This thesis posits shortcomings in current techniques for locating parks. It suggests a possible solution that involves dual use of existing parking lots as recreational amenities. These recreation enhanced parking lots would serve as both parking lots and part-time parks. The project explores the form these facilities would take, how they can enhance access to recreation, and the appropriate urban contexts for them. Demonstration design is done for retrofitting an existing parking lot in Athens, Georgia. The specific research question that this thesis addresses is: How can we increase urban access to recreation by leveraging existing parking infrastructure?

INDEX WORDS: Parking lots, Urban parks, Urban recreation, Parking lot design
IF PARKING LOTS WERE PLAYGROUNDS:
A NEW MODEL FOR ENHANCING URBAN RECREATION

by

TEELA JAMES
B.S., University of Saskatchewan, Canada, 1996

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

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# TABLE OF CONTENTS

ACKNOWLEDGMENTS ....................................................................................... iv
LIST OF FIGURES ................................................................................................. viii
LIST OF TABLES .................................................................................................. ii

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 2.1 - Part of a plan showing tennis courts integrated into a parking lot. ..8
Figure 2.2 - Skateboard facility in a parking lot. ..........................................................8
Figure 2.3 - Fremont parking lot. ................................................................................10
Figure 2.4 - Parking lot at Baker-Butler Elementary School ....................................11
Figure 2.5 - Before and After Activity in a Shared Street .......................................13
Figure 3.1 - Denny's Parking Lot, Dickson City, PA..................................................24
Figure 4.1 - Shared street entrance sign. .................................................................33
Figure 4.2 - Options for placement of REPL zones .............................................37
Figure 4.3 - Entrance treatment for a shared street..................................................38
Figure 4.4 - Basketball REPL Zone Perspective ...................................................40
Figure 4.5 - Layout modification to create human scale dead-end lots. ..............42
Figure 5.1 - Site Location .........................................................................................49
Figure 5.2 - College Station Shopping Center Parking Lot ..................................50
Figure 5.3 - Georgetown Square Parking Lot ..........................................................50
Figure 5.4 - Site Layout ............................................................................................51
Figure 5.5 - Aerial Photo of Site ..............................................................................56
Figure 5.6 - Cumulative Car Counts ........................................................................58
Figure 5.7 - Composite Parking Analysis Map .......................................................59
Figure 5.8 - Synthesis Map ........................................................................................62
Figure 5.9 - Proposed Redesign ...............................................................................63
Figure 5.10 - Tennis Court Plan ..............................................................................64
Figure 5.11 - Basketball Court Plan ..........................................................................65
Figure 5.12 - Current Conditions of Proposed Publix Playground .......................66
LIST OF TABLES

Table 3.1 - REPL Classifications ................................................................. 20
Table 3.2 - Features Checklist ................................................................. 28
Table 4.1 - Summary of Control Mechanism Techniques ....................... 34
Table 5.1 - Potential REPL activities ....................................................... 60
Table 5.2 - Complementary Uses ............................................................. 61
Table 5.3 - Summary of REPL Modifications .......................................... 73
Table 7.1 - Area and Percent Coverage .................................................. 103
Table 7.2 - Analysis of REPL Improvements in High Priority Areas .......... 106


CHAPTER 1
INTRODUCTION

“Why are there so often no people where the parks are and no parks where the people are?”

– Jane Jacobs

Concept

I found myself pondering Jacobs' question one afternoon as I ran my weekly errands. Although my toddler and I had driven to the park in the morning before starting errands, the impact of that visit was short lived. He was becoming increasingly restless as we visited a series of stores, and he was repeatedly shuttled from his car seat to a shopping cart. I would gladly have stopped for another park visit if I had the chance, but the only distractions available for a child his age were a free cookie and a cart with a steering wheel at the grocery store. As I looked around, frustrated by my inability to find an appropriate place for my child to play, I found myself agreeing with Jacobs. There were other parents in the parking lot, struggling with young children as I was. There were employees lingering near the edge of buildings on smoke breaks. Several joggers pounded along sidewalks adjacent to busy urban roads. Here were the people, but there was not even grass, let alone a park, in sight. Her question is as relevant today as it was fifty years ago.

Parks, People, and Prime Locations

Far from being an unquestioning advocate of parks, Jacobs characterizes parks as volatile places that tend to "run extremes of popularity and unpopularity" (89). She is quick to point out that unpopular parks are not only a missed opportunity, but also suffer from vandalism and can become havens for criminal activity. Jacobs discusses
the need to bestow the "boon of life and appreciation" upon parks (89). Parks, she feels, need to be located where the people are and must support diversified use. Effective parks should "help to knit together diverse surrounding functions by giving them a pleasant joint facility; in the process they add another appreciated element to the diversity and give something back to their surroundings" (101).

However, Jacobs’ concerns over only establishing urban green space in specific locations are not shared by all. Urban parks are receiving increasing recognition for the important role they play in cities. Research indicates that parks serve many important functions, including providing health, social, economic, and environmental benefits (Sherer). As public awareness of the health implications of physical activity and exposure to nature grows, so has support for urban parks. Currently, cities are "building new parks at a rate not seen for 100 years" (Weinbach, 80). Are these new parks being built where the people are? Are they effectively realizing intended benefits for the community? While current enthusiasm for parks is warranted, it is essential that they are well located or they will be subject to the lack of use and decline that Jacobs describes.

In his article "Accidental Parks", Gisolfi discusses how parks are being located. In early city plans, parks were deliberately placed within the urban environment. Some plans, like the one for Savannah, included multiple parks within a grid plan. Others, like the plan for Boston, called for the creation of a city around a central green space. However, these deliberate plans are no longer possible as cities are now established and have limited availability of land. Furthermore, if there is available land in prime locations, it is often too costly for parks departments to acquire it. The result is that parks are being located on leftover pieces of land. Gisolfi calls these "accidental parks", stating that they are sited "randomly as a result of the efforts of individual groups that lobby to reform specific remnants" (76). A variety of current articles on new parks indicate the prevalence of this approach to siting parks. Reviews of new parks
in *Landscape Architecture* magazine mention locations such as a traffic island (Jost, 68), "a leftover bit of land next to a truck route" (Leigh, 36), and parks located under interstates (Jost, 78). "Shoehorn Parks", Harnik’s article on squeezing green space into crowded cities, confronts the issue of land shortage directly and suggests building parks in such places as cemeteries, schoolyards, rooftops, stormwater channels, and reservoirs. While small parks are being fit into any available space, large parks are primarily being located on distressed land that is "abandoned, polluted, neglected, or all three" (21st Century Park, 60). Sites such as landfills and abandoned rail corridors have become prime candidates for park development. All of these parks are being sited based on availability of land, rather than the presence of people and activity that are likely to ensure the success of the park.

So where are the people? Interestingly enough, as I observed while I ran my errands, the people are often found in or near parking lots. While recognition of the importance of walkability within cities is growing, driving is still overwhelmingly pervasive in North America. There are actually more cars than citizens in the United States and the ubiquity of driving in our society has led to the joke that "a pedestrian is someone one who has just parked their car" (Vanderbilt, 16). The prevalence of automobiles has, of course, led to a prevalence of parking lots. In many cases, parking lots are underutilized and have either times of day, times of the week, or times of the year when they have a significant number of unused spaces. This unused space is an opportunity.

As all these ideas came together, I began to observe parking lots carefully. There are many parking lots, frequently located in prime areas. There are generally people in them. There is generally a surplus of space that can be used for activities other than parking. Could parking lots be a good location urban parks? Could they continue to meet parking needs, while simultaneously providing recreation opportunities? It seemed to me that, with some forethought and up front investment, lots could be designed to facilitate concurrent recreational uses. For instance, church parking
lots can be designed to include basketball courts for use from Monday to Saturday. Shopping center parking lots, which are typically only fully used during the Christmas season, could support a playground that is installed for most of the year and removed to provide additional parking in December. Large office parking lots could be modified to include a walking trail for lunch time walkers. While there are a number of logistical issues to address, this kind of design has the potential to greatly increase the availability of urban recreation.

This thesis introduces the concept of parking lots that integrate recreation and parking functionality, which will be termed Recreation Enhanced Parking Lots (REPLs). Parks would be situated where the people are—people would essentially trip over the parks when they parked their cars. Land would be used more efficiently due to the dual use model. People would have multiple recreation opportunities throughout their day that would occur as part of their daily routine. This is significantly different from the status quo. Currently, many people make specific trips for recreation, either to a fitness facility or a park, and spend a dedicated amount of time there. A better model, particularly for children, would allow for users to encounter recreation opportunities several times through the day, thus promoting continuous recreation. Some efforts, like the walkable routes to schools initiative, are already attempting to integrate physical activity into daily routine. REPLs located at common destinations, such as grocery stores, shopping areas, banks, offices, and gas stations, would also facilitate increased physical activity. Given the advantages, locating parks in parking lots is an idea that merits further investigation. How can we increase urban access to recreation by leveraging existing parking infrastructure?

Answering this question requires two levels of investigation. The first is to explore what exactly a REPL is and how it functions. This is especially important because parking lots are not intuitive places to situate parks. If anything, parks and parking lots represent opposites. Parks are often viewed as a beautiful places, filled
with greenery, devoid of cars, and safe havens from the outside world. Parking lots are generally ugly places, filled with cars, and are a part of the outside world that people are trying to avoid when they visit parks. Prior to investigating the impacts of REPLs, it is critical to examine whether parking lots and parks can be reconciled to effectively meet both parking and recreation function. Once a clear understanding of REPLs is established, it is possible to address the second part of the investigation: how the implementation of REPLs on a large scale would impact urban environments and increase access to recreation.

Limitations

The purpose of this thesis is to examine, from a design and usability perspective, whether parking lots can accommodate urban recreation. Actual implementation of this idea would involve addressing a myriad of other issues, including such topics as liability, zoning and ordinances, incentive programs, and construction and maintenance costs. While each of these topics is worthy of research and discussion, they are beyond the scope of this work.

It should also be mentioned that REPLs are intended to supplement, not replace, existing parks. Certain kinds of recreation activities are appropriate in parking lots, while others are not. For instance, parking lots as we currently design them are not suitable locations for natural areas, which are an important part of existing park infrastructure. The intent of this idea is to increase recreation opportunities, and infringement on traditional parks that limit either the variety or availability of urban recreation would be counterproductive.

Additionally, REPLs are one technique for addressing under-utilized parking space. A variety of other approaches, including using stackable cars that minimize parking space requirements, creating walkable neighborhoods, and creating lots that are shared by several businesses with different peak parking periods are being proposed and implemented. REPLs are not intended to undermine or replace these
initiatives. Rather, they are another option that can be explored and used when appropriate. In particular, many of the approaches mentioned above apply to new development, while REPLs can be applied to existing development. While designing lots to accommodate recreation from the outset will likely yield better designs and provide more flexibility, it is reasonably effective to retrofit existing lots to include recreation opportunities. This means that REPLs present an excellent opportunity for the many under-used parking lots currently in existence.

**Thesis Structure**

This chapter has introduced what REPLs are and why they have the potential to be useful. Subsequent chapters expand on these ideas. Chapters Two through Five describe how and where to build REPLs. Specifically, Chapter Two contains a review of relevant literature. Chapter Three presents an in-depth discussion of which sites are appropriate for REPL development. Chapter Four details design considerations for REPL designs. Chapter Five illustrates a sample design for a REPL in Athens, GA. The focus of Chapters Six and Seven is to examine how wide-scale implementation of REPLs would impact the urban environment. Chapter Six contains a detailed discussion of the strengths and weakness of REPLs. Chapter Seven presents a GIS analysis of access to parks in one city, Athens, GA, and examines how implementation of a REPL network would alter access. Chapter Eight concludes by summarizing results and lessons learned.
CHAPTER 2
LITERATURE REVIEW

This chapter presents a literature review of relevant work pertaining to Recreation Enhanced Parking Lots (REPLs). Although there is relatively little work that directly addresses the use of parking lots for recreation, there are a number of relevant works that establish context and indicate the probability of success of REPLs. This chapter first presents a discussion of directly applicable theoretical work and built projects and then discusses related topics, including shared streets design and park access metrics.

Theoretical Work

The concept of multiple-use of parking lot space is certainly not a new one. Many authors have recognized that space devoted to parking is frequently excessive and under utilized. According to Childs, parking lots cover 6 to 40 percent of land in American cities and "empty parking spaces are not only a waste of land and money, but by separating buildings from one another with uninhabited spaces, they undermine the ability of cities to be social places" (xix). A variety of solutions have been proposed for this issue including sharing parking lots for different business uses and reducing available parking. Others, like Shroup in The High Cost of Free Parking, propose charging for parking as a mechanism for reducing demand, which would eventually result in a reduction of space devoted to parking. Another possibility is to use the land for more than just parking. Less has been written about the possibility of using parking lots for recreation activity, but several authors have touched on this possibility in larger works on parking lot design. In Carscape, Miller describes several competition entry designs for a parking lot in Colombus, Indiana that attempt to integrate recreation into the design. Figure 2.1 illustrates one entry, "Studio C", that specifies a distance between stalls that allows the space to be used as tennis courts during evening and
weekends (46). In his 2001 thesis, *Where the Asphalt Ends: A Systematic Approach to Designing a Better Strip Mall Parking Lot*, Kidd states that parking lots should be designed to facilitate multiple uses. Figure 2.2 illustrates how he incorporates a skateboard park into a lot. Both of these works are good theoretical examples of combining recreation and parking use, but neither author addresses the topic in much detail.

In *Parking Spaces: A Design, Implementation, and Use Manual for Architects, Planners and Engineers*, Childs proposes many alternative uses for parking lots including art parks, time-shares, vendors, markets, festivals, tailgating, Shakespeare in the parking lot, asphalt sports, and play lots. In particular, asphalt sports and play

**Figure 2.1** - Part of a plan showing tennis courts integrated into a parking lot.  
*Source: Miller, Carscape, 43*

**Figure 2.2** - Skateboard facility in a parking lot.  
*Source: Kidd, Where the Asphalt Ends, 88*
lots are directly applicable to REPLs. Childs notes that "the hard, smooth surfaces and open area of parking lots are ideal for many sports" and encourages "parking lot hockey and other activities" (146). Childs provides an example of a city that uses municipal parking lots for skateboarders and stunt bicyclists and recommends the possibility of a parking-lot hockey or basketball league. He also mentions the possibility of using parking lots for activities for children, such as hopscotch or bubble making (147). The scenarios that Childs describes involve closing a lot for automobile use and opening it for recreation use. This is one type of REPL, but REPLs push the idea even farther, calling for the design of spaces where only portions of a parking lot are closed or designs where individual spaces alternate between recreation and parking use depending on availability.

Childs also discusses the potential of parking lots near residential areas to be used as playgrounds on weekends. In this discussion, Childs mentions the issue of liability and provides several design guidelines such as providing benches, chairs, and informal seating overlooking the play area. He also notes the importance of clarity with respect to how the lot is shared (149). While Child's work mentions the possibility of using parking lots in this way, he provides very little detail on the specifics of how these uses would be accommodated. Importantly, his work does not underscore the importance of designing space to facilitate recreation from the outset, but is more focused on finding ways to adapt existing lots to recreation use. While adapting lots is important, superior results can be achieved by planning for recreation use in the initial design. This facilitates appropriate layout of the lot, circulation, and landscape islands, and allows for appropriate materials to be used. This will be discussed in detail in Chapter Four.

**Built Works**

In addition to theoretical discussion of integrating recreation into parking lots, there are some built examples. Activities like farmers markets and midways in parking
lots are reasonably common. These uses, however, are integrated into existing parking lots after the fact. This thesis is interested in parking lots that have been specifically designed to support recreation use. There are fewer examples of this.

Figure 2.3 illustrates a parking lot in the Fremont district of Seattle that is also used as an outdoor theatre. Modifications to the lot to support this use are minimal, primarily including setup of the projection surface. The recreation use of this space is extremely successful—ironically it can be difficult to find parking for some movie screenings. The vibrant programming of the space is an essential part of its success. The parking lot even has its own blog discussing upcoming events. Many users comment on the need to bring lawn chairs as the asphalt surface is not ideal for viewing movies. This lot certainly illustrates the potential to successfully design spaces that support parking and recreation. It also shows the potential of such spaces to provide economic benefits. However, the dual use model is very basic. The lot is either being used for parking or for recreation, not for the two uses simultaneously. Additionally, it does not feature deliberate design to accommodate recreation use, but is an example of retrofitting an existing facility.

(a) - Parking use  
Source: Childs, Parking Spaces, 138.  
(b) - Cinema use  
Source: Childs, Parking Spaces, 145.  
(c) - Fremont blog site  
Source: parkingspace27.blogspot.com

Figure 2.3 - Fremont parking lot.
Another built example, shown in Figure 2.4, is a school parking lot for Baker-Butler Elementary School in Albermarle County, Virginia, which includes a running track in the bus parking area. Attention to dual use during the design phase is evident. Sizing of the track and the appropriate number of bus sized stalls were reconciled. Furthermore, the track was located in the bus parking area, rather than the car parking area, providing a reasonable mechanism for mediating between recreation use and parking use. As buses use the parking only intermittently and at predictable times, it is clear when the space is available for recreation. According to Linda Mopin, a teacher at Baker-Butler, the track is well used and there have been no conflicts between the recreation use and the parking use. The track has proven particularly useful after it has snowed, as the parking lot is clear and available for use before the school grounds have dried sufficiently.

Other built works that speak to the potential of REPLs include existing recreation facilities that are associated with businesses, like the indoor play areas associated with fast food restaurants. They demonstrate the economic value of providing recreation
opportunities. Another example is Ikea, a retail chain that provides a play space where parents can drop off children while they shop. The play area provides economic value to the store by featuring many of the toys that Ikea sells. In addition to creating an opportunity to promote store products, Ikea increases its appeal to parents who appreciate the childcare while they shop. This gives Ikea a competitive advantage over similar stores. While the indoor play areas are not REPLs they do indicate the economic benefits that businesses can realize by investing in recreation activities.

Shared Streets

Another body of related work is the literature on shared streets. Shared streets are relevant to REPLs because, like REPLs, they seek to integrate both automobile and pedestrian use into the same space. Works such as Appleyard's *Livable Streets* discuss how streets can be dynamic, social spaces if they are designed appropriately and not overwhelmed by traffic. In particular, he found that people had a better connection with their neighbors and an enhanced sense of community when they lived on streets with less traffic. In recognition of the non-transportation related value of streets, many countries have modified street design to encourage alternative uses.

Shared streets are called by different names in different countries, but they all emphasize streets as a shared space for pedestrians and cars, with pedestrians having priority. Walking and playing in these streets is encouraged. Shared streets are designed to reduce through traffic, enhance safety, and provide more space for trees, shrubs, and flower beds. Both the work of Southworth and Ben-Joseph in *Streets and the Shaping of Towns and Cities* and the work of Hass-Klau, Nold, Bocker, and Crampton in *Civilized Streets: A Guide to Traffic Calming* provide information on the intention, design, and effectiveness of shared streets. These works illustrate how shared streets are safer than traditional streets and that they are more effective social realms.
Both of these ideas directly pertain to REPLs. REPLs are only feasible if they are safe. Traditionally, North American traffic design seeks to separate people and traffic for safety reasons. However, "before" and "after" studies on shared streets have shown a reduction in both the number and severity of accidents (Hass-Klau, 3). Studies in Germany, Denmark, Japan, and Israel show that there are 20 percent fewer accidents in shared streets and 50 percent fewer severe accidents compared with standard residential streets (Southworth, 118). This indicates that, with the correct design, safety concerns related to mixing cars and pedestrians can be addressed.

Furthermore, shared streets are effective mixed-use public spaces, which is also a goal of the REPLs. Studies indicate that the public have a high level of satisfaction with shared streets and that residents are willing to accept restraints on automobiles in order to improve the social environment (Southworth, 117). Figure 2.5 illustrates the dramatic increase in play activity in a street in Germany after it was converted to a shared street. These studies serve as a precedent indicating the potential of REPLs to be safe and effective public spaces.

Figure 2.5 - Before and After Activity in a Shared Street
Source: Southworth, Streets and the Shaping of Towns and Cities, 116
Park Access Metrics

The other area of relevant research that bears discussion is current metrics for evaluating urban access to parks. This thesis seeks to address whether REPLs increase urban access to parks. This is not an easy task. Standards for evaluating access to parks do not yet exist. Early metrics on availability of parks measured the number of park acres per 1000 city residents (Harnik, 121). This metric, however, fails to consider the distribution of park land within a city and what percentage of residents can feasibly get to park facilities. Additionally, it fails to consider the quality of the facilities. As such, a variety of new metrics have evolved. In Inside City Parks, Harnik compares a variety of factors including total number of acres, acres per 1000 residents, acres as a percentage of city area, park agency budget, park-related expenditures per resident, park related expenditure per acre, groundskeeping expenses, programming expenses, and number of employees of the park agency. Clearly, there are many factors involved in evaluating recreation opportunities.

Another metric that cities are using is the distance from residences to parks. For instance, Denver Parks and Recreation aims to have all residents live within six walkable blocks of a park (Harnik, 27). New York hopes that every resident will be within a 10 minute walk of a park by 2030 (Williams, 132). These metrics consider distribution of park land, which is a great improvement over merely measuring acres per resident. However, there are still failings with this current metric. It adheres to an all or nothing model, defining people as either having access to a park or not having access. However, a number of part-time parks are available. For instance, many school yards are used as parks during non-school hours, but these parks do not have the same availability as a full time park. In order to ensure equitable access to parks, we need to consider more than just distance and start looking at the hours of availability. As REPL facilities would also be part-time facilities, a metric that addresses this issue
is required to accurately determine how overall recreation access is impacted by REPL development.

Another possible issue with this metric is that it measures the distance from residences to park. This has the underlying assumption that people are at home when they wish to recreate, which is not necessarily valid. A common justification for siting parks near residences is that it is important for those who do not drive, like children and the elderly, to be able to independently access parks. While this is unquestionably important, we need to realize that people are not always at home when they might wish to recreate and recognize the potential of other sites. For instance, office workers commonly use their lunch hours for recreation, forming informal walking clubs. Another example is the child that accompanies a parent on errands like groceries, shopping, or appointments. These children are in a destination with no access to recreation. Thus, when measuring access to recreation, access should be determined from the location where people are available for recreation, not just their residence. This would lead to locating parks near non-residential destinations where they would be available on a part-time basis to all users who visit the destination. For instance, a REPL at a grocery store has a large potential user base, but people would only have access to the facility when they were doing their grocery shopping. Consideration of non-residential access is also central to understanding how REPLs would impact park access.

Harnik's *Inside City Parks* is the major work on measuring park availability and comparing park systems. It addresses neither part-time parks nor differences in residential versus destination parks. As such, more work in this area is needed to provide a standardized and effective way to evaluate urban access to parks.

**Summary**

This chapter has presented a summary of work relevant to integrating recreation into parking lots. It highlights several theoretical and built designs. It also discusses literature relating to shared streets, which is relevant because shared streets share
many of the same design objectives as REPLs and provide a precedent for the success of REPLs. Additionally, information on how urban access to recreation is currently measured is presented. This work is relevant to determining how implementation of REPLs would impact urban access to recreation.

Overall, there is relatively little existing information on integrating recreation into parking lots. REPLs are largely a new idea. The works discussed in this chapter provide preliminary examples of functioning REPLs and speak to the potential of providing recreation opportunities in parking lots.
CHAPTER 3
SITE SELECTION

Not all parking lots are suitable sites for recreation enhancement, and among the suitable sites, some are better candidates than others. The study of built Recreation Enhanced Parking Lots (REPLs) is necessary for a comprehensive guide to site selection, but that is not possible due to the limited number of built works. Nonetheless, it is still possible to provide preliminary guidelines for site selection based on an understanding of the goals of REPLs and knowledge of important factors in both parking lot and recreation design. Optimal REPLs will be located on sites that provide maximum recreation where the intersection between the hours of availability of recreational activities and the number of people available to recreate is greatest, while simultaneously continuing to meet parking needs. This chapter presents a broad discussion of sites appropriate for REPL implementation. It addresses three different angles: impacts of the associated business, characteristics of the site, and the urban context. The chapter concludes with a checklist that summarizes points to consider in selecting a REPL site.

Impacts of the Associated Business

The business use associated with a parking lot is important for several reasons. First, it dramatically impacts the parking profile of the lot. It dictates how many parking spaces can be allocated for multiple use and when they are available for each type of use. Secondly, the associated business serves to draw people—potential REPL users—to the parking lot. One of the important benefits of REPLs is that they provide recreation opportunities that fit into existing daily routines; users don't need to make a special trip to a recreation facility but can take advantage of a REPL that they happen
to be parked in. In this respect, some businesses serve as better draws than others. For instance, someone who is going to the mall is likely to have time to take advantage of recreation features in a parking lot if they have the inclination. However, someone who is parking in airport economy parking is unlikely to take advantage of recreation features—they will most likely be trying to catch their flight or in a hurry to get home. Thus, the mall serves as a better draw. The final reason complementary business uses should be considered in REPL site selection is that possibilities may exist for complementary recreation and business uses, such as designing picnic space near a restaurant. Such designs can enhance the functionality of both the business and the recreation feature. The following sections discuss each of the implications of the associated business in detail.

Parking Profile

A parking profile identifies the amount of space and the location within the lot of space available for recreation use. In addition, it specifies the times that these spaces will be available. Incorrectly assuming that there is less demand for parking than there actually is will result in recreation facilities that cannot be fully used and conflict between those who wish to recreate and those who wish to park. Assuming that there is more parking use of the actual space than there actually is may result in a parking lot being considered unsuitable for REPL use, a non-optimal selection, or the generation of an inferior REPL design that does not fully utilize available space. Thus, an accurate parking profile is an important part of assessing suitability of a space for REPL use.

While lot observation is the best way to determine a parking profile, initial efforts are likely to be based on the business use of the lot and general parking profiles for that business use. The Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI) have accumulated and published data on typical parking needs and peak times associated with specific types of businesses (Parking Generation Manual and Shared Parking Manual). Unfortunately, there is not a large amount of information
concerning under-utilization of parking lots, although there is some recent work outlining how parking requirements can be reduced by sharing lots between businesses with different peak parking periods. Still, most of the literature reflects the industry interest in peak-parking demand. In order to effectively use under-utilized parking spaces, more effort in profiling use is required. However, using existing data and examining peak demand versus average demand and the timing of identified peak periods can provide some understanding of how much space is likely to be available and when. Combined with a general understanding of parking patterns, such as the knowledge that customers tend to park as close to the entrance of a store as possible, this information can then be used to determine a preliminary parking profile that suggests what sort of recreation features could be incorporated into a given lot.

For REPL purposes, peak parking times can be broken down into four categories: daily patterns, weekly patterns, seasonal patterns, and event patterns. Each of these types has implications for REPL design. Table 3.1 summarizes how different business uses are associated with each of these categories. Note that businesses may fit into more than one category. For instance, restaurants have both a daily and a weekly pattern. They have peak times at lunch and at dinner and are typically busier on weekends. Peak time data used for classification is taken from ITE’s *Parking Generation*.

Suggestions for recreation possibilities are the author’s and are not intended to be comprehensive. Recommendations were determined based on the peak parking profile which define whether it is reasonable to include activities that require setup. A daily peak parking pattern typically requires recreation facilities that require no setup and are self-managing. This means that the design must provide a mechanism to clearly indicate whether a space is available for parking or recreation. Various options for this will be discussed in Chapter Four. At the other end of the spectrum, recreation activities in seasonal lots can require more substantial setup because they need to be
setup and removed less frequently. For instance, surface materials like wood chips or sand could be installed over parking surfaces to facilitate recreation activities like beach volleyball or a playground. Recreation possibilities for event parking are highly dependent on specific locations and events.

Table 3.1 - REPL Classifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Parking Demand</th>
<th>Land Use (Peak Time)</th>
<th>Recreation Possibilities</th>
</tr>
</thead>
</table>
| Daily   | Peak demand experienced at certain times of day. | • Bowling Alley (Evening)  
• Movie Theater (Evening)  
• Video Rental (6-8pm)  
• School(Day)  
• Hospital(Day)  
• Supermarket(Afternoon)  
• Restaurant(11am-1pm,6-8pm) | • basketball court  
• hopscotch  
• track  
• spray park |
| Weekly  | Peak demand experienced on a specific day or days of the week | • Industrial (Weekday)  
• Hotel(Weekday, Sat.)  
• Movie Theater (Sat)  
• School(Mon.-Fri.)  
• Church(Sun.)  
• Home Improvement Store (Sat.)  
• Restaurant(Sat.) | • hotdog stand  
• picnic tables  
• market tables |
| Seasonal| Peak demand associated with specific months or seasons | • Commercial Airport (Christmas, Thanksgiving, End of School)  
• Hotel (Summer)  
• Church(Easter, Christmas)  
• Video Rental (July-Aug)  
• Shopping Center (Dec) | • playground  
• beach volleyball  
• community garden  
• midway fair  
• art installations |
| Event   | Peak demand associated with specific scheduled events | • Stadium | • baseball field  
• dog park/agility course  
• track |

**Attracting Users**

A successful REPL is one where the number of recreation users justifies the extra expense of building and maintaining recreation features in the parking lot. Ideally,
a REPL will increase recreation access for users who have poor access. As REPLs that
draw a large number of people are likely to result in increased access, businesses that
draw a large number of people are good candidates for REPL consideration.

REPL users have the potential to come from two different places: users who
come from the surrounding area for the purpose of using the recreation facilities and
users who come to the business and may or may not choose to use the recreation
facilities. The associated business use greatly impacts which category REPL users
come from. For instance, a church parking lot may be full during times when services
are held, but almost completely vacant at other times. Thus, nearly the whole lot could
be used for recreation activities when services are not being held. However, users
of these recreation services would need to come from the surrounding community
as the recreation elements would be unavailable during the time when services are
held. For practical purposes, the business cannot be said to be providing users to the
REPL. As such, the church REPL would serve a minimal number of users—those in
walking distance. Alternatively, consider how a business like a grocery store draws
users. A grocery store follows a daily pattern, with less use in the mornings and more
in the afternoon. Thus, REPL features could be available in the mornings to everyone
who shops for groceries at that time as well as to those within walking distance, thus
providing REPL access to a number of the business customers. Additionally, grocery
stores draw from a reasonably large area and have the potential to increase access to
recreation for many people.

The positive impact of the associated use is likely to be present for individual and
personal recreation and not for organized multi-person recreation, such as softball. This
kind of use will need to be associated with a neighborhood or organized league to be
successful. Selecting an appropriate site is highly context sensitive. The desirability
of a site largely depends on the context including the associated use, the proposed
recreation features, and the current access to recreation of potential users. Sites that
are rarely parked to capacity, generally have some people parked there, and support recreation compatible business are good for providing casual recreation as part of an existing routine. Neighborhood adjacent sites where parking is either full or empty will be used in a similar fashion to existing neighborhood parks, but have only part time availability.

Complementary Recreation and Business Use

The Trust for Public Land identifies economic benefits as one of the many benefits of city parks (Sherer, 14). While economic revitalization and tourism benefits are associated with feature parks, REPLs have the potential to realize a slightly different kind of economic benefit—a direct economic benefit to the business(es) associated with the REPL. In the same way that the businesses draw users to the recreation facilities, the recreation facilities may draw users to the business. For instance, consider a REPL associated with a grocery store. Someone who comes to take advantage of the park features may choose to purchase groceries while they are there. The existence of a REPL may result in some users choosing one business over another. If a grocery store has a playground in the parking lot, parents might be more inclined to shop there rather than at a store that lacks such a feature. Several examples of recreation facilities attracting customers currently exist in the built environment—many fast food restaurants have children’s play areas to attract customers, as does big box retailer IKEA. Careful design that results in complementary uses, such as associating an off-leash area with a pet store, a playground with a toy store, or a picnic space with a deli, has the potential to reinforce the business use on the site and make the REPL an economic asset to the business.
Characteristics of the Site

When considering which sites are appropriate for recreation enhancement, one can apply general park design criteria. In determining which criteria to apply, it is important to recognize the strengths and weaknesses of REPLs for recreation. REPLs are particularly suited to behave as small urban parks and likely to accommodate activities that require flat and paved surfaces easily. REPLs are not suited to become natural area parks, wildlife spaces, or places of retreat from society. The following criteria should be considered:

Suitable Parking

First and foremost, REPL sites must meet parking requirements. This means that existing parking meets current needs and surplus space is available at times for recreation use. The addition of recreation features must not impact functional parts of the parking design, like creating sight lines to store fronts, allowing easy and safe access to and from the lot, and managing stormwater.

Corridor or Connection Potential

The idea of using parks to create wildlife corridors and urban habitat has gained popularity in recent years. In particular, Forsyth and Musacchio have promoted the idea that well situated small urban parks can contribute to wildlife connectivity (15). While attempting to integrate wildlife into REPLs is not advisable, a modified version of the connectivity concept can be applied. Specifically, it is important to try to create urban connectivity for people. Complete street advocates, who emphasize the importance of streets that accommodate diverse uses, stress the importance of establishing a network of usable streets (McCann, 20). Thus, parking lots that connect to transportation services, existing corridors, or special attractions may enhance urban connectivity and be preferable for REPL development. Unfortunately, it is all too common to see a visitor to a big box retail outlet leave one store, get in their car, and drive through the parking
lot to a nearby store. This reflects inadequacies in parking lot design that neglect pedestrian needs. Choosing REPL sites that enhance connectivity with other parking lots is one step in addressing this issue.

**Location**

As with regular parks, the location of a REPL will help to determine the success of the space. Specifically, REPLs should be located near a user base—either within walking distance to a neighborhood or adjacent to a business that draws a significant number of users. Additionally, REPLs near existing recreation facilities with similar features are unlikely to be successful. For instance, creating a REPL with a walking track in the parking lot of botanical gardens is unlikely to be successful, as anyone who wishes to walk will likely choose to walk through the gardens.

**Views or Points of Interest**

Although a view or point of interest is not necessary to create a REPL, the existence of attractions on the site that can be incorporated into the design will enhance the attraction of the REPL. For instance, a parking lot situated on top of a hill might afford a good view to the city below. Figure 3.1 shows a customer appreciating such a view in a parking lot in Dickson City. Designing a walking trail or pedestrian circulation through the lot to take advantage of the view will enhance the user experience of the space.
Noise

Surrounding ambient noise should be considered when creating a REPL. Many parking lots are in noisy areas. Frequently lots are adjacent to busy streets with significant traffic noise. Certain kinds of recreation, like picnicing, require that users be able to carry on a conversation (Alexander, 61). Other activities, like loud sports, may be more flexible regarding ambient noise. Noise levels of potential sites should be evaluated with respect to the recreation activities planned for the site and excessively loud sites should be avoided. Options do exist for noise management, such as placing recreation facilities in a part of the lot that is removed from the noise or creating a sound barrier, but these solutions may not integrate with parking requirements. For instance, an effective sound barrier might also screen the business from the road and reduce road visibility which would not be desirable.

Safety

REPL features will not be used if the space is not perceived as safe. Areas with sufficient traffic to provide informal surveillance are ideal. For instance, a 24-hour grocery store that has staff periodically entering the lot to pick up carts or for breaks will lend a feeling of safety to the lot. Lots with questionable associated business uses, like pawn shops or bail bond agencies, are less ideal.

Caretaker

One of the problems with neglected parks is that maintenance is not attended to in a regular fashion, which leads to a spiral of under use and neglect that erodes the usability of the park. Often, this is due to the fact that the park system is understaffed and no one takes ownership of the park. This common issue with urban parks can be avoided with REPLs, as parking lots are typically owned and regularly used. As such, the associated business is can provide a caretaker for the space. The caretaker is an individual who is regularly on the site due to other job responsibilities and happens
to monitor and report safety, maintenance, or operational issues to the appropriate authority. This is not to say that the business assumes all responsibility for maintaining the park. It may be that the city parks department or the property owner handles maintenance issues, but the associated business provides people who monitor the space.

**Pollution**

Business uses that create or are adjacent to highly polluted areas or obnoxious odors are not suitable for REPL use.

**Existing Vegetation**

Vegetated recreation spaces tend to be more appealing. Research indicates that treeless landscapes, particularly in built areas, were much less preferred. In particular, users appreciated "large trees with dense upper canopies but little eye-level foliage" (Forsyth and Musachhio, 39). In addition to being less appealing, completely cleared lots may be too hot to be used for recreation purposes. Asphalt lots produce a heat island effect that makes them hotter than surrounding areas (Ferguson, 15). Sufficient shade is essential for recreation, especially in hot climates. Some of the need for vegetation can be addressed in the design of the REPL and can leverage existing requirements for landscaping in parking lots. However, sites that have or are adjacent to existing established vegetation that can be integrated into the design are preferable locations. One possibility for finding sites with existing vegetation is to use parking lots of former big box retail stores. Many big box retailers move to new, more desirable locations and abandon old locations. These abandoned sites often have large parking lots with mature trees and the new use for the site frequently does not require the same amount of parking.
Site Topography

Generally speaking, recreation features are more flexible with respect to topography than parking lots. Most parking lots are fairly level as significant slope can make entering and exiting cars difficult. As a result, most REPLs will be able to integrate activities like court sports that require level surfaces. However, parking lots that have unusual topography create opportunities for additional types of recreation activities. For instance, a parking lot with two levels could include a small climbing wall or a skatepark.

Urban Context

As an understanding of the important benefits provided by urban parks increases, the need to provide frequent and equitable access to urban parks has become apparent (Sherer, 8). While some cities provide frequent parks within walking distance to most residents, many cities do not. Cities differ widely in both the availability and quality of recreation opportunities. Finding places for urban recreation is a particular problem in cities that are "built out“ where existing park facilities are insufficient and acquiring new property is prohibitively expensive (Harnik, 2006). While Harnik proposes that parking be removed to create parks, this alternative is really only effective when excessive parking has been supplied. Otherwise, it creates a conflict between recreation and parking needs. Considering that we want to locate parks where there are people and that where there are people, we typically want parking, it seems clear that this conflict is likely to occur. Rather than pick one service over the other, creating multiple use REPLs can be a reasonable alternative.

While REPLs can be created on an individual basis when they benefit the associated business and surrounding community, it may be worthwhile to implement REPLs on a city wide basis. Handled in this fashion, REPLs could become part of a park system. Incorporating REPLs into a system allows them to benefit from
centralized, experienced management, and to be sited to equitably distribute recreation opportunities to as many residents as possible. Certain cities stand to benefit more from REPLs than others. In particular, REPLs are likely to be most appropriate in cities that are underserved by parks, do not have a lot of open land available, and have high land costs. REPLs are least likely to be useful in cities with existing strong park networks and that have available and reasonably priced land. Additionally, the layout of the city will impact how many residents can be reached by REPL networks. As REPLs require parking lots, cities that have residential only neighborhoods will have less coverage than cities that have more mixed-use neighborhoods or locate schools and churches in residential areas. When picking REPL sites within a city context, as with picking any park site within a city context, it is important to consider existing recreation facilities and to determine the number of additional people who will be served.

**Summary**

Selecting an appropriate site for a REPL or a series of REPLs involves considering the impacts of the associated use, the parking profile, characteristics of the site, and an understanding of the urban context of the site. The checklist in Table 3.2 summarizes points to consider that are discussed in this chapter.

**Table 3.2 - Features Checklist**

<table>
<thead>
<tr>
<th>Associated Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What are the current associated uses?</td>
</tr>
<tr>
<td>• Are there complementary recreation activities associated with the uses?</td>
</tr>
<tr>
<td>• Will the associated uses bring users to the site? Approximately how many?</td>
</tr>
<tr>
<td>• How much space is available for recreational use?</td>
</tr>
<tr>
<td>• What times of the day is available? Which days of the week? During which months/seasons?</td>
</tr>
</tbody>
</table>
### Site Characteristics

- Are there potential neighborhood users within walking distance? How many?
- Is the site safe enough for REPL development (traffic, crime)?
- Is the site quiet enough for the desired activity?
- Are there unpleasant odors or pollution that will be a problem on the site?
- Could the site enhance urban connectivity?
- Are there competing recreation activities near the site?
- Does the site meet existing parking needs?
- Are there adjacent views or points of interest?
- Is there existing vegetation on or adjacent to the site?
- What recreation elements does the site topography support?
- Is there an individual or group who will act as a caretaker? Can necessary parking features (number of spots, sight lines, screening) be preserved if recreation features are added?

### Urban Context

- Does the site serve users who are currently underserved? Does it add to overall recreation coverage?
- Will recreation facilities appropriate to the business use and parking profile replicate existing recreation features in the area, or will they provide new opportunities?
- Do land costs and existing uses merit the addition of REPLs or would a traditional park be more appropriate?
CHAPTER 4
DESIGN CONSIDERATIONS

This chapter contains a discussion of design considerations for Recreation Enhanced Parking Lots (REPLs). A considerable body of knowledge already provides design guidelines for both parks and parking lots, much of which is applicable to the design of REPLs. The intent of this chapter is not to reiterate these guidelines. Rather, the work here identifies differences in how standard park and parking lot design guidelines should be applied to REPLs and additional considerations specific to REPLs. This discussion draws from existing literature regarding the design of parking lots and the design of parks, and also from literature on shared streets, which provides design guidance on areas that mix car and pedestrian use. The resulting list of design considerations can be used to guide initial efforts to create REPL designs and are applied to the demonstration design in this thesis.

Parking Lot Design Objectives

While the specifics of parking lot design vary by region and zoning ordinances, a number of texts exist that provide general guidelines for parking lot design. They include such works as the Urban Land Institutes's (ULI) *The Dimensions of Parking*, the ULI's *Parking Requirements for Shopping Centers*, and Child's *Parking Spaces: A Design, Implementation, and Use Manual for Architects, Planners, and Engineers*. These texts discuss stall layout, grades, end islands, overhangs, wheel stops, bumpers, accessible stalls, truck parking, bicycle parking, loading zones, circulation patterns, ingress and egress, pavements, drainage, curbs, sidewalks, lighting, fencing, and landscaping. Historically, parking lot design has emphasized:
• accommodating the largest number of vehicles possible
• providing a safe environment for the user
• minimizing construction and maintenance expenses
• maximizing convenience for motorists

More recently designs have sought to mitigate some of the environmental impacts of parking lots. Many parking lot designs now include landscaping, which, among other benefits, reduces urban heat island effects. Pervious pavements and biofiltration areas that assist with stormwater management by reducing flow and removing pollutants have also become more common.

**Park Design Objectives**

Texts such as Rutledge's *The Anatomy of a Park* and Forsyth and Musacchio's *Designing Small Parks* describe park design considerations. Park design varies considerably depending on the type of a park. Rutledge identifies different park types as the neighborhood playground, neighborhood park, community playfield, city park, county park, and natural environment area (146). Clearly, the design concerns for a neighborhood playground are quite different than the design concerns for a natural environment area, but park designers generally need to consider several areas including function of the park (amenities, location, safety, lighting, circulation), environmental impact (wildlife corridors, stormwater management, native vs. exotic vegetation), long term operation considerations (maintenance, programming, public involvement, operational cost), and aesthetics. REPLs incorporate several of the objectives of park design, including providing recreation amenities to users and creating an aesthetically pleasing environment that enhances the social interactions of users and facilitates a sense of community.

**REPL Design Objectives**

REPL design objectives share several of the traditional parking lot design objectives, including providing sufficient parking, providing a safe environment, and minimizing environmental impacts. However, several of the traditional objectives
receive less emphasis, including maximizing convenience to the motorist, minimizing costs, and providing the maximum number of parking spots. Rather, REPLs seek to do the following:

- establish multiple uses of space, realizing parking function, recreation function, and environmental benefits
- create an aesthetically pleasing space similar to a park that realizes physical and social benefits

A variety of techniques, derived from existing guidelines for designing shared streets and for designing parks, can be applied to realize these objectives. Shared streets challenge the notion that the street is the domain of the automobile and have been specifically engineered to support a variety of uses. Shared streets are not common in North America, but are prevalent in a number of countries and are known by a variety of names, including woonerf, living street, mixed court, community street, and integrated street. Such streets are considered a "physical and social part of the living environment" and are "used simultaneously for vehicular movements, social contacts, and civic activities" (Southworth, 109). According to Southworth:

The underlying concept of the shared street system is one of integration, with an emphasis on the community and the residential user. Pedestrians, children at play, bicyclists, parked cars, and moving cars all share the same street space. Even though it seems these uses conflict with each other, the physical design is such that the drivers are placed in an inferior position. Such conditions are actually much safer for the pedestrian than in common residential street layouts. (109)

Several of the principles described by Southworth and Ben-Joseph in Streets and the Shaping of Towns and Cities are directly applicable to REPL design and will be discussed further in this chapter. The remainder of this chapter focuses on techniques, derived from principles of parking lot, park, and shared street design, for meeting the REPL design objectives of establishing multiple use of space and creating aesthetically pleasing space.
Establish Multiple Use of Space

REPLs introduce another function, recreation, into the parking lot. As such, one of the main design considerations is how to accommodate the new use. In order to facilitate recreation, we must consider how to mediate between parking and recreation users, the most effective circulation patterns to integrate the new use, how to announce the new use, and how we can modify physical components of the design, like stall layout, bioretention areas, and landscape islands, to support multiple use of space.

Mediating between parking and recreation users

REPLs require an effective mechanism for identifying when spaces are available for parking and when they are available for recreation. Such mechanisms can be either informal or formal. An informal mechanism is one that is managed by the driver and recreating individual, with no outside intervention. For example, when children play street hockey, they watch for cars. When they see a car, they pick up their nets and move off the street. Once the car has driven past, the game resumes. A formal mechanism is one that is managed by someone other than drivers and recreation users. For example, in a parking lot that uses some parking spaces for a spray park for part of the day, someone would be in charge of turning the water on and off and managing barriers that indicated whether vehicles were or were not allowed in parking spaces during spray park operation. For safety reasons, it is essential that control mechanisms, whether formal or informal, are clear and effective.

A variety of control mechanisms, including eye contact, signage, signals, semaphores, striping, bollards, and pavements can be used when design

Figure 4.1 - Shared street entrance sign.  
Source: Hass-Klau, 54
<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Contact</td>
<td>Recreation users and motorists make eye contact to determine appropriate action.</td>
<td>Traffic must be unable to move quicker than a pedestrian pace. Safe street guidelines should be implemented. Useful for daily and weekly REPLs.</td>
<td>• Effective.</td>
<td>• Safe streets can be costly. • Limited applicability due to traffic slowing requirement.</td>
</tr>
<tr>
<td>Signs permanent</td>
<td>Permanent signs that describe appropriate usage. See Figure 4.1.</td>
<td>Post hours available for recreation/parking. Identify a recreation zone. Useful for all REPL types.</td>
<td>• No maintenance. • Inexpensive.</td>
<td>• Easy to ignore.</td>
</tr>
<tr>
<td>Signs temporary</td>
<td>Temporary signs for specific events indicating parking/recreation availability.</td>
<td>Good for seasonal and event REPLs.</td>
<td>• Easy to install/remove as appropriate.</td>
<td>• Easy to ignore. Requires some maintenance.</td>
</tr>
<tr>
<td>Semaphores</td>
<td>A mechanism to indicate who can use certain parking spaces. Could be a traffic light, gates, turnstiles, or custom recreation feature (e.g. a soccer net blocking a parking entrance)</td>
<td>Useful when an unambiguous and effective technique is mandatory. Useful for all REPL types.</td>
<td>• Very effective. • Must be managed.</td>
<td>• Expensive.</td>
</tr>
<tr>
<td>Technique</td>
<td>Description</td>
<td>Applicability</td>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Striping  | Different paint colors indicates that spaces can be used for recreation and should not be parked in if regular spaces are available. | Useful for all kinds of REPLs, but especially daily REPLs and smaller lots with high turnover. | • Inexpensive.  
    • Easy to understand.  
    • No management needed. | • Easy to ignore.  
    Appropriate spots must be selected for recreation striping, or cars will use them anyway. |
| Bollards  | Bollards can be used to restrict cars from entering a recreation space.       | Best for seasonal or event REPLs.                                      | • Very effective.  
    • Easy to understand. | • Limited applicability.  
    • Require management. |
| Pavements | Different paving materials signify areas as designated for dual use.         | Best for daily and weekly REPLs.                                       | • May have aesthetic benefits.  
    • No maintenance. | • Easy to ignore. |


REPLs. Table 4.1 summarizes a variety of control mechanism. The techniques listed here are common traffic calming techniques which are discussed in Ewing's *US Traffic Calming Manual*. The application of these techniques to REPLs is the author's work.

*Circulation*

The design of circulation within the parking lot is another area that is impacted by dual use. This section touches briefly upon entrance patterns, circulation around recreation features, and circulation to recreation features.

Traditional circulation design strives to allow easy entrance to the lot (even at the expense of the exit) so that traffic is less likely to queue in the street waiting to enter the lot (*Dimensions of Parking*, 52). In the interest of keeping entrance simple and efficient, recreation facilities should not be sited in such a fashion as to complicate the entrance to the lot. Entering motorists can be expected to be concentrating on traffic in the roadway and may not be able to simultaneously focus on REPL uses of the lot.

Once inside the lot, traditional designs strive to allow vehicles to circulate past as many spots as possible when entering the lot and as few as possible when exiting the lot (Childs, 253). REPLs add the additional consideration of managing circulation to and around recreation features. One of the characteristics of shared streets that can be applied to recreation zones in parking lots is that through traffic is discouraged (Southworth, 114). Thus, it is no longer desirable to always circulate vehicles past spots intended for recreation—instead traffic in these areas should be minimized when the area is being used for recreation. Where possible, it is useful to allow motorists to bypass recreation areas when they are not available for parking. Figure 4.2a shows the layout of a typical parking lot. Figure 4.2b shows placement of a REPL zone that can be bypassed, while Figure 4.2c shows a poorly placed REPL zone that will result in some motorists to travel through the REPL zone. Moreover, in the interest of minimizing traffic in recreation zones, REPLs should not present tempting shortcuts through the
lot. Additionally, in areas that are informally managed, REPL spots should not be the first desirable spots encountered. For instance, consider a lot that is using striping to manage REPL activity. Lots striped in an alternative color of paint indicate to motorists that they should not use these spaces unless there are no single use spaces available. However, if motorists encounter the recreation spaces first, they may be tempted to park there instead of continuing the search for a different parking space. If they do continue to look for a different space, but none are available, they will need to circle back to the recreation spaces which creates unnecessary traffic. A far more effective approach is to ensure that the recreation spaces are the last ones the motorist encounters or wants to use. The goal of circulation should be to allow maximum exposure to single use spaces, while minimizing the need to travel through areas containing dual use spaces.

Another consideration necessitated by the addition of REPLs is creating effective circulation routes between recreation features. Users should not feel the need to get in their car and drive to recreation elements located in the overflow parking area. The walk to the recreation space, either from the store or from the parking space, should be inviting, enjoyable and safe. This can be accomplished by connecting the areas

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**Figure 4.2 - Options for placement of REPL zones**

*Source: Author*
with sidewalks, paths, or safe street zones. Note that sidewalks and safe streets use very different approaches. A sidewalk seeks to separate pedestrians from automobiles. With shared streets, there are "no conventional, straight stretches of pavement with raised curbs, and the pavement and sidewalk are not rigidly demarcated" (Southworth, 114). Thus, the appropriate technique to employ will depend on the characteristics of the lot, the budget, and design objectives. A safe street is likely to be a more inviting and aesthetically pleasing alternative, but in areas where motorists will be travelling quickly, a sidewalk will be more effective. A final circulation consideration is the need for accessible routes to recreation areas. In the event that additional accessible parking is not located near the recreation zones, accessible routes to the recreation zones should be created.

*Entrance Treatments*

Both parks and shared streets have clearly defined entrances that welcome users and identify the nature of the space. REPLs too should also have clearly marked, aesthetically pleasing entrances. The REPL entrance(s) should designate the space where motorists must cede priority of the road and proceed with increased caution. As such, if only part of a parking area is used for REPL activity and part is used for regular style

*Figure 4.3 - Entrance treatment for a shared street.*
*Source: Hass-Klau, 48*
parking, this should be made obvious through the design cues and entrance to the REPL portion of the lot. Entrances can be delineated in a variety of ways. Techniques like adding signs, trees, flowerpots, and gates are appropriate. Entrance treatments are most effective when combined with further traffic calming, the most effective of which are pinch points that narrow the road and road humps (Hans-Klau, 47). Other measures like changing the pavement type can also indicate that motorists need to slow down. Figure 4.3 shows a sample entrance to a shared street. Similar treatments are appropriate for REPLs. Where REPLs serve a specific business use, the opportunity may exist for a creative entrance that announces both the business and the REPL. For instance, a REPL in a McDonald’s parking lot could span the entrance with golden arches and change the pavement type to create a specialized entry sequence.

Landscaping

In *Parking Lot Landscaping*, Corwin describes the uses of landscaping in parking lots. Plants improve the appearance of lots. They moderate the microclimate, reducing heat and wind. They can improve air quality, filter pollution, mitigate stormwater impacts, and serve as a buffer for noise and glare. Additionally, the placement of landscape islands can be used to control traffic flow within a lot. Motorists happily drive over painted lines, but typically respect raised curves and plants. Additionally, islands can protect elements like lightposts or fire hydrants and preserve visibility at the end of aisles, increasing safety within a lot. In addition to continuing to serve these purposes, landscaping in REPLs can also be used to delineate and buffer recreation areas. Figure 4.4 shows a basketball court that is bounded by landscaping. In this design, the landscaping serves several purposes. It clearly defines the boundaries of the REPL space. The plants also serve to trap errant basketballs. Finally, they can be used for bioretention so that they serve an environmental as well as recreational purpose. REPL design should make every effort to use landscaping to achieve multiple goals.
Stormwater retention areas should be used as attractive features and larger islands can include picnic areas or benches if they are in an appropriate location.

Traditional parking design calls for 10% vegetation. In the interests of preserving visibility, a mixture of low shrubs and trees that don't branch below 7 ft. are recommended (Childs, 131). While these guidelines are mostly applicable, designers should be alert for occasions where these guidelines do not apply. Where cost and space allow, additional vegetation should be used, which will enhance the park-like feel of the space. Furthermore, the recommended planting guidelines for preserving visibility have actually created a distinctive look that identifies areas as parking lots. Where possible, increasing plant variety and pattern can be an effective tool in breaking away from the parking lot mould and creating a more aesthetically pleasing place.

Figure 4.4 - Basketball REPL Zone Perspective
Source: Author
Create an Aesthetically Pleasing Park Space

In addition to modifying design principles to facilitate dual use of space, REPLs must show greater attention to aesthetics than the traditional parking designs. As with regular parks, different REPLs will have a different emphasis on aesthetics. Some may be more focused on providing athletic venues. Others may have more of emphasis on passive recreation and require a more aesthetically pleasing environment. Park design guidelines provide guidance on what will work well in a REPL environment. This section discusses how to approach scale, site furnishings, and landscaping to create more aesthetically pleasing REPLs.

Scale

Appropriate scale of REPL elements is exceedingly important. Parking lots are car scale. Parks are human scale. The two scales are not the same. According to Alexander, "Large parking lots, suited for the cars, have all the wrong properties for people. They are too wide; they contain too much pavement; they have no place to linger" (505). Even parking lots with excellent landscaping do not feel like parks. In order for a REPL to be an effective recreation space, it must mediate effectively between human and car scale. Achieving a workable scale is not trivial. Alexander suggests small lots of 5-7 cars to keep human scale (505), but this recommendation is too restrictive and will not satisfy the parking, circulation, and space requirements of most parking lots. For instance, the basketball court shown in Figure 4.4 accommodates 20 parking spots. In fact, REPLs are well suited for including athletic courts. Some of these, like soccer fields, are not necessarily human scale, but are nonetheless appropriate for REPLs. Thus, the REPL designer should strive to include human scale elements in key locations in the lot to achieve a park-like feel, but mediated this effort with the need to meet functional parking requirements and to include varied forms of recreation.
One technique for creating human scale is careful configuration of elements to create human scale pockets that are visually linked. The number, configuration, and placement of recreation elements within a parking lot will greatly impact the overall success of the space. Areas that are used solely for parking should remain at parking scale and areas intended for dual use should strive for human scale. Additionally, designers should integrate recreation elements throughout the lot to create a sense of path and place. More attention should be given to establishing focal points in the lot that anchor the pedestrian experience. Ideally, users in one recreation space should be able to see other recreation spaces, creating a sense of continuity rather than isolation.

Another technique for achieving appropriate scale is to break up aisles to include small dead end lots. Although dead-end lots are generally avoided in traditional parking lot design, they are more desirable in a REPL setting. Dead-end lots typically contain fewer stalls to minimize conflicts due to excessive turnover. This has the side effect of creating a more intimate scale that is appropriate for recreation needs. Childs recommends no more than 10-12 cars in public parking dead-end lots (255). Figure 4.5 shows how a typical parking lot with no dead end lots can be reconfigured.

![Figure 4.5](image_url)

(a) - A typical parking lot.  
(b) - Layout modification for REPL zones (hatched area)

**Figure 4.5 - Layout modification to create human scale dead-end lots.**  
*Source: Author*
to include dead end lots that can be used for recreation purposes. These lots are an effective REPL tool because they address scale and meet the aforementioned criteria of eliminating through traffic. Thus, when the space is being used for recreation purposes, cars have no incentive to enter the space.

Finally, the scale of recreation elements will be dictated to some extent by the activities they support. If a court sport is being supported, the size of the recreation zone is determined by the sport, as with the basketball court shown in Figure 4.4. Note how the poles for the baskets divide the driving lanes. This serves to mark the entrance to a REPL zone and slow traffic entering the court. Tot lots are another activity that REPLs can support. According to Rutledge, tot lots should be around 2400 to 5000 sq. ft. (55). For areas that contain outdoor picnic areas or mimic small public squares, 60 ft is an appropriate diameter (Alexander, 311). Alexander identifies this as the distance where people feel comfortable, can identify facial expressions on others, and can call out to each other and be heard. Application of these guideline will assist in creating human scale spaces.

The attempt to create human scale and support recreation activities necessitates compromising traditional parking lot layout techniques that involve maximizing the number of stalls. Fortunately, due to concerns over impervious surfaces, parking design is already moving away from creating the maximum number of stalls and instead focusing on an optimal number of stalls. Several counties in Georgia have now implemented a stormwater utility that requires users to pay for stormwater runoff (Smith). As parking lot owners are now required to pay regular fees for impervious surfaces, there is a significant incentive not to provide parking that is not regularly used. As such, the maximum number of parking stalls is no longer such a priority in parking lot design which will hopefully result in additional space available to modify lots so that they are appropriate for recreation purposes.
Site Furnishings

Site furnishings are also an important part of creating an appropriate REPL environment. This is another criteria borrowed from safe street designs which have "extensive landscaping and street furnishings" (Southworth, 114). These elements are used to slow traffic, provide amenities, and create aesthetic appeal. Within REPLs, aesthetic appeal can be increased by both adding additional elements like benches and by selecting more aesthetically appealing options for existing elements. Rather than use utility lighting, a lighting style that adds to the visual interest of the space may be used. Pavements present another option for creativity. While patterns should always reinforce the legibility of traffic and circulation flow, aesthetically pleasing alternatives to asphalt can be used. If a round-about is included to control traffic, the center of the island can be transformed to an attractive focal point.

Conclusion

As discussed above, existing guidelines for designing parking lots, parks, and shared streets can be applied effectively to understand REPL design. While many of the criteria are similar, REPLs design must address the creation of a multiple use space and strive to improve aesthetics over traditional parking lots. In particular, in order to accommodate dual-use, traditional parking criteria of minimizing costs and maximizing the number of stalls must receive lower priority. Ideally, this would be incentivized in some way, perhaps through a credit for building lots with a certain percent of the space used as a REPL. The discussion in this chapter serves as a starting point for understanding REPL design, not as a definitive guide for REPL design. In the event that REPLs are built, a more comprehensive set of design guidelines will evolve as REPLs are observed and refined.
CHAPTER 5  
DESIGN EXAMPLES

This chapter presents an example of retrofit of an existing parking lot to a Recreation Enhanced Parking Lot (REPL). The purpose of the design is both to illustrate the concepts explored in the preceding chapters and to test them through design experience. The chapter first outlines a general process for designing REPLs and then applies that process to a specific site. The application demonstrates parking analysis, recreation analysis, and applying the results of those analyses to generate a REPL design for an actual mixed-use retail site in Athens, GA. The example shows all components of designing a REPL, including initial site selection, site analysis, and design. The design is described through presentation of an overall master plan and then through detailed description of each of the introduced recreation elements. Descriptions and graphics illustrating how each of these components implement multiple use are presented to demonstrate the functionality of the design.

REPL Design Process

Designing a REPL includes all the steps of designing a parking lot and many of the steps of designing a park. In addition to these items, a special kind of site analysis must be performed to determine which parts of the parking lots are appropriate for multiple use. These parts must have a period of time in which they are used for parking and a period of time in which they are available for recreational use. They must be appropriate for recreational use and be able to support a recreational activity that is suitable to the location. This information can be obtained through performing parking and recreation analyses.
The purpose of a parking analysis is to determine parking patterns for the lot and to understand which parts of the lots are unused and at what times—essentially the parts of the lot that are available for multiple use. The end product of this sort of analysis is a site map showing available areas for specific time periods. A variety of techniques can be used to gather this sort of information, including informal observation of the parking lot, formal observation providing exact usage data, and extrapolation from data acquired from similar parking lots.

*Informal Observation*

This technique is most useful for simple sites that have users who can fully describe typical parking profiles for the site. Using this knowledge, and some common sense about preferred parking spaces, one can make educated guesses about available space. Aerial photographs can also be useful data points in this sort of analysis.

*Formal Observation*

This technique can provide the most rigorous profile of a site, but is time consuming and thus costly. Formal observation involves visiting the site at representative times and gathering data regarding how many cars are parked in the lot and where they are parked. Data can then be combined into a composite analysis that provides a clear parking profile. The usability of this data depends on picking appropriate times to perform car counts that correspond to peak and non-peak use times. For instance, for profiling a church parking lot, it might be generally sufficient to perform counts in two categories: Sunday and not-Sunday, but a grocery store might require morning, afternoon, and evening profiling for each day of the week.

Note that the main goal of this sort of profiling is to discover more about the nature of non-peak parking. Many parking counts, like the counts performed for the Institute of Transportation Engineers (ITE), for their popular parking reference manual, *Parking Generation*, focus on determining peak use. REPL design is more concerned with how many spaces are available during non-peak use. In the church example
above, it would not be necessary to profile high use events like Christmas or Easter Sunday. These days are high-use days, like regular Sundays, where all spaces would be used for parking. Rather, the focus is to determine how much of the supplied parking is available during low use periods.

**Extrapolation**

This technique involves examining available parking data for similar uses and making educated guesses. This may be the only technique available for new construction, and is likely to be cost effective. While parking data does exist in references such as *Parking Generation* for specific lot types, it tends to emphasize peak demand and peak periods, so one is left to deduce what sort of demand occurs during non-peak periods and what sections of the parking lot are unused. Application of general knowledge and educated guesses are necessary to use this data. For instance, although there may be no data on where cars are parked, customers will generally park as close to their destination as possible, so remote sections of the lot will be the best candidates for reuse.

**Parking Zone Map**

Regardless of what technique is used to analyze parking, the end result should be a parking zone map. This map shows what space is available for multiple use. Zones categorizing may be as simple as always available or never available, or it may be as complex as a zone that is available on Tuesday mornings during peak months and all weekday mornings during non-peak months.

**Recreation Analysis**

The purpose of the recreation analysis of the parking lot is to determine what recreation activities should be integrated into the parking lot. The analysis determines who the potential users are, what activities might interest them, and the best places to place those activities within the parking lot.
Common techniques for designing parks are appropriate here. Texts such as Rutledge’s *The Anatomy of a Park*, Forsyth and Musacchio’s *Designing Small Parks*, and Reed’s *Park Planning and Design* detailed common considerations. Like design of traditional parks, REPL design will benefit from recreation needs surveys, public meetings, and analysis of near by amenities. The extra dimension that must be considered in integrating recreational facilities into a REPL is how the business use of the site impacts the design. One of the principles of park design is the grouping of compatible use areas, such as grouping quiet activities like nature walks and canoeing in a separate space from louder activities like tennis and basketball (Molnar and Rutledge, 18). This principle must be expanded in the context of a REPL to consider the use of the building(s) on the site and to plan recreation activities accordingly. For instance, planning picnic spaces next to restaurants with take-out, reading gardens near bookstores, and off-leash areas near pet stores creates a reciprocal relationship where the business and recreational activity promote usage of each other.

In addition to considering complementary use zones, a recreation analysis should also note areas where recreation use is not possible. Again, while this would factor into regular park design, it is a larger part of REPL design. Parking lots are full of spaces that are inappropriate for recreation—spaces that are too close to a busy road making them too loud or too dangerous, service spaces near dumpsters that smell, and higher usage areas that are too busy. A good recreation analysis should identify these areas as unsuitable for recreation.

The outputs of a recreation analysis should be: a description of potential users and REPL appropriate activities that would interest them, a map illustrating potential compatible uses, and a dead-zone map showing spaces inappropriate for recreation.

**Applied Example**

The remainder of the chapter is devoted to an applied example that demonstrates the site analysis and design of a REPL. The demonstration design
serves as both to test the principles of REPL design articulated in this thesis and to present an example with enough detail to stimulate meaningful discussion.

**Site Description**

The site discussed in this example is located in Athens, GA and includes Georgetown Square, College Station Shopping Center, and the adjacent stores. This site is a district of contiguous shopping centers that have been built, rebuilt, and connected over time. While there are many sites appropriate for REPLs in Athens, including sites such as the Georgia Square Mall, a variety of neighborhood churches, or many of the businesses on Highway 29, this site was selected because it displays more of the ideal characteristics for a REPL site than the other candidates. Both the anchor grocery stores on the site and the location near residential neighborhoods with no parks means that there is an exceptionally strong potential user base for REPL amenities. Additionally, the size, layout, and uses of the site lend themselves to demonstrating

![Figure 5.1 - Site Location](maps.google.com)
different kinds of recreation/parking control mechanisms, making the site good for example purposes.

This mixed retail site is located on the east side of Athens, just outside the perimeter loop road on College Station Road and Barnett Shoals Rd. as illustrated in Figure 5.1. The site is approximately 43 acres. There are 1664 parking spaces on the site servicing 353,570 sq. ft. of retail spaces. The largest stores are Kroger (grocery), Kmart (general goods), and Publix (grocery). They are surrounded by restaurants, retail stores, service stores, a gas station, and a pharmacy. Georgetown Square, which hosts Publix, is a newest development (circa 2007) and the impact of more recent codes is evident in the development of the parking lot, which features more generous landscaping than College Station Shopping Center. Figures 5.2 and 5.3 illustrate the different character of the two lots. Both lots are set back from the main artery street, Barnett Shoals Road, which is lined by a series of small restaurants. College Station Shopping Center and Georgetown Square were designed separately and have been linked together by a central road through the parking lot. The layout of the complex is depicted in Figure 5.4.
Figure 5.4 - Site Layout
It should be noted that the base map is an approximation of the actual site and, while entirely adequate for demonstration purposes, is not survey quality. Data to generate the base map was obtained from aerial photos, county records, county GIS data, and through direct measurement. Data on the gross leasable area (GLA) is presented as parking requirements are frequently generated based on the GLA of buildings on the site. This data was obtained from the county GIS data and is, again, unverified yet sufficient for demonstration purposes.

The design example is a redesign of an existing space. In analyzing the current lot, several flaws in the original design became evident. Solutions to these design flaws are implemented only in the event that it is required to demonstrate REPL design. For instance, one of the issues with the original design is the lack of landscaping islands in parts of the lot. Many REPL components depend on landscape islands to delineate recreation activities and provide buffers between people and automobiles. As such, landscape islands are addressed in the new design.

Site Suitability

This section evaluates the suitability of the selected site according to the criteria outlined in Chapter Three. First, the impacts of the associated business, including the parking profile, the user base, and the complementary uses, are discussed. Then site characteristics like the suitability of parking area, corridor/connection potential, views or points of interest, noise, pollution, odors, safety, caretaker potential, existing vegetation, and site topography are evaluated. Finally, the urban context of the site, specifically the potential for recreation surrounding the site is addressed.

Parking Profile

Different portions of the lots have different parking profiles, due to the large number of uses on the site. The lot has areas that exhibit daily, weekly, and seasonal patterns. Some portions, like the areas near the grocery stores, exhibit all three
patterns. While this does increase the complexity of performing parking analysis and planning REPL activities for the site it also means that the site is excellent for example purposes as activities associated with a variety of different patterns can be included.

User Base

The site has an excellent potential user base. A large number of shoppers regularly visit the site, providing a substantial user base of both customers and employees. To provide a general indication of use, the two grocery stores on the site performed around 31,000 transactions during the week of August 2, 2009 (Kennedy, Taylor). If anything, this would be considered a slow week, as most of the university students, a significant economic force in Athens, are out of town over the summer. The Planning Department of Athens Clarke County estimated the population of Athens to be 108,222 in 2005 (www.athensclarkecounty.com), so it is clear that a large number of Athens residents visit the site. In addition, the site is also walking distance to several neighborhoods, including University Heights and Green Acres. As a result, a REPL at this location has the potential to serve a large number of shoppers, neighborhood residents, and shopping center employees.

Complementary Use

The large number of uses on the site create a number of opportunities for complementary uses. Possible examples include outside dining to complement restaurants, outside movie events associated with video rental stores, and community gardens associated with the Kmart garden center.

Suitability of Parking Area

The site is definitely large enough to incorporate several recreational features and the layout and use patterns can accommodate the integration of mixed-use zones. There are several features on the site including a stormwater retention pond and a reasonably sized unused paved space that fit well into a recreation enhanced design.
**Corridor/Connection Potential**

An existing bike lane runs along Barnett Shoals Road on the north side of the site. This will allow bicycle access to the site. The University of Georgia owns the land on the south side of the site. While this land is currently pasture land, the University plans to develop the new veterinary school on the site. There has been some preliminary discussion of connecting the vet school site to the Athens-Clarke County Greenway, which features a multi-use trail that runs along the river. If this development occurs, the bike lane on Barnett Shoals Road could be connected to the vet school and to the Greenway through the parking lot, which would enhance urban connectivity.

**Views or Points of Interest**

The site does not feature particularly appealing views or points of interest. All views look to streets, commercial developments, or vegetation screens. The best potential view is to the stormwater pond behind Publix.

**Undesirable Elements (Noise, Odors, Pollution, Traffic)**

Barnett Shoals Road receives a lot of traffic, which is the source of both noise and pollution. However, the heart of the site is set back a good distance from the street so it should be possible to create successful recreation features in those areas. There are some odors associated with service locations in the lot, but lot size will allow these locations to be avoided.

**Safety**

The site is acceptably safe. The Kroger is open 24 hours, so there are always people present on the site and a place to go if assistance is required. The one part of the lot that feels less safe is the service area behind the shopping facilities. During the day there are many deliveries made in this area, but at night it is largely deserted and not well lit. If recreation features are added to this area, safety concerns will need to be addressed.
Caretaker Potential

The site contains many potential caretakers. Individual business owners and employees could easily monitor the condition of recreation facilities and report issues to either the parks and recreation staff or to the building owners. Grocery store employees, in particular, survey the lot extensively as they frequently help customers take groceries to their cars.

Existing Vegetation

There is no especially impressive vegetation on the site, although some mature vegetation screens and buffers exist between the complex and residential apartments on the northwest part of the site. Some parking lot landscaping exists in the Georgetown segment of the site.

Site Topography

The site is quite flat, likely due to grading efforts as part of the existing development.

Adjacent Recreation Opportunities

Recall that adjacent recreation opportunities can impact REPL success. Sites without other recreational opportunities are more likely to receive significant usage. The only walkable recreation from the site is located at Gaines Elementary School, approximately half a mile from the site. The schoolyard is available for neighborhood use during non-school hours. However, the utility of this park is limited. It primarily features playground equipment and tends to be unavailable during the hours when children are typically taken to the park, which coincides with school hours. It is also informally used as an off-leash area by dog owners. Given the limited nature of this facility, it is unlikely to compete heavily with a REPL at the proposed location.
Parking Analysis

All of the three parking analysis techniques described earlier in the chapter were used in analyzing this site. Informal analysis included examining aerial photographs, speaking with employees, and observing parking patterns. Aerial photographs were of limited use—information on the time of day that the photos were taken is not available and there are a limited number of photos available. Only one of the available photos was taken after the Georgetown development was complete. However, photos can be used to verify which spots tend to be most popular and provide a data point for portions of the lot that may be available for multiple use. Figure 5.5 shows an aerial photograph of the site, taken in 2009. Note the sparse use of the parking lot, which indicates the potential for a REPL.

Conversations with employees of Kroger, Kmart, and Publix also provided useful information on parking patterns. These conversations yielded the following information:

- Saturday and Wednesday (Seniors Day) are the busiest days at Kroger.
- Kroger is busiest between the hours of 4pm and 7pm. Mornings tend to be less busy.
• Kroger employees park on site, but are required to park at the back of the lot or along the side, leaving prime parking for customers.
• The Kmart lot is rarely full. Busiest days include the period where students return to town, the day after Thanksgiving, and the Christmas holidays.
• Saturday and Thursday afternoons tend to be a busier period for Kmart.
• The Publix lot is usually relatively full. Between 3-9pm on Sunday and Monday tend to be the busiest times.
• Publix employees park on site, but are required to leave prime parking for customers.

In addition to the informal analysis described above, several formal car counts were performed. Car count data shows which parking spots were free and which were in use. Note that it takes approximately an hour to count all cars in the lot and the parking configuration will vary somewhat over that time period. Thus data should be interpreted as indicative of general use patterns, rather than as a perfect snapshot of use at a given moment in time. Figure 5.6 shows results of car counts for a morning time slot, an afternoon time slot, and an evening time slot. This data is then compiled into a composite parking analysis map which is presented in Figure 5.7. Due to the time involved in collecting data, a minimal number of counts were performed. Additional counts would result in higher accuracy. However, the data presented here is consistent with informal observation of the lot and was deemed complete enough for demonstration purposes.

The final technique used for parking analysis was extrapolation. Examining parking statistics for similar parking lots yields an estimate of parking use for the sample lot. Two good sources for parking data are the Institute of Traffic Engineers’ *Parking Generation* and the Urban Land Institute’s *Parking Requirements for Shopping Centers*. These two sources outline parking demand and provide data on peak periods. Recall that our site has a GLA of 353,570 sq. ft and has 1664 parking spots. Approximately 16% of the GLA is used by restaurants. The Urban Land Institute (ULI) recommendation for parking for this type of shopping center is 4.18 spots per 1000 sq. ft. GLA (*Parking Requirements for Shopping Centers* 56). This would indicate a need
for 1478 parking spots, so our site is oversized by 186 spots. This source also indicates that during 40% of the year, over half of the available spaces will be empty. Given the excess spots and the half of the 1478, we could reasonable expect 925 of the parking spots to be empty a significant amount of the time and thus available for recreation.

Consumers tend to park near their destination so we would target the spots farthest from store entrances for multiple use. We can also apply the data presented in *Parking Generation* on peak period usage patterns. Peak demand for mixed retail occurs in the month of December. Saturday is the busiest day of the week (data for Sunday was not included) and peak demand occurs between 11am and 3pm (193). In the absence of other data, this analysis could be used to determine the recreation potential of the lot. For our purposes, however, this analysis can be combined with the results from the formal and informal analyses to inform the REPL design.

**Recreation Analysis**

Recall that the purpose of the recreation analysis of the parking lot is to determine what recreation activities could be integrated into the parking lot. While a comprehensive user input process is out of scope for this example, data on potential recreational uses was obtained through observation of the lot, discussions with employees, and map analysis. Current recreational activities on and near the site include picnicking and jogging. Kroger has several picnic tables near the entrance and employees frequently use the area on breaks. Additionally, joggers use the streets surrounding the site. This information can be combined with general brainstorming to come up with a list of potential REPL appropriate activities.

**Table 5.1 - Potential REPL activities**

<table>
<thead>
<tr>
<th>User</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>Walking Track, Court Sports, Community Garden, Scenic Views,</td>
</tr>
<tr>
<td></td>
<td>Picnicing, Break (lunch/smoking) Areas</td>
</tr>
<tr>
<td>Shopper</td>
<td>Playground, Picnicing, Walking Track</td>
</tr>
</tbody>
</table>
In addition to a set of possible activities, it is useful to examine the layout of the lot to determine possible adjacent use activities. Table 5.2 shows potential complementary uses for current business use of the site. Whether or not these uses are feasible will depend on factors like lot layout and parking profile. Another important aspect of recreational analysis is to determine zones that cannot be used for REPL activity. Few people will recreate in areas that are too loud, too close to traffic, unsafe, or adjacent to unpleasant odors. These zones are identified on the upcoming synthesis map.

<table>
<thead>
<tr>
<th>Business</th>
<th>Compatible Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurants</td>
<td>Picnic Area</td>
</tr>
<tr>
<td>Shoal Creek Animal Clinic</td>
<td>Off-leash Area</td>
</tr>
<tr>
<td>Kmart - Garden Center</td>
<td>Community Gardens</td>
</tr>
<tr>
<td>Vision Video or Hollywood Video</td>
<td>Outdoor Theater</td>
</tr>
<tr>
<td>Bulldog Sporting Goods</td>
<td>Court Sports</td>
</tr>
</tbody>
</table>

Synthesis Map

Combining the parking analysis and the recreation analysis creates a combined map that can inform REPL design. This map, shown in Figure 5.8, illustrates zones that are appropriate for both parking and REPL activities.

Design

The site analysis information contained in the synthesis map was use to generate a sample REPL design for the site. The proposed redesign is illustrated in Figure 5.9. It features a multi-use track through the parking lot that may be used for pedestrian circulation or as a track, playground space for children near both major grocery stores, picnic space, athletic spaces, a scenic pond, and a community garden. Note that several access points have been added to the main road through the site.
Figure 5.8 - Synthesis Map

Notes:

The road cutting through the parking lot should be reworked. It is not aligned well, which is a safety hazard. Furthermore, it is not pedestrian friendly.

College Station Shopping Center lot needs more landscaping.

Picnic opportunities behind the fast food restaurants lining Barnett Shoals Road should be considered.

Look for opportunities for play areas near the grocery stores.
SUMMARY:
1659 Parking Spots
212 Multiple Use Spaces

Figure 5.9 - Proposed Redesign
This is intended to slow traffic on the road, which currently is used as a through road. For the purpose of this design the road is intended to function as a shared street that accommodates pedestrians and cyclists. Traffic calming measures like pinch points and road humps would also be useful to help reinforce the mixed use nature of the space.

**Athletic Courts**

The design features two basketball courts and a tennis court. These facilities are available year round during portions of the day when the whole court space is not needed for parking. This mechanism is achieved by striping parking spaces as a recreation zone. Recreation zones can be striped with a different color of paint that indicates that cars should only park in the space if other spots are unavailable. The courts could be formally closed during periods of high parking like Christmas, Thanksgiving, or the first week back to school for the college students.

In order to provide safety for court users and for nearby motorists, landscape islands buffer the basketball courts from adjacent parking. The courts are located in the remote part of the Kmart lot for two reasons: this portion of the site receives less use than the adjacent grocery store, which would allow more time for recreational use, and the College Station Shopping Center lot needs to increase the portion of the lot that is landscaped, so the landscaping surrounding the courts would significantly improve the parking lot.

While landscape islands are deemed sufficient barriers to trap basketballs, the tennis court would need

![Figure 5.10 - Tennis Court Plan](image)
to be fenced to keep balls in the court. The tennis court is located near a restaurant (currently vacant). As restaurants have strong peak parking times corresponding with meal times, the court could be formally closed at those times, but available during large portions of the day. Figure 4.10 in the previous chapter shows a perspective view of a parking/basketball court. Figure 5.10 and Figure 5.11 show the striping and dimensions of the plans for the tennis and basketball courts. In both cases, the parking stalls are 9’ by 18.4’ with a 24’ two-way aisle.

**Multi-use Track**

The multi-use track provides an aesthetically appealing walking circuit that can be used by staff, residents, and shoppers alike. The track can be used for walking, jogging, skating, and cycling. The current design of the lot poses several challenges for pedestrians, especially the lack of sidewalks. There are no sidewalks connecting College Station Square and Georgetown Square and only two of the entrances from the street have sidewalks. The path of the proposed new track is shown in Figure 5.9. The track both joins the recreation facilities in the parking lot and provides access to the lot from the street.

Several portions of the track are dual use zones and overlap with parking spaces. These spaces are considered overflow parking and motorists should not park in these areas if other spots are available. These portions of the track are street adjacent and shared street design principles should be used in these areas. Where the track
crosses driving lanes exiting restaurants, different paving materials should be used to alert motorists that they are crossing a pedestrian zone. In the case of intersections with access streets, raised crosswalks should be used. As for paving the track itself, a material other than asphalt should be used. This will increase the visibility of the track and remind drivers that parking spaces located on the track are for overflow use only.

**Publix Playground**

This playground space would be available most of the year, but converted into parking for the holiday season from Thanksgiving until the New Year. Figure 5.12 illustrates the current conditions of the proposed site. The location for the playground was selected due to its proximity to Publix, which is a primary destination for those with children, and due to the reasonably protected nature of the location (no through traffic). The surface would need to be modified during the play season to a play appropriate surface. Given that the site would not receive a lot of parking activity, soft porous paving surfaces would be an option. For instance, wood chips could be used and

![Figure 5.12 - Current Conditions of Proposed Publix Playground](image)

Source: Author
installed at the beginning of the play season. However, as wood chips would be packed and displaced when the lot was used for parking, it would be essential to replenish the surface prior to resuming play activity.

Play equipment would be present for 11 months of the year. During this time, bollards could be used to signal that the lot was unavailable for parking. Additionally, a playground zone sign would remind motorists that children are playing in the area. Additionally, a “Playground closed, parking available” sign could be posted in December. Figure 5.13 shows a perspective of the proposed playground. Although this illustration depicts conventional play equipment, easily removable options should be considered. For instance, Kaboom’s Imagination Playground equipment, described at http://imaginationplayground.org/, features large, movable blocks that allow children to construct their own environment (see Figure 5.14). Another product useful for REPL designs is Kompan’s Freegame™ described at http://www.kompan.us/sw53851.asp. This is a flexible court structure that supports a variety of different sports.
Kroger Playground

This playground space is intended for reuse on a daily basis. As such, playground components must require no conversion to become available parking. Appropriate components include elements like spray park, painted games like hopscotch, or using the space for riding tricycles. The proposed design presented here calls for a small spray park in the Kroger playground. Due to the hot weather in Athens, water play is especially attractive in the summer. Given the absence of students and the subsequent decline in use of the parking lot over the summer months, the spray park could potentially be open all summer. Once the students returned, it could be open in the mornings and closed in the afternoon and evenings when parking needs increase. It would be closed in the winter when it is colder, leaving the spaces fully available for the peak retail times near Christmas.

In order to manage safety concerns, this space would be officially opened and closed. When the spray park was open, a physical barrier would restrict car traffic in
the area. When the spray park was closed, the water would be turned off, so the space would no longer be an attractive play space. Note that the play area is surrounded by islands. Shade and seating should be provided so parents can comfortably supervise children.

**Pond**

A stormwater detention basin exists on the site behind Georgetown Square. The current installation is fenced and inaccessible. However, with some modification, the basin can actually become a feature for the site, providing a scenic location on the multi-use track and a secluded picnic space. The location is very quiet as it is behind the Publix and removed from most of the activity on the site. As such, it has the potential to be a peaceful retreat. Proposed changes include removing the fence around the site, wrapping the multi-use trail around the basin, and enhancing plantings to create a more park-like atmosphere. Figure 5.16 shows a rendering of the reworked pond area.

**Picnic Space**

Picnic spaces are located along the walking track at various locations, both near recreation spaces and restaurants. A few of the newer fast food restaurants have patio
spaces, but most of these spaces are close to Gaines School Road and have significant traffic noise. The proposed new picnic spaces are located on the interior portion of the lot. None of the sites specified in this design are located in dual use zones as there was sufficient space available without needing to use parking spaces. However, seasonal picnic areas are a possibility for parking lots with less available space. Certainly, the large space containing several picnic sites that is located near Publix could be surfaced with turf and used as overflow parking if additional parking in the lot was required.

**Community Garden**

The proposed community garden would be located adjacent to the Kmart gardening center, providing a potential economic benefit to the retailer. The garden would be created from stackable square foot gardening beds. Square foot gardening is a popular style of gardening that promotes intensive planting in small beds. This style of gardening is appropriate for REPL use because the beds can easily be removed and reconfigured. Additionally, the small, clearly delineated plots that this kind of gardening promotes is a good style for a community garden. Figure 5.17 shows a sample square
foot gardening bed. These beds could be laid out for the gardening season. They could be constructed to stack so they could be put away to make room for parking during the holiday season. There are a number of square foot gardening products currently available, including gardening beds on wheels that would facilitate flexible configuration of the space. The garden layout illustrated in the proposed redesign consists of 4’ by 4’ gardening beds with 3’ aisles separating the plots, but a number of different layouts and bed sizes are possible.

Irrigation issues would also need to be addressed. The potential for rainwater collection from adjacent buildings is a possibility. The community garden would be primarily intended for residents of the adjacent neighborhoods and for employees. It is a particularly nice feature for staff who have an interest in gardening. They would have the opportunity to visit their community garden space regularly, without generating additional automobile traffic and could tend to their garden plot on their breaks.

Reflections

The purpose of the demonstration design was two-fold: to present an example of a REPL and to serve as an exercise to increase understanding of REPL design. In creating a design for this site, several generalized lessons on REPL design became apparent:

1) Overflow parking is very appropriate for seasonal REPL use. Overflow parking is, by definition, rarely used for parking purposes and thus has high availability for recreation activities. Additionally, due to the infrequent use for parking, a greater option of surfacing materials exists, which corresponds to a greater number of potential
recreational uses. Finally, overflow parking often exists somewhat removed from regular parking, which provides a buffer zone required for most REPL components.

2) Spaces that exhibit strong peak period use are often compatible with asphalt REPL activities. For instance, church parking lots or restaurant parking lots tend to be either full or largely empty. These spaces have defined periods of availability for recreation. The lull in use provides the necessary safety buffer.

3) Larger lots will tend to provide greater flexibility in creating REPL components. Combining several parking lots can be useful. Very small parking lots will have very small amounts of reusable space and will severely limit the kinds of recreational amenities that can be provided. Features like the multi-use track in the sample design require a large amount of space.

4) Small parking bays that have no through access and are human scale are excellent locations for REPLs if they have appropriate periods of availability.

5) REPLs would benefit from additional products designed specifically for REPL use. These might include items such as alternative surfaces designed for play and parking or equipment designed for temporary installation and storage.

Summary

Table 5.3 shows a summary of the suggested modifications for a REPL redesign of the parking lot. Overall, the redesign of the lot calls for a similar number of parking spaces—the current design has 1664 parking spaces and the redesign contains 1659, 212 of which are designated for dual use. The redesign, in addition to continuing to meet parking requirements, provides recreational opportunities for nearby residents, shoppers, and staff. It also provides aesthetic improvements and interest to the parking space, transforming it from urban dead space to living space.
Table 5.3 - Summary of REPL Modifications

<table>
<thead>
<tr>
<th>Activity</th>
<th>Reuse Type</th>
<th>Management</th>
<th>Intended Audience</th>
<th>Reused Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletic Courts</td>
<td>Daily</td>
<td>Self-Managed, Colored Striping, Signage</td>
<td>Adjacent neighborhood residents</td>
<td>19105 sq. ft. 72 parking spaces</td>
</tr>
<tr>
<td>Multi-Use Track</td>
<td>Self-Managed</td>
<td>Staff, residents, shoppers</td>
<td></td>
<td>105 parking spaces</td>
</tr>
<tr>
<td>Publix Playground</td>
<td>Seasonal</td>
<td>Signage</td>
<td>Shoppers, residents</td>
<td>4109 sq. ft. 13 parking spaces</td>
</tr>
<tr>
<td>Kroger Playgournd</td>
<td>Daily, Weekly, Seasonal</td>
<td>Colored Striping, Signage</td>
<td>Shoppers, residents</td>
<td>3811 sq. ft. 10 parking spaces</td>
</tr>
<tr>
<td>Picnic Spaces</td>
<td>N/A</td>
<td>N/A</td>
<td>Shoppers, staff</td>
<td>N/A</td>
</tr>
<tr>
<td>Pond</td>
<td>Environmental</td>
<td>N/A</td>
<td>Shoppers, staff, residents</td>
<td>N/A</td>
</tr>
<tr>
<td>Community Garden</td>
<td>Seasonal</td>
<td>Signage</td>
<td>Residents, staff</td>
<td>2736. sq. ft. 12 parking spaces</td>
</tr>
</tbody>
</table>
CHAPTER 6
ADVANTAGES AND DISADVANTAGES OF REPLS

Recreation Enhanced Parking Lots (REPLs) provide different advantages and disadvantages than both traditional parking lots and traditional parks. Although, given the absence of built REPLs to evaluate, it is not possible to provide an observation-based evaluation of REPLs. However, existing research and an understanding of REPL design and intent can be used to discuss the advantages and disadvantages of REPLs. This discussion is beneficial in several ways. Importantly, it contributes to a general understanding of REPLs and when they are appropriate and when they are inappropriate. The discussion also serves as a starting point for evaluation of built REPLs, defining areas of concern, and establishing areas for further research.

The first area of discussion is the impact that conversion of a parking lot to a REPL has on the parking lot. This is a primary concern as it is important to ensure that the parking lot continues to serve the function of providing parking effectively. Additional areas of discussion include the impact of conversion on the associated business, on the environment, and on urban recreation.

Impacts For Parking Users

REPLs stand to benefit parking lot users in a number of ways, including providing aesthetic improvement to the lot, improving safety, and improving circulation. However, introducing an additional area of functionality into the lot also requires additional management and increases the complexity of parking. There is a high onus of responsibility on the designer to generate a successful design that realizes potential benefits and minimizes potential drawbacks. A poor design will result in insufficient parking space, conflict between recreation and parking uses, increased maintenance
issues, and increased hazards in the lot. Alternatively, a strong design will provide the benefits detailed in this section and result in an improvement in the livability and utility of the lot.

**Advantage - Aesthetic Improvements**

Parking lots are traditionally considered to be devoid of aesthetic value. They have been characterized as "dead spaces plagued by visual monotony" (Miller, 22) and "bleak, unaesthetic, and insensitive to the landscape" (Franklin, 21). REPLs are likely to be more visually pleasing than standard parking lots for several reasons. They are likely to have additional vegetation relative to standard parking lots, which most people find attractive (Forsyth and Musacchio, 39). The extra vegetation results from the fact that many recreation needs require vegetation to provide shade, aesthetic appeal, or to provide screening. For instance, if a REPL integrates a sport that involves a ball, vegetation might be used to contain the ball in a specific area. While some of these vegetation needs may be satisfied using existing landscaping requirements for parking lots, some will involve additional plant material.

Another aesthetic improvement can be realized by using functional elements of the parking lot, like areas for stormwater detention or retention, as a recreation feature. Rather than fencing off stormwater management areas, such areas can be landscaped and surrounded by walking paths. The potential to use stormwater management as an aesthetic part of the landscape is discussed in detail in Shinde's thesis, *Multi-use of Stormwater Detention Ponds in Parks and Open Spaces*, Shinde states that efforts to detain stormwater

...usually take the form of detention ponds or structures in open spaces that are sometimes covered or fenced off and are considered an eye sore. They are often not very popular within communities. It is beneficial to make the hydrological system a part of the space not just physically but also socially. Stormwater if treated in a appropriate way can provide amenities in communities, especially when it is incorporated in open space and recreation grounds. It can have multiple functions like water
quality enhancement, wildlife habitat and flood control while providing aesthetic value and community recreation. (2)

Figure 6.1 illustrates a typical stormwater management basin that is an eye-sore. It is surrounded by a poorly maintained fence, contains a lot of litter, and detracts from the urban landscape. Figure 6.2 shows a space where more attention has been paid to aesthetics. The area is not fenced, has some landscaping, and a viewing platform has been incorporated. Given the general affinity that people have for water, transforming stormwater management areas of REPLs into park features is a good idea that will increase the aesthetic appeal of the parking lot and address the visual monotony.

In addition to inclusion of directly appealing elements like increased vegetation and stormwater improvements, the addition of recreation features will also add visual interest to parking lots. People find other people and activity to be interesting. Thus,

Figure 6.1 - Typical stormwater management, Piggly Wiggly, Athens, GA.
Source: Author
users of the REPL can watch those who are involved in recreation, rather than focus on endless rows of parked cars.

Advantage - Safety Improvements

Crime in parking lots is an on-going concern. According to the U.S. Department of Justice, approximately 40% of all violent crimes reported in 1994 took place in parking garages and lots (Childs 165). Similarly, crime is also a large concern in parks (Forsyth, 83). One of the big advantages of REPLs, is that they have the potential to reduce crime in parking lots and their associated recreation facilities because REPLs intrinsically limit opportunity for crime. This is evident through examining REPL design in the context of the principles of Crime Prevention Through Environmental Design (CPTED).
CPTED is a set of principles and techniques for designing in such a way as to
deter criminal behavior. CPTED proposes that crime can be reduced in a number of
ways, including providing natural surveillance, natural access controls, natural territorial
reinforcement, maintenance, and activity support that promotes the presence of people.

Natural surveillance refers to design techniques like placing building windows
so that public spaces can be observed. Essentially, increased surveillance increases
the chance that the perpetrator of a crime will be seen and thus be more likely to be
apprehended or will elect not to commit the crime in the first place. This technique
was first proposed by Jane Jacobs in *The Life and Death of Great American Cities* in
the context of creating safer streets. According to Jacobs, people can not be forced
to survey areas, but locating mixed uses in a space naturally results in users who will
provide surveillance as part of their regular routine. Indeed, increasing surveillance
is a common technique for reducing parking lot crime and many lots hire an attendant
or majordomo who is physically present on the site to increase safety (Childs, 171).
However, in many cases it is not financially feasible to provide a dedicated person to
supervise a parking lot. REPLs can achieve many of the benefits of having a parking lot
attendant without the cost of a full-time attendant. Essentially, the space is safer than
either a dedicated use parking lot or a dedicated use park, because the two uses are
combined, resulting in additional people using the space. Employees and customers
of the associated business provide additional surveillance for recreation users and the
recreation users watch over the parked cars.

Natural territorial reinforcement refers to designing spaces so that they appear
to be owned, based on the premise that spaces without ownership tend to attract
crime. One of the key components in having a space feel owned is to keep the space
maintained. In most cases, REPLs will be owned by the associated business. This
means that, unlike some parks that end up with an abandoned appearance, REPLs will
have an owner with a vested interest in keeping the space looking maintained, owned, and orderly.

Although criminal activity is often the focus of safety discussions, parking lot safety, like park safety, encompasses two distinct areas: management of crime and management of accidents and hazards. It is unclear at this point how REPLs will impact safety with respect to accidents and hazards. Increased maintenance intrinsic in REPLs should reduce or eliminate some hazards. For instance, areas that support court sports will require more surface maintenance than a traditional parking lot would require. A pothole that might not be repaired in a parking lot would be fixed if it is part of a tennis court.

REPLs may also increase risk. A REPL will introduce additional users to the parking lot and in some cases those users may be participating in activities that can create hazards. For instance, a game of basketball will introduce the possibility of an escaped ball rolling into traffic. An argument could be made that the additional people and activities will increase accidents due to increased opportunity. While this seems reasonable on the surface, it may not be correct. There is some evidence that the safest streets are actually those that have an increased number of obstacles. Research on forgiving roads, illustrates this point. Forgiving roads are built with the assumption that drivers will make mistakes and vehicles will crash, and that we should engineer roads so that the consequences of crashing are reduced. For instance, if you remove trees, utility poles, and other obstacles from the side of the road to create a clear zone, a driver who goes off the road will not crash, but rather be allowed to stop naturally. However, data indicates that forgiving roads actually have more crashes and fatalities (Vanderbilt, 206). It has been suggested that forgiving roads are actually permissive roads, allowing motorists to travel faster and pay less attention to their surroundings. One hypothesis on the increased safety of traditional roads is that drivers are aware of the increased number of hazards and drive more cautiously. This theory is also
supported by research into shared streets that combine pedestrian and automotive use that have repeatedly been shown to be safer than traditional streets (Southworth, 118). As such, it seems possible that REPLs may actually be safer than traditional parking lots. Researching safety should be one of the first priorities in evaluating built REPLs.

**Advantage - Circulation Improvements**

REPLs are also likely to have improved circulation compared to traditional parking lots. While some standard parking lots have effective pedestrian circulation, many do not, and it can be difficult to navigate such lots unless one is in a vehicle. Generally, pedestrian circulation is only considered from the standpoint of moving people from the parking lot to the business. Designing a REPL implicitly requires a wider consideration of pedestrian factors, including circulation to the recreation elements within the lot, connectivity to the surrounding areas, and the interface between pedestrians and vehicles within the space. Although a REPL is not guaranteed to have better circulation, detailed consideration of circulation is a significant part of the design process and the increased attention in this area should result in more functional designs.

**Disadvantage - Increased complexity in parking**

Transforming some of the spaces in a parking lot into dual use zones means that certain parking spaces will not always be available. This constitutes an extra consideration for drivers who are parking their car. In observing flow in parking lots, it is not uncommon to see a motorist attempt to pull into a parking spot only to realize that it is a restricted space: either an accessible space, a reserved space, or some other designated use like an expectant mother space. The motorist then reverses and continues to search for a spot. Clearly, REPLs have the potential to increase misidentification of parking spots, although REPL spots are unlikely to be located in the most desirable parking areas, so they should have less of an impact in this way
than accessible parking spaces do. In addition to increasing the complexity of finding a parking spot, REPL design may result in more circuitous parking routes, and increased pedestrian traffic in the lot. While these factors may or may not increase safety, they will certainly increase the complexity in the lot and require drivers to pay close attention while finding a parking spot.

**Impacts For Recreation Users**

This section discusses the potential impact of REPLs on people who use the recreation features of REPLs. Recreation provides numerous health benefits and REPL users stand to realize these benefits the same way they would if they were to engage in recreation at another venue. However, REPLs specifically encourage a different model of recreation that provides unique benefits. Traditional parks and fitness facilities are designed to support dedicated trips for recreation purposes. REPLs are designed to encourage integration of recreation into daily activities. For instance, a community garden in a REPL could encourage employees to use their breaks for small amounts of gardening. By integrating opportunities for active and passive recreation into the places we visit on a regular basis, we are making it feasible for people to enjoy recreation as part of their daily routine. This has the potential to have health benefits to users and to make the city a more child friendly environment.

**Advantage - Health benefits**

Studies show that access to parks and other recreation facilities result in increased exercise (Sherer, 14) and exercise has been proven to have a multitude of health benefits (*Physical Activity and Health*, 4-8). As exercise levels have reached alarmingly low levels, with only 25% of adults getting the recommended level of exercise (Kahn, 73), finding ways to encourage physical activity has become a public health priority. One of the top priorities of the government's Healthy People 2010 initiative is to
increase exercise levels and they are actively studying ways to encourage people to get more physical activity. REPLs can be part of the solution to this problem. They are, by nature, conveniently located. The intent is to bring the parks to where the people are, thus increasing access to recreation. The potential for REPLs to modify our recreation style is another priority area that should be studied in the built environment.

Advantage - More child friendly city environment

The change in recreation model discussed above is particularly important with respect to children. According to Louv, author of *Last Child in the Woods*, “the childhood link between outdoor activity and physical health is clear” (Louv, 47). CDC data indicates a 36% increase in the number of overweight children between ages two to five from 1989 to 1999 (Louv, 47). Louv argues that increased exposure to nature is key to increasing children's physical activity levels and mourns the loss of open land as part of the childhood playscape. While it is important to examine techniques for increasing children's exposure to nature, it is also important to recognize the reality of the increasingly developed nature of our cities. We live in the "most auto dependent, car-adapted, and mileage-happy society in the history of the planet" (Vandenburg, 15). REPLs are an opportunity to mitigate the impacts of development on children—just because we lose the nature does not mean we need to lose the opportunity for children to engage in physical activity. By accepting the reality of the changes to our built environment and by planning our parking lot development to integrate play activities, we can reintroduce opportunities for children to be active.

REPLs encourage frequent, short play opportunities. This is particularly well suited for children as they tend to have shorter attentions spans and require frequent breaks from activities. As such, REPL style recreation may actually meet the needs of children more effectively than a single longer visit to a traditional park.
Disadvantage - Design Restrictions

REPL design is more restricted than the design of a traditional park. The kinds of recreation activities that can be incorporated depend on the conditions of the site, the parking profile, and the associated business use. Depending on the recreation needs of the community, a REPL may not be able to meet both parking and recreation needs. This is particularly evident if the community wants amenities like nature trails that are incompatible with REPLs. In cases where REPLs supplement existing traditional parks, this is unlikely to be an issue, but if a REPL is the only recreation facility it may be less successful than a traditional park in satisfying diverse user requirements.

Disadvantage - Availability Restrictions

In addition to restrictions on the design of recreation facilities, REPLs also have use restrictions. By definition, they are part time facilities. As with current shared parks, like schoolyards, the part-time nature of the facility restricts usage and provides less access to recreation than a full-time park. The extent to which availability impacts the function of the park depends on the sort of REPL facilities. If REPL use is scheduled, like a church that has recreation available all days but Sunday, the REPL will be able to function like a neighborhood park. However, if recreation facilities are available on an unpredictable schedule, which is to say they can be used if no one is parked there, the facility is fundamentally unsuitable as a neighborhood park. Facilities of this nature should only ever be considered as a supplement to existing recreation facilities with more predictable availability.

A better understanding of the exact impacts of availability restrictions is another interesting area for further research. In particular, it would be useful to determine the cost effectiveness of REPLs. Do they get fewer users per dollar spent because of reduced availability, or do they get more users because of increased exposure? An
examination of this issue is critical to understanding whether REPLs are economically reasonable and would be useful in determining reasonable budgets for REPL facilities.

Disadvantage - Exposure to pollution

One other potential disadvantage that will need to be evaluated is the potential for increased exposure to pollution in REPL parks versus traditional parks. Pollution impacts people by causing health problems, limiting enjoyment of parks, and obscuring scenic views in larger parks. While exposure to a pollution is an issue in all parks, REPLs may present an increased risk for exposure to pollution due to their proximity to developed areas and close association with automobiles. Outdoor exercise can be complicated by high levels of air pollution and result in health complications in some individuals. In particular, automobiles emit carbon monoxide. Carbon monoxide levels tend to be highest near the source, and for that reason it is not recommended to exercise in heavy traffic areas.

One way to examine this issue would be to look at studies that examine the impact of air pollution on cyclists, as cyclists are often exercising in traffic heavy areas. Several studies have shown that air pollution is significantly increased in traffic areas compared to park areas. For instance, Bevan found that exposure to respirable particles in Southampton (UK) was about nine times higher when cycling along a busy city center street versus cycling in parkland. This indicates that, with respect to air quality, traditional parks are preferable venues. However, to keep matters in perspective, a study in Copenhagen found that, even after taking the increased respiration rate of cyclists into consideration, car drivers seemed to be more exposed to airbourne pollution than cyclists (Rank et. al). Thus, pollution levels in a REPL, while higher than traditional parks, are not higher than levels we are regularly exposed to as we commute through the city.

This is another area where significant research is needed. While air pollution levels in traditional parks are likely to be lower than in REPLs, it is important to
remember that the alternative to a REPL may not be a traditional park. For instance, if the user is an employee taking a break from work, they would be unable to access a traditional park. In cases such as this, air quality comparison between REPLs and traditional parks are not meaningful. Meaningful data in this area needs to consider what activity a visit to a REPL is replacing, what the air quality associated with that activity is, and whether the REPL activity involves health benefits from exercise that might otherwise not take place.

Impacts for the Environment

Advantage - Decreases amounts of driving

Our dependence on driving has been linked to a number of environmental problems, including greenhouse gas emissions, depletion of natural resources, and air and noise pollution. As such, design solutions that can decrease car travel are beneficial to the environment. REPLs have the potential to decrease driving to parks in two ways. First, implementing a REPL infrastructure increases the number of recreation areas and thus more people will be within walking distance to a recreation area, eliminating the need to drive to visit a park. The potential for this will be illustrated in the discussion of REPL networks in Chapter Seven. Second, REPLs allow those who drive to a location to take advantage of recreation features there, eliminating the need for a dedicated trip to a park. Thus, while driving is still a component of visiting a park, the total number of miles travelled has been reduced.

Advantage - Decreases amount of impervious surface

REPLs could also benefit the environment by freeing up space in traditional parks that are used for impervious surface activities. Impervious paved surfaces are detrimental to the environment in a variety of ways, resulting in stormwater runoff problems, declining vegetation, poor water quality, and urban heating (Ferguson, 1). Current parks, especially athletic style parks that contain amenities like basketball and
tennis courts, can contain a significant amount of impervious surface. One solution is to move such facilities from traditional parks to REPLs. As REPL surfaces must generally be paved and level to meet parking requirements, they are good candidates for dual use with court sports. If these activities can be feasibly relocated to areas that are already paved, space in current parks can be freed up for more environmentally friendly amenities. While the reuse of the existing park space also depends on the needs of the park users, the potential for more naturalistic designs that provide more urban vegetation and increases wildlife habitat patch sizes exists.

**Advantage - Encourages environmentally sensitive parking lot design**

Inclusion of recreation elements in the design may result in more environmentally sensitive designs. For instance, one of the issues that REPLs must address is keeping clean recreation surfaces. Parked cars may have leaks that will spill substances like oil, antifreeze, grease, and metals onto parking surfaces. Part of REPL operation will require cleanup of these substances, which, if done appropriately, has an environmental benefit. Additionally, as mentioned earlier, REPLs may require additional vegetation to create shade, improve aesthetics, or to delineate activity areas. Additional vegetation contributes positively to the environment by improving air quality and reducing urban heat island effects. REPLs may also encourage the use of grass areas in overflow parking. Grass is a recreation surface of choice, and can be used as a parking surface in areas that are used infrequently. As a pervious surface, grass provides a stormwater benefit by reducing runoff. The extent of environmental benefits realized by REPLs vary greatly depending on the design and function of the space.

**Impacts for the Associated Businesses**

REPLs have the potential to provide economic benefits to businesses, but they also introduce increased construction and maintenance costs, and increased liability. While REPLs provide many overall benefits to the community, depending on
the cost factors involved, various incentives may be needed to make REPLs practical for businesses. These might take a monetary form, like a tax rebate for hosting a REPL. Alternatively, a mechanism to rent parking lot space to the park system might be devised. Such a measure could generate some revenue for the business and also provide some liability protection.

**Advantage - Economic benefits**

Business stand to benefit from well designed REPLs. A REPL is a feature that can draw customers to the area and stimulate economic activity. For retail establishments, recreation features draw additional people to the area and these people are potential customers. For office environments, where REPLs contributes to the quality of life of employees, the existence of the REPL is an employment perk that may help attract quality employees. In cases where the REPL increases activity levels, associated health benefits should result in fewer sick days and overall reduced medical expenses, which also benefits the employer. Finally, opportunities for economic benefit in areas like advertising or public relations may also present possibilities.

**Disadvantage - Increased construction and maintenance costs**

Increased construction costs may stem from the cost of providing recreation facilities, such as a children's playground, basketball hoops, or picnic tables. Additionally, there may be additional construction costs for landscaping including increased material, installation, and irrigation costs. Enhanced parking lots may also require additional features such as signs or traffic calming features that involve a greater initial investment. The extent of these increased costs will vary greatly depending on the design. For instance, including a hopscotch space in one parking stall would involve very minimal cost, while including a splash park would be considerably more expensive.

Increased maintenance cost over a traditional parking lot can be also expected. Typical park maintenance activities relate to three areas: human activities, ground
and surface conditions, and vegetation (Forsyth and Musacchio, 88). REPLs can be expected to increase costs and work loads in all three areas. Litter, trash collection, and repair of REPL equipment will increase maintenance costs. Additionally, some work may be involved in mediating between parking and REPL activities. For instance, if a retail facility sets up a playground for eleven months of the year, there will be labor involved in the seasonal setup and removal of the play facilities. Ground and surface conditions will also require maintenance. While traditional parking lots require this kind of maintenance, surfaces for recreation may need to be maintained at a higher level.

Disadvantage - Increased liability

Finally, liability is certain to be a concern for business owners. Introducing additional activities into the parking lot involves an obligation to ensure that the design and operation of the activities illustrate a reasonable standard of care. While examining potential solutions to this issue is beyond the scope of this work, it is unquestionably and important issue that would need to be addressed for REPLs to become a reality.

Impacts for the Park System

Implementation of a system of REPLs has the potential to benefit a park system by providing additional recreation facilities, reducing land acquisition costs, and potentially reducing the maintenance load on recreation staff. Ideally, park staff and business owners would collaborate on the creation, construction, operation, and maintenance of REPLs. This would allow for effective planning of facility distribution so that REPLs can be introduced into areas that most need them. Additionally, it capitalizes on the expertise of recreation staff in designing and operating the facilities. It may allow businesses to include features that they may not have the expertise or equipment to maintain, but which are feasible with the assistance of the parks department.
**Advantage - Increased access to recreation facilities**

The main benefit of including REPLs in the park system is that they have the potential to increase user access to recreation facilities. REPLs can increase access in two important ways: increasing the number of facilities and siting facilities in areas where people are. Further details on how this improves access will be discussed in chapter seven. The increase in the number of facilities is possible due to the fact that REPLs assume some shared costs with the associated businesses. In particular, avoiding the cost of land acquisition for a dedicated park is especially important.

**Disadvantage - Issues relating to mixed public/private ownership of recreation facilities**

Assuming responsibility for REPLs is shared in some way between business owners and park and recreation staff, there may be some ramifications with respect to the mixed public/private nature of REPL facilities. At least some portion, if not all, of a REPL is likely to be privately owned. This introduces management complications. Can owners refuse certain people access to the recreation facilities? Certainly, homeless populations are current users of public parks and it is probable that business owners are likely to object to a large contingent of homeless users in their parking lot. However, attempts to implement privileged access to city recreation facilities is not acceptable. Another area of concern is advertising. Business owners are quite likely to engage in advertising for their own business, and if their parking lot becomes popular, they may sell advertising space within the lot. While this is a common and accepted business activity, there are those who would object to advertising in a public park. Finally, in the event that a business goes bankrupt, the parking lot are recreation facility may become largely abandoned which nullify several REPL benefits. The city would require a mechanism for handling such cases.
Conclusion

This chapter has outlined expected advantages and disadvantages of REPL implementation. An effort was made to consider impacts from a variety of perspectives: that of parking users, recreation users, the environmental impact, the associated business, and the park system. The purpose of the discussion is both to further an understanding of the potential of REPLs and to identify areas that require further research.
CHAPTER 8
CONCLUSIONS

The question this thesis seeks to address is "how can we improve urban access to recreation by leveraging existing parking infrastructure?" Answering this question required examining how to create individual Recreation Enhanced Parking Lots (REPLs) and analyzing how the creation of many REPLs within a city would impact urban recreation opportunities.

Investigating the creation of individual REPLs required researching parking design guidelines, park design guidelines, and shared street design guidelines. This information was synthesized to produce REPL specific guidelines, which were presented in the chapters on site selection and design considerations and then applied to an actual site.

Suitability of sites depends on the associated business use, the site characteristics, and the urban context of the site. Some sites, such as those that are too loud, too polluted, adjacent to undesirable business uses, or unlikely to be accessed by people interested in recreation are inappropriate for REPL use. Sites with sufficient space, with appropriate parking patterns to accommodate recreation, and that are located in highly accessible areas are desirable sites.

Design of the REPL itself must meet parking, recreation, and environmental criteria. Additionally, REPL design must address issues of aesthetics and scale to create a park-like ambience that fosters many of the benefits of parks, including increasing social interaction and physical activity. Designers must consider appropriate control mechanisms to mediate between parking and recreation activities, lot layout, circulation, entrance treatments, site furnishings, and vegetation.
A comprehensive demonstration design for Georgetown Square and College Station Shopping Center in Athens, GA was presented. This work demonstrates the principles of REPL design and provides a concrete example of how a REPL would look and function. Work on the sample design also furthered understanding of how to design REPLs. It became apparent that larger lots tend to create greater design flexibility, overflow parking provides good opportunities for REPLs, and that flat, paved areas with high parking turnover are appropriate for court sports. Additional demonstration designs for other sites would increase knowledge of the REPL design process.

Once a clear definition of REPLs was established, it became possible to examine what impacts the large scale implementation of REPLs within a city. The advantages and disadvantages of REPLs were discussed and a GIS analysis of how REPL implementation would impact overall access to recreation was presented. Preliminary analysis indicates that REPLs would increase recreation access through creation of additional recreation facilities and by providing more facilities in more convenient locations. Other benefits include improved aesthetics in parking lots, improved safety from crime, better circulation in parking lots, and increased connectivity to adjoining properties. However, the work presented here is theoretical and more research in this area would be beneficial. Both the advantages and disadvantages of REPLs need to be verified through observation of built REPLs. Additionally, while research does show that increased access to recreation opportunities does result in increased recreation, the exact relationship between availability of REPLs and activity levels would require further research. It would be valuable to determine whether the increase in recreation is significant and justifies the expenditures to create and maintain facilities. It would also be beneficial to expand the discussion of how the large scale implementation of REPLs impacts the urban environment to include additional cities. This would allow the impact of city layout and zoning on the effectiveness of REPLs to be evaluated.
While considerable work remains, this thesis establishes a foundation for further research. It demonstrates how parking lots can be designed for recreation use and how they have the potential to increase urban recreation opportunities. It presents a detailed analysis of where REPLs are likely to be successful, design considerations for creating REPLs, and an analysis of the advantages and disadvantages of REPLs. Additionally, each section identifies areas that require further research.

Hopefully this area of inquiry will receive further attention, as there are a number of excellent reasons to explore this idea. First and foremost, it has the potential to provide improved access to urban recreation and extend the benefits of parks to a greater number of users. This is especially important given the current crisis regarding physical activity levels in the nation. Secondly, this idea proposes dual use of parking space which would provide both social and environmental benefits. Providing recreation amenities in parking lots will encourage social interaction between users and foster a sense of community. Dual use of the space will create a safer environment for both park and parking users, as the increased use of the space will result in increased informal surveillance. With respect to the environment, REPLs decrease the need to commute to parks by situating recreation facilities in convenient locations. Increased vegetation to support the park-like ambience of REPLs has further environmental benefits. Building or retrofitting appropriate parking lots as REPLs would complement the traditional park system and provide a variety of benefits to the community.

Finally, REPLs are a timely idea. As an increasing number of regulatory measures regarding landscaping of parking lots and stormwater management are implemented, the obstacles to developing REPLs have decreased. If one is already putting a stormwater pond and shade trees in a parking lot, why not add an adjacent walking trail with a view to pond? Just as recent trends in parking lot design have made REPLs more feasible, so have current trends in park design. Traditional park design is now focusing on establishing natural areas and moving away from expansive lawns and
paved areas which are associated with a higher environmental impact (Forsyth, et al.). This makes the reuse of parking lots, which tend to have large flat surfaces and paved areas, very compelling. They can absorb some of the activities which require the paved surfaces, reducing the need for paved surfaces in traditional parks. Finally, as the search for appropriate urban park land becomes more challenging, dual use of space is becoming necessary. All of these factors contribute to the feasibility of REPLs and make them an attractive alternative for meeting urban recreation needs.

While REPLs should not be considered a replacement to traditional parks, they can effectively complement existing facilities. REPLs can be used where land is too costly or unavailable, as a way of removing activities that require paved surfaces from traditional parks, and where business are willing to bear some of the costs of construction and maintenance of recreation facilities. REPLs are a way of meeting Jacobs’ requirement of putting parks where the people are. People will be near their cars, which is to say near parking lots, so let us put playgrounds there too.
CHAPTER 7

URBAN SCALE IMPLEMENTATION OF REPLS

This thesis addresses how we can increase urban access to recreation by leveraging existing parking lot infrastructure. This requires examining the feasibility of modifying parking lots to accommodate urban recreation, which has been explored in previous chapters, and determining how these modified facilities impact recreation overall. There are many unanswered questions in this area. How will REPLs compare with traditional parks? How would the increased convenience of REPL locations combined with fewer hours of availability impact usage? In creating a REPL network, which parking lots and/or business uses are the best candidates for conversion? Many of these questions can not be answered without built REPLs to study, but a theoretical examination of the impact of a REPL network on urban access to recreation is still valuable. This chapter presents a limited theoretical analysis of how a REPL network would impact access to recreation in Athens, GA. The study seeks to answer the following questions:

- Will implementation of a REPL network increase urban access to recreation?
- Does the distribution of specific kinds of parking lots within a city make conversion of certain lots better candidates than others for increasing urban access to recreation?
- Do REPLs tend, more than existing recreation facilities, to be located in areas where parks have greater potential for use?

While a theoretical analysis of one city has very limited scope, it is a valuable part of learning how we can evaluate whether REPLs are effective and an important part of establishing further questions for research in the area.

This analysis examines both existing and potential recreation access in one city—Athens, GA. Access is determined by examining walking distance to parks from all locations within the Athens Clarke County boundary, not just residences. Additional
analysis is performed to examine how potential and existing facilities are sited with respect to high priority areas where park usage is expected to be greater. These metrics are used to evaluate the potential of implementing REPLs to increase urban recreation.

**Methods**

**Overview**

GIS analysis in ArcMap is used to determine current access to recreation, generate several possible REPL configurations, and determine their impact on access to recreation. Configurations evaluated include locating REPLs in grocery store parking lots, locating REPLs in church parking lots, locating REPLs in all parking lots greater than 5 acres in size, and locating REPLs in all parking lots greater than 1 acre in size. Grocery stores are considered of interest as everyone needs access to groceries, and thus locating parks in proximity to grocery stores would theoretically ensure some access for all individuals. Churches are of interest because they are often located in close proximity to residential neighborhoods and have a different parking pattern than businesses. The one acre and five acre sizes were chosen arbitrarily as a starting point in examining how size relates to coverage. The following work flow was applied to each area to determine recreation access:

- **Define recreation facilities.** Define a service area surrounding the facility that is within walking distance. Two services areas, corresponding to a \(\frac{1}{4}\) mile and a \(\frac{1}{2}\) mile walking distance, are used. Walking distance calculations assume people are walking on roads.
- **Determine the total service area** by summing all service areas for a specific recreation model. Road area is not included in total coverage area. Use the area within the ACC Boundary (minus roads) to calculate the percentage of coverage.
- **Determine the intersection of the service areas with the high priority areas.** Determine total service area contained in the high priority area. Use the area of the high value property layer to calculate high priority percent coverage.

Note that when calculating the service area for a recreation facility, we are attempting to determine walking distance. However, what actually constitutes walking distance
is a heavily debated topic. Many factors, including age, ability, the nature of the route (safety, aesthetic appeal, obstacles), and the weather impact people’s choice of whether to walk. For the purposes of this research, two service area layers were calculated, the ¼ mile service area and the ½ mile service area. These values were chosen because both have been commonly identified as walking distance (Calthorpe).

**Input Data**

Input data obtained from Athens Clarke County Planning Office:

- **ACC Boundary** – delimits the region for the study
- **Parcels** – shows parcel boundaries, provides area and value of each parcel
- **Schools** – identifies locations of ACC schools
- **Zoning** – shows zoning of specific parcels. In particular, identifies areas zoned as park land.
- **RoadPavement** – area occupied by current roads
- **Roads** – existing road infrastructure used to access recreation facilities
- **Buildings** – existing area occupied by buildings
- **Impervious Surfaces** – existing impervious surface, including buildings and parking lots

Generated input data:

- **Recreation facilities** – This data was determined through examining parcels zoned as Park and cross referencing that information with facilities described on the Athens Clarke County Leisure Services website. As Leisure Services also offers part-time parks located in school lots, the relevant school sites (from the Schools layer) were added to the recreation facilities layer. Identified recreation sites include: Alps Road Elementary/Clarke Elementary, Barnett Shoals Elementary, Barrow Elementary, Ben Burton Park, Bishop Park, Burney Harris Lyons Middle School, Chase Street Elementary, Cleveland Road Elementary, Coile Middle School, Columbus Ave. Senior Center, Dudley Park, East Athens Community Center, East Athens Park, Fourth Street Elementary, Fowler Drive Elementary, Greenway, Hilsman Middle School/Gaines School Elementary.
Holland Youth Sports Complex, Lay Park, Memorial Park, North Oconee River Park, Oglethorpe Elementary, Reese & Pope Park, Rock and Shoals Park, Rocksprings Community Center, Sandy Creek Nature Center, Sandy Creek Park, Satterfield Park, Southeast Clarke Park, Timothy Road Elementary, Whit Davis Elementary, Whitehead Road Elementary, Winterville Elementary

- **Grocery facilities** – Grocery facilities were selected from Google Maps and individually examined for relevance. Only larger facilities that have substantial parking lots were selected for inclusion. Locations were obtained from Google Maps, geolocated, and imported into a point feature layer. Identified grocery locations include Earth Fare, Ingle's, Kroger (2), Piggly Wiggly (2), Publix (2), Sam's Club, Save A Lot, and Walmart.

- **Church facilities** – Church facilities were selected from Google Maps, geolocated, and imported into a point feature layer. Due to the larger number of facilities, individual verification of parking lot adequacy was not performed. Seventy-five churches were identified.

- **Parking Lots greater than 1 acre** - The parking lot layer was derived from the impervious surface layer and buildings layer. The impervious layer includes both buildings (roofs) and parking lots. First, buildings were erased from the supplied impervious layer. Only output polygons of greater than 20000 sq. ft were included in the output layer. Adjacent lots were then lumped into a single polygon using the dissolve feature. Finally, lots greater than 1 acre were selected for the 1 acre layer.

- **Parking Lots greater than 5 acres** – Steps as with 1 acre, except that lots greater than 5 acres were selected for the 5 acre layer.

- **High Priority Property** – This layer, intended to identify optimum park service areas, was derived from the parcel layer. The parcel layer includes both the area of specific parcels and the current value. The value of the land was
determined by dividing the current value by the area and determining land cost per acre. See Figure 1.1 - Determine High Priority Service Areas For Athens Clarke County. Property valued at more than $20,000 per acre was selected as high value property. The intention of defining a high priority area was to identify commercial areas and residential areas that are likely to have a significant number of potential park users. Traditional park metrics measure access for residential areas and ignore the fact that people may be available for recreation when they are not at home. The relatively low value per acre used to generate this layer reflects the intention to exclude undeveloped areas, while including most other properties. Low value property, shown in blue in Figure 1.1, was excluded from the high priority service area. From the location and the aerial photo underneath we can see that this property is generally farther from the city center and not developed. Thus, as fewer people would visit it, the need for park service in these areas is not likely to be as high as areas shown in red. Note that parcels with either an area of zero or a price of zero were excluded from the analysis and that this layer excludes roads as they are not parcels with values.

Limitations & Assumptions:
The current analysis has several limitations and assumptions:

- Identified recreation sites include Leisure Services facilities only. They do not include other areas that are used for recreation including empty lots, private parks or recreation facilities, and spaces like the UGA intramural fields. The decision to focus on Leisure Services facilities aligned with the intent of the work, to discuss how cities can provide equitable and effective urban recreation opportunities; however, the exclusion of outside facilities means that actual access to recreation is under estimated.
- In determining service areas, parks are marked where they adjoin roads as
opposed to where facilities actually exist. Markers usually lead to a parking lot—facilities are beyond the parking lot. In some cases, there is a substantial distance (which could actually exceed the service area distance) from the marker to the park facilities. Thus, in some instances, the service area may be overestimated.

• Park markers are placed where parks adjoin the road, typically in several places, to determine maximum coverage. In some cases, entrances to the park may not exist at the marked location. However, this was deemed to be an issue with the design of the park, as opposed to an issue with the location. As the purpose is to examine theoretical changes to the network, good access to all parks is assumed.

• REPL facilities only have one marker, located at the centroid of the parking lot polygon. As the design of REPLs differ greatly depending on the type of facility the parking lot serves and peak parking demand, it is impossible to delimit the recreation features within individual parking lots. However, in a 5 acre lot, they would be unlikely to take up a significant portion of the 5 acres, so it is not reasonable to use markers around the perimeter of the lot. Thus, a single marker is used, though it may result in estimating a slightly smaller service area than would exist in actuality.

• The road network does not currently contain information on roads that are not walkable.

Results

The area being examined is 121.17 sq. miles (77,550 acres) and is delimited by the Athens Clarke Country boundary. Our analysis does not include roads in area calculations, so we are actually interested in 118.27 sq. miles or 75,562 acres within the ACC boundary. Additionally, the identified high priority service area is 58.02 sq. miles
Determining High Priority Service Areas For Athens Clarke County

Figure 7.1 - High Priority Service Areas

Legend ($/acre)

- 0 - 10000
- 10001 - 20000
- 20001 - 30000
- 30001 - 40000
- 40001 - 50000
- 50001 - 100000000000

1 in = 2 miles
Figure 7.2 - Urban Recreation Locations

**Legend**
- Access Point
- 1/4 Mile Service Area
- 1/2 Mile Service Area
- High Priority Service Area
Figure 7.3 - Grocery REPL Locations

Legend:
- Grocery REPL Location
- Recreation Access Point
- 1/4 Mile Service Area
- 1/2 Mile Service Area
- High Priority Service Area
Church REPL and Urban Recreation Locations
For Athens Clarke County

Figure 7.4 - Church REPL Locations

Legend
- Church REPL Location
- Recreation Access Point
- 1/4 Mile Service Area
- 1/2 Mile Service Area
- High Priority Service Area

1 in = 2 miles
Parking Lots Over 5 Acres REPLs and Urban Recreation Locations For Athens Clarke County

Figure 7.5 - 5+ Acre REPL Locations
Figure 7.6 - 1+ Acre REPL Locations

Parking Lots Over 1 Acre REPLs and Urban Recreation Locations For Athens Clarke County
or 37,136 acres. Table 1.1 summarizes results, showing both the current area served and the area served under each of the proposed scenarios. The first row of the table shows the data for existing access to recreation. Figures 1.1-1.6 provide a graphical representation of the identified facilities and service areas.

Table 7.1 - Area and Percent Coverage

<table>
<thead>
<tr>
<th>Site</th>
<th>Service Area</th>
<th>% of ACC Area</th>
<th>Intersect Area Between High Priority Area and Service Area</th>
<th>High Priority and Service Area_intersect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 MILE SERVICE AREA RESULTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation Sites - ¼ mile (33 Sites)</td>
<td>104097663 sq. ft 2390 acres</td>
<td>3.2%</td>
<td>74998502 sq. ft. 1721 acres</td>
<td>4.6%</td>
</tr>
<tr>
<td>Grocery Sites - ¼ mile (11 Sites)</td>
<td>118895901 sq. ft 2729 acres</td>
<td>3.6%</td>
<td>86089078 sq. ft. 1976 acres</td>
<td>5.3%</td>
</tr>
<tr>
<td>Church Sites - ¼ mile (75 Sites)</td>
<td>203582206 sq. ft 4674 acres</td>
<td>6.2%</td>
<td>154379096 sq. ft. 3544 acres</td>
<td>9.5%</td>
</tr>
<tr>
<td>5 acre lots - ¼ mile (74 Sites)</td>
<td>197885408 sq. ft 4543 acres</td>
<td>6.0%</td>
<td>147604696 sq. ft. 3389 acres</td>
<td>9.1%</td>
</tr>
<tr>
<td>1 acre lots - ¼ mile (566 Sites)</td>
<td>543519798 sq. ft 12477 acres</td>
<td>16.5%</td>
<td>401248239 sq. ft. 9211 acres</td>
<td>24.8%</td>
</tr>
<tr>
<td>1/2 MILE SERVICE AREA RESULTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation Sites - ½ mile</td>
<td>269906536 sq. ft 6196 acres</td>
<td>8.2%</td>
<td>195305499 sq. ft. 4484 acres</td>
<td>12.1%</td>
</tr>
<tr>
<td>Grocery Sites - ½ mile</td>
<td>313624705 sq. ft 7200 acres</td>
<td>9.5%</td>
<td>229418796 sq. ft. 5267 acres</td>
<td>14.2%</td>
</tr>
<tr>
<td>Church Sites - ½ mile</td>
<td>496623283 sq. ft 11401 acres</td>
<td>15.1%</td>
<td>375339446 sq. ft. 8617 acres</td>
<td>23.2%</td>
</tr>
<tr>
<td>5 acre lots - ½ mile</td>
<td>505702227 sq. ft 11609 acres</td>
<td>15.4%</td>
<td>376478800 sq. ft. 8643 acres</td>
<td>23.3%</td>
</tr>
</tbody>
</table>
Discussion

The results provide data that can be used to address the questions posed in the introduction:

*Will implementation of a REPL network increase urban access to recreation?*

As the results clearly show, the addition of REPL facilities will increase urban access to recreation. This is hardly a surprising result—one would expect additional facilities to increase access in any system that was not already inundated with facilities. Additional traditional parks would also increase access. However, REPLs may be the only option in places where land values or existing development restrict the ability to develop traditional parks. Additionally, REPLs may be more a more feasible option if part of the funding to create and maintain the REPL was supplied by the business served by the parking lot. This situation is possible if businesses realize economic gains from the presence of a REPL, either through an increased customer base or through incentive programs.

*Does the distribution of specific kinds of parking lots within a city make conversion of certain lots better candidates than others for increasing urban access to recreation?*

Results from this analysis do not indicate that any one of the REPL types evaluated is a better candidate for conversion. However, the results do illustrate differences in the different kinds of lots. Churches and the 5+ acre sites provide a similar percentage of area, however, examining the service area maps show a different distribution of area. 5+ acre REPLs are noticeably clustered along Highway 78 where there is a lot of big box retail. Churches are slightly more concentrated in the downtown area. Grocery sites provide a very minimal improvement—partially because there are not very many of them and partially due to the fact that several are located near existing recreation facilities resulting in an overlap in service areas. Nonetheless, this highlights an area in the model that could use improvement. Grocery stores are excellent REPL sites due to the fact that they see a lot of throughput, meaning that a
comparatively large number of people would be served by a REPL in that location. One acre parking lot sites provide significantly more coverage as would be expected given the large number of additional sites. In fact, grocery stores, churches, and 5 acre lots provide an average of 30 acres of extra coverage per additional site (for quarter mile service areas), while the 1 acre lots provided an average of only 17 acres increased per additional site. This is due to the fact that an increasing number of sites will result in additional overlap in service areas.

While data from other cities is required to reach a conclusion on this issue, the data from this study does not demonstrate that one type of REPL site has superior coverage over another. Largely, this analysis indicates two things. First, a finer algorithm is called for that considers various other attributes of the site. Secondly, this analysis indicates how the development pattern of a city influences how useful REPLs can be. Mixed-use development that introduce parking lots in a more distributed fashion will yield better overall coverage that cities that have developed residential areas that have no parking lots.

*Do REPLs tend, more than existing recreation facilities, to be located in areas where parks have greater potential for use?*

The REPL placement models evaluated seem to provide a similar proportion of improvement in both high priority and low priority service areas. Both REPLs and existing recreation facilities have a greater representation in high priority areas as indicated by the consistently higher percentage of high priority area served. While it seemed logical that REPLs would naturally occur in greater proportion in high priority areas (due to the fact that parking is typically provided in high priority areas), this does not seem to be the case. As shown in the Table 7.2, the coverage improvement in service areas are consistent in both the high priority and entire area of ACC:
### Table 7.2 - Analysis of REPL Improvements in High Priority Areas

<table>
<thead>
<tr>
<th>Site</th>
<th>% of ACC Area</th>
<th>Improvement Compared to Existing Recreation Sites</th>
<th>% of High Priority Area</th>
<th>Improvement Compared to Existing Recreation Sites in High Priority Areas</th>
<th>Ratio of percent of ACC Area to percent of High Priority Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation Sites - ¼ mile (33 Sites)</td>
<td>3.2%</td>
<td>N/A</td>
<td>4.6%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Grocery Sites - ¼ mile (11 Sites)</td>
<td>3.6%</td>
<td>3.6/3.2 = 1.13</td>
<td>5.3%</td>
<td>5.3/4.6 = 1.15</td>
<td>1.13/1.15 = 0.98</td>
</tr>
<tr>
<td>Church Sites - ¼ mile (75 Sites)</td>
<td>6.2%</td>
<td>6.2/3.2 = 1.94</td>
<td>9.5%</td>
<td>9.5/4.6 = 2.06</td>
<td>1.94/2.06 = 0.94</td>
</tr>
<tr>
<td>5 acre lots - ¼ mile (74 Sites)</td>
<td>6.0%</td>
<td>6.0/3.2 = 1.88</td>
<td>9.1%</td>
<td>9.1/4.6 = 1.98</td>
<td>1.88/1.98 = 0.95</td>
</tr>
<tr>
<td>1 acre lots - ¼ mile (566 Sites)</td>
<td>16.5%</td>
<td>16.5/3.2 = 5.15</td>
<td>24.8%</td>
<td>24.8/4.6 = 5.39</td>
<td>5.15/5.39 = 0.95</td>
</tr>
</tbody>
</table>

The ratios are near 1. If REPLs provided a more significant improvement in high priority areas, the ratio would be higher. This indicates that REPLs do not occur naturally in greater proportion high priority areas in ACC. It should be noted, however, that modifying the value ($20000/acre) used to determine the high priority area might significantly change these results.

### Areas For Future Work

There are several ways this work can be expanded upon, including:

- Calculate a distribution metric to show degree of clustering of recreational facilities within the ACC Boundary. While an even distribution is not our goal, hence the high priority area, one could argue that an even distribution within the high priority area is desirable.
• Data for one city is insufficient. As cities differ greatly in layout, calculating similar statistics for several cities would enhance the usefulness of the work.
• Include an estimate of the number of people to visit the site as part of evaluating the desirability of a REPL. This would address the issue raised earlier regarding a grocery store REPL having greater potential to impact urban access to recreation that a REPL in an obscure 1 acre parking lot.
• Alter the model to represent part-time parks effectively. Both the current recreation sites and the proposed REPLs operate on a part time basis, making the coverage numbers presented here inflated.
• This study evaluates five recreation model options. Evaluation of additional recreation models may be warranted.
• Better model the service areas by altering the road network to incorporate information on obstacles and pedestrian-only routes. Additionally, alternative access to parks including public transportation and cycling routes impact access to recreation and could be included in the model.
• Finally, considerable work needs to be done of verifying the results of the analysis. This would involve checking the suitability of identified sites as locations for REPLs, verifying the accuracy of service area networks (are routes identified as walkable actually walkable), and verifying the validity of the high demand area.

Conclusion

This chapter presents a preliminary discussion of the potential impact of implementing a REPL network on urban access to recreation. Results clearly indicate that a network of REPLs would increase urban access to recreation. However, most significantly, the analysis frames the need for additional work in the area. In particular,
studies of built REPLs are needed to determine factors like availability and actual usage, so more accurate analysis is possible.
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