Essentially, in order to make a

city child friendly, the four topics of transportation, built form, outdoor space, and city services/retail, their respective subtopics, and the design guidelines within the subtopics must be appropriately applied into high density neighborhoods in a child friendly fashion. The next page begins with the transportation topic, and more specifically states the importance of utilizing numerous design methods that make cycling child-friendly in high density neighborhoods.



Children playing on a city street (New York, New York)

Children often bike to travel, as the costs associated with automobiles and public transit, the slow movement of walking, and the congestion of automobile traffic make biking economical and a fast form of transportation. Unfortunately, cycling in high density neighborhoods can be problematic for children. Sidewalks are often overcrowded, and roads can be dangerous with the fast movement of automobiles. Moreover, not all children own bikes, it can be cumbersome to bring one's bike throughout a city, and bikes risk being stolen in crowded areas.

Child-friendly cycling neighborhoods shall...

-Contain an abundance of bike racks. {12}

-Place bike stations throughout the community that are accessible for ALL ages, cost-effective, durable, and easily identifiable. {12}

-Create a bike network that encompasses bike specific signage (traffic lights, speed limits), consists of distinct and visible road markings (directional arrows, varied color palettes), leads to spaces that children enjoy or heavily use (playgrounds, parks, schools), and is separated or protected from automobile traffic (on-street parking, green islands). {4 & 10}



Bike lane separated from road and varied color palette (London, England)



Bike specific traffic light (Budapest, Hungary)



Bike Station (Washington, D.C)

In high density neighborhoods, walking is a heavily used form of transportation for children, as most facilities are in walking distance. Additionally, children often use sidewalks as play spaces, sometimes even more so than neighborhood parks or playgrounds; thus, it is vital to design sidewalks not just for transport, but for entertainment as well. Sidewalks that become underutilized can quickly become deteriorated and dangerous, so keeping sidewalks busy is vital to promote walkability in high density neighborhoods.

Child-friendly sidewalks shall...

- Be at least 8 feet wide. {4}
- Contain a barrier between the road through the use of on-street parking or vegetation. {10}
- Have street furniture. {4}
- Encompass street vegetation. {9}
- Be oriented toward retail facilities when possible. {6}
- Incorporate dedicated kid routes using iconography or color palettes. {4}



Sidewalk that is over 8 ft wide, contains street trees, utilizes on-street parking as a barrier, and is oriented toward retail facilities (Columbus, Ohio)



Artistic street furniture (Belfast, Maine)



Dedicated Iconography (San Francisco, California)

The road is often portrayed as a dangerous element for children. Parents worry about their children being struck by cars, and in the United States in particular, roads rarely take in account the needs of pedestrians, and rather are built to alleviate traffic and fulfill the needs of automobiles. Nevertheless, there are a variety of viable methods used to produce child friendly roads; and in some instances, roads can even become shared spaces that are used by children for play.

Child friendly neighborhoods roads shall...

-Utilize woonerfs (shared streets where pedestrians and cyclists have legal priority over motorists) when possible. {9}

-Slow traffic along sidewalks that children heavily use by constructing speed bumps, chicanes, curb extensions, and sharp curves. {10}

-Reduce crosswalk distance using a median island or sidewalk extension. {10}

-Create interactive crossing signals, e.g., sounds, colorful flags, and visual pattern changes {4}

-Differentiate the land material among crossing areas and the rest of road. {4}



Woonerf (Copenhagen, Denmark)



Different crosswalk material (Venice, Florida)



Crosswalk Island
(Cambridge, Massachusetts)

Like roads, public transit is often considered unsafe for children to use. Parents sometimes feel that public transit is dirty, used by those of low socioeconomic status, and fear that their children are unprepared to utilize public transportation by themselves. Nonetheless, public transit is growing and is effective at offsetting the traffic issues that arising from growing cities. Moreover, there are a variety of ways to make public transit safer, more accessible, and increasingly used by children.

Child-friendly public transit shall...

-Consist of sheltered waiting areas that protect children from the natural elements. {4}

-Grant passes that are affordable to children. {13}

-Provide frequent routes and stops. {13}

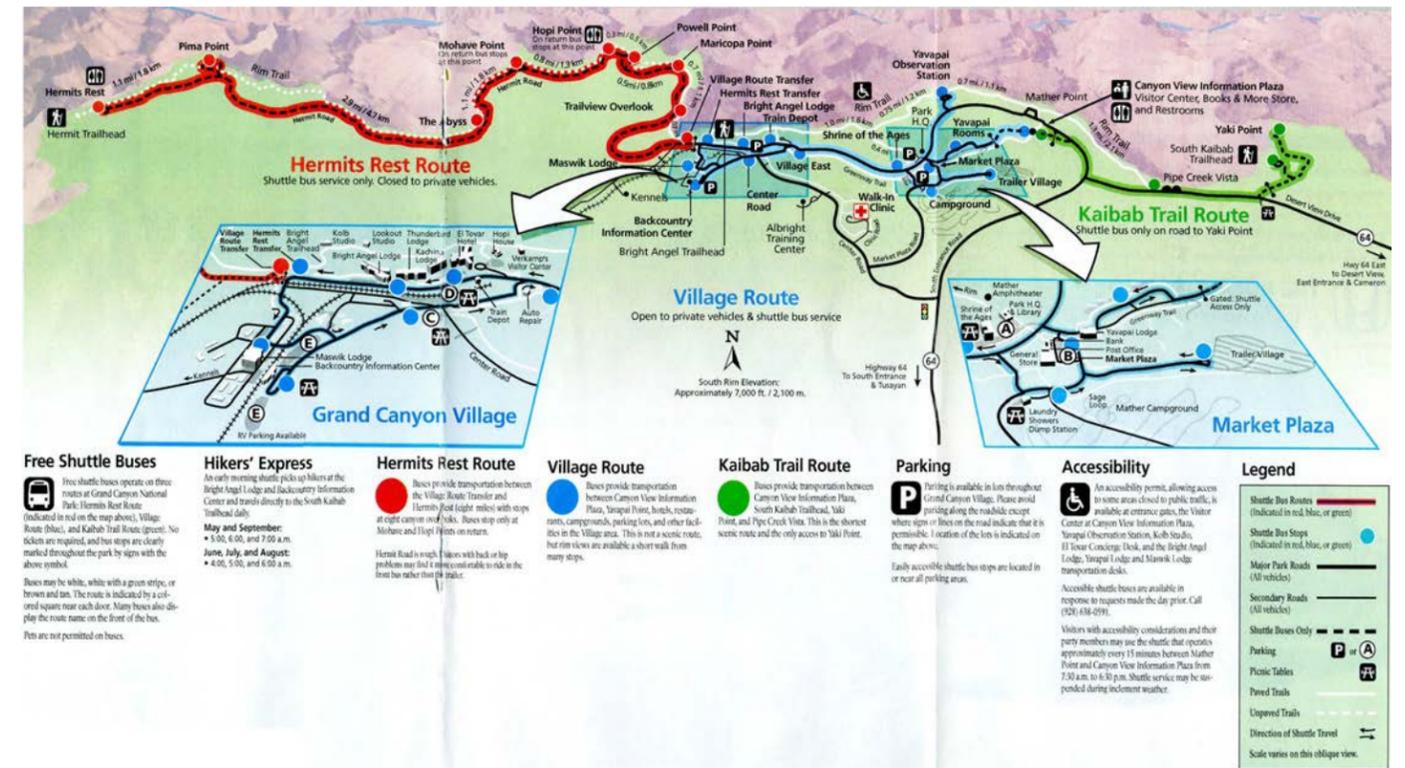
-Locate and direct routes and stops near locations that children relish or commonly utilize (playgrounds, parks, schools). {13}

-Ensure child safety by not accelerating too quickly, traveling at a consistent speed, employing safe drivers/operators, and creating secure pathways that lead to routes and stops. {13}

-Assure that routes and stops are easily navigable through the implementation of recurrent signage, iconography, and maps. {4}



Bus shelter (Curitiba, Brazil)



Detailed public transit map (Grand Canyon, Arizona)

Informal paths are often a forgotten transportation component in high density neighborhoods because of their lower usage among the other transportation methods. Nonetheless, informal paths are a vital element in high density neighborhoods, especially for children. Informal paths offer children the opportunity to safely and quietly explore across their busy neighborhoods. They are separated from the chaos of the city, and become hidden quiet spaces that children can use for quick travel and relaxation.

- Child-friendly informal paths shall
- Be slightly hidden. {8}
- Lead to shortcuts throughout neighborhoods. {2}
- Cut across green and natural elements. {8}
- Be constructed of natural materials (rock, soil, etc). {8}
- Be narrower than major and heavily used pathways. {2}



Hidden and narrow informal path constructed of natural materials and adjacent to green elements (Chicago, Illinois)

The size of building footprints is critical in child-friendly development. Structural components that are too large can make children feel diminished, oppressed, and insignificant; while structural features that are too small can cause children to feel cramped, restricted, and constrained. Therefore, it is key to design buildings that are properly portioned for youth to inhabit.

Child-friendly building size shall...

- Encompass a mixture of building masses and heights. {4 & 12}
- Group dwellings large enough (30+ units) to support a variety of communal spaces and play opportunities for all ages. {2}
- Ensure structures are 6 stories or less. {4}
- Insure there is accessible storage space for play materials. {5}
- Provide gallery widths that reflect the number of dwellings served. {2}
- Implement wide access ways spaces that accommodate children's need to play. {2}



Mixture of building heights that are all under 6 stories tall
(New York, New York)

The acoustics of buildings can have both a major positive and negative impact on children's livelihood. Children need spaces that are quiet and relaxing, but also require spaces which give them the freedom to play loudly without disturbing adjacent neighbors. Through proper acoustical design, it is possible to create structures that offer both tranquility and boisterous autonomy for children to exploit.

-Child-friendly building acoustics shall

-Avoid the construction of child care centers near large noise sources, including highways, street intersections, railroad lines, and airport flight paths. {5}

-Provide sufficient floor space where children can be in seen and/or heard. {5}

-Create rooms meant for quiet and relaxation. {5}

-Posses soundproofing between decks and dwellings through the utilization of insulating party walls, carpet, cork floors, and mats. {2 & 7}

-Minimize noise within an individual dwelling by avoiding the construction of open floor plans, and by implementing acoustic panels, acoustic baffles, and varying ceiling heights. {7}



Variety of artistic acoustic wall panels



Acoustic ceiling panel

Like adults, children appreciate the functions of facades, which set the tone of a building, illustrate the beauty of a neighborhood, and act as a navigational component in a community. Lackluster, rundown, uninteresting, and confusing facades hinder the appeal and navigability of a city, thus preventing children from fully interacting with their neighborhood. In order to design facades that are child-friendly, one must employ a variety of aesthetic and directional techniques.

Child-friendly building facades shall...

-Illustrate diversity between different dwellings and buildings through the integration of an assortment colors, shapes, and textures by varying building materials and paint shades. {4}

-Utilize artwork and nature. {4}

-Visibly label house numbers, mailboxes numbers, and other forms of personalization {2}

-Clearly identify informal and formal entrances. {2}



Varying paint shades, windows, and clear formal entrances
(New York, New York)



Facade that illustrates the building's address number by utilizing light and shade patterns
(New York, New York)

Building views are crucial in child-friendly design, as views allow individuals to connect to the outdoors within the interior of buildings. Poor sightlines disengage the connection, and cause the outdoors and indoors to feel completely separate rather than as one entity. Conversely, good views contribute to psychological well-being, display effective observation, and promote privacy among children and their families.

Child-friendly building views shall...

- Utilize window seats. {5}
- Employ porches and street trees as visual buffers. {2}
- Ensure that buffers do not block the sightlines of main entries. {2}
- Provide windows that offer sightlines of green space and streets, enable surveillance from the inside, and prevent outsiders from easily looking inside structures. {2}
- Supply adequate interior and exterior structural lighting, especially through the use of natural light. {10}



Porch, street trees, sightline of the street, enabled surveillance from the inside and outsiders cannot easily look inside structure (New Orleans, Louisiana)

Circulation both inside and right outside of dwellings can promote child friendliness if designed correctly. Poor circulation can produce overcrowdedness, confusing navigation, and a lack of shared community interaction. Effective circulation alleviates all these issues, and generates efficient passages between adjacent dwelling units and public spaces.

Child-friendly circulation shall...

- Utilize grade changes. {2}
- Avoid tunnel like or utilitarian space (garages, carports, etc.) {2}
- Assure that formal and informal entries are clearly distinct from one another. {2}
- Provide critical transition points (front gates, private front paths, front porches, entrance halls, and foyers). {2}
- Allow for ground level access with separate private paths. {2}
- Permit for a minimum of 3-4 and maximum of 8-10 dwelling units per entrance. {2}
- Be designed so that private paths that are at least five paces from main circulation routes. {2}



Sidewalk grade change (Chicago, Illinois)



Entrance over 5 paces from circulation route (Des Moines, Iowa)

Urban agriculture is becoming increasingly popular in high density neighborhoods, as individuals are becoming more conscious of the positive environmental, social, and economic effects associated with locally grown horticulture. Children in particular gain a profusion of benefits from urban gardens, including place attachment, a sense of community, an improved value system, and a connection to nature. Nevertheless, in order for children to receive these benefits, urban agriculture must be correctly implemented into communities.

Child-friendly urban agriculture shall...

- Involve children in the gardening and cultivation processes. {4}
- Plant edible and non-toxic landscapes. {4}
- Encompass private and public community gardens. {4 & 9}
- Include not only vegetation, but farm animals as well. {4}
- Avoid fencing when possible; however, if fencing needed, it must be constructed beautifully (avoid chain link fences). {12}



Children working in unfenced yet protected community garden (Columbus, Ohio)

Playgrounds are one of the most common components discussed in child-friendly design, as they are constructed specifically for children to use and are seen as protective and safe. However, conventional playgrounds are much less popular than originally thought of because they are artificial, manufactured, and ordinary. Still, there is great potential in designing playgrounds that are frequently used by children as long as proper design methods are put into place.

Child-friendly playgrounds shall...

- Be inclusive. {4}
- Be placed in public rather than private locations. {9}
- Utilize nature. {4, 5, 8 & 9}
- Encourage learning through educational games and structures. {4}
- Implement sound elements (wind chimes, drums, piano keys). {4}
- Limit the construction of commonplace components, e.g., jungle gyms, slides, swings, and monkey bars. {9}
- Invoke creativity by using different themes, concepts, and shapes. {9}

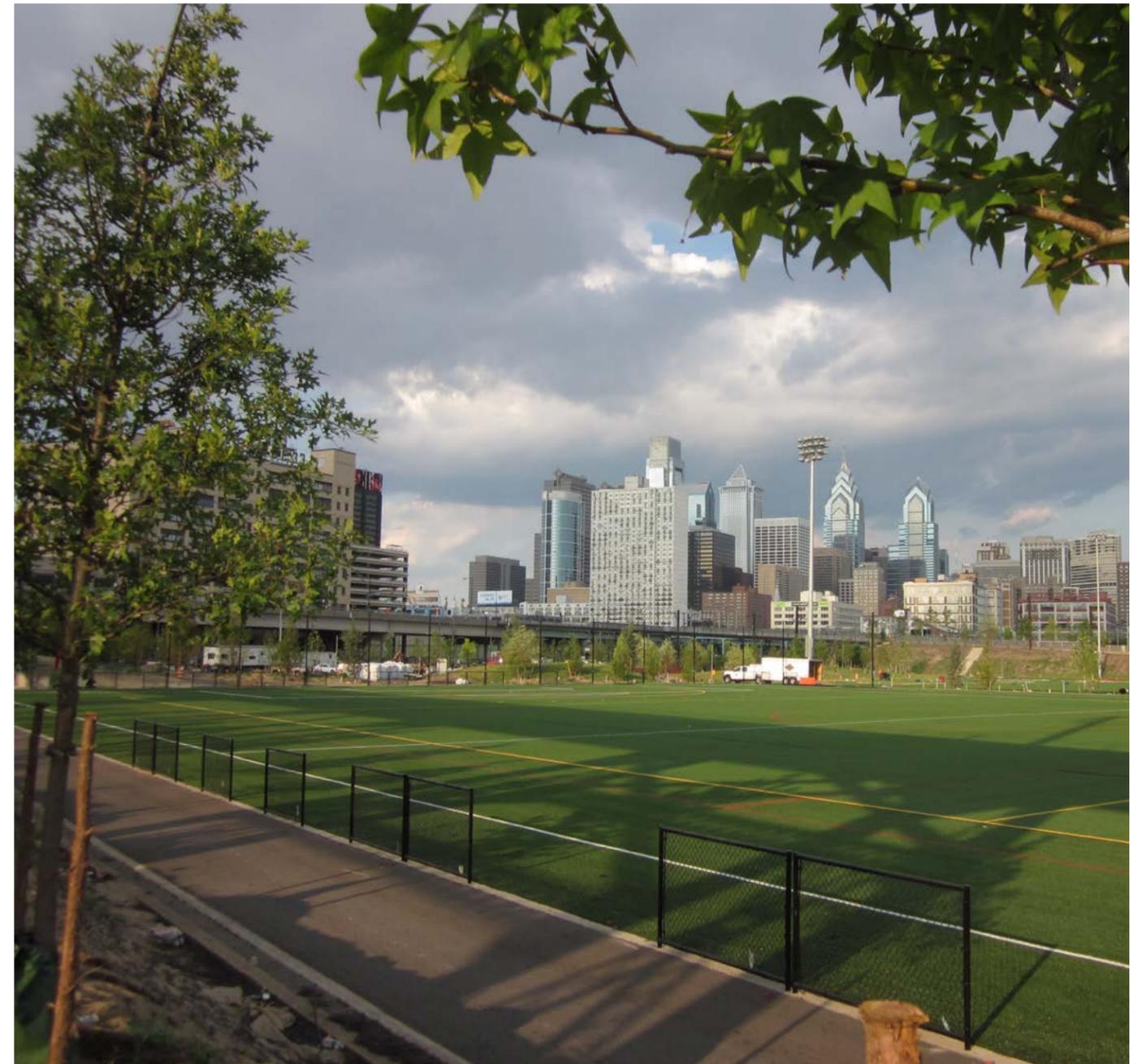


Nature playground at school (Copenhagen, Denmark)

Sport fields and courts are an important component in child-friendly neighborhoods because they encourage children to exercise by playing a wide variety of sports. Unfortunately, at times sport fields can become unsafe, underused, boring, and neglected by communities, especially during the winter when children are occasionally hesitant to play in cold weather. Nevertheless, there are numerous design opportunities to promote year-round sport court and field use by children.

Child-friendly sport courts and fields shall...

- Employ inclusiveness. {4}
- Be multiuse. {12}
- Be placed in public rather than private locations. {9}
- Avoid fencing, unless adjacent to street; nonetheless, if fencing is required, it must be built beautifully. {12}
- Utilize pavement with varying ground slopes. {2}
- Consider indoor sporting facilities, such as recreation centers. {12}



Multi-use public soccer field (Philadelphia, Pennsylvania)

One could argue that natural landscapes are the most imperative recreational feature in child-friendly neighborhoods. Children must feel an intrinsic bond with the environment to receive the psychological benefits associated with natural systems, but this can be challenging to achieve in urban areas. However, despite the difficulties, it is possible to implement nature in dense neighborhoods for the benefit of children.

Child-friendly natural landscape shall...

-Implement heraclitean motion (the movement of nature) by illustrating wind, fish swimming in water, and the patterns of light and shade. {8}

-Promote change/resilience (the cycles and processes of nature), through the use of recycled elements and the natural aging of materials. {8}

-Demonstrate variations of a themes by producing a diversity of landscape features. {8}

-Illustrate discovered complexity (nature that encourages exploration) by exhibiting elements that initially allow for initial comprehension then later engagement at a more detailed level. {8}

-Generate multi-sensory environments. {8}

-Produce transformability by showcasing natural play materials (leaves, rocks, sand, water, branches, and flowers). {8}



Natural landscape in high density area (Boulder, Colorado)

While manmade landscape is not quite as effective as natural environments in facilitating the development of nature immersion in children, it is still an advantageous aspect of child-friendly design. Yards, parks, greenways, bioswales, gardens, and planted vegetation can all connect children to natural processes, even when surrounded by urban environments. The key is to design these elements so they integrate health, inclusiveness, and nature all into one entity.

Child friendly artificial landscape shall...

- Be over thirty feet wide between dwellings. {2}
- Flow from the private into the public realm. {9}
- Construct backyards, front yards, and courtyards as communal rather than public spaces. {9}
- Harmonize with urban concrete areas. {9}
- Be designed within neighborhood layouts that easily integrate vegetation, such as green alleyways, cul-de-sacs, greenways, woonerfs, home zones, and clustered housing. {9}
- Be heavily and diversely vegetated. {8}



Park that harmonizes with the city (New York, New York)

Rescue services may not be as enjoyable as other elements for children to experience, but they are critical for the safety of children. High and middle income areas typically already have excellent access these services, but poor communities struggle to provide them to all of their citizens, even children. Having access to police security, fire rescue, and basic healthcare is a -universal right, and it is vital that all high-density neighborhoods, including those with limited income, utilize different methods in order to best provide rescue services to their community.

Child-friendly rescue services shall...

- Have a strong police officer/security presence. {14}
- Implement regular police patrols. {14}
- Coordinate safety demonstrations with schools. {4}
- Be in close proximity throughout neighborhoods. {14}



Police officers helping youth (New York, New York)

Child-friendly neighborhoods require sustainable energy, especially considering the negative environmental effects linked with substantial energy use. Efficient energy is beneficial for the entire populace, but it is crucial for children because they are most prone to the effects of pollution. Furthermore, it is paramount that children learn the benefits of sustainable energy, as the knowledge of energy use empowers children to make positive changes throughout their communities in the present and future.

Child-friendly energy use shall..

- Use and physically reveal renewable systems, such as solar, wind, geothermal, and hydroelectric power. {4}
- Generate and physically illustrate how biomass and biofuels are created. {4}
- Refrain from placing dirty energy (coal, natural gas, oil refineries) near residential and commercial areas. {5}
- Utilize recycling. {4}



Solar Canopy Parking Lot (San Jose, California)

Other than their own homes, school is the most used location by children. Therefore, it is critical that schools are completely child-friendly and a focal point in neighborhood designs. In some instances, schools do not take into account the needs of their community, offer inadequate education, and fail to inspire their students. Nevertheless, there are approaches schools and communities can take to alleviate these issues.

Child-friendly schools shall...

- Conduct lesson plans that compel children to interact with their community. {4}
- Teach sustainability. {8}
- Organize activities outdoors when feasible. {9}
- Be planned around neighborhoods. {1}
- Contain public parks. {9}



Nature kindergarten (Victoria, Canada)

Mobile retail is inexpensive compared to most physical retail outlets; thus, it is noticeably popular amidst children. Because children can usually afford the goods sold in such facilities, mobile retail is often already predisposed to be tailored toward children. Due to this, mobile retail and its complementary elements are inherently child-friendly, and must have strong presence in high-density neighborhoods.

Child friendly mobile retail shall...

- Encourage community garage sales. {1}
- Consists of a diversity of food carts and trucks. {4}
- Be placed in public squares, wide sidewalks, or streets that restrict automobile use during business hours. {12}
- Publicize farmer's and flea markets. {4}



Food Carts (India)

Children may not have an abundance of spending money, but they still congregate in the vicinity of stores. Moreover, while retail outlets are usually geared towards the needs of adults, children can gain wisdom by socializing in commercial areas. Business owners have the capability to promote child-friendliness in cities, particularly by bolstering safety and creating an organic decision-making process among children.

Child-friendly stores shall...

- Be clustered within a diversity of businesses. {12}
- Be located in mixed-use structures. {10}
- Utilize store owners as neighborhood watchers/protectors by designing glass storefronts. {6}
- Be affordable to children when viable. {4}
- Offer goods that children find enjoyable (sporting equipment, toys, food/drink). {4}
- Tame advertising. {4}



Child-friendly store with glass storefront (Saugerties, New York)

- {1} Reid, Carolyn. *School-Oriented Development: A New Paradigm for Neighborhood Planning*. Diss. Arizona State, 2011. Print.
- {2} Cooper Marcus, Clare, and Wendy Sarkissian. *Housing As If People Mattered: Site Design Guidelines for Medium-Density Family Housing*. Berkley: University of California Press, 1988. Print.
- {3} Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. *A Pattern Language: Towns, Buildings, Construction*. Oxford: Oxford University Press, 1977. Print.
- {4} Mclennan, Jason. "Child Centered Planning: A New Specialized Pattern Language Tool." *Trim Tab*. July 2013. Print.ley, 2012. Print.
- {5} Vliet, Willem van. *The Encyclopedia of Housing*. Thousand Oaks: SAGE Publications, 1998. Print.
- {6} Jacobs, Jane. *The Death and Life of Great American Cities*. New York City: Random House, 1961. Print.pr. 2014.
- {7} "Creating Quieter Childcare Environments with Acoustical Treatments." *ATS Acoustics*. ATS Acoustics, 1 Nov. 2013. Web. 16 Apr. 2014.
- {8} Campbell, Lindsay, and Anne Wiesen. *Restorative Commons: Creating Health and Well-being through Urban Landscapes*. Washington DC: USDA Forest Service, 2009. Print.
- {9} Kellert, Stephen, Judith Heerwagen, and Martin Mador. *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life*. Hoboken: John Wiley & Sons, 2008. Print.
- {10} United Kingdom. London Planning Department. *Shaping Neighbourhoods: Children and Young People's Play and Informal Recreation*. London: Greater London Authority, 2012. Print.
- {11} Alexander, Christopher. *A New Theory of Urban Design*. Oxford: Oxford University Press, 1987. Print.
- {12} Various high school and elementary school students. "Green Neighborhood Presentations" Boulder High School, Whittier Elementary, and University of Colorado Boulder. Boulder, CO. Feb. - Apr. 2014. Class Presentations.
- {13} Cervero, Robert and Cathleen Sullivan. "Kid-Friendly TODs." *Institute of Urban and Regional Development*. Berkley: UC Berkley, 2012. Print.
- {14} European Union. Council of Europe. *Guidelines of the Committee of Ministers of the Council of Europe on Child-Friendly Justice*. Strasbourg: Committee of Ministers, 2011. Print.