

**Increasing outdoor play opportunities in the
neighborhood environment through play streets**

by

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Increasing Outdoor Play Opportunities in the Neighborhood Environment through Play Streets

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ABSTRACT

At present, children in the United States are spending less time engaging in outdoor play than ever before. Play is extremely beneficial to a child's health and development because it provides social, cognitive, creative, and physical development opportunities. As children become more sedentary due to lack of time, safety concerns, and lack of accessible play spaces, the prevalence of health and development issues is rising. When children are able to play outdoors, they tend to stay close to their home environment, which is preferred by parents as well, but many neighborhood environments are not suitable for children's play.

A Play Street is the temporary closure of a street, allowing for children to play close to their home, while maintaining a safe atmosphere. Safety is further reinforced by having parents from the neighborhood act as supervisors during the event. The purpose of this research was to analyze opportunities and barriers for outdoor play and determine the most suitable neighborhoods to implement Play Streets. This research also helped gain a better understanding of children's outdoor play behaviors, patterns, barriers, and parent's opinions on suggested Play Street locations. This information was used to complete informed design typologies for three different Play Street locations.

A mixed-method approach was applied to this study. A GIS-based suitability analysis and parental surveys were used to develop informed Play Street design typologies and solutions. These techniques were used to ensure that the designed spaces would mitigate parental concerns, while maintaining a level of excitement for the children. The findings of this study could be used to assist community members, developers, policy makers, and designers in organizing Play Streets and neighborhood development.



Increasing Outdoor Play Opportunities in the
Neighborhood Environment Through

PLAY STREETS



Katelyn Larkin



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CHAPTER 1

INTRODUCTION





1.1 Background

Play is a volunteer activity that children participate in during their free time that does not fit into regular life activities (Dargan and Zeitlin, 1990). Play allows kids to express emotions and re-imagine their lives (Desai, 1994). When children engage in physical play, their coordination and motor skills are improved. Children develop social skills by interacting with people, because it influences them to build relationships (Desai, 1994). There is a positive correlation between the number of friends a child has in the neighborhood and the amount of time they spend outdoors (Veitch *et al.*, 2006).

Children are unable to spend time playing outdoors because of any combination of, lack of play time, over-committed lifestyles, parental safety concerns, and not having accessible outdoor spaces (Louv, 2008; Derr and Lance, 2012). Lack of play is causing children to forget how to be kids (Frost, 2008). A decrease in play time may be associated with children's sedentary lifestyle and lack of social interaction (Chang Lee and Jun Park, 2018).

Parents are the determining factor when it comes to the amount of time their children spend outdoors and how often they are able to do so (Nursing Standard, 2007). In order for children to have the opportunity to spend time outdoors, parents need to be comfortable with the environment in which their children play. Previous parent interviews stated that the main factors keeping them from letting their children play outdoors are “strangers, teenagers/gangs, road traffic”, drug issues, and child abduction (Veitch *et al.*, 2006; Nursing Standard, 2007). Gender, age, distance to destination, and socioeconomic status are also factors determining the activities parents let their kids participate in (Soori and Bhopal, 2002).

Children tend to stay closer to home when they play outside; accordingly, the neighborhood environment design needs to be adapted to create a space for children as well as adults (Desai, 1994). Access to outdoor play in the neighborhood environment enables everyone to receive the health benefits of spending time outside (Chang Lee and Jun Park, 2018). A Play Street is an intervention that has been developed to increase play opportunities in the neighborhood environment (D'Haese *et al.*, 2015).

1.1.1 What is a Play Street?

A Play Street is a street that temporarily closes down and redirects street traffic to create a safer and more accessible environment for children's outdoor play. It also provides supervised social interaction, education, and helps reduce parents' safety concerns about their children playing outdoors (Pollack Porter and Umstadd Meyer, 2019; Reiss and Shinder, 1975).

Play Streets are typically located in areas that lack outdoor play space in "densely populated, low income, urban areas" (Reiss and Shinder, 1975). Play Streets are intended to foster neighborhood community by promoting social interaction, giving children and adults a common space to spend time, and engage in active play (Miner, 2019).



Figure 1. Play Street Example 1 (Hammersmith and Fulham Council, 2015).



Figure 2. Play Street Example 2 (Hammersmith and Fulham Council, 2015).

1.2 Research Questions and Objectives

Objectives: *1.) What are the most suitable neighborhoods for Play Streets within the study area?*

- » Identify the most suitable neighborhoods for Play Streets in Manhattan, KS.

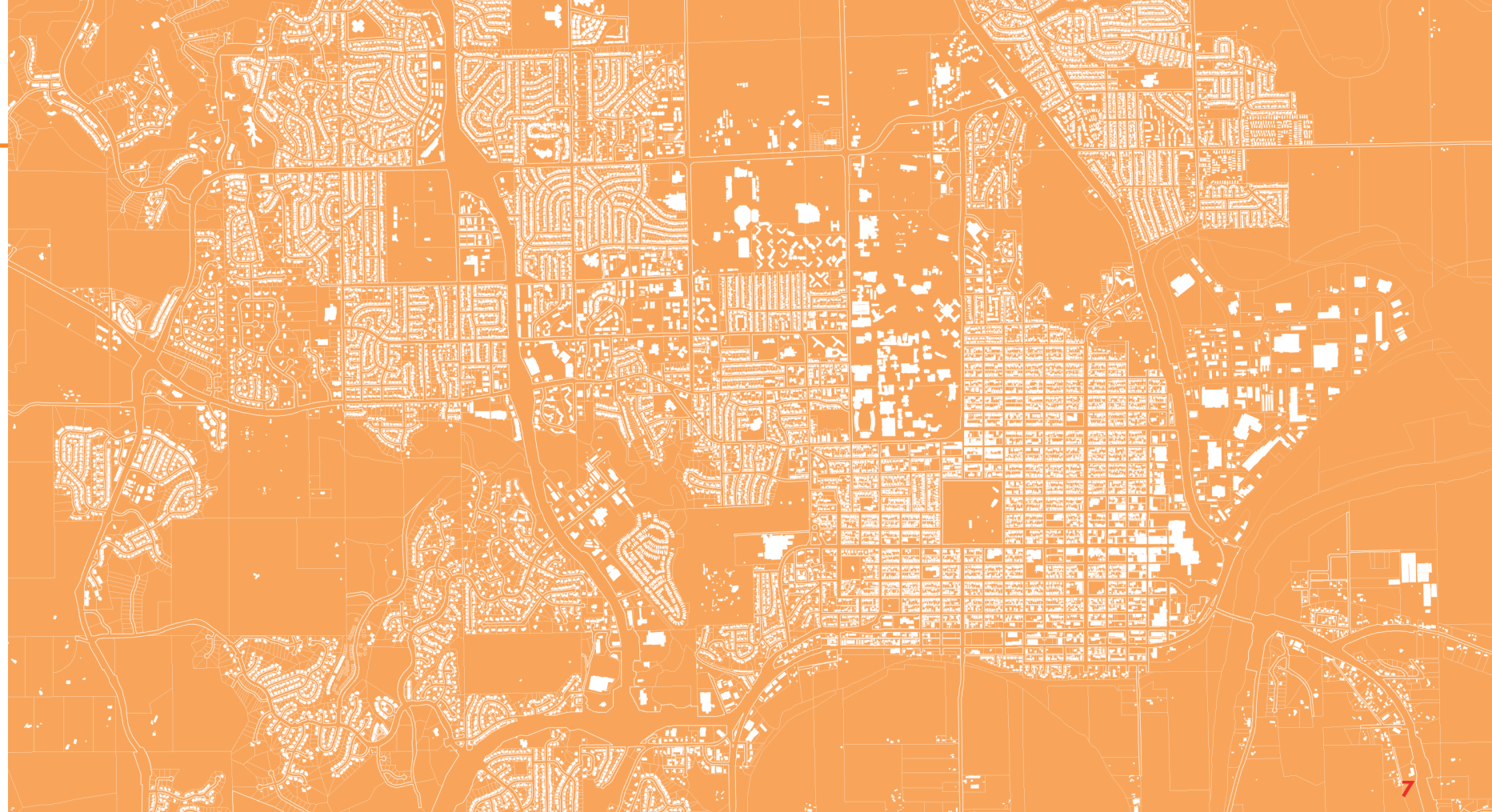
2.) How do children's play behaviors and parents' opinions on different types of neighborhood environments guide Play Street designs?

- Objectives:**
- » Identify typologies of typical neighborhoods to adapt different Play Street strategies for different neighborhood conditions.
 - » Compare outdoor play barriers and opportunities for developing a Play Street in different types of neighborhoods.
 - » Understand parents' concerns and ideas for Play Streets and outdoor play environments.
 - » Discover opportunities and ideas to guide Play Street design.
 - » Provide design guidance for designers, developers, planners, and community members wanting to implement Play Streets.

1.3 Significance

Play Streets are becoming a more popular strategy for creating safe, outdoor play spaces for children. This research provides guidance for Play Street development in different locations and types of neighborhoods. A GIS-based suitability analysis, combined with parent surveys, was used to develop informed designs for Play Street typologies.

This research contributes to existing literature by using a GIS-based suitability analysis to gain a better understanding of geographical context needed to select suitable Play Street locations. The other way this research contributes to existing literature is by creating detailed design considerations. This research used parents ideas and concerns to guide informed Play Street designs. These techniques were used to ensure that the designed spaces would mitigate parental concerns, while maintaining a level of excitement for the children. The findings of this study could be used to assist community members, developers, and policy makers in organizing future Play Streets and neighborhood development.



CHAPTER 2

LITERATURE REVIEW





2.1 Literature Review Introduction

The literature review was completed to support the need for research on Play Streets and prove its importance. This research is intended to fill a gap in literature, but in order to do this, a gap had to be found. The following literature and information supports the need for Play Streets and explains the necessity of engaging in outdoor play.

Children are spending less time playing and engaging in physical activity, resulting in increased health issues (Rose, 2017). Lack of play time, over-committed lifestyles, parental safety concerns, and lack of accessible outdoor spaces keep children from engaging in outdoor play (Louv, 2008; Derr and Lance, 2012). The neighborhood environment needs to be designed to allow children to have a space to play near the home, since they tend to play there most frequently (Desai, 1994). A Play Street is a solution that addresses many parental concerns that keep children from playing outdoors. Play Streets are beneficial because they are supervised, provide a consistently paved surface, and divert traffic from the play area, creating a safe, inexpensive outdoor play space near the home (Moore, 1987; Cortinez-O’Ryan, 2017; Umstattd Meyer *et al.*, 2019).

The connections between the different literature and references can be observed in Figure 3.



2.1.1 Importance of Children's Outdoor Play

Research shows that spending time outdoors has health/developmental benefits, promotes exercise, and creates opportunities for social interaction among children (Hennger, 1993). Play is beneficial to a child's health, well-being, coordination and motor skills (Desai, 1994; Zhang *et al.*, 2014). Physical activity is crucial to children's health and development because it "builds strong bones and muscles, reduces the risk of obesity, and improves academic performance" (Pollack Porter and Umstadd Meyer, 2019). Play encourages mental development, such as creative thinking, language skills, decision making, problem solving, and personalities by allowing children to learn how to express themselves (Christner, 2013; Desai, 1994). Children are losing the ability to be independent and participate in activities on their own, causing them to have future health problems (Ergler *et al.*, 2013).

Social interaction with friends and family can influence physical activity among children (Zieff *et al.*, 2016). The social skills developed during play allows children to build relationships and teaches children how to interact with other people (Desai, 1994). There is a positive correlation between the number of friends the child has in the neighborhood and the amount of time they spend outdoors (Vetich *et al.*, 2006).



There are several types of physical activities that children can participate in, including structured activities, unstructured activities, and active play (Brockman *et al.*, 2011). According to Brockman, an example of a structured activity is organized sports, while an unstructured activity is riding bikes. Active play is an unstructured, outdoor activity that children engage in on their own time (Brockman *et al.*, 2011). Active play increases physical activity; therefore, by participating in active play, children experience lower body mass, a decrease in insulin levels/blood pressure, and an increase in their well-being (Brockman *et al.*, 2011).

A study was conducted to understand children's barriers and motivators for engaging in active play (Brockman *et al.*, 2011). It was reported that children enjoy socializing with friends; playing outdoors gives them an opportunity to meet new people and play games with their neighbors. They expressed joy in playing because they feel that it is boring to stay indoors to watch television. Children stated they recognize the health benefits that come from engaging in play and they enjoy it, because play allows them to burn off energy, keeps them in shape, makes them happy, and provides a sense of freedom (Brockman *et al.*, 2011).



2.1.2 Lack of Outdoor Play Time

One of the issues with today's society is that outdoor spaces are becoming a secondary option behind staying indoors (Hennger, 1993). The amount of time a child spends participating in structured activities is taking away from their play and exercise; causing developmental issues, physical problems, and leading to an increase in obesity rates (McBride, 2012). Obesity is becoming an alarming trend in American children between the ages of 2 and 19. This could be associated with mental and physical health problems, such as ADD and ADHD (Rose, 2017). Play is essential to a child's development. As play time reduces, due to many reasons, including lack of space for activities in the neighborhood environment and reduced recess during school hours, children are experiencing play deprivation. According to Frost, play deprivation can lead to several health issues including "physical and emotional illnesses, depression, violence, diminished impulse control, addictive predilections, low school achievement, and social abnormalities" (Frost, 2008,6).

Children need approximately 60 minutes of physical activity every day. To gain sufficient health benefits, bone-strengthening, muscle-strengthening, and aerobic activities each need to be completed 3 days a week (U.S. Department of Health and Human Services, 2018). There is more information regarding the Physical Activity Guidelines on page 136. Studies show that only one of five children are receiving the appropriate amount of physical activity (Pollack Porter and Umstatted Meyer, 2019).



Parks and playgrounds are spaces for children to participate in outdoor play. The lack of accessibility to these spaces limits the amount of physical activity children are able to engage in (Zieff *et al.*, 2016).

Children spend a majority of their time indoors, however, spending time outdoors allows them to develop the ability to distinguish elements, count, problem solve, and be creative (Kellert, 2015). A shift in an adult's mindset towards structured activities is reducing the amount of time children can participate in play. Many adults feel it is more important for children to spend their time in structured/formal learning environments (Dowdell *et al.*, 2011). Play areas are less spontaneous and creative than they used to be. There are more rules; decreasing the level of creativity and activity children participate in. It is important to include unprogrammed areas for children, because it creates a connection to their surroundings and gives them a place to build relationships, experiment, discover, and explore (Dargan and Zeitlin, 1990).



2.1.3 Problems with Outdoor Play Spaces

Development has decreased the number of parks and amount of open spaces incorporated into neighborhood environments (Zieff *et al.*, 2016). Veitch *et al.* (2006) noted that since backyards are getting smaller, the importance of public space is increasing. The issue is that children are unable to easily access public outdoor spaces because there is a lack of pedestrian friendly circulation and recreation spaces are restricted (Reimers and Knapp, 2017). Previous research indicated that physical activity is negatively impacted if outdoor play spaces are located over one-half mile away (Zieff *et al.*, 2016).

Parks provide opportunities for children to play outdoors, but safety within these spaces is a rising concern for parents (Veitch *et al.*, 2006). When children enter public greenspace, they are introduced different types of hazards, such as “bullying, swearing, drinking alcohol and in some parks taking drugs” (McAllister, 2008; Veitch *et al.*, 2006). Other spaces designed for children, such as schools and other learning environments are often times not located within proximity of the home, making walkability difficult for children (Tai *et al.*, 2006). Even when children are given the opportunity to go to the park or playground, designs often are not intriguing enough to make children spend a lot of time there.



In an interview from a study on children, one of the children stated that parks were boring, because most parks contain similar play elements, such as climbing features, swings, and some slides (Jansson, 2010).

Children’s behavior is influenced by their environment (Farley *et al.*, 2008). Opportunities for play need to be incorporated in as many environments as possible (Desai, 1994). Children often choose what is familiar to them, causing them to stay close to home and have less motivation to explore new locations (Hand *et al.*, 2016). Some types of neighborhoods are more supportive of play than others. Physical activity is impacted by the amenities present and quality of a neighborhood. Some of these qualities include traffic, opportunities for socialization, and recreation (Molnar *et al.*, 2004). A study on different neighborhood settings showed that children living in cul-de-sacs have more opportunities to play outdoors than children living on main streets because their parents are less worried about their safety. It was indicated that these types of neighborhood spaces foster a “strong community-oriented network” (Veitch *et al.*, 2006).





2.1.4 Safety in the Neighborhood Environment

When children were asked what factors keep them from engaging in physical activity outdoors, their responses included parental concerns, weather, lack of comfort/ safety in parks and playgrounds, technology, and neighborhood environments (Brockman *et al.*, 2011). Many children stated that when they play outdoors, they go to a nearby cul-de-sac, field, or park (Brockman *et al.*, 2011). A child's neighborhood and their family has an influence on their level of physical activity and amount of time they spend being sedentary (D'Haese *et al.*, 2015).

Previous physical activity interventions have been used to change people's personal and psychological factors, but by focusing on the neighborhood environment there is the potential to positively impact more people and decrease sedentary time (D'Haese *et al.*, 2015). There are several programs existing to improve parks and school playgrounds, including making school playgrounds accessible outside of school hours, but not much research has been done involving how to improve physical activity at the neighborhood scale (D'Haese *et al.*, 2015).

In the past, one of the popular places children played was the street, but an increase in density and traffic speed reduced accessibility of these spaces (Woolley and Lowe, 2013). Previous research revealed that children spend more time outside when the traffic volume is lower, due to lower risk of traffic incidents (Ergler *et al.*, 2013).

An increase in population density and urban sprawl is causing families to spend less time playing and more time traveling between destinations. Schools and learning environments are not located within proximity of the home, making it more difficult for children to walk to school (Tai *et al.*, 2006). In addition, increased traffic has reduced children's ability to walk to playgrounds (Reimers and Knapp, 2017).

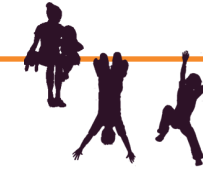
Some tactics used to promote children's safety, while they are outdoors are to enforce speed limits, provide separation between children and automobiles, and increase visibility so that pedestrians can analyze the surrounding environment. Pedestrian-friendly routes make parents more comfortable letting their children walk places, especially if they are accompanied by other children (Howard, 2010). One of the ways to solve walkability problems is to implement "complete streets" to create spaces that can be used by people of all ages and suit all types of transportation (Schaeffner, 2018).



2.1.5 Play Streets

Over time, the number of vehicles on the roads has substantially increased, causing safety concerns for parents. Streets are important because they provide a meeting space and opportunities for social interaction with neighbors (Cowman, 2017). According to Robin Moore in the article “Streets as Playgrounds”, “Streets are the social hub of the neighborhood, where children meet, learn about each other and their adult neighbors, and investigate their surroundings” (Moore, 1987, 52). There used to be a positive mindset behind children playing in streets. The streets were full of children back in the 1950s when they used to be considered safe play spaces, when there were not as many vehicles (Cowman, 2017).

A Play Street is a street that temporarily closes traffic in neighborhoods to provide safer spaces for children to play by separating them from vehicles (Cowman, 2017). According to Reiss and Shinder, Play Streets are typically located in areas that lack outdoor play space in densely populated, low-income, and urban areas. By redirecting traffic that would initially cause safety concerns, they catalyze pedestrian use. (Reiss and Shinder, 1975; Cowman, 2017).



The average street closure time for a Play Street is three to five hours (Pollack Porter and Umstadd Meyer, 2019). During that time, Play Streets provide opportunities for social interaction and education (Pollack Porter and Umstadd Meyer, 2019; Reiss and Shinder, 1975). The Miami Play Street Guide recommends having at least 4 parent volunteers to supervise and assist with activities (Connectfamilias and Urban Impact Lab, n.d.). Physical activity is promoted through Play Streets, because it gives children access to different types of temporary activities, games, and equipment (Pollack Porter and Umstadd Meyer, 2019).

Cities across the United States and in other locations, such as London, have implemented Play Street programs. (Connectfamilias and Urban Impact Lab, n.d.) Many existing Play Street programs suggest that one of the top priorities in implementing a Play Street is to ensure that the neighborhood is supportive of the idea. A Play Street should be all inclusive, therefore, everyone needs to be considered in the organization process (Connectfamilias and Urban Impact Lab, n.d.).



It is important to collect feedback from the community when implementing a Play Street (Connectfamilias and Urban Impact Lab, n.d.). Previous Play Street events have had positive feedback from both parents and children. Participants stated that the Play Street provided them with opportunities to socialize with their friends during summer vacation (Pollack Porter and Umstatted Meyer, 2019). Participants, from a Play Street in New York City, provided feedback stating the Play Street was successful in providing opportunities for physical activity because 64% of people over the age of 10 stated that they would have been sedentary without access to the Play Street. Over 80% of attendants felt the neighborhood safety and friendliness was improved (Zieff *et al.*, 2016).

Play Streets have been studied through short-term events and summer months, but there is a lack of information regarding long-term, recurring events (Cortinez-O’Ryan, 2017). This provides an opportunity for future research.

2.1.6 Benefits of Play Streets

Streets provide a consistent, paved surface that allows children to ride bikes or bounce balls in a public space adjacent to the home (Moore, 1987). A Play Street is an inexpensive strategy that converts the street environment into a space to engage in active, outdoor play opportunities, connecting children and adolescents back to the outdoors and promoting physical activity. (Cortinez-O’Ryan, 2017; Umstatted Meyer *et al.*, 2019). Play Streets are intended to foster neighborhood community by promoting social interaction and giving children and adults common space to spend time and engage in active play (Miner, 2019). Play Streets should not be designed to suit the needs of the entire city, but for the neighborhood and surrounding community (Reiss and Shinder, 1975).

In a study using a control and test group for Play Streets among a low income Hispanic neighborhood in the US, researchers found that children who had access to the Play Street engaged in significantly more physical activity (Cortinez-O’Ryan, 2017). Play Streets provided children the opportunity for social interaction with their neighbors, parents felt the Play Street was safe, and the children were excited to be there (D’Haese *et al.*, 2015). Play Streets encourage children to engage in more physical activity. There was a positive correlation between the number of activities provided at the Play Street and its success. It was suggested that Play Streets be paired with other interventions to improve physical activity because activity was still low outside of the Play Street event (D’Haese *et al.*, 2015).



2.2 Summary

Children need to spend time outdoors because it provides health benefits and is crucial to their well-being (Desai, 1994; Zhang et al, 2014). There are several reasons that children are not spending as much time outdoors, such as lack of accessible outdoor play spaces, safety concerns, and lack of play time (Louv, 2008; Derr and Lance, 2012). Play Streets have been developed to limit some of these factors. Play Streets give children the opportunity to play outdoors near the home environment and limit safety concerns (Cowman, 2017).

The purpose of the literature review was to gain an understanding of existing research and documents involving children's outdoor play environments, Play Streets, parent concerns for outdoor play environments, and more. The literature review influenced the following research to ensure that the new ideas introduced were not already represented in existing literature.



CHAPTER 3

METHODOLOGY



3.1 Research Design

3.1.1 Research Overview

The first study objective was to identify the most suitable neighborhoods for Play Streets in Manhattan, KS. To complete this objective a GIS-based suitability analysis was conducted by overlaying spatial data such as lot size, neighborhood proximity to greenspace, child population density, traffic count, speed limits, and socioeconomic representation. The second study objective was to identify typologies of typical neighborhoods to adapt different Play Streets strategies for different neighborhood conditions. To reach this objective, three different locations from the GIS-based suitability analysis were selected. These locations were then included in the parent survey. The parent survey was used to develop a better understanding of children's outdoor play preferences, parental concerns, visions for their children's outdoor play, and parents' own childhood outdoor play experiences. The final study objective for this research was to use the information collected from the GIS-based suitability analysis and the parent surveys to develop informed Play Street design typologies. The research process can be seen in Figure 4.

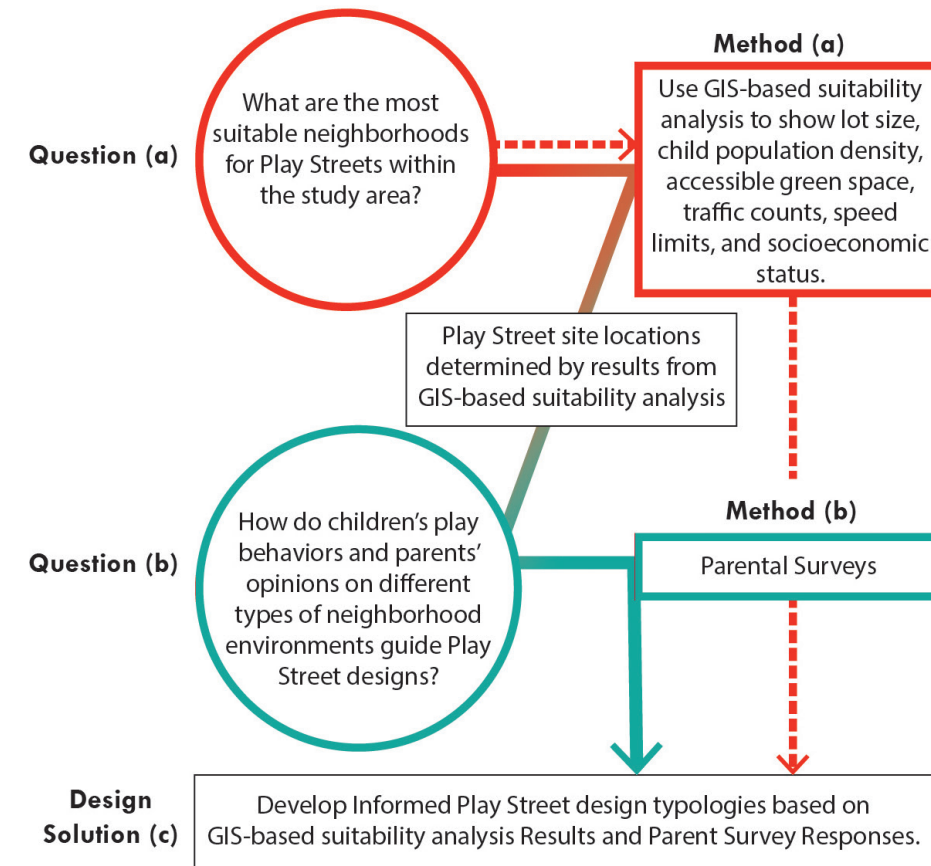


Figure 4. Research Overview Diagram

3.2 Study Site Selection

3.2.1 Study Area

This research was completed through a two-phased, mixed-method approach. The study site is located in Manhattan, Kansas. Manhattan's population is 55,427 people, making it the 9th largest city in Kansas (Deloitte *et al.*, N.d; Cubit, 2019). Manhattan's location within the state of Kansas can be seen in Figure 5, while the aerial view of the city is shown in Figure 6.

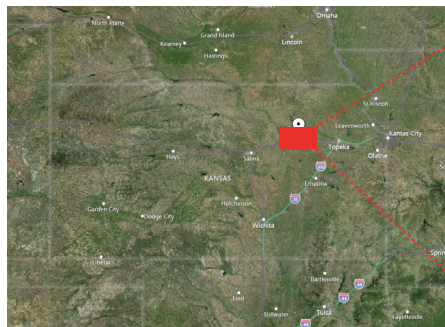


Figure 5. Location of Manhattan, KS (State Scale). Map Source Google Earth.

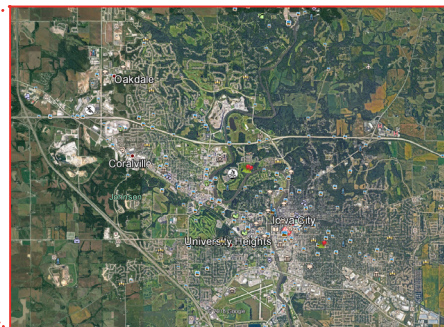


Figure 6. Aerial Map of Manhattan, KS (City Scale) Map Source Google Earth.

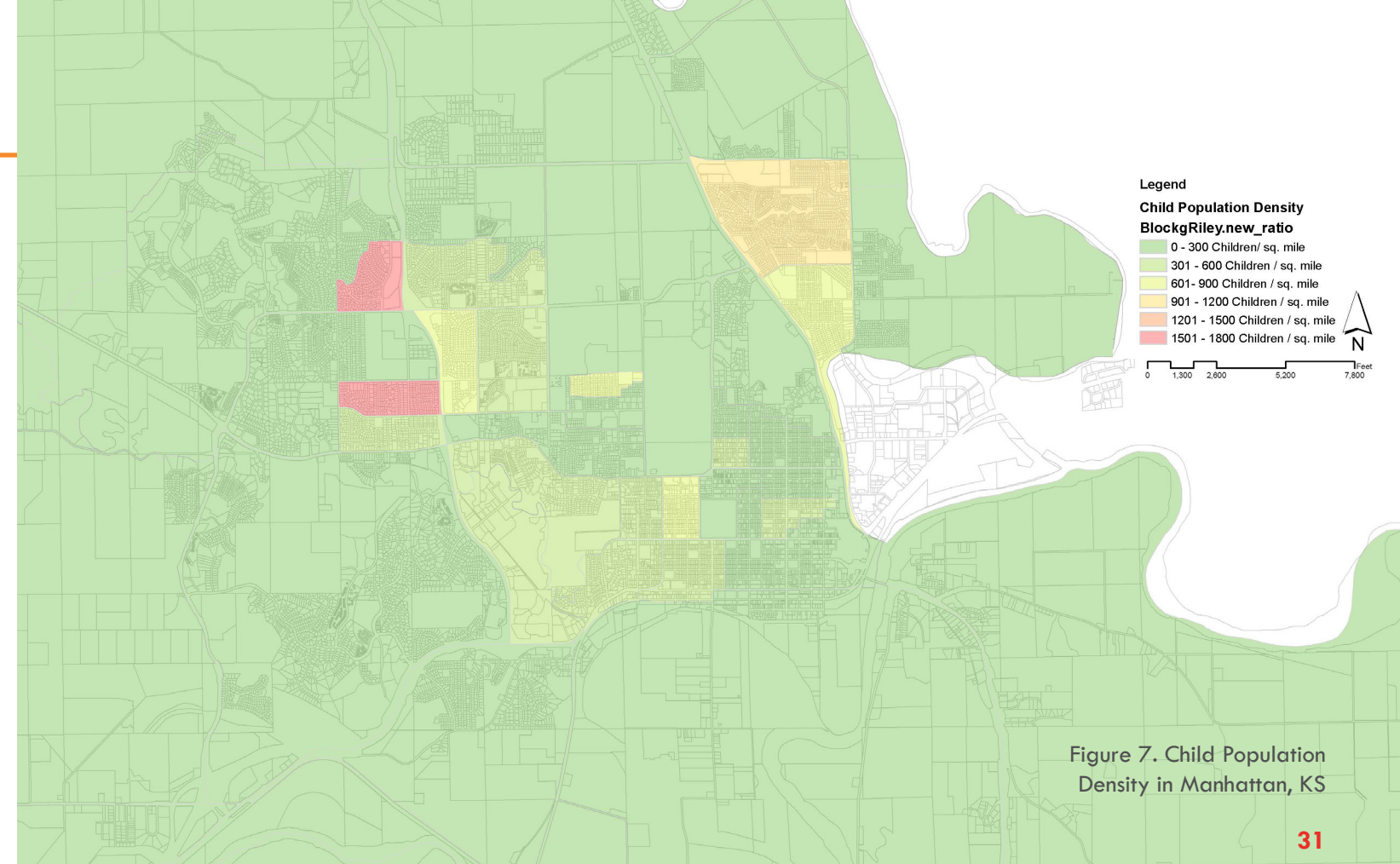


Figure 7. Child Population Density in Manhattan, KS



3.2.2 Objective 1: GIS-based suitability analysis

Objective 1: Perform GIS-based suitability analysis to determine the most suitable neighborhood streets for implementing Play Streets in Manhattan, Kansas.

A neighborhood analysis is an important step to selecting the right location for a Play Street (Connectfamilias and Urban Impact Lab, n.d.). It is also important to consider a location that takes advantage of underutilized spaces, while maintaining accessibility (Pollack Porter and Umstadd Meyer, 2019). The Miami Street Play Guide states that when selecting a neighborhood to implement a Play Street, the neighborhood must have several children, a desire to socialize, traffic that is preferably moving slower than 25 MPH, and a value for physical activity.

A Play Street would be a solution for neighborhoods lacking greenspace accessibility because “Children should be able to safely walk to a park in under 10 minutes” (Connectfamilias and Urban Impact Lab, n.d., 8). Analysis of the traffic capacity of the surrounding streets is required to determine if they can successfully manage the traffic increase (Reiss and Shinder, 1975).

This information was used to guide the analysis of information gathered in support of the first objective. The first objective was a quantitative approach that involved completing a GIS-based suitability analysis for Manhattan, Kansas. Several different types of maps were created for the city and overlaid to determine which neighborhoods were the least suitable for outdoor play. This information was used to determine the most suitable locations to implement Play Streets.





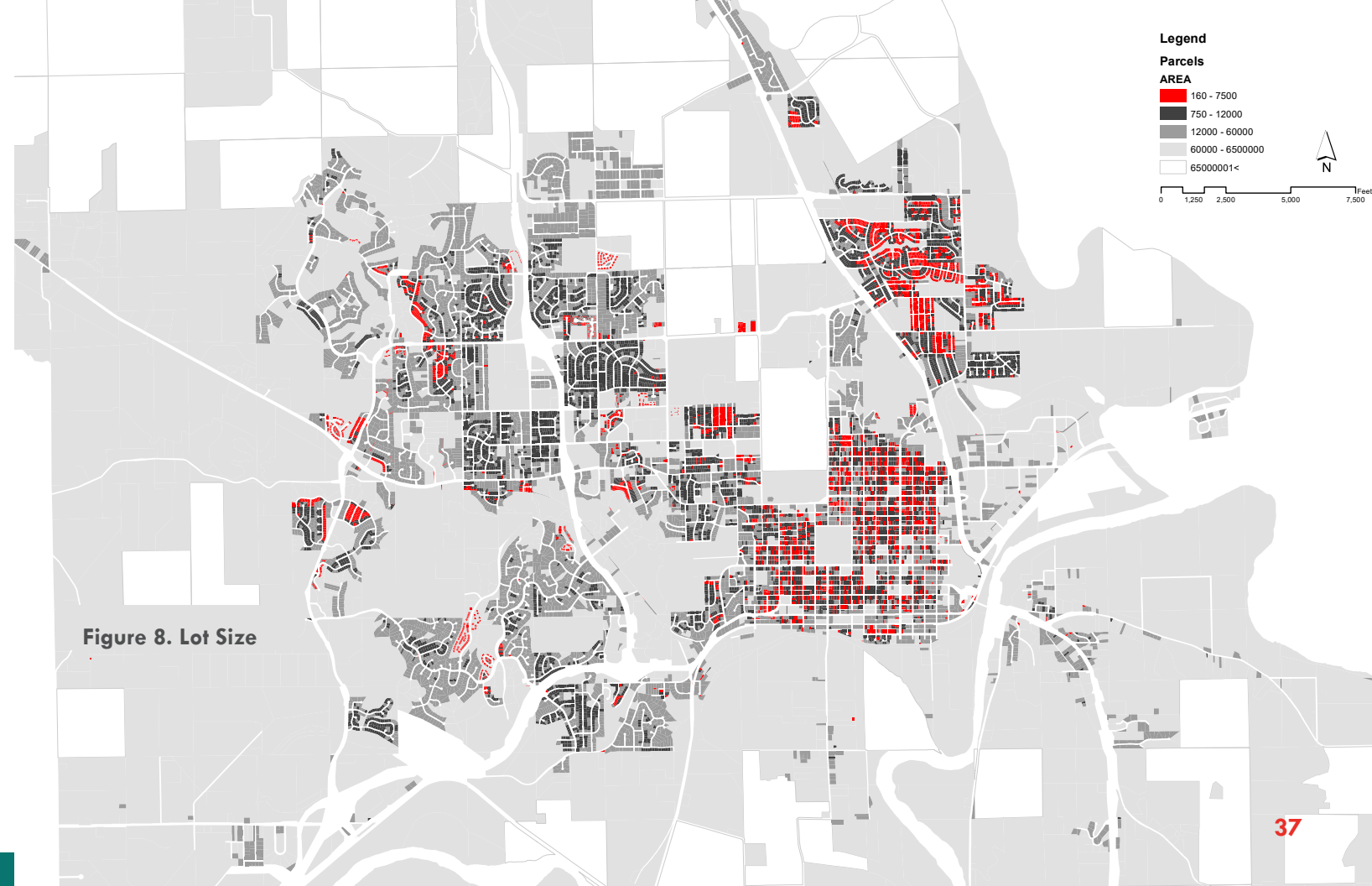
The GIS data used for the map overlay to determine the most suitable Play Street locations included:

- » *Lot size, to indicate which neighborhoods have the least amount of accessible outdoor space, adjacent to the home environment. (Page 37)*
- » *Parks and school environments are spaces typically designed for children and play. A quarter-mile radius, half-mile radius, and mile radius buffer were overlaid over parks and greenspace to determine which neighborhoods lack accessible outdoor space within a walkable distance from the home. (Page 39)*
- » *A traffic count map was used to show the types of roads within the city and indicate which roads had low enough traffic volumes to best suit a Play Street. A Play Street temporarily closes the road, so this information would also be needed determine if adjacent roads could manage the increased traffic volume (Reiss and Shiner, 1975). (Page 41)*
- » *Play Streets are typically located on streets that have a speed limit less than 25 MPH. Due to this, a map showing the locations of speed limits was necessary (Connectfamilies and Urban Impact Lab, n.d.). (Page 43)*
- » *A child density map was used to show which neighborhoods in Manhattan have the most children, since Play Streets are typically located in neighborhoods with children (Connectfamilies and Urban Impact Lab, n.d.). (Page 45)*
- » *A socioeconomic status map was used to determine which spaces were in most need of having outdoor space in proximity to the home. Children from low socioeconomic locations are often positioned in areas with a large percentage of hardscape in the core or towards the outskirts of cities, where they lack development and maintenance (Derr and Lance, 2012). (Molnar, 2004). (Page 47)*

These individual maps can be seen on pages 36-47.

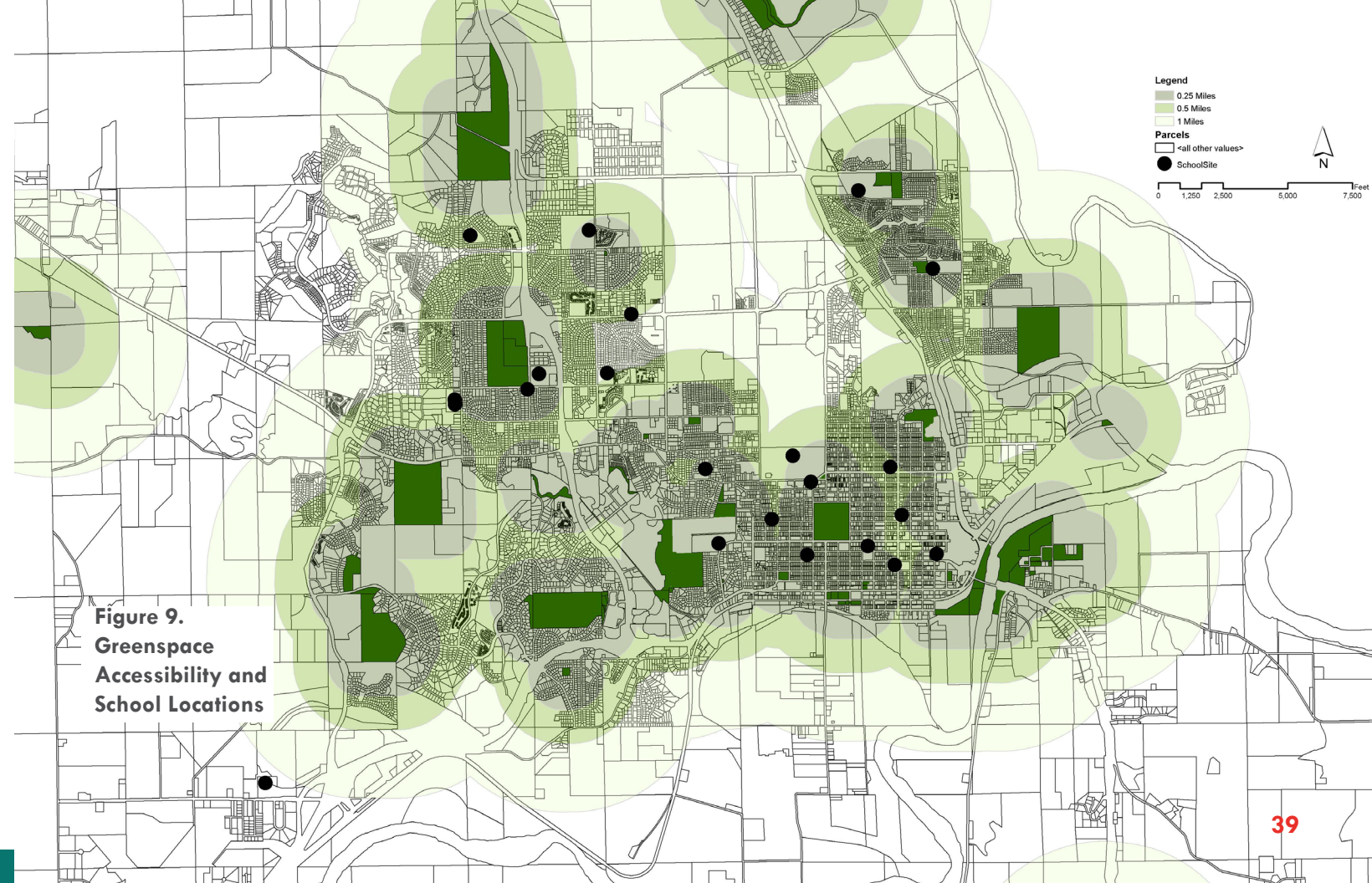
Lot Size

Children tend to stay close to the home when they play (Desai, 1994). This is why a map showing lot size square footage was used to show which neighborhoods have the least amount of accessible outdoor space adjacent to the home environment. The average lot size in Kansas is approximately .23 acres or 10,018 square ft (Kelly, 2016). The red parcels shown in the map on the right indicate those lots are smaller than the average lot size in Kansas. These spaces need more opportunities for outdoor play.



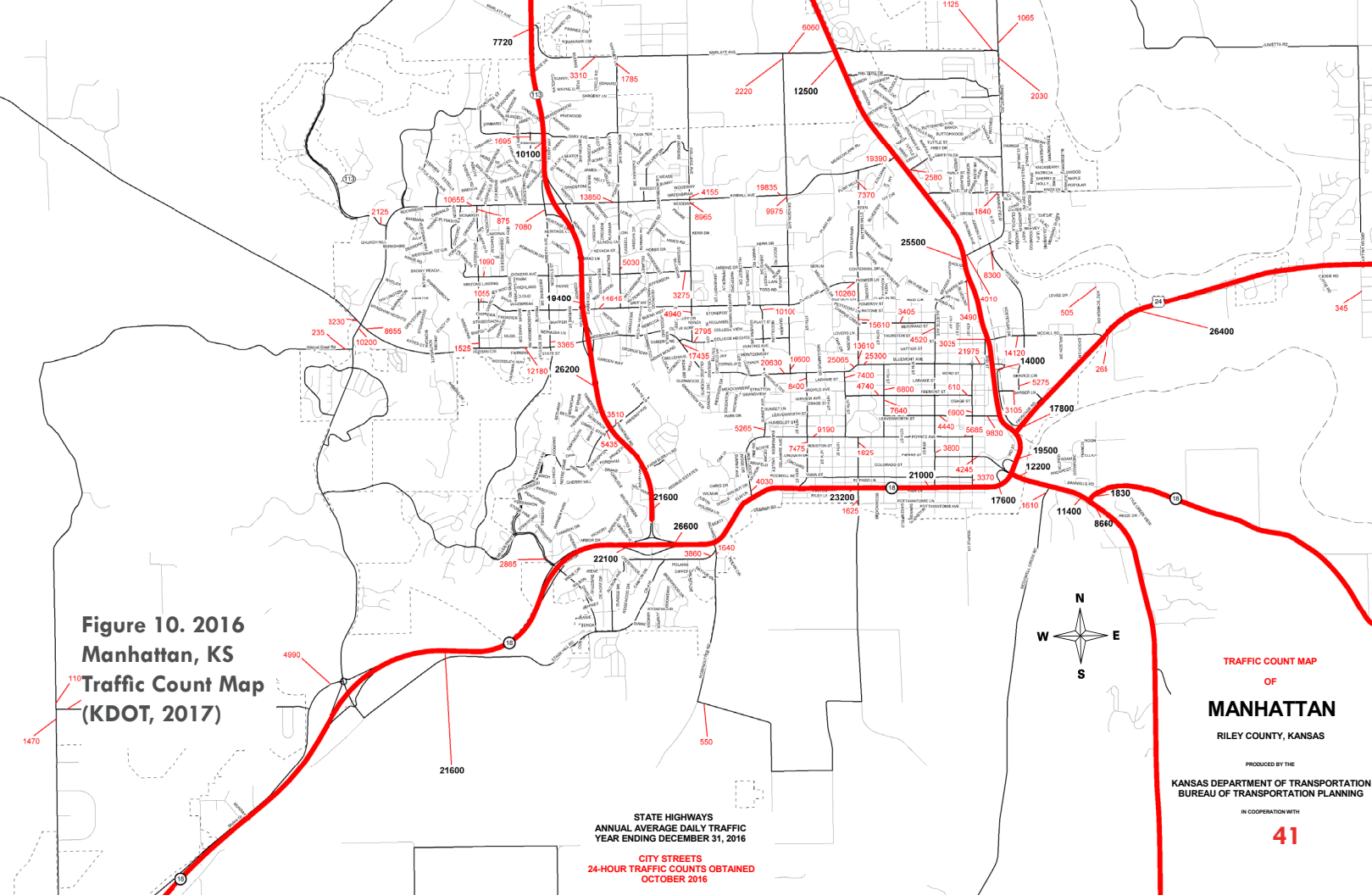
Greenspace Accessibility and School Locations

Parks and school environments are spaces typically designed for children and play. A quarter-mile radius, half-mile radius, and mile radius buffer were overlaid over the parks and greenspaces in Manhattan to determine which neighborhoods lack accessible outdoor space within a walkable distance from the home. The map on the right indicates that Manhattan has good park coverage, but some of the spaces are still not accessible, due to traffic and lack of sidewalk connections.



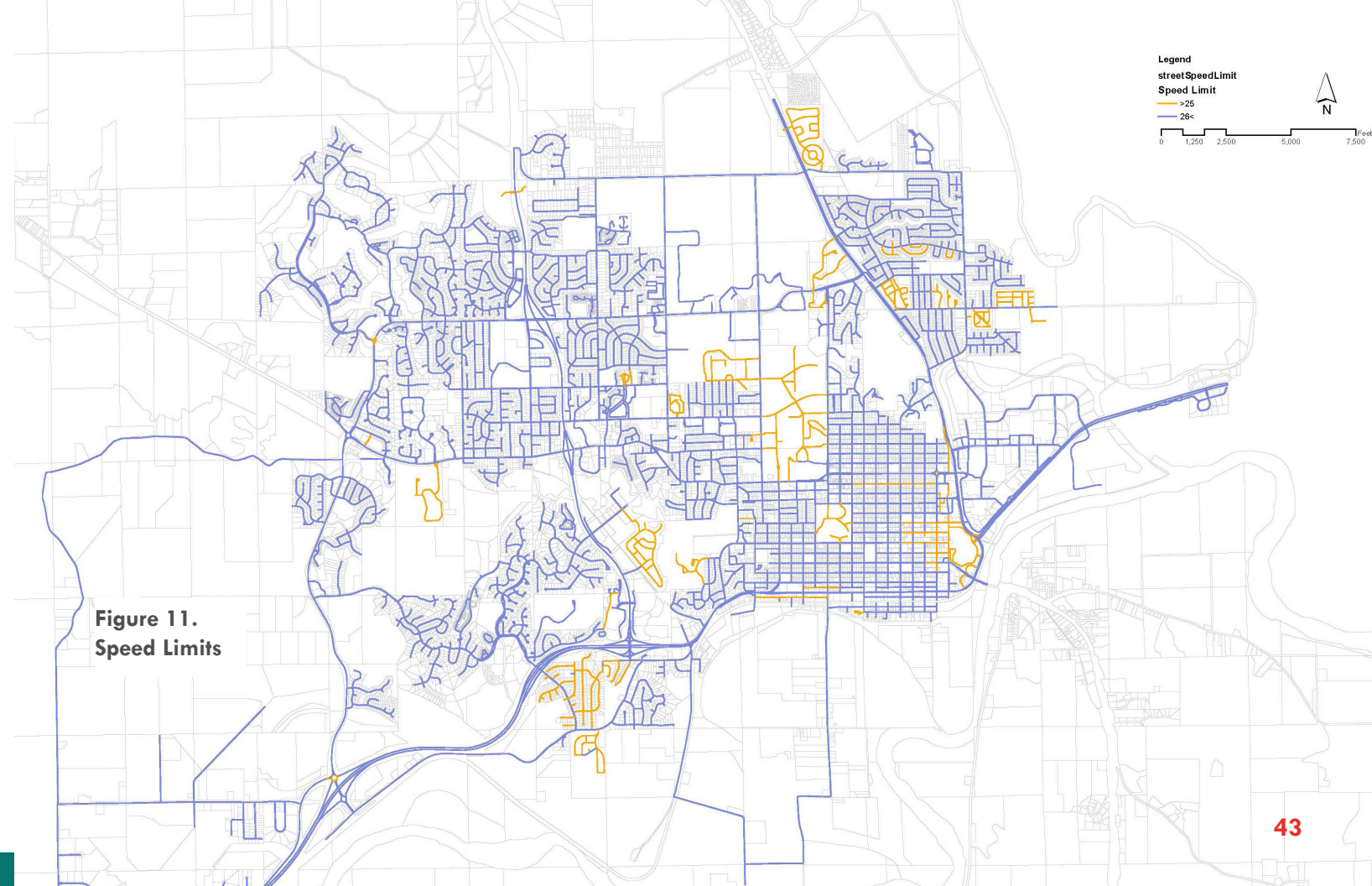
Traffic Count

A traffic count map shows the types of roads within the city and indicates which roads have less traffic to best suit a Play Street. A Play Street temporarily closes the road, so this information can also determine if adjacent roads can manage the traffic increase (Reiss and Shiner, 1975).



Speed Limits

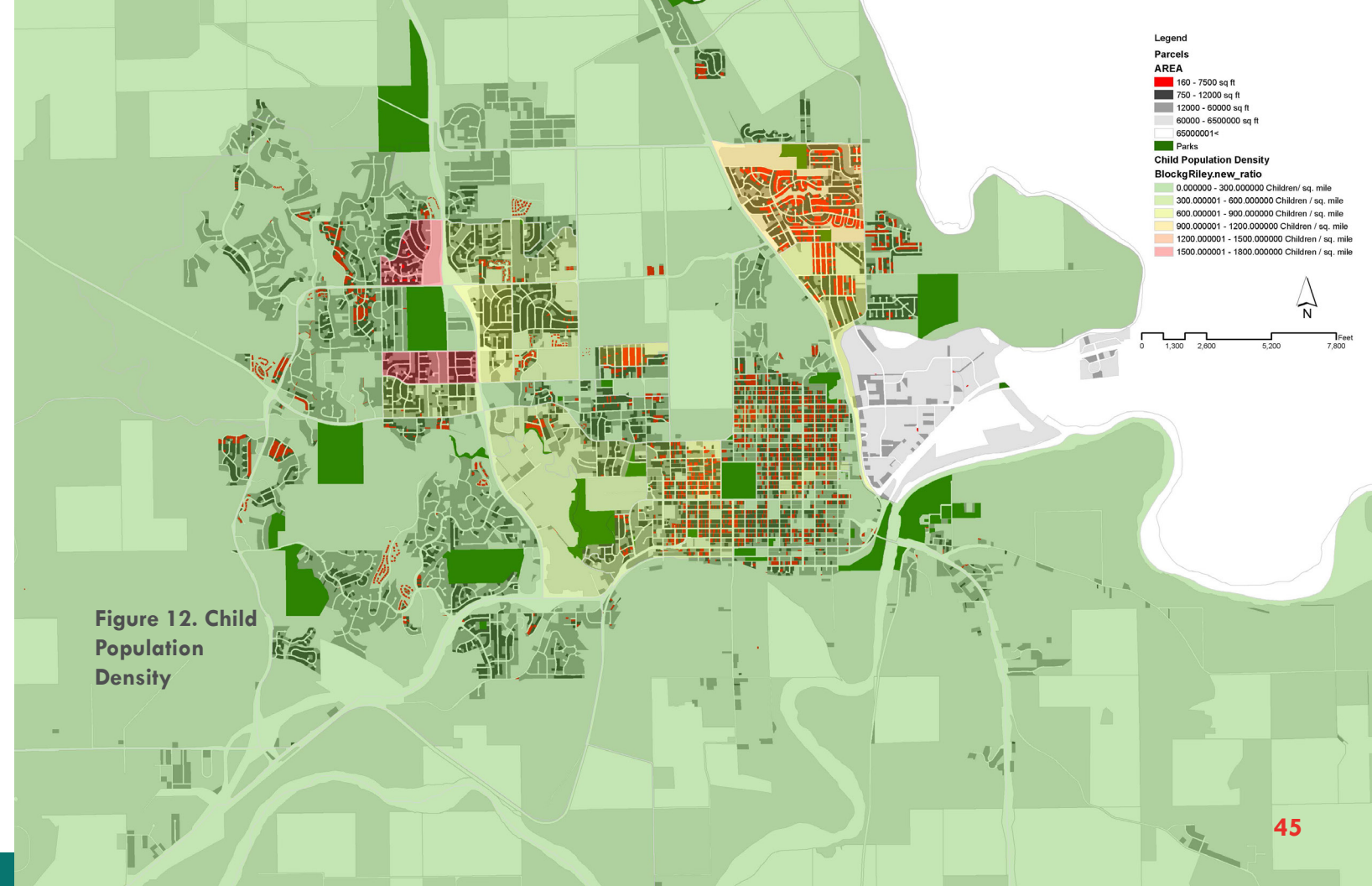
A speed limit map shows which streets have lower speed limits, since Play Streets are typically located on streets that have a speed limit less than 25 MPH (Connectfamilias and Urban Impact Lab, n.d.). The orange streets, shown in the map on the right, are the streets in Manhattan with speed limits lower than 25 MPH.



Child Population Density

Play Streets need to be located in neighborhoods with a lot of children (Connectfamilias and Urban Impact Lab, n.d.). A child population density map was created to show which neighborhoods have the most children in Manhattan. The map indicated that the suburban neighborhoods have the highest child population. These neighborhoods are not located near downtown or Kansas State University's campus.

Figure 12. Child Population Density



Socioeconomic Status: Household Income

A socioeconomic status map was used to determine which spaces are in most need of having outdoor space in proximity to the home. Children from low socioeconomic locations are often positioned in areas with a large percentage of hardscape in the core or towards the outskirts of cities, where they lack development and maintenance (Derr and Lance, 2012). There is a positive correlation between a neighborhood's physical activity and socioeconomic ranking (Molnar, 2004).

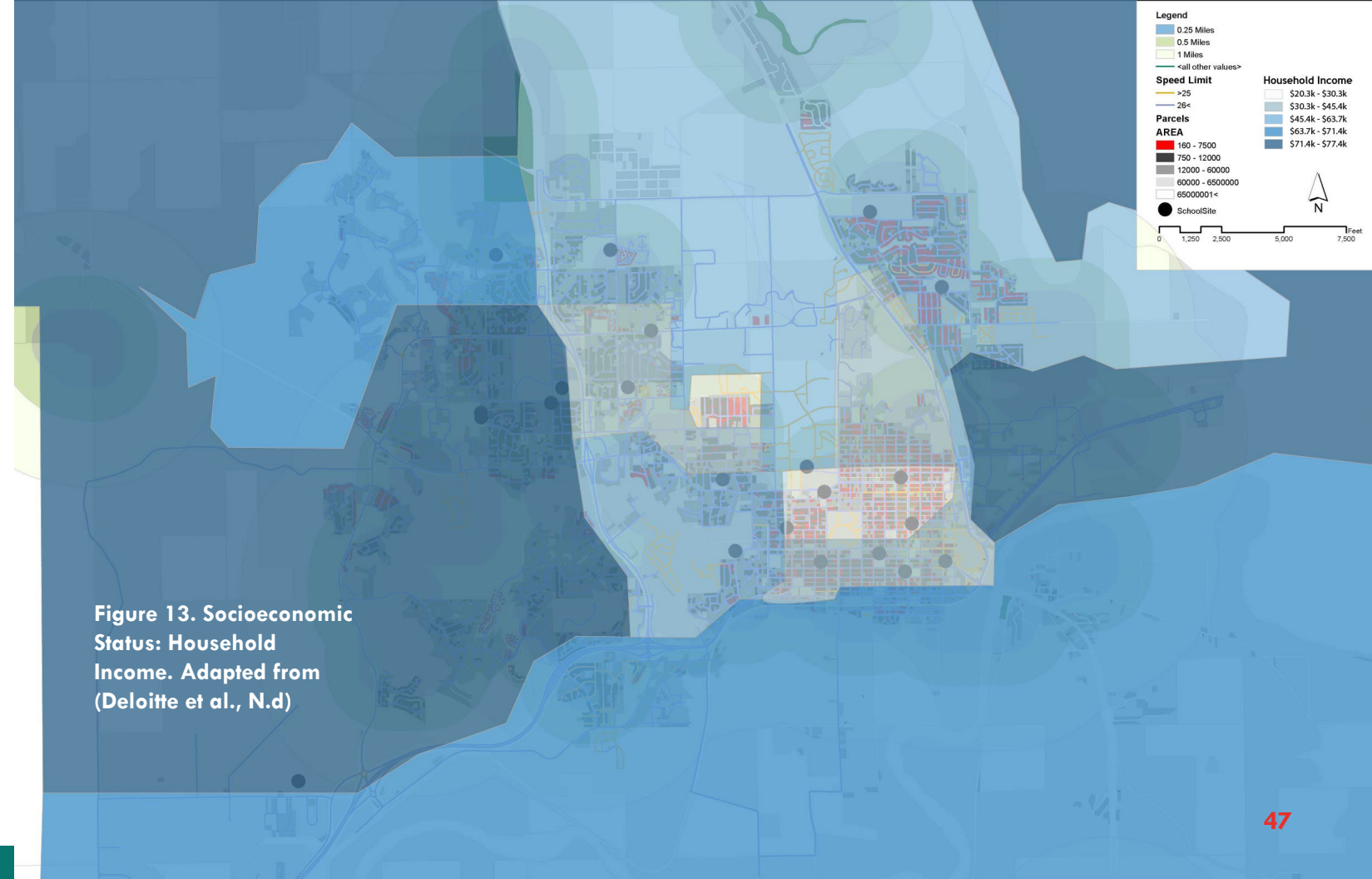


Figure 13. Socioeconomic Status: Household Income. Adapted from (Deloitte et al., N.d)

3.2.3 Suitability Analysis Results

The GIS maps above (Figure 8 through 13) were overlaid to determine potential Play Street locations in Manhattan, Kansas. The potential Play Street locations can be seen in the map overlay in Figure 14. Ten potential Play Street locations were selected from the GIS-based suitability analysis. These locations have a lack of accessible green space and playgrounds, smaller lot size, and higher child density. There was a quarter-mile radius, half-mile radius, and mile radius buffer placed at each of the parks. The selected locations are either over a half-mile from the nearest park or have difficult pedestrian routes, due to lack of sidewalks or street arrangement. The red parcels shown in the overlay are less than 10,018 square feet. This is smaller than the average lot size in Kansas (Kelly, 2016). This means there needs to be more play opportunities adjacent to the home in these locations. The child population density map overlay shows how many children are located within these neighborhoods. It is important that Play Streets are located in areas with children to use the space (Connectfamilies and Urban Impact Lab, n.d.).

More details on the selected Play Street locations can be seen in Table 1 on page 50.

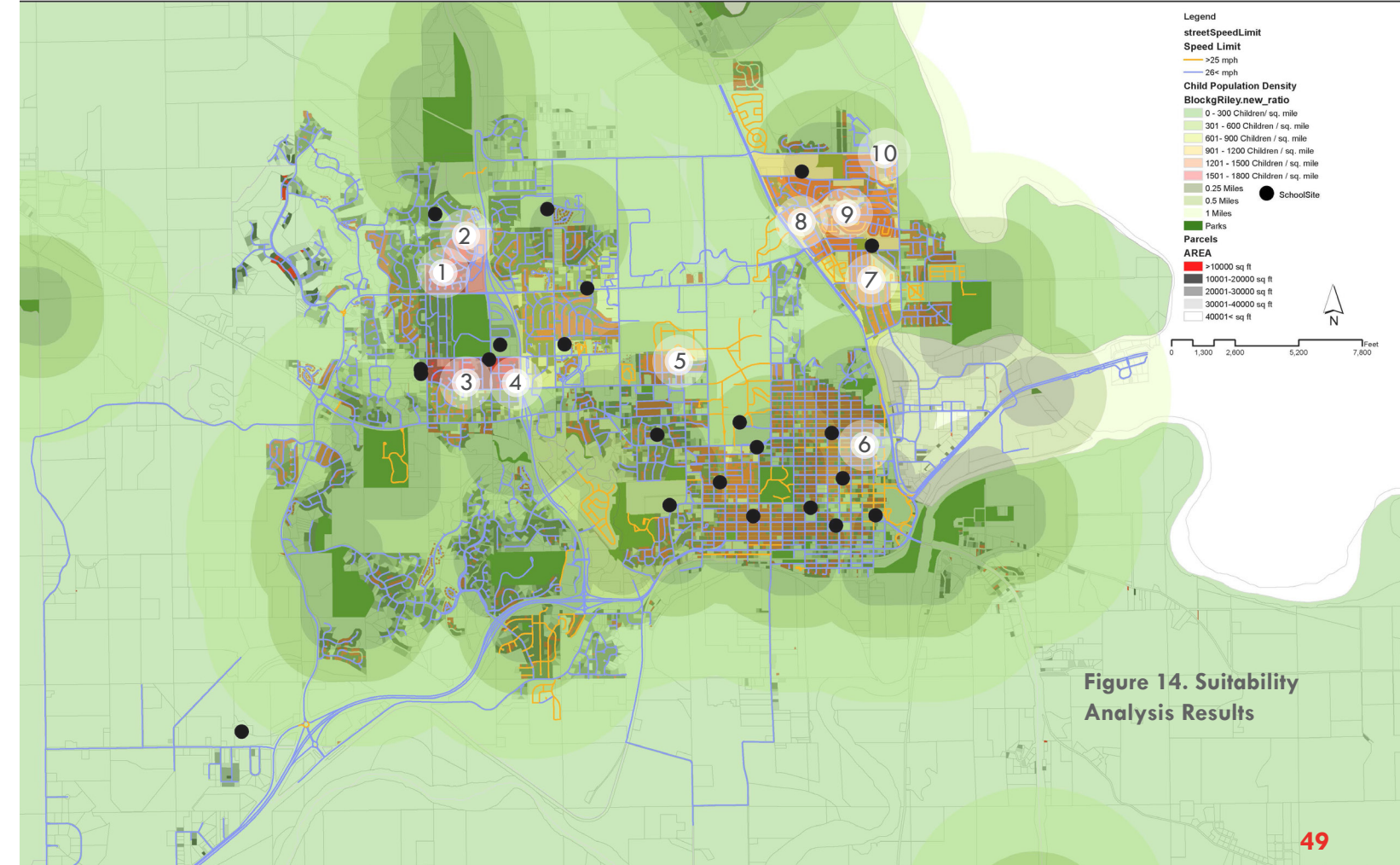


Figure 14. Suitability Analysis Results



Table 1: Play Street Suitability Results

Play Street	Lot Size	Green Space Accessibility and School Locations	Road Type	Speed Limit Suitability	Child Population Density	Socioeconomic Status
1	High	High	Cul-de-sac	Low	High	Low
2	High	Medium	Thru-Street	Low	High	Low
3	High	Medium	Cul-de-sac	Low	High	Low
4	Medium	Medium	Thru-Street	Low	High	Medium
5	High	High	Thru-Street	Low	Medium	High
6	High	High	Thru-Street	High	Low	High
7	High	High	Thru-Street	Low	Medium	Medium
8	High	High	Cul-de-sac	Low	Medium	Medium
9	High	High	Loop off Main Road	High	Medium	Medium
10	High	High	Cul-de-sac	Low	Medium	Medium



Note: The higher rating means that specific location is more suitable for a Play Street based on the factor above.

Lot size: The selected location was considered highly suitable for a Play Street when the lot size was smaller than the average lot size in Kansas. This means there needs to be more space to play near the home environment. As the lot size grows larger, the suitability for a Play Street decreases because play space already exists.

Green Space Accessibility and School Locations: Once again, children need to have accessible play spaces. Buffers were placed around each of the parks and the schools were identified on the map. A location was considered highly suitable if it was located over a half-mile away from a park or greenspace. Some of the locations that were considered highly suitable for a Play Street are located within the half-mile buffer, but this is due to the circulation and route a child would need to take if they were to walk to a park or school.

Road Type: While parents were less concerned about their children playing in a cul-de-sac, parents' concerns increased as play locations moved towards busier locations. More information can be found in Chapters 4 and 5.

Speed Limits: Play Streets should be located on streets that have lower speed limits. When a street had a speed limit over 25 MPH, it was not considered suitable for a Play Street. This should be something that is considered when selecting a Play Street location, but few streets in Manhattan, have speed limits lower than 25 MPH.

Child Population Density: Play Streets need to be located in neighborhoods with children (Connectfamilies and Urban Impact Lab, n.d.). The more children residing in a neighborhood, the more suitable it is for a Play Street.

Socioeconomic Status: Children from low socioeconomic locations are often positioned in areas that lack development and maintenance (Derr and Lance, 2012). Socioeconomic status was considered for this reason. Play Streets were considered more suitable when the household income was lower. Socioeconomic status was not a major factor in this research. This research was focused more towards environmental and neighborhood factors.

Question 2: How do children's play behaviors and parents' opinions on different types of neighborhood environments guide Play Street designs?



3.3 Parent Surveys

3.3.1 Overview

Objective 2: Conduct parent surveys to understand their children's outdoor play behaviors, patterns, and environmental barriers, as well as their opinions about proposed Play Street environments.

The second research objective was a qualitative approach that used parent surveys and neighborhood analysis of three different types of neighborhoods selected from the GIS-based suitability analysis. These three neighborhood locations can be seen on pages 56-63. A parent survey was created using photographs from each of the three proposed Play Street locations and questions were included that asked parents their ideas pertaining to the proposed locations, their children's play behaviors, favorite activities, and Play Street preferences. The survey questionnaire can be seen in Appendix B. Chapter 4 of this report details the results of the parent survey.

The second objective of this study was to gain a better understanding of play barriers and opportunities for Play Streets in different types of neighborhoods. The responses to the parent survey were used help guide the design typologies shown in Chapter 5. Since parents often determine how much time their children are able to spend outdoors, it is important to create environments in which they would approve (Nursing Standard, 2007).





3.3.2 Survey Design

The survey included a set of questions that were used to determine how the parents feel about allowing their child play in selected neighborhood environments and how the parents would design the space to allow their child to play in these locations. Since parents are the determining factor when it comes to the amount of time their children spend outdoors, it is important that they are comfortable with the environments their children are playing in (Nursing Standard, 2007). This survey was designed to capture parents' concerns, and to better understand play barriers and opportunities within the neighborhood environment. This information provides guidance and awareness for future developers. The questions on the survey helped determine top outdoor play concerns and gauge the level of support parents would have towards Play Streets. There were also questions that asked parents about their childhood memories and activities from when they were children. These questions can be seen in the parent survey questionnaire in Appendix B. The parents' responses were intended to guide informed designs that connect to both children and parents by creating spaces that would be support and suit the needs of a variety of people.

3.3.3 Subject and Sampling

Forty-five parent surveys were completed for this study. The only inclusion criteria for the survey was to have children under the age of 12. Recruitment was completed through convenient and snowball sampling. Parents from Seneca, Dodge City, and Manhattan in Kansas, as well as the Kansas City metropolitan area and Springfield, Missouri, completed this survey. The goal was to collect surveys from various sexes, ethnicities, and socioeconomic groups. Having parents from different sizes of cities and walks of life complete the survey was intended to diversify the responses and provide new ideas for the Play Street designs.

In this study, a non-probability convenient sampling method was used to approach the potential respondents with children under the age of 12. The researcher traveled to the previously-listed locations and walked around to different businesses. This allowed for the researcher to reach people from different backgrounds and ethnicities. Several surveys were collected through snowball sampling because parents connected the researcher to other parents or coworkers. This research was approved by the Kansas State University Institutional Review Board (IRB) for all the activities involving human subjects. The approval letter can be seen in Appendix A.



3.2.4 Selection of Play Street Typologies for Informed Designs

The three proposed Play Street typologies can be seen in Figure 15. The typologies were selected because they have a higher population density and are located on streets that can be closed without negatively impacting surrounding streets. Other factors that were taken into account include smaller lot sizes and less accessibility to green spaces or school playgrounds. The proposed locations sites are in different types of neighborhoods and will create opportunities for different design typologies. These typologies could provide guidance for communities, designers, and policy makers wanting to implement Play Streets in different cities.

Site one is located near downtown on a thru-street, site two is located in a loop off a main road surrounded by single family and multi-family housing, and the third site is located in a cul-de-sac. More details about these three locations can be seen on pages 58-63.

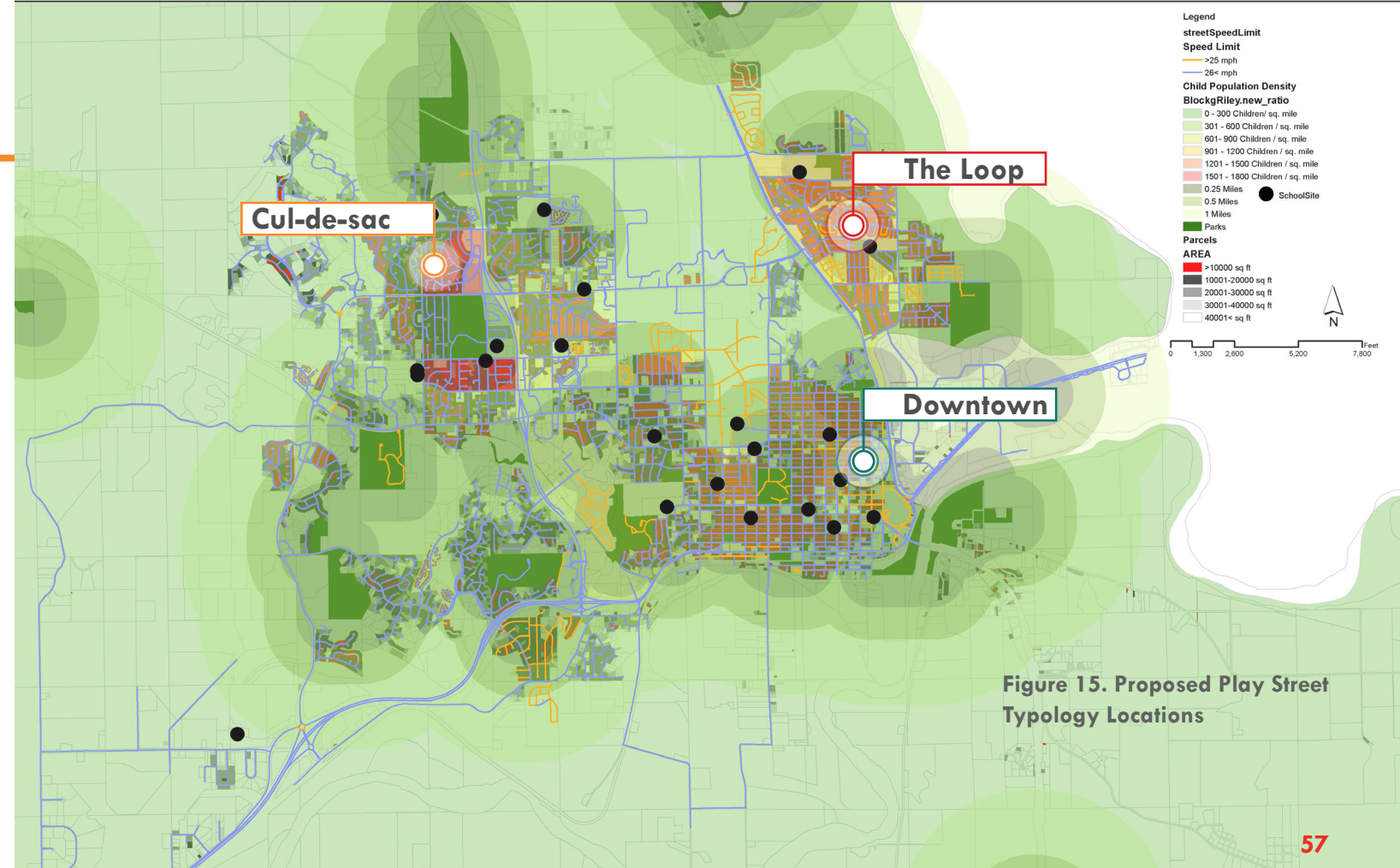


Figure 15. Proposed Play Street Typology Locations





DOWNTOWN

The first typology, Downtown, is located near downtown Manhattan, KS. The child population is not as high in this location, but the design recommendations for this space can provide guidance for cities in other locations. This site was selected due to its lack of accessible greenspace, its proximity to downtown, and the busy streets surrounding this location. This is a one-way street, therefore traffic should not be as much of an issue.

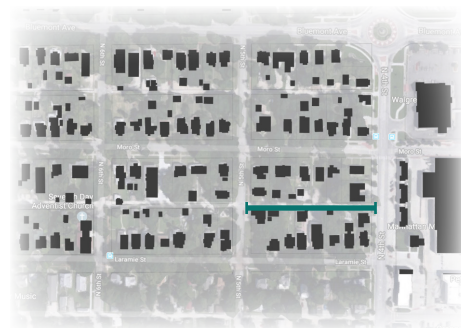


Figure 16. Downtown Context

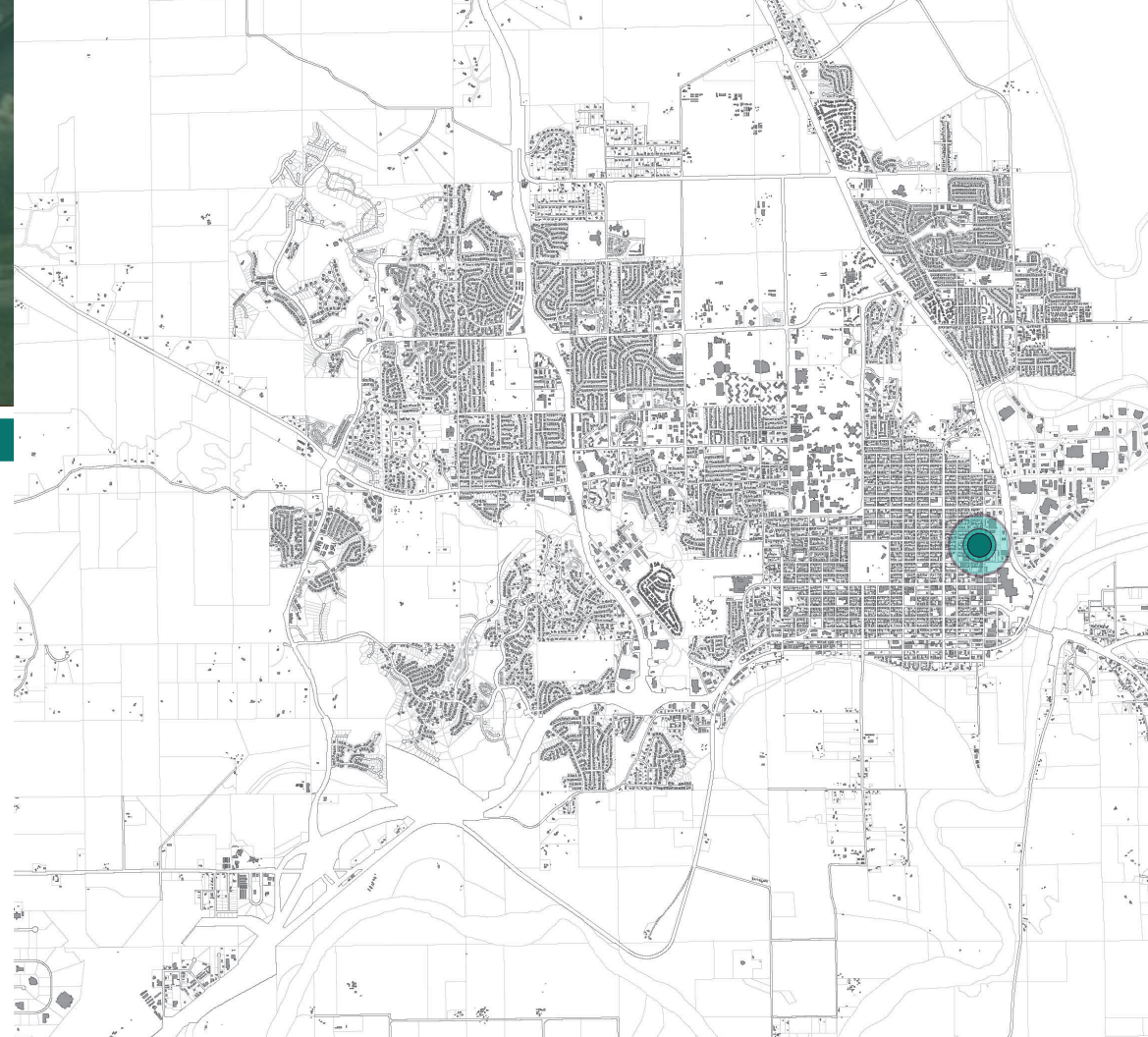


Figure 17. Apartment Buildings Near Downtown (Google Street View, 2020)



Figure 18. Larger-scale Apartment Buildings (Google Street View, 2020)

Figure 19. Downtown Location



THE LOOP



Figure 20. The Loop Context

The second typology, The Loop, is located in a lower-income neighborhood on the outskirts of Manhattan. This site has a higher child population density and is located between single family and multi-family housing. The lot sizes in this space are smaller, indicating there is less play opportunities adjacent to the home. The selected street has a 20 MPH speed limit and is located off a busy road.



Figure 21. Main Street Adjacent to The Loop Greenspace (Google Street View, 2020)



Figure 22. Multi-family Housing Located Adjacent to The Loop (Google Street View, 2020)

Figure 23. The Loop Location



CUL-DE-SAC

The third typology, Cul-de-sac, is in a higher-income neighborhood with a high child population density. The street is a typical cul-de-sac neighborhood development, seen in various other locations. This site has less accessible greenspace and school environments, therefore, there is a need for more organized play space in the neighborhood. This neighborhood environment had different design considerations than the previous two sites because thru-traffic was not as large of a concern.



Figure 24. Cul-de-sac Context

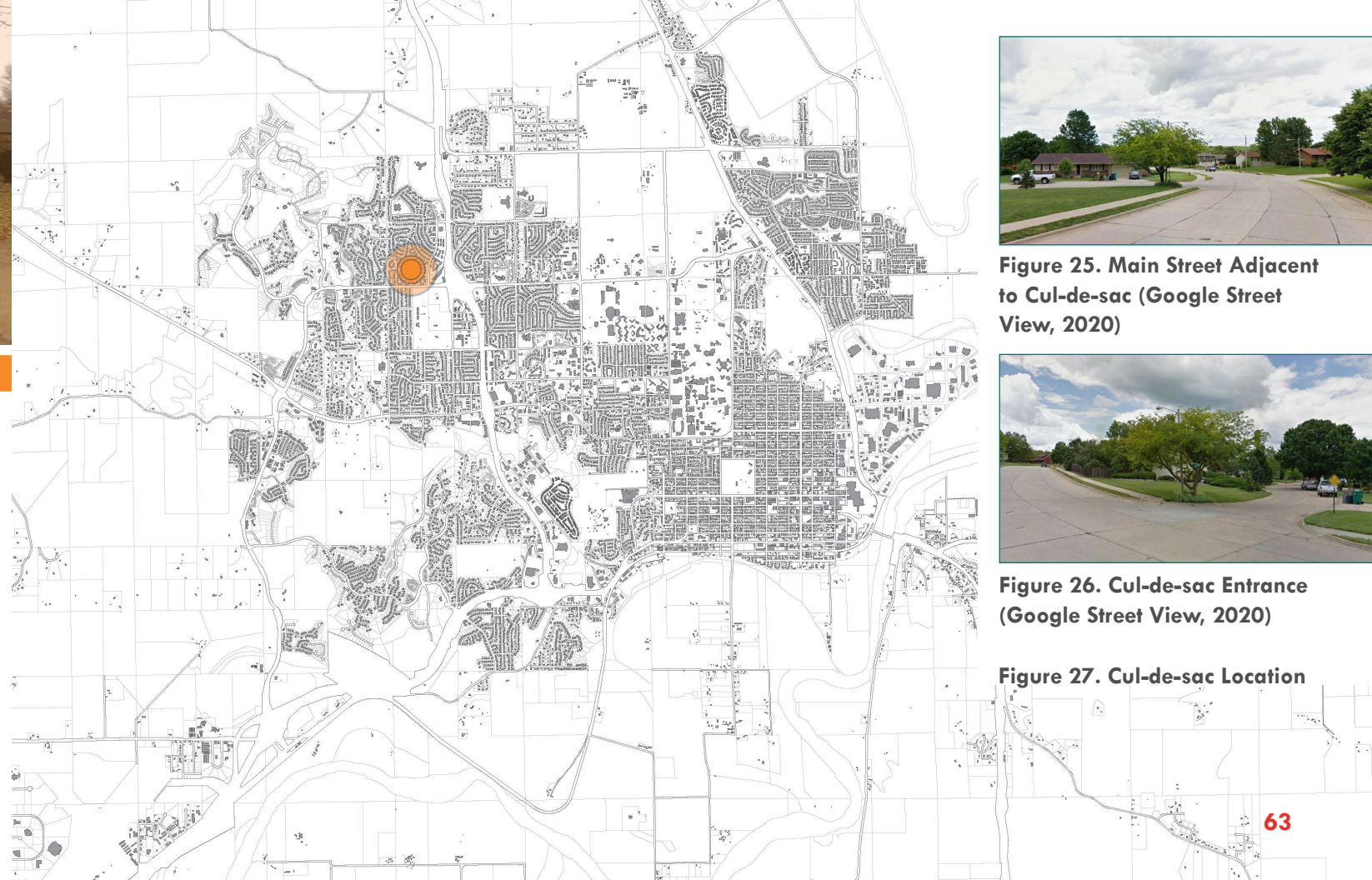


Figure 25. Main Street Adjacent to Cul-de-sac (Google Street View, 2020)

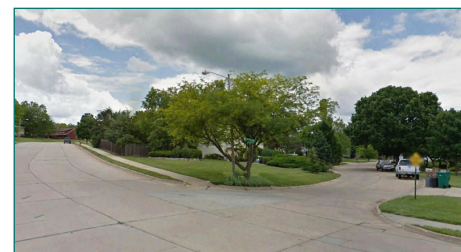


Figure 26. Cul-de-sac Entrance (Google Street View, 2020)

Figure 27. Cul-de-sac Location

3.4 Informed Design

3.4.1 Overview

Objective 3: Propose a design example to illustrate how Play Streets can be implemented into the neighborhood environment.

The data collected from the GIS-based suitability analysis and responses from the parent surveys were used to create informed Play Street Designs for the three different typologies. The parent surveys provided guidance on the types of activities and elements that should be incorporated within the Play Streets and listed neighborhood concerns that limited children's outdoor play time. The design typologies created from this research will provide guidance for developing Play Streets in any location. The proposed design strategies can be seen in Chapter 5.



CHAPTER 4

Results





4.1 Survey Results

Forty-five parent surveys were collected for this research out of the sixty surveys that were initially handed out. The responses from the parent surveys were used to ensure that the proposed Play Street designs reduce parents' concerns, include children's favorite activities, and emphasize the opportunities for each of the three proposed neighborhood environments. The survey responses can be seen in Chapter 4 and how these responses influenced the design outcomes can be observed in Chapter 5.

4.1.1 Data Analysis

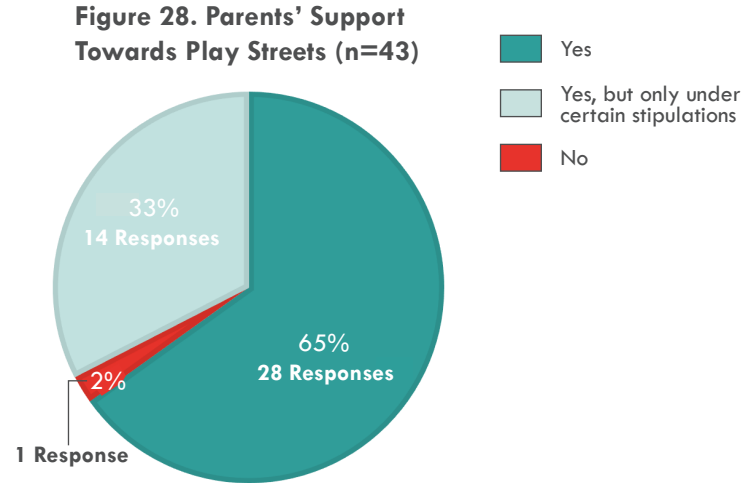
The hard-copy questionnaires were distributed, collected, and analyzed. For the analysis, all survey data was coded into a Microsoft Excel sheet. A code-based system was developed and the parent responses were tallied to determine which responses occurred the most. The following graphics indicate the number of respondents that answered each question. Some of the results indicate that there were more responses than respondents, this is because some parents listed several ideas for each question. Each time a word, phrase, or statement occurred, it was categorized. This technique mixed with an interpretive process was used to find relationships between the responses.

4.1.2 Parents' Support Towards Play Streets



Would you allow your child to play in the locations shown in the previous images if the street was blocked so traffic couldn't get through and the space was supervised by neighborhood parents?

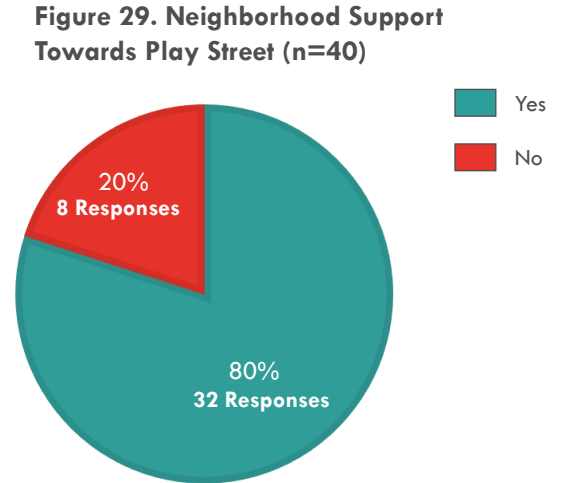
This study received mostly positive feedback from parents; this can be seen in Figure 28. Sixty-five percent of the parents were supportive and showed excitement about the idea of a Play Street. Thirty-three percent of the parents said they would allow their child to participate in a Play Street, but stated they wanted to be there unless they knew the parents supervising. Some of the parents also stated that they would let their children participate depending on the environment in which it was held. The parents' concerns included potential thru-traffic, blind spots, and traffic on adjacent streets. The reasoning behind why parents' did not support the idea of a Play Street was because they did not want their child to think it was acceptable to play in the street.



4.1.3 Neighborhood Support Towards Play Streets

Do you feel like residents within your neighborhood would be supportive of a Play Street? If not why?

An important step to organizing a Play Street is to make sure neighbors and residents within the neighborhood are supportive of the idea. Eighty percent of parents believe the residents would be supportive of a Play Street in their neighborhood. The reasons parents think the residents within their neighborhood would not support a Play Street are due to them not being able to have access to the street if they were wanting to leave, not having enough children in the neighborhood to make it worthwhile, or their neighborhood environments wouldn't support it due to traffic. These concerns are important to consider when selecting potential Play Street locations.





4.1.4 Best Times for a Play Street

Table 2. Parents' Suggested Time to Hold a Play Street (n=43)

		Day of the Week						
		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Time of Day	Morning							
	9 am	2	3	3	4	4	5	5
	10 am	4	4	4	5	5	10	10
	11 am	4	4	4	5	5	10	10
	Afternoon							
	12 pm	5	5	5	5	5	13	13
	1 pm	5	5	5	5	5	15	13
	2 pm	4	4	4	4	4	16	16
	3 pm	12	12	12	12	13	20	19
	4 pm	16	16	16	16	16	23	24
	Evening							
	5 pm	18	18	18	18	18	18	18
	6 pm	11	11	11	11	12	14	14
7 pm	3	3	3	3	4	10	7	
8 pm	1	1	1	1	2	6	5	
9 pm					1	5	4	

15+ Responses

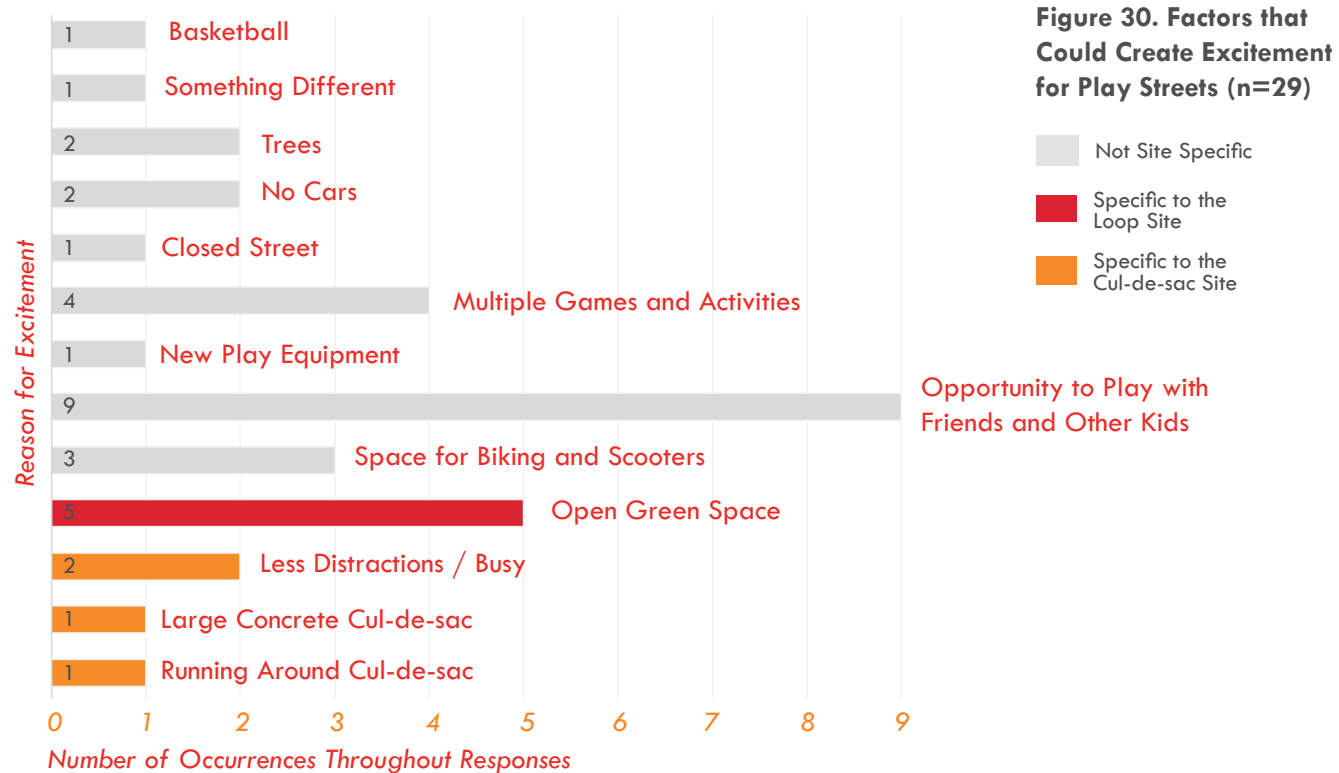
10- 14 Responses

What day and time would a Play Street work best for you and how long?

Parents were asked when a Play Street would work best for them and how long it should last. The times that parents listed were tallied to determine which days and times occurred the most throughout the responses. It was determined that after school throughout the week and Saturday and Sunday afternoons would be the most suitable times. However, this raises a challenge because when parents were asked about their top concerns for the different suggested Play Street locations, a common concern was how residents would have access to their homes. The time parents suggested to host a Play Street is during one of the busiest traffic times throughout the week. There would need to be communication to see if residents within the neighborhood would have a problem with the Play Street being held after school hours or this could provide an opportunity to have the Play Street on weekend afternoons. Some parents stated how long they believe a Play Street should last. These numbers were averaged and it was revealed that 2 hours would be best for families.

These days and times were determined by the parents who completed the survey. This will provide a general guidance for communities and policy makers. The time and length for a Play Street can vary depending on location and residents. The time could also be adjusted depending on the time of the year. The summer months can provide opportunities for a Play Street during the day or later in the evening, after traffic has calmed down, but it's still light out. Once again, this preference will depend on the neighborhood and its residents.

4.1.5 Factors that Could Create Excitement for Play Streets



Is there anything you see in the images of the Play Street locations that would make your child excited about playing here?

It is important to make sure that children would be excited about participating in a Play Street. This is why parents were asked if there was anything from the proposed Play Street locations that would make their child excited to play there. This information could provide guidance on Play Street site selection and what to be aware of when choosing a location. Most of the responses were not site specific, but there were things that would be easily accomplished with a Play Street. The top responses, overall, included having the opportunity to play with friends and other children, playing in the open green space, and getting to experience multiple games and activities. Five responses mentioned the open green space in The Loop. Four responses were specifically related to the Cul-de-sac environment. The responses for the Cul-de-sac included the large concrete space being used for activities and the location being less busy since it is in a closed-off area.



4.1.6 Play Street Activities

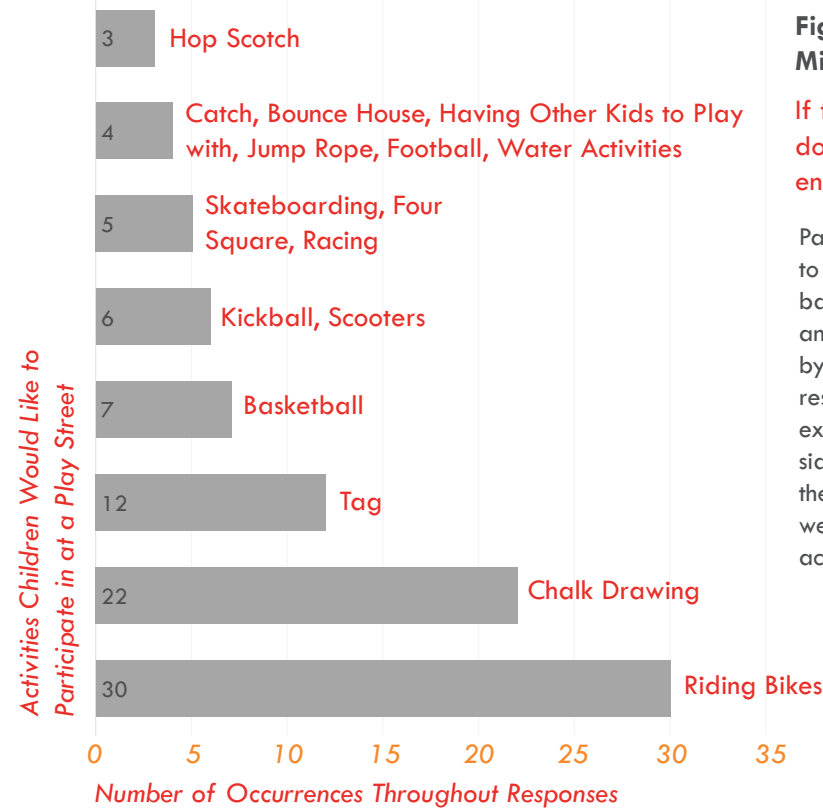


Figure 31. Activities Parents Feel Their Children Might Enjoy at a Play Street (n=44)

If this was a Play Street, what activities do you feel your child would like to engage in?

Parents felt their children would most likely want to participate in bike riding, sidewalk chalk, tag, basketball, soccer, kickball, four square, racing, and skateboarding. These results were determined by how many times they occurred throughout the responses. The question on the survey provided examples for the parents, such as riding bikes, sidewalk chalk, and tag. The researcher believed the examples had an impact on the responses that were given because they were also the top three activities listed in the responses.

4.1.7 Children's Favorite Outdoor Activities

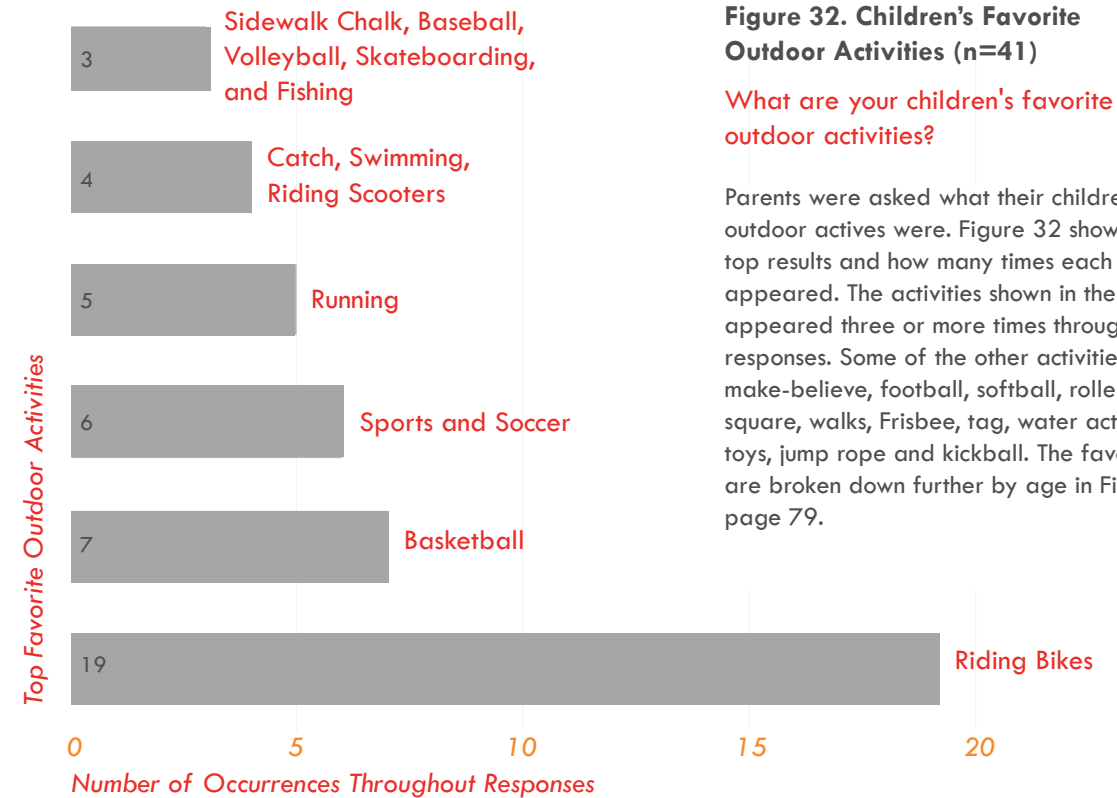


Figure 32. Children's Favorite Outdoor Activities (n=41)

What are your children's favorite outdoor activities?

Parents were asked what their children's favorite outdoor activities were. Figure 32 shows the top results and how many times each activity appeared. The activities shown in the graph appeared three or more times throughout the responses. Some of the other activities listed were make-believe, football, softball, rollerskating, four square, walks, Frisbee, tag, water activities, riding toys, jump rope and kickball. The favorite activities are broken down further by age in Figure 33 on page 79.
























































4.1.8 Children's Favorite Activities and Activities they would like to Engage in at a Play Street Based on Age Groups

If this was a Play Street, what activities do you feel your child would like to engage in?

What are your children's favorite outdoor activities?

The parents were asked what their children's favorite activities were and which activities they feel their child would like to engage in at a Play Street. These responses were analyzed and categorized by age groups. The information can be seen in Figure 33. The top activity for each age group, over the age of one, was bike riding. This information provides guidance for which activities should be included at a Play Street. This is important, because there should be activities present that would benefit and provide excitement for all age groups.

Figure 33. Children's Favorite Outdoor Activities and Activities Children Would Enjoy at a Play Street Based on Age Group (n=44)

Age of Child	Number of Children for Each Age Group	Favorite Activities and Activities Children Would Like to Engage in at a Play Street
<1	2	Too Young for Specific Activities
1	4	
2	3	    
3	7	  
4	6	     
5	6	      
6	6	     
7	6	   
8	7	   
9	5	 
10	6	    
11	7	   
12	9	   
13<	24	   



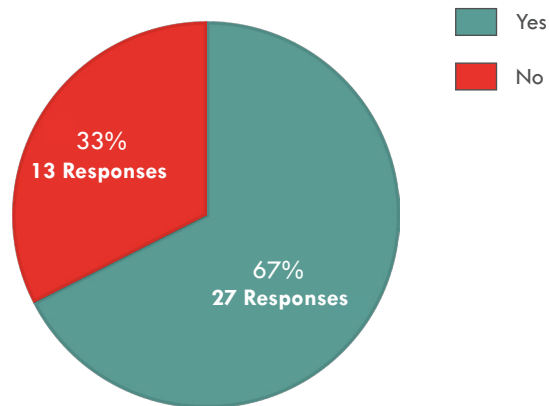
4.1.9 Outdoor Play Time



Do Parents Feel their Children Engage in Enough Outdoor Play Time?

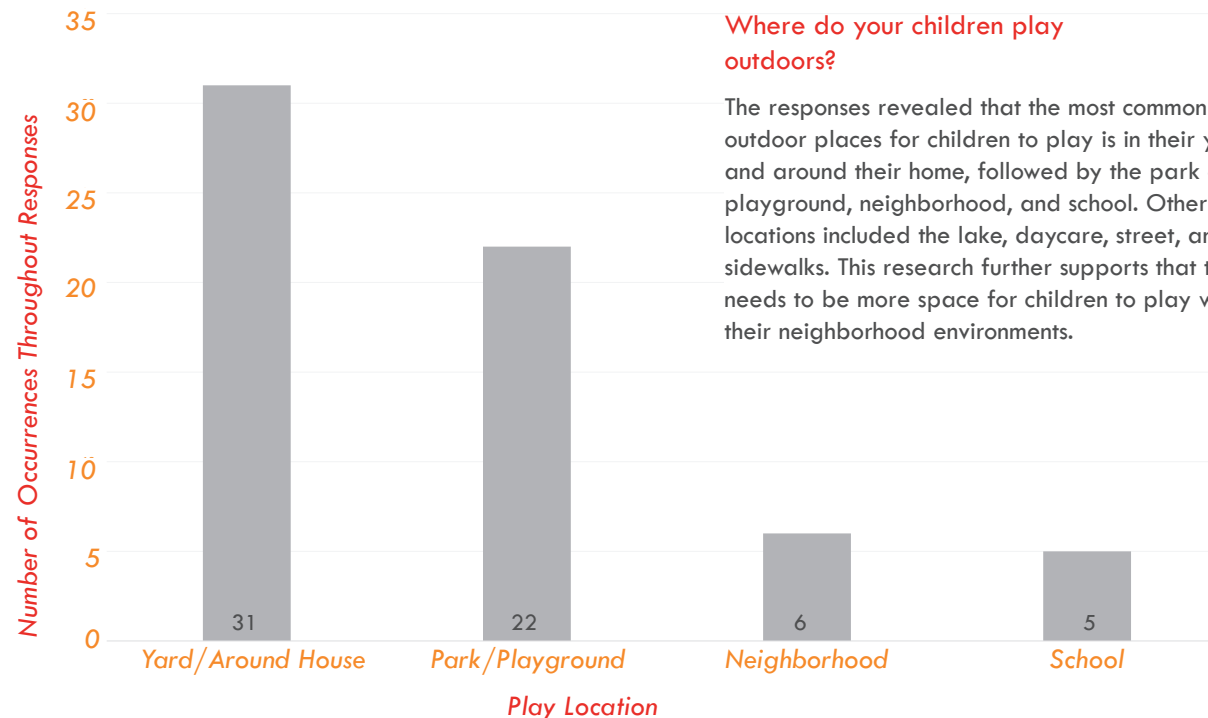
Forty parents responded to this question; sixty-seven percent of them stated that they believed their child(ren) spent enough time playing outdoors. Given children's busy schedules, rise in safety concerns, and traffic, it was hypothesized that a majority of parents would feel their children did not spend enough time playing outdoors. The hypothesis was wrong, but parents still showed interest and had positive feedback on the concept of a Play Street. When one of the parents was asked if their child spent enough time playing outdoors, they stated "Yes, but more is always better!"

Figure 34. Parents' Feelings Towards Their Child's Outdoor Play Time (n=40)



4.1.10 Children's Top Play Locations

Figure 35. Children's Top Outdoor Play Locations (n=41)





4.2 Summary

The survey was successful in discovering outdoor play barriers and understanding children's favorite outdoor play activities. This study also revealed opportunities for developing Play Streets in different types of neighborhood environments. Some of the questions received more responses than others. The predicted reasoning for this is that the question took too much time to answer. It is a possibility that the parents did not have time to answer the question, therefore, they left it blank. Another possibility for not getting responses on all of the questions, was that parents did not understand what the question was asking. Even though this provided a limitation, there were still responses to each question that contributed ideas for the informed design typologies in Chapter 5.

This study supported the need for Play Streets because children spend a majority of their play time in the yard and around the house. Parents' felt a Play Street would be a great opportunity to get their children outdoors and socializing in the neighborhood environment. Many of the responses also supported the importance of the GIS-based suitability analysis. There were several neighborhood factors indicated in the survey that could be opportunities or constraints, such as potential resident support, pavement conditions, or the importance of greenspace. These factors are all important considerations for selecting a Play Street location.



CHAPTER 5

Informed Design Strategies



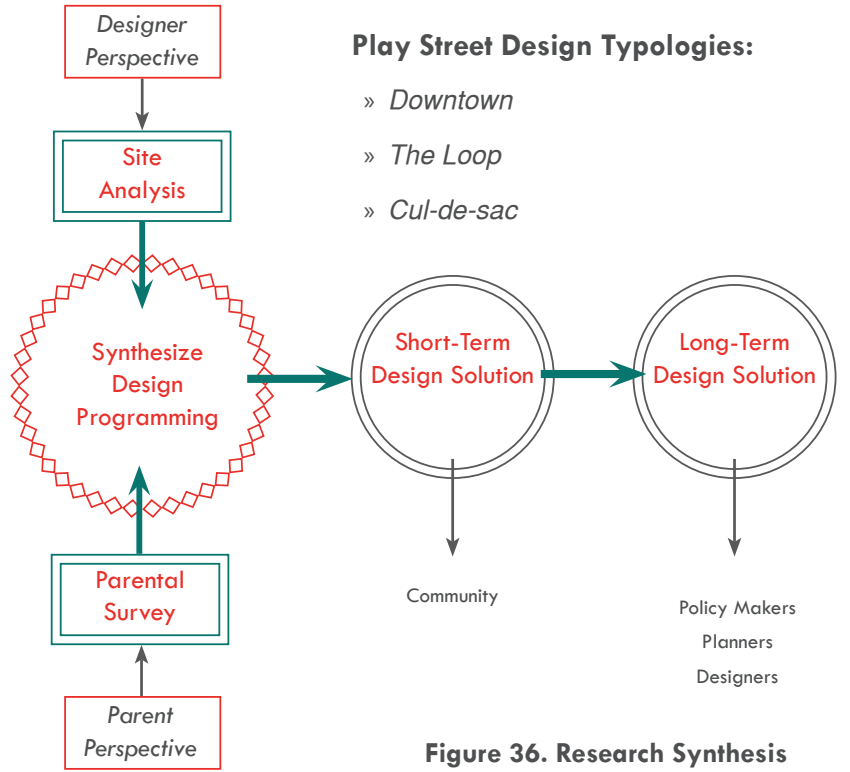


5.1 Approach

5.1.1 Synthesis

The information from the parent surveys and site analysis was used to guide the design typologies for the Downtown, The Loop, and Cul-de-sac Play Street locations.

The Play Street design programs were then developed into Short-Term solutions that are intended for communities and Long-Term solutions directed towards assisting policy makers, planners, and designers with future development.



Play Street Design Typologies:

- » *Downtown*
- » *The Loop*
- » *Cul-de-sac*

Figure 36. Research Synthesis

5.1.2 Design Considerations

The research in this document is intended to provide guidance for developing Play Streets. Therefore, the anticipated audience includes community members, designers, planners, and policy makers. Icons were created for each user type and top concerns considered throughout the design analyses and typology programs. This provides direction and guidance for readers. These icons are used to indicate which sections most pertain to that audience or idea.



Communities and Play Street Users

Identifies the ideas and strategies pertaining to site users and communities.



Designers, Planners, and Policy Makers

Show ideas and strategies to consider when organizing or designing neighborhoods and Play Streets.



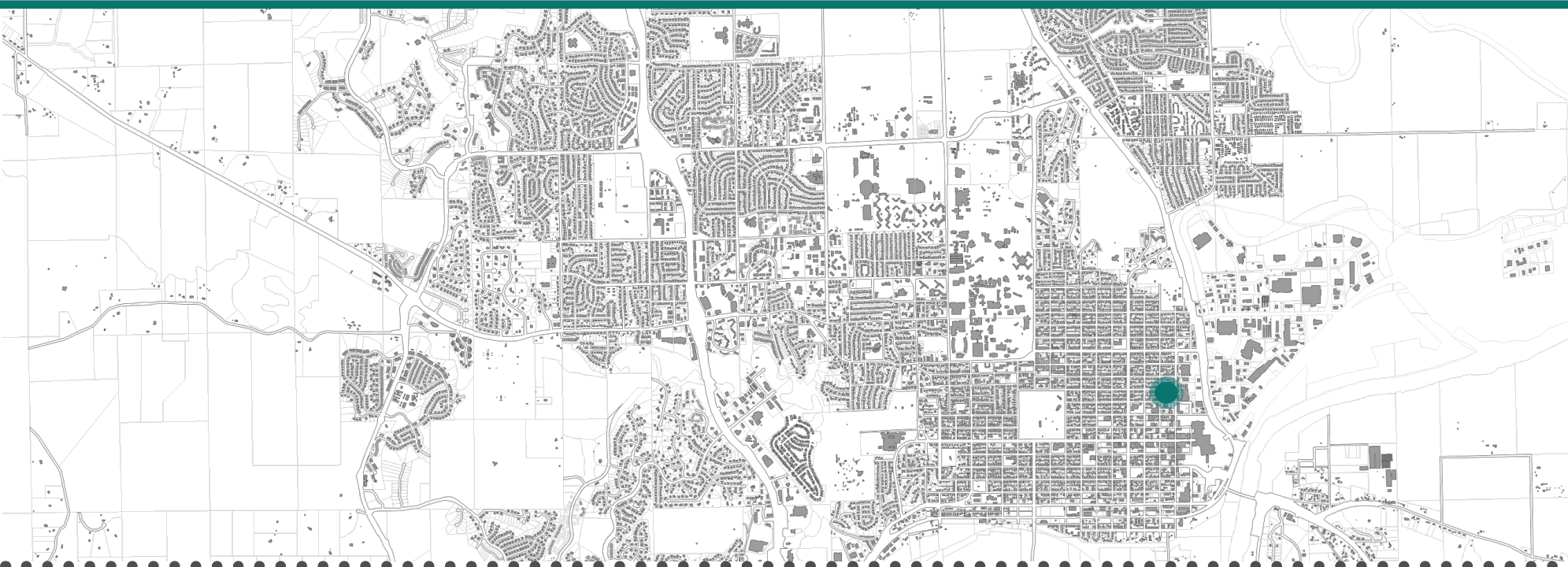
Traffic and Vehicles

Indicates traffic concerns and solutions.



Residents and Neighborhood

Shows resident and neighborhood considerations.



DOWNTOWN

5.2 DOWNTOWN DESIGN STRATEGY

5.2.1 Parental Perspective Analysis for the Downtown Site






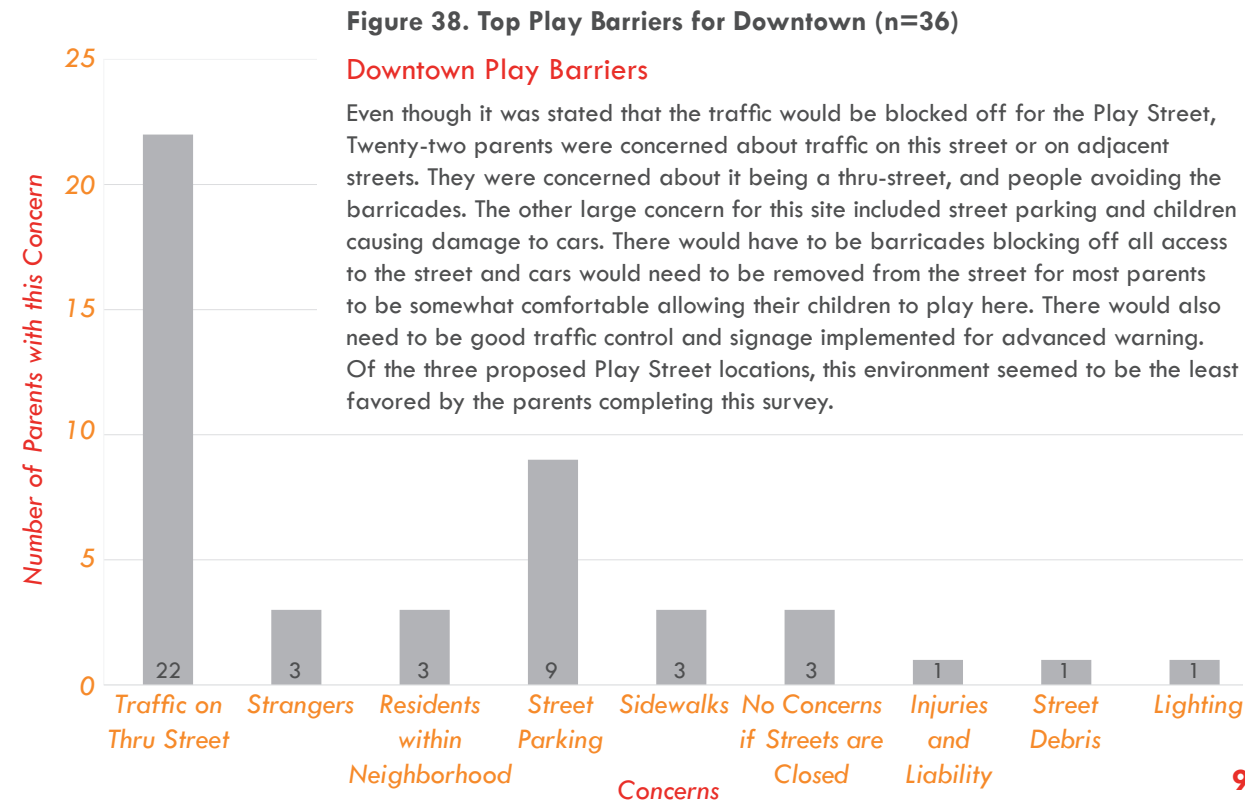
-  Alley provides additional access.
-  Concerns about heavy traffic on adjacent streets.
-  No street parking during Play Street hours. Parents were concerned about cars reducing visibility and children causing damage.
-  Strong barricades that span the length of the street should be located at both ends of the street. This was a large concern for parents.
-  Parents approved of the one-way street. It reduces traffic, but they still want barricades at both entrances.
-  Alleys are located behind the properties along the Play Street location. This allows residents to park near their home, reducing parent concerns for residents having easy access to their home and opens the street for play.

Figure 37. Parental Perspective Analysis for the Downtown Site



5.2.2 Designer Perspective Analysis for the Downtown Site



Figure 39. Designer Perspective Analysis for the Downtown Site

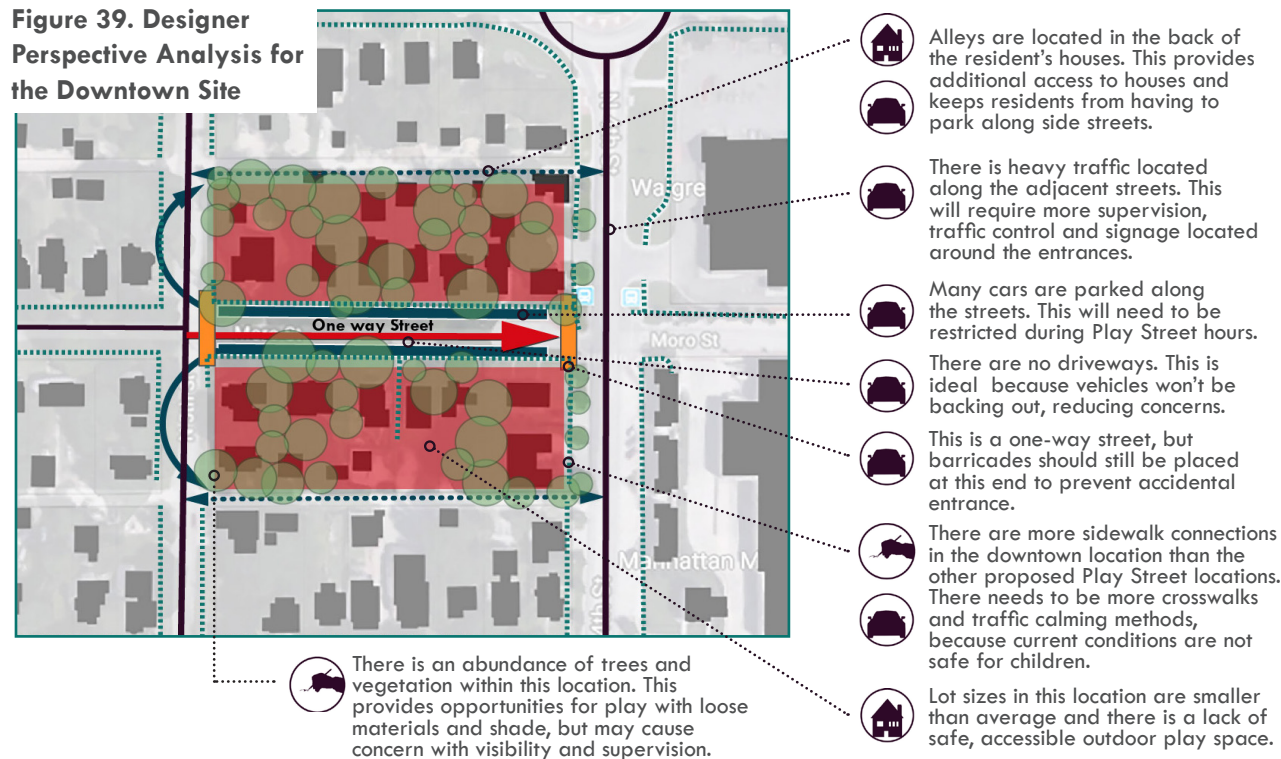
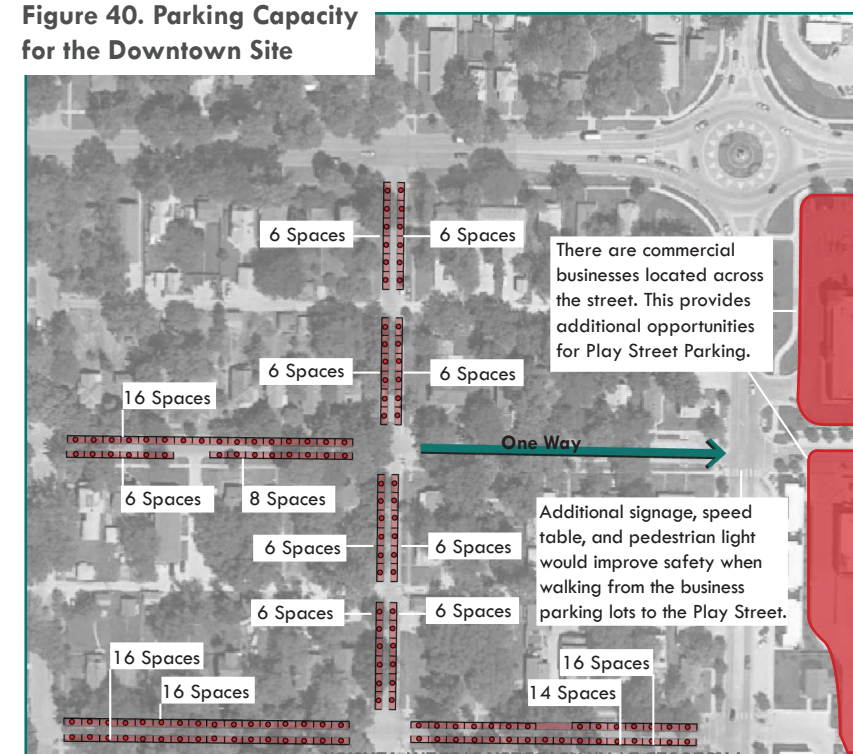


Figure 40. Parking Capacity for the Downtown Site



Parking Capacity for the Downtown Site

Legend

- Play Street Location
- Parking Space
- Parking Opportunity

Number of Parking Spaces:

Total of 140 On -Street Parallel Parking Spaces

It is important to have accessible parking located near the Play Street to make sure community members that do not live adjacent to the space have access to the Play Street. The downtown location has potential for parallel parking on the side roads surrounding the Play Street. There is already space for parking along these roads.



Figure 41. Street View Facing the West in Downtown



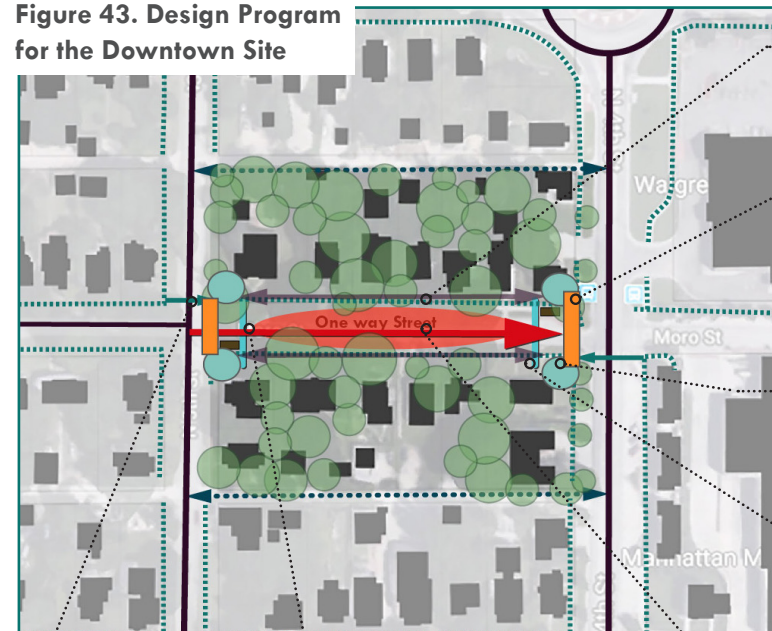
Figure 42. View Towards the Businesses in Downtown

5.2.3 Analysis and Synthesis for the Downtown Site

The designer and parent analysis were similar. Both perspectives took into account the traffic, sidewalk connections, and the parking conditions. Parents were most concerned about traffic in this location. The traffic was not as large of a concern for the designer analysis because it was a one-way street. It was expected that parents would be more supportive of this location, due to the street type. Some parents stated they liked it being a one-way street, but overall they concurred that both potential entrances need to be blocked off. Parents were also concerned about street parking. This concern was stated for each location and should be considered when selecting future Play Street locations.

5.2.4 Design Program for the Downtown Site

Figure 43. Design Program for the Downtown Site



Crosswalks will be implemented on the cross streets to promote walkability.

Colored lines will be painted approximately 15 to 20 feet from the main barricades. This will direct children on where to play, but could also be a starting line for races.

This Play Street site is more dense and has less room for activities than the other two locations. It also has sidewalk infrastructure within the site. This is where more passive activities, such as sidewalk chalk, are located to allow for more space for active play within the street.

Strong barricades span the length of the street entrances to prevent cars from entering the space when the street is blocked off. There will also be signage that warns traffic to slow down, includes the Play Street hours, and a crosswalk. This site is a one-way. Both entrances will still be blocked off to direct children and reduce parents traffic concerns.

Parents were concerned about visibility and blind spots. Remove overgrown vegetation along the street preventing supervision. Parents can supervise from these areas to keep children from entering the main roads.

Since there is less space for storage in this location, movable, multi-functional storage boxes will be placed within the easement during the event to allow children to access the toys. These boxes are located near the entrances of the site, so children in the active space do not run into them while they are searching for toys and they can be supervised by parents.

The active space is located within the middle of the street. This keeps children away from the busy adjacent streets to reduce concerns.

5.2.5 Short-Term Design Solution for the Downtown Site

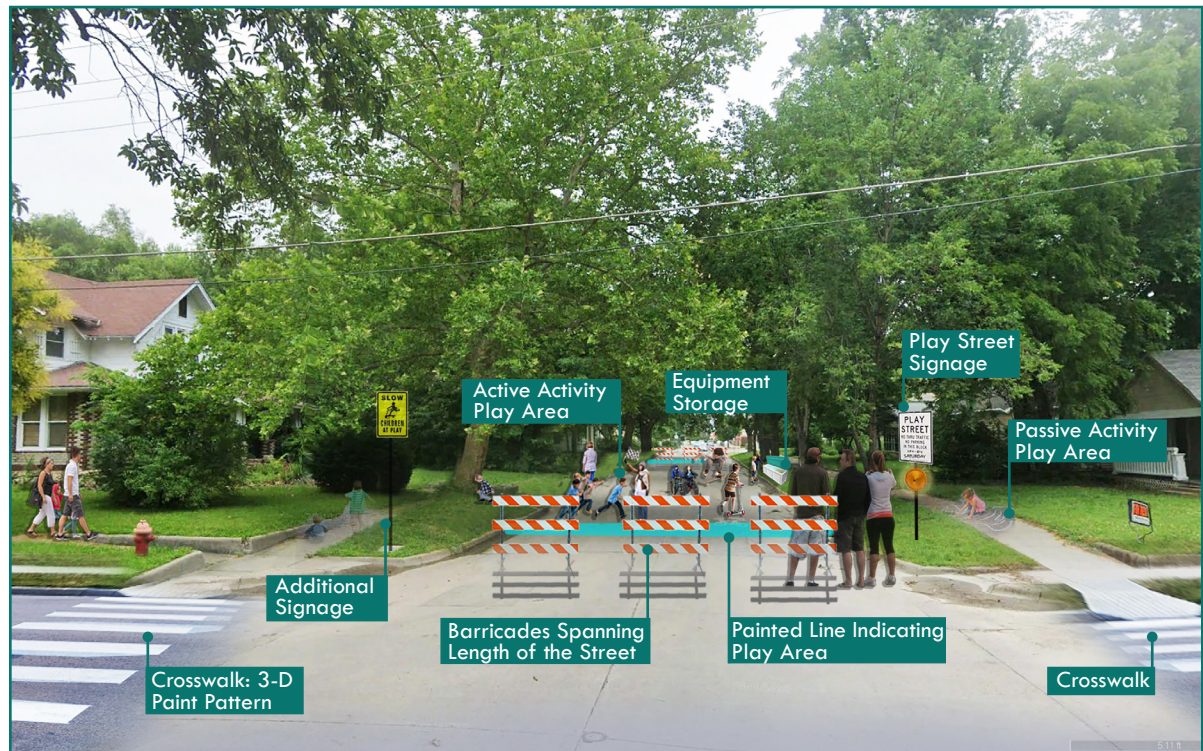


Figure 44. Short-Term Design Solution for the Downtown Site

Parents were most concerned about their children playing in this neighborhood, due to traffic concerns. This design uses the street to maximize space for active activities, such as bike riding, jump roping, riding scooters, and racing. There is already sidewalk infrastructure located within this neighborhood that provides a more separated space for calm, passive activities, such as exploring and chalk drawing. This programming strategy is organized to prevent children participating in active activities from colliding with children engaging in passive activities. There is a temporary line painted on the sidewalk to identify the Play space to direct children, but it is advised parents stand towards the end of the street to supervise. These ideas are directed towards keeping children away from the busy adjacent streets to help reduce parents' concerns with this space.

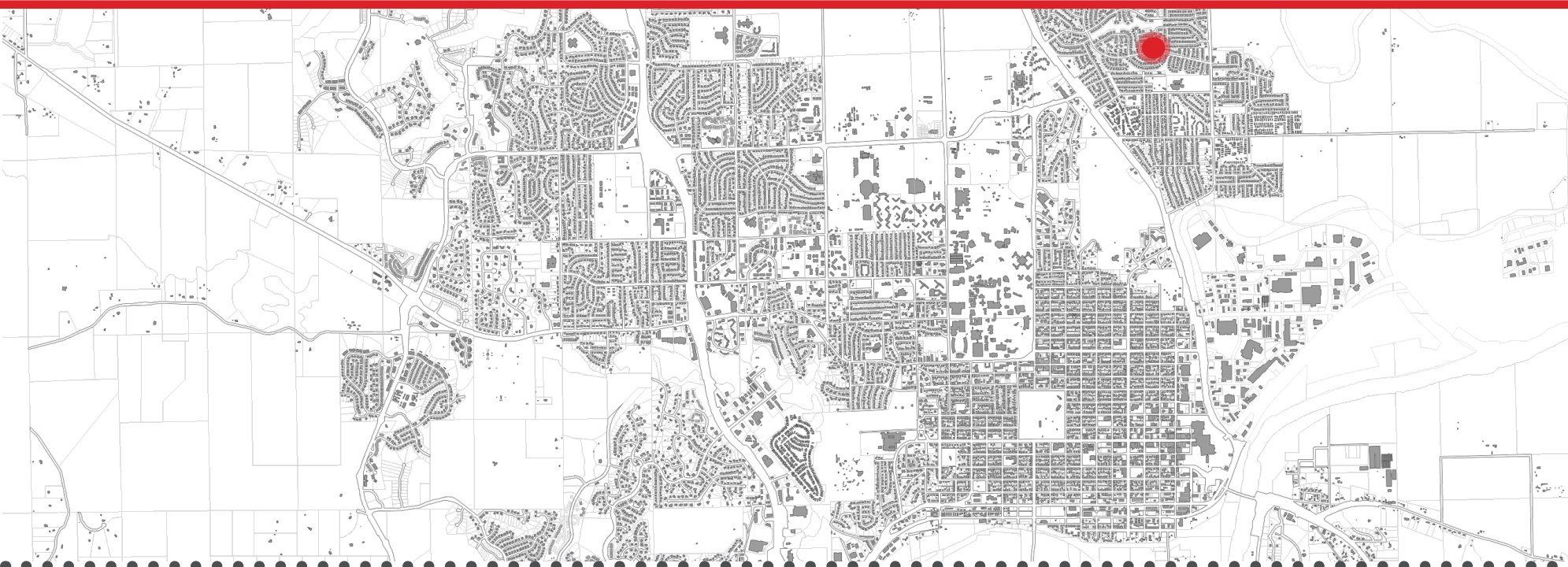
5.2.6 Long-Term Design Solution for the Downtown Site



**The sheep barricades were designed by Christophe Machet (Christ Church City Council, 2018). They are used to provide an example for the types of barricades envisioned for the Long-Term Play Street Designs.*

The programming and organization for the long-term Play Street solution is similar to the short-term solution. The differences between the two design strategies is the infrastructure and investment needed for the elements in the long-term Play Street. The sidewalk connections to this location would need to be improved for a long-term strategy. A pedestrian crossing signal, additional signage, crosswalks, bike lane, and speed table are also suggestions needed to improve walkability and reduce traffic speed on surrounding streets. Traffic and lack of sidewalk connections were large concerns for parents and would be an important to address in order for parents to allow their children to play this location. A bold, colorful banner is located at the entrance to bring attention to the event and inform passing traffic, pedestrians, and the community of the Play Street.

Figure 45. Long-Term Design Solution for the Downtown Site

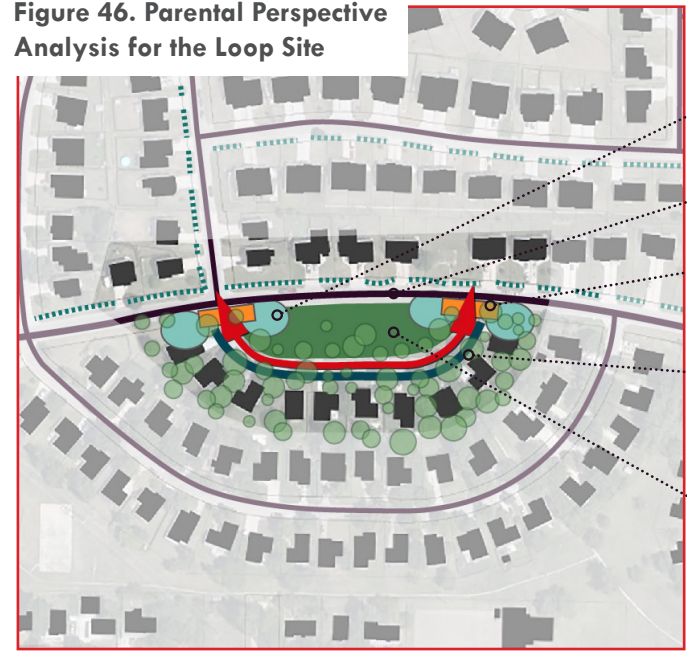







THE LOOP

5.3 THE LOOP DESIGN STRATEGY

5.3.1 Parental Perspective Analysis for the Loop Site

Figure 46. Parental Perspective Analysis for the Loop Site



-  Parents were concerned about blind spots located on the corners of the intersections
-  Concerns about heavy traffic and its location near the main road.
-  Strong barricades that span the length of the street should be located at both ends of the street. This was a large concern for parents.
-  No street parking during Play Street hours. Parents were concerned about cars reducing visibility and children causing damage.
-  Parents had a positive response about the large green space located adjacent to the Play Street location. This provides an opportunity for a larger variety of activities.

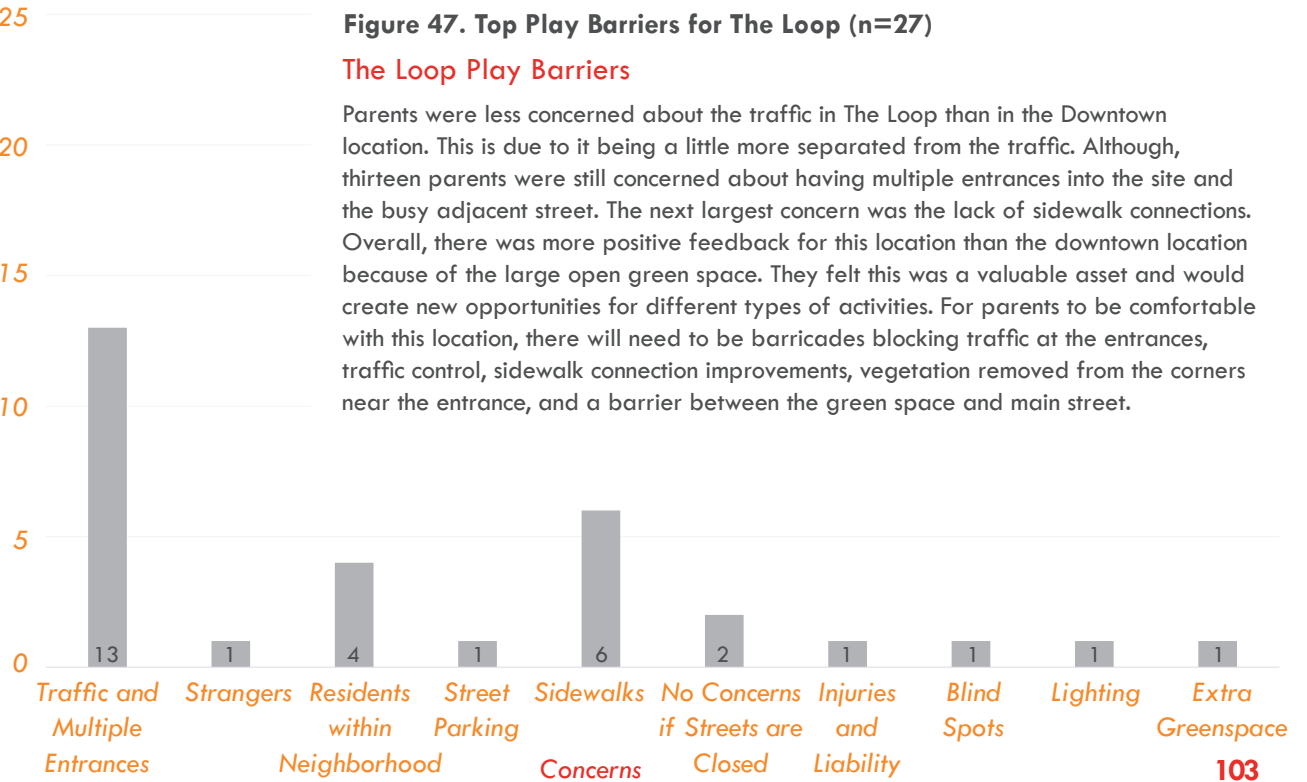


Number of Parents with this Concern

Figure 47. Top Play Barriers for The Loop (n=27)

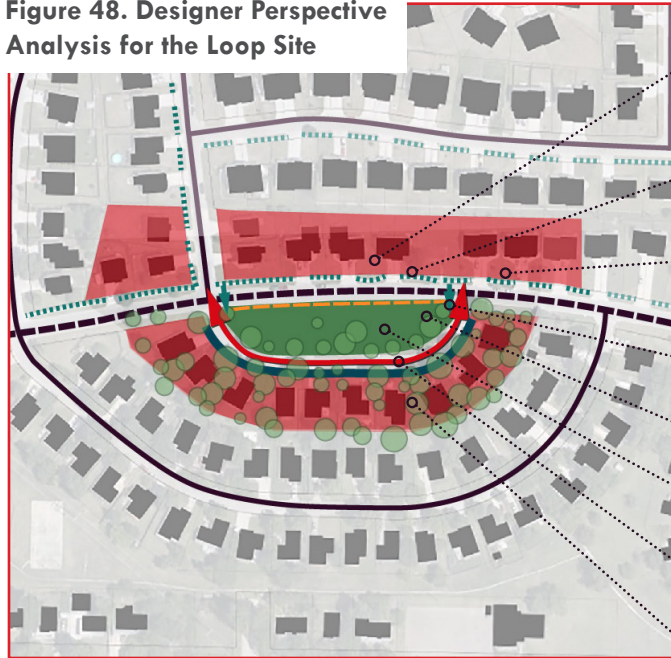
The Loop Play Barriers

Parents were less concerned about the traffic in The Loop than in the Downtown location. This is due to it being a little more separated from the traffic. Although, thirteen parents were still concerned about having multiple entrances into the site and the busy adjacent street. The next largest concern was the lack of sidewalk connections. Overall, there was more positive feedback for this location than the downtown location because of the large open green space. They felt this was a valuable asset and would create new opportunities for different types of activities. For parents to be comfortable with this location, there will need to be barricades blocking traffic at the entrances, traffic control, sidewalk connection improvements, vegetation removed from the corners near the entrance, and a barrier between the green space and main street.



5.3.2 Designer Perspective Analysis for the Loop Site

Figure 48. Designer Perspective Analysis for the Loop Site



-  Multi-family housing is located within a neighborhood, along with several children. Children need more space to play outdoors, this housing rests on smaller lots.
-  Driveways are located adjacent to the street creating fragmented sidewalks. This may make it difficult for children to walk safely.
-  There is a busy street located adjacent to the Play Street location. There will need to be a barrier to keep children from entering the main street.
-  There needs to be crosswalks and traffic control to slow traffic during Play Street hours.
-  Vegetation creates opportunities for Play and shade while people are outdoors.
-  Large greenspace creates opportunities for a variety of activities and equipment storage.
-  Road has a 20 MPH speed limit and parking is only allowed for residents within the neighborhood.
-  Single family housing is located on smaller lots decreasing opportunity for outdoor play.






Figure 49. Parking Capacity for the Loop Site



Parking Capacity for the Loop Site

Legend

-  Play Street Location
-  Proposed Bike Lane
-  Parking Space

Number of Parking Spaces:
Total of 45 On-Street Parallel Parking Spaces

The Loop has fewer parking spaces due to the driveways located along the street. This location lacks pedestrian opportunities, such as sidewalks and bike infrastructure. A proposed bike lane is located on the south side of the road to improve connectivity within the neighborhood. This also limits some of the parking spaces.



Figure 50. Street View of The Loop Play Street Location



Figure 51. Large Greenspace Located at The Loop

5.3.3 Analysis and Synthesis for the Loop Site

Many of the concerns and observations were shared between the parent and designer analysis, such as the traffic concerns, lack of sidewalks, and excitement about the opportunity for children to play in the large green space. Overall, the difference between the parent and designer analysis was that the vegetation was looked at more as an opportunity and shade from the designers perspective and a visual obstruction from the parents' perspective. The parents' analysis recognized more play concerns and the designer analysis noticed more context for the site and who may be using the space. Both perspectives are important to developing successful outdoor spaces for children.

5.3.4 Design Program for the Loop Site

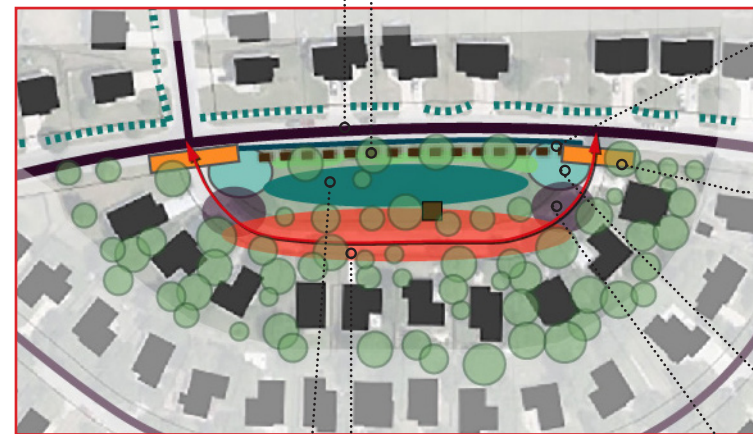
Move street parking to main street during Play Street hours to reduce parents' concerns about damaging vehicles.



Street trees will be located along inside of the fence to create a secondary barrier for vehicles, shade for the Play Street, and fallen leaves and fruit can provide opportunities to children to play with loose materials.



Figure 52. Design Program for the Loop Site



Add fence between the edge of the green space and the main road to keep children from leaving the Play Street area. Parent supervisors can be located towards the end of each of the fences/ entrances.



Barricades span the length of the street entrances to prevent cars from entering the space when the street is blocked off. There will also be signage that warns traffic to slow down, includes the Play Street hours, and a three dimensional crosswalk that also slows down traffic.



Parents were concerned about visibility and blind-spots. To solve this issue, remove dense and tall vegetation adjacent to the intersection.



Green space creates more opportunities for different activities that can not be done on pavement.



Active activities located furthest from the main road to keep children from entering the main road. There should be cones set up or temporary painted lines to separate passive and active activities to prevent injury.



Passive, less active activities can located 15 to 20 feet from the main barricades. Parents can supervise on the corners of the barricades. This lowers the risk of children riding their bikes and scooters in the main street.



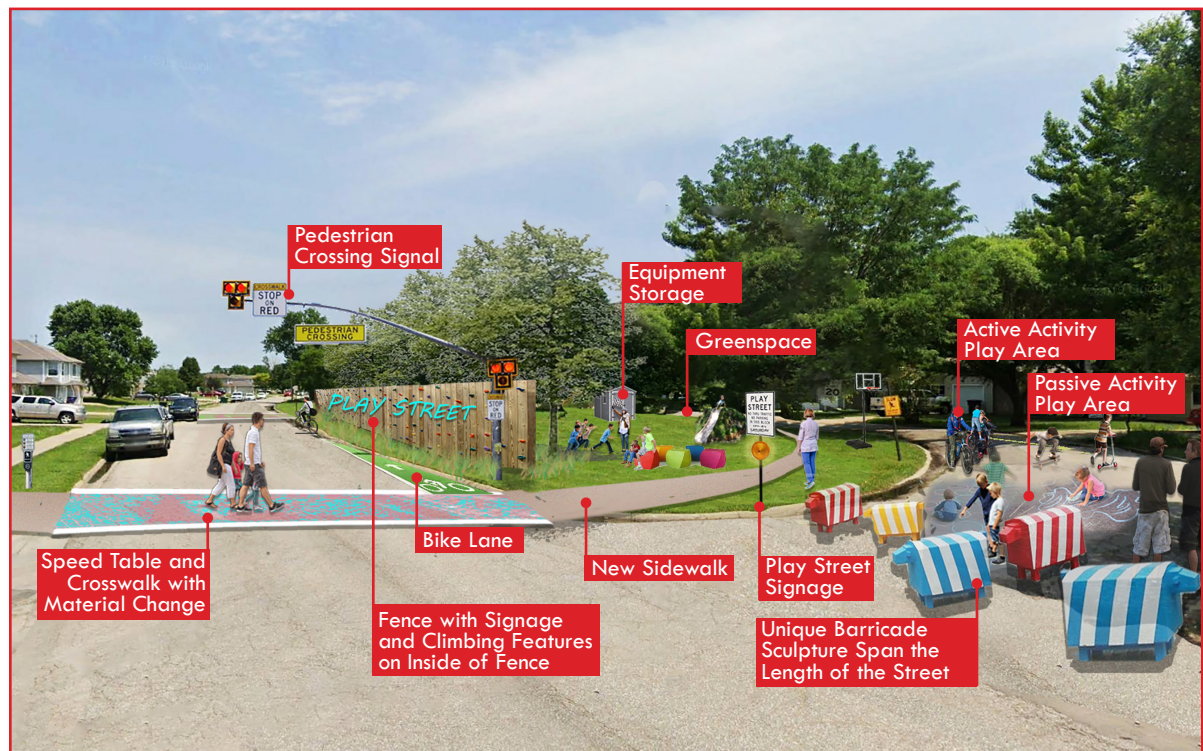
5.3.5 Short-Term Design Solution for the Loop Site



Figure 53. Short-Term Design Solution for the Loop Site

Parents were more supportive of The Loop location than the Downtown space, however, there were still concerns with traffic on the adjacent roads and sidewalk connections. Barricades, signage, and crosswalks were recommended to improve walkability in the neighborhood and reduce traffic concerns. This site has a large greenspace that creates opportunities to introduce different activities. Parents enjoyed the idea of having the greenspace, but they were worried about children running into the street. It is recommended that a fence be constructed and implemented to reduce these concerns. This design has passive activities located near the entrance. This is intended to lower risks of children entering the main road. Active activities are located further from the entrances. These spaces are defined by temporary painted lines to prevent children from running into each other. Storage is located towards the center of the greenspace for toys and equipment for accessibility.

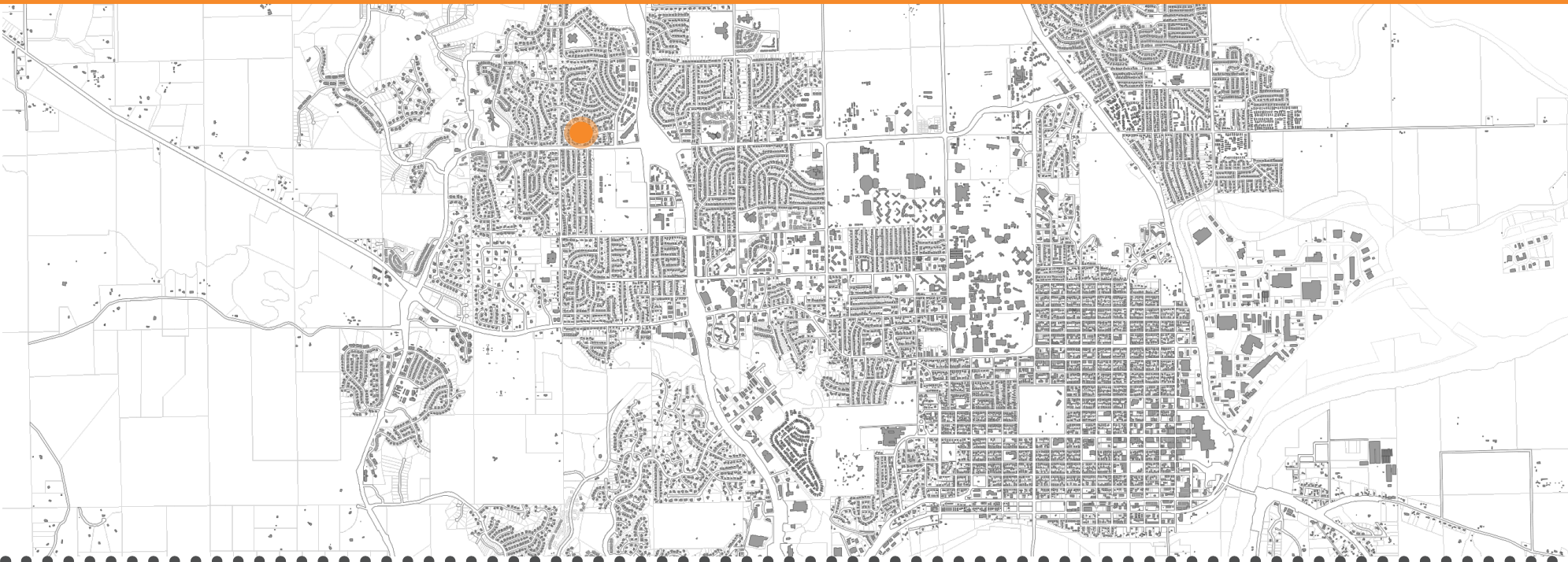
5.3.6 Long-Term Design Solution for the Loop Site



**The sheep barricades were designed by Christophe Machet (Christ Church City Council, 2018). They are used to provide an example for the types of barricades envisioned for the Long-Term Play Street Designs.*

The long-term design solution for The Loop involves implementing permanent elements to reduce traffic concerns and keep children away from the main road. The fence in the long-term solution differs from the short-term solution because there are climbing handles on the back that are similar to a rock wall. A pedestrian crossing light, speed table, signage, and sidewalks are recommended for a long-term Play Street in this location. Parents were concerned about the lack of sidewalk connections within The Loop, therefore, sidewalks were proposed to reduce these concerns. Unique barricade sculptures are located at both entrances to keep traffic from entering the space. The program organization for the long-term programming is similar to the short-term programming. The difference being the permanence of the features provided at the Play Street and the surrounding infrastructure.

Figure 54. Long-Term Design Solution for the Loop Site

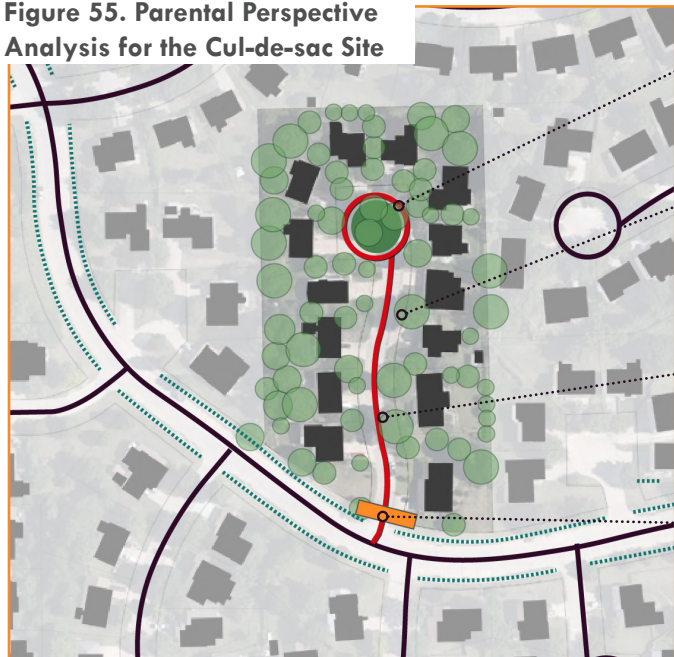


CUL-DE-SAC

5.4.1 Parental Perspective Analysis for the Cul-de-sac Site



Figure 55. Parental Perspective Analysis for the Cul-de-sac Site



One parent was concerned about grouping at the end of the street. To prevent this, parent supervision could be present towards the end of the cul-de-sac.



Parents were concerned about the lack of sidewalk connection towards the cul-de-sac. There would need to be more sidewalks implemented to create a safer space for children to have access to the Play Street.



Some parents were concerned about the condition of the pavement. Play Street locations would need to be checked to prevent potential injury or liability from children falling.



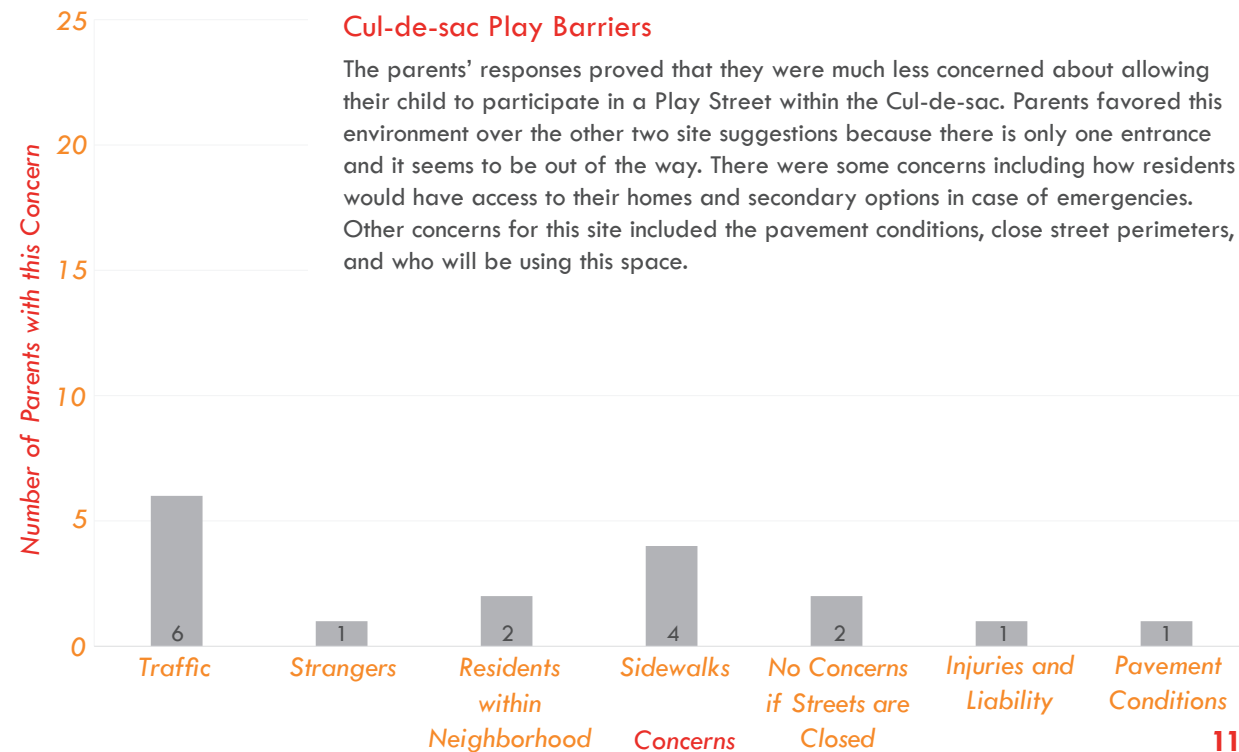
Some parents were concerned about traffic avoiding barriers and residents not having access to their homes.



Figure 56. Top Play Barriers for the Cul-de-sac (n=27)

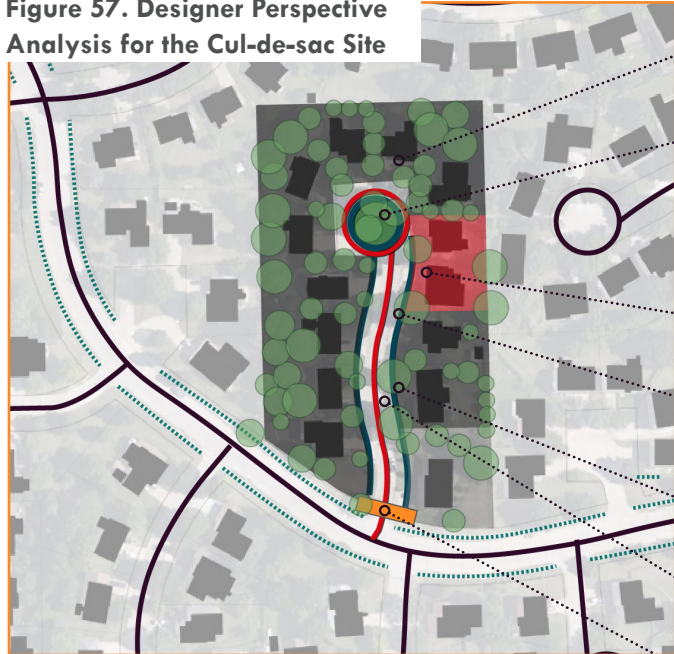
Cul-de-sac Play Barriers

The parents' responses proved that they were much less concerned about allowing their child to participate in a Play Street within the Cul-de-sac. Parents favored this environment over the other two site suggestions because there is only one entrance and it seems to be out of the way. There were some concerns including how residents would have access to their homes and secondary options in case of emergencies. Other concerns for this site included the pavement conditions, close street perimeters, and who will be using this space.



5.4.2 Designer Perspective Analysis for the Cul-de-sac Site

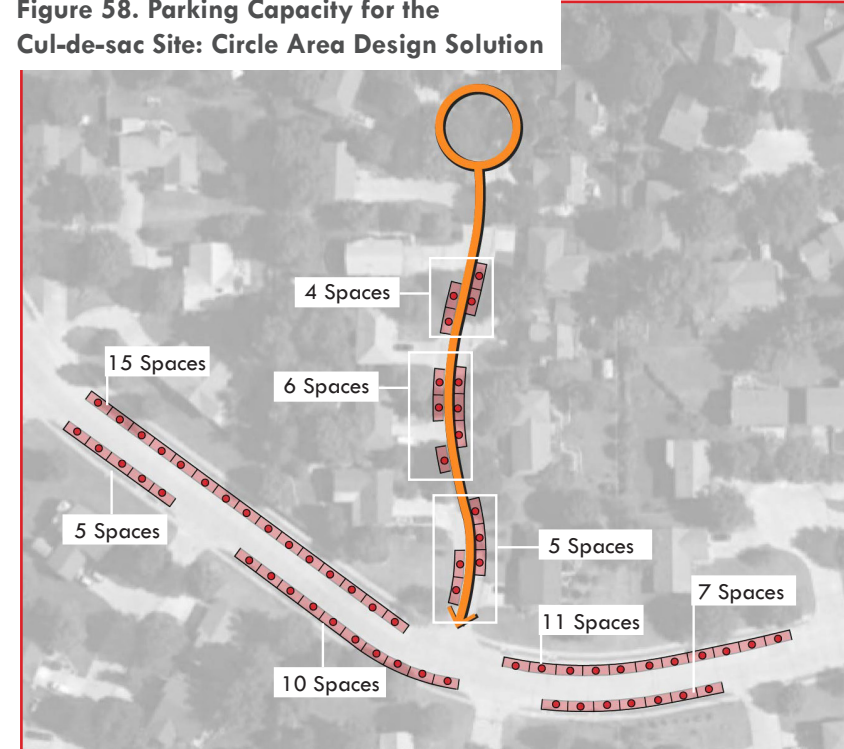
Figure 57. Designer Perspective Analysis for the Cul-de-sac Site



-  The lot sizes are larger in the Cul-de-sac than the previous two locations.
-  The cul-de-sac island has mature vegetation that provides opportunities for play for short-term Play Streets, but for the long-term Play Street this space could be cleared and grass could be planted to great more space for yard activities.
-  Front yards appear to be more shallow, potentially making it difficult to implement sidewalks.
-  Street parking is located on both sides of the street. This will need to be restricted reduce concerns about damaging vehicles.
-  Vegetation creates opportunities for Play and shade while people are outdoors.
-  The street pavement has patchwork done to seal cracks. This could cause children to trip and fall.
-  Barricades still need to be located at the entrance to keep vehicles from entering the Play Street..





Figure 58. Parking Capacity for the Cul-de-sac Site: Circle Area Design Solution



Parking Capacity for the Cul-de-sac Site: Circle Area Design Solution

Legend

-  Play Street Location
-  Parking Space

Number of Parking Spaces:

Total of 108 On-Street Parallel Parking Spaces

The Cul-de-sac location has opportunities for parking spaces on the main road adjacent to the Play Street. This is ideal because of the existing sidewalk infrastructure, improving accessibility. This will also make vehicle circulation more efficient when the Play Street ends and participants leave the area. There are spaces located on the Play Street road, but they are limited due to driveways.



Figure 59. View Towards the Entrance of the Cul-de-sac



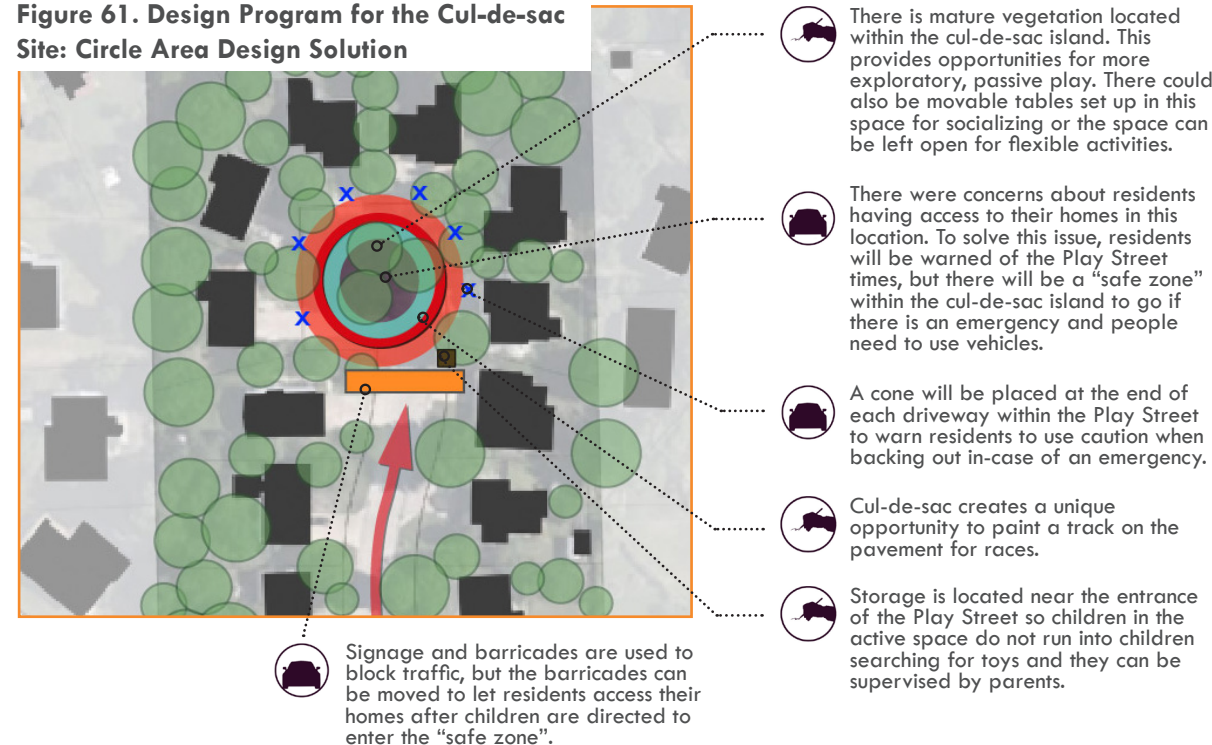
Figure 60. Large Island Located at the End of the Cul-de-sac

5.4.3 Analysis and Synthesis for the Cul-de-sac Site

The Cul-de-sac is not a typical Play Street location. Play Streets are located in neighborhoods where children do not have access to outdoor play space. Children living in Cul-de-sac environments play outdoors more, because there are less parent concerns (D’Haese *et al.*, 2015). The designer and parent analysis were similar for the Cul-de-sac. The parents still had some concerns about traffic and the lack of sidewalk connections. The difference between the two analyses was that the parents were concerned about who would use the space and the quality of the pavement. They also wanted to make sure that residents would have access to their homes. These concerns were addressed in the design process.

5.4.4 Design Program for the Cul-de-sac Site: Circle Area Design Solution

Figure 61. Design Program for the Cul-de-sac Site: Circle Area Design Solution



There is mature vegetation located within the cul-de-sac island. This provides opportunities for more exploratory, passive play. There could also be movable tables set up in this space for socializing or the space can be left open for flexible activities.

There were concerns about residents having access to their homes in this location. To solve this issue, residents will be warned of the Play Street times, but there will be a “safe zone” within the cul-de-sac island to go if there is an emergency and people need to use vehicles.

A cone will be placed at the end of each driveway within the Play Street to warn residents to use caution when backing out in-case of an emergency.

Cul-de-sac creates a unique opportunity to paint a track on the pavement for races.

Storage is located near the entrance of the Play Street so children in the active space do not run into children searching for toys and they can be supervised by parents.

Signage and barricades are used to block traffic, but the barricades can be moved to let residents access their homes after children are directed to enter the “safe zone”.

5.4.5 Short-Term Design Solution for the Cul-de-sac Site: Circle Area Solution

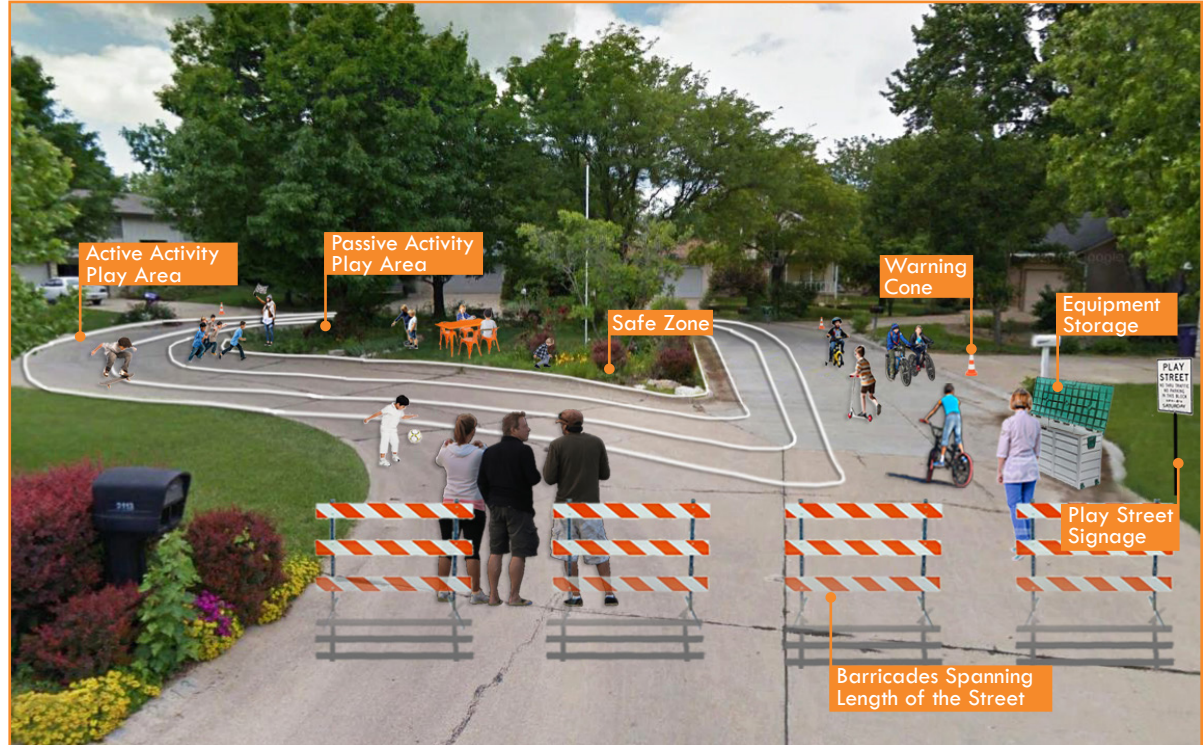
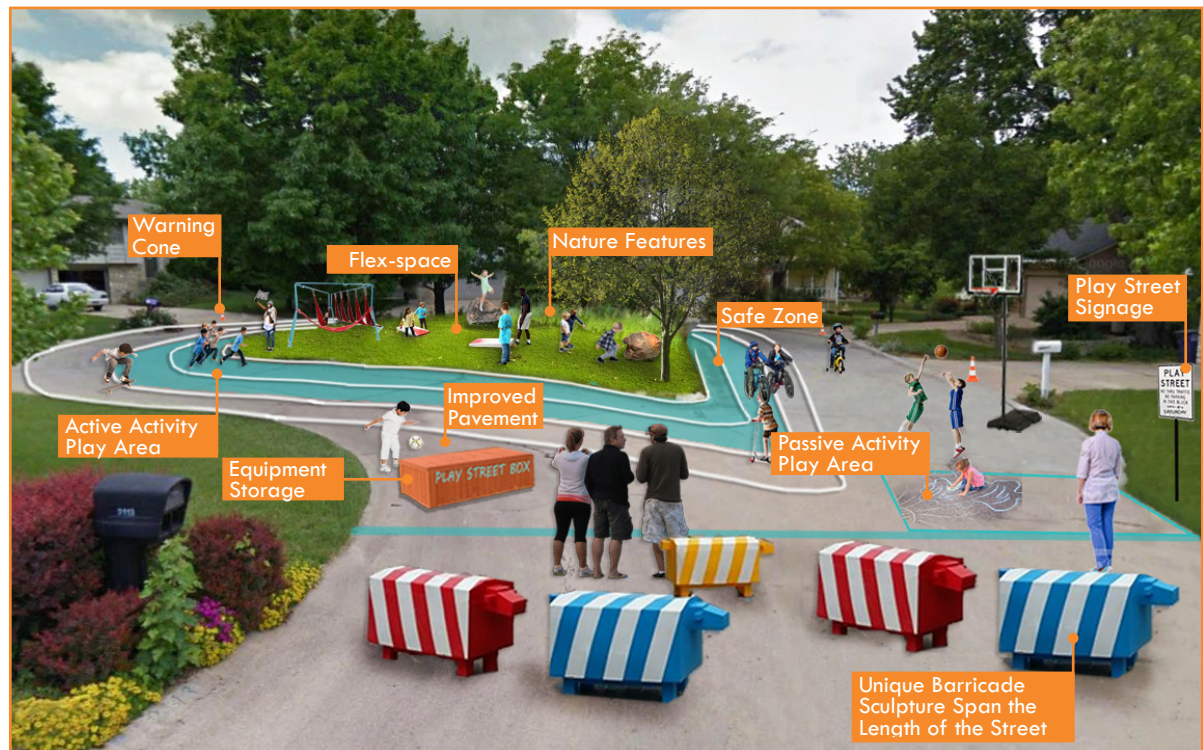


Figure 62. Short-Term Design Solution for the Cul-de-sac Site: Circle Area Design Solution

Parents were most supportive of the Cul-de-sac environment. Many parents said they preferred this Play Street location over the Downtown and The Loop because it was less busy and had only one entrance. The Cul-de-sac circle area design solution focused on the end of the Cul-de-sac near the island. In this solution, the barricades were intended to stop traffic from entering the space. A “Safe Zone” is included within the greenspace of the cul-de-sac island where children can go when residents need to access their homes in-case of an emergency. The parents would need to move the barricades to allow the resident to enter, giving the children time to move into the “Safe Zone”. A cone would also to be placed at the end of the driveways within the Play Street to warn residents to use caution. This design used the greenspace within the island to provide a space for calm, passive activities. The pavement could then be used for active activities, such as racing, bike riding, and scooters.

5.4.6 Long-Term Design Solution for the Cul-de-sac Site: Circle Area Design Solution



**The sheep barricades were designed by Christophe Machet (Christ Church City Council, 2018). They are used to provide an example for the types of barricades envisioned for the Long-Term Play Street Designs.*

Figure 63. Long-Term Design Solution for the Cul-de-sac Site: Circle Area Design Solution

The short-term strategy focused on conserving the vegetation and space the neighborhood already developed, while the long-term strategy was modified to provide more space for play. For this design, the island was developed and mature vegetation was removed. This created a larger space for children to participate in greenspace activities. Since the neighborhood originally planted vegetation within the space, some of the vegetation was preserved to help contribute to exploring and nature play for younger children. This design is similar to the short-term because it has the painted track lines for racing around the cul-de-sac island, signage, and storage. The “Safe Zone for the long-term solution is a painted area on the outskirts of the cul-de-sac island within the track. This painted space creates safe place for children to go, adds color, and implements a playful quality to the space. This design is directed towards reducing the space used on the street to create fewer issues for residents living within the neighborhood.



Figure 64. Parking Capacity for the Cul-de-sac Site



Parking Capacity for the Cul-de-sac Site

Legend

- Play Street Location
- Parking Space

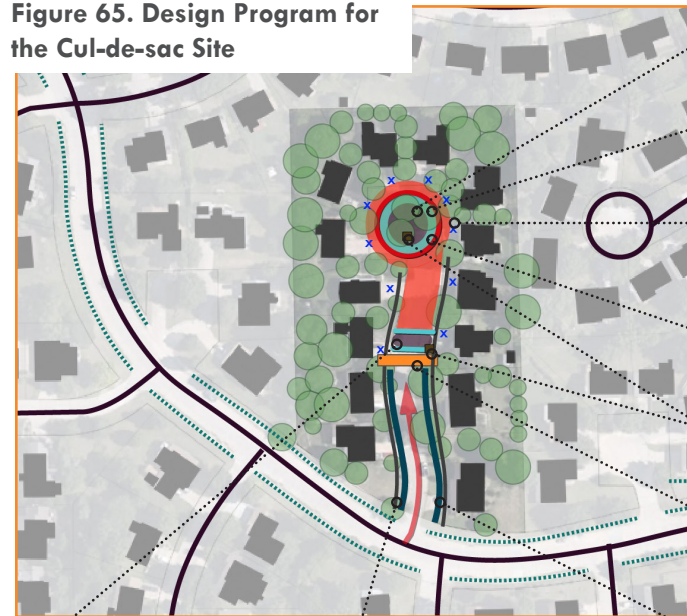
Number of Parking Spaces:

Total of 99 On-Street Parallel Parking Spaces

The larger Cul-de-sac Play Street option decreases parking along the street. There is still an opportunity for parking near the entrance, but a majority of the parking is located on the main road. This option provided more play space for the children.


5.4.7 Cul-de-sac Programming

Figure 65. Design Program for the Cul-de-sac Site



-  Cul-de-sac island greenspace provides opportunities for different activities.
-  The "Safe Zone" gives children and families a place to go if vehicles need to access the neighborhood in the case of an emergency.
-  A cone will be placed at the end of each driveway within the Play Street to warn residents to use caution when backing out in-case of an emergency.
-  Cul-de-sac creates a unique opportunity to paint a track on the pavement for races.
-  Storage will be located at the entrance and in the Cul-de-sac island to improve accessibility to equipment
-  Having the barricades located halfway through the street still provides space for activities, but opens half the street for on-street parking and interferes with fewer residents.
-  Sidewalks can be implemented along the street to promote walkability

 Passive Area is located near the entrance.

 The barricades are located halfway down the street, but the signage is located at the entrance to inform people of the Play Street.

5.4.8 Short-Term Design Solution for the Cul-de-sac Site

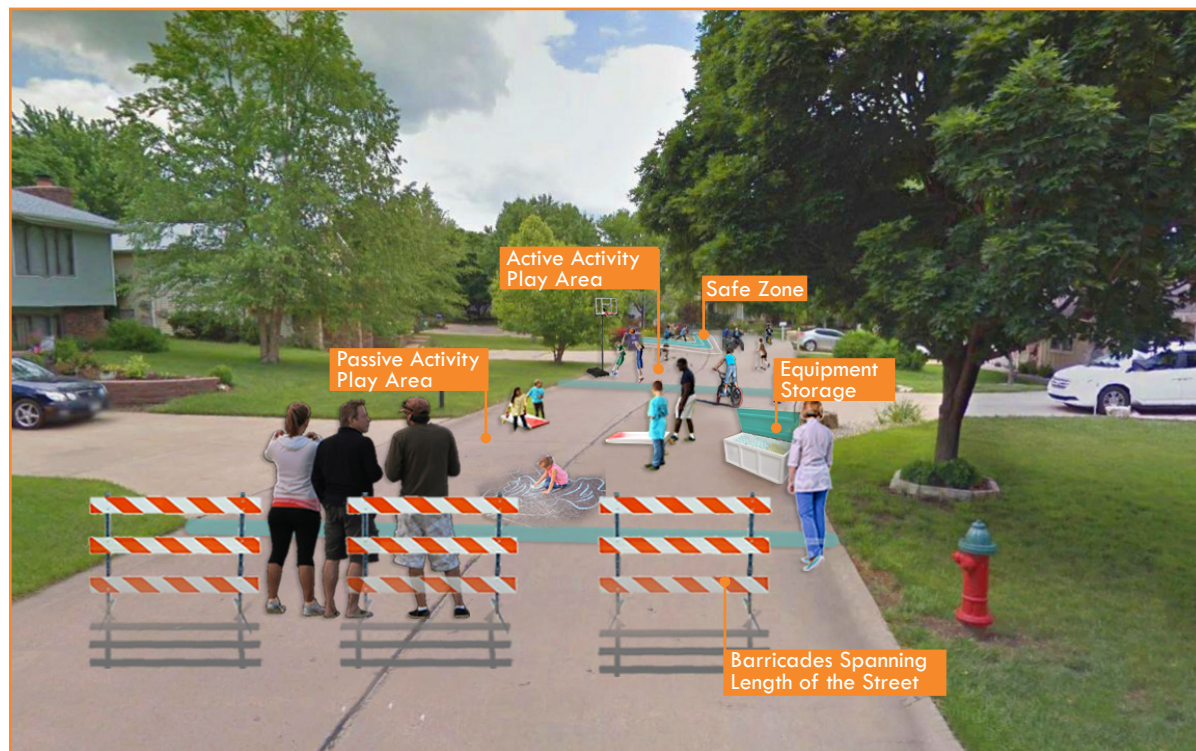
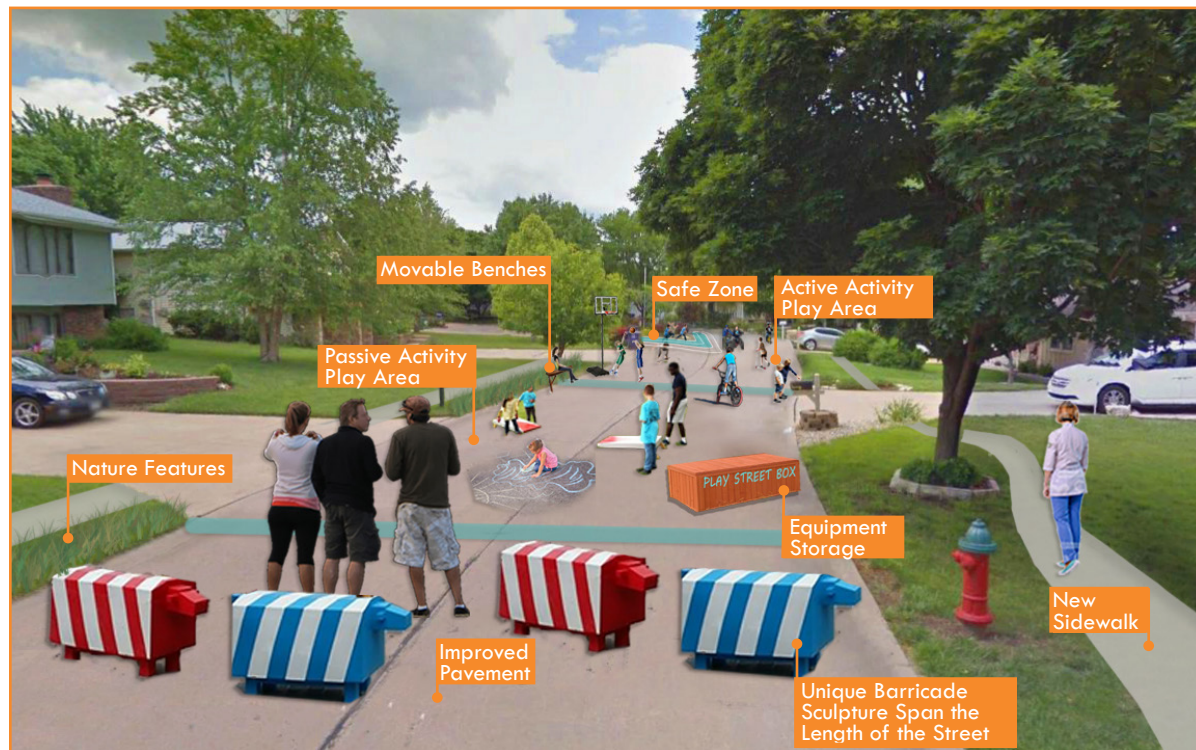


Figure 66. Short-Term Design Solution for the Cul-de-sac Site

The Cul-de-sac design strategy only covers half of the street length because it appeared that closing the entire length of the street took too much space. This would not only create problems for residents in the neighborhood, but also for parents supervising the event. Closing only half the street provides opportunities for street parking in the unused section of the street. There would need to be signage located at the entrance of the cul-de-sac to inform people of the street closure and the Play Street hours. Many of the design elements are similar to previous strategies, including movable equipment storage, barricades to block traffic, and consideration of active and passive activity spaces.

5.4.9 Long-Term Design Solution for the Cul-de-sac Site



**The sheep barricades were designed by Christophe Machet (Christ Church City Council, 2018). They are used to provide an example for the types of barricades envisioned for the Long-Term Play Street Designs.*

Figure 67. Long-Term Design Solution for the Cul-de-sac Site

The long-term strategy for the Cul-de-sac is similar to the other previous long-term strategies. Unique barricade sculptures were used to stop traffic from entering the site. This could potentially create opportunities for local artists within the city. Vegetation is located along the site of the street to promote natural play and provide aesthetic views along the street. Movable benches are proposed for this site, so people are able to have a choice where they sit and it doesn't interfere with residents yards. A top concern for this location was the lack of sidewalk connections. The sidewalks currently do not extend past the entrance, therefore, it is proposed to implement sidewalks along the sides of the road to improve walkability and reduce parent concerns. It is also important when selecting a location to pay attention to pavement condition. Parents had concerns about the pavement conditions in the Cul-de-sac. This issue would need to be addressed for long-term solutions to prevent accidents and injuries from occurring.

5.5 Design Elements and Materials

5.5.1 Short-Term Strategies

Short-term strategies may be used in situations where communities are wanting to work towards developing long-term Play Streets or are wanting a less expensive, temporary solution. If communities are wanting to work towards developing long-term Play Streets, it gives them an opportunity to test the level of success within the neighborhood before moving forward.

Figure 68. Crosswalk with 3-D Paint Pattern and signage



Three dimensional crosswalks are a fun traffic calming method that can promote walkability in a variety of locations. There are also less extensive signage options that could be used to show there is no parking and the Play Street hours.

Figure 69. Temporary Barricades



Movable barricades are necessary for Play Streets to not only reduce parent concerns, but keep vehicles out of the Play Street.

Figure 70. Movable Seating



Some parents mentioned wanting tables and chairs for their children to socialize and play games. Movable furnishings are flexible and can easily be stored.

Figure 71. Equipment Storage



The type of storage needed will depend of the Play Street location. Parents were concerned about equipment storage, therefore, there is storage included in each one of the design typologies. The short-term storage option can be more temporary.

Figure 72. Sidewalk and Street Improvements



Depending on the extent of the deterioration, patch work can be done on the sidewalks and streets to reduce risk of falling and decrease liability.



5.5.2 Long-Term Strategies

Long-term solutions are intended for communities wanting to implement permanent Play Streets within their neighborhoods. These strategies are more expensive and unique.

Figure 73. Permanent Crosswalk and Traffic Calming Methods



The crosswalks implemented for these solutions are permanent. They are combined with speed tables to reduce traffic speeds on the adjacent roads and create safer, walkable routes for families and children. There should also be a light installed for pedestrians and a bike lane.

Figure 74. Designed Barricades



The sheep designed barricades are a unique example for a fun way to block traffic for the Play Street. This could provide opportunities to bring in local artists and refer to local fauna, such as bison.

Figure 75. Designed Permanent Seating Options



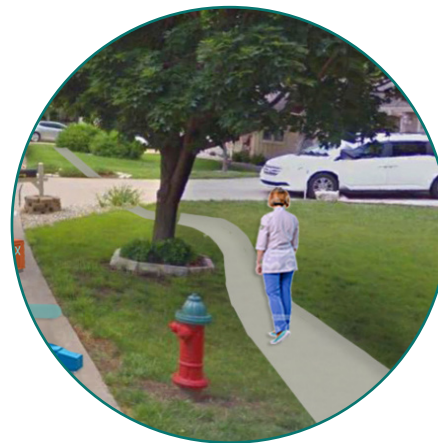
Fixed tables and benches would provide permanent seating options for children and parents supervising the Play Street.

Figure 76. Play Street Box



A "Play Street Box" could be a multi-functional option for both storage and activities. For example, this box could be transformed into a soccer goal.

Figure 77. Sidewalk Implementation and Street Improvements



Parents were concerned about the lack of sidewalk connections to the Play Street locations. If a Play Street is long-term, it would be beneficial to provide complete sidewalk infrastructure to the site.

5.6 Activities and Programming



5.6.1 Activity Options for Programmed Spaces

Parents suggested a variety of activities within the responses that could be used to provide guidance for communities wanting to develop Play Streets. The activities provided at a Play Street will be dependent on the neighborhood residents preferences or the people attending the Play Street. The design strategies for the different typologies were organized into zones, such as active activities, passive activities, greenspace, and pavement. This activities list gives communities the option to select the activities they would like to see in those particular spaces.



Figure 78. Pavement Activities Space



Figure 79. Greenspace Activities Space



Figure 80. Pavement and Greenspace Activities Space

Figure 81. Activities for Programmed Spaces

Pavement Activities

- Riding Bikes
- Bike Course
- Riding Scooters
- Riding Toys
- Skateboarding
- Rollerskating
- Wagons
- Basketball
- Street Hockey
- Four Square
- Bouncing Balls
- Jump Rope
- Hop Scotch
- Sidewalk Chalk

Greenspace Activities

- Football
- Badminton
- Croquet
- Ultimate Frisbee
- Cornhole
- Tug-of-War
- Make-Believe
- Playing in the Dirt
- Tree Climbing
- Exploring
- Free Play
- Playing in the Leaves
- Tree Swings
- Scavenger Hunt
- Picnic

Activities Suitable for Either Space

- | | |
|------------------|------------------|
| Soccer | Chase |
| Dodgeball | Catch |
| Kickball | Frisbee |
| Volleyball | '500' |
| Softball | Water Activities |
| Whiffle Ball | Bounce Houses |
| Capture the Flag | Red Rover |
| Tag | Hula-Hoops |
| Running | Freeze Dance |
| Races | Hide and Seek |
| Relay Races | Bean Bag Toss |
| Obstacle Course | Carnival Games |

5.6.2 Physical Activity Guidelines

The Physical Activity Guidelines for Americans state that children should be participating in physical activity for approximately 60 minutes a day. These physical activities can be classified as either aerobic, muscle-strengthening, or bone-strengthening. It is recommended that each of these types of physical activities are done three days a week (U.S. Department of Health and Human Services, 2018).

Figure 82. Types of Physical Activity and Examples (U.S. Department of Health and Human Services, 2018).

Activity:	Aerobic	Muscle-Strengthening	Bone-Strengthening
Examples:	Biking Tag Throwing	Climbing Push ups Tug of War	Running Jumping Jacks Sports

It is important that children are engaging in activities appropriate for their age (U.S. Department of Health and Human Services, 2018). This is why the children's favorite activities and potential Play Street activities were organized by age groups in Figure 33. As it was mentioned before, engaging in physical activity and outdoor play time has several health benefits. Activities should be included at the Play Street to help children reach the recommended physical activity guidelines.



CHAPTER 6

CONCLUSION



6.1 Key Findings and Concluding Thoughts



Residents and Neighborhood

A neighborhood site analysis is an important step to selecting Play Street locations. The site location and context can have a large impact on the success of the Play Street. Some observations recognized while completing this research include looking at driveway location. One of the top parent concerns for the Play Street locations was residents having access to their homes. Neighborhoods with garages and alleys located behind the house, away from the main street can help promote safety, create opportunities, and reduce concerns.

Parents were also excited about children having access to greenspace. The large open space in The Loop and the island in the Cul-de-sac create opportunities for different types of activities. Many parents felt that the open space would make their child excited to play there. It is important to select sites that not only limit parents' concerns, but have elements that excite children.

A comparison was done over the play barriers between the three neighborhood sites. It was recognized that the neighborhood, traffic and street type had an impact on the parents concerns, comfort, and support towards the Play Street. The comparison for the traffic concerns for each Play Street location can be seen below.

Figure 83.
Comparison of
Traffic Concerns
for Play Street
Locations



Traffic and Vehicles

Parents expressed a large concern for traffic throughout this survey. It was the top concern for all three of the proposed design locations and also impacted whether parents would allow their child to participate in a Play Street. Some suggestions parents had to lower traffic concerns were to have strong barricades spanning the length of the Play Street entrances, additional signage, good traffic control, and crosswalks. Some of these strategies can be expensive depending on the type of infrastructure and elements the community wants to implement. This is one the reasons why short-term and long-term strategies were suggested by this research. The short-term strategies were intended to be less expensive, but still provide a solution to help limit parent concerns. Another parent concern included street parking. Parents did not want street parking in the Play Street because they were concerned their children would damage the vehicles. Street parking needs to be restricted during Play Street hours. Before completing the survey, street parking was not anticipated to be a top concern.



Designers, Planners, and Policy Makers

Many ideas and design strategies were provided to help guide future development and organization of Play Streets. One of the design goals was to create informed, multi-functional spaces that could provide inclusive play opportunities for children and families. Throughout the survey process, parents listed active and passive activities that their children would enjoy participating in. The designs capitalize on separating these activities to prevent accidents and allow children to have safe, comfortable experiences. The passive, calm activities were primarily located closer to the entrances because parents would be supervising and it would be easier to keep the children from running into adjacent streets. The active activities were located towards the interior of the site to provide more buffer space between the children and adjacent streets. One of the research objectives was to create informed design typologies. It is believed that the design strategies would be beneficial for both the parents supervising the Play Streets and the children participating.



Communities and Play Street Users

A main focus of this research was to use data-driven information from the parent surveys and GIS-based suitability analysis to create informed designs that would suit of the needs of children and parents. Parents from different locations and backgrounds completed this survey. Therefore, many new ideas and concerns were mentioned that would have not originally been considered, such as having track and field lines painted around the cul-de-sac island for races.

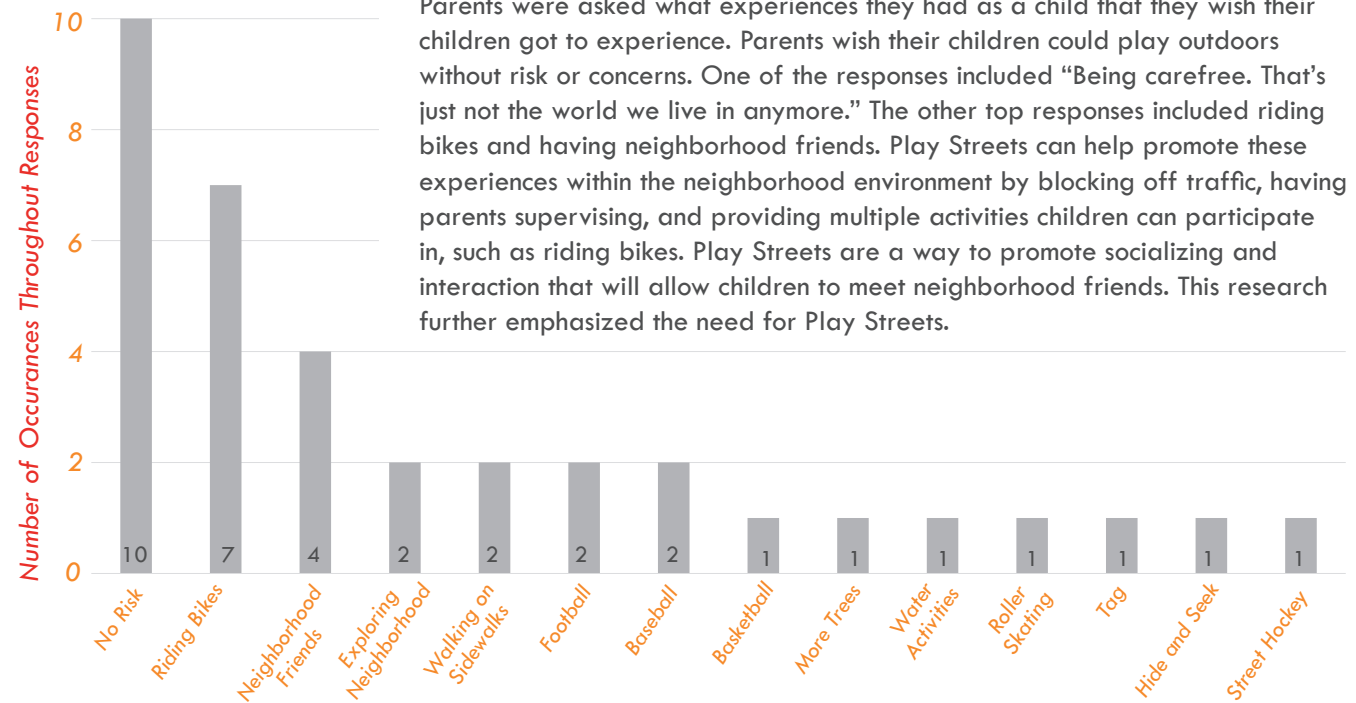
Parents enjoyed the idea of a Play Street because they felt it was a great way for their child to get exercise, socialize, and spend time outside. It was assumed before the research was completed that most parents would believe their children do not spend enough time playing outdoors. This assumption was contradicted because some parents believed that “more is better”, even if they felt their children spent enough time playing outdoors.

It should also be noted, that communication is the key to creating successful guidance for Play Streets. The community and residents within the neighborhood must be considered and involved in the process to ensure the space and activities provided at a Play Street suit the needs of the people using it. Play Streets can provide several opportunities for not only children and parents, but the other residents within the neighborhood. Play Streets can help improve existing infrastructure by patching sidewalks and roads or introducing new sidewalks and amenities altogether. Play Streets create opportunities to connect the neighborhood and have the ability to benefit everyone in the neighborhood if there is successful communication and everyone is included.



Figure 84. Experiences Parents Want Their Children to Have (n=42)

Parents were asked what experiences they had as a child that they wish their children got to experience. Parents wish their children could play outdoors without risk or concerns. One of the responses included “Being carefree. That’s just not the world we live in anymore.” The other top responses included riding bikes and having neighborhood friends. Play Streets can help promote these experiences within the neighborhood environment by blocking off traffic, having parents supervising, and providing multiple activities children can participate in, such as riding bikes. Play Streets are a way to promote socializing and interaction that will allow children to meet neighborhood friends. This research further emphasized the need for Play Streets.



Play Streets could adapt to the neighborhood and people using the space. Children in the neighborhood will grow up and need less parent supervision. The space can expand as the children grow older and need more space to play. An example of this can be seen in the diagrams below. Play Street space has the opportunity to expand past the closed street if the right infrastructure exists. As children grow up there could be an opportunity for them to ride their bikes on the sidewalk around the block and a couple parents could stand near the corners and supervise or use the entire cul-de-sac street, shown in Figure 87. This would be determined by the parents supervising and the context of the Play Street. Play Streets located in areas surrounded by busy roads may have a more difficult time expanding space for older children, but traffic control and improved sidewalks can help create a safer space for children to play.

Opportunities for Play Street Growth in Different Types of Neighborhoods

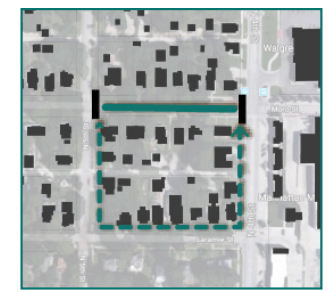


Figure 85. Downtown Growth Opportunity



Figure 86. The Loop Growth Opportunity

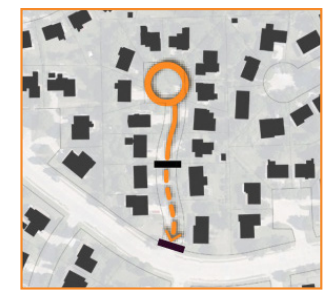


Figure 87. Cul-de-sac Growth Opportunity



Communities may wonder how to start a Play Street. Different Play Street programs have been developed in cities across the United States to reference, such as Miami, New York City, Seattle, and more. Some cities have programs that provide grant opportunities to improve neighborhoods and public spaces. A couple of existing grant examples include the Great Streets Challenge and the CicLAvia in Los Angeles. The Great Streets Challenge aids communities wanting to improve and redesign their streets, while CicLAvia is a non-profit organization that works towards creating car-less environments for open streets (Play Streets, 2018). In Chicago, Play Streets can be organized using grants through the Chicago Department of Public Health (City of Chicago, 2020). These examples are used to show there are different approaches that can be used to help initiate Play Streets. Communities can apply for grants, although, they are often location specific or have certain requirements that need to be followed. Communities and cities wanting to implement Play Streets will need to complete research prior to organizing the event to see which grants or funding options are available to them.

6.1.1 Concluding Remarks

This research provides a new perspective for Play Street design. There is existing literature on Play Street locations and where they would best be suitable, but there is a lack of information regarding location selection. The GIS-based suitability analysis used data to show the overall context for the city to choose the best Play Street locations. This strategy can be used to provide guidance for other locations. This method took into account the lot size, child population density, speed limits, street types, green space accessibility, and socioeconomic status. These considerations allowed for an informed Play Street site selection that considers the surrounding context.

This research also concluded that parents liked the idea of a Play Street because it could help get their children to play outdoors, get them moving, and help them to socialize with other people in the neighborhood. The survey responses provided great feedback and ideas that were helpful in guiding the informed Play Street designs. The designs recognized the surrounding context and provided ideas on how to address parent concerns, while creating a child-friendly space. The designs provide different Play Street typologies that can be tailored for different types of activities. The designs are intended to be flexible; allowing for communities to select the activities, elements, and materials that would best suit their needs.



6.2 Limitations and Future Research

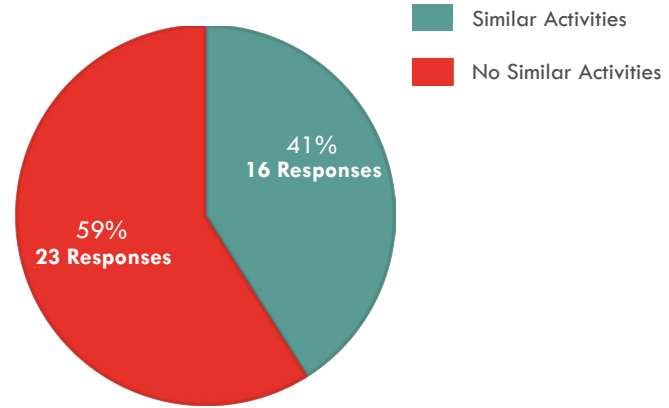
The limited time frame and lack of funding caused limitations for this research. This also creates opportunities for future research. One of the concerns with this research is that there would not be enough representation of people from different cultures and socioeconomic levels. To address this concern, the researcher traveled to businesses in different locations. The scope and the time frame of this research also limited the number of parents able to complete the survey. Future research could include a larger sample size. It is also important to consider residents without children. The sample size only included parents with children under the age of 12. There are people without children that may be opposed to the idea of a Play Street and this research does not include their responses because they do not fit into the sample size.

Another limitation is that there was not enough time to have residents within the proposed Play Street sites complete the survey. This could have provided new ideas and perspectives for the neighborhood. This could be an opportunity for future research.

There were also concerns with Play Streets being a stopgap measure for parks and recreation departments. Play Streets are a temporary solution for children to have access to outdoor play spaces in the neighborhood. Enhancements to infrastructure would be needed to make sure children have safe routes to existing parks and schoolyards. This is another opportunity for future research, but with the time allotted to complete this research and document, it was outside the scope of the project.

Parents were asked what their favorite activities were when they were children. The parents' favorite childhood activities were compared to their children's favorite activities. Forty-one percent of the parents and children had similar favorite activities. This brings up the idea that parents could have an influence on the type of activities their children participate in or enjoy. There were too many variables for this idea to be presented as a key finding, therefore, the idea couldn't be used to help the design process. Even though parents enjoyed engaging in the activities they listed as children, they may not want to participate in those particular activities now that they are adults. This could provide opportunities for future research to better understand children's activities in relation to their parents favorite activities. Understanding this information could also help create spaces that provide activities for both parents and children to interact more together.

Figure 88. Similar Favorite Activities Between Children and Parents (n=39)





There are a few more opportunities for future research, such as considering broader typologies in different regional and local contexts. This research focuses on creating different design typologies for communities, policy makers, designers, and planners to reference when implementing Play Streets. There could be more research towards creating a broader typology because surrounding context, region, and the community have an influence on the design outcome of a Play Street.

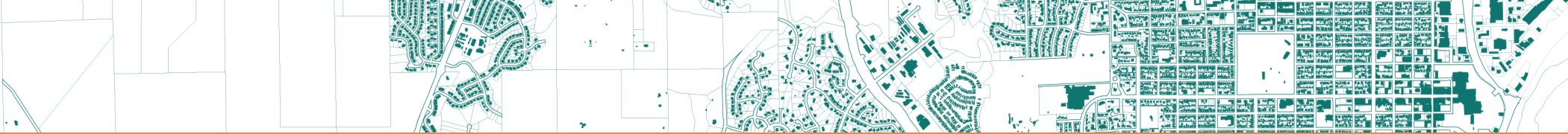
Another opportunity for future research is more rigorous sampling. The time and scope of this research limited the sample size and number of surveys that could be collected. Having a larger sample size could help diversify responses and provide new information for developing Play Streets that has not been considered.

Lastly, there needs to be more questions asking parents about whether they would adopt a Play Street in their own neighborhood. The parental survey used for this study focused on gaining an understanding on the level of support towards Play Streets and design considerations for future development, but didn't ask parents if they would want a Play Street in their own neighborhood. Whether or not parents would want a Play Street in their own neighborhood would be important information for developing Play Streets, and could also bring new ideas for guiding future development.



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Figure 1. Hammersmith and Fulham Council. 2015. Roxwell Road Play Street- Image 12. {Photograph}. <https://www.flickr.com/photoshammersmithandfulham/18841028943>

Figure 2. Hammersmith and Fulham Council. 2015. Roxwell Road Play Street- Image 2. {Photograph}. Retrieved from <https://www.flickr.com/photos/hammersmithandfulham/19435583816/>

Figure 10. Kansas Department of Transportation. 2017. "Urban City Traffic Count Maps." Accessed October 29, 2019. <http://www.ksdot.org/burtransplan/maps/MapCountCities.asp>

Figure 17. Google Earth Street View. Apartment Buildings Near Downtown. Accessed February 26, 2020.

Figure 18. Google Earth Street View. Larger-scale Apartment Buildings. Accessed February 26, 2020.

Figure 21. Google Earth Street View. Main Street Adjacent to The Loop Greenspace. Accessed February 27, 2020.

Figure 22. Google Earth Street View. Multi-family Housing Located Adjacent to The Loop. Accessed February 27, 2020.

Figure 25. Google Earth Street View. Main Street Adjacent to Cul-de-sac. Accessed February 27, 2020.

Figure 26. Google Earth Street View. Cul-de-sac Entrance. Accessed February 27, 2020.

Figure 45. Long-Term Design Solution for the Downtown Site. Rendering.
 *The sheep barricades were designed by Christophe Machet:
 Christ Church City Council, 2018. "Cities Urban Sheep go Under the Hammer". Accessed February 2, 2020. <https://newsline.ccc.govt.nz/news/story/citys-urban-sheep-to-go-under-the-hammer>

Figure 54. Long-Term Design Solution for the Loop Site
 *The sheep barricades were designed by Christophe Machet:
 Christ Church City Council, 2018. "Cities Urban Sheep go Under the Hammer". Accessed February 2, 2020. <https://newsline.ccc.govt.nz/news/story/citys-urban-sheep-to-go-under-the-hammer>

Figure 63. Long-Term Design Solution for the Cul-de-sac Site: Circle Area Design Solution
 *The sheep barricades were designed by Christophe Machet:
 Christ Church City Council, 2018. "Cities Urban Sheep go Under the Hammer". Accessed February 2, 2020. <https://newsline.ccc.govt.nz/news/story/citys-urban-sheep-to-go-under-the-hammer>

Figure 74. Designed Barricades
 *The sheep barricades were designed by Christophe Machet:
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Figure 82. Types of Physical Activity and Examples
 Adapted from U.S. Department of Health and Human Services. 2018. "Physical Activity Guidelines for Americans, 2nd Edition". https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

APPENDICES



Appendix A: IRB Approval

TO: Dr. Hyung Jin Kim
Landscape Architecture/Regional and Community Planning
1102 Seaton Hall

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 12/09/2019

RE: Proposal Entitled, "Increasing Outdoor Neighborhood Play Opportunities Through Play Streets"

Proposal Number: 9986

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written - and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

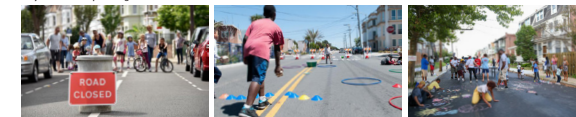
Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, 45 CFR §46.101, paragraph b, category: 2, subsection: ii.

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Appendix B: Parental Survey Questionnaire

Play Street Example Images:



Site 1: Downtown location with single family housing



COMMENTS:

Site 2: Residential with single and multi-family housing



COMMENTS:

Site 3: Suburban Cul-de-sac Development



COMMENTS:

Would you allow your child to play in the locations shown in the previous images if the street was blocked so traffic couldn't get through and the space was supervised by neighborhood parents?

If this was a Play Street, what activities do you feel your child would like to engage in? (Example: bike riding, Sidewalk chalk, tag, etc.)

What day and time would a Play Street work best for you and how long?

Do you feel like residents within your neighborhood would be supportive of a Play Street? Yes No
If not, why?

Is there anything you see in the images of the Play Street locations that would make your child excited about playing here?

Site 1: Downtown location with single family housing (See 1st Page) Site 2: Residential with single and multi-family housing (See 1st Page) Site 3: Suburban Cul-de-sac Development (See 1st Page)



What about the types of neighborhoods in the previous images would make you hesitant to allow your child to play here (Example: No sidewalks, Traffic, etc.)?

Site 1:
Site 2:
Site 3:

What would you change about the neighborhood environments shown in the images to make you feel comfortable allowing your child to play here and why?

Site 1:
Site 2:
Site 3:

What was your favorite outdoor activity when you were a child?

What outdoor experience did you have as a child that you wish your child got to experience?

How many children do you have? Age(s): Gender(s):

What are your child's favorite outdoor activities?

Do you feel your child or children engage in enough outdoor play time? Please Circle one. Yes No

If so:
When do they play outdoors?

Where do they play outdoors?

How often do they play outdoors?